MORAVA CORRIDOR MOTORWAY PROJECT

Republic of Serbia Ministry of Construction, Transport and Infrastructure

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

NOVEMBER 2020

MORAVA CORRIDOR MOTORWAY PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

Version	Revision	Date	Prepared by							Checked by	Approved by
Draft	A.0	February 2020	T. Eser Env. Eng.	E. Kaya Sociologist	Y. Çelikel Social Expert	T. Nazlı Env. Eng.	C. Denizli Biologist	E. Okumuşoğlu Geo. Eng.	K. Ağrıman Env. Eng	D. E. Kaya Env. Eng.	G. Ozenirler Env. Eng, M.S.
Final Draft	B.0	May 2020	T. Eser Env. Eng.	A. Duman Sociologist	Y. Çelikel Social Expert	T. Nazlı Env. Eng.	C. Denizli Biologist	E. Okumuşoğlu Geo. Eng.	K. Ağrıman Env. Eng	D. E. Kaya Env. Eng.	G. Ozenirler Env. Eng, M.S.
Final	C.0	November 2020	T. Eser Env. Eng.	A. Duman Sociologist	Y. Çelikel Social Expert	T. Nazlı Env. Eng.	C. Denizli Biologist	E. Okumuşoğlu Geo. Eng.	K. Ağrıman Env. Eng	D. E. Kaya Env. Eng.	G. Ozenirler Env. Eng, M.S.

Revision Codes: A: Draft, B: Final Draft, C: Final

SE102-000-ES-REP-00002

November 2020

Client:

ENKA

Balmumcu Mah.,
Zincirlikuyu Yolu No: 10,
34349,
Beşiktaş Istanbul, Turkey

Client:

BECHTEL

11 Pilgrim Street
London
England
EC4V 6RN
United Kingdom

Client:

КОРИДОРИ СРБИЈЕ

KORIDORI SRBIJE LTD.
Kralja Petra 21, Belgrade
Serbia
☎: +381 (011) 3344148

Consultant:

2U1K international

2U1K INTERNATIONAL LTD.
PS 6 - 3rd Floor, The Meydan
Office Tower
Meydan Road, P.O. Box 450676
Dubai – UAE
☎: +90 (533) 283-6569

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

Page

LIST OF ABBREVIATIONS

2U1K	2U1K Engineering & Consulting Inc.
AFs	associated facilities
AoI	Area of Influence
APCV	Air Pollution Contribution Values
BEJV	Bechtel Enka Joint Venture
BT	Near Threatened
CCF	Chain of Custody Form
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
CIP	Institute of Transportation
CLC	CORINE Land Cover
CM	Construction Manager
COD	Chemical Oxygen Demand
CoS	Corridors of Serbia
CRO	Community Relations Officer
CRSD	Community Relations and Sustainability Department
DTM	Digital Terrain Model
ECA	United Kingdom's Export Credit Agency
EIA	Environmental Impact Assessment
EP	Equator Principles
EPAQS	Expert Panel on Air Quality Standards
EPR	Emergency Response Plan
ESDAC	European Soil Data Center
ESH	Environmental, Safety and Health
ESHR	Environmental and Social Human Rights
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
ESSs	Environmental and Social Standards
EU	EU European Union
EUNIS	European Nature Information System
FGD	Focus Group Discussions

GDAS	Global Data Assimilation System
GFS	Global Forecast System
GHG	Greenhouse Gas
GM	Grievance Mechanism
HS	Hydrological Station
HSEP	Health, Safety and Environmental Plan
IBAs	Important Bird Areas
IFC	International Finance Corporation
IFI	International Financial Institutions
IJC	The Jaroslav Černi Water Institute
ILO	International Labour Organisation
IPAs	Important Plant Areas
KBAs	Key Biodiversity Areas
KPs	Kilometer Points
LC	Least Concern
MIGA	Multilateral Investment Guarantee Agency
MoCTI	Ministry of Construction, Transport and Infrastructure
MSK	Medvedev, Spanheuer and Karnik
NCEP	National Centres for Environmental Prediction
NGO	Non-Governmental Organizations
NOAA	National Oceanic and Atmospheric Administration
OECD	Organisation for Economic Co-operation and Development
PAP	Project Affected People
PEMP	Project Environmental Management Plan
PM	Project Manager
PPM	Public Participation Meeting
PS	Performance Standards
RCIA	Rapid Cumulative Impact Assessment
RMHS	Republic Hydro meteorological Service of Serbia
RoS	Roads of Serbia
SAoI	Social Area of Influence
SEP	Stakeholder Engagement Plan
SMA	Stone Mastic Asphalt

TCNs	Third Country Nationals
UKEF	UK Export Finance
VECs	valued ecosystem components
VU	Vulnerable
WB	World Bank
WHO	World Health Organization
WMP	Waste Management Plan
WRF	Weather Research and Forecasting

1 EXECUTIVE SUMMARY

1.1 Introduction

This Executive Summary serves to provide an overview of the results of the Environmental and Social Impact Assessment (ESIA) studies carried out for *Morava Corridor Motorway Project* (the Project), developed by the Ministry of Construction, Transport and Infrastructure (MoCTI) and located in the West Morava Region of Serbia, is approximately a 112 km length alignment and connects the country from Preljina to Pojate.

The ESIA Report of the Project was prepared by 2U1K Engineering and Consultancy Inc. Government of Serbia is the owner of the Project (represented by the Ministry of Finance as the borrower) and the Corridors of Serbia (CoS) is the Owner and implementing entity responsible for the access to the Project site, land acquisition and expropriation. Construction of the Project will be conducted by the Joint Venture of Bechtel ENKA UK Limited (BEJV) that is called as the Contractor.

Public Enterprise Roads of Serbia (RoS) is responsible entity for operation of the Motorway which includes, maintenance and preservation, exploitation, construction, reconstruction, organization and control of toll collection, development and management of I and II category state roads in the Republic of Serbia.

The Contractor is responsible for the detailed design and construction of the motorway. Jaroslav Cerni Water Institute (JCI) is responsible for the design of the river regulation, and the Contractor is responsible for the construction. Any design changes required as a result of the ESIA studies will be incorporated into the Project as part of a Change Management Procedure to be prepared and implemented by the Contractor according to their Environmental and Social Management Systems. Also, the construction survey of the Project is still on going, in case of a change on any Project component is needed, additional social and environmental studies will be conducted accordingly as an addendum.

Last, the preliminary design and national Environmental Impact Assessment (EIA) studies for the Project were prepared for three sections by two different consultants. The responsible consultants for the Project design and national EIA studies are as follows:

- Section-1 & 2: Institute of Transportation (CIP[1])
- Section-3: Highways Institute

[1] Institute of Transportation CIP Ltd, Belgrade is a company registered with the Serbian Business Registers Agency mainly for works for Engineering services and technical consulting. CIP is responsible party for preparation of EIA Reports for Section-1 and Section-2 and the Spatial Plan.

1.2 ESIA Objectives

The aim of this ESIA study was to carry out an environmental and social assessment of the Project, document the potential environmental and social impacts associated with its construction and operation phases and provide mitigation measures to prevent, avoid, reduce or compensate for any adverse impacts.

The ESIA process started with the gap assessment phase according to the internationally accepted and implemented impact assessment procedures. The findings of the studies were documented in the Gap Assessment for the Scoping Report in April 2019 (see Appendix-1). This Report assesses the available information on environmental, social, health and safety, and public consultation in regard to national requirements, all relevant EU substantive environmental standards or directives, and IFC Performance Standards on Environmental and Social Sustainability (IFC PSs). It further assesses the extent of the risk posed by each identified gap and provides an opinion as to whether the risk issue should be further assessed and/or considered for avoidance, minimization and mitigation, and how it should be monitored.

After completion of the gap assessment phase, the following key activities were performed within the scope of the ESIA process.

- Re-definition of the Project units and activities to include project facilities,
- Identification of the Project Area of Influence (AoI) with respect to redefinition of the project units and activities
- Identification of the Project's stakeholders (focusing on directly affected ones) and engagement
- Collecting environmental and social baseline data through field studies
- Impact identification, estimation and analysis
- Establishment of mitigation or management measures and actions
- Assessing the significance of impacts and residual effects.

The following Table presents the Key Stages for this ESIA Report.

Table 1-1. Key Stages for the ESIA Report

ESIA Stage	Description
Gap Assessment for Scoping Report	This study was conducted in April 2019 to identify technical stakeholders involved to the process gaps between local EIA studies and ESIA requirements according to international finance institutions.
Environmental and Social Baseline	Outlines the existing physical, biological, social and cultural baseline characteristics in the Project's Area of Influence are described environmental and social baseline studies conducted for the Project as well as including physical, biological and socio economic baseline.
Impact Assessment	Describes the methodology used for the assessment of impacts associated with the Project, as well as the process followed to identify mitigation and enhancement measures and then assign residual impact significance. The results of the impact assessment are then presented under the following impact headings.

ESIA Stage	Description
ESMMP	Introduces the Environmental and Social Management and Monitoring Plan (ESMMP) that present the mitigation measures for the identified environmental and social impacts with the proposed monitoring activities and responsible parties.
Stakeholder Engagement Plan	Outlines stakeholder engagement approach for the Project, defines stakeholder identification, presents previous and planned stakeholder engagement activities.
Resettlement and Livelihood Restoration Framework	This document frames the national and international legal requirements, gaps between them, defines roles and responsibilities and actions to be taken to fill the gaps according to roles of the institutions.

1.3 Project Description

1.3.1 Project Background

Initial phase of the Project was started in 2010. After that, the Spatial Plan for Specific Purposes for infrastructural corridor highway E-761, Section Pojate - Preljina (Official Gazette RS 84/10) was prepared by CIP. The Spatial Plan includes information on the purpose of the Project, location, potential impacts, overview of the Project and its facilities and further potential developments aligned with this Project. In 2013, the Regulation of Spatial Plan for Specific Purposes for infrastructural corridor highway E-761, Section Pojate - Preljina was adopted and has been put in force since November 08, 2013 (Official Gazette RS 98/13).

In line with the enforcement of the Spatial Plan, National Environmental Impact Assessment (EIA) Reports for relevant sections (Section 1, Section 2 and Section 3) was prepared and received an approval from related authorities. The Project's official document, including the national Strategic Environment Assessment [1], was available for public review and participation for 30 days from May 14 to June 12, 2012 and the documents are still available in the archives of the Republic Agency for Spatial Planning [2].

After the flood event along West Morava River in 2014, the Jaroslav Černi Water Institute (IJC) conducted a Hydro-technical Study for River Regulation to re-determine the 100 years flood zone line. The study also proposed river regulation on the West Morava River to protect the Project as well as settlements located in the West Morava River Plain. As the outcome of this study, the alignment of the Project including over passes on the West Morava River have been changed by considering the new 100 years flood zone line. In this respect, the Spatial Plan was amended to include new alignment as well as river diversion project, which resulted to update the existing EIA Reports.

This decision for the amendment of the Spatial Plan was publicly disclosed in the Official Gazette of the Republic of Serbia (numbered 33/2017 and dated April 07, 2017). The following the Formal Decision (2017), the Ministry of Construction, Transport and Infrastructure's the Department for Spatial Planning has organized early insight to the Spatial Plan for the area of specific purpose: The Plan for the Infrastructure Corridor E-761, Section Pojate - Preljina.

In that regards, the draft version of the Spatial Plan that includes change in the alignment and river diversion was available between the dates of August 30, 2017 to September 13, 2017 for a public disclosure. The Plan was available at the website of the Ministry of Construction, Transport and Infrastructure [3]. The announcement and public invitation to citizens and interested public (also referred as Notice on Public Insight) was being done through announcements in the media as well as on the website of the Ministry of Construction, Transport and Infrastructure. Locally, the public invitation for Early Insight was disclosed on the website of the Municipality of Čačak[4], Municipality of Trstenik[5] and Municipality of Varvarin[6]. The public invitation was accompanied by a full set of documents available on-line. The received feedbacks from the stakeholders were implemented and the draft version of the Spatial Plan went into revision process accordingly.

With the revisions being implemented the second draft version of the Spatial Plan was disclosed with the Public for 30 days from July 18 to August 16 of 2019. The Disclosure was held in the city halls of Kraljevo, Kruševac and Čačak, and the municipalities of Varvarin, Vrnjačka Banja, Trstenik and Ćićevac, as well as on the MCTI website. The process for the Spatial Plan was disclosed with the stakeholders through Public Participation Meeting (PPMs). The first PPM was conducted by CoS on August 26, 2019. As a result, the feedback of the stakeholder was implemented in the revision of the second Draft Spatial Plan.

The disclosure of the final version of the Spatial Plan was held from November 04 to November 18, 2019 in Kraljevo and Krusevac and Vrnjacka Banja and Trstenik as well as on the MCTI website. The PPM was conducted on November 29, 2019. These concerns were addressed by the relevant experts during the meeting and final version of the Spatial Plan is currently being processed. In these PPM's, 2U1K has attended with participation of their local experts to follow up the discussions and process. In parallel to revision of the Spatial Plan, the EIA for Section-2 is being revised to present the updated alignment of the Project. After the completion of final versions of the Spatial Plan and the EIA report, Construction Permit for the Project will be obtained accordingly.

1.3.2 Project Overview

The Project route with a total length of approximately 112 km is divided into three Sections including nine Sectors which are distributed differently along each Section. The width of the road corridor including the travel width is 900 m. This width is divided into six zones; i) 2 x 15 m motorway, ii) 5 m Emergency Zone on each side, iii) 15 m Fence Zone, iv) Immediate Protection Zone of 40 m on each side v) Wider Protection Zone of 40 m on each side and vi) Larger Protection Zone of 235 m on each side.The breakdown of the Sectors with respect to each Section is given in Table 1-2.

Table 1-2. The Sections of the Project.

Project Sectors		Length (km)	Expropriation	Construction Employer	Operator
Section-1: Pojate - Kruševac (Koševi)		27.83	**CoS**	**CoS**	**Roads of Serbia (RoS)**
Sector-1	Pojate – bridge across South Morava	9.06			
Sector-2	Bridge across South Morava – Makrešane	7.89			
Sector-3	Makrešane – Koševi	10.88			
Section-2: Kruševac (Koševi)- Adrani		53. 89	**CoS**	**CoS**	**RoS**
Sector-4	Kruševac (Koševi) – Lopoška river	13.93			
Sector-5	Lopoška river – Trstenik	14.55			
Sector-6	Trstenik – Tovarnica river	11.61			
Sector-7	Tovarnica river – Adrani	13.80			
Section-3: Adrani-Preljina		30.66	**CoS**	**CoS**	**RoS**
Sector-8	Adrani interchange – Mrčajevci interchange	9.00			
Sector-9a	Mrčajevci interchange – Preljina interchange	9.00			
Sector-9b	Preljina interchange – Preljina interchange (E-763)	12.66			
Responsibilities			Land cadastral maps Expropriation administration Payment	Supervision of design and construction (through and third party Consultant) Ownership of RAP Monitoring	Operation and maintenance of motorway

The proposed Morava Corridor Motorway Project from Pojate to Preljina passes through the valley of the West Morava River. As stated before, length of motorway from Pojate to Preljina is approximately 112 km, while the length of the Western Morava River on this part is about 139 km and 35.42 km will be the total length of river regulation along the entire route of the Motorway.

The construction of the Motorway will approximately require 2,000 ha area including the construction facilities. The construction of the Project is planned to be completed in four years. The earthworks start dates for each Section are as follows;

- Section-I in April 2020,
- Section-II in April, and
- Section-III in August 2020.

Construction phase of the Project was planned to be completed in late November 2023 when the motorway will be operational. The operation period of the Project is foreseen to be 22 years.

The average number of the construction workers will be 3,100 and the peak number of the Project workers will be approximately 3,800. The labour requirement for the construction of the Project will be primarily sourced from Serbia, local labour force and complemented by expats.

Almost all sections of the motorway are on flat farmland and next to the West Morava River, which is on a large flood plain. The site is accessible due to the proximity of local roads and access points. Construction plan comprises passing through agricultural areas. All expropriation and land access provisions (except for construction facilities to be done by the contractor) are the responsibility of the Government of Serbia.

According to the Preliminary Economic Analysis and Feasibility Study[2], the necessity of the proposed Project (i.e., the goals of the realization of this project) is as follows:

- Reduce flood risk in the region;
- Improved employment in the Morava Valley with 9,950 employees by 2030;
- Increased tourism participation by 9% by 2025;
- Less time-consuming transportation from Pojate to Preljina (around 1 hour);
- Additional telecommunication connection for inhabitants;
- Overall Internal Rate of Return (IRR) of 7.75%, 7.91% and 13.49% for the three Sections 1, 2 and 3 (see project overview for detailed information about road sections) respectively;
- Toll revenue of €74.44m per year by 2044; and
- Accidents will reduce by over 50%.

[2] Preliminary Economic Analysis and Feasibility Study for the E-761 the Republic of Srpska border - Požega - Preljina – Pojate Highway Construction.

The main aim of the Project is to shorten travel times with safe condition which is expected to lead an increase in import and export opportunities in the region as well as nationwide, where the domestic companies will have more opportunity to transport their goods and access to new technologies. The Project is strategically significant for economic development and investments in the region. The Project will also enable a connection between the municipal centres Ćićevac, Varvarin, Kruševac, Trstenik, Vrnjačka Banja, Kraljevo and Čačak as well as economic zones and tourist destinations in the region. The Project will include construction of telecommunication infrastructure that will make the Motorway a digital highway, with modern optical and digital cables, free internet and notifications to drivers for a safe traffic. In the operational phase of the Project, the transit time between Pojate and Preljina will be reduced from two hours to less than one hour.

1.3.3 Project Development and Project Alternatives

Project development phase of the Morava Corridor Motorway Project has been started in 2008. At the initial design phase of the Project, general topographical condition of the West Morava River valley is considered mainly for the identification of route options. The hills bounding the North and South of the West Morava River valley limit the potential route option for the Project in terms of constructability regarding physical, environmental and financial point of views. The West Morava River together with the high number of settlements located along the river basin is other limiting factors for the Project route selection. In addition to these limiting factors, several variation options are considered from aspects to assess whether there are other feasible options that will result in less significant impacts during the development of the Project.

Other factors considered in the route selection processes are to i) avoid settlements as much as possible to minimize resettlement; ii) avoid natural and archaeological protected areas; and iii) comply with technical design specifications considering topographical and hydrological conditions of the basin. The whole process starting with the route selection, selection of intersection locations and selection of project facilities' locations are comprehensively carried out in order to avoid and minimize the potential impacts as much as practical.

The project development timeline provided in the Hydrotechnical Regulation of the Zapadna (West) Morava River Within the Infrastructure Corridor of Highway E-761 (see Appendix-10) indicates that the route selection process of the Project was proceeded during the project development together with the river regulation works. The project design activities performed since 2008 are provided in Table 1-3 and summarized below.

Table 1-3. Summary of the Project History

Activity/Design	Design subject
General Design of the Regulation of the West Morava River (2007)	Based on the conducted extensive field survey, the issue of the protection against the adverse impacts of the West Morava River was integrally considered within the General Design Report in 2007.
General Design and Pre-feasibility Study of the E-761 Motorway Pojate-Kraljevo-Preljina, km 000+000.00 - km 109+612.72 (2008)	Three variant solutions of the Motorway Route from Pojate to Preljina were analyzed in the General Design and Pre-feasibility Study Report of the E-761 Motorway in 2008. All analyzed routes pass through the West Morava River valley, with changes on the certain sections.
Preliminary and Main Design of the E-761 Motorway, Pojate - Preljina (2012-2013)	Preliminary and Main Designs of the E-761 Motorway were prepared in 2012-2013 by the HI (section Adrani - Preljina) and CIP (section Pojate - Adrani), and the investor was "Roads of Serbia". New designs were prepared in line with the previous design consideration, which was not provided for the institutional control.
Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate – Preljina (SPSPA) (2013)	The SPSPA-2013 stated that the almost entire route of the Proposed Motorway was situated in the West Morava floodplain. Additionally, the Proposed Motorway Route was intersecting the West Morava River course at several locations, and at some zones the Proposed Motorway Route was significantly approaching to the river course of the West Morava.
Hydrotechnical Study of E-761 Motoway Route, Section Pojate-Preljina (HTS) (2016)	HTS-2016 was conducted in order to harmonize the motorway design with i) the water regime of the West Morava River, ii) existing water structures and water management plans, in accordance with the Scope of Work outlined by the Water of Serbia, as the Ministry competent for water management, and the Roads of Serbia. As it was requested in the Scope of Work, the hydraulic model for the West Morava River developed in 2007 (General Design Report) was used to define the basic parameters of flow regime for the altered hydrological conditions that was occurred after the floods in May 2014.
New SPSPA and Harmonized Preliminary Designs of the E-761 Motorway and Hydrotechnical Regulation of the West Morava River, 2017-2020	New SPSPA was carried out, due to: - New baseline data obtained during the detailed field survey carried out for the purposes of further elaboration of project documentation; - New alignment proposed by HTS-2016; - The reconsideration of the road structures locations and the accompanying contents of motorway and the harmonization with the new legislation, which was adopted in 2014. The new technical solutions were developed at the preliminary design level, through the constant harmonization of the motorway design and hydrotechnical structure design on the West Morava River.
Design for the Construction Permit (DCP) for Hydrotechnical Works and Structures (2020)	The preparation of DCP-2020 is in progress. According to the time schedule, the design for Section-1 will be completed during May 2020. Upon the performed technical review, which is mandatory under

Activity/Design	Design subject
	the Law on Planning and Construction, the investor will receive a construction permit. The design for Section-3 will be finalized by the end of May 2020, and the construction permit is expected at the end of June 2020. The drafting of the Section-2 design will follow the acceptance of the Preliminary Design, for the same sector, by the National Review Commission.

For more information about the content of documents stated in Table 1-3, please see Chapter-3.

The project development stages of the Project shows that alternative routes were considered as route variations. These variations were mainly based on technical considerations regarding flood risk of the West Morava River and River Regulation Works. Some of the variations were also proposed to minimize the impact on the settlements. As it can be seen in Table 1-4, the existing Proposed Motorway Route and previous route alternative have almost same land characteristics with minor changes.

Table 1-4. Land Characteristics of the Alternative Routes

Land Use for The Existing Route	Proposed Motorway Route		Previous Route Alternative	
	Area (ha)	Percentage	Area (ha)	Percentage
Intensive unmixed crops	634.49	76.52%	576.06	75.99%
Active opencast mineral extraction sites, including quarries	1.24	0.15%	3.17	0.42%
Residential buildings of city and town centers	8.15	0.98%	7.10	0.94%
Rural industrial and commercial sites still in active use	1.52	0.18%	0.39	0.05%
Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	70.80	8.53%	68.06	8.98%
Thermophilous deciduous woodland	66.81	8.05%	60.86	8.03%
Road networks	25.45	3.07%	24.35	3.21%
Highly artificial non-saline standing waters	2.47	0.30%	2.51	0.33%
Permanent non-tidal, smooth-flowing watercourses	7.57	0.91%	6.55	0.86%
Permanent mesotrophic pastures and aftermath-grazed meadows	10.79	1.30%	9.06	1.19%
Total Area (ha)	**829.77**		**758.11**	

As it is stated above, the Proposed Motorway Route Alignment together with River Regulation Works has been identified in 12 years with several studies. As the outcome of these studies, major route option and River Regulation Works have been fixed before the start of the ESIA works and all other planning works such as Special Purpose Spatial Plan and local EIAs, which are already completed and/or are going to be completed in accordance to the identified route option and River Regulation Works. Therefore, “constraint mapping” process is used in order

to avoid and minimize the further impact on habitats in line with ESIA findings. In this respect, all no-go areas are identified and provided to engineering group for identification of the new potential project unit locations as well as potential route modifications required by detailed design phase.

1.3.3.1 Technological Alternatives

For the Project of concern, the technological aspect is the safe and sound operation of traffic of passenger and freight motor vehicles, provision of services and regular-road maintenance using the accompanying facilities. Looking at vehicle movement as a technological process, alternatives are variations in traffic mode, in terms of regulating the speed of movement of traffic participants and directing them to individual lanes. That is mostly governed by the Law on Traffic Safety and Vertical and Horizontal Signaling and is not the subject of this study. All alternatives in terms of road maintenance and related content management are subject to specific projects. Fuel consumption depends on the traffic load, type and age of the vehicle, traffic participants, and is stochastic.

For the aspect of the technological treatment of drainage water from the pavement surface of motorway, the state of art closed system such as network of underground drainage pipe connected to oil separators through gullies and manholes will be undertaken. However, alternative equivalent system can also be considered during design development stage.

1.3.3.2 Zero Alternatives

Zero alternative of the Project (i.e., no realization of the Project) means an alternative solution which will replace the Motorway construction with the same purpose to enable the connection in the part Pojate - Kruševac - Kraljevo - Preljina, with branches to A1 and A2 state roads at its ends. Considering such options as railway or alternative route corridor, there is none to be considered in order to prefer zero alternative.

1.4 Legal Framework

The Project is planned to be funded by various international financial institutions (IFI), which require an Environmental and Social Impact Assessment (ESIA) Report. With this intention, the Project is committed to follow the Equator Principles, IFC performance standards on environmental and social sustainability (2012), Environmental and Social Standards (ESSs) of the World Bank Group as well as international environmental and social guidelines and standards in addition to the relevant national environmental legislation and regulations. The ESIA Report also provides detailed legal register of legislation, guidelines and strategies (both national and international) pertinent to the proposed Project and associated ESIA.

Table 1-5 presents the summary of national laws and regulations to reduce the potential and social impacts that may arise from the construction and operation activities of the Project.

Table 1-5. National Environmental and Social Legal and Policy Framework

National Environmental Legal and Policy Framework	
Environmental Impact Assessment	
Law on Environmental Impact Assessment	Official Gazette of the RS ", No. 135/04 and 36/09
Law on Strategic Environmental Impact Assessment	Official Gazette of RS, No.135/2004
Law on Planning and Construction	Official Gazette of RS, No. 47/03, 34/06
Law on Environmental Protection	Official Gazette of RS, No. 66/91, 83,92, 67/93, 48/94, 53/95, 135/04
Water	
Law on Water	Official Gazette of RS", No. 95/2018
Air	
Law on Air Protection	Official Gazette of RS, No 78/09
Law on Integrated Environmental Pollution Prevention and Control	Official Gazette of RS, No. 13/04
Soil	
Law on Soil Protection	Official Gazette of RS, No. 112/15
Noise	
Law on Environmental Noise	Official Gazette of RS, No. 88/10
Waste	
Law on Waste Management	Official Gazette of RS, No. 36/09 and 88/10
Geology and Seismicity	
Law on Mining and Geological Explorations	Official Gazette of RS, No. 88/2011
Nature Conservation	
Law on Nature Conservation	Official Gazette of RS, No. 9/10
Law on Forest	Official Gazette of RS, No. 30/10, 93/12, 89/15
National Social Legal and Policy Framework	
Assets	
The Law on Foundations of Property Law Relations	Official Gazette of RS, No. 6/80, 36/90
Law on Planning and Construction	Official Gazette of RS, No. 72/09
Law on Non-Contentious Proceedings	Official Gazette of RS, No. 25/82 and 48/88 Official Gazette of the RS No 46/95, 18/05, 85/12, 45/13, 55/14, 6/15 and 106/15
Law on State Surveying and Cadastre of Immovable Property	Official Gazette of the RS, No 72/09, amended on 18/10, 65/13 and 15/15
Law on Public Property	Official Gazette of RS, No. 95/18
Law on Contract and Property Rights	Official Gazette of RS, No. 9113/17
Expropriation	
Expropriation Law	"Official Gazette RS", No. 53/95
Labour and Working Conditions	
Labour Law	Official Gazette of RS, No. 75/2014
Occupational Health and Safety Law	Official Gazette of RS, No: 101/05
Law on Gender Equality	Official Gazette of RS, No. 104/09
Law on the Prohibition of Discrimination	Official Gazette of RS, No. 22/09
Law on Preventing Discrimination against Persons with Disabilities	Official Gazette of RS, No. 33/06 and 13/16
Law on Retirement and Disability Insurance	Official Gazette of RS, No. 34/03, 64/04
Law on Prevention of Harassment at Work	Official Gazette of RS, No.36/10
Law on Employment of Foreigners	Official Gazette of RS, No. 128/14

Stakeholder Engagement	
Law on Free Access to Information of Public Importance	Official Gazette", No. 120/04
Law on the Protector of Citizens	Official Gazette of RS" No. 54/07
National Environmental Legal and Policy Framework	
Environmental Impact Assessment	
Law on Environmental Impact Assessment	Official Gazette of the RS ", No. 135/04 and 36/09
Law on Strategic Environmental Impact Assessment	Official Gazette of RS, No.135/2004
Law on Planning and Construction	Official Gazette of RS, No. 47/03, 34/06
Law on Environmental Protection	Official Gazette of RS, No. 66/91, 83,92, 67/93, 48/94, 53/95, 135/04
Water	
Law on Water	Official Gazette of RS", No. 95/2018
Air	
Law on Air Protection	Official Gazette of RS, No 78/09
Law on Integrated Environmental Pollution Prevention and Control	Official Gazette of RS, No. 13/04
Soil	
Law on Soil Protection	Official Gazette of RS, No. 112/15
Noise	
Law on Environmental Noise	Official Gazette of RS, No. 88/10
Waste	
Law on Waste Management	Official Gazette of RS, No. 36/09 and 88/10
Geology and Seismicity	
Law on Mining and Geological Explorations	Official Gazette of RS, No. 88/2011
Nature Conservation	
Law on Nature Conservation	Official Gazette of RS, No. 9/10
Law on Forest	Official Gazette of RS, No. 30/10, 93/12, 89/15
National Social Legal and Policy Framework	
Assets	
The Law on Foundations of Property Law Relations	Official Gazette of RS, No. 6/80, 36/90
Law on Planning and Construction	Official Gazette of RS, No. 72/09
Law on Non-Contentious Proceedings	Official Gazette of RS, No. 25/82 and 48/88 Official Gazette of the RS No 46/95, 18/05, 85/12, 45/13, 55/14, 6/15 and 106/15
Law on State Surveying and Cadastre of Immovable Property	Official Gazette of the RS, No 72/09, amended on 18/10, 65/13 and 15/15
Law on Public Property	Official Gazette of RS, No. 95/18
Law on Contract and Property Rights	Official Gazette of RS, No. 9113/17
Expropriation	
Expropriation Law	"Official Gazette RS", No. 53/95
Labour and Working Conditions	
Labour Law	Official Gazette of RS, No. 75/2014
Occupational Health and Safety Law	Official Gazette of RS, No: 101/05
Law on Gender Equality	Official Gazette of RS, No. 104/09
Law on the Prohibition of Discrimination	Official Gazette of RS, No. 22/09
Law on Preventing Discrimination against Persons with Disabilities	Official Gazette of RS, No. 33/06 and 13/16

Law on Retirement and Disability Insurance	Official Gazette of RS, No. 34/03, 64/04
Law on Prevention of Harassment at Work	Official Gazette of RS, No.36/10
Law on Employment of Foreigners	Official Gazette of RS, No. 128/14
Stakeholder Engagement	
Law on Free Access to Information of Public Importance	Official Gazette", No. 120/04
Law on the Protector of Citizens	Official Gazette of RS" No. 54/07

Lender guidelines to be adopted by the Project is presented in Table 1-6.

Table 1-6. International Finance Institutions' Requirements

International Finance Institutions' Requirements	
UK Export Finance (UKEF)	Impact Assessments and Environmental and Social Management Plans produced by the project sponsor against host country laws and the relevant international standards, typically the International Financial Corporation (IFC) Performance Standards (PSs). UKEF, also adopted the Equator Principles. Similarly, Equator Principles refers to IFC Performance Standards on Environmental and Social Sustainability and the World Bank Group Environmental, Health and Safety Guidelines for the project type (Toll Roads), which is of concern for financial support.
Multilateral Investment Guarantee Agency (MIGA)	There are 8 Performance Standards (PS) established for the client to meet throughout the life of an investment supported by MIGA as: PS 1: Assessment and Management of Environmental and Social Risks and Impacts PS 2: Labor and Working Conditions PS 4: Community Health, Safety and Security PS 5: Land Acquisition and Involuntary Resettlement PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources PS 7: Indigenous Peoples PS 8: Cultural Heritage
IFC Requirements	IFC requires the Project Parties to carry out an environmental and social assessment of Project-related impacts according to the PSs as; PS 1: Assessment and Management of Environmental and Social Risks and Impacts PS 2: Labour and Working Conditions PS 3: Resource Efficiency and Pollution Prevention PS 4: Community, Health Safety and Security PS 5: Land Acquisition and Involuntary Resettlement PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources PS 7: Indigenous Peoples PS 8: Cultural Heritage;
Equator Principles	The Principles comprise a set of ten broad principles that are underpinned by the environmental and social policies, standards and guidance of the IFC as follows; Principle 1: Review and Categorization; Principle 2: Environmental and Social Assessment; Principle 3: Applicable Environmental and Social Standards; Principle 4: Environmental and Social Management System and Action Plan; Principle 5: Stakeholder Engagement; Principle 6: Grievance Mechanism; Principle 7: Independent Review; Principle 8: Covenants Principle 9: Independent Monitoring and Reporting; and Principle 10: Reporting and Transparency

1.5 Baseline Conditions

1.5.1 Area of Influence

The Area of Influence (AoI) is an important element in assessing environmental and social impacts of a proposed development since it informs about the physical and/or social extent onto which the assessment should be performed. For this study, two different definitions of AoI have been used for social and environmental baseline studies.

1.5.1.1 Environmental Area of Influence

The relevant environmental AoI for the Project can be divided into two main parts. The first part covers the followings;

- The Proposed Motorway Route,
- The extended AoI of the Project, including access roads, quarries, asphalt and batch plants, maintenance areas, and construction camps to be realized due to the Project,
- Area of receptors (i.e. soil, surface water and ground water) that may be impacted from supply and waste management operations,

For the intense and direct impacts associated with the project activities in construction and operational phases, the immediate vicinity of the Proposed Motorway Route covering above mentioned three items is considered to be a corridor of 1,000 m width (500 m on each side of the motorway) along the Proposed Motorway Route. This is the first part of the Environmental AoI along the Proposed Motorway Route. In addition, the following areas compose the second part of the Environmental AoI due to the fact that the there can be impacts (e.g., handling of wastes and transportation of the supply materials to the site from a long distance) associated with the activities in relation to the Project outside the corridor of 1,000 m width:

- Waste disposal facilities and the roads associated with waste management (i.e. sanitary landfills, waste recycling facilities), and
- Material supply locations and the roads associated with transport of such materials.

A total of 700 m wide corridor is specified as the protection zone in the Spatial Plan of E-761 Motorway Infrastructure Corridor (see Chapter-3 for the detailed information about the zone). When determining the AoI as 1,000 m, the first intension was to cover this 700 m wide protection zone. Then, activities causing impacts on a wider range were considered. In this respect, the most important aspect that was taken into account is the impact area regarding the air pollutant emissions which are expected to have impact on a wider area than the other impacts of the Project such as noise or impacts on surface water and soil.

In this respect, a total of 1,000 m width was chosen as the first part of the Environmental AoI. The size of the chosen area depends upon the types of the emission sources, mass of the

emissions, and types of the pollutants being emitted as well as the topography and meteorological conditions of the area.

1.5.1.2 Social Area of Influence

The spatial scope of the Social Area of Influence (AoI) includes the following areas:

The Primary AoI: The primary area of influence encompasses a corridor of 500 m (being 250 m on each side of the Motorway centerline). This corridor is potentially expected to experience the land acquisition impacts in addition to other environmental and social impacts.

The Secondary AoI: Area of potential socioeconomic impacts directly associated with the Project activities (e.g. health impact caused by traffic movement, air pollution, and impact on resources used by the villages.)

Area of Indirect Impacts: Area of potential socioeconomic impacts indirectly induced by the Project activities (e.g. increase in the local employment rate and incomes, contacts with the Project personnel, labour migration).

1.5.2 Environmental Baseline Conditions

The Project is located in the West (Zapadna) Morava River basin, and the Project route mainly follows the West Morava River opposite to the river flow direction of west to south. The West Morava River basin has significant use for agricultural and industrial purposes. The curvature of the route of the West Morava River is highly variable, with a radius ranging from 100 m to 1,000 m. Some parts of the River are straight but they are very few and short. Radii of the downstream river are generally greater than 200 m, and radii of the upstream river are smaller than 200 m. The section of the West Morava River from km 90 to km 135 (from Kraljevo to Čemernica) with a series connected of the river bends has radii of from 80 m to 200 m. Furthermore, the existing surface water quality was determined at the study areas which were determined within the environmental AoI by taking samples, from surface waters along the proposed motorway route and the measurement results did not exceed the national and international limit values at any point.

The general climate of AoI of the Project can be described as moderate-continental. In Serbia, annual precipitation over the ranges from 600mm to 1000mm. The average maximum monthly temperature and the average minimum monthly temperature are approximately 21.01 and -0.62°C, respectively.

Baseline air quality and noise assessment was provided by using the results of the extensive air quality measurements conducted by 2U1K. As a result of the measurements, the daily average values are below Serbian limit values and IFC Guideline Limits for Ambient Air Quality (125 µg/m^3 as interim target-1).Comparing results of concentrations of suspended $PM_{2.5}$ and PM_{10} particles to the limit value can be concluded that measured values of $PM_{2.5}$ and PM_{10}

particles do not exceed the limit value. In addition, the noise measurement results do not exceed the limit values which is given according to World Health Organization (WHO) Noise Guideline.

The geological composition and tectonic composition of the AoI are very complex; various rock masses and soil - both in terms of age and genetic affiliation - are represented in the geological structure of the terrain. That means numerous lithostratigraphic units of complex internal structure and interrelationships are represented. The AoI is located over mainly three blocks regarding Serbo Macedonian Massif, Vardar Block and Dinarides Block, respectively and along to a seismic fault line situated in the West Morava River Valey. According to the seismological data, magnitudes of the Major Earthquakes are varies between 4.8 to 6.1 where the corresponding intensity levels are in between 7º and 9º. The Project route is located in an area that is classified as II degree Zone.

The existing soil quality of the AoI have been determined by taking samples, using the necessary equipment and the technician, from soil on the motorway route. The soil analysis results indicates that the thresholds levels for the parameters As, Zn, Cd, Se, Cr, Pb, and Ni are exceeded at several locations in the Project AoI. The literature about this contamination first points the major flood event occurred in 2014 as the major cause about this contamination. On the other hand, the detailed studies in the region signify the characteristics of the soils are mostly similar to those in West Morava River. These findings imply that their sources in the soils might be similar to those of the flood sediments in the AoI.

In terms of ecology, there are nine different European Nature Information System (EUNIS) habitat types identified in the AoI of the Project. Natural habitats are usually not continuous but intermittent. The AoI covers mostly invasive plant species habitats and agricultural lands.

Table 1-7. EUNIS Habitat Types

Habitat Class	Habitat Code	Habitat Type
Natural Habitats	C2.3	Permanent non-tidal, smooth-flowing watercourses
	E2.1	Permanent mesotrophic pastures and aftermath-grazed meadows
	G1.1	Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix
	G1.7	Thermophilous deciduous woodland
Modified Habitats	I1.1	Intensive unmixed crops
	J1.2	Residential buildings of city and town centres
	J2.3	Rural industrial and commercial sites still in active use
	J3.2	Active opencast mineral extraction sites, including quarries
	J5.3	Highly artificial non-saline standing waters

Number of observed species within the AoI of the Project is given in the following Table.

Table 1-8. Observed species within the AoI

Plant	Invertebrate	Amphibian	Reptilian	Bird	Mammal	Fish	Macrobenthic
234	49	10	12	115	50	14	4 (18 Family)

The habitats identified in the field study are very common in Europe. Invasive species are generally found in natural habitats in the project site. A large part of the project site consists of agricultural areas.

Surroundings of the project site show similar habitat and ecosystem characteristics to those that had been identified at the project site before the onset of construction activities. Therefore, vicinity of the project site bears suitable alternative habitats for fauna species with high ecological carrying capacity. Outside the project site, there are animal species from each large terrestrial vertebrate class, with prey-predator relationships representing the food pyramid.

In the official letter issued by the Institute for Nature Protection of Serbia for the local EIAs "Location Condition" (03 no.019-1532/2 19.06.2019) includes the following statements for the area where the activity will take place;

There are no protected areas on the Motorway Section for which protection procedure has been carried out or initiated, ecologically significant areas and ecological corridors of international importance of the ecological network of the Republic of Serbia determined by the Decree on Ecological Network (Official Gazette of RS, No.102/2010), nor recorded natural assets.

It is also the habitat of several species of strictly protected and protected species of fish, amphibians, reptiles, birds and mammals. No endemic or relict species were found. *The animal and plant species that inhabit this area are relatively widespread in the territory of Serbia, so the section in question does not represent a vital part of the habitat for their survival or overall conservation status.*

Furthermore, according to the findings obtained from these habitats, no flora and fauna species classified as dangerous and / or threatened (CR-EN) were observed. Species under protection according to national and international conservation criteria are available. However, all of the species identified in the field have high global populations and all species are widely distributed species

Conservation of biodiversity requires protection of habitats for survival of species as well as sustenance of ecosystems. Critical habitats are areas of high biodiversity value that include at least one or more of the five values specified in Performance Standard 6 (PS6) and/or other recognized high biodiversity values.

The habitats and species identified in the studies in West Morava, where the Morava Corridor Motorway Project is located, have been assessed in accordance with PS6.

Critical habitat criteria are as follows:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Endemic or restricted-range species
- Criterion 3: Migratory or congregatory species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Key evolutionary processes

Although no critical habitat was detected in the context of the project in the scope of the ESIA baseline studies, it should be noted that there are ongoing additional studies on biodiversity including collection of additional baseline data for identification of critical habitats and biodiversity impact assessment. Results of such additional studies will be disclosed within the Supplementary Lenders Information Package (SLIP). Please refer Chapter 10 where details on additional tasks/studies are provided in a tabular form.

1.5.3 Social Baseline Conditions

There are 7 municipalities located in the Social AoI, including 48 affected villages within those municipalities. Following Table presents the respective information on each affected municipalities of the Project.

Table 1-9. Municipalities Located in the Social AoI

Municipality	Number of settlements within buffer zone
Ćićevac	4
Varvarin	2
Kruševac	7
Vrnjačka Banja	6
Trstenik	8
Kraljevo	11
Čačak	10
TOTAL	**48**

In order to obtain baseline information and assess the possible social impacts of the Project, Community Level Surveys, Household Surveys, Key Informant Interviews, Business Surveys and Focus Group Discussions have been conducted by the social experts of the 2U1K. Along with the field studies, secondary data sources were used as key tools to understand the socioeconomic baseline.

According to social field studies, all of the affected municipalities experience population increase as a result of economic lack of employment opportunities. Agriculture is one of the main occupations in all affected villages and the interviewed farmers of the affected villages stated that the income from agriculture was decreased because of the floods and droughts happened in recent years. In all affected municipalities, the average family income ranges from 255 to 850 Euros.

According to results of the social surveys it has been observed that the ecosystem services are being used for household purposes and consumption. The villages are considered to be highly sensitive where Morava river is being used for; transportation, fishing, irrigation and leisure activities. In terms of forest usage, the majority of the Project affected people is using forest to collect wood for heating purposed and hunting for household consumption.

For health services, not every settlement in the social AoI have health facilities within its borders. In terms of education, almost all locals within the AoI are literate. Last, the infrastructure services were observed to be not sufficient especially waste management system, sewage system, conditions of the local roads and the capacity of the electricity system.

1.6 Impact Assessment

1.6.1 Environmental Impact Assessment and Mitigation Measures

Environmental impacts of the proposed Project on water quality, air quality, noise and vibration, geology and soil, waste, terrestrial and freshwater ecology and archaeological and cultural resources have been determined, and the mitigation measures to be taken against them are given in detail in Chapter 6 of the ESIA Report. The most important subjects that will be impacted by the Project are water quality, air quality, noise, geology and soil and terrestrial and freshwater ecology.

The most significant impact on water regime is related to reconstruction of the sections of Morava River. River diversion may affect the natural water flow due to construction of artificial structures and barriers. In which may result in siltation of riverbed, flowage during the high-water period or heavy rains, etc. On the other hand, surface water quality and quantity are considered to be temporary affected by the construction activities including but not limited to: Silty/soiled water from excavations, quarries, topsoil placing, machinery washing, washing of finished road surfaces to remove accumulated soil and disturbance of drains and streambeds; the surface water may be at risk in case of a construction site or refueling and storage depot is located near a surface water body; wastewater from construction accommodations and other facilities poses a risk to water environment if not treated prior to discharge. During the operation phase of the Project surface water sources may be impacted negatively. Some of the potential sources of the impacts can be raised from: Pollutants released from vehicles; occupation of the flood plain by the motorway; alteration of flow patterns due to hydraulic structures. On the other hand, surface water quality and quantity are considered to be affected followings during operation phase of the Project including but not limited to: spills due to road accident and from gas stations and service areas; Motorway repair activities such as removal of asphalt and replacement, painting etc. can impact to surface water quality; high storm water flow rates can cause flooding, erosion and habitat degradation due to increase of impermeable surface.

The Project has planned to locate on approximately 112 km route and there will be several emission sources on the route during construction phase. The construction phase activities cover all activities during the construction period including land arrangement, quarry and borrow pit activities, crushing plants, batch plants, asphalt plants, main construction activities and equipment's movements such as cement mixers, trucks, backhoes, asphalt pavers etc. Significant pollutant of this step will be dust generated from above activities and the release of engine emissions (such as NO_X, SO_X, particles, CO, VOC etc.) from construction equipment and vehicles.

According to activity type and location diversity, construction phase emission sources can be classified as follow.

I. Borrow pits and quarries
II. Crushers and screen plants
III. Asphalt plants and batch plants
IV. Road construction

Noise levels will increase significantly during the construction phase of the Project compared to the current situation. This is due to the noise and vibrations emitted by machinery and equipment used during construction and activities. In addition, noisy construction operations (earthworks, bridge construction, demolition, production of gravel and concrete, on-site and off-site transport of materials, etc.) cause an increase in noise levels and emit vibrations. Vibration during the construction stage is mainly from two main sources. One of them is blasting activities held in quarries and second is construction vibration due to machine and equipment that is used in main motorway construction. However, according to modelling study results, it is expected that during operation phase, there is no vibration impact caused by the Motorway.

The potential impacts of the land preparation and construction activities on the soil environment are summarized as; disturbance such as loss of fertile top layer; mixing of soil layers and types; soil compaction etc. due to top soil stripping, cut and fill operations; construction of road structures and extraction of construction materials at the quarry sites; soil erosion and soil contamination due to unexpected leakages or spills. During the operation phase, soil contamination risks may be caused by the improper handling of the hazardous materials to be used in the road maintenance activities and leakage/spill of fuels, chemicals, etc. during the unexpected accidents.

The construction and operation of the Project will involve a wide range of activities that have the potential to affect ecology. Impacts of project activities can be further divided into the target group of biological elements as terrestrial and aquatic. Important impacts of motorway construction and operation activities on biological environment are mainly habitat loss and habitat fragmentation. Habitat loss is the process by which a natural habitat becomes incapable of supporting its native species. The organisms that previously inhabited the site are

displaced or die, thereby reducing biodiversity and species abundance Habitat fragmentation can be described as the splitting of natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important. The ecological impacts of transportation include disturbance in terms of noise and visual nuisance and pollution, which act to reduce the suitability of adjacent areas for wildlife. The infrastructure itself contributes significantly towards habitat fragmentation by creating barriers to animal movement. This may result in the isolation and extinction of vulnerable species. The steady increase in the number of animal casualties associated with roads and to a lesser extent with drowned animals in waterways, provides a further indication of the fragmentation effect. Fauna mortality, in particular, has helped raise the public perception of the problem, due to the inherent link to traffic safety. Finally, devaluation of the landscape and nature for human recreation can make an important negative economic factor.

1.6.2 Social Impact Assessment and Mitigation Measures

Summary of the potential Project related social impacts and mitigation measures can be found in the following paragraphs. Detailed version of the Social Impact Assessment including the respective mitigation measures can be found in Chapter 6 of the ESIA Report in detail.

The existing land use of the Social AoI will be affected by the construction of the Project and its components as well as by the Project facilities. There will be loss of business, municipality, governmental and individual land as a result of the Project. The Project execution will require permanent acquisition of land by using expropriation. The Project is expected to cause economic displacement and physical resettlement, however, at this stage, the magnitude of displacement is not completely known. The major impacts will be felt by people who will have to expropriate all or most of their land and other property and move to the other locations. Moderate impacts will be felt by people who will lose smaller portions of their land and assets and who will not need to physically relocate. Losses will not only be limited to property owners with legally recognized property rights, but some impacts could possibly be felt by people without ownership rights, such as tenants and informal or itinerant land users. CoS will ensure that effects of physical and economic displacement are minimized, and that people affected by the Project will be compensated in accordance with the Principles set in the in the Resettlement and Livelihood Restoration Framework of the Project.

During operation phase, the most likely potential impact would be damage to crops near the Motorway corridor from maintenance activities or vehicular access. If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case and where necessary, corrective actions will be planned and implemented.

The Project alignment will pass through forestlands in each of the Municipalities within the AoI. The most affected Municipalities are located in Section-2 including Trstenik and Vrnjačka

Banja Municipalities. The forestlands in the AoI are mainly used for wood, plant and mushroom collection and hunting purposes. All of the forest related activities are mainly used for household consumption according to the results of social field study. Although the Project activities require forest utilization, no significance impact is foreseen on this ecosystem service, since most of the plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use. Also, Section 3 is expected experience more river regulation impacts among the Project sections. According to Household and Community Level surveys, none of the locals among the Section 3 derives household income from the Morava River. Popovici village, being the closest settlement to the river regulation activities in Section 3 stated to use Morava River for fishing on household consumption. None of the affected settlements use the river for transportation purposes. From this aspect, regulation impacts on river usage could be managed sufficiently with proper mitigation measures

The construction phase of the project may result influx of addition population. To mitigate any negative impacts from the job seekers in the region who migrate to the Project area to get benefit from the job opportunities of the Project, a Recruitment Plan will be prepared to prevent spontaneous influx of job seekers. Recruitment procedures to be prepared by the contractor should aim to provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled, and skilled workforce, and giving priority to vulnerable persons (especially those who will be economically disabled). Priority will be given to Social AoI. In order for to increase local procurement benefits, Project should seek to maximize the benefits for local communities in terms of both direct and indirect employment and purchasing of local good and services.

The ESIA also assessed the labour and working conditions as well as the health and safety risks due to general occupational health and safety hazards during both operation and construction phase of the Project, to mitigate any negative impacts, the Project will adopt and implement Occupational Health and Safety Plan, Emergency Response Plan, Fitness to Work Process Procedure, Camp Management Procedure, Subcontractor Management Procedure, Human Resources Policy, Recruitment plan and Worker Accommodation Plan. In line with the occupational health and safety measures, community health and safety impacts have also been assessed and to mitigate any potential impacts, measures including proper trainings, grievance mechanism, and protocols to be followed by the workers have been implemented within the scope of impact assessment. Occupational Health and Safety Management Plan will include awareness of community health and safety issues, including - the Pandemic Preparedness Plan within its scope with respect to Covid – 19 and/or any other diseases present in the region.

When assessing the potential operation impacts of the Project, increase and decrease in population is expected. The population decrease as a result of PAPs whom become landless and may decide to out-migrate is a negative impact at Municipal level. On the other hand, the operational activities may attract people from other regions to migrate to the Project Area in parallel with economic development and urbanization at District level. Employment for the

operation and maintenance activities of the motorway, bridge and tolls will be required, resulting in long-term employment opportunities for the municipal, district and national workforce. Local contractors and subcontractors as well as national and local companies will have the opportunity to be involved in maintenance and repair works as well as services to be provided in amenities. It is assumed that operation and maintenance work will require a mix of skilled and semiskilled labor, which may be employed from the municipal or district workforce. For in-depth details for the social impacts and proposed mitigation measures please see Chapter 6 of the ESIA Report.

1.7 Stakeholder Engagement

Stakeholder engagement refers to a process of sharing information and knowledge, seeking to understand and respond to the concern and expectations of stakeholders and building relationships based on collaboration. As such, stakeholder engagement is a crucial part of the ESIA process, looking to ensure that the views interests and concerns of interested groups are taken into account in the project design and planning. The Stakeholder Engagement Plan (SEP) presented in Appendix-3 has been developed with the aim of explaining how the Project will communicate and interact with the stakeholders that may be directly or indirectly affected by and / or interested in the Project.

SEP was revised as version 15 after completion of the Public Participation Meetings (PPMs) where it was aimed to share the results of the ESIA studies with local people and to get their comments or opinion about the Project, ESIA studies etc. PPMs were carried out in seven affected municipalities, namely, Ćićevac, Varvarin, Kruševac, Tristenik, Vrnjačka Banja, Kraljevo and Čačak. Outdoor meetings were held due to Covid-19 measures. The PPMs were organized in between September 23 and 30, 2020.

1.8 Conclusions

As a result of the ESIA, it was assessed that the impacts of the Project are mostly medium and residual impact decreases to low level after the implementation of the proposed mitigation measures given in Chapter 6 of the ESIA Report. The impacts considered as high are; flood risk during construction and operation, air quality, noise, change of landscape due to changes in land use, visibility of new structures, loss of private lands, fragmentation of agricultural land plots, physical and economic displacement of PAPs and traffic. In addition, socially positive impacts are also evaluated. These impacts are mainly based on development in the local economy and employment opportunities during the construction and operation phase of the Project, which will be result from direct and indirect job opportunities and procurement opportunities in the Project region.

2 INTRODUCTION

2.1 Background to the Proposed Morava Corridor Motorway Project

Morava Corridor Motorway Project (the Project) runs east/west in the West Morava River valley and is seen as a key enabler of the economic corridor to the industrial city of Kruševac and its ultimate international connections to Bosnia, Montenegro and Macedonia. The motorway will boost international and local connectivity by linking pan-European Corridors 10 and 11 and all major towns and cities in a central Serbian region that has a population of around 500,000 and includes *Čačak*, Kraljevo, Vrnjačka Banja, Trstenik, *Kruševac* and *Ćićevac*.

The Project is expected to create around 10,000 jobs during construction, utilizing mainly Serbian workforce which will prevent the flow of non-skilled and skilled Serbian workforce to outside of Serbia. During the implementation of the Project, numerous workers will be trained in very specific construction fields, contributing to their technical skills considerably. According to the SPSPA, industrial zones are planned in the region, which will benefit from the construction of the motorway and will also create significant job opportunities. The Project will contribute the revitalization of the industry in the central Serbia.

In addition to reducing the travel time, the Motorway will also enable a much safer means of travel in the region. Connectivity of the region will be improved by extensive telecommunication network (5-G) planned, providing a Digital Corridor.

The Project also features extensive flood protection measures solving the challenge of flood protection along the Motorway alignment corresponding to wide flood plain of West Morava River. The current infrastructure in the region is based on previous (prior to 2014) 100-year max flood protection level which the flood precautions are not valid anymore, after assessment of 2014 flood disaster. Significant improvement of the flood protection measures is urgently needed in order to assure protection of the settlements against flooding. The improvement will be performed through new river bed arrangements improving the hydrological and flow characteristics of West Morava River and construction of dykes forming the most important flood protection measure.

Therefore, the Project is not only a motorway construction but also a flood protection measure which requires urgent involvement and immediate actions.

Considering social, environmental and economic benefits to the nation, the Project is classified as “project of importance for the Republic of Serbia” by The National Assembly of the Republic of Serbia. Bechtel ENKA UK Limited was selected as Strategic Partner to implement the Project as fast-track sectional delivery to mitigate the risk and ensure immediate flood protection in the shortest construction duration.

2.1.1. Proposed Morava Corridor Motorway Project

Morava Corridor Motorway Project, developed by the Ministry of Construction, Transport and Infrastructure (MoCTI) and located in the West Morava Region of Serbia, is approximately a 112 km length alignment and connects the country from Preljina to Pojate. Construction of the Project will be conducted by Bechtel ENKA UK Limited that is called as the Contractor hereinafter. The preliminary design of the Project has started in September 2019 and the construction is expected to be completed in 4 years.

At present, movement predominantly takes place along the IB category[1] (2 lines, asphalt pavement) state road number 23 (Pojate-Kruševac-Trstenik-Kraljevo), and further on (due to overlapping of alignments of state roads) along IB category state road number 22 (Kraljevo-Mrčajevci-Preljina) in this section. In general, this state road from Pojate to Preljina is coded as E-761 (international code). These two state roads, together with their extensions, (i.e. with the use of other intersecting road routes), enable the movement of persons and goods across the west, central and east part of Serbia. Traffic circulates along the existing state roads, with all the disadvantages and deficiencies of a two-lane road, with increased impact of activities of nearby settlements on the traffic flow. It currently takes around two hours, at best, to drive from Pojate to Preljina.

Construction of the Project will provide a safer and shorter connection between the project region and Bosnia and Herzegovina with the E-763 (Belgrade – South Adriatic) road and the Corridor X, i.e. “Belgrade – Niš motorway”, and further on to east parts of Serbia and Bulgaria. In addition, the Project will provide a linkage for the residents (more than 500,000 people) and 21,000 companies. This will include better accessibility for businesses in the region to expand their geographical markets and resources into other areas and countries. It is estimated that the transit time between Pojate and Preljina will be less than one hour after the completion of this Project. With this intention, implementation of the Project is expected to attract more investors to the Project region. Consequently, the increased investment will bring more employment opportunities to the local people, including diversification of economic activities.

In order to develop local economy throughout the operation phase of the Project, according to the Spatial Plan of the Special-Purpose Area of the Infrastructure Corridor E-761, Section Pojate/Preljina (SPSPA) prepared by Institute of Transportation CIP Ltd. in 2017, there will be two maintenance facilities in which expected to hire local community. Also, the Project will establish amenities including; parking lots, rest areas, motels, gas stations (including grocery, cafes and restaurant) in which is expected to increase benefits to local economy. Therefore, after the completion of the Project, roadside businesses may enhance and facilitate trade along the Project corridor.

[1] The main roads in Serbia are designated as "state roads", all of which are paved. They are classified as I and II, having two subclasses A and B (For detailed information about classification, please visit the web page: https://web.archive.org/web/20130419032548/http://www.putevi-srbije.rs/pdf/zakon_o_putevima_lat.pdf).

Based on the economic indicators of the previous motorway projects, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway.

For procurement services, the Project will be subject to regular maintenance, including summer and winter maintenances, in which will provide procurement opportunities of local and national contractors. This is expected to further increase employment opportunities and increase of livelihood of Project Affected People (PAP). Other increase impacts are considered to be mostly in the service sector such as tire repair services, on the road assistance and auto mechanics.

The Project alignment is shown in Figure 2-1.

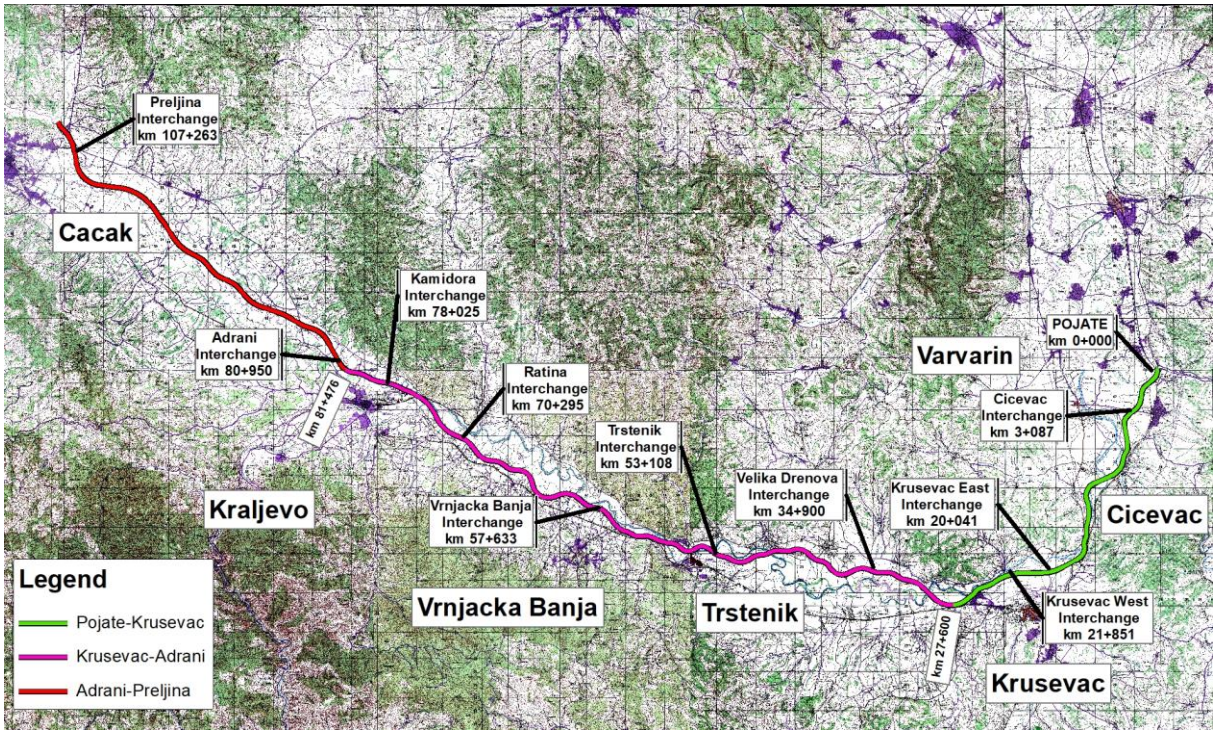


Figure 2-1. Project Alignment

2.1.2. Project Justification

MoCTI defines the set of goals for sustainable development of the road network in accordance with the principles of Serbia's Regional Development Program as well as inclusion into the Trans European Network, through the development and construction of the EU Core Network to the Western Balkans. The Project is one of the main elements of this network. The importance of the Project is to be the first motorway that will connect Serbia from east to west, and connect Corridor X to Corridor IX, from Pojate to Preljine.

Main aim of the Project is to shorten travel times with safe condition which is expected to lead an increase in import and export opportunities in the region as well as nationwide, where the

domestic companies will have more opportunity to transport their goods and access to new technologies. The Project is strategically significant for economic development and investments in the region. The Project will also enable a connection between the municipal centres Ćićevac, Varvarin, Kruševac, Trstenik, Vrnjačka Banja, Kraljevo and Čačak as well as economic zones and tourist destinations in the region.

The Project will include construction of telecommunication infrastructure that will make the Motorway a digital highway, with modern optical and digital cables, free Internet and notifications to drivers for a safe traffic.

According to the Preliminary Economic Analysis and Feasibility Study[2], the necessity of the proposed Project (i.e., the goals of the realization of this project) is as follows:

- Reduce flood risk in the region;
- Improved employment in the Morava Valley with 9,950 employee by 2030;
- Increased tourism participation by 9% by 2025;
- Less time-consuming transportation from Pojate to Preljina (around 1 hr);
- Additional telecommunication connection for inhabitants;
- Overall Internal Rate of Return (IRR) of 7.75%, 7.91% and 13.49% for the three Sections 1, 2 and 3 (see project overview for detailed information about road sections) respectively;
- Toll revenue of €74.44m per year by 2044; and
- Accidents will reduce by over 50%.

The Project also has many indirect benefits such as facilitating access to tourist centres, recreation and food facilities, development of health services and other recreational facilities. Moreover, the Motorway will provide easy access to the regional market.

2.1.3. Project Overview

As shown in Figure 2-1 the Project comprises 3 sections including 9 sectors[3] having different lengths along each section. The Motorway runs parallel to the West Morava River, and all sections of the Motorway mainly on the flat farmland of the West Morava River Plain.

- Section-1 provides a connection between Ćićevac and Varvarin municipalities and the city of Kruševac.

[2] Preliminary Economic Analysis and Feasibility Study for the E-761 the Republic of Srpska border - Požega - Preljina – Pojate Highway Construction.

[3] Different terminology is used in the construction contract with the Contractor.

- Section-2 provides a connection between Trstenik and Vrnjačka Banja municipalities and the city of Kraljevo.
- Section-3 provides a connection between the cities of Kraljevo and Čačak.

Table 2-1. Sections of the Project

Section	Approximate Length	Sector
Section 1 (Pojate – Kruševac)	27.83 km	Sectors 1 through 3
Section 2 (Kruševac – Adrani)	53.89 km	Sectors 4 through 7
Section 3 (Adrani – Preljina)	30.66 km	Sectors 8 through 9

In addition, the Proposed Motorway Route will enable the connection in the part Pojate - Kruševac - Kraljevo - Preljina, with branches to A1 (i.e., E-75 international code) and A2 (i.e., E-763 international code) state roads (see Figure 2-3).

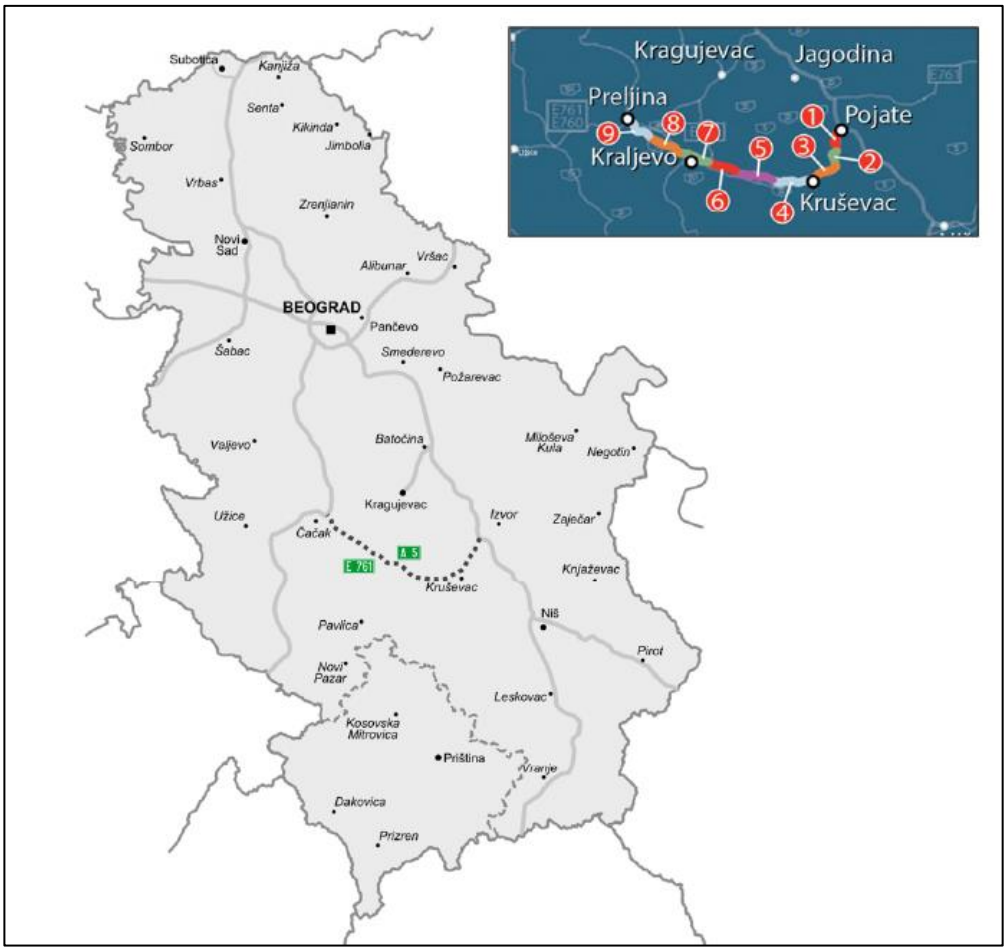


Figure 2-2. General Project Alignment

Construction of the Project will require approximately 2,495 hectares of land including project facilities such as construction campsites, borrow pits, material storage sites, asphalt plants and concrete batching plants. All expropriation and land access provisions are the responsibility of the Government of Serbia. On the other hand, in case of any requirement, the

Contractor will also buy or rent additional land(s) for project facilities required for the construction.

The design and construction of the project is planned to be completed within four years. With this intention, the design works have started in September 2019 and the mobilization works started in April 2020 and it is planned that the earthworks will start in November 2020. It is expected that all the works will be completed in October 2023. The average number of the construction workers will be 3,100 and the peak number of the Project workers will be approximately 3,800. The labour requirement for the construction of the Project will be primarily sourced from local labour force and complemented by international workers. The operation period of the Project is foreseen to be 22 years.

Initial phase of the Project was started in 2010. After that, Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate/Preljina (SPSPA) (Official Gazette RS 84/10) was prepared by CIP. The SPSPA includes information on the purpose of the Project, location, potential impacts, overview of the Project and its facilities and further potential developments aligned with this Project. In 2013, the Regulation of Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate – Preljina was adopted and has been put in force since November 08, 2013 (Official Gazette RS 98/13).

In line with the enforcement of the SPSPA, National Environmental Impact Assessment (EIA) Reports for relevant sections (Section 1, Section 2 and Section 3) was prepared and received an approval from related authorities. The Project's official document, including the national Strategic Environment Assessment[4], was available for public review and participation for 30 days from May 14 to June 12, 2012 and the documents are still available in the archives of the Republic Agency for Spatial Planning[5].

After the flood event along West Morava River in 2014, The Jaroslav Černi Water Institute (IJC) conducted a Hydrotechnical Study of E-761 Motoway Route, Section Pojate-Preljina to re-determine the 100 years flood zone line. The study also proposed river regulation on the West Morava River to protect the Project as well as settlements located in the West Morava River Plain. As the outcome of this study, the alignment of the Project including over passes on the West Morava River have been changed by considering the new 100 years flood zone line. In this respect, the SPSPA was amended to include new alignment as well as river diversion project, which resulted to update existing EIA Reports.

[4] Soon after the adoption of the Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate – Preljina and the SEA, there was a halt pending on the selection of strategic partner for this Project. In the spring of 2014, this region was hit by massive flooding which affected the whole country and this natural catastrophe provoked the necessity for changes in the Project documentation, especially related to hydrological situation. Institute "Jaroslav Černi" was commissioned to perform a detailed hydrological study of the area of concern. The hydrotechnical study was completed in December 2016.

[5] The Agency has was decommissioned in 2014, however, the link is still available. (See: http://195.222.96.93/index.php?kuda=dummy&sta=planovi&idplana=174).

This decision for the amendment of the SPSPA was publicly disclosed in the Official Gazette of the Republic of Serbia (numbered 33/2017 and dated April 07, 2017). Following the Formal Decision (2017), the Ministry of Construction, Transport and Infrastructure's the Department for Spatial Planning has organized early insight to the Spatial Plan for the Special Purpose Area: the Plan for the E-761 Motorway Infrastructure Corridor, Section Pojate-Preljina.

In that regards, the draft version of the SPSPA that includes change in the alignment and river diversion was available between the dates of August 30, 2017 to September 13, 2017 for a public disclosure. The SPSPA was available at the website of the Ministry of Construction, Transport and Infrastructure[6] applewebdata://0A982FCD-13C9-4004-8852-CFDE1C23E5A6/-_ftn3. The announcement and public invitation to citizens and interested public (also referred as Notice on Public Insight) was being done through announcements in the media as well as on the website of the Ministry of Construction, Transport and Infrastructure. Locally the public invitation for Early Insight was disclosed on the website of the Municipality of Čačak[7], Municipality of Trstenik[8] and Municipality of Varvarin[9]. The public invitation was accompanied by a full set of documents available on-line. The received feedbacks from the stakeholders were implemented and the draft version of the SPSPA went into revision process accordingly.

With the revisions being implemented the second draft version of the SPSPA was disclosed with the Public for 30 days from July 18th to August 16th of 2019. The Disclosure was held in the city halls of Kraljevo, Kruševac and Čačak, and the municipalities of Varvarin, Vrnjačka Banja, Trstenik and Ćićevac, as well as on the MCTI website. The process for the SPSPA was disclosed with the stakeholders through Public Participation Meeting (PPMs). The first PPM was conducted on August 26, 2019. As a result, the feedback of the stakeholder was implemented in the revision of the second Draft SPSPA.

The disclosure of the final version of the Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate/Preljina was held from November 04 to November 18, 2019 in Kraljevo and Kruševac and Vrnjačka Banja and Trstenik as well as on the MCTI website. The PPM was conducted on November 29, 2019. These concerns were addressed by the relevant experts during the meeting and final version of the SPSPA is currently being processed. In parallel to revision of the SPSPA, the EIA for Section-2 is being revised to present the updated alignment of the Project. After the completion of final versions of the SPSPA and the EIA report, Construction Permit for the Project will be obtained accordingly.

[6] http://www.mgsi.gov.rs/

[7] https://www.cacak.org.rs/Rani_javni_uvid_povodom_izrade_Izmena_i_dopuna_Prostornog_pl%D0%B0n%D0%B0_podrucj%D0%B0_posebne_n%D0%B0mene_infrastrukturnog_koridora_autoputa_E_761_deonica_Pojate_%E2%80%93_Preljina-1-1-3597

[8] http://www.trstenik.rs/index.php/aktuelnosti/1262

[9] http://varvarin.org.rs/rani-javni-uvid/

2.2 National EIA Process

The main objectives of the national EIA study are to:

- Identify existing bio-geo-physical and socio-economic conditions in the project area.
- Describe the impacts (positive and negative) of the Project during construction and operation periods.
- Recommendations to eliminate, reduce or control the magnitude and significance of identified impacts and propose plans and procedures to manage results, and
- Incorporate the views and opinions of stakeholders, national and international environmental regulations, laws and conventions related to proposed project activities into the final project design from the EIA report review.

For the Morava Corridor Motorway Project, the preliminary design and national Environmental Impact Assessment (EIA) studies were prepared for three sections by two different consultants. The responsible consultants for the Project design and national EIA studies are as follows:

- Section-1 & 2: Institute of Transportation (CIP)
- Section-3: Highways Institute

Separate National EIA Reports for each section of the Proposed Motorway Route had been previously prepared, and approvals were received from related authorities. However, these EIA Reports were revised due to the fact that, in the Spring of 2014, Serbia faced a tragic flood disaster that has affected houses, infrastructure, livelihood, agriculture, and industries. The Jaroslav Černi Water Institute (IJC), known as the leading research organization in Serbia's water sector, conducted a hydrotechnical study in order to harmonize the Project (route and facilities in the Proposed Motorway Route) with the regime of water, the existing water facilities and the plans for water management. The objective of the Study was to present the changed hydrological conditions (after floods of May 2014) and to provide the level of protection to the Project from floods and erosion effects of watercourses. This study will harmonize the Project with the regime of water, the existing water facilities and the water management plans. As a result, a new location conditions were required within the scope of the Project, in order to commence the national EIA for the revised Project, for all sections.

According to the national EIA consultants of Section-1 and Section-3, the updated EIA will not have any difference in terms of horizontal design. However, the new EIA will have difference in terms of vertical design due to hydrotechnical work. The alignment in Section-1 and Section-3 was simply raised to accommodate these new flood levels. However, Section-2 required large amounts of additional earthworks and was also moved horizontally to avoid the worst flood areas.

Due to the design change of the Project, the EIA consultant for Section-2 waited for the new location conditions that are provided from the Ministry for Environmental Protection to complete the EIA studies.

The completion of the national EIA reports for Sections 1, 2 and 3, in accordance with the Law on EIA, is expected to be completed by mid 2020. The diagram of the national EIA process is given in Figure 2-3. For the purposes of the ESIA, all available information from the national EIA studies has been assessed and incorporated where possible and appropriate.

The ESIA Report prepared for the Morava Corridor Motorway Project is based on the information provided in Chapter 3 - Project Description. The design of the project is progressing in parallel with the ESIA studies. Assessments made within the scope of this ESIA Report are based on the most current design. On the other hand, the design and/or optimization of some Project components (e.g. storage sites) are still on going. Other important data limitations affecting the assessments made under this ESIA Report are summarized in Table 2-2.

Table 2-2. ESIA Limitations and Assumptions – include general and specific limitations and assumptions that have influenced the preparation of the ESIA

Chapter	Contents	Assumptions & Limitations regarding information from Contractor and Investor
Chapter 1 – Executive Summary	Provides an overview of the results of the environmental and social impact assessment studies carried out for the Project. Also known as the Non Technical Summary.	NA[10]
Chapter 2 – Introduction	Presents a brief background to the proposed Project, Project rationale, the national EIA and international ESIA processes and the purpose and structure of the ESIA report. Describes the ESIA Process followed for the proposed Motorway ESIA Project and the associated impact assessment methodology employed.	National EIA processes for Section-1 and 3 have been completed. On the other hand, completion of national EIA for Section-2 is expected to be completed by mid 2020.
Chapter 3 – Project Description	Describes the Area of Influence (AoI) and the proposed Project components, including an overview of ancillary infrastructure / Project activities. Discusses the Project alternatives that have been considered in the ESIA process	Typical methods of construction and preliminary location of project facilities including camp sites, borrow pits, quarries, asphalt plants, concrete batching plants were used during the ESIA process. During the detailed design phase, these locations can be changed. In addition, number of houses to be demolished were not certain yet (or at least that number was not provided us due the unavailability of EIA Report for Section 2). The base map regarding all houses/buildings along the alignment of

[10] Not Applicable

Chapter	Contents	Assumptions & Limitations regarding information from Contractor and Investor
		the Proposed Motorway Route is not available yet. Therefore, broader maps (i.e. 1/25.000 or 1/50.000) and satellite images were used as background.
Chapter 4 – Legal Framework	Describes the legislative, policy and administrative requirements, as well as international good practise requirements applicable to the proposed Project.	Any changes/amendments to Serbian legal framework after 07.02.2020 will not be reflected in this report. Legal requirements were determined using the standards below: • UKEF Requirements • MIGA Requirements • Equator Principles • IFC Performance Standards and Related Guidelines
Chapter 5 – Baseline Conditions	Provides a detailed baseline assessment of the physical environment (e.g. air, noise, water, etc.) and biological conditions in the AoI and surrounds. Provides a detailed baseline assessment of the receiving socio-economic and health environment in the AoI and surrounds.	The content of the Gap Assessment for Scoping Report was taken into account during the preparation of the methodology of the baseline studies. Route alignment provided in final version of the Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate – Preljina is taken into consideration while writing environmental baseline conditions. Some limitations (missing parts in Chapter-5) in the ESIA process is due to the fact that the EIA Report for Section-2 is not available. Specific limitations for Chapter 5 are as follows; • The data on water supply and sewerage systems is not available for all affected settlements. • All settlements using private wells for water supply are not known and there is no information about the quality of drinking water from these wells. • There is no published landscape unit map for the project area. For this reason, the Digital Terrain Model (DTM) was used to describe the topography in the Project area. • The locations and capacities of the storage sites are not selected for all sections. Consequently, such components could not be included in the relevant assessments (e.g. air quality modelling) due to uncertainty of their locations. For social baseline conditions, majority of the household surveys were interviewed with the local men, in order

Chapter	Contents	Assumptions & Limitations regarding information from Contractor and Investor
		to bridge any gender-based gaps, Focus Groups Discussions were made with different type of local women groups (including farmers, elderly groups, unemployed, general population, Roma groups and young generations).
Chapter 6 – Impact Assessment	Presents the predicted impacts to the physical environment, biological environment and socio-economic as a result of the proposed Motorway. Presents the management and mitigation recommendations.	Assessment is mainly based on the project description given in Chapter-3. In that respect, some of the detailed design parameters such as vertical alignment, exact numbers of the vehicle types, final location of the project facilities etc. are not fully known. Therefore, impact assessments are based on worst case scenarios. After finalization of the detailed design, locations which has significance impact can be re-evaluated by considering final design parameters. Unpredictable impacts to be encountered during the implementation of the Project should be re-assessed.
Chapter 7 – Cumulative Impact Assessment	Presents the cumulative impacts that are a result of existing Projects in the broader AoI.	Limited and emergent, strategic regional, sectoral, or integrated resource planning schemes. Lack of baseline data related to the other project developments. Uncertainties associated with anticipated developments.
Chapter 8 – ESMMP	Introduces the Environmental and Social Management and Monitoring Plan that present the mitigation measures for the identified environmental and social impacts with the proposed monitoring activities and responsible parties.	This ESMMP has been compiled to address the environmental and social impacts that are anticipated to occur as a result of the proposed project, as identified in the ESIA. As mentioned in the ESIA, the exact siting of certain Project infrastructure / activities (Construction Camps & Plant; and Quarries & Borrow Pits) are not yet completely determined. In addition, the national EIA reports for all Sections have not been received. Accordingly, this ESMMP should not be regarded as complete or final, and requires a mechanism to manage change. This mechanism must ensure that changes to the scope of the proposed Project are subjected to a robust social and environmental assessment process. Any changes to Project scope or new substantive environmental and social findings will be evaluated for their degree of significance, and will be incorporated into the appropriate Project documentation as follows: • Minor changes will be reflected in updates to the ESMMP; and

Chapter	Contents	Assumptions & Limitations regarding information from Contractor and Investor
		• Substantive design changes that might potentially alter the ESIA findings (i.e. those that result in changes to the predicted significance of environmental and social impacts) will be subject to re-assessment, further stakeholder consultation, supplementary reporting and revision of the ESMMP.
Chapter 9 – Stakeholder Engagement	Summarises the stakeholder engagement activities undertaken for the ESIA Project to date.	No specific limit specified.
Chapter 10 – Conclusion and Recommendations	Summarises the key findings and recommendations of the ESIA.	NA
Chapter 11 - Appendices	• Appendix-1 Gap Assessment for Scoping Report in April 2019 • Appendix-2 Company Certifications and Qualifications • Appendix-3 Stakeholder Engagement Plan (SEP) • Appendix-4 National Legislation and International Standards • Appendix-5 Maps ○ 5.1 Location of Borrow Pits Map ○ 5.2 Measurement Locations Map ○ 5.3 Archaeological Points and Heritage Buildings ○ 5.4 Soil Map ○ 5.5 Land Use Map ○ 5.6 Visibility Map ○ 5.7 Constraint Map • Appendix-6 Analysis Report • Appandix-7 Biodiversity Baseline Report • Appendix-8 Air Quality Modelling Report • Appendix-9 Acoustic Report	NA
Chapter 12 - References	Contains a list of references used in compiling this ESIA Report.	NA

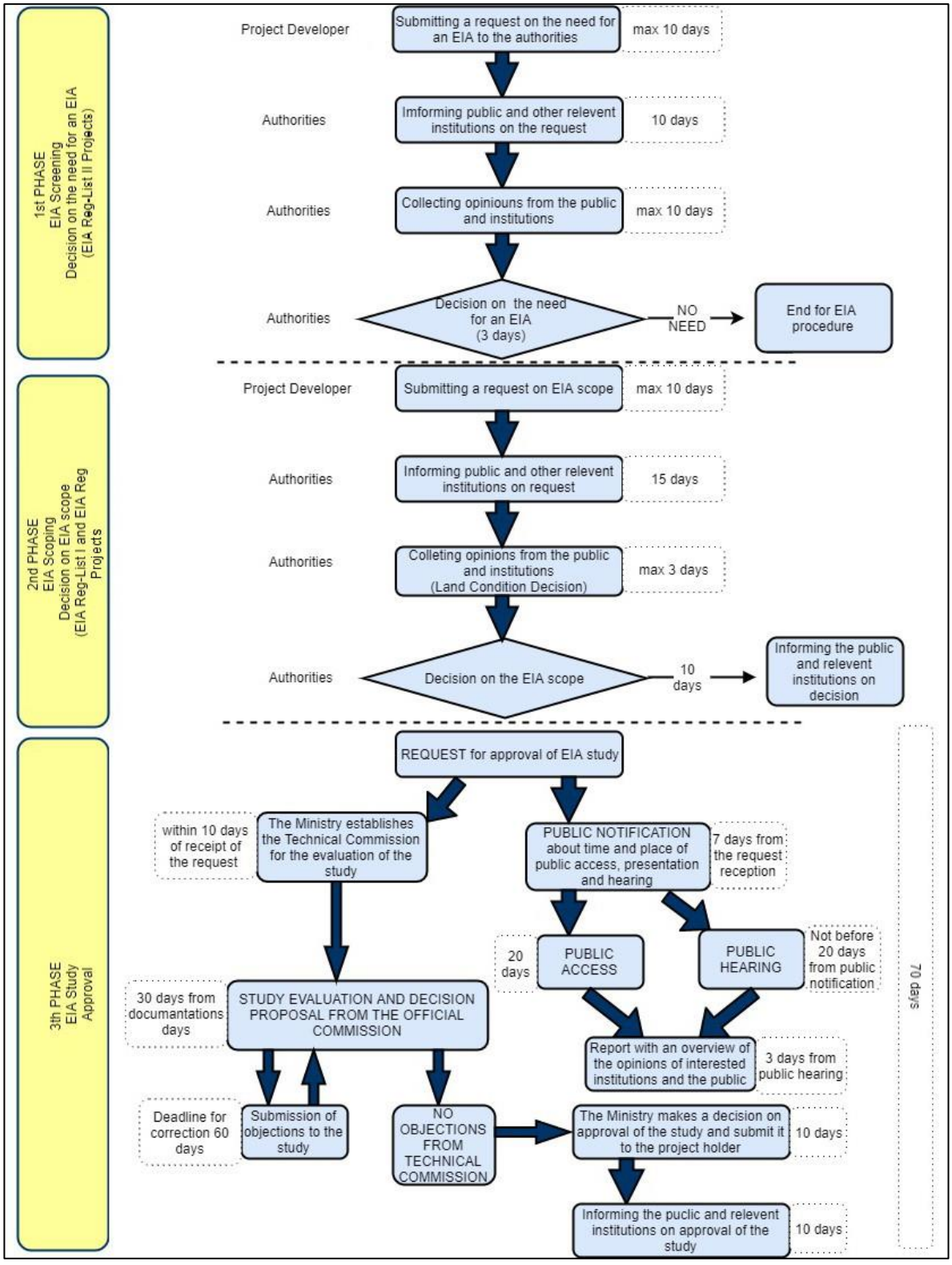


Figure 2-3. EIA Procedure in Serbia

2.3 ESIA Process

The Project is planned to be funded by various international financial institutions (IFI), which require an Environmental and Social Impact Assessment (ESIA) Report. With this intention, the Project is committed to follow the Equator Principles, IFC performance standards on environmental and social sustainability (2012), Environmental and Social Standards (ESSs) of the World Bank Group as well as international environmental and social guidelines and standards in addition to the relevant national environmental legislation and regulations.

The Government of Serbia requested the Contractor for assistance with the procurement, appointment and management of the ESIA Consultant to support the finance loan approval of the proposed Project. The Contractor has (on behalf of Government of Serbia) appointed 2U1K Engineering & Consulting Inc. (2U1K) as an independent environmental and social consultant to undertake an ESIA for the proposed Project.

The main objectives of this ESIA report are to present the following:

- A detailed description of the proposed Project and relevant Project alternatives; The ESIA process and a detailed legal register of legislation, guidelines and strategies (both national and international) pertinent to the proposed Project and associated ESIA;
- The outcomes associated with stakeholder engagement activities carried out to date;
- A detailed baseline review of the physical, biological and socio-economic characteristics of the AoI (Area of Influence) and surrounds;
- An assessment of impacts to the physical, biological and socio-economical environments related with the different phases (pre-construction, construction and operational phases) of the proposed Motorway;
- Mitigation measures and associated management plans that aim to avoid /minimise/manage the severity of identified impacts; and
- An assessment of cumulative impacts associated with other planned, existing or project-related developments in the broader AoI.
- To ensure that stakeholders are fully informed and that decision-makers evaluate both the negative and positive environmental and social impacts, when deciding to continue the project or not.

The ESIA process started with the gap assessment phase according to the internationally accepted and implemented impact assessment procedures. The findings of the studies were documented in the Gap Assessment for Scoping Report in April 2019 (see Appendix-1).

After completion of the gap assessment phase, following key activities were performed within the scope of the ESIA process.

- Re-definition of the project facilities and activities,
- Identification of the project Area of Influence with respect to redefinition of the project facilities and activities,
- Identification of project stakeholders (focusing on directly affected ones) and engagement,
- Collecting environmental and social baseline data through field studies,
- Impact identification, estimation and analysis,
- Establishment of mitigation or management measures and actions,
- Assessing the significance of impacts and residual effects.

The key stages for the ESIA Report are explained in Table 2-3.

Table 2-3. Key Stages for the ESIA Report

ESIA Stage	Description
Gap Assessment for Scoping Report	This study was conducted in April 2019 to identify technical stakeholders involved to the process gaps between local EIA studies and ESIA requirements according to international finance institutions.
Environmental and Social Baseline	Outlines the existing physical, biological, social and cultural baseline characteristics in the Project's Area of Influence are described environmental and social baseline studies conducted for the Project as well as including physical, biological and socio economic baseline.
Impact Assessment	Describes the methodology used for the assessment of impacts associated with the Project, as well as the process followed to identify mitigation and enhancement measures and then assign residual impact significance. The results of the impact assessment are then presented under the following impact headings.
ESMMP	Introduces the Environmental and Social Management and Monitoring Plan (ESMMP) that present the mitigation measures for the identified environmental and social impacts with the proposed monitoring activities and responsible parties.
Stakeholder Engagement Plan	Outlines stakeholder engagement approach for the Project, defines stakeholder identification, presents previous and planned stakeholder engagement activities.
Resettlement and Livelihood Restoration Framework	This document frames the national and international legal requirements, gaps between them, defines roles and responsibilities and actions to be taken to fill the gaps according to roles of the institutions.

2.3.1 International ESIA Consultants

The ESIA was conducted by a highly qualified and experienced team of national and international experts under the coordination of the lead ESIA consultant, 2U1K. All company certifications and qualifications are provided in Appendix-2.

2U1K was supported by HPC France and its local consulting company (ENACTA Ltd.) (Beograd/Serbia), mainly for environmental baseline data collection and Niš University lecturers and SeConS Development Initiative Group for social baseline studies. In addition, for environmental measurements and modelling studies, 2U1K had support from SEGAL

Environmental Measurement and Analysis Laboratory, Frekans Environmental Laboratory and Ennotes Air Quality Management Services. For social studies, 2U1K also worked with SRM Consulting Co. Ltd. and for ecological studies, 2U1K had support from some international experts from the Universities in Turkey. Details about ecological experts are given in Table 2-4. Figure 2-4 represents the national and international support taken for the Project.

Table 2-4. Universities of the International Experts for Ecological Studies

International Ecological Experts	
Botanist	Hacettepe University, Biology Department
Invertebrate Expert	Ankara University, Biology Department
Hydro biologist	Ankara University, Biology Department
Ornithologist	Hitit University, Biology Department
Mammologist	Ahi Evran University, Biology Department

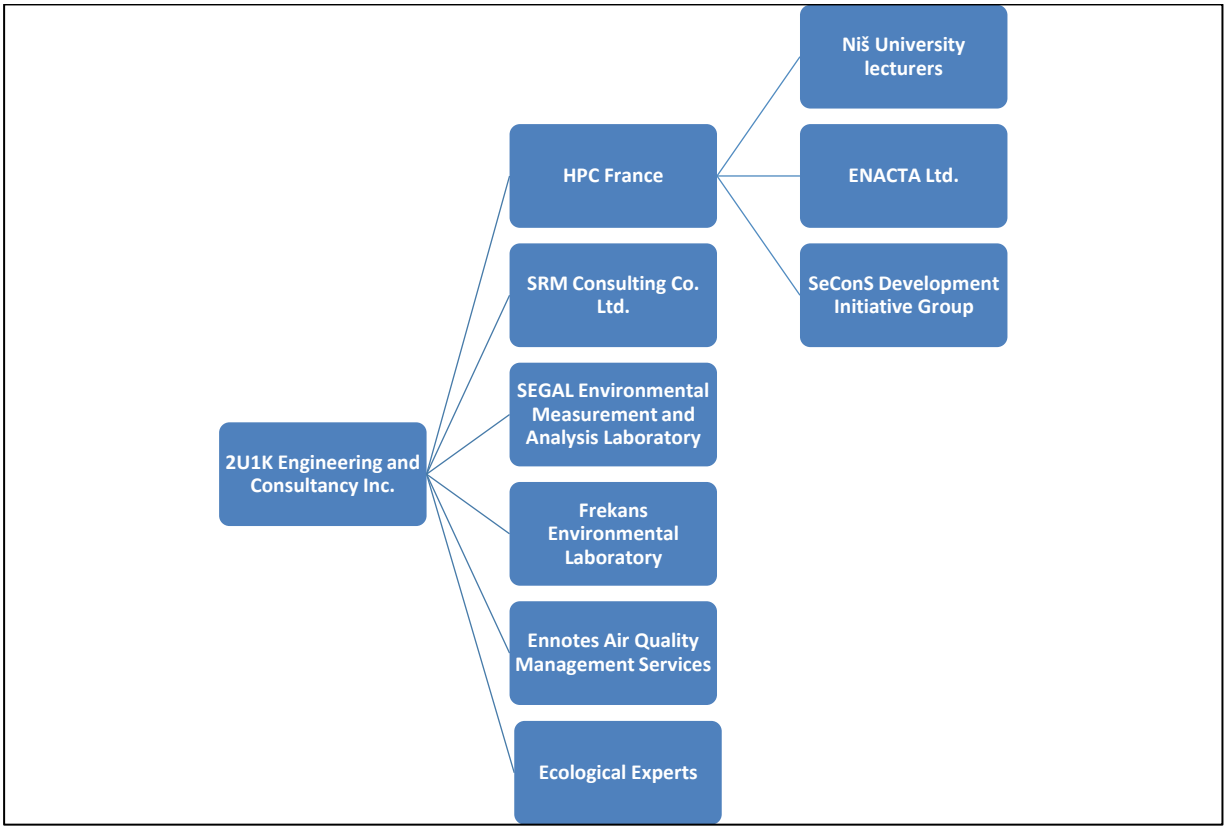


Figure 2-4. National and International Experts Under the Coordination of 2U1K International

After the review of the ESIA report by the International Environmental and Social Consultant of the lenders, it is decided to carry out additional environmental and social studies and currently these are being conducted to complement the ESIA Report. When these studies completed, they will be disclosed also as part of the ESIA Lenders disclosure (in particular, as a Supplementary Lenders Information Package). List of these studies are provided in Chapter 10.

2.3.2 Structure of ESIA Report

This ESIA Report is arranged into the following components:

- **Part I** – ESIA Report; and
- **Part II** – Annexures.

The structure of the ESIA Report (Part I) is outlined in Table 2-5.

Table 2-5. ESIA Report Structure

Chapter	Contents
Chapter 1 – Executive Summary	Provides an overview of the results of the environmental and social impact assessment studies carried out for the Project.
Chapter 2 – Introduction	Presents a brief background to the proposed Project, Project rationale, the national EIA and international ESIA processes and the purpose and structure of the ESIA report. Describes the ESIA Process followed for the proposed Motorway ESIA Project and the associated impact assessment methodology employed.
Chapter 3 – Project Description	Describes the Area of Influence (AoI) and the proposed Project components, including an overview of ancillary infrastructure / Project activities. Discusses the Project alternatives that have been considered in the ESIA process
Chapter 4 – Legal Framework	Describes the legislative, policy and administrative requirements, as well as international good practise requirements applicable to the proposed Project.
Chapter 5 – Baseline Conditions	Provides a detailed baseline assessment of the physical environment (e.g. air, noise, water, etc.) and biological conditions in the AoI and surrounds. Provides a detailed baseline assessment of the receiving socio-economic and health environment in the AoI and surrounds.
Chapter 6 – Impact Assessment	Presents the predicted impacts to the physical environment, biological environment and socio-economic as a result of the proposed Motorway. Presents the management and mitigation recommendations.
Chapter 7 – Cumulative Impact Assessment	Presents the cumulative impacts that are a result of existing Projects in the broader AoI.
Chapter 8 – ESMMP	Introduces the Environmental and Social Management and Monitoring Plan that present the mitigation measures for the identified environmental and social impacts with the proposed monitoring activities and responsible parties.
Chapter 9 – Stakeholder Engagement	Summarises the stakeholder engagement activities undertaken for the ESIA Project to date including the latest Public Participation Meetings conducted for disclosure of the Draft Final ESIA Report.
Chapter 10 – Conclusion and Recommendations	Summarises the key findings and recommendations of the ESIA.
Chapter 11 - Appendices	Contains a list of appendices within the ESIA Report.
Chapter 12 - References	Contains a list of references used in compiling this ESIA Report.

The ESIA Report is supported by the following appendices:

- APPENDIX – 1 Gap Assessment for Scoping Report in April 2019
- APPENDIX – 2 Company Certifications and Qualifications
- APPENDIX – 3 Stakeholder Engagement Plan
- APPENDIX – 4 National Legislation and International Standards
- APPENDIX – 5 Maps
  - APPENDIX – 5.1 Location of Borrow Pits Map
  - APPENDIX – 5.2 Measurement Locations Map
  - APPENDIX – 5.3 Archaeological Points and Heritage Buildings Maps
  - APPENDIX – 5.4 Soil Map
  - APPENDIX – 5.5 Land Use Map
  - APPENDIX – 5.6 Visibility Map
  - APPENDIX – 5.7 Constraint Map
- APPENDIX – 6 Analysis Report
- APPENDIX – 7 Biodiversity Baseline Report
- APPENDIX – 8 Air Quality Modelling Report
- APPENDIX – 9 Acoustic Report
- APPENDIX – 10 Hydrotechnical Regulation of the Zapadna Morava River within the Infrastructure Corridor of Highway E-761
- APPENDIX – 11 Detailed Critical Habitat Assessment
- APPENDİX – 12 Environment and Social Management System Framework

3 PROJECT DESCRIPTION

This Chapter provides an overview of the key elements of the Morava Corridor Motorway Project. Government of Serbia is the owner of the Project (represented by the Ministry of Finance as the borrower) and the Ministry of Construction, Transport and Infrastructure, represented by the Corridors of Serbia (CoS) is the implementing entity including land access and expropriation. Construction of the Project will be conducted by Bechtel ENKA UK Limited that is called as the Contractor.

Public Enterprise Roads of Serbia (RoS) is responsible entity for operation of the Motorway which includes, maintenance and preservation, exploitation, construction, reconstruction, organization and control of toll collection, development and management of I and II category state roads in the Republic of Serbia.

The Project information used for the Environmental and Social Impact Assessment (ESIA) studies is based on the preliminary design provided by the Employer and the Contractor for the preparation of the ESIA and does not include any subsequent design changes during detailed design phase.

The Contractor is responsible for the detailed design and construction of the Project. Any design changes required as a result of the ESIA studies will be incorporated into the Project as part of a Change Management Procedure to be prepared and implemented by the Contractor according to their quality management system requirements.

3.1 Project Development and Project Alternatives

Project development phase of the Morava Corridor Motorway Project has been started in 2008. At the initial design phase of the Project, general topographical condition of the West Morava River valley is considered mainly for the identification of route options. The hills bounding the North and South of the West Morava River valley limit the potential route option for the Project in terms of constructability regarding physical, environmental and financial point of views. The West Morava River together with the high number of settlements located along the river basin is other limiting factors for the Project route selection. In addition to these limiting factors, several variation options are considered from aspects to assess whether there are other feasible options that will result in less significant impacts during the development of the Project.

Other factors considered in the route selection processes are to i) avoid settlements as much as possible to minimize resettlement; ii) avoid natural and archaeological protected areas; and iii) comply with technical design specifications considering topographical and hydrological conditions of the basin. The whole process starting with the route selection, selection of intersection locations and selection of project facilities' locations are comprehensively carried out in order to avoid and minimize the potential impacts as much as practical.

The project development timeline provided in the Hydrotechnical Regulation of the Zapadna (West) Morava River Within the Infrastructure Corridor of Highway E-761 (see Appendix 10) indicates that the route selection process of the Project was proceeded during the project development together with the river regulation works. The project design activities performed since 2008 are provided in Table 3-1 and summarized below.

Table 3-1. Summary of the Project History

Activity/Design	Design subject
General Design of the Regulation of the West Morava River (2007)	Based on the conducted extensive field survey, the issue of the protection against the adverse impacts of the West Morava River was integrally considered within the General Design Report in 2007.
General Design and Pre-feasibility Study of the E-761 Motorway Pojate-Kraljevo-Preljina, km 000+000.00 - km 109+612.72 (2008)	Three variant solutions of the Motorway Route from Pojate to Preljina were analyzed in the General Design and Pre-feasibility Study Report of the E-761 Motorway in 2008. All analyzed routes pass through the West Morava River valley, with changes on the certain sections.
Preliminary and Main Design of the E-761 Motorway, Pojate - Preljina (2012-2013)	Preliminary and Main Designs of the E-761 Motorway were prepared in 2012-2013 by the HI (section Adrani - Preljina) and CIP (section Pojate - Adrani), and the investor was "Roads of Serbia". New designs were prepared in line with the previous design consideration, which was not provided for the institutional control.
Spatial Plan for the Special Purpose Area of the E-761 Motorway Infrastructure Corridor, Section Pojate – Preljina (SPSPA) (2013)	The SPSPA-2013 stated that the almost entire route of the Proposed Motorway was situated in the West Morava floodplain. Additionally, the Proposed Motorway Route was intersecting the West Morava River course at several locations, and at some zones the Proposed Motorway Route was significantly approaching to the river course of the West Morava.
Hydrotechnical Study of E-761 Motoway Route, Section Pojate-Preljina (HTS) (2016)	HTS-2016 was conducted in order to harmonize the motorway design with i) the water regime of the West Morava River, ii) existing water structures and water management plans, in accordance with the Scope of Work outlined by the Water of Serbia, as the Ministry competent for water management, and the Roads of Serbia. As it was requested in the Scope of Work, the hydraulic model for the West Morava River developed in 2007 (General Design Report) was used to define the basic parameters of flow regime for the altered hydrological conditions that was occurred after the floods in May 2014.
New SPSPA and Harmonized Preliminary Designs of the E-761 Motorway and Hydrotechnical Regulation of the West Morava River, 2017-2020	New SPSPA was carried out, due to: - New baseline data obtained during the detailed field survey carried out for the purposes of further elaboration of project documentation; - New alignment proposed by HTS-2016; - The reconsideration of the road structures locations and the accompanying contents of motorway and the harmonization with the new legislation, which was adopted in 2014. The new technical solutions were developed at the preliminary design level, through the constant

Activity/Design	Design subject
	harmonization of the motorway design and hydrotechnical structure design on the West Morava River.
Design for the Construction Permit (DCP) for Hydrotechnical Works and Structures (2020)	The preparation of DCP-2020 is in progress. According to the time schedule, the design for Section-1 will be completed during May 2020. Upon the performed technical review, which is mandatory under the Law on Planning and Construction, the investor will receive a construction permit. The design for Section-3 will be finalized by the end of May 2020, and the construction permit is expected at the end of June 2020. The drafting of the Section-2 design will follow the acceptance of the Preliminary Design, for the same sector, by the National Review Commission.

a) General Design and Pre-feasibility Study of the E-761 Motorway Pojate-Kraljevo-Preljina

General Design and Pre-feasibility Study Report (GDPFSR) was prepared by the Highway Institute (HI) from Belgrade for the investor "Roads of Serbia" in 2008. Three route variations for the Proposed Motorway, between Pojate and Preljina, were analyzed in the GDPFSR-2008. All the route variations were located in the West Morava River valley with variations on the certain sections. It was seen that the negative impacts of flood on the Proposed Motorway's construction and operation were not considered during the identification of the alternative options. Additionally, GDPFSR was not including the investment calculations for the protection measures required for the negative impacts of the river system.

b) Preliminary and Main Design of the E-761 Motorway Pojate – Preljina

Preliminary and Main Designs of the E-761 Motorway Report (PMDR) were prepared between the years 2012 and 2013 by the HI (section Adrani - Preljina) and CIP (section Pojate – Adrani) for the investor Roads of Serbia. In the PMDR, the route designs were prepared in accordance to the previous Law on Planning and Construction (LPC), which was amended in 2016, and the designs were not submitted to revision or technical control. The Environmental Impact Assessment (EIA) Studies have not been prepared for the drafted PMDR. Only for the section between Pojate and Kruševac, the Ministry of Environmental Protection provided the scope and the content of the EIA Study.

In the new design, several opinions developed by PWMC Srbijavode and Republic Hydrometeorological Service of Serbia (RHMS) was considered in order to minimize the hydrological impacts. In the study, surface elevation of the Proposed Motorway Route was determined based on the hundred year flood return period calculation (Q_{100}) performed in 2007 (General Design of the regulation of the West Morava River, 2007).

In the PMDR, the Proposed Motorway Route defined in 2008 was significantly changed. One of the major changes was observed on the increased number of river crossings. For example, 3 bridge crossing proposed in 2008 was increased to 6 bridges in the 2012 design. Therefore, depending on the route changes, impact of the Motorway on the West Morava River was

increased, whereas the impact of the West Morava River on the Motorway was increased as well. Consequently, investment cost of the Motorway was increased depending on 2012 design.

c) Spatial Plan for the Special Purpose Area for the E-761 Motorway Infrastructure Corridor

Spatial Plan for the Special Purpose Area (SPSPA) for the Motorway in 2013 was based on the route option developed in the revised PMDR that was in the drafting phase. And, SPSPA-2013 was concluded that:

- The embankments, which are proposed to control floodwaters and to protect the settlements and economic activities located in flood basin, were partially built along the course of the West Morava River. In other words, the embankments were constructed partially in the zone of larger settlements and zone of low coastal terrain where the impact of floods was at maximum level. By considering the Proposed Motorway Route, it was seen that the route crossed almost the entire floodplain zone of the West Morava River. Due to that reason, surface elevation of the Motorway should be raised above the flood level.
- The Proposed Motorway Route was intersecting at several location with the course of the West Morava River whereas at one location with the course of South Morava River. Additionally, at some zones, the Proposed Motorway Route was significantly approaching to the course of the West Morava River.

Consequently, it has been emphasized that all activities on the harmonization of proposed motorway infrastructure with water management infrastructure should be performed with the approval and control of the competent authorities for water management.

d) Hydrotechnical Study of E-761 Motorway Corridor, Section Pojate-Preljina in line with SPSPA-2013

As the outcome of the SPSPA-2013, a specific study, named as Hydrotechnical Study of E-761 Motorway Corridor Section Pojate-Preljina (HTS), was conducted in 2016 to harmonize the motorway design with the i) water regime of the West Morava River, ii) existing water facilities, and iii) water management plans.

HTS-2016 was prepared by Jaroslav Černi Water Institute (JCWI) in accordance to the contract signed with Roads of Serbia, and with Scope of Work agreed upon by PWMC Srbijavode, and the Ministry competent for water management.

Agreed Scope of Work for HTS-2016 dictated that the hydraulic model for the West Morava River developed in 2007 should be used to define the basic parameters of flow regime by considering the altered hydrological conditions after the floods in May 2014.

The new hydrological analysis was based on the observation data from the period 1955-2015. As the worst-case scenario, significantly higher calculated values of the maximum annual discharges of the West Morava River in the construction zone of the Motorway have been considered.

In order to determine the changes in the river course in the period 2007-2016 and to revise the hydraulic model of the West Morava River, new control profile locations at the locations of the proposed bridges on the Motorway were included in the revised study in addition to the control profiles surveyed in 2007. As a result, the study performed at total of 25 profile locations. The study showed that the significant changes of the river bottom geometry were not observed at the surveyed control profiles in parallel no significant erosion or backfilling at the bottom of the river course.

In the HTS-2016, special attention was also given to the identification of potentially critical sections, at which the unfavorable fluvial erosion processes could pose risk to the Proposed Motorway Route. The risk areas were presented into three (3) categories with respect to the distance between the Proposed Motorway Route and the river course as well as the condition of the riverbank. These categories are provided below, and the number of risk areas summarized in Table 3-2.

Category I: Riverbank is naturally stable or stabilized (there is a protective object) and the distance from the bank to the Proposed Motorway Route is less than 50 m; or the riverbank is unstable and the distance from the bank to the flood line is less than 100 m,

Category II: Riverbank is stable and the distance from the bank to the Proposed Motorway Route is 50-100 m,

Category III: All locations with a distance from the riverbank to the Proposed Motorway Route is greater than 100 m.

Table 3-2. Potentially critical locations along the proposed motorway route option

Sector of the Motorway	Total	I	II	III
Pojate - Kruševac	3	3	-	-
Kruševac (Koševi) - Adrani	8	3	2	3
Adrani - Mrčajevci	7	6	1	-
Mrčajevci - Preljina	4	2	2	-

Other technical considerations in the hydromorphological model are given below;

- 1D hydraulic calculation of the Q_{100} level for quasi steady-state conditions was performed in HEC RAS software in order to determine the impact of facility on the water regime of the West Morava River. In the study, two states of the West Morava River were modelled. These states were i) the existing state of the West Morava River Basin and ii) the new state regarding construction of the Proposed Motorway.
- In general, the hydromorphological model of the current status of the West Morava River was taken from the 2007 report, i) with the replacement and addition of the cross-section profiles with new surveys and ii) the minor route changes due to the occurrence of meander cut-off. Due to the use of the new data of detailed geodetic surveys along the motorway route and connecting roads, the topography of river inundation zones was defined in more detail than 2007.
- The hydromorphological model regarding the new status of the West Morava River Basin was made by including all designed facilities in addition to the existing state. With this intention, the Proposed Motorway Route with 8 bridges, access roads, loops and river regulation works proposed for the West Morava River were included in the modelling study. The existing embankments were also included, but with the assumption that their reconstruction was carried out by considering the conditions of Q_{100} in order to not have an overflow.

The study concluded that:

- The designed route of the Proposed Motorway was located, almost on its entire length, through the valleys of the Great, South and the West Morava and Čemernica Rivers. The Proposed Motorway Route is mostly located in the real flood zones, and the lesser extent in flood-protected areas (i.e. in potentially flood zones);
- The flood zones of the West Morava River for the existing and designed states are very similar. Although the major part of the Proposed Motorway Route was located in the floodplain, the Motorway did not block the flood. Therefore, the flood was expected on both sides of the Proposed Motorway;
- Surface elevation of the Proposed Motorway, in general immediate vicinity of the West Morava River, should be high enough to provide a protection from estimated Q_{100} level. It was estimated that the minimum freeboard of 1 m above the flood level calculated for Q_{100}. It was also concluded that longitudinal position together with other project structures of the Proposed Motorway and the changed hydrological conditions of the West Morava River after the big flood event occurred in 2014 should be taken into account;
- The study indicated that several critical locations, where the West Morava River and the Proposed Motorway Route intersect (i.e. the connecting roads), were required

to be changed due to design considerations such as bridge angle, width of the bridge opening, position of access roads etc.

- The Proposed Motorway Route was getting closer to the main river course at several localities, of which many of them were critical due to the high instability of the watercourse.
- The materials required for the construction of motorway body could be provided by dredging from the riverbed of West Morava River. According to the PHD-2012 Report, about 20,000,000 m^3 of material was required for the construction of the Proposed Motorway and other infrastructures.

e) Final SPSPA and the Harmonized Preliminary Designs of the E-761 Motorway and Regulation of the West Morava River

In 2017, SPSPA-2013 was amended due to following reasons;

- The harmonization of the SPSPA-2013 in line with the outcomes of the HTS-2016.
- The results of the detailed field surveys were required to be elaborated to technical documentations.
- The review of the Proposed Motorway Route together with locations of the road facilities in accordance to the new LPC legislation which was adopted in 2014.

For the amendment of the SPSPA, at first stage, the issues identified in the HTS-2016 have been elaborated and the new technical solutions were provided at the level of preliminary design, through the process of harmonization of the proposed motorway design and design of the hydrotechnical facilities required for the regulation of the West Morava River. In this respect;

- New Preliminary Highway Designs (PHDs) were prepared by; i) CIP, for Sections 1 and 2, and ii) by HI, for Section 3, in accordance to the contracts signed with Roads of Serbia. In the new PHDs, technical solutions were defined in several phases, and the Motorway Route was subjected to significant changes in terms of the route location, location and shape of the interchanges, location of the parking and rest areas, as well as location of the road maintenance facilities.
- Preliminary Design of Hydrotechnical regulation of the West Morava River along the E-761 Motorway route (PDHTR) was prepared by the JCWI, under a separate contract with Roads of Serbia. The general goal of the PDHTR was to choose the optimal solution for the watercourse and coastal regulation, which will minimize the negative impacts of the proposed motorway construction on the water regime in the basin and, at the same time, provide a quantitative estimation for the material required for the construction of the Proposed Motorway. In PDHTR, in parallel to the proposed motorway design, works and measures required for the regulation of watercourse and for the coastal protection in several phases were predicted. In order

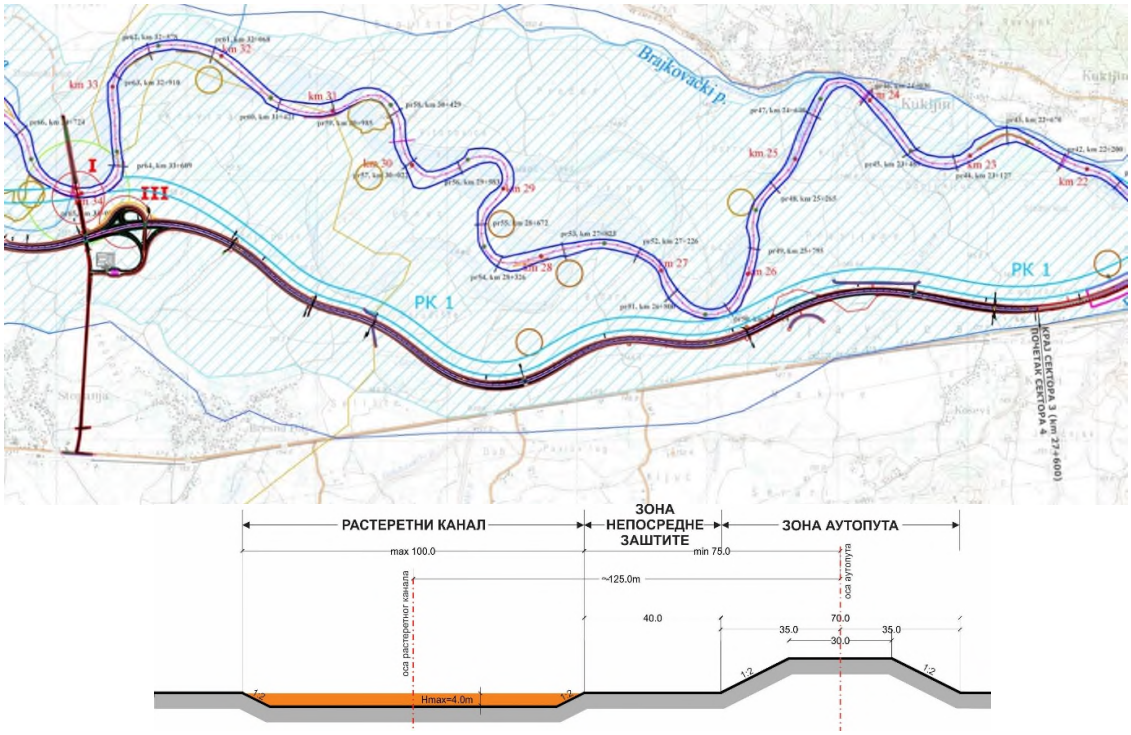
to perform of the hydraulic calculations in the PDHTR, the hydraulic model from the HTS-2016 was revised by inclusion of the new location of motorway project facilities. After that, the new locations of the project facilities were also changed and adapted.

PHD-2012 indicated that the most significant interactions between the Proposed Motorway Route and the river system were estimated at the Proposed Motorway Section-2 between Kruševac and Adrani. According to the PHD-2012, in this sector, the Proposed Motorway was guided in a high embankment through the floodplain zone of the West Morava. Several critical localities that have negative interactions were identified. In order to solve the problems at these locations, two phased approach has been performed.

At first phase, CIP has developed a new PHD along the same route regarding the change of surface elevation of the Proposed Motorway and interchanges in line with the recommendations of the hydraulic design engineers. At the same time, as the hydrotechnical design, construction of the flood relief channels for the discharge of flood of the West Morava River was analyzed with inclusion of inflow, outflow and stabilization facilities, in order to i) reduce the impact of the Proposed Motorway, ii) lower the Q_{100} level and iii) provide material for backfilling of the proposed motorway main body.

As it is given in the Figure 3-3, the flood relief channels were located adjacent to the Proposed Motorway, in order to direct use of the excavated material from the channel excavation in the motorway construction. Six flood relief channels have been designed between Čitluk near Kruševac and the mouth with Ibar River, with a total length of about 26 km. The channels had a trapezoidal cross-section, about 100 m wide at bottom level and with an average depth of about 4 m. The channels were supposed to be connected with the West Morava River only when the Q_{100} appears. As the design, the channels were regulated by the inflow and outflow structures located at both end of the channels. In the design of flood relief channel system, LIDAR survey of the river valley was performed and the existing 1D hydraulic model was updated.

A meeting was held on 25th of May 2018 by the Government of Serbia in order to determine the status of preparation of the technical documentation. The Commission concluded that the motorway solution from Kruševac to Adrani with the route in the West Morava valley was not sustainable due to the high flood risk and the need for a large amount of filling material. The commission requested development of a new variant option located outside of the floodplain, regardless of the high cost of the new exploration works and of the new design.



Source : Hydrotechnical Regulation of the Zapadna Morava River within the Infrastructure Corridor of Highway E-761 **(JAROSLAV CERNI WATER INSTITUTE, 2020)**

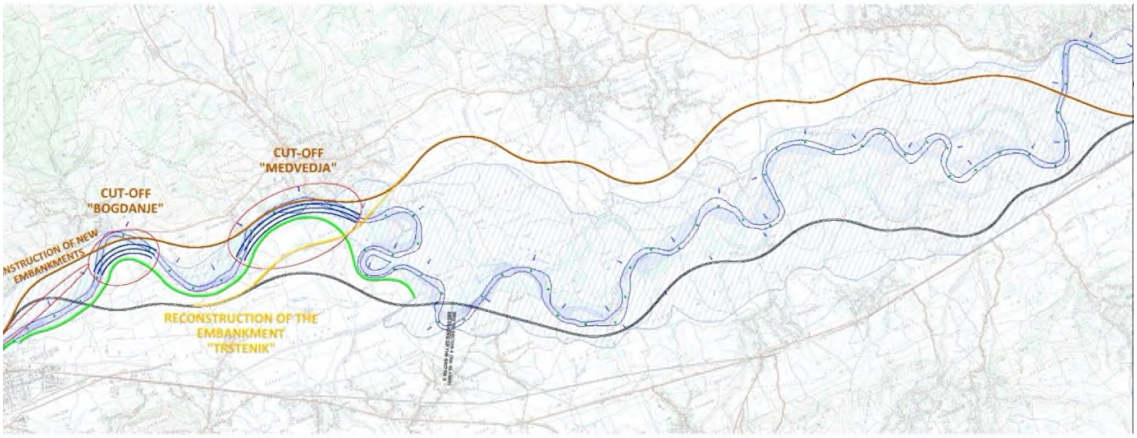
Figure 3-1. The route and Cross-section of Flood Relief Channels

At second phase, CIP-JCWI design teams worked in parallel from September 2018 to January 2020 for new variant options. The JCWI analyzed the several variant solutions for new motorway route in order to determine the impact of the route position on the West Morava River during flooding and to identify the height of the Proposed Motorway as well as to develop new hydrotechnical solutions.

After several iterations, Final PHDs were prepared with the adopted technical solution of the Proposed Motorway Route and its structures. Each PHD contains a separate book related to the design of the hydrotechnical structures of the West Morava River (PDHTR).

The figure showing the comparison of the initial and final motorway route variations at Section-2 is presented in Figure 3-2.

The PDHTR on the river reaches corresponding to Section-1: Pojate - Koševi (Kruševac) (km 0 - km 27.6) and Section-3: Adrani - Preljina (km 79 - km 97) received a positive evaluation from the National Review Committee. The expert control of the PDHTR for Section-2: Koševi (Kruševac) - Adrani (km 27.6 - km 81.476) is still in progress. The new SPSPA is adopted in January 2020 (Off. Gazette of the RS, No. 10/2020 on 6th February 2020).



Source : Hydrotechnical Regulation of the Zapadna Morava River within the Infrastructure Corridor of Highway E-761 (JAROSLAV CERNI WATER INSTITUTE, 2020)

Figure 3-2. Variant Options at Sector-2

The project development stages of the Project shows that alternative routes were considered as route variations. These variations were mainly based on technical considerations regarding flood risk of the West Morava River and River Regulation Works. Some of the variations were also proposed to minimize the impact on the settlements. As it can be seen in Table 3-3, the existing Proposed Motorway Route and previous route alternative have almost same land characteristics with minor changes.

Table 3-3. Land Characteristics of the Alternative Routes

Land Use for The Existing Route	Proposed Motorway Route		Previous Route Alternative	
	Area (ha)	Percentage	Area (ha)	Percentage
Intensive unmixed crops	634.49	76.52%	576.06	75.99%
Active opencast mineral extraction sites, including quarries	1.24	0.15%	3.17	0.42%
Residential buildings of city and town centers	8.15	0.98%	7,10	0.94%
Rural industrial and commercial sites still in active use	1.52	0.18%	0,39	0.05%
Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	70.80	8.53%	68,06	8.98%
Thermophilous deciduous woodland	66.81	8.05%	60,86	8.03%
Road networks	25,45	3.07%	24,35	3.21%
Highly artificial non-saline standing waters	2.47	0.30%	2,51	0.33%
Permanent non-tidal, smooth-flowing watercourses	7.57	0.91%	6,55	0.86%
Permanent mesotrophic pastures and aftermath-grazed meadows	10.79	1.30%	9,06	1.19%
Total Area (ha)	**829,77**		**758.11**	

As it is stated above, the Proposed Motorway Route Alignment together with River Regulation Works has been identified in 12 years with several studies. As the outcome of these studies, major route option and River Regulation Works have been fixed before the start of the ESIA works and all other planning works such as Special Purpose Spatial Plan and local EIAs, which are already completed and/or are going to be completed in accordance to the identified route option and River Regulation Works. Therefore, “constraint mapping” process is used in order to avoid and minimize the further impact on habitats in line with ESIA findings. In this respect, all no-go areas are identified and provided to engineering group for identification of the new potential project unit locations as well as potential route modifications required by detailed design phase.

3.1.1 Zero Alternative

Zero alternative of the Project (i.e., no realization of the Project) means an alternative solution which will replace the motorway construction with the same purpose to enable the connection in the part Pojate - Kruševac - Kraljevo - Preljina, with branches to A1 and A2 state roads at its ends. Considering such options as railway or alternative route corridor, there is none to be considered in order to prefer zero alternative.

3.1.2 Technological Alternatives

For the Project of concern, the technological aspect is the safe and sound operation of traffic of passenger and freight motor vehicles, provision of services and regular-road maintenance using the accompanying facilities. Looking at vehicle movement as a technological process, alternatives are variations in traffic mode, in terms of regulating the speed of movement of traffic participants and directing them to individual lanes. That is mostly governed by the Law on Traffic Safety and Vertical and Horizontal Signaling and is not the subject of this study. All alternatives in terms of road maintenance and related content management are subject to specific projects. Fuel consumption depends on the traffic load, type and age of the vehicle, traffic participants, and is stochastic.

For the aspect of the technological treatment of drainage water from the pavement surface of the Motorway, the state of art closed system such as network of underground drainage pipe connected to oil separators through gullies and manholes will be undertaken. However, alternative equivalent system can also be considered during design development stage.

3.2 Project Elements and Alignment

The Proposed Motorway Route with a total length of approximately 112 km is divided into three Sections that are further divided into nine Sectors. The breakdown of the Sectors with respect to each Section and responsible parties is given in Table 3-4. In addition, the Western Morava River flowing along the road is 139 km and approximately 32 km river regulation along the entire route of the Motorway will be carried out within the Project. Detailed information about the project location and the River Regulation is provided in Table 3-5.

Table 3-4. The Sectors of the Project

Project Sectors		Length (km)	Expropriation	Construction Employer	Operator
Section-1: Pojate - Kruševac (Koševi)		27.83	CoS	CoS	Roads of Serbia (RoS)
Sector-1	Pojate – bridge across South Morava	9.06			
Sector-2	Bridge across South Morava – Makrešane	7.89			
Sector-3	Makrešane – Koševi	10.88			
Section-2: Kruševac (Koševi)-Adrani		53.89	CoS	CoS	RoS
Sector-4	Kruševac (Koševi) – Lopoška river	13.93			
Sector-5	Lopoška river – Trstenik	14.55			
Sector-6	Trstenik – Tovarnica river	11.61			
Sector-7	Tovarnica river – Adrani	13.80			
Section-3: Adrani-Preljina		30.66	CoS	CoS	RoS
Sector-8a	Adrani interchange – Mrčajevci	9.00			
Sector-8b	Mrčajevci– Preljina interchange	9.00			
Sector-9	Preljina interchange – Preljina (E-763)	12.66			
Responsibilities			Land cadastral maps Expropriation administration Payment. RAP execution	Supervision of design and construction (through and third party Consultant) Ownership of RAP Monitoring	Operation and maintenance of motorway

Table 3-5. Project Location

Section	Location	Sector		Cadastral Municipaliy
Section 1	The bridge on the South Morava is led by Pojate via Ćićevac to Stalač - City on the right bank of the river Velika and South Morava (see Figure 3-3).	Sector 1:	Pojate - most on the South Morava river from km -0+229,75 to km 8+829,94 in length of 9.059,69 km	• Pojate, • Ćićevac, • Lučina, • Varvarin selo, • Stalać • Town of Stalać
		Sector 2:	Bridge on the South Morava river - Makrešane (beginning bypass Kruševac) from km 8+829,94 to km 16+721,95 with a length of 7.892,01 km River Regulation: from km 10 + 500 to km 12 + 850 in length of 1.671 km	
		Sector 3:	Makrešane (beginning bypass around Kruševac) - Goals (end bypass around Kruševac) from km 16+721,95 to km 27+600,00 in the length of 10.878,05 km	
Section 2	Bridge in the South Morava - Makrešane, located in the Kruševac basin zone. The route was led by Stalaca - the city on the left bank of the river Morava to the village of Makrešane, where the route crosses the right bank of the West Morava river and fits into the existing main road M-5 (see Figure 3-2). The route is designed with an embankment across the West Morava alluvial.	Sector 4:	Krusevac (bins) - Lopaška River from km 27 + 600 to km 41+528,24 with a length of 13.928,24 km	• The town of Stalac • Maskare • Mrzenica • Bosnjane • Šanac • Makrešani
		Sector 5:	Lopaška River - Trstenik from km 41+528,24 to km 56+073,87 to length of 14.545,63 km	
		Sector 6:	Trstenik - Tovarnica River from km 56+073,87 to km 67+680,41 to length of 11.606,54 km	
		Sector 7:	River Tovarnica - Adrani from km 67+680,41 to km 81+476,86 to length of 13.796,45 km River Regulation: from km 75 + 750 to km 76 + 500 in length of 0.984 km River Regulation: from km 76 + 800 to km 78 + 200 in length of 1.626 km River Regulation: from km 79 + 100 to km 80 + 125 in length of 1.300 km River Regulation: from km 80 + 400 to km 81 + 477 in length of 1.145 km	
Section 3	Makrešane-Kosevi, located in the Kruševac basin zone, on the part of the existing main road M-5 and on the same section for which the expansion of the existing road is planned for ~ 15 m (see Figure 3-3). The route is led north of Kruševac with the alluvion of the Western Morava.	Sector 8:	Adrani - Mrčajevci from km 79 + 000 to km 97 + 000 in the length of 18,00 km River Regulation: from km 81 + 350 continues to the Sector 9 in length of 17.137 km	• Makrešane • Šanac • Bivolje • Lazarica • Jasika • Čitluk • Kukljin • Peplikac.
		Sector 9:	Mrčajevci - Preljina from km 97 + 000.00 to km 109+663,80 in length of 12.663,80 km. River Regulation: from the end of the Sector 9 to km 104 + 750 in length of 7.836 km	

Section-1 from Pojate to Kruševac

This Section includes Sectors 1, 2 and 3, which connects the municipalities of Ćićevac and Varvarin and the city of Kruševac. Map of Section route is given in Figure 3-3.

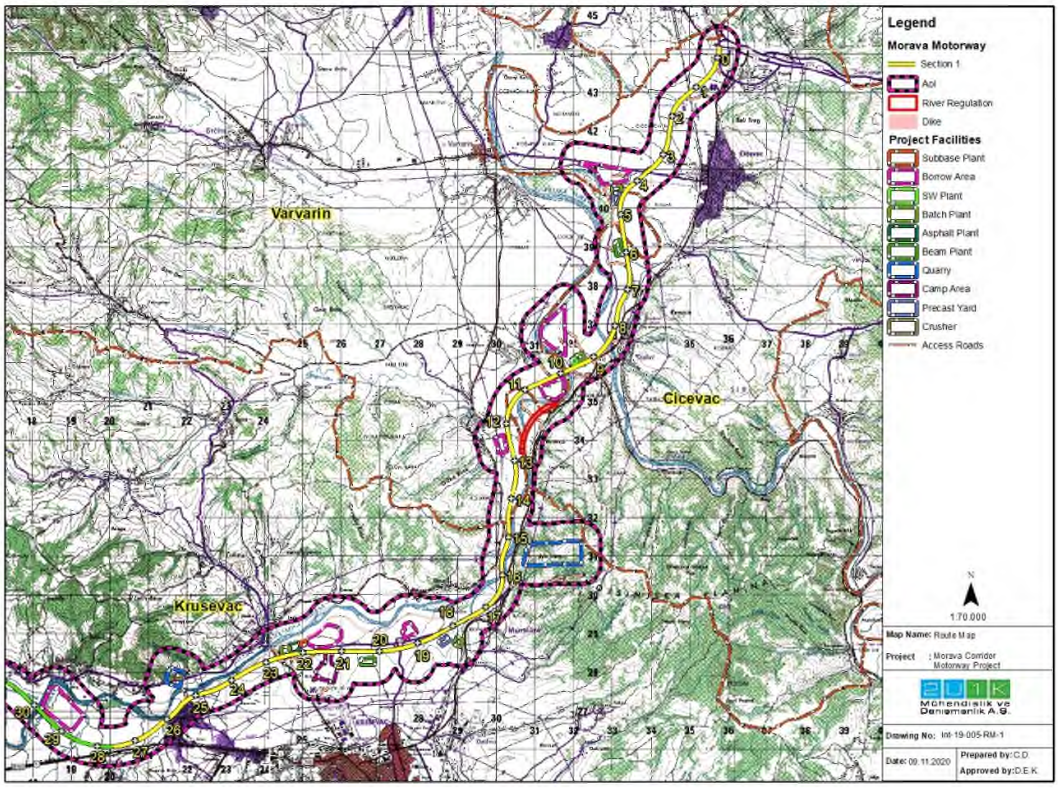


Figure 3-3. Route Map of Section-1

Section-2 from Kruševac to Adrani

This Section includes Sectors 4, 5, 6 and 7, connecting the municipalities of Trstenik, Vrnjačka Banja and the city of Kraljevo (see Figure 3-4 and Figure 3-5).

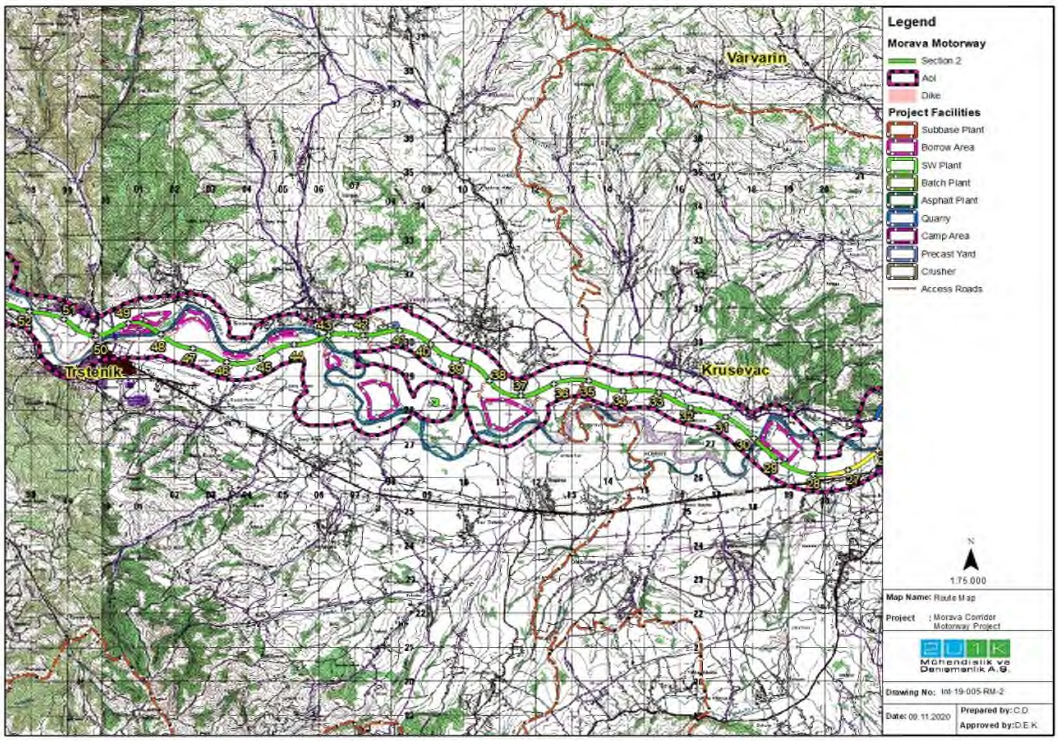


Figure 3-4. Route Map of the first part of Section-2

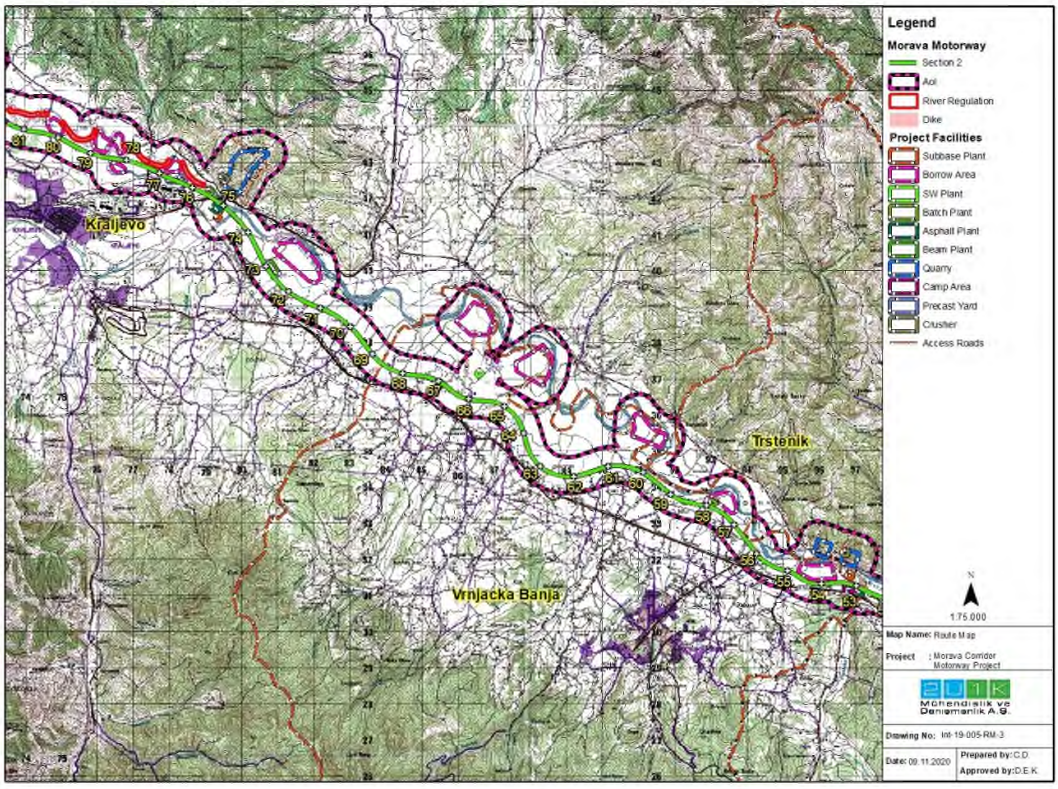


Figure 3-5. Route Map of the second part of Section-2

Section-3 from Adrani to Preljina

This Section of the Motorway includes Sectors 8 and 9, which connects the cities of Kraljevo and Čačak. The Section's route map is presented in Figure 3-6.

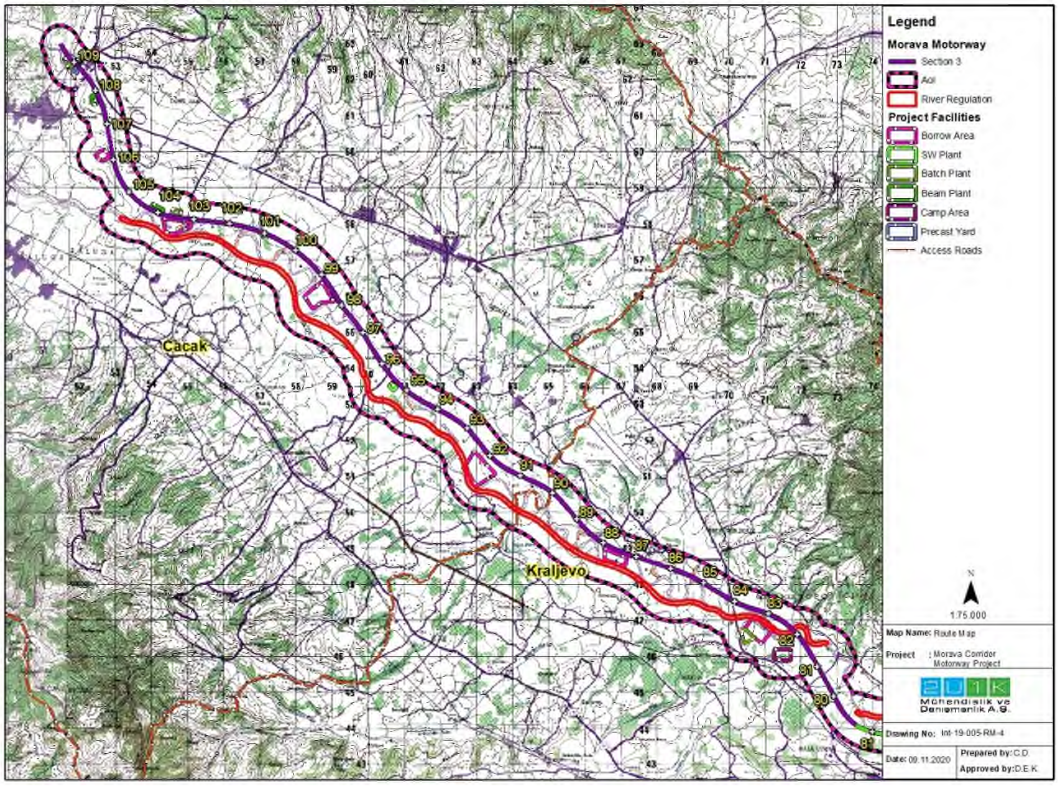


Figure 3-6. Route Map of Section-3

3.3 Design Criteria

Specific design elements of the Project are listed in the following table.

Table 3-6. Different Design Criteria of Morava Corridor Motorway Elements

General Information	
Project Design Speed (Vp)	130 km/h
Horizontal Profile	
Minimum Radius of Horizontal Curve (Rmin)	800 m
Minimum Length of Transition Length (Lmin)	115 m
Vertical Profile	
Minimum Radius of Vertical Concave Curve (R'min)	11,250 m
Minimum Radius of Vertical Convex Curve (R''min)	22,500 m
Minimum Longitudinal Slope	0.30%
Maximum Longitudinal Slope	4%
Cross Section	
Minimum Cross Slope of Pavement (i)	2.50%
Maximum Cross Slope of Pavement (i')	7%
Width of Traffic Lane	4 x 3.75 m
Width of Emergency Lane	2 x 2.50 m
Width of Shoulder	2 x 1.50 m
Width of Marginal Strip	2 x 1.50 m

Source: BEJV Design Team, 2019.

As per Schedule 2 of the Contract signed between CoS and the Contractor, the Contractor may work with other recognized standards and technical regulations where the Contractor in its absolute discretion considers the RSTS (*Public Enterprise Roads of Serbia Technical Specifications –Version E*) is antiquated, superseded, or there are equivalent or updated standards available for design, installation and/or testing purposes issued by a foreign standardization body such as ISO, EN, DIN, ASTM. Any conflict between the codes and standards shall be resolved by the Control Engineer (Supervisor) in accordance with the provisions of the Special Law (namely, Law on the Establishment of a Public Intersection and Special Procedures for the Implementation of the Project for Construction of the Infrastructure Corridor of the E-761 Motorway section Pojate-Preljina**)**.

The width of the road corridor including the travel width is 900 m. This width is divided into six zones; i) 2 x 15 m motorway, ii) 5 m Emergency Zone on each side, iii) 15 m Fence Zone, iv) Immediate Protection Zone of 40 m on each side v) Wider Protection Zone of 40 m on each side and vi) Larger Protection Zone of 235 m on each side.

3.4 River Regulation and Drainage Control

The West Morava River is the left component of the Morava Basin. Length of the West Morava River to the point where it combines with the South Morava River is approximately 210 km and its basin area is 15,755 km^2. The valley of the West Morava River has significant agricultural

potential and prominent traffic role, and the West Morava River itself flows through a large number of settlements, some of them are significant industrial centers (e.g., Čačak, Kraljevo). Because of this fact, Western Morava does not only represent the interests of water management, but also it has broader socio-economic importance.

The nature of the West Morava River has many winding sections. Winding (i.e. meandering or bending) sections of rivers are almost the exact opposite of rapids; they are usually slow-moving parts of a river with a very minor downward grade and are most often found in plains or lowlands.

Main goals for the flood protection along the West Morava were set more than 50 years ago. These goals are: (a) protection of valuable assets in the riparian zone from flooding; (b) protection of roads and bridges; and (c) stabilization of the river route and control of fluvial erosion. In line with these goals, river regulation solutions for flood protection first General Design was prepared in 2008. According to this design report;

Flood protection: It has been planned to preserve the existing flood protection system, and to reconstruct the embankments in the area of Trstenik, in order to provide protection against flooding caused by 100-year return river flow (Q_{100}). The construction of new embankments was not planned, due to the fact that protection of the agricultural lands from floods was not a priority.

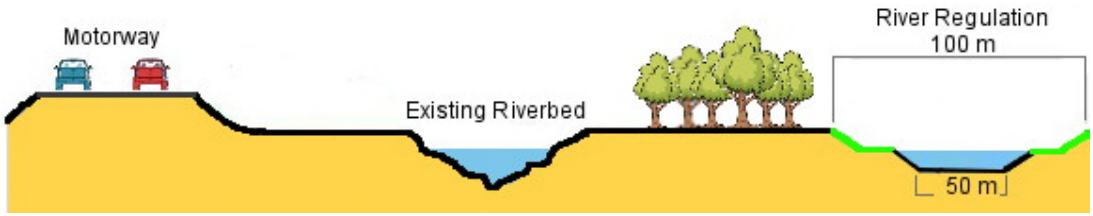
Flood protection of the main and regional roads: Existing roads were mostly protected from the negative impact of the watercourse. However, it has been noted that the designed route of the proposed motorway was in the impact zone of the river. Therefore, significant works on the regulation of river course proposed to protect the project facilities from the flooding.

River route stabilization and fluvial erosion control**:** Biotechnical measures were recommended for the protection of erosion-prone riverbanks of West Morava River to prevent the proposed motorway, embankments and other significant facilities located near to the river coastal area from erosion risk. In particular, a major river regulation works were suggested between r.km 96.5 and r.km 138.5 (the mouth of Čemernica River) of West Morava River, which has meanders freely through the river valley and thus poses a risk for the proposed motorway. At this part of West Morava River, a long river diversion channel (new river course) with smooth curves was proposed as river regulation measure. With the construction of the new river course, it was planned to eliminate the several consecutive sharp river bands as well as several sites of erosion-prone riverbanks.

With the above-stated goal of the study, it is aimed to estimate or propose measures for the regulation of watercourses and protection of coastal areas to minimize the negative impacts of construction of the Project on the water regime, the stability of the riverbed and other water resources' users in coastal areas. Also, the study defines the basic parameters of the water regime.

At the same time, considering the floods of May 2014 in Western Morava Flood Plains, the River Regulation and Drainage Control Study (officially named as "Hydrotechnical Study, Corridor of the Motorway E-761, Section Pojate-Preljina") aimed to be designed to provide the level of protection of the Motorway from floods and erosion effects of watercourses. The Study was performed in 2016 by Jaroslav Černi Institute for the Development of Water Resources in Belgrade.

As it is stated above, the proposed regulation designs are to protect against flooding and eliminate more consecutive sharp bends and bank erosion. On the other hand, as the suggestion of the ESIA and local EIA's prepared for Sector-8 and Sector-9, the flow in the old riverbed required to be maintained and it will not be completely interrupted to enhance aquatic and riparian habitat. In this respect, old riverbed will not be used as borrow area and not filled with unsuitable materials as it was recommended in the River Regulation and Drainage Control Study Report. Cross-section view of the regulated channel of the Morava Corridor Motorway Project is illustrated in Figure 3-7.



Source : Hydrotechnical Study Report

Figure 3-7. Typical Cross-Section of the Regulated Channel

3.5 River Regulation Design

As stated in Section 3.1, length of the Motorway from Pojate to Preljina is approximately 112 km, while the length of the Western Morava River on this part is about 139 km and approximately 32 km will be the total length of river regulation along the entire route of the Motorway. Based on the technical documentations developed by JCWI, following 18 structures along the West Morava River are suggested as river regulation works.

Section-1 Pojate - Kruševac (km 0+229,75 - km 27+600):

- **STRUCTURE 1:** The cut-off of the river curve from r.km 4.7 to r.km 7.1 near the village of Maskare (km 11 - km 11.6 of the highway). The meander cut-off is projected along the right inundation of the West Morava River in order to move the main river channel from the highway route, and thus reduce the negative impacts of the River.
- **STRUCTURE 2:** Protection of the left bank of the West Morava River (embankment) in the length of ~ 600 m, from r.km 8.63 to r.km 9.25 (km 14.1 - km 15 of the Motorway). Embankment protects the riverbank of the West Morava River near the Motorway from fluvial erosion.

- **STRUCTURE 3:** Reconstruction of the existing right bank dike of the West Morava River and the left bank dike of Rasina near Kruševac (cassette "Čitluk") in order to protect the Proposed Motorway Route, which passes through the flood zone (km 18.65 - km 24.6 along the Motorway). Total length of the dike is about 8 km.
- **STRUCTURE 4:** Protection of the right bank of the West Morava River (embankment) in the length of ~ 800 m from r.km 20.7 to r.km 21.26, i.e. km 25.7 - km 26.5 of the Motorway.

Section-2 Kruševac (Koševi) - Adrani (km 27+600 - km 81+476,86):

- **STRUCTURE 5:** Reconstruction of the existing dike on right bank of the West Morava River and the left bank dike of the Crnišavska River near Trstenik (cassette “Trstenik”, (r.km 42.75 to r.km 55.32). Total length of the dike is 10.2 km.
- **STRUCTURE 6:** Reconstruction of the existing dike on left bank of the West Morava River near Trstenik (cassette "Zvezdan", r.km 55.32 - r.km 58.1) and construction of the dike along left bank of the Mala River up to the high terrain. Total length of the dike is about 2760 m.
- **STRUCTURE 7:** Construction of a new dike on left bank of the West Morava River from the mouth of the Ljubostinjska River (r.km 55.1) to the iron bridge in Trstenik (r.km 55.32), with a length of about 235 m.
- **STRUCTURE 8:** Construction of a new dike with the regulated river channel of the Ljubostinjska River from the Motorway to high terrain in Trstenik, in length of about 230 m.
- **STRUCTURE 9:** Protection of the unstable left bank of the West Morava River from the existing concrete bridge (r.km 54.77) to the iron bridge (r.km 55.32) that is near the Proposed Motorway Route.
- **STRUCTURE 10:** Protection of the unstable right bank of the West Morava River from r.km 62.45 to r.km 62.97 which is near the Proposed Motorway Route.
- **STRUCTURE 11:** Protection of the unstable right bank of the West Morava River from r.km 66.5 to r.km 67.15 due to proximity to the Proposed Motorway Route.
- **STRUCTURE 12:** Protection of the stable right bank of the West Morava River from r.km 87+880 to r.km 88+380 due to proximity to the Proposed Motorway Route.
- **STRUCTURE 13:** The cut-off of the river curve (from r.km 88+900 to r.km 90+970) at the location of intersection of the Proposed Motorway Route with the existing meander of the West Morava River.
- **STRUCTURE 14:** The cut-off of the river curve (from r.km 91.41 to r.km 95.19) at the location of intersection of the Proposed Motorway Route with the existing meander of the West Morava River.

- **STRUCTURE 15:** The cut-off of the river curve (from r.km 96.55 to r.km 98.53) at the location of intersection of the Proposed Motorway Route with the existing meander of the West Morava River.
- **STRUCTURE 16**: The cut- off of the river curve (from r.km 98.96 to r.km 101) at the location of intersection of the Proposed Motorway Route with the existing meander of the West Morava River.

Section-3, Adrani - Mrčajevci (km 79+000 - km 109+663,80):

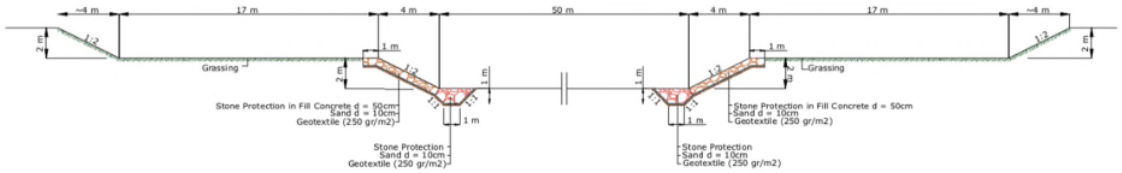
- **STRUCTURE 17:** The cut- off of the river curves of the on the reach Adrani - Mrčajevci (km 79 - km 97 of the Motorway, i.e. from r.km 100.8 to r.km 127.2).
- **STRUCTURE 18:** The cut-off of the river curves on the reach Mrčajevci - Preljina (km 97 - km 109.664, i.e. from r.km 127.2 to r.km 138.4).

According to Law on Waters ("Official Gazette of RS", no. 30/10 and 93/12), the water and waterways, as well as goods of general interest, subject to special protection and can be used under the conditions provided by the law. In this respect, the law allows to use floodplains of the river system by considering the main factors given below;

- without causing an adverse effect on water coastal ecosystem;
- without causing impact on existing ground water quality and quantity.
- construction of water facilities and installation of devices intended for regulation of watercourses;
- preservation of river courses and water facilities;
- implementation of measures to protect water; and,
- implementation of protection from contamination;

The total of 32 km length of river channel will be constructed to a bed width of 50 m, top width of 100 m, depth of 4.00 m and bank slope of ½ (shown on the plan and profile maps in Figure 3-8. The side slope of river channel is designed as ½ considering the slope stability of sandy riverbanks. The typical cross section drawings from the Proposed River Regulation are shown in Figure 3-8.

TYPICAL CROSS SECTION OF RIVER REGULATION WITH STONE PROTECTION



TYPICAL CROSS SECTION OF RIVER REGULATION WITH GABION AND RENO MATTRESS

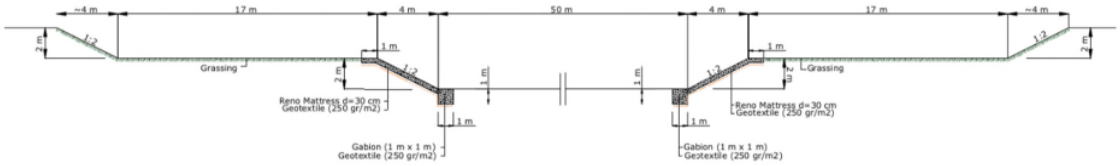


Figure 3-8. River Regulation Typical Drawings

The outline design drawings of the proposed cross sections show that high amount of excavation works will be required. The excavated material will be used during the construction works. The calculation shows that the amount of cut from the river regulation works will be fully used during the road construction. On the other hand, any remained excavated material due to unsuitability will be used for site arrangement and reinstatements of borrow pits used for road construction. Additionally, no additional material source (such as borrow area or quarry etc.) is required for the construction of river regulation works. Same material sources for road construction works will be used for the construction of the river regulation works.

According to the book of Freshwater Biodiversity: importance, threats, status and conservation challenges (Dudgeon, ve diğerleri, 2006), there are 4 types of River Regulation that are i) dam construction markedly alters flow conditions to which riverine biota are adapted, ii) channelization, iii) flow reduction due to water abstraction, and iv) water transfers between drainage basins. In this Project, when it comes to river regulation, it is about channelization which is defined as river flow characteristics altered by channel straightening and constraints of rip raps along the riverbanks; increased rate of runoff in engineered channel. As stated in the reference book, channelization may cause entirely destroyed habitat, if natural river channel replaced by channel with concrete sides and base. However, the Morava Corridor Motorway Project does not propose such concrete sides/banks or coverage of base of the riverbed.

In the Project, existing river channel at river regulation areas will be protected and flows in the old riverbed will not be completely interrupted to enhance aquatic and riparian habitat. The side slopes, which are under the effect of the continuous flow, will be strengthened by the

implementation of “gabions” or “reno mattress” depending on the flow conditions. The river section comprising upper bank will be left for natural vegetation and riverbed of new channel will be left as much as natural. With this intention, channelization with the proposed design of river regulation in the Project does not possess major impacts like those of regulation by dams, water transfer between the basins. Some of the proposed river regulation structures are provided in between the Figure 3-9 and Figure 3-13.

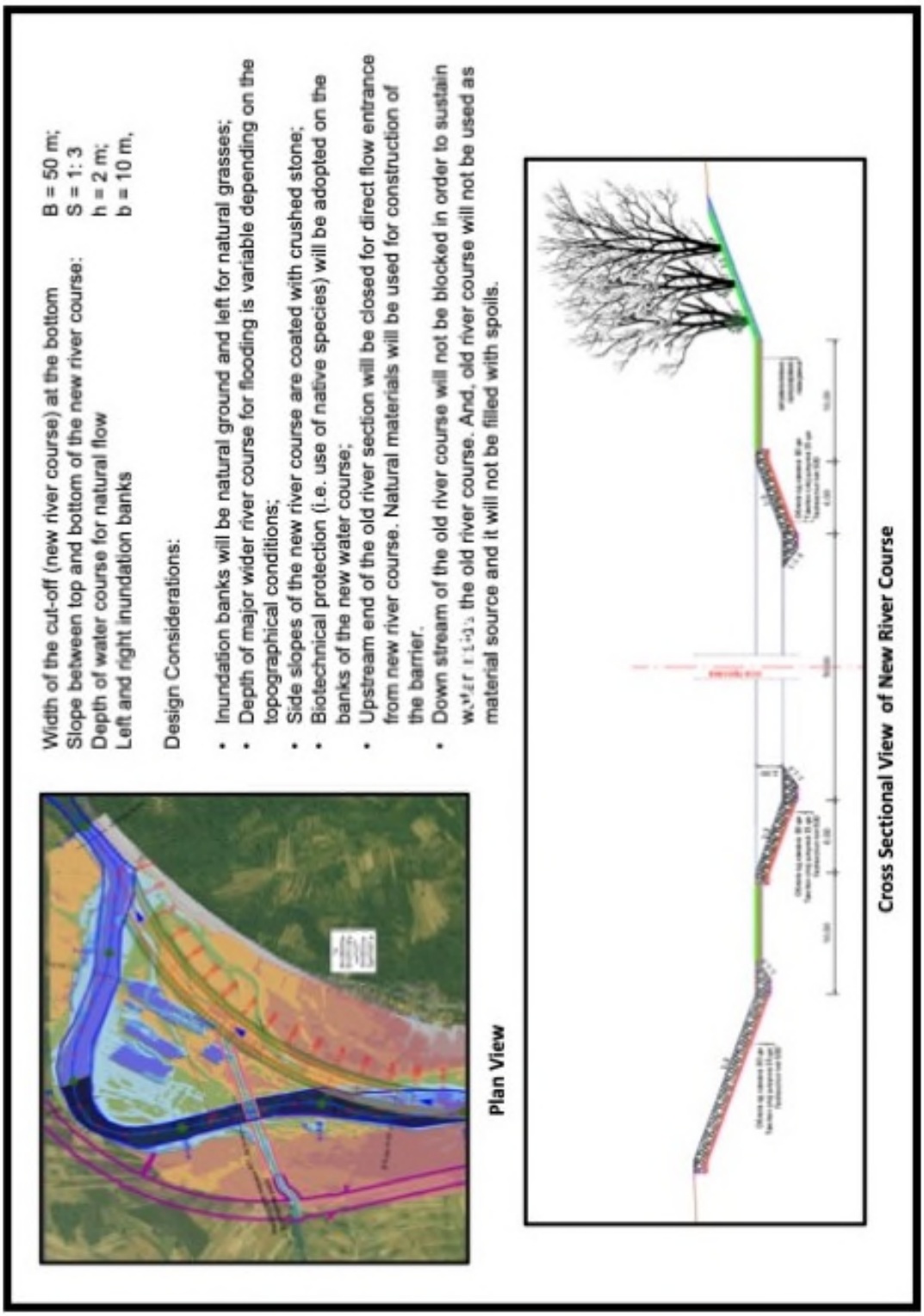


Figure 3-9. The route and typical cross-section of the Structure 1, Section-1

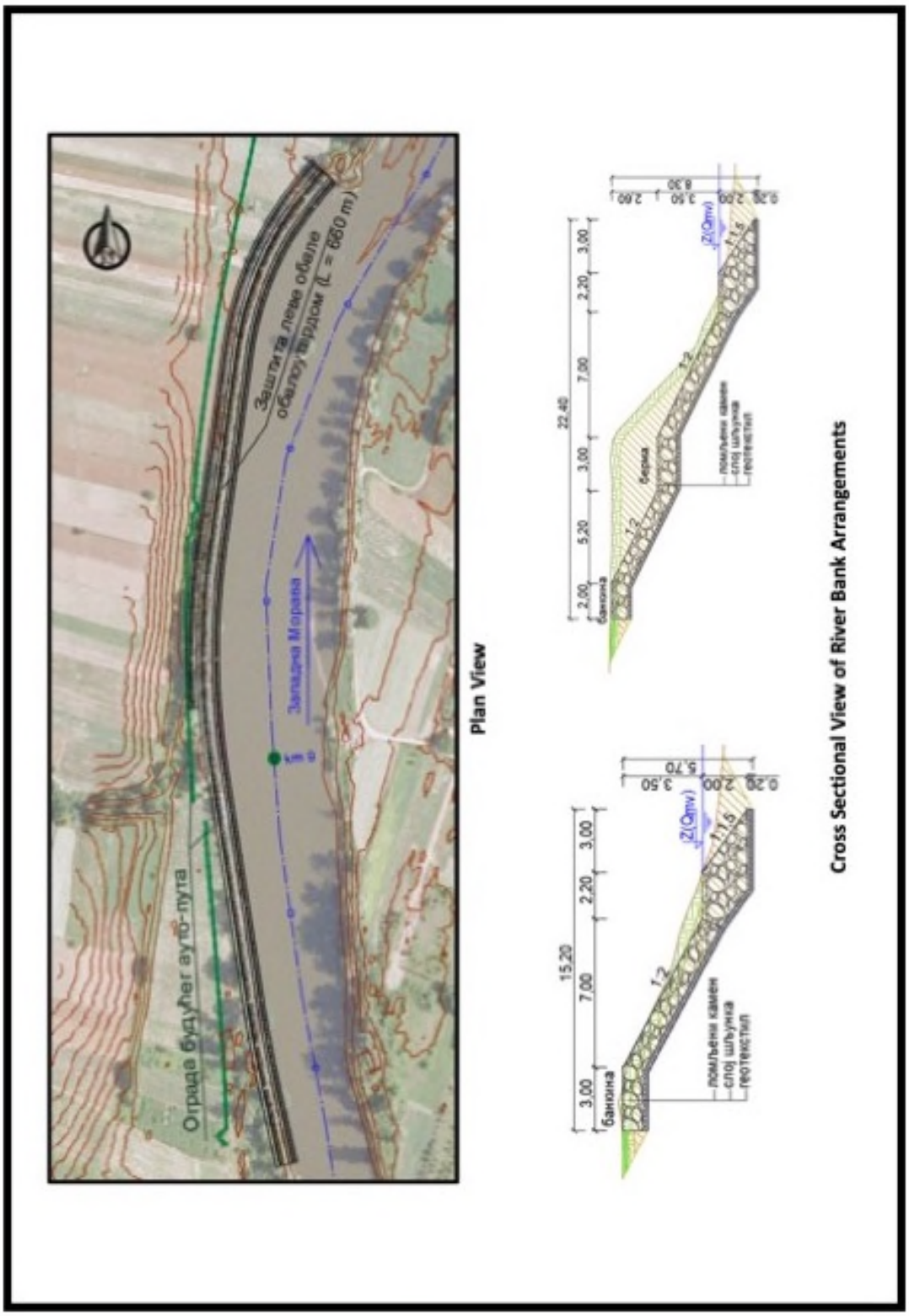


Figure 3-10. The route and typical cross-section of the Structure 2, Section-1

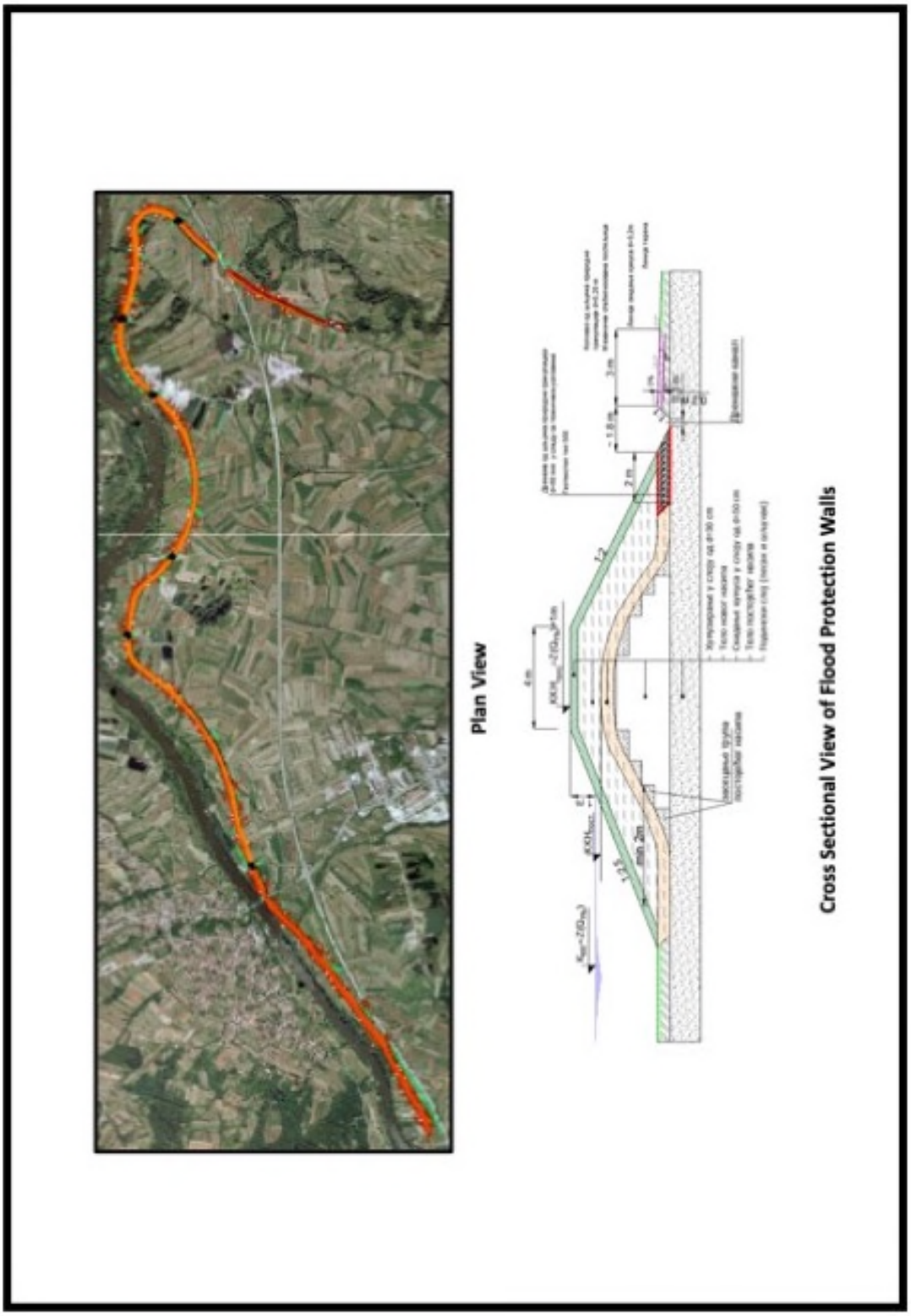


Figure 3-11. The route and typical cross-section of the Structure 3, Section-1

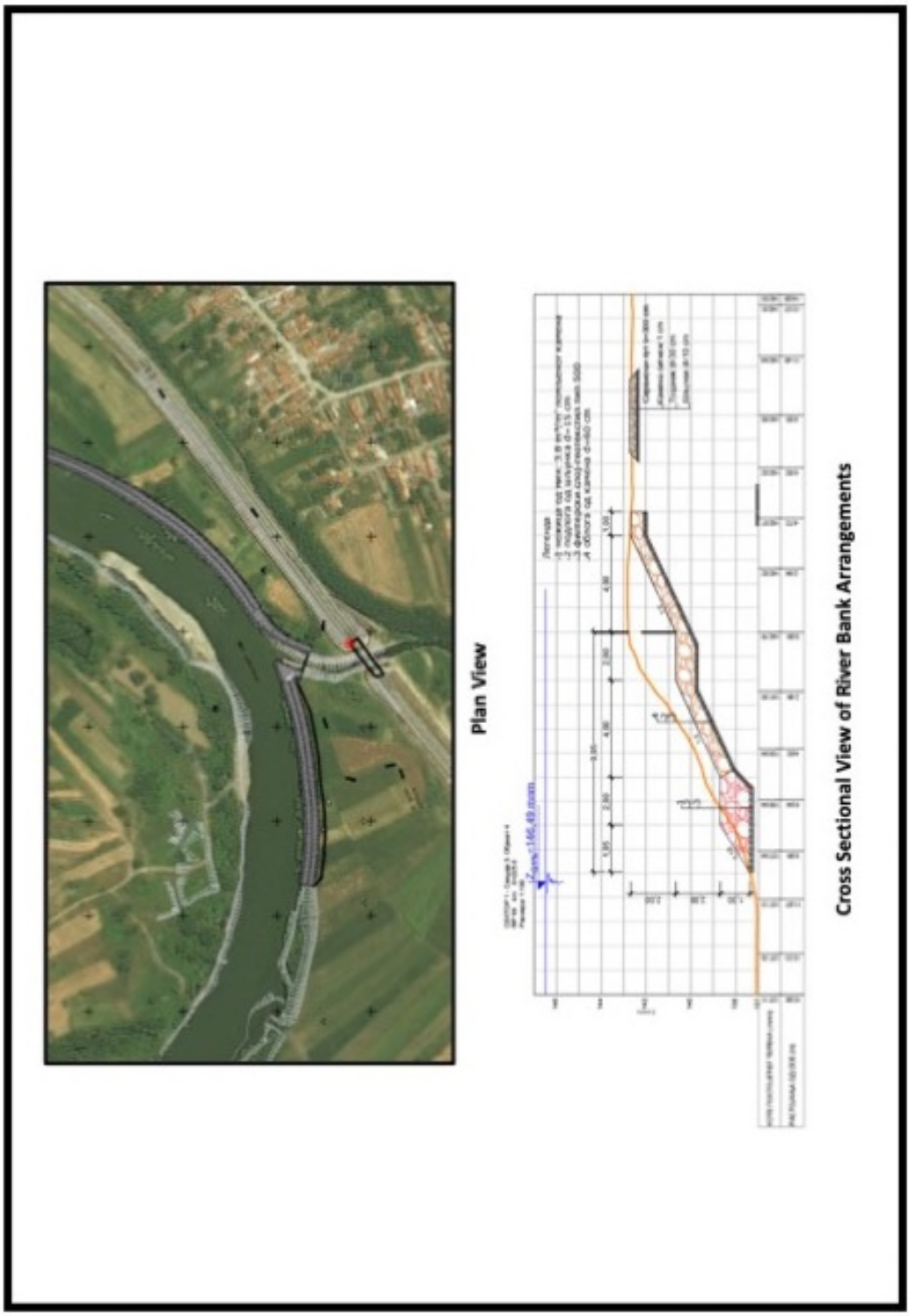


Figure 3-12. The route and typical cross-section of the Structure 4, Section-1

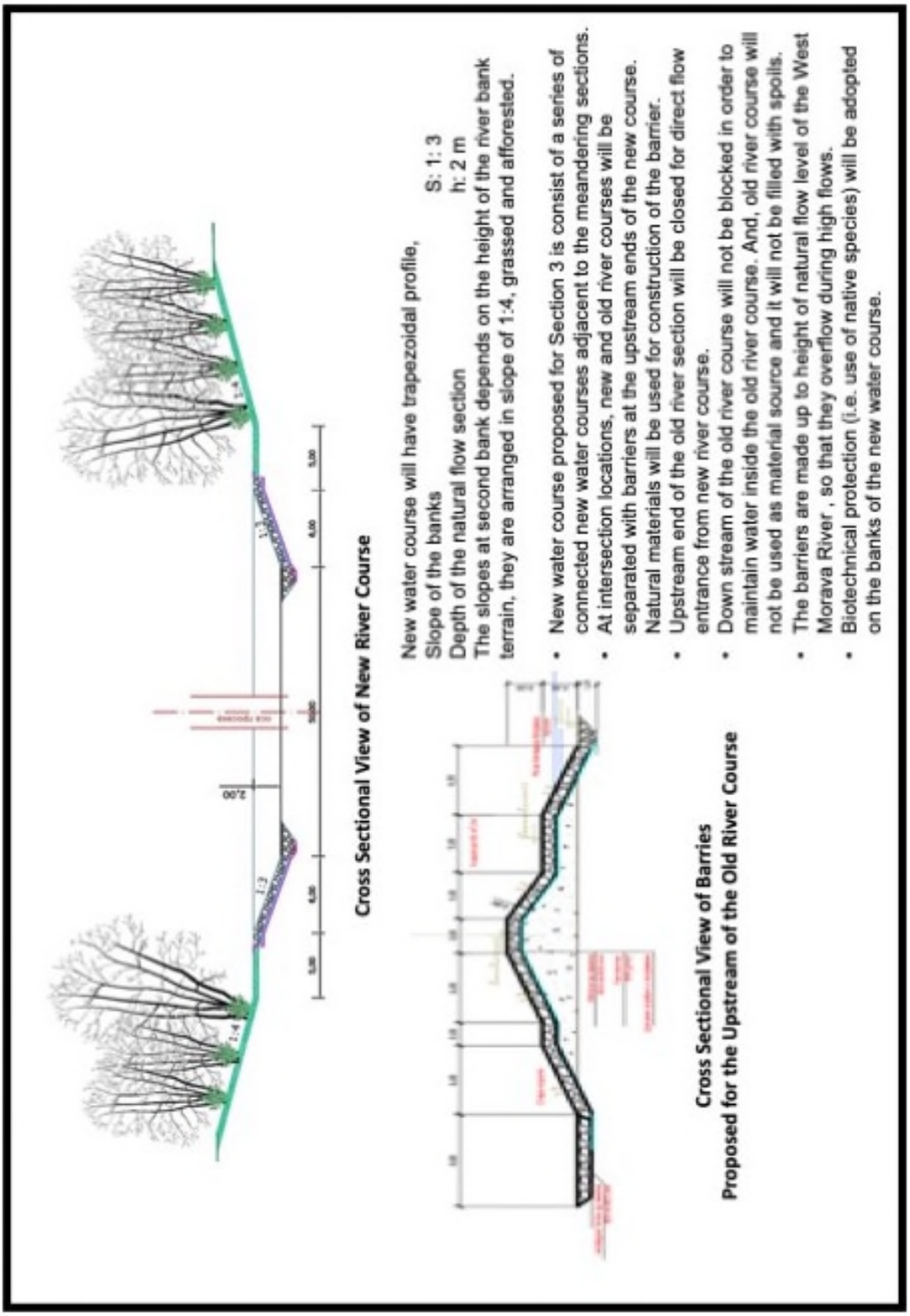


Figure 3-13. Typical cross-section of the Structure 17, Section-3

3.6 Above Ground Structures and Key Infrastructure

Information about the bridges, overpasses and interchanges along the Proposed Motorway Route are presented in Table 3-7.

Table 3-7. Number of Bridges, Overpasses and Interchanges along the Sections of the Motorway

	Section-1	Section-2	Section-3
Bridge	10	31	15
Overpass	8	19	4
Underpass	1	15	9
Culvert	19	19	15
Interchange	4	5	2

Bridge: Bridge is a structure built to span “physical obstacles such as streams, lakes”.

Overpass: It is a bridge, road, railway or similar structure that crosses over another “road” or “railway”.

Underpass: It is a road or a pedestrian passage in a tunnel that runs underneath a “road” or “railroad”.

Culvert: A culvert is a structure that allows water to flow under a road, railroad, trail, or similar obstruction from one side to the other side.

Interchanges: Interchanges are the components of the Project for the connection of the Motorway with the existing and planned road network in the region. The location of interchanges is determined according to the position of the designed alignment route in relation to the existing road network. The design of the intersections is a result of secondary road ranking. Interchanges are designed with full connections. The dimensions of the layout elements of the interchanges are related to the existing spatial constraints. The following table is the list of interchanges designed in the Morava Corridor Motorway Project.

Table 3-8. List of Interchanges of the Morava Corridor Motorway Project

Sections	Sectors	Station	Interchange List
Section-1	Sector-1	752+720	Pojate Interchange
	Sector-1	3+087	Ćićevac Interchange
	Sector-3	20+041	Kruševac East Interchange
	Sector-3	21+851	Kruševac West Interchange
Section-2	Sector-4	34+791	Velika Drenova Interchange
	Sector-5	47+546	Trstenik Interchange
	Sector-6	57+407	Vrnjačka Banja Interchange
	Sector-7	71+325	Vrba Interchange
	Sector-7	77+994	Kamidzora Interchange
Section-3	Sector-8	80+950	Adrani Interchange
	Sector-9	107+263	Preljina Interchange

The following figures show the sketches of the proposed interchanges designed in the Morava Corridor Motorway Project.

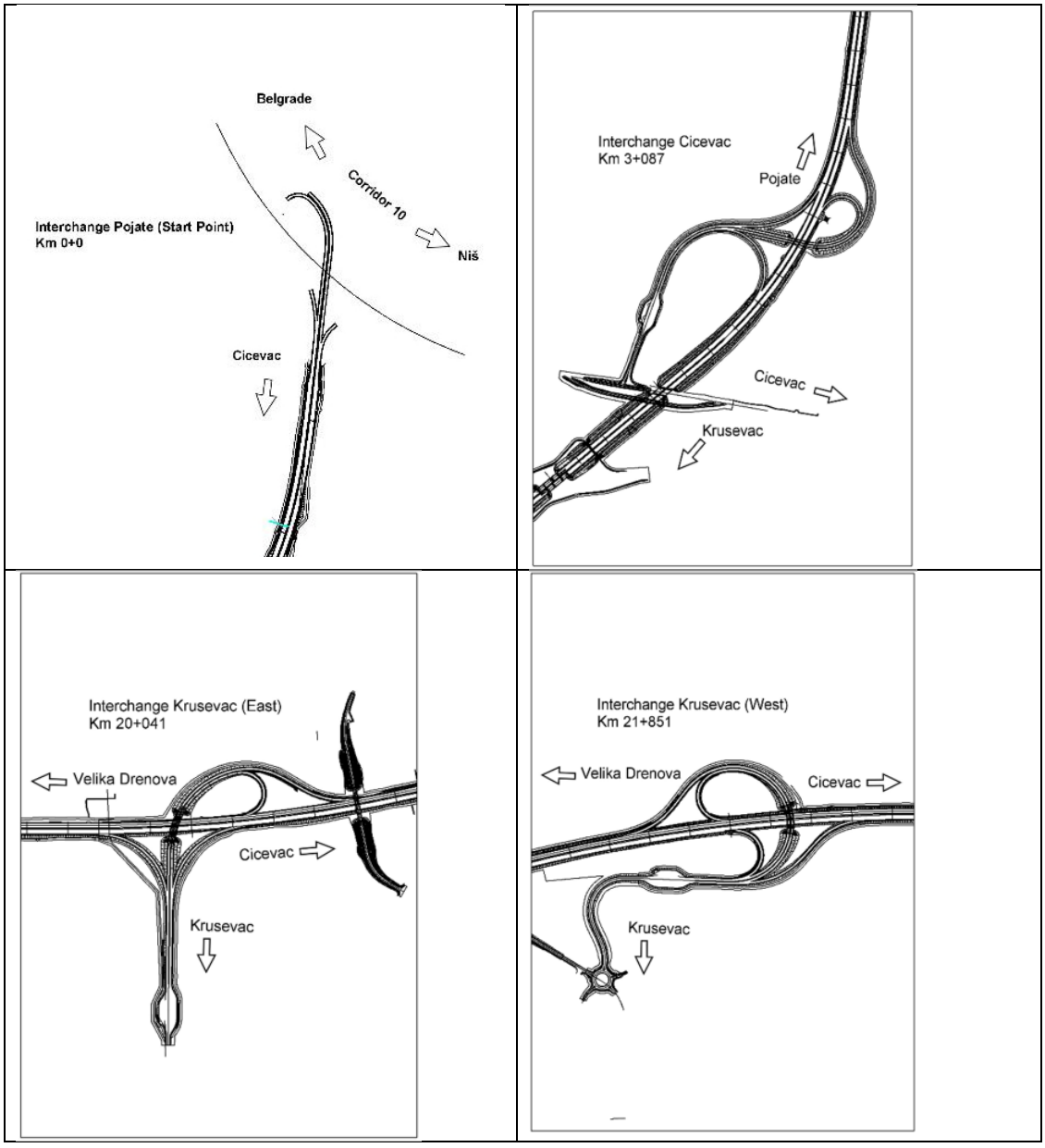


Figure 3-14. Sketches of the Interchanges planned along the Motorway.

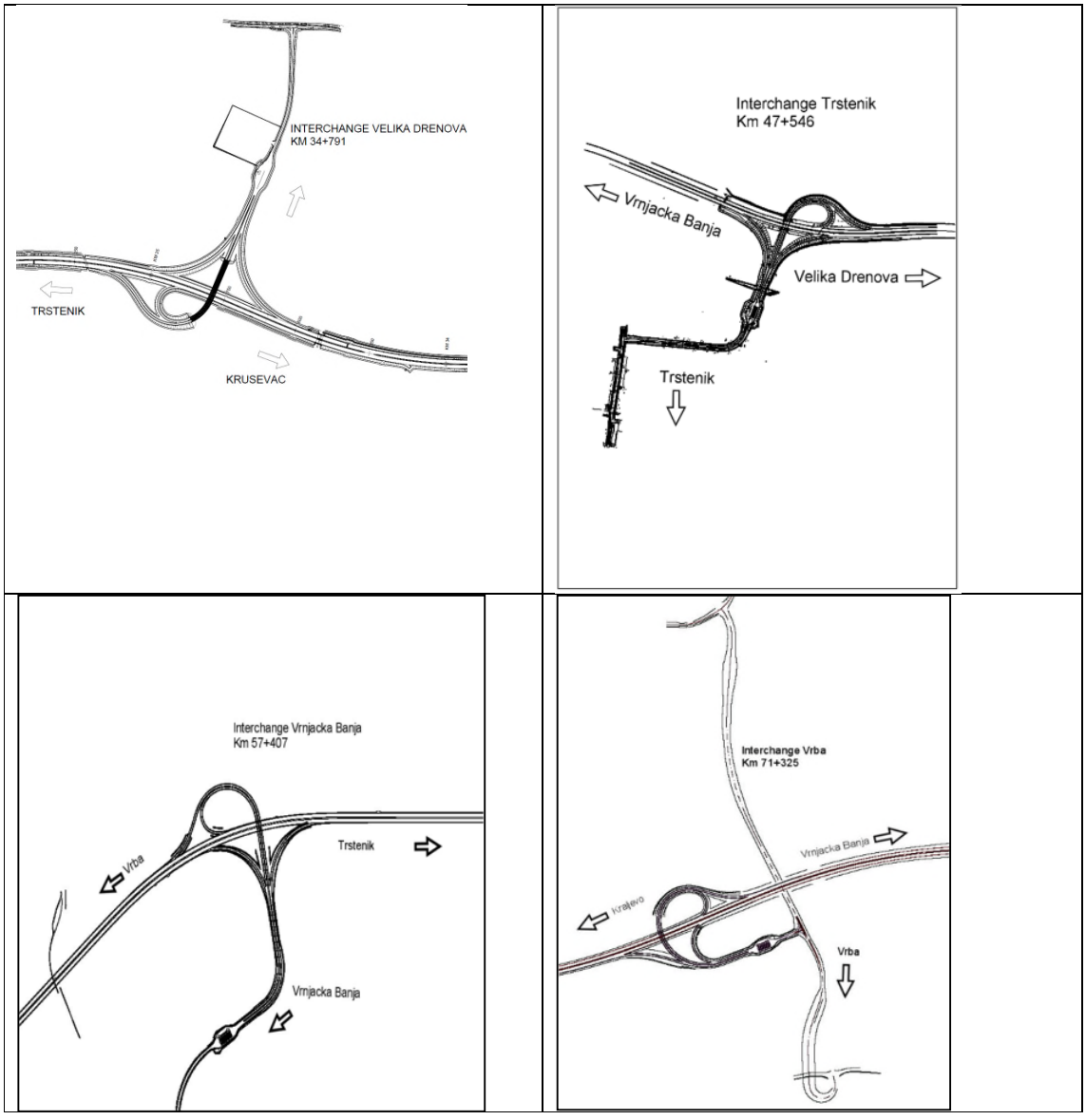


Figure 3-15. Sketches of the Interchanges planned along the Motorway.

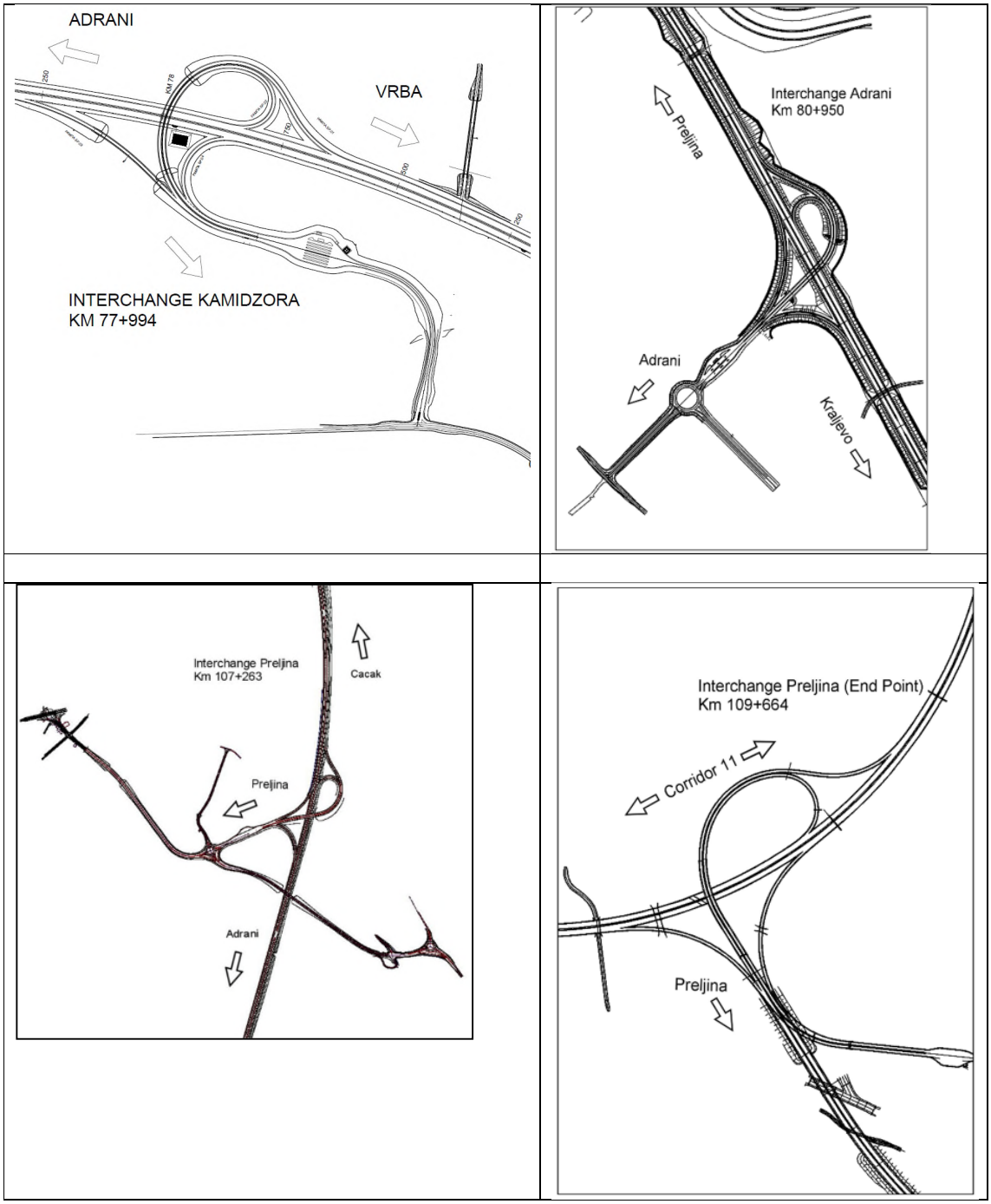


Figure 3-16. Sketches of the Interchanges planned along the Motorway.

3.7 Project Facilities

Third party facilities, that are also funded as a part of the Project are considered as the project components. These facilities' construction and operation are also considered in the context of the ESIA studies.

Among others, the main project facilities to be considered in the ESIA are the followings:

- Quarries and borrow pits;
- Camp sites and storage areas;
- Crushers, concrete batching plants and asphalt plants;
- Access roads; and
- Power lines, communication cables and substations.

3.7.1 Camp Sites, Storage Sites

In the context of the Project's construction activities, there will be three campsites and five precast storage yards of which currently planned locations and layouts can be seen in the following table and figures. There will be no additional campsite for the river regulation works. There will be a total of max. 3,800 workers, accommodated in 3 camps.

Table 3-9. Camps and Precast Yards

Description	Amount
Camp (office and accommodation)	3
Precast Yard	5

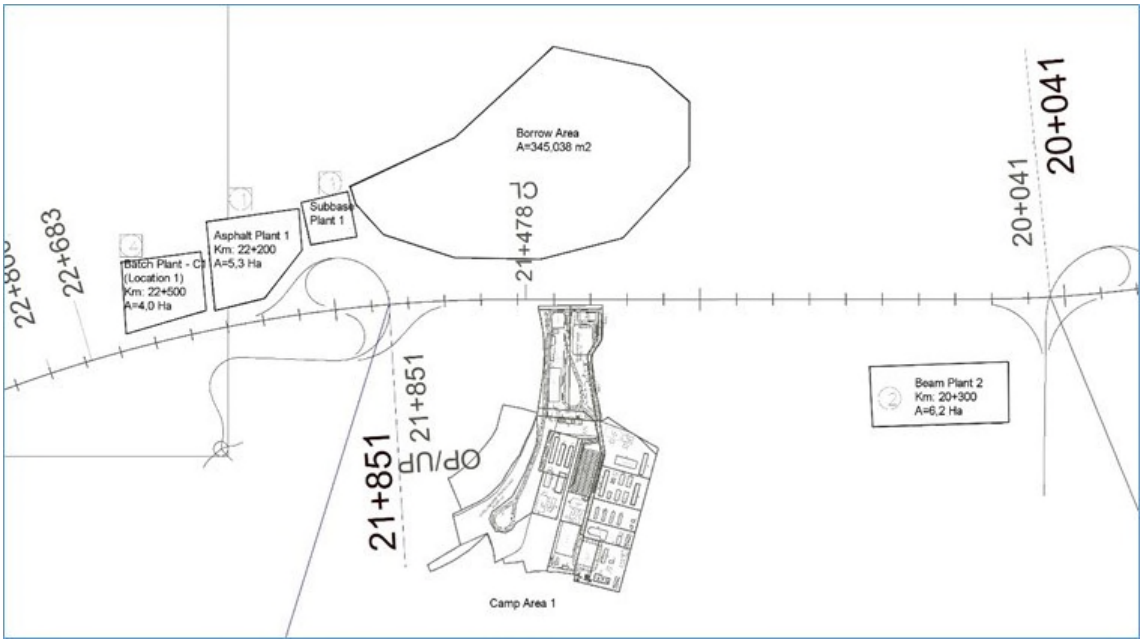


Figure 3-17. Camp Area – 1 in Section-1.

Current layout of the camp area, that might be changed in the final design phase, can be seen in Figure 3-18 below and the figure shows the types of the facilities to be installed within the camp area.

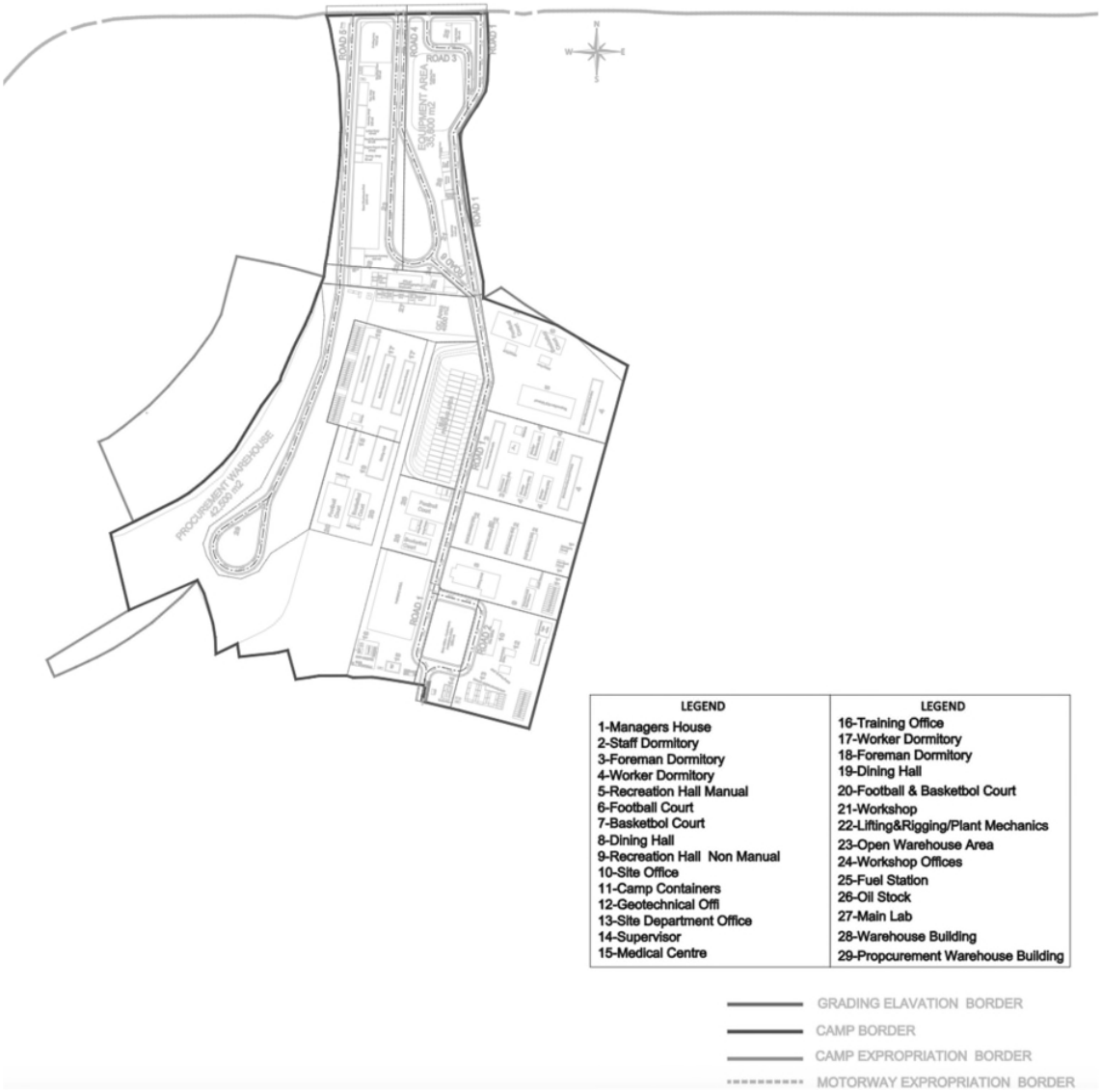


Figure 3-18. Layout of Camp Area in Section-1 (Krusevac).

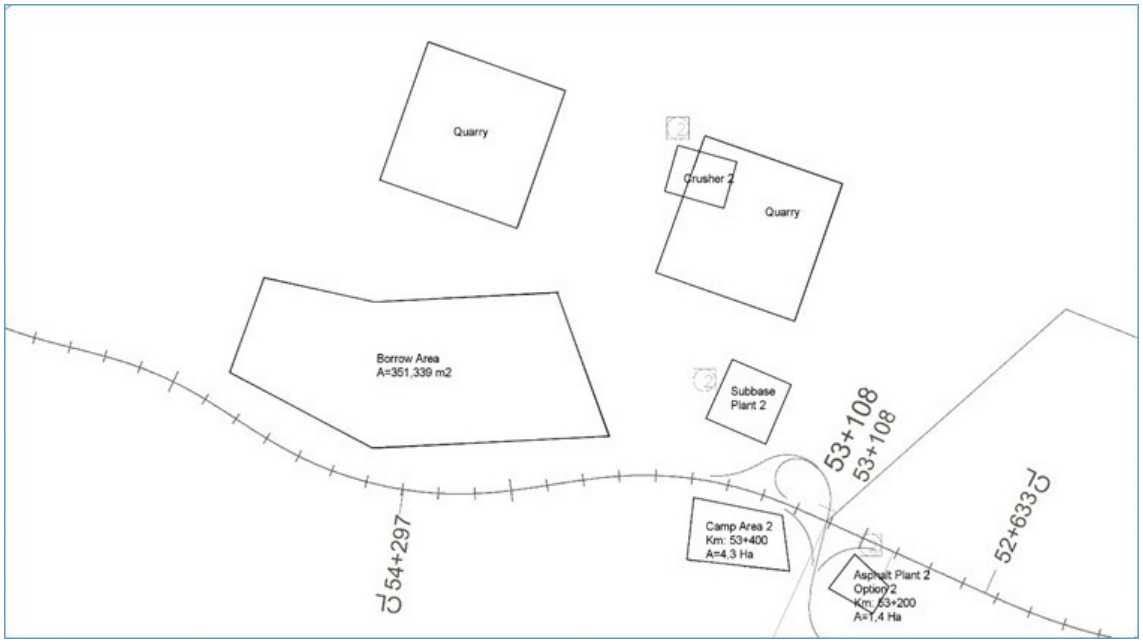


Figure 3-19. Camp Area – 2 in Section-2.

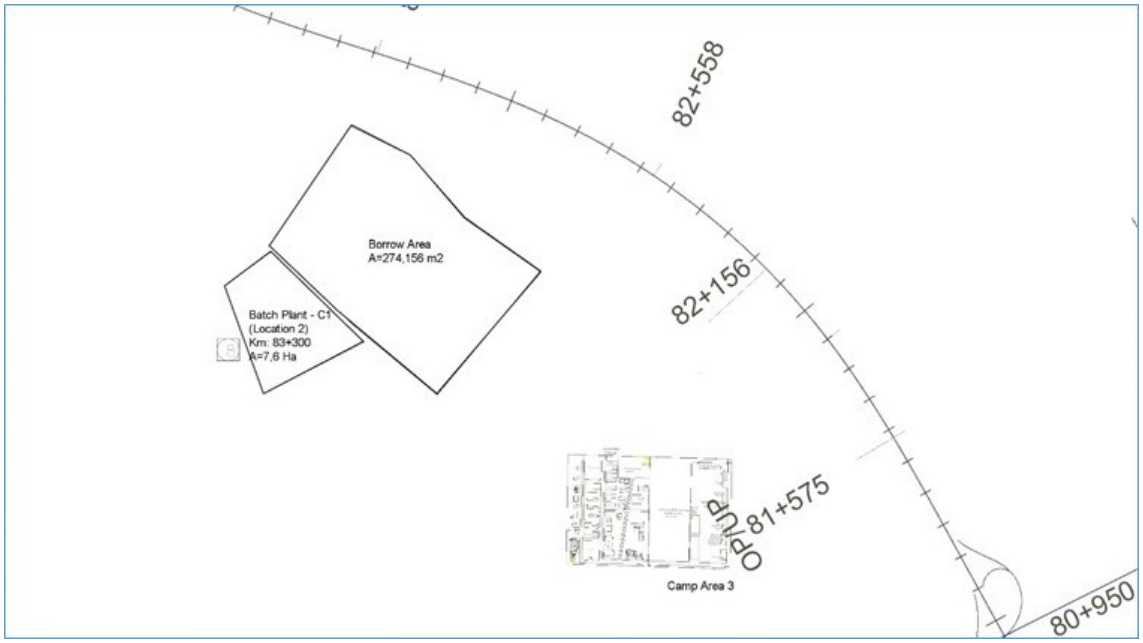


Figure 3-20. Camp Area – 3 in Section-3.

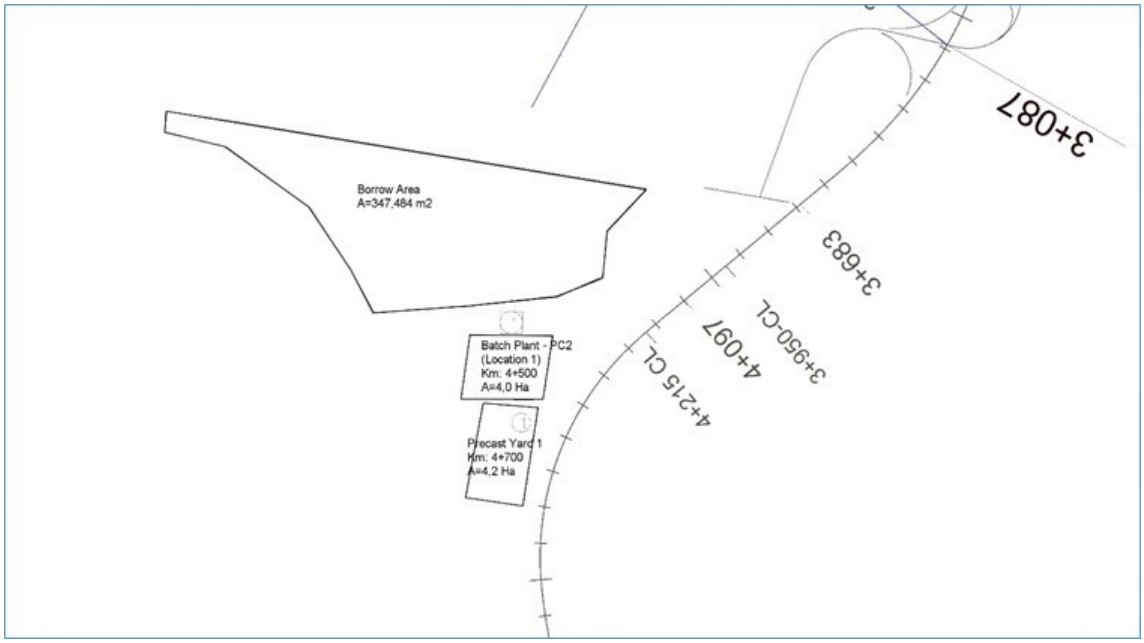


Figure 3-21. Precast Yard-1

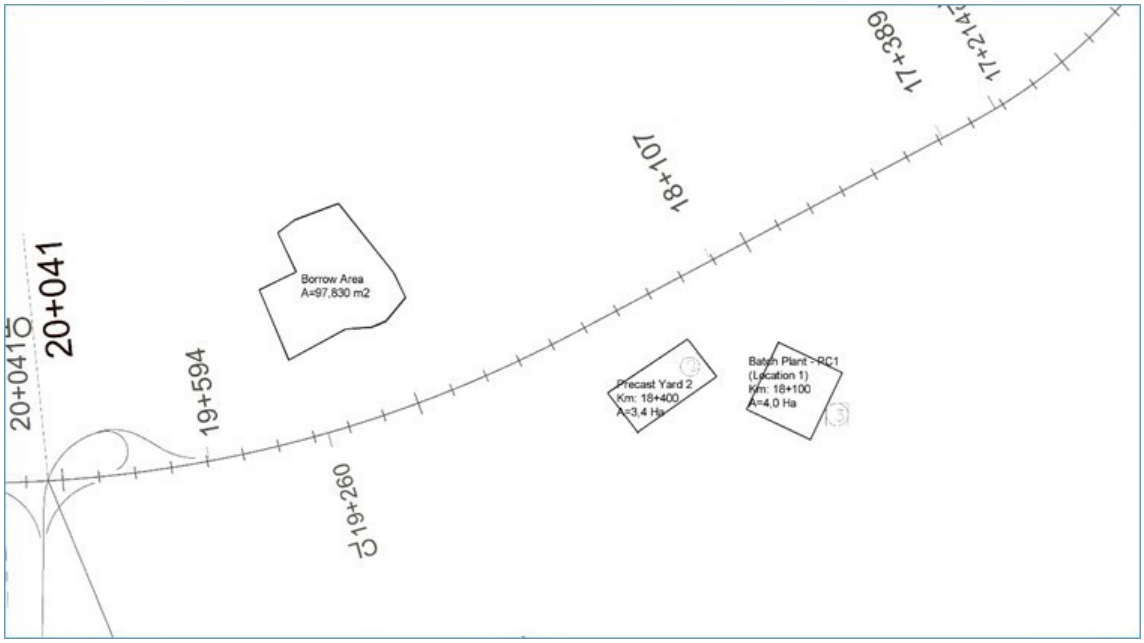


Figure 3-22. Precast Yard-2

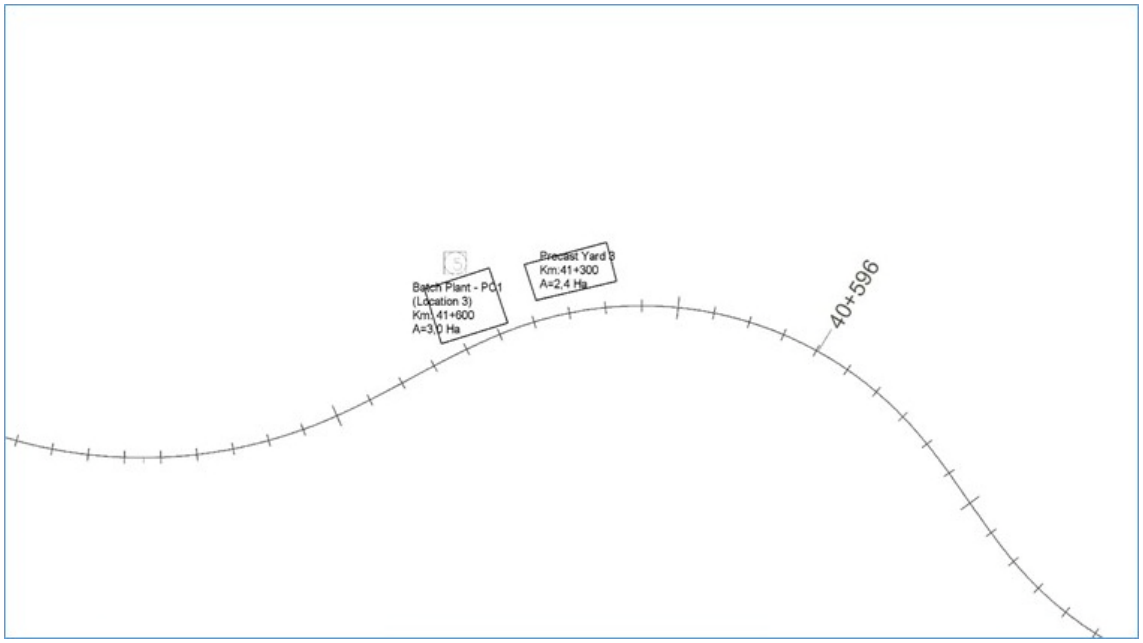


Figure 3-23. Precast Yard-3

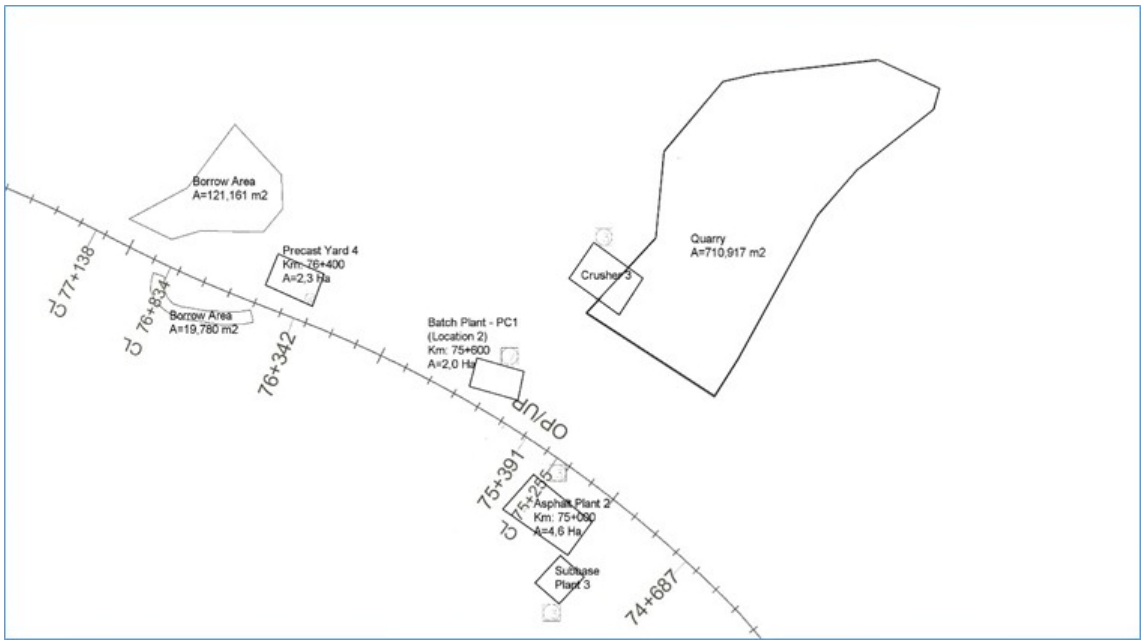


Figure 3-24. Precast Yard-4

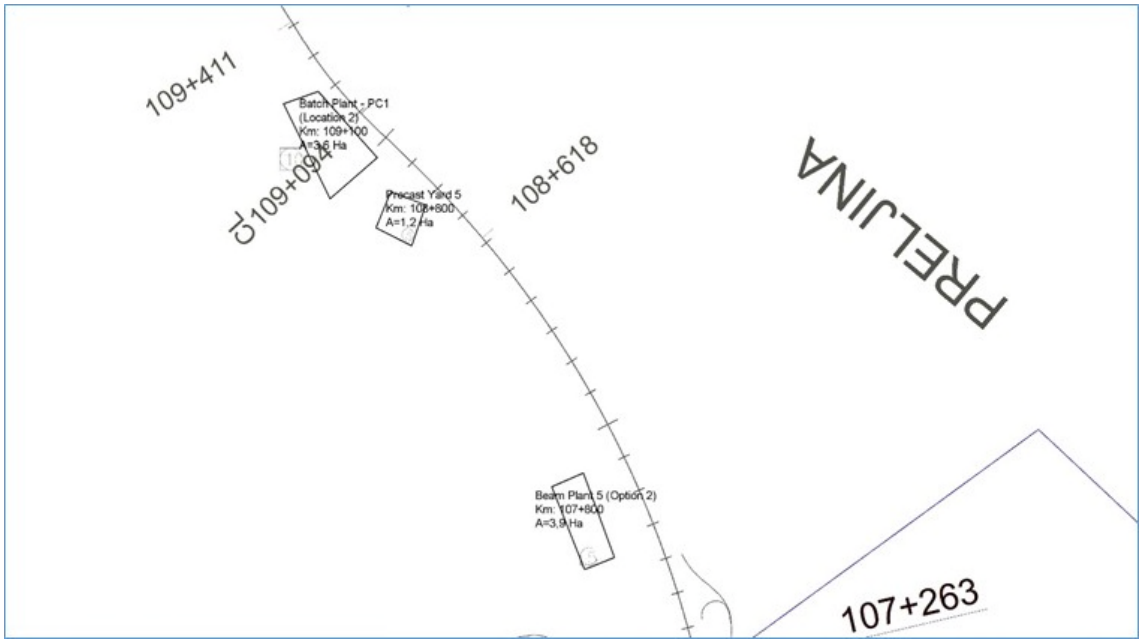


Figure 3-25. Precast Yard-5

3.7.2 Quarries and Borrow Pits

There will be various borrow pits and quarries, that have been identified by the Employer and the Contractor along the Proposed Motorway Route, to be used in the construction phase of the Project (See Table 3-10).

Table 3-10. Quarries and Borrow Pits

Description	Amount
Identified Borrow Pit (Alluvial Deposit)	49
Identified Quarry (Rock Material)	5
Eruptive Quarry	2
Crusher	4

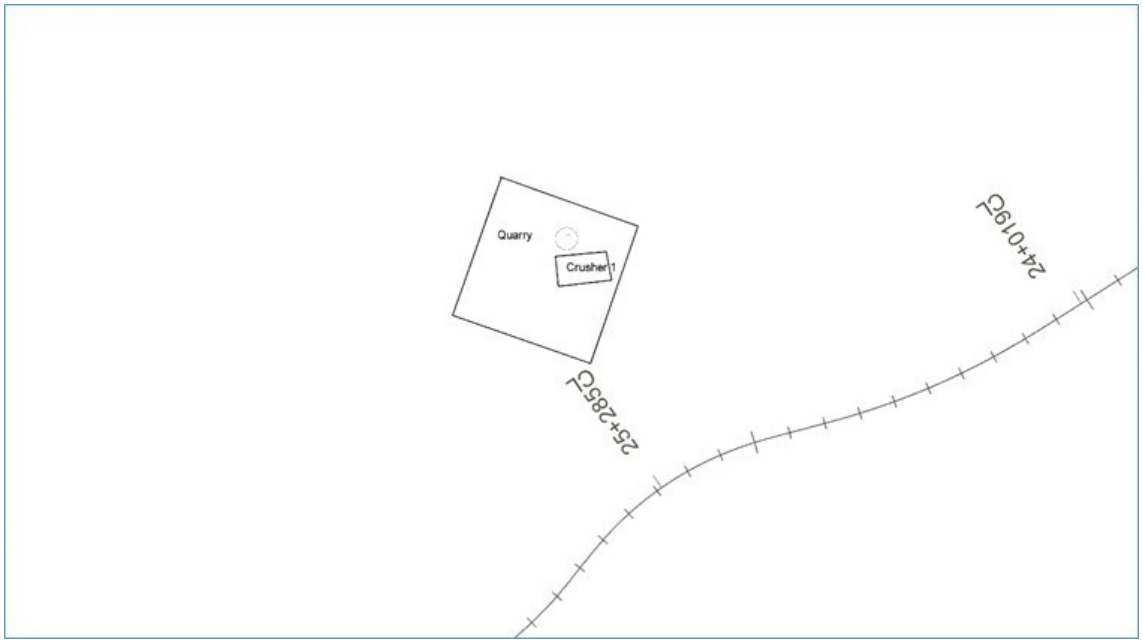


Figure 3-26. Quarry with Crusher-1

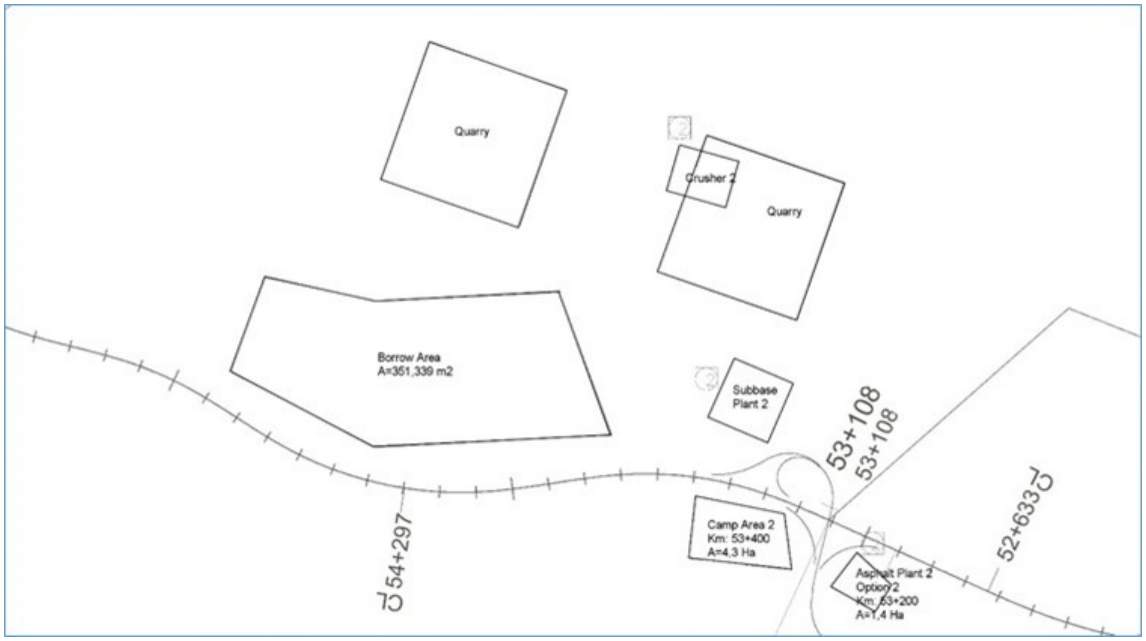


Figure 3-27. Quarry with Crusher-2

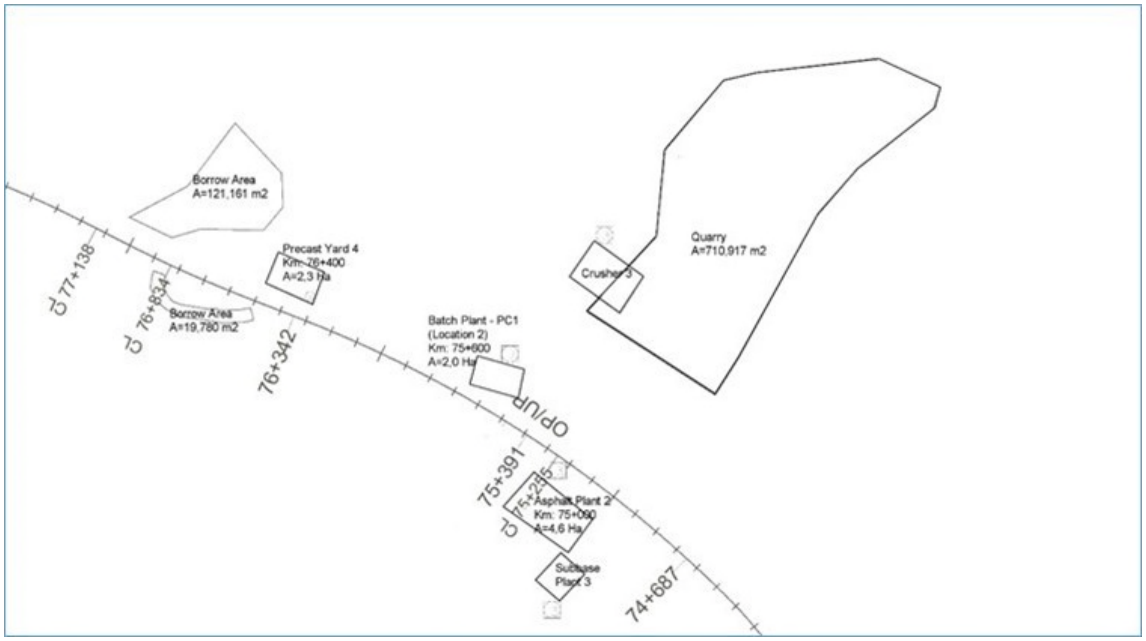


Figure 3-28. Quarry with Crusher-3

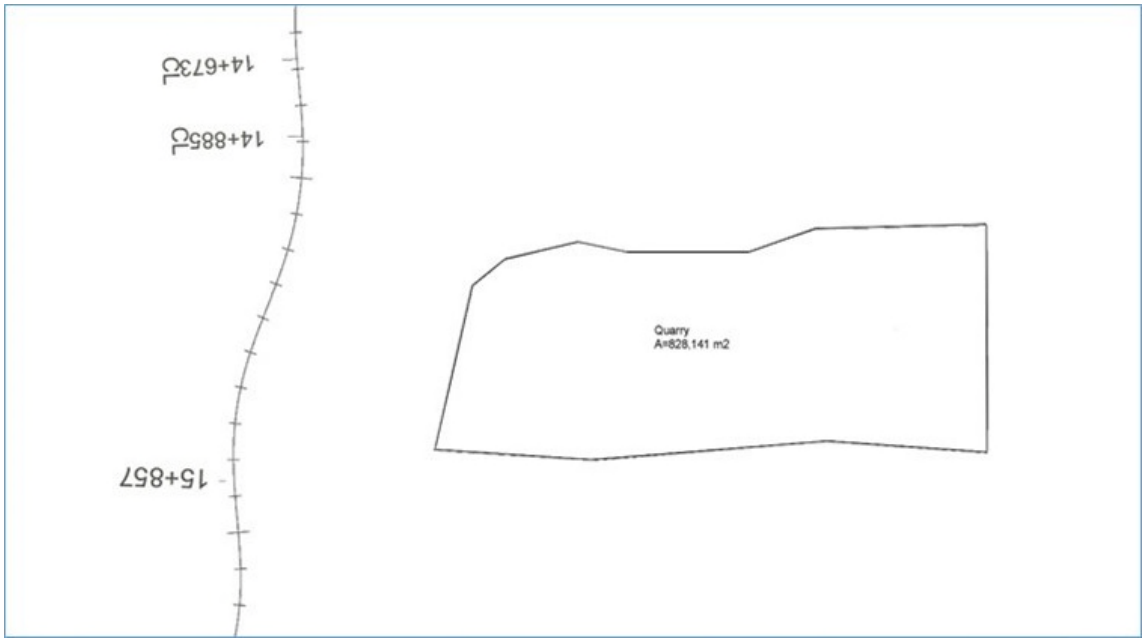


Figure 3-29. Quarry

During the site selection of borrows and quarries, the locations proposed by design team were assessed by 2U1K in terms of environmental (in particular ecological features such as natural habitats) and social constraints. Some areas proposed were rejected and alternatives were proposed and evaluated. The locations of different borrow pits proposed for the project's material need supply are provided in Appendix-5.

3.7.3 Concrete Batching, Beam, Subbase, Asphalt and Screen – Wash Plants

There will be various plants for production of asphalt, subbase, beams and batching to be used in the construction phase of the Project (see Table 3-11 and Figure 3-30 to Figure 3-37). Planned working duration is 10 hours for batch plants. It is planned to consume 280 tons of cement as daily average and it is estimated that concrete production will be 750 m^3 as daily average. Two aspahlt plants with 300 tons per hour (tph) and 150 tph capacity will be erected. Planned working duration for asphalt plants is 10 hours. It is estimated to have 3,000 tons of asphalt production as daily average. As an option, bitumen can be used in the asphalt and in such cases it will be purchased from Pančevo Refinery.

Table 3-11. Different Plants such as batch, asphalt, subbase, beam and screen and wash plants

Description	Amount
Batch Plant	9
Asphalt Plant	3
Subbase Plant	3
Beam Plant	4
Screen & Wash Plant	4

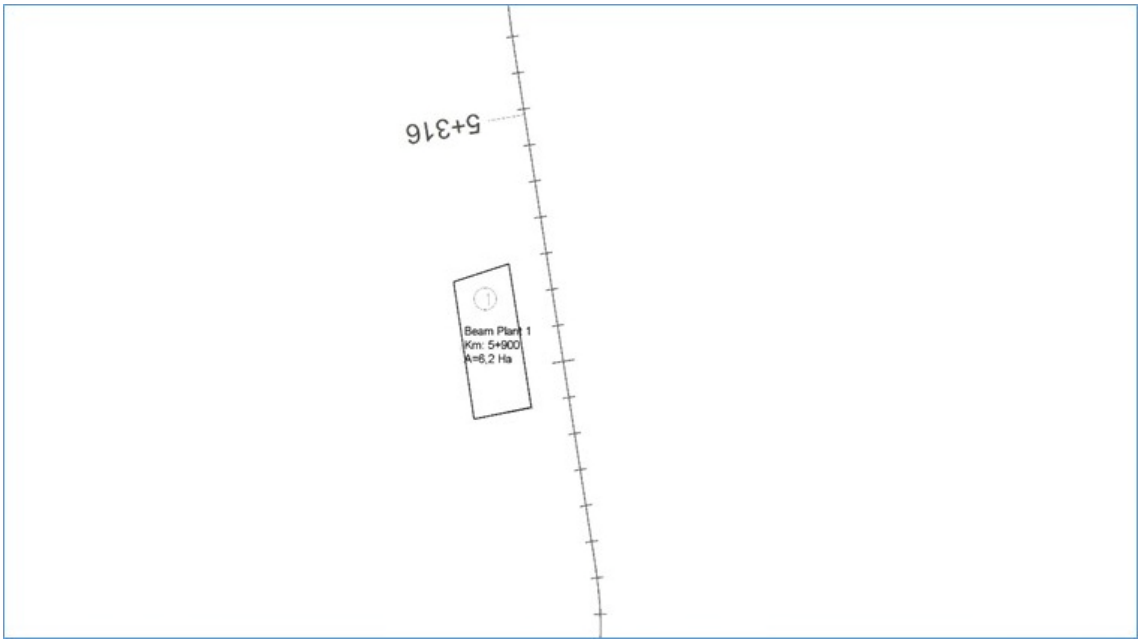


Figure 3-30. Beam Plant-1

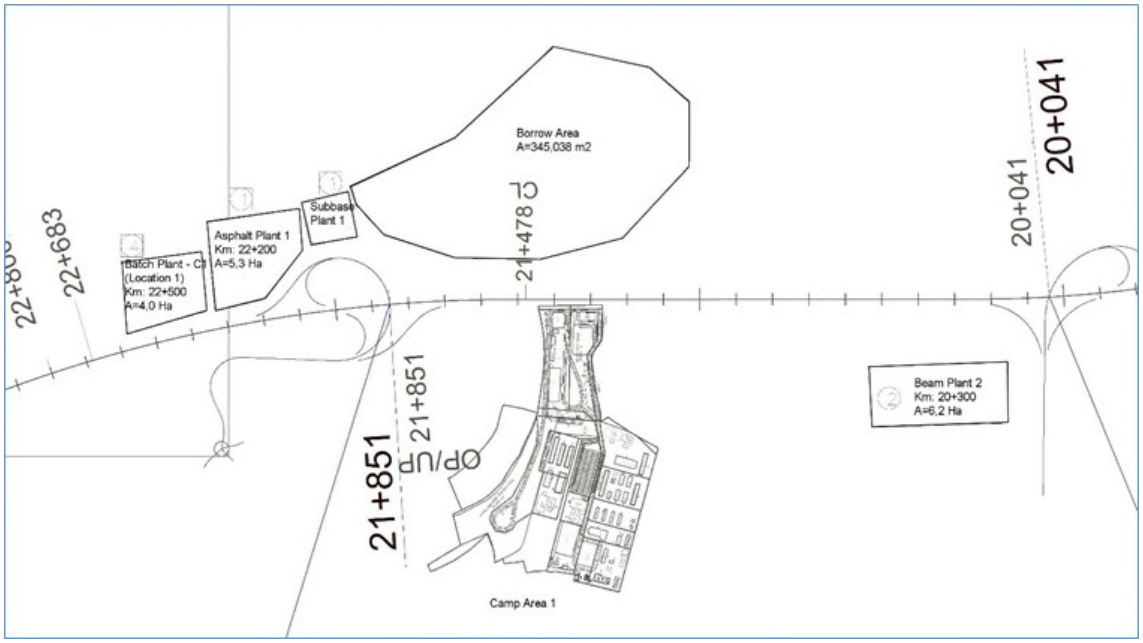


Figure 3-31. Batch Plant-1, Asphalt Plant-1, Beam Plant-2 and Subbase Plant-1

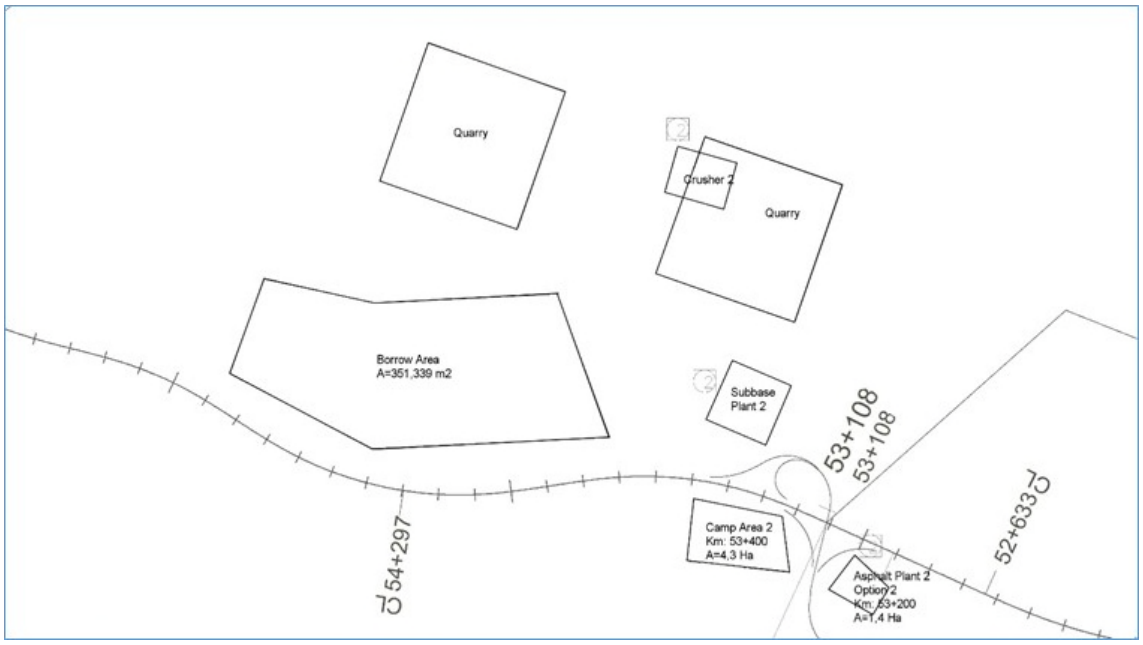


Figure 3-32. Asphalt Plant-2 and Subbase Plant-2

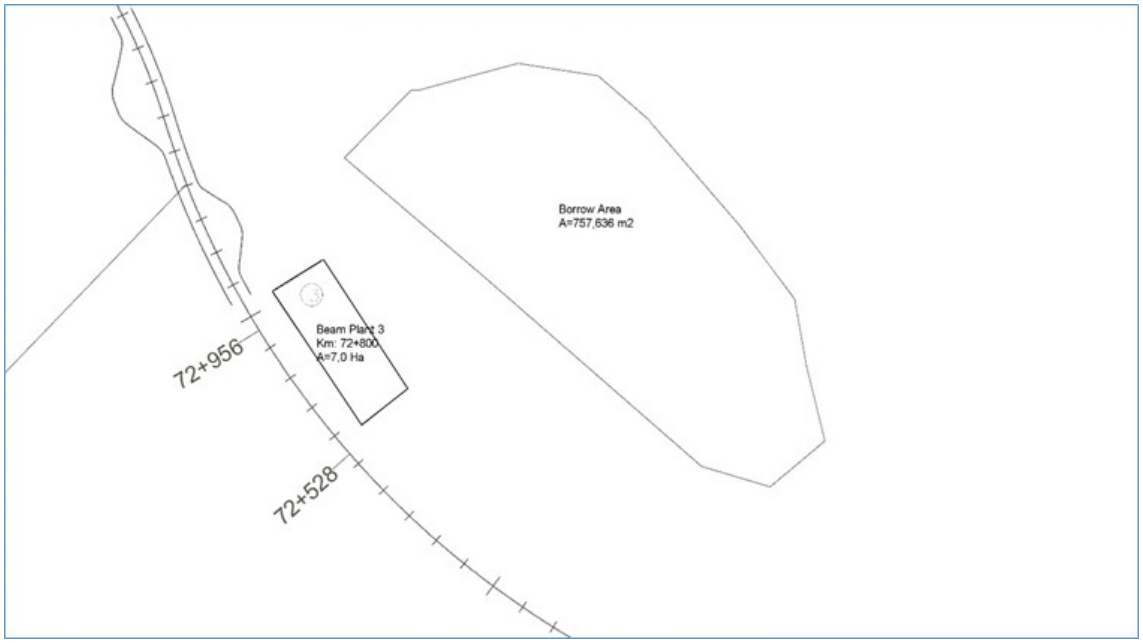


Figure 3-33. Beam Plant-3

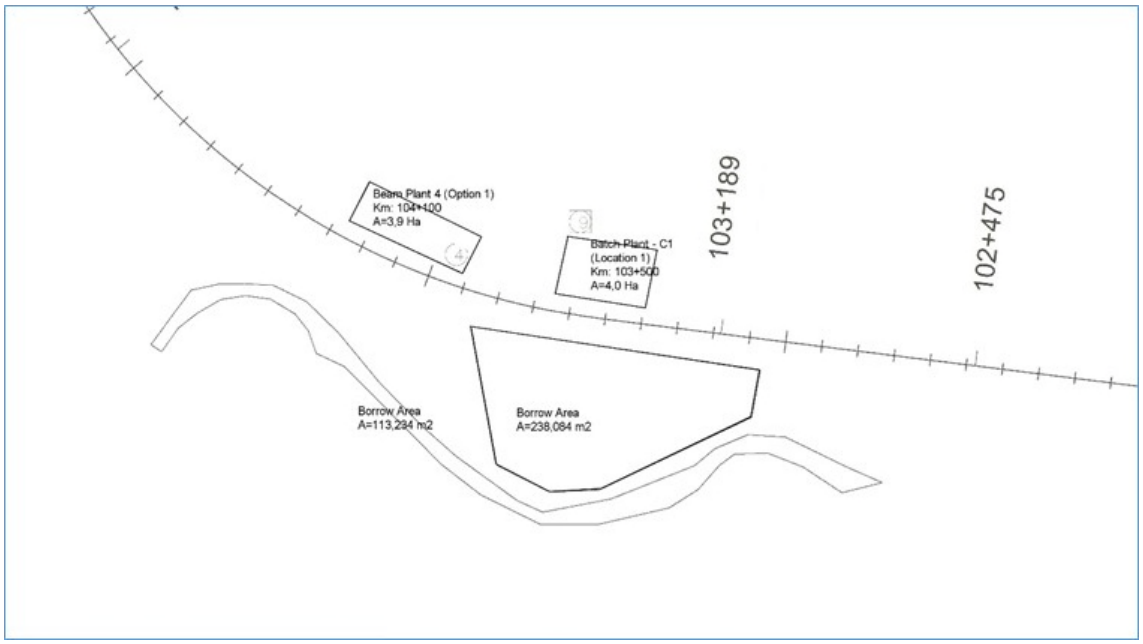


Figure 3-34. Beam Plant-4

Figure 3-35. Screen and Wash Plant-1

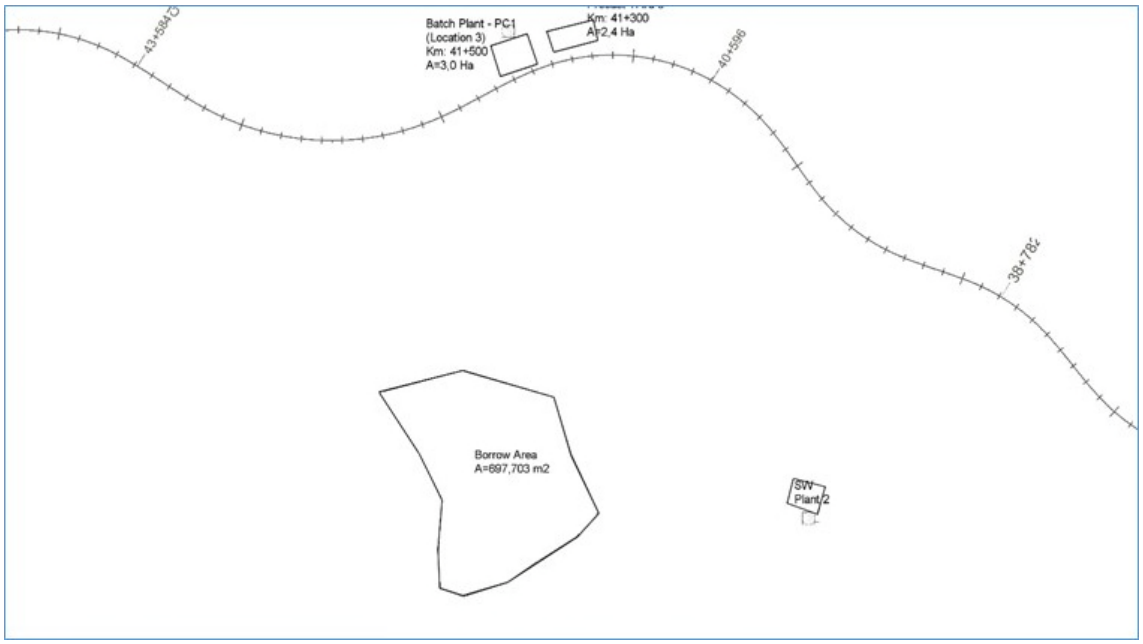


Figure 3-36. Screen and Wash Plant-2

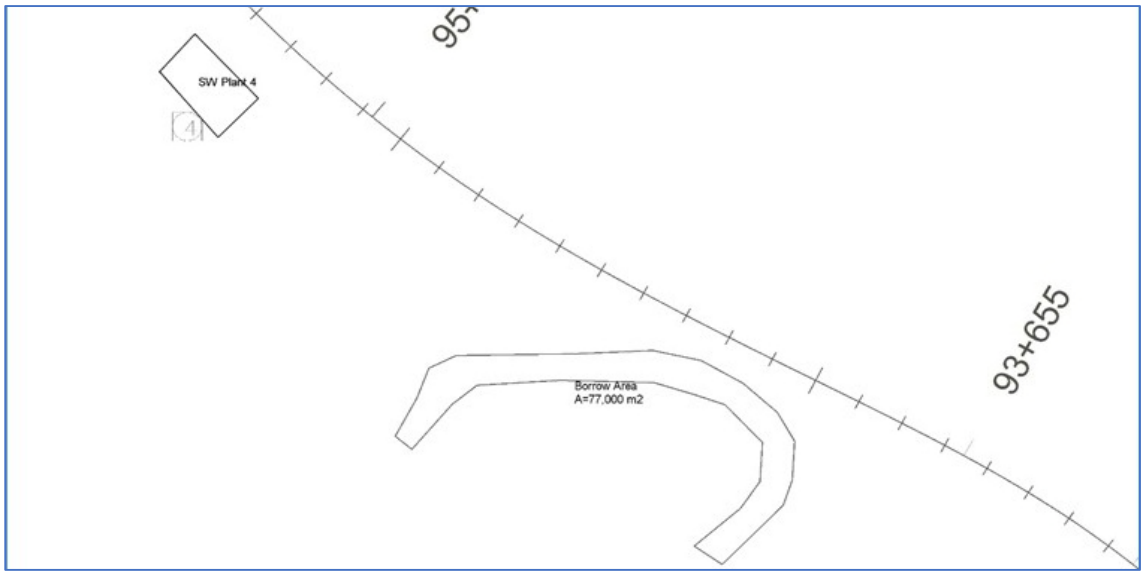


Figure 3-37. Screen and Wash Plant-4

3.7.4 Temporary Access Roads

Access roads will be required to reach motorway alignment locations from existing local/national roads. These existing roads will also be used to reach the area where river regulation works are carried out, including on-farm roads. Furthermore, in addition to these existing roads, temporary access roads will be constructed for transportation to the Project Site. The locations and layout of these temporary access roads will be developed by the Contractor in consultation with the local authorities. The length of the temporary access roads will be approximately 66,000 m in total. If any requirement, arrangements will be made on existing roads. The figure below illustrates the typical cross section of access roads. As it seen in the Figure, 30-40 cm thick of topsoil will be stripped from the existing surface and at least 30 cm thick of filling material will be used to stabilize the road.

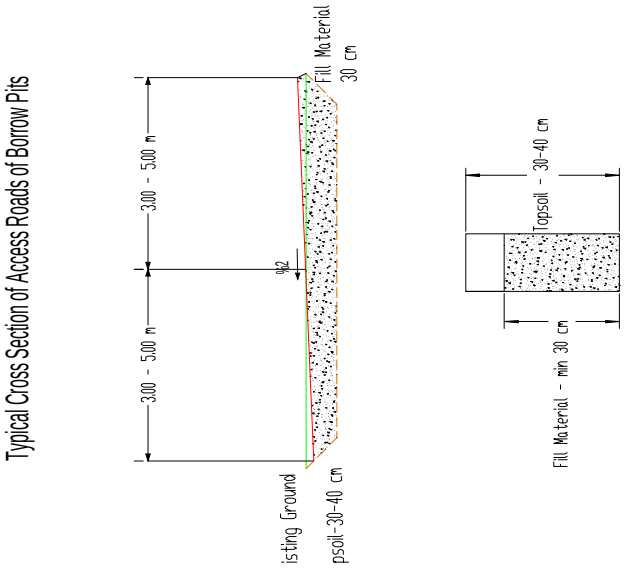


Figure 3-38. Typical Cross Section of Access Roads

3.8 Third Party Utilities

In linear development projects such roads as Morava Corridor Motorway, the route traverses third party utilities that are the existing structures or planned ones. These third-party utilities may include roads, railways, dams, overhead energy transmission lines, pipelines, telecommunication cables etc. The following tables include the river, lake/pond, road and railway crossings along the proposed motorway project.

Table 3-12. River Crossings (via Bridge)

Sections and Sectors	KP	Length (m)	River
Section-1 and Sector-1	8+519	100	Morava
Section-1 and Sector-2	9+933	100	Morava
Section-1 and Sector-2	15+857	150	Morava
Section-2 and Sector-4	29+911	100	Morava
Section-2 and Sector-4	43+150	80	Morava
Section-2 and Sector-5	48+100	100	Morava
Section-2 and Sector-5	52+100	100	Morava
Section-2 and Sector-7	71+000 Ratina Interchange	75	Morava
Section-2 and Sector-7	74+687	100	Ibar
Section-3 and Sector-8	82+150	50	Morava

Source: Design Team of Contractor, 2019.

Table 3-13. Pond Crossings

Artificial Pond Crossing		
KP Start	**KP End**	**Length (m)**
4+900	5+100	200
15+850	15+900	50
80+850	80+950	100
81+600	81+700	100
84+700	84+750	50
Total Length (km)		0.5

Source: GIS Department of Consultant, 2019.

Table 3-14. Road Crossings

Sectors	KP	Type of Crossing
Sector-1	00+216	Overpass
Sector-1	03+087	Overpass
Sector-1	05+316	Overpass
Sector-1	07+689	Overpass
Sector-3	19+594	Overpass
Sector-3	20+041	Overpass
Sector-3	21+851	Overpass
Sector-3	22+683	Overpass
Sector-4	34+792	Overpass
Sector-4	35+167	Overpass
Sector-4	36+373	Overpass
Sector-4	38+088	Overpass
Sector-5	44+534	Overpass
Sector-5	46+283	Overpass
Sector-5	55+044	Overpass
Sector-6	57+407	Overpass
Sector-7	71+325	Overpass
Sector-7	71+865	Overpass
Sector-7	73+086	Overpass
Sector-7	75+359	Overpass
Sector-7	77+994	Overpass
Sector-8	80+950	Overpass
Sector-9	101+644	Overpass
Sector-9	106+891	Overpass
Sector-9	107+263	Overpass
Sector-3	17+389	Underpass
Sector-4	27+936	Underpass
Sector-4	31+041	Underpass
Sector-4	32+565	Underpass
Sector-4	39+149	Underpass
Sector-4	40+173	Underpass

Sectors	KP	Type of Crossing
Sector-6	63+232	Underpass
Sector-6	64+819	Underpass
Sector-6	67+386	Underpass
Sector-7	68+339	Underpass
Sector-7	70+012	Underpass
Sector-7	70+813	Underpass
Sector-7	70+977	Underpass
Sector-7	75+441	Underpass
Sector-7	78+717	Underpass
Sector-7	80+308	Underpass
Sector-8	79+650	Underpass
Sector-8	80+595	Underpass
Sector-8	81+575	Underpass
Sector-8	83+390	Underpass
Sector-8	85+350	Underpass
Sector-8	86+897	Underpass
Sector-8	89+740	Underpass
Sector-8	93+655	Underpass
Sector-9	106+619	Underpass

Source: Design Team of Consultant, 2019.

Table 3-15. Railway Crossings

RWX (KP)	Remarks
1+322	Two-line railway crossing via bridge
75+465	Underpass

Source: Design Team of Consultant, 2019.

Table 3-16. Powerline Crossings

Type of Power Line	KP
Existing 110 kV	25+050
	77+000
	106+400
Existing 35 kV	6+500
	37+500
	43+500
	74+300
	86+100
	98+100
	111+800
Planned 400 kV	72+700
Planned 110 kV	110+900

Source: GIS Department of Consultant, 2019.

Table 3-17. Gas Pipeline Crossings

Type	KP
Over 16 Bar	7+000
	10+200
	4+800
	15+750
	19+100
	19+850
	22+500
	24+300
	25+900
	26+700
	50+200
	50+500
	52+500
	53+100
	56+850
	56+050
	56+400
	58+550
	58+600
	59+950
	60+250
	61+400
	64+850
	65+050
	70+000
	71+300
	74+400
	75+000
	77+250
	81+550
	83+000
	86+450
	111+150
Up to 16 Bar	111+500

Source: GIS Department of Consultant, 2019.

In addition, there are waste disposal sites in the settlements around the Project Site and these areas were evaluated during the field studies. The communal waste disposal sites to be potentially used within the scope of the Project are as follows;

- **Ćićevac and Varvarin**[1] JKSP Razvitak from Ćićevac and JKP Varvarin from Varvarin are engaged for collection, transport and disposal of communal waste. Collected communal waste from Ćićevac and Varvarin Municipalities is disposed on non-hygenic dumpsite located in abandoned river valley, approximately 500 m from Great Morava River and 4 km from the road Ćićevac – Varvarin. The dumpsite has been used for more than 20 years and it occupies surface of approximately 1 ha. Annual disposal of communal waste from both companies is estimated on approximately 10,600 m^3. There are no protective measures and very limited activities for compacting of disposed waste (with bulldozer). Certain amounts of construction and animal waste are disposed also.

- **Kruševac**[2] JKP Kruševac is engaged for collection, transport and disposal of communal waste. Communal waste is disposed on the Srnje dumpsite, location used since 1984, located approximately 6.5 km from Kruševac and between three villages: Srnje, Velika Kruševica and Padež. Total surface of complex is 37 ha of which 20 ha is dedicated for the communal waste disposal. There are no drainage canals on the dumpsite and other protective measures. Daily disposal of non-hazardous waste is estimated on 150 t. The bulldozer and loading shovel are used for manipulation with collected communal waste. JKP Kruševac holds one separate operational unit for sorting and recycling of PET packaging, glass and cardboard/paper/PVC folia.

- **Trstenik**[3] JKSP Komstan Trstenik is engaged for collection, transport and disposal of communal waste on the city landfill. Annual disposal of waste is 9,000 t for communal waste and 2,000 t for the waste from the industry. Industrial waste is presented with sludge and waste chemicals, which are disposed in dedicated concrete cassettes. The landfill is located in Osaonica, in the place called “Dzamski potok”, approximately 3 km from the city of Trstenik. Total surface of the landfill is 7.5 ha. The landfill is edged with fence, with access road, plateau, system for extracting of landfill gases, drainage water system, installed piezometers, etc.

- **Vrnjačka banja**[4] Vrnjačka banja Municipality has signed the contract with sanitary landfill in Lapovo for collection, transport and disposal of communal waste.

- **Kraljevo**[5] JKP Čistoća is engaged for collection, transport and disposal of communal waste on dumpsite “Kulagića Ada”, located approximately 150-200 m from West Morava River. The dumpsite is formed in 1971 and the communal waste is disposed since then. It occupies a surface of approximately 8 ha. Approximately 36,000 t of waste is disposed on

[1] Document: LEAP for the Municipality of Ćićevac for 2017-2021, dated: December 2017 and Strategy of sustainable development of the Municipality of Varvarin for 2007-2017, dated: March 2007.

[2] Document: Local program for environmental protection 2015-2024, dated: March 2015.

[3] Document: Program for environmental protection in the Municipality of Trstenik 2017-2021, dated: February 2017.

[4] Publicly available information.

[5] Document: LEAP for the Municipality of Kraljevo, dated: 2012.

this dumpsite annually. It is characterized as a dumpsite without minimal protective measures according to applicable Laws.

- **Čačak**[6] Čačak Municipality with other 8 Municipalities in Serbia have founded Duboko regional sanitary landfill in Užice and they are engaged for collection, transport and disposal of communal waste since 2005. Daily collected communal waste in Čačak is approximately 70 t. In addition, the Municipality of Čačak has opened transfer station in March 2016, as a central place for collection and primary sorting of waste in Čačak.

3.9 Project Construction Activities

The construction of the Project will require approximately 2,700 ha of land area including the Construction Project Facilities. The construction of the Project is planned to be completed in four years. The earthworks start dates for each Section are as follows;

- Section-1 in April 2020;
- Section-2 in April 2021; and
- Section-3 in August 2020.

Construction phase of the Project was planned to be completed in late November 2023 when the motorway will be operational.

The average number of the construction workers will be 3,100 and the peak number of the project workers will be approximately 3,800 in 2022. The labour requirement for the construction of the Project will be primarily sourced from Serbia, local labour force and complemented by expats.

Almost all sections of the Motorway are on flat farmland and next to the West Morava River, which is on a large flood plain. The Proposed Motorway Route is easily accessible due to the proximity of local roads and access points. Construction plan comprises passing through agricultural areas. All expropriation and land access provisions are the responsibility of the Employer.

Typical road construction works begin with clearing the terrain in the area defined by the project design boundaries. These works involve the removal of vegetation and structures in the area. The next activities consist of earthworks (cut and fill sections` excavation and embankment activities) for which graders, dozers, concrete skippers, rollers and other similar machinery are used. This is followed by the construction of culverts and drainage systems as well as the construction of larger structures (bridges, retaining walls, etc.). Upon completion of these works, finishing works and pavement of the constructed road starts, i.e., the lower carrier layer,

[6] Publicly available information.

the upper carrier layer and the pavement. The final stages are the installation of ancillary equipment (fencing, signaling etc.) and the preparation of the road belt (greening).

The planned design and construction sequence provided by the Contractor, is as follows:

- Design for Construction (Contractor's Scope);
- River Regulation Design (Employer's Scope);
- Expropriation for project facilities such as camps (other expropriation is Employer's scope);
- Utility Relocations Completion;
- Mobilization;
- Earthworks;
- Drainage[7];
- Structural Concrete;
- Paving;
- Finishing Works; and
- Open to Traffic.

Typical construction activities provided by the Contractor, which will subject to change as per detailed design, are outlined in this section of the Report. The list given in Figure 3-41 shows the possible construction equipment to be used in the construction activities. Permits for "Access to Site" and "Access to Geotechnical Investigation and Survey Locations" as well as "Provision of Borrow Pits/Quarries and Waste Areas" will be obtained by Employer prior to the start of these activities of the Contractor.

3.9.1 Description of Methods of Earthworks

Clearing and grubbing involves the removal from the alignment of surface vegetation and material unsuitable as part of the motorway structure. Bulldozers will generally be used for the clearing and piling the material for hauling. Hydraulic excavators will be required for the demolition of existing obstructions.

For the Project, the cleared and grubbed material will be removed, loaded and transported to a site provided by the Employer and disposed of in an acceptable manner. Hydraulic excavators will be used to load the material into suitable hauling equipment (off-highway or on-highway trucks).

These activities will not include the clearance, removal, or disposal of any hazardous waste, including unexploded ordinance or similar substances.

[7] Drainage design targets a solution in order to achieve that all storm or surface runoff water from pavement surface are effectively collected and taken for the treatment and discharge to the receiving body. Rainwater from cut and fill slopes are collected with trenches and concrete channels along the right of way fence.

For river regulation methodology, the EIA Reports of Sectors 8 and 9 were evaluated. According to the EIA Report for Sector-8, a geotextile filter layer is applied to the sharp slope areas that have the risk of scoring in Sector-8, through which is applied a layer of gravel and then a stone that is poured with cement mortar to the minor troughs.

The shore of the River is secured by a dump of broken stone of the required volume. In regulation curves, it is necessary to cover the slopes of major troughs of concave curves, in the same way as the slopes of minor troughs. The slopes of the major trough on the convex curves and the banks along the entire regulation, must be covered with grass mixture.

According to the EIA Report for Sector-9, a heat-treated geotextile is applied to the sharp slope in Sector-9, through which are applied reno mattresses filled with gravel from the excavation of the regulated trough.

Figure 3-39. Example of Reno Mattress

Mixed herbaceous vegetation will also be made. Thus, while maintaining slope stability, it also enables riperian vegetation formation like in Figure below.

Figure 3-40. Example of Riperian Vegetation Formation

The blade is formed by gabions that are also filled with gravel from the excavation of the regulated trough.

In regulation curves, it is necessary to cover the concave slopes of major troughs, in the same way as the slopes of minor troughs. Reno mattresses are filled at the installation site to form a flexible and porous, monolithic structure.

3.9.2 Excavation of Topsoil

Topsoil excavation is the removal of soil material to the depth specified in the design. This work includes the excavation, removal of any deleterious material not suitable for inclusion in usable topsoil and loading usable topsoil material and hauling of this material to a temporary storage area within the work limits (or a temporary storage area, which will be provided by the Employer outside the work limits).

Bulldozers will strip and push the topsoil material to the storage areas near the expropriation limits (out of the way of follow-on construction activities) (see Figure 3-42 and Figure 3-43).

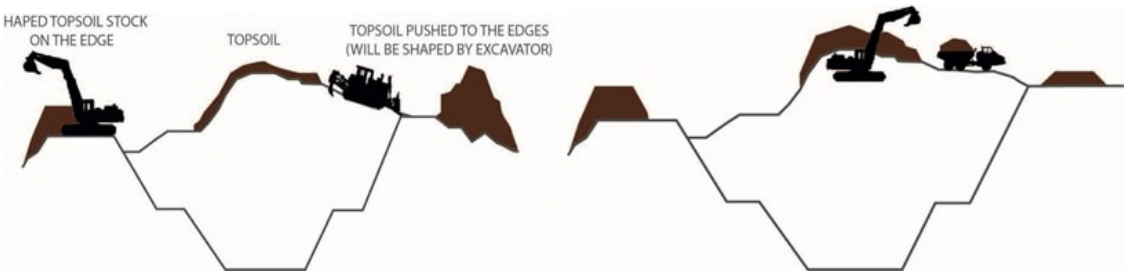
Equipment	Needed Equipment
Sedan Car	7
SUV 4*4	34
Passenger Bus	23
Worker Bus	36
Pick Up	163
Ambulance	8
Mechanic Pick-up	0
Boom Truck	38
Cargo Truck	0
Bitumen Distributor Truck	1
Repair Truck	7
Lube Truck	8
Tire Truck	6
Fuel Truck	16
Wash Truck	3
Potable Water Truck	4
Water Truck	23
Truck Tractor	25
Heavy Truck Tractor	1
Transit Mixer 6X4	41
Concrete Pump Truck	6
Dump Truck 8X4	24
Dump Truck 6X4	688
Truck with Snow Plow	1
Wet Shotcrete Machine	0
Highbed Trailer	28
Lowbed	10
Cement Silo Truck	1
Water Trailer (30,000 Liter)	0
Farm Tractor Trailer	9
Manlift	2
Forklift	11
Twin Boom Platform Lifter	0
High Pressure Washer	4
Rough Terrain Crane 30 Tons	9
Rough Terrain Crane 26 to 50 Tons	8
Rough Terrain Crane 51 to 100 Tons	8
Tower Crane	9
Gantry Crane	8
Wheel Loader	47
Backhoe Loader	22
Steer Skid Loader	7
Dozer (CAT D4 or equivalent)	3
Dozer (CAT D6 or equivalent)	0
Dozer (CAT D8 or equivalent)	24
Dozer (CAT D9 or equivalent)	1
Excavator (Hitachi ZX33 or equivalent)	3
Excavator (Hitachi ZX690 or equivalent)	19
Excavator (Hitachi ZX490 or equivalent)	5

Figure 3-41. Tentative List of Construction Equipment

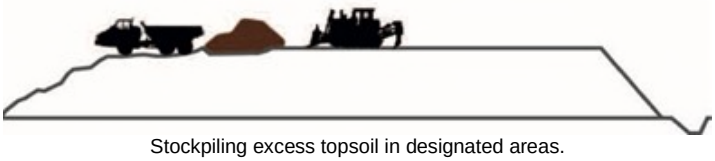
Example of area to be cleared and grubbed. (not from this project)

Stockpiling the cleared and grubbed material at disposal area.

Figure 3-42. Photos from Typical Clearing and Grubbing Works



Hauling the excessive topsoil to determined stockpile areas.



Stockpiling excess topsoil in designated areas.

Figure 3-43. Topsoil Excavation and Stockpiling within the Alignment

3.9.3 Excavation of Any Material Except Topsoil

'Excavate any material except topsoil' covers the excavation of all materials within the alignment to the depth specified in the design. This entails staking out the existing horizontal and vertical layout of the alignment at regular increments. From this, grade control is established and maintained during the earthworks operation until the formation is completed.

The excavation operation encapsulates all types of naturally occurring materials, and includes:

- Common excavation to fill or waste (disposal);
- Excavation of rock to fill or waste (disposal); and
- Mixed material to fill or waste (disposal).

The selection of excavation equipment depends on the type of soil, height and length of the surface to be excavated, quantity of the soil to be excavated, transport distances and the schedule.

3.9.3.1 Common Excavation

Excavation commences with bulldozers or excavators and includes the formation of the slopes. The material excavated by hydraulic excavators will be directly loaded into trucks; material excavated by bulldozers will be loaded by loaders into trucks. These trucks will transport excavated material to the fill, stockpile, or disposal area.

3.9.3.2 Replacement of Unstable Soils at Formation

This work covers activities that are required to improve the bearing capacity of the alignment formation (foundation) level by means of soil replacement with stronger material. This is beneficial to the finished quality of the Motorway and provides a working platform from which it is possible to operate without being affected by day to day adverse weather conditions. This will improve schedule certainty, as it (barring significant weather events) materially reduces weather productivity losses.

In the case of unstable soil at formation level, it is assumed that the weak soil will be replaced with borrowed material.

Excavation of common material with excavator. Cutting of slopes with excavator.

Figure 3-44. Similar Excavation Photos

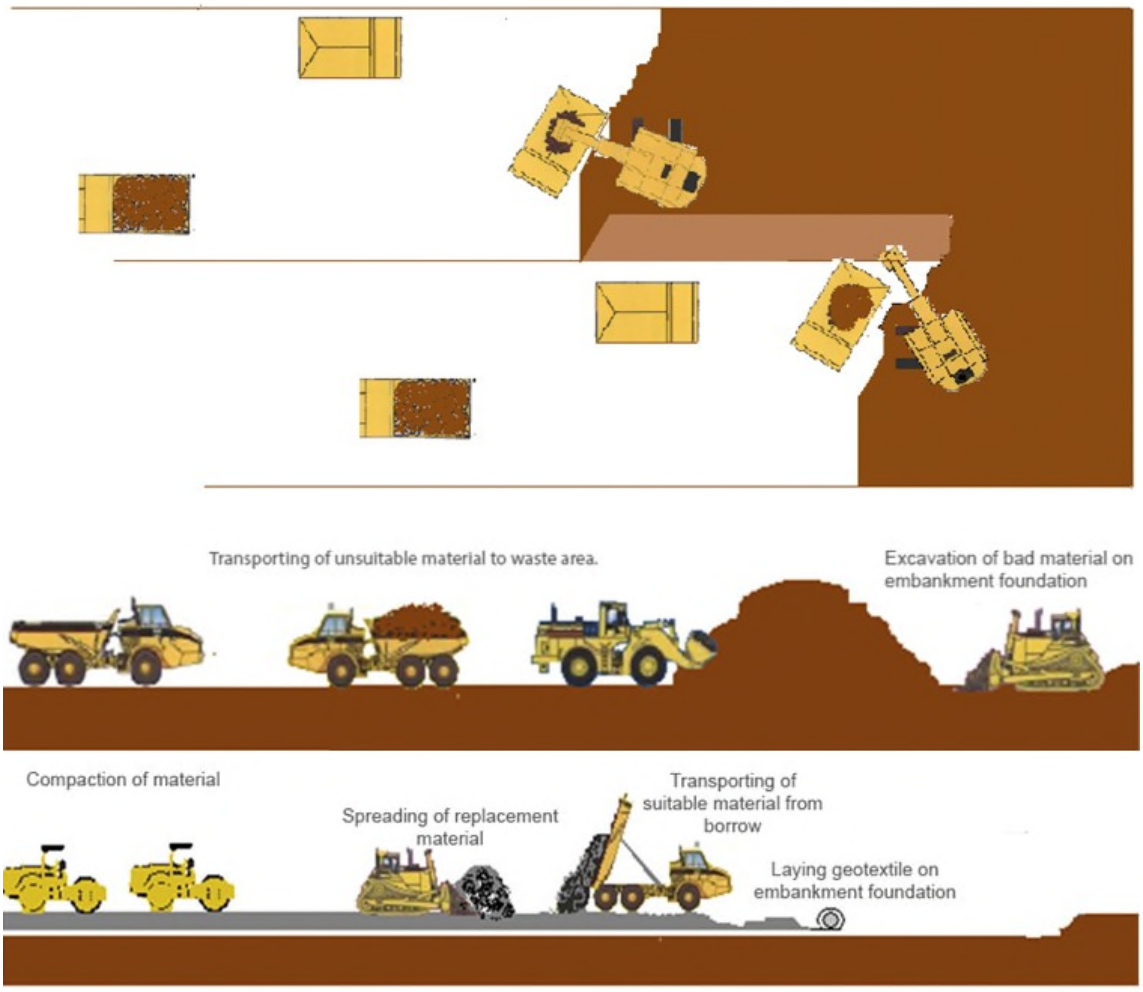


Figure 3-45. Example of Excavation and Hauling as well as Compaction Works along the Alignment

Figure 3-46. Example of Replacing of Embankment Formation (Foundation) with Geotextile and Suitable Material

3.9.3.3 Rock Excavation

Even though it is not expected to face rock excavation in general, rock materials are strong materials where blasting may be required to perform the excavation. The speed of the drilling and blasting operation is on the critical path for the earthworks schedule where rock material prevails.

Excavation method, drilling method, spacing of boreholes and the size of explosive charge will be decided after completion of the review of the geotechnical investigation reports. Hydraulic drills will perform the drilling of boreholes for blasting operations (See Figure 3-47). The number of the boreholes will be decided according to the blasting plan in order to reduce to a minimum any need for secondary blasting of rock.

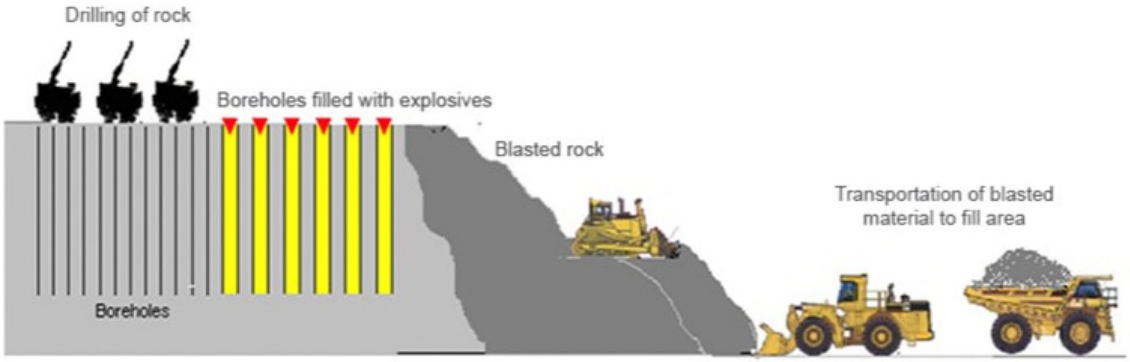


Figure 3-47. Excavation Procedure Using Blasting Technique

Rock drilling.

Location ready for filling with explosives.

Loading of blasted material.

Loading of blasted material with hydraulic excavators.

Figure 3-48. Typical Pictures from Excavation Procedure Using Blasting Technique.

3.9.4 Mixed Material to Waste or Fill

Mixed materials are materials defined as semi-solid rock materials. In this class of material, the excavation will be performed partly by mechanical equipment and partly by blasting. The scope of blasting operations is relatively small when compared with the mechanical excavation.

Bulldozers will do the excavation and hydraulic loaders, or excavators will be used to load the trucks. The material will be hauled either to the fill area or disposal area, as appropriate.

Slope inclination in cuttings and side-cuts will be realized according to the design.

The trimming of the slopes will be done either with excavators and pick-hammers or with the drilling and blasting operations.

During the excavation, drainage of the cut platform will be achieved by forming transverse slopes on the alignment and constructing temporary drainage ditches. Water will be removed from the alignment as described earlier, since the excavation of mixed material, like common excavation, is very sensitive to climatic conditions.

3.9.5 Spreading and Compacting of Fill

Spreading and compacting of fill involves the spreading of fill material in layers, levelling, and compacting the fill material to the standards specified.

Fill material for the embankment will be provided from the borrow pits provided by the CoS. Suggested locations are identified by the Contractor. In order to extract the embankment fill from borrow pits, the topsoil above the borrow-pit area will be removed to the sides of excavation. Following that, excavators that can be operational in water conditions will excavate and load the excavated gravel material onto the trucks or to the nearest side, depending on the water content of materials. The depth of gravel material suitable for fill at the borrow pits is expected to be 4 m to 6 m under the 40 cm to 1m-thick topsoil. Removal of topsoil above borrow pits will be performed as explained in the topsoil excavation section above. Embankment material transported from borrow pits will be spread with dozers or graders at the appropriate thickness, which will be determined by trial fill sections in advance. Compaction tests will be performed by plate-load tests prior to starting the next level of embankment fill. Spreading and compaction of earth material means the spreading of non-rock material in layers, levelling and compacting the material to standards specified.

Benches will be provided where the embankment is to be placed on existing slopes, or where new embankments are to be constructed against existing embankments. If the slope of the existing ground is too steep, steps will be provided equal in the height to the fill layer thickness, with a proper width and down- slope cross fall. The embankment surface will be kept free from precipitation by providing temporary drainage.

Figure 3-49 shows the spreading and compaction of gravel and earth materials along the road construction alignment.

Figure 3-49. Spreading and Compaction of Gravel and Earth Materials

3.9.6 Reinforced Concrete Piles

Reinforced concrete piles, cast in situ to the specified diameter, will be used when the bearing capacity of the soil underlying the foundation is not sufficient to support the design pressure of the structure. The work consists of drilling the shaft for the in-situ pile, providing for bentonite slurry or casing the shaft in extremely poor ground conditions, and the placement of concrete using a tremmie pipe and curing.

There may also be cases where nearby borehole test results will indicate strong-enough foundation soils to allow shallow foundations in the design, but where the real site condition is different, for example due to weaker soil or higher water table. In areas with dubious soil conditions, design consultants make available alternative piled-foundation designs so that the Project's progress is not unnecessarily adversely affected.

Figure 3-50. Pile Casting

3.9.7 Lean Concrete

Lean concrete (15 N/mm^2) applies to the supply and placement of lean-mix concrete, including any required formwork (including blockouts) and waterproofing.

The lean-mix concrete will be batched, transported to the required location along the alignment, placed directly onto the prepared ground, consolidated, finished, and cured. The concrete will either be placed directly from the concrete mixer truck, with a concrete pump, or with a concrete bucket, which will be lifted by either a mobile crane or tower crane. After the curing period all formwork will be removed and prepared for reuse.

Figure 3-51. Lean Concrete Placement for Stepped Structural Foundation

3.9.8 Foundation Concrete

'Reinforced concrete in foundation' applies to the provision of all required aggregates, cement, additives, water, and equipment to mix, transport, place, compact, finish, protect, and cure foundation concrete. This concrete will be placed below grade and act as a foundation for walls, piers and/or abutments.

This work item commences when the excavation for the foundation is complete, piling placed, sub-grade is proofed, and lean concrete completed. Localized control and pumping of water may be required to maintain the integrity of the sub-grade.

Foundations will normally be constructed in single lifts. First, the sides of the foundation are formed using panel type formwork and supported. Then the rebar is installed, per design drawings. Concrete is then placed using concrete pump or concrete bucket in layers, each layer being compacted using vibrators. After completion, the surface is finished by trowel and cured. Once cured, the formwork is removed.

Figure 3-52. Foundation Concreting Operation

3.9.9 Wall Concrete

Abutment walls and retaining walls are considered in this work category. Formwork for this kind of structural element consists of panel-type formwork systems. Panels are connected on the ground to the required overall dimension, and then lifted to the final position with a mobile or tower crane to form one side of the wall. After the wall rebar is installed, the opposite side of the form is assembled on the ground and lifted to close the formwork.

Concrete is placed by pump. Care must be taken during concreting in order to not exceed the permissible speed, which is dependent on the height of the wall and load-bearing characteristics of the formwork. Approach is to use well designed formwork systems, permitting walls of up to 10 m in height to be cast in lifts (4-5m). In order to prevent segregation at the lower parts of the wall during concreting, the hose of the concrete pump must be of sufficient length to assure a concrete dropping height not in excess of 1.5 m. Concrete will be placed in continuous lifts and will be well compacted using vibrators, as shown below.

Figure 3-53. Abutment Wall Ready for Concreting.

3.9.10 Pier Concrete

3.9.10.1 Piers for Viaducts

It was assumed that the construction design of piers for viaducts will be of a hollow type. These types of piers are cast in lifts of 4 - 5m height using special climbing formwork sets.

3.9.10.2 Piers for Overpasses

Piers for overpasses are typically of a solid design and smaller in size and height. They are cast in one lift, with panel-type formwork. Panel sizes are chosen according to pier dimensions and assembled on the ground. Pier rebar can be prefabricated and erected using mobile cranes. After rebar installation, formwork is closed and properly supported on all four sides, and the concrete is placed by pump or bucket.

3.9.10.3 Pier Heads for Overpasses

These are small in size, and as the pier height for overpasses is small, scaffolding is used to support the formwork for this type of pier head. Before erecting the scaffold, the ground is compacted and steel spreader plates are placed under the legs of the scaffold frames. At pier-head level a platform is built to form the bottom of the pier head and to serve as a working platform. The rebar cage at ground level will be prefabricated or installed in situ and lift it into position by mobile crane. The side forms are then closed, and concreting can proceed.

3.9.11 Pier Heads for Viaducts

These types of pier heads are typically larger in size and can be constructed at considerably higher elevations; we therefore utilize the formwork and pier-head concrete, is supported by a system of truss girders anchored to the pier by special connections (see Figure 3-54).

Figure 3-54. Pier Concreting

3.9.12 Beam Transportation

Within the beam production yard, two-gantry cranes will be used.

For short distance transportation (< 500 m), mobilifts with a proper capacity will be used. They will work in groups of two, each lifting one end of the beam with specially designed lifting attachments. Mobilifts will be used to haul the beams from the beam-production yard to nearby storage areas, or from temporary storage close to the structure to the launching girder (or cranes) for beam installation. They are not meant for off-road use, so proper access roads between the beam plant, temporary storage areas and structures will be arranged.

For longer hauling distances (> 500m), which will constitute the majority of beam transportation on this Project, special beam trailers will be used (see Figure 3-55). To use this type of beam trailer, earthworks must be completed, therefore structure construction and earthwork activities will be closely coordinated.

Figure 3-55. Specialist Trailer Transportation

3.9.13 Beam Installation

There are two possibilities for installing the beams, either by launching girder or with cranes.

Beam installation by crane is faster; however, it is limited by structure height and access. Cranes will be stationed between the piers and the beams will be brought either by Mobilifts or beam trailer to a location adjacent to the cranes for pick up. It is assumed that with cranes 4 to 8 beams per day can be installed, dependent on the beam-hauling distance. If the structure is higher than 20m, it is likely that the lifting radius may exceed our crane's capacity. In addition, a higher structure means a deeper valley, and therefore steeper access – and slopes greater than 5-6% are beyond Mobilifts or beam-trailer capacity. In such cases, launching girders will be used.

Figure 3-56. Preparation of Beam Installation

3.9.14 Deck Slab Concrete

For structures with precast concrete beams, the deck slab is cast on top of the beams to form the carriageway of the structure. For structures without precast beams, scaffolding and formwork is required to support the deck slab concrete.

First, the side forms to the deck are erected, then the rebar is installed. Following the final check of the top elevation, concrete is placed by pump. To achieve a smooth concrete surface, vibrating screeds will be used. Proper curing control is important to prevent cracking on such a large surface area.

3.9.15 Description of Drainage Work Methods

Drainage works will follow the completion of earthworks activities up to sub-grade level. Excavators will perform drainage-pipe excavation. Slip-form pavers will be used for channels and gutters to achieve the shortest installation time, whilst delivering excellent quality. Similarly, the use of prefabricated culverts is proposed to shorten the construction period. Drainage works can be classified as follows:

- Internal Drainage: Collector pipes, cross pipes, manholes, water inlets, perforated drainage pipes, concrete channels, bridge drainage and separators; and
- External Drainage: Culverts, drainage ditches, lagoons, and down chutes.

The aim of internal drainage is to collect water coming from concrete ditches and down chutes, and to take the discharge of water from the internal.

The aim of external drainage is to collect water coming from concrete ditches and down chutes, and to take the discharge of water from the internal drainage system and collect it all in

lagoons. These lagoons facilitate the precipitation of solid wastes, resulting in the discharge of clean water to natural watercourses.

For drainage excavation in general, it is planned on utilizing the following equipment:

- Excavators for collector, cross pipe and separator excavation; and
- Rubber tire excavators for water inlet excavation.

Figure 3-57. Lagoon Construction

3.9.15.1 Internal Drainage

3.9.15.1.1 Collector Pipes

Excavation will be executed as per design, and the excavated material will be kept adjacent to the trench to act as a safety barricade.

The pipes will be backfilled as per design, and thereafter with selected suitable excavated material.

3.9.15.1.2 Cross Pipes

After excavation, the pipe will be placed onto lean concrete and will be protected as per design. Since the backfill depth is shallow, excavated material is unsuitable for cross- pipe backfill. It is usual and common practice to use 0 - 25 or 0 – 30 mm crushed aggregate on these backfills to prevent deformation at the asphalt surface over the cross pipes in the future. But use of material for backfilling will be proceeded as per design.

3.9.15.1.3 Slotted Pipes

Medium-slotted pipes might be used to collect water coming from the asphalt surface.

3.9.15.1.4 Channel and Gutters

Channels will be applied on cut sections, and gutters will be applied on fill sections. Sub-base will be spread and compacted, and our survey crews will set up offset wires for the slip form paver. Typical internal drainage system works are shown below.

Collector pipe installation.

Perforated pipe installation.

Sand bedding.

Sand fill

Channel and gutter operation - median and shoulder.

Figure 3-58. Drainage Components' Installation and Finishing Works

3.9.15.2 External Drainage

3.9.15.2.1 Culverts

Culvert operations start with earthworks operation. There are two types of culverts: box culverts and pipe culverts.

3.9.15.2.2 Box Culverts

Either prefabricated (precast) or cast in situ method can be used. Preference is the precast culvert method, as this permits acceleration of the earthworks. According to the experience of the Contractor, a box culvert (of 1.5 m x 2.0 m size) can be constructed by the precast method 75% faster than the cast in situ method. In addition, the production quality will be better, and the operation will not be weather susceptible. Precast culvert plants will be located adjacent to our precast beam plants.

Larger culverts (> 2.0 m x 2.0 m size) will be constructed in situ, as precast elements of this size or bigger become too heavy to lift with standard cranes.

3.9.15.2.3 Pipe Culverts

Pipe culverts usually will be constructed on local and parallel roads. It is expected that the pipe diameters to be between 60 and 140 cm. After the placing of lean concrete, the pipes will be laid and covered by concrete. Finally, the inlet and outlet structures will be constructed.

3.9.15.2.4 Drainage Ditches

Drainage ditches will be constructed as V type or trapeze type to collect water coming from the top of the cut or fill slopes and transfer it to the culverts or absorption wells.

3.9.16 Description of Paving Work Methods

Paving operations will start with sub-grading works, following the completion of drainage works. In order to meet the schedule and quality requirements, high capacity quarries, crushers, sub-base and asphalt plants are needed to support the paving laydown operations. As with all critical path activities, it is committed to achievement of the schedule through a variety of shift patterns. A rotation system will be implemented to ensure our operators have sufficient rest time between shifts. Detailed execution planning for the paving works is described below.

3.9.16.1 Preparation of Sub-Grading – Capping Layer

Preparation of the sub-grading capping layer relates to the spreading and compacting of suitable material over the completed cut, or last layer of fill, to improve the bearing capacity of the roadbed under the sub- base and asphalt layers.

The sub-grade crew will execute sub-grade capping layer works. The material is spread by graders up to the defined thickness and compacted with rzollers to achieve required compaction and density, as shown below.

Sub-grade placement.

Spreading the sub-base.

Concrete ditches and down chute construction.

Figure 3-59. Sub-base and Ditches Construction and Finishing Works

3.9.16.2 Mechanical Sub-Base

'Mechanical sub-base' is the provision of the specified aggregate mixture, transported to site, and spread and compacted according to the specifications.

Mechanically prepared sub-base material is transported to the site by truck. Spreader boxes driven by bulldozers spread the first layer of sub-base. This layer is then compacted by the rollers. The final (second) layer is spread by pavers to achieve a smooth and precise level and is compacted. Typical photographs of this operation are shown in Figure 3-60.

3.9.16.3 Asphalt Concrete Binder Course

'Asphalt concrete binder course' is the preparation of plant-mix surfacing mixtures by hot mixing in a central batching plant, loading and transporting the material to the site, placing the materials by means of finishers with electronic controls, and compacting. Setting the baseline for finishes with electronically guided sensors, preparation of the adjusted offset line to help set elevations, staking, levelling, and monitoring of the asphalt placement will be performed as part of this item.

Asphalt material will be transported from the asphalt plants, with the quantity matching the placement capacity. Due to the width of the paved surface, 2 pavers side by side to place the asphalt layer will be required. The joints will be provided under the traffic line between the lanes. Sufficient double-drum and rubber-tired rollers will be used to compact the layer.

Figure 3-60. Drumrollers Compact the Asphalt Layer

3.9.16.4 Asphalt Concrete Wearing Course

Asphalt Concrete Wearing Course is the preparation of plant-mix surfacing mixtures by hot mixing in a central batching plant, loading and transporting the material to the site, placing the materials by means of finishers with electronic controls, and compacting. Setting the baseline for finishes with electronically guided sensors, preparation of the adjusted offset line to help set elevations, staking, leveling, and monitoring of the asphalt placement will be performed as part of this item.

3.9.17 Finishing Works Methods

Finishing works will start in parallel with related construction operations. These works will be performed by direct hire forces or by subcontractors. Finishing works can be summarized as follows:

- Erection of cage-type fence
- Installation of safety barriers (guardrails) on the alignment
- Installation of bridge protective barriers (guardrails) on the bridges
- Installation of vertical signs
- Erection of sign gantries
- Horizontal painting
- Telecom ducts
- Grassed areas and hydroseeding.

Figure 3-61. Finishing Works

3.10 Project Operation Activities

In the current condition (preliminary data of the “Roads of Serbia” for 2018), the value of average annual daily traffic between Pojate and Preljina ranges from 3,609 vehicles/day (section Ratina - Kraljevo (Kamidžora)) to 12,743 vehicles/day (section Mrčajevci - Preljina). The average value, which accounts for the lengths of individual sections, is 8,205 vehicles/day. After constructing the Motorway, part of this traffic will stay on the existing roads and other part will be on the new motorway sections.

In the operational phase of the Motorway, the transit time between Pojate and Preljina will be reduced from two hours to less than one hour. It is planned to make the motorway operational in October 2023. Forecast values of Annual Average Daily Traffic (AADT) on motorway sections for the first and the last year of traffic analysis are set forth here below.

Table 3-18. Motorway sections forecast AADT (vehicles/day)

Section-1: Forecast Study Results (2018)

Section	Year	PC*	BUS	LFV+MFV*	HFV+TT*	Total
Pojate - Ćićevac	2023	4664	49	266	706	5686
	2043	7773	69	413	1124	9380
Ćićevac - Kruševac east	2023	6001	224	449	1031	7706
	2043	10002	316	697	1644	12658
Kruševac east - Kruševac west	2023	3853	0	315	899	5067
	2043	6420	1	489	1434	8344
Kruševac west - Koševi	2023	3570	0	383	566	4520
	2043	5957	0	593	904	7455

Section-2: Forecast Study Results (2011)

section	year	PC	BUS	LFV+MFV	HFV+TT	total
Koševi - Velika Drenova	2015	9477	176	328	511	10493
	2035	19704	280	640	1008	21631
Velika Drenova - Trstenik	2015	7774	134	301	508	8716
	2035	16292	214	596	1001	18103
Trstenik - Vrnjačka Banja	2015	7749	123	306	528	8705
	2035	16238	196	605	1040	18080
Vrnjačka Banja - Ratina	2015	7798	162	322	557	8839
	2035	16342	259	638	1098	18336
Ratina - Kamidžora	2015	8141	122	276	482	9021
	2035	17061	194	546	938	18739
Kamidžora - Adrani	2015	4380	143	255	519	5298
	2035	9158	225	498	1019	10899

Section-3: Forecast Study Results (2018)

section	year	PC	BUS	LFV+MFV	HFV+TT	total
Adrani - Mrčajevci	2023	5193	118	387	982	6680
	2042	8526	165	595	1542	10828
Mrčajevci - Preljina	2023	8682	181	630	1266	10759
	2042	14895	252	969	1988	18104
Preljina - Preljina AP	2023	11623	233	625	1402	13883
	2042	19081	324	962	2202	22569

** PC: Private Cars, LFT: Light Freight Vehicle, MFT: Medium Freight Vehicle, HFT: Heavy Frieght Vehicle, TT: Tractor Trailer*

Toll Collection

All junctions are designed according to closed toll fee payment system and include control access to the Motorway through the toll platforms. In other words, toll payment collection will be performed by paying directly to toll staff at booths or by toll card (electronic pre-paid payment system).

Table 3-19. Financial effects-income from toll and commercial income (Million €)

Year	Pojate- Kruševac (Koševi)	Kruševac (Koševi)-Adrani	Adrani-Preljina	TOTAL Pojate-Preljina (all 3 sections)
2023	3.93	8,66	5.35	17.94
2044	17.22	35.75	21.47	74.44

The following table shows unit rate for toll collection, by basic vehicle type in Serbia.

Table 3-20. Unit rates by basic vehicle type-category in Serbia

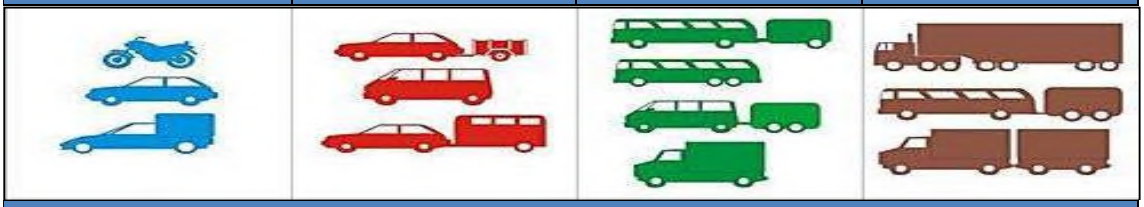
Vehicle categories			
I	II	III	IV
			
Rate in EUR/km			
0.03	0.05	0.10	0.20

Table 3-21. Facilities for the operational phase of the Morava Corridor Motorway Project

Sections	Sector	KP	Operational Project Facility[8]
1	Sector-1	7,200 m	Parking Area
2	Sector-4	33,750 m	Service Area
2	Sector-4	34,790 m	Maintenance Area
2	Sector-5	44,875 m	Parking Area
2	Sector-6	64,000 m	Service Area
2	Sector-7	73,400 m	Parking Area
3	Sector-8	80,950 m	Maintenance Area
3	Sector-9	99,600 m	Parking Area

The Motorway connecting Preljina near Čačak with Pojate on the A1 Motorway (the North-South motorway in central Serbia) through Kruševac, provides a linkage for the residents (more than 500,000 people) and 21,000 companies. This will include better accessibility for businesses in the Region to expand their geographical markets and resources to other areas and countries.

The Motorway is expected to attract more investors in the Region. The increased investment will bring in more employment opportunities to the local people, including diversification of economic activities. This is quite significant considering the fact that majority of the expropriated land are agricultural lands, and PAPs whom may be affected economically can shift and continue to attribute their income through newly introduced economic fields.

[8] Operational Project Facilities include parking area, service area and maintenance area.

In order to develop local economy throughout the operation phase of the Motorway, the Spatial Plan indicates that there will be two maintenance facilities throughout the alignment in which is expected to employ local community within its departments. Also, the Project will establish amenities including; parking lots, rest areas, motels, gas station (including grocery, cafes and restaurant in which is expected to increase benefits to local economy. Therefore, after the establishment of the Project, roadside businesses may enhance and facilitate trade along the Proposed Motorway Route.

For procurement services, the Project will be subject to regular maintenance, including summer and winter maintenances, in which will provide procurement opportunities of local and national contractors. This is expected to further induce employment opportunities and increase of livelihood of PAPs. Other induced impacts are considered to be mostly in the service sector such as tire repair services, on the road assistance and auto mechanics.

3.11 Resource Management

During the design and construction phase of the Project, there will be different types of resources usage including water consumption for domestic needs in camps, production needs in concrete batching plants etc. The estimated amount of water use for labor camps is 25,000 tons in total of 2 camps as monthly average. If the number of camps is to be 3 then this estimate will yield as 38,000 tons per month. Water will mainly be supplied from the water wells.

For batch plants, water consumption of 10,000 tons is estimated as monthly average. Batch plants will work year-round. Amount of raw material to be used will be about 36,000 tons of aggregate and 7,500 tons of cement in order to produce 20,000 m^3 of concrete as monthly average. Around 25 dump trucks will be used for raw material transportation to batch plants. 750 m^3 of concrete production is estimated as daily average. For this purpose, 280 tons of cement will be consumed as daily average. Amount of daily water use for batch plant is foreseen as 400 tons per day.

Regarding the consumptions of resources in asphalt plants, it is estimated to consume 3,500 tons of water as monthly average. Asphalt production of 3,000 tons is planned on a daily basis average.

Amount of aggregate required for the construction for Sections 1, 2 and 3 are estimated as 1,984,000 m^3, 3,894,500 m^3 and 2,277,900 m^3, respectively. These amounts will include reserves of alluvial gravel, aggregate of carbonate origin (limestone), used for the construction of the upper supporting layers of pavement structure and concrete. These materials will be provided from different locales. For instance, according to the national EIA Report of Section-1, "Ladjevci", "Chokoće", "Plana" are planned to be such areas where the construction raw material including aggregates will be provided. Likewise, aggregates of Andensitic origin used for the construction of the upper pavement layers (bonding and wear layer) are being exploited at two sites in the wider zone of corridor E-761: "Kamenica" and "Strana". All listed sites of the rock aggregate are located 20-30 km from the construction site. All materials used for

installation in embankments, as well as for the construction of lower and upper bearing pads must meet the requirements defined by national standards.

In addition, excavation materials to be obtained as a result of river regulation works will also be used in the construction of the Motorway. The amount to be obtained after this regulation works is calculated as 9.968.980 m^3. Regulation works will not include filling operations in the River bottom.

3.12 Waste Management

Construction activities of the Project will cause all sorts of wastes including hazardous and non-hazardous as well as inert wastes such as excess excavated material that needs to be dumped properly. If wastes are not inadequately managed, this can lead the major environmental impacts.

According to the national EIA studies, the evaluation of the spillage of the materials was made on the basis of experience arising from 20-year studies where the quantities of solid and liquid deposit per unit of road surface for reference traffic load (average annual daily traffic – 8,700 vehicles) are given annually. For the forecast traffic load on the sections of the Motorway Pojate-Koshevo, oil and lubricant spills are calculated proportionally and are estimated at 1.9-3.3 kg / ha annually.

A Waste Management Plan (WMP) will be prepared and maintained by the Contractor and its subcontractors. The WMP will determine the types and quantities of wastes that are likely to form during the construction phase, including: excavated materials and construction wastes;

- Most of the excavated material will be reused, if practical and proper in the way to serve as filling material or reinstatement / restoration /landscape works in the scope of the environmental mitigation implementations;
- In the pre-construction activities, location of the proper landfills will be determined in order to be used for the disposal of the wastes and it should be covered in the WMP.

Waste materials generated by the regular operation of the Motorway are as follows:

- solid municipal waste within project facilities,
- solid municipal waste from uncontrolled emissions of road users on slopes (wild landfills),
- waste oils and sludge accumulated in separators for the purification of atmospheric wastewaters from roadways,
- waste resulting from regular and periodic road maintenance.

Waste management regarding the operational phase of the Motorway will be mainly composed of food, paper, and packaging waste generated by passengers that would use the parking

places and gas stations along the Motorway. With the appropriate number of waste collection bins and containers are going to be provided at the parking places and cooperation with local public utility companies for waste disposal, the significance of the impact is to be negligible.

Any hazardous, contaminated wastes to be generated from the operation and maintenance facilities as well as gas stations will be disposed according to the national requirements. Private gas station facilities are responsible for their own operations in terms of the environmental compliances. Furthermore, during regular traffic, release of liquid substances may occur in the sense of leaking tanks, or engine parts, with fuel, engine oil and antifreeze remaining on the Motorway.

3.13 Employment

The Project will result in temporary employments for the duration of the construction phase (expected to be 4 years, see Figure 3-62). The average number of the construction workers will be 3,100 and the peak number of the project workers will be approximately 3,800. Majority of the unskilled workforce are expected to be hired from the locals of Social AoI, on the other hand, majority of the skilled construction workers are expected to be recruited from expat employees.

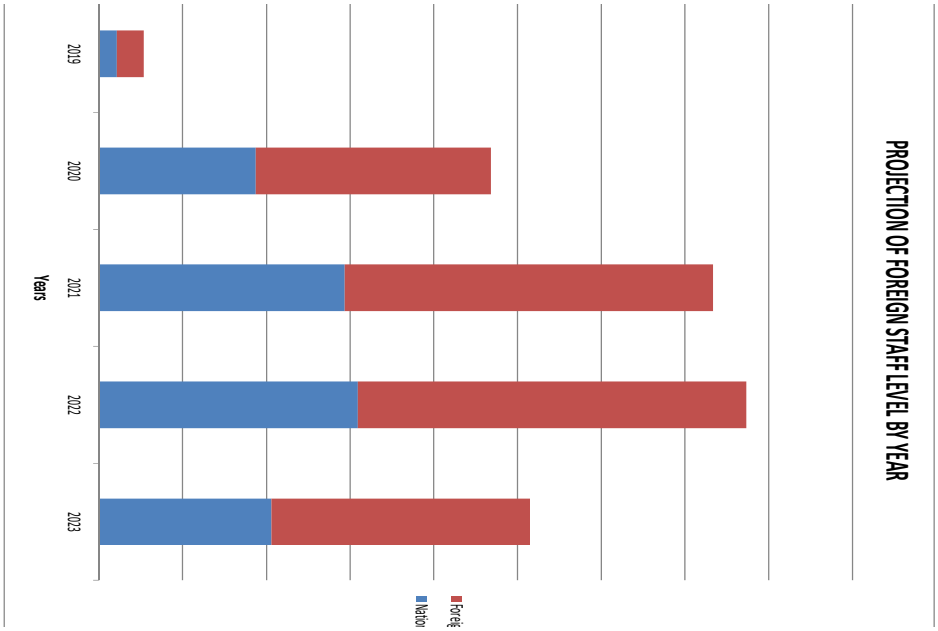


Figure 3-62. Construction Employment Projection

Operational period employment strategy is discussed in Section 3.16.

3.14 Land use / Land take and resettlement

There will be loss of agricultural, forest, municipal, village and private land as a result of the Project. The existing land use of the social AoI will be affected by the construction of the Project and its opponents as well as by the project facilities.

The Project execution will require permanent acquisition of land by using expropriation. The Project is expected to cause economic displacement and physical resettlement, however, at this stage, the magnitude of displacement is not completely known. Identification of the landowners for Section-1 started in February 2019 and the expropriation process started in April 2019, which is planned to be completed in May 2020 by Corridors of Serbia. On the other hand, Location Conditions[9] for Section 2 and 3 is currently in progress; therefore the exact amount of expropriated land is currently unknown.

The CoS will be responsible for the expropriation activities for each section of the Project. Responsible Institutions and their roles on land acquisition and expropriation for the Project is provided in Table below.

Table 3-22. Responsible Institutions on Land Acquisition & Expropriation

Sections	Expropriation Roles
Section-1	CoS
Section-2	CoS
Section-3	CoS
Responsibilities	• Land cadastral maps • Expropriation administration • Payment • RAP implementation

All sections of the Motorway are on flat farmland and next to the West Morava River, which is on a large flood plain. The site is accessible due to the proximity of local roads and access points. However, in addition to local roads, temporary access roads are needed to access the Site. Land use for the access roads Construction plan comprises passing through agricultural lands. All expropriation and Land Access provisions are the responsibility of the Government of Serbia. Within the scope of the Project land acquisition activities, the *number* of houses and businesses to be physically displaced is going to be determined exactly at this stage (in particular when the EIA for Section-2 is prepared and submitted for approval by CIP).

According to the data obtained by CoS and observations of the ESIA Consultant, arable land (non-irrigated arable land) and heterogeneous agricultural areas (with complex cultivation patterns) covers the largest area along the AoI, which covers 500 m on each side of the motorway along the Proposed Motorway Route. The AoI also includes urban fabric, industrial,

[9] The Project has previously prepared the separate National "Environmental Impact Assessment (EIA)" Reports for each section of the Project route alignment and received approvals from related authorities. However, these EIA Reports are being revised due to the fact that, in the Spring of 2014, Serbia faced a tragic flood disaster that has affected houses, infrastructure, livelihood, agriculture, and industries. Therefore, the Project started a new Location Condition Collection in order to receive national EIA for the re-proposed Project, for all sections.

commercial and transport units, mine, dump and construction sites, artificial, non-agricultural vegetated areas, pastures, heterogeneous agricultural areas, forests, scrub and/or herbaceous vegetation associations, inland wetlands, Inland waters. Total area of land to be used in the AoI is estimated about 18,437 ha, details can be found in Table 3-23 below.

The Project will also require some temporary land take for construction routes, construction laydown areas and camps, temporary storage of excavated materials/soil, cut trees etc. Temporary land and property impacts (for borrow pits, excess material disposal sites, storage, access roads and worker camps) will affect the landowners during the construction phase of the Project. Total area of land to be used for the temporary access roads, project facilities and motorway is estimated approximately 2.493 ha, details can be found in Table 3-23.

Table 3-23. Land Use Areas in AoI

Land Use (for The AoI)	Area (ha)	Percentage
Intensive unmixed crops	11,312.16	61.4
Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	2,710.59	14.7
Thermophilous deciduous woodland	2,211.62	12.0
Residential buildings of city and town centres	863.65	4.7
Permanent non-tidal, smooth-flowing watercourses	685.95	3.7
Permanent mesotrophic pastures and aftermath-grazed meadows	188.42	1.0
Rural industrial and commercial sites still in active use	142.92	0.8
Road networks	130.83	0.7
Highly artificial non-saline standing waters	116.62	0.6
Active opencast mineral extraction sites, including quarries	74.43	0.4
Total Area (ha)	18,437.19	100.00%

Table 3-24. Land Use Areas for the Temporary Access Roads, Project Facilities and Motorway

Land Use (for the Temporary Access Roads, Project Facilities and Motorway)	Area (ha)	Percentage
Intensive unmixed crops	1,696.80	68.06
Thermophilous deciduous woodland	338.90	13.59
Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	319.94	12.83
Road networks	29.22	1.17
Permanent mesotrophic pastures and aftermath-grazed meadows	67.82	2.72
Residential buildings of city and town centres	21.15	0.85
Permanent non-tidal, smooth-flowing watercourses	4.64	0.19
Highly artificial non-saline standing waters	3.35	0.13
Active opencast mineral extraction sites, including quarries	1.54	0.06
Rural industrial and commercial sites still in active use	9.72	0.39
Total Area (ha)	2,493.08	100.00%

Detailed information on the Project Owner's commitments for the Project Affected People and physical, economic displacement and livelihood impacts caused by Project implementation in all Project phases can be found in Resettlement and Livelihood Restoration Framework (RLRF) prepared as a part of ESIA Disclosure Package.

Also, Resettlement Action Plan (RAP) is currently being prepared by an independent consultant company in line with IFC Performance Standard 5 in order to:

- mitigate adverse social and economic impacts of expropriation and temporary or permanent losses by providing compensation for losses of property on the basis of replacement costs and ensure implementation of the activities of displacement with appropriate data disclosure, consultations and participation of the PAPs,
- at a minimum, re-establish sources of income and living standards of resettled persons to the level before Project impact.

The Project Employer will prepare and make available to all PAPs and interested stakeholders the summary document of the RAP, after final RAP has been adopted, in addition of appropriate full RAP disclosure.

In addition to land acquisition, the Proposed Motorway Route may divide the land parcels or abrupt access to remaining land. During the disclosure of the draft Spatial Plan on August 2019, the landowners and land users underlined the importance of the accessibility to their agriculture lands. Hence the Commission for Conducting the Public Insight of the Spatial Plan stated that the Project will take necessary measures such as interchanges, overpasses, bridges and underpasses in order to sustain the accessibility of the land owners and users to these areas in order to minimize any adverse impact on the livelihood resources.

The Project will avoid the acquisition of lands or land use rights that result in any physical or economic displacement where applicable. If the land acquisition and displacement is unavoidable, the Project will apply the measures to minimize the impacts of displacement.

3.15 Social Engagement

Stakeholder engagement is a two-way process of communication between the project parties and its stakeholders. It is a key part of the ESIA process, allowing stakeholders to express their views about the Project.

The Stakeholder Engagement Plan (SEP) presented in Appendix-3 has been developed with the aim of explaining how the Project will communicate with stakeholders that may be directly or indirectly affected by and / or interested in the Project. The SEP summarizes engagement activities undertaken to date and includes details of the approach and mechanisms proposed for future engagement with stakeholders. It also includes details of a grievance mechanism for stakeholders to raise any concerns related to the Project. In accordance to international best practice, objectives of the Stakeholder Engagement are to:

- build and maintain a constructive relationship with and among the stakeholders, in particular project-affected communities,
- promote environmental and social performance via effective stakeholder engagement,
- promote and provide effective means for adequate engagement with project-affected communities throughout the project cycle on issues that could potentially affect them so that their concerns are addressed accordingly and to ensure that meaningful environmental and social information is disclosed to them and to other stakeholders,
- ensure that all stakeholders have ways to access project information and raise issues,
- ensure that project-affected people (PAPs) have accessible and effective means to raise issues and grievances, and the Contractor respond to and manage such issues and grievances appropriately.

For the scope of ESIA studies following stakeholder engagement activities were carried out.

Table 3-25. Past Stakeholder Engagement Activities within the Scope of ESIA Studies

<table>
<tr><th>Engagement Activity</th><th>Details</th><th>Date</th></tr>
<tr><td>Gap Assessment Studies for ESIA</td><td>For the initial stakeholder analysis, 2U1K conducted Key Informant Interviews (KII) carried out in order to:
•understand the Justification of the Project;
•obtain updated information on the EIAs prepared for the different phases of the Project; and
•understand the possible environmental and social impacts and the approach to mitigations of the impacts.</td><td>March 2019</td></tr>
<tr><td>ESIA Consultation Phase</td><td>Following number of surveys and interviews conducted respectively and following sub-sections provide details of the surveys conducted.
<table>
<tr><th>Type of Survey/ Interview</th><th>Number of Surveys/Interviews/ Meetings</th></tr>
<tr><td>Household Surveys</td><td>1563</td></tr>
<tr><td>Community Level Surveys</td><td>48</td></tr>
<tr><td>Key Informant Interviews (KIIs) during the Gap Assessment</td><td>6</td></tr>
<tr><td>KIIs with Non-Governmental Organizations</td><td>9</td></tr>
<tr><td>KIIs with Affected Municipalities</td><td>7</td></tr>
<tr><td>Focus Group Discussions</td><td>7</td></tr>
<tr><td>Business Surveys</td><td>110</td></tr>
</table></td><td>August 2019 – October 2019</td></tr>
<tr><td>Disclosure of the Resettlement and Livelihood Restoration Framework (RLRF)</td><td>In the third quarter of February 2020, public participation meetings for RLRF disclosure were conducted to share the scope of the Framework for each affected municipality.</td><td>Third quarter of February 2020</td></tr>
<tr><td>ESIA Disclosure</td><td>On September 23-30, seven open air Public Participation Meetings were conducted in each affected municipalities. (Summary of the meetings can be found in Chapter 9 of this report and SEP).</td><td>September 2020</td></tr>
</table>

It is important to note that, the Stakeholder Engagement Program, through an Informed Consultation and Participation (ICP) process, includes set of actions with targeted audience and responsibilities in order to ensure the maximum engagement level for all relevant stakeholders. The ICP process comprises all Project Phases including; pre-construction phase, construction phase and operation phase. Details of the engagement methods structured for the Project phases can be found in Chapter 9 of this Report and SEP.

3.16 Construction Management

The contractor will prepare its management plan covering the construction method statement that considers the commitments in the ESIA Report and its appendices (in particular Environmental and Social Management and Monitoring Plan (ESMMP) and its supporting sub-plans). The Construction time schedule that covers the important milestones of the construction works is provided in Figure 3-63. It should be noted that the construction works to be carried out by the contractor will be supervised by the CoS.

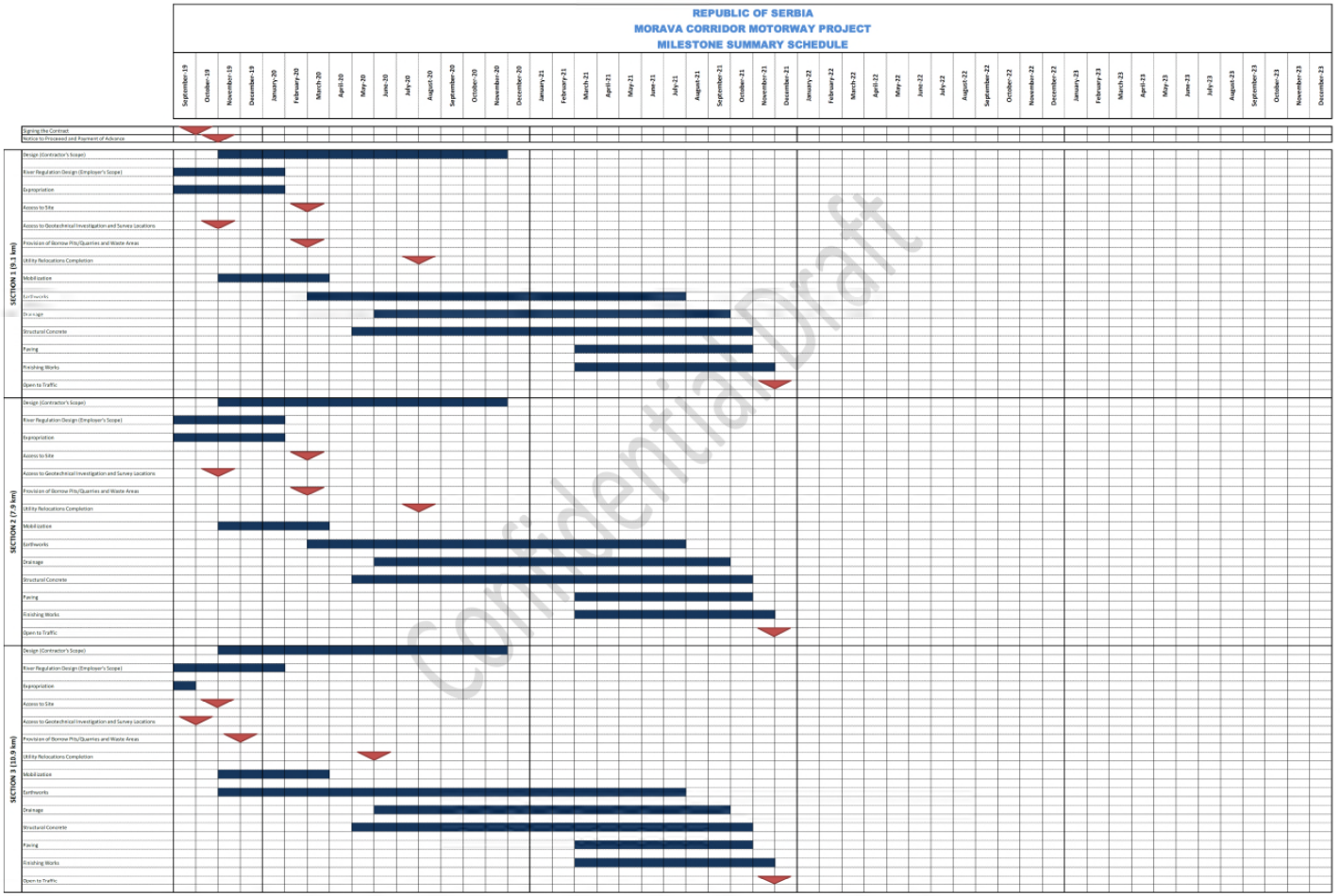


Figure 3-63. Construction Time Schedule (for all sectors)

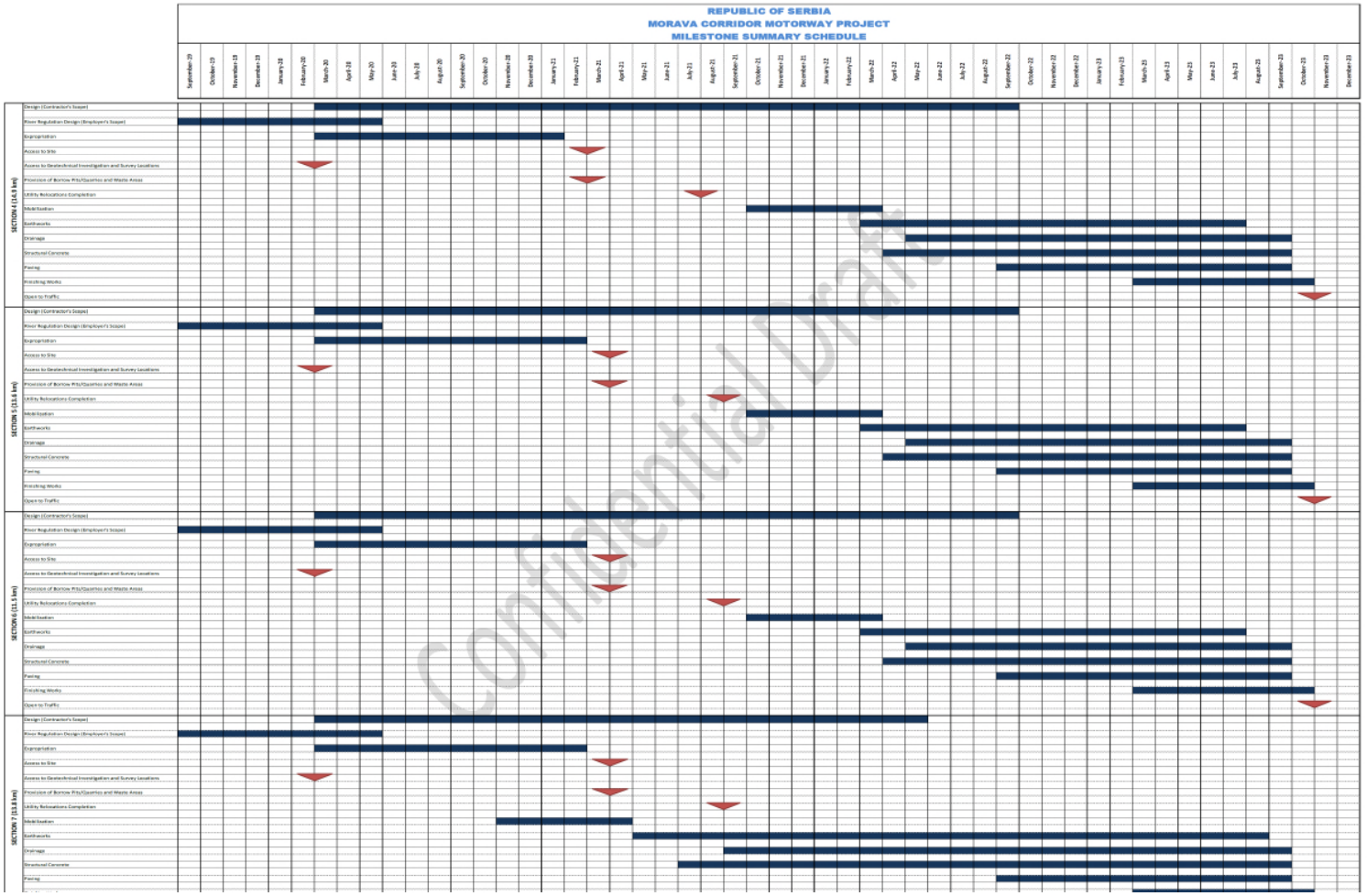


Figure 3-64. Construction Time Schedule (for all sectors) (Continue)

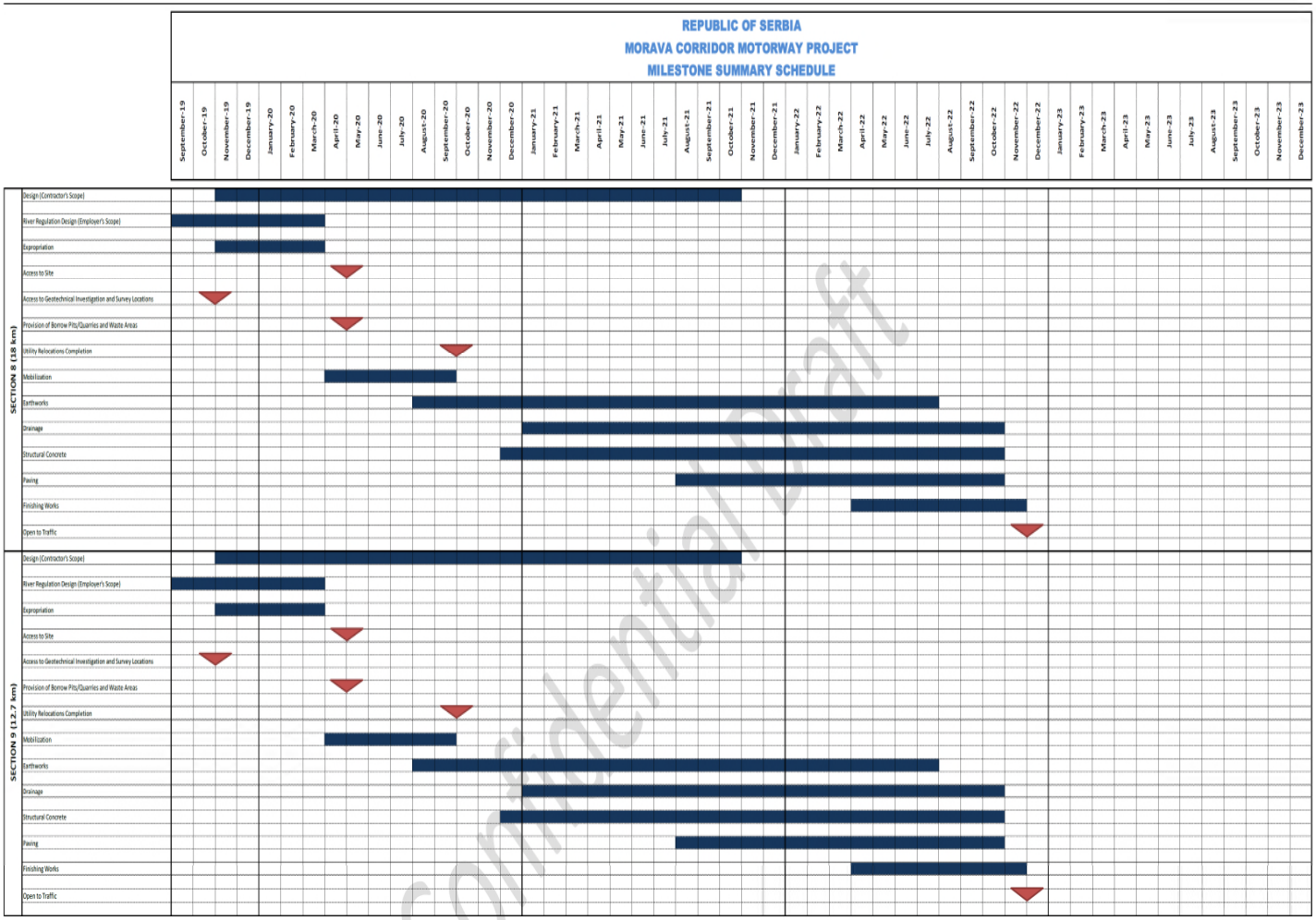


Figure 3-65. Construction Time Schedule (for all sectors) (Continue)

The Contractor's proposed construction management organizational structure for the execution of the Project is provided in Figure 3-66.

The management and monitoring of mitigations proposed in the ESIA, and which are the responsibility of the Contractor will be implemented by the appropriate department within the Contractor's organization. The implementation of environmental, health, safety and social commitments will be managed in line with the national and international requirements. The Contractor will prepare policies, plans and association procedures for this purpose.

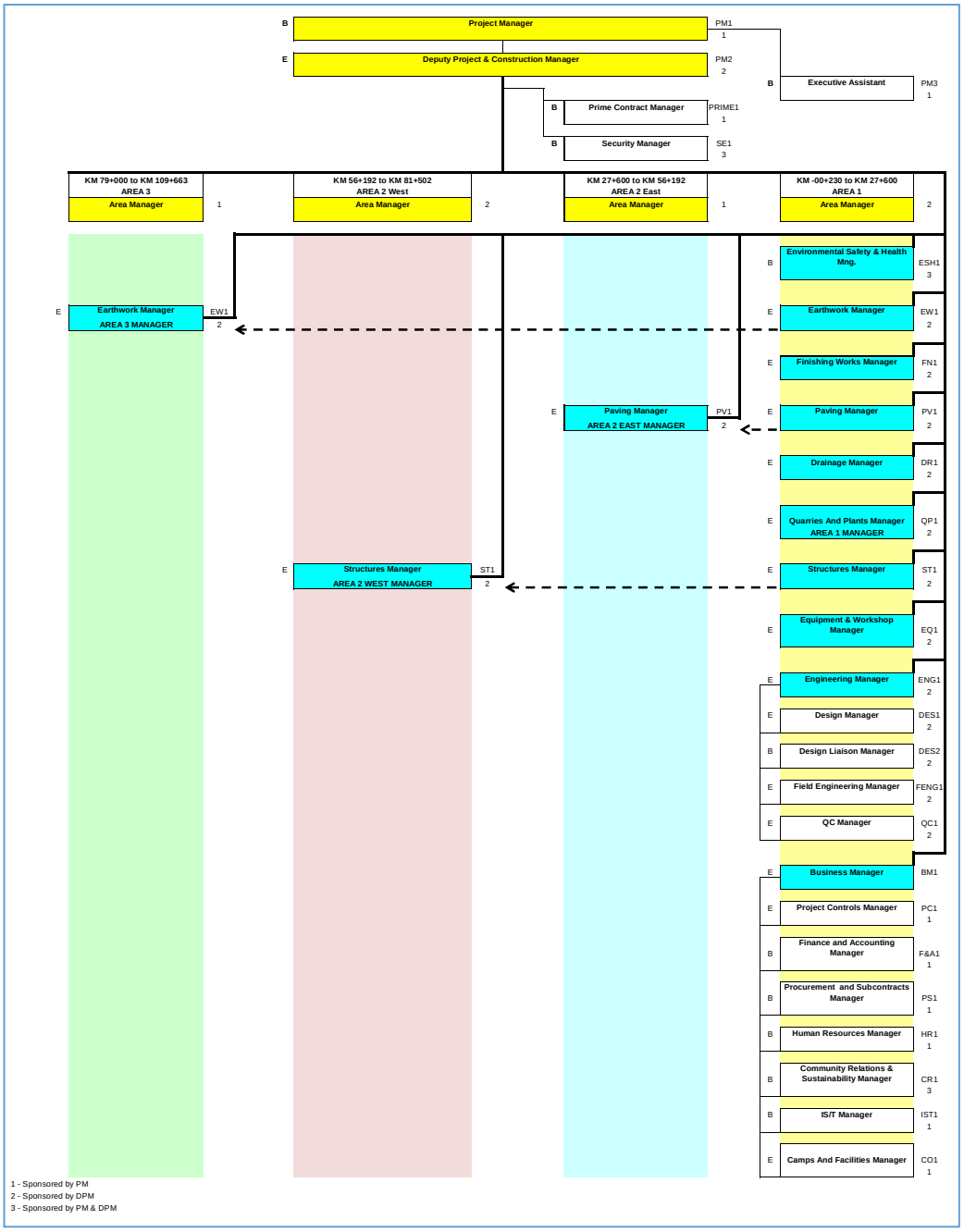


Figure 3-66. Proposed Construction Management Organization Structure

3.17 Operation Management

The Project is expected to be completed and commissioned in 2023, with 22 years of operation period (overall horizon of analysis is 25 years and it includes the period of investment and the period of operation). Corridors of Serbia (CoS) will operate the Motorway after its construction is completed for Section-1 and Section-2. On the other hand, Roads of Serbia (RoS) will be the responsible authority of the operation of Section-3 under the coordination of the CoS.

In order to develop local economy throughout the operation phase of the Motorway, the Spatial Plan indicates that there will be two maintenance facilities throughout the alignment in which is expected to employ local community within its departments. Also, the Project will establish amenities including; parking lots, rest areas, motels, gas station (including grocery, cafes and restaurant in which is expected to increase benefits to local economy. For national level, the primary benefit will be derived from the toll collection for the Motorway.

The National Highways in Serbia are under tolling. Therefore, the primary national benefit will be derived from the toll collection for the Motorway. Furthermore, the Motorway will significantly shorten the travel time and the Social Area Influence will benefit from the improved carriageway with higher quality transport movement and safer infrastructure. This will improve the facilitation of goods transport costs and commune of financial resources within the country, in general.

3.18 Operational Employment

Employees will be required for the operation of the toll collection and service facilities, the maintenance of the Motorway, and environmental health and safety staff such as the Emergency Response Team (ERT).

Based on the economic indicators of the previous motorway projects, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway.

The average number of personnel to be employed is expected to range between 300 and 400 full time equivalents throughout the years, including all contractors. These estimates will be further developed during detailed design and implementation. Many of the persons will be employed by the Operation and Maintenance (O&M) Contractor.

4 LEGAL FRAMEWORK

This Chapter presents the key elements of the national legislation and international standards, guidelines and requirements that are relavent to the Project and its activities. Detailed information on the mentioned legislation and international requirements are described in Appendix-4.

4.1 National Legislation

This section presents the key national laws and regulations applicable to the reduce the potential environmental and social impacts that may arise from the construction and operational activities of the Project.

4.1.1 General Serbian Legal Framework Related to the Project

The Constitution of Republic of Serbia

The Constitution of Republic of Serbia was proclaimed on November 8, 2006. According to Article 74 of the Constitution;

- Everyone shall have the right to live in healthy environment and the right to timely and full information about the state of environment.
- Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of environment.
- Everyone shall be obliged to preserve and improve the environment

Article 58 of the Constitution guarantees of peaceful tenure of a person's own property and other property rights acquired by law. The Article indicates that right of property may be revoked or restricted only in public interest established by law and with compensation which cannot be less than market value.

Article 16 of the Constitution states that the foreign policy of the Republic of Serbia shall be based on generally accepted principles and rules of international law. Generally accepted rules of international law and ratified international treaties shall be applied directly if they are dully signed and ratified by the Government of Serbia.

International Conventions and Treaties

Table 4-1 presents the international conventions and agreements that have been ratified by the Government of Serbia and are related to the Project .

Table 4-1. International Conventions and Agreements ratified by Serbia

Name of the Convention	Details
Ramsar Convention	The Convention on Wetlands of International Importance was adopted in Iran in February 1971 and came into force in December 1975. The Convention considers the subject area of wetland conservation and comprises three elements of activity. The three elements are; the designation of wetlands of international importance as Ramsar sites, the promotion of sustainable use of all wetlands on the territory of each country, and international co-operation with other countries to further the sustainable use of wetland and their resource.
The Convention on Biological Diversity	The Convention on Biological Diversity (CBD) was adopted in Rio de Janeiro in June 1992, and came into force in December 1993. It was the first global treaty to provide a legal framework for biodiversity conservation. The treaty has three primary goals; the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources. Signatories to the Convention are required to create and enforce national strategies and action plans to conserve, protect and enhance biological diversity. The Republic of Serbia ratified the convention in 2002.
The Bern Convention	The requirements of the Convention on the Conservation of European Wildlife and Natural Habitat came in into force in 1982. The Convention requires signatories to ensure the conservation and protection of wild plant and animal species that are listed within the Convention which number over 500 wild plants and more that 1000 wild animal species. The Republic of Serbia ratified the Convention in 2007.
The Bonn Convention on Conservation of Migratory Species of Wild Animals	The aim of the convention in respect to migratory species is to achieve their effective management across national or jurisdictional boundaries. Threatened migratory species are listed in Appendix 1 of the Convention. The signing states are obliged to protect them. The migratory species in need of international cooperation for their conservation are listed in Appendix II. The convention allows for development of special international agreements. These agreements include those protecting populations of European bats (Eurobats), African-Eurasian migratory water birds (AEWA) and birds of grassland habitats (Grassland Birds). Serbia ratified the Bonn Convention in 2007.
European Landscape Convention	Serbia is a signatory to the European Landscape Convention (ELC), the fundamental point of which is that all landscapes are important, not just in special places and whether beautiful or degraded. The implementation of the ELC is included in the Spatial Plan of the Republic of Serbia 2010- 2020 (Official Gazette No. 88/ established on 2010), which includes a section on the Protection and Development of Landscapes. This states that “The basic goal of protection and development of landscapes in Serbia is to achieve various high quality and adequately used landscapes and physically developed rural and urban settlements pleasant for living and leisure, with rich identity based on respect and affirmation of natural and cultural values”.

Name of the Convention	Details
UN Economic Commission for Europe (UNECE) Aarhus Convention	The Aarhus Convention on Access to information, public participation in decision-making and access to justice in environmental matters, which the Republic of Serbia has ratified on May 12, 2009. („Official Gazette – International Contracts ", No. 38/09) came into force in 1998 and links environmental rights and human rights and is based on the belief that it is a basic right of present and future generations to live in an environment adequate to health and wellbeing. The convention is focused on achieving this through the implementation of three pillars: rights of access to information, access to decision-making, and access to justice. Convention states that public participation should be timely, effective, adequate and formal, and contain information, notification, dialogue, consideration and response.

Law on the Establishment of a Public Interest and Special Procedures for the Implementation of the Project for Construction of the Infrastructure Corridor of the E-761 Motorway section Pojate-Preljina (Official Gazette of RS, No. 49/19) adopted in July 2019 and regulates the determination of the public interest for complete and incomplete expropriation and temporary occupation of real estate for construction Morava corridor, designation of beneficiaries of expropriation, method of security financial resources for project realization, expropriation procedure, selection strategic partner, implementation of international standards for design and execution works, customs procedures and taxes applicable upon importation of equipment and materials, as well as arranging other issues in order to make the Project more effective.

Table 4-2 presents the salient feataures of the Law.

Table 4-2. Related Information and Article within the Law

Article	Details
Article 1	Prescribes the establishment of a public interest for the expropriation of the real estate for the construction of the Pojate-Kruševac-Adrani-Preljina (Čačak) motorway as part of the E-761 corridor, with regulation of the river and the construction of telecommunication infrastructure along the highway corridor, determining the end-user of the expropriation, the method of securing financial means for the realization of the project, the procedure of expropriation, the choice of a strategic partner, the application of international standards for design and expropriation customs procedures and taxes applied when importing equipment and materials, as well as arranging other issues for the purpose of more efficient implementation of this project.
Article 3	Establishes the public interest for the expropriation of real estate land and conversion to the land for the purpose of building the "Morava Corridor" with the accompanying necessary infrastructure.
Article 5	Defines the PE "Roads of Serbia" and "Corridors of Serbia" l.t.d. for expropriation beneficiaries, as well as JVP "Srbijavode" for the expropriation beneficiary for performing works on the regulation of the river Morava.
Article 6	Stipulates that the proposal for expropriation shall be submitted no later than three years from the date of entry into force of this Law.
Article 7	Defines the competent authority that decides on the proposal for expropriation.
Article 8	Prescribes the documentation submitted with the proposal for expropriation.
Article 9 & 10	Stipulates the eligibility criteria for acquisition of construction land .
Article 11	Prescribes the actions of the competent authority for expropriation, upon the receipt of the proposal for expropriation.

Article	Details
Article 12	Prescribes the grievance mechanism, as well as an appeal for "silence of the administration".
Article 13	Prescribes the procedure for concluding negotiated settlement .
Article 14	The investor has the right to bring the contractor into possession of the real estate expropriatedin accordance with this law upon the expiration of a period of seven days from the date of delivery of the decision onexpropriation to the parties to the proceedings.

Law on Planning and Construction ("Official Gazette of RS" No. 72/09, 81/09, 64/10, 24/11, 121/12, 42/13, 50/13, 98/13, 132/14, 145/14, 83/18, 31/19 and 37/2019) and the Law on the Spatial Plan of the Republic of Serbia for the period from 2010 to 2020 ("Official Gazette of the RS", No. 88/10) for the proposed Project.

In accordance with "2.4. Spatial Plan for Special-Purpose Areas, Article 21" of the Law on Planning and Construction, the Spatial Plan of a special-purpose area is adopted for areas which require special regimen of organization, development, use and protection of space, for projects of importance to the Republic of Serbia or for areas designated by the Spatial Plan of the Republic of Serbia, or other spatial plan, and in particular for:

- Area of natural, cultural-historical or landscape value;
- Area that has possibilities for exploitation of mineral resources;
- Area that has possibilities for using tourism potential;
- Area that has possibilities for using hydroelectric potential;
- For the realization of projects which are determined by the Government to constitute projects of importance to the Republic of Serbia;
- For the construction of facilities which require a building permit issued by the ministry competent for construction matters, or the competent authority of the autonomous province.

Accordingly, the Spatial Plan for infrastructural corridor highway E-761, Section Pojate-Preljina ("Official Gazette of RS" No. 84/10) includes information on the purpose of the Project, location, potential impacts, overview of the Project and its associated facilities and further potential developments aligned with this Project. In 2013, the Regulation of Spatial Plan for Specific Purposes for infrastructural corridor highway E-761, Section Pojate-Preljina was adopted and has been put in force since November 08, 2013 ("Official Gazette of RS" No. 98/13).

4.1.2 Relevant Legal Framework for Environmental Matters

4.1.2.1 EIA Legislation

The national legislation of the Serbia is currently implementing and adopting EU standards and requirements. In that regards, Environmental Impact Assessment (EIA) adopted the EIA Directive (Directive 92/11/EC). The national EIA procedure comprises the phases of screening, scoping, impact assessment and public consultation, furthermore, an EIA is required during the Preliminary design phase of a project. The requirement for an EIA is initiated by a formal screening study to identify the categorization of the proposed project. The fulfilment of EIA requirements is a requirement to receive construction permit for the proposed project.

The major laws in force relevant to the EIA related to this project are listed below:

- Law on Environmental Impact Assessment (EIA) ("Official Gazette of the RS ", No. 135/04 and 36/09) regulates EIA process,EIA content, Interested Autorities and organizations participation and public participation, international notification for projects that can have important impacts on other environment and inception and other important issues for EIA.The need of an EIA is regulated by the Decree on the List of Projects (2008) that an EIA is mandatory. According to the List 1, EIA is required for “construction of main highways and roads with four or more lanes”.
- Law on Strategic Environmental Impact Assessment (SEIA) (“Official Gazette of RS” No.135/04) regulates the conditions, manner and procedure for assessing the impact of certain plans and programs, on the environment.
- Law on Planning and Construction (“Official Gazette of RS” No. 47/03, 34/06) that regulates both the scope and the content of spatial, urban plans and technical documentation. Strategic Environmental Impact Assessment is an integral part of the spatial plan of the special purpose area.
- Law on Environmental Protection (“Official Gazette of RS” No. 66/91, 83,92, 67/93, 48/94, 53/95, 135/04) is the framework national environmental law. The law regulates the integral system of environmental protection ensuring the human right to live and develop in a healthy environment as well as developing a balanced economy and protection of the environment in Serbia.

Figure 4-1 presents the EIA Procedure in Serbia through flowchart and the stakeholder engagement required by the law in each phase of the EIA managed by the Ministry of Environmental Protection.

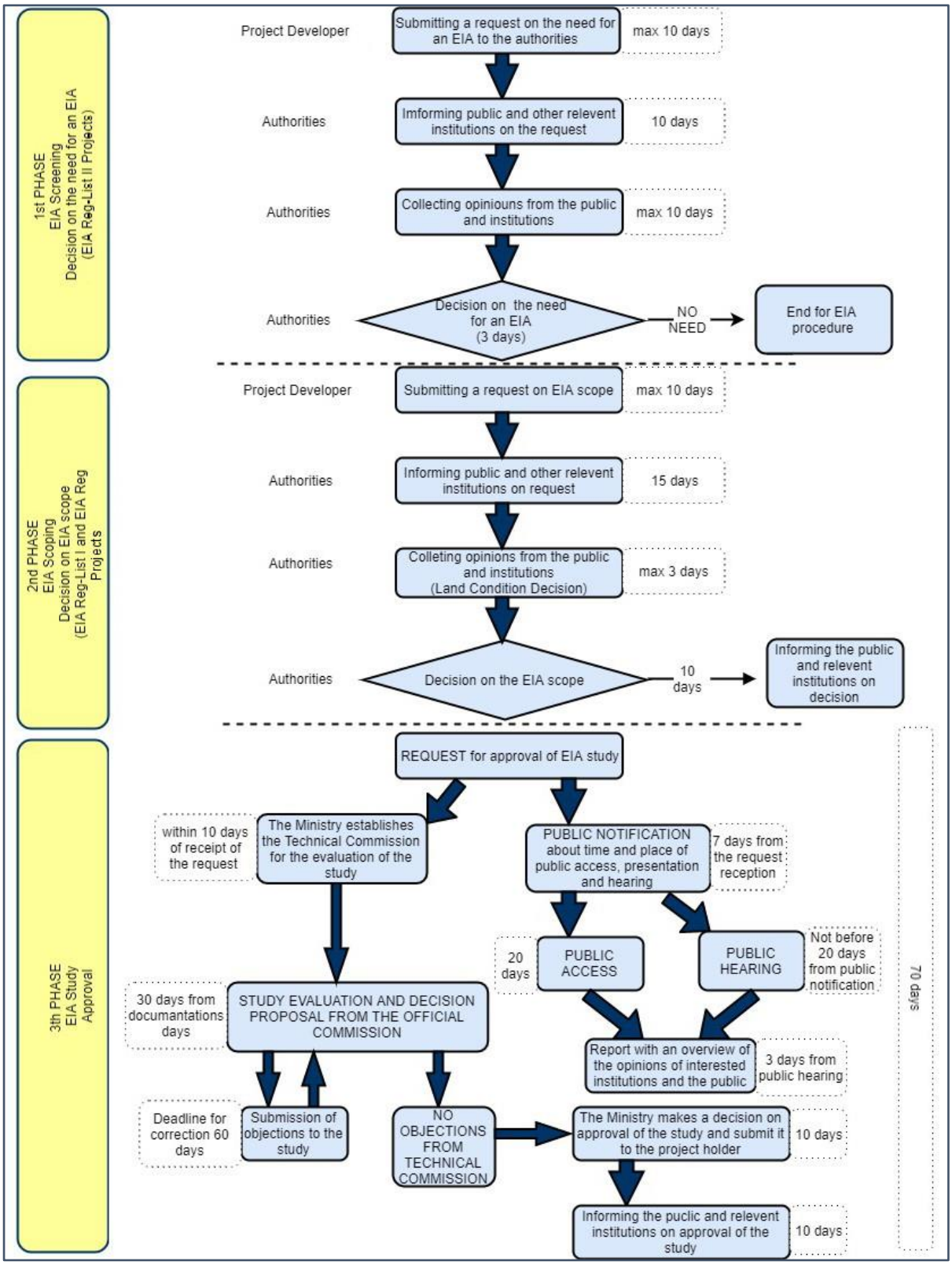


Figure 4-1. The EIA Procedure in Serbia

4.1.2.2 Water Qualitye

Law on Water ("Official Gazette of RS", No. 30/210 as amended with 95/18) regulates the legal status of water, integrated water management, water management facilities and water land, sources and method of financing water activities, supervision over implementation of this law, as well as other issues relevant to water management. The bullets below present Decrees adopted by the Republic of Serbia that is related within the Project's scope as:

- Surface water quality, groundwater and sediment standards are regulated by the Decree on limit values of polluting substances discharged into surface water, groundwater and sediment and deadlines for compliance setting the limit values of polluting substances and defining five classes of the ecological status: high, good, moderate, poor and bad ("Official Gazette of RS", No. 507/12).
- Limit values of parameters related to general water conditions, oxygen regime, nutrients, salinity, metals, organic matter, and microbiology are defined by the Regulation on parameters of the ecological and chemical status of surface water and parameters of the chemical and quantitative status of groundwater ("Official Gazette of RS", No. 74/11).
- Limit values for priority and priority hazardous substances are set by the Decree on limit values of priority and priority hazardous substances polluting surface waters and deadlines for compliance ("Official Gazette of RS" No. 35/11).

4.1.2.3 Air Quality

The Law on Air Protection was adopted in May 2009 ("Official Gazette of RS", No. 36/09). According to this Law, the Ministry of Environment and Spatial Planning prepared drafts of subsidiary legislations, such as the Decree on requirements of air quality, the Decree on monitoring of air quality and the Decree on emission limit values of pollutants.

Also, the Law on Integrated Environmental Pollution Prevention and Control ("Official Gazette of RS", No. 13/04) regulates the conditions and procedure of granting of integrated permits for installations and activities that may have adverse effects on human health, environment or material resources, types of activities and installations, supervision and other issues that are of relevance for environmental pollution prevention and control.

4.1.2.4 Soil Quality

The basic legal Act regulating the soil protection in the Republic of Serbia is the Law on Soil Protection ("Official Gazette of RS", No. 112/15). According to Article 1, the Law regulates the protection of soil, systematic monitoring of the soil quality, measures of sanation, remediation, reclamation, inspection and other issues of importance for the protection and preservation of the soil as a natural resource of the national importance.

The purpose of this Law is to preserve areas and functions of the soil as a natural resource and to prevent or eliminate harmful changes in the soil that can occur for example as a result of unplanned urbanization, construction and development of infrastructure or erosion or fire and chemical accidents, etc.

In addition, the standards for contaminated soils are stipulated by the Regulation on the Program for Systematic Monitoring of Soil Quality, Indicators for Evaluation of Soil Degradation and Methodology for Preparation of Remediation Program ("Official Gazette of RS", No.88/10).

4.1.2.5 Noise

Environmental noise is regulated by the Law on Environmental Noise ("Official Gazette of RS", No. 88/10) as the main legislative document.

The permitted noise levels are defined by the Decree on environmental noise indicators, limits values, assessment methods of the noise indicators, the nuisance and the harmful effects ("Official Gazette of RS", No. 75/10). This Decree stipulates the noise levels, which must not be exceeded. According to Annex 2 of the Decree, the defined noise limits are applied to the all-encompassing noise generated by all noise sources at the site. However, it is not stated what the appropriate noise limit is in the case of a new development, where the prevailing noise levels already exceed the stated values.

4.1.2.6 Waste Management

The main legislative document in Serbia regulating the waste management is the Law on Waste Management ("Official Gazette of RS", No. 36/09 and 88/10) The Law is supplemented by 29 by-law documents regulating specific waste management aspects. In 2015 the Law was revised and amended to more precisely transpose certain requirements of the Waste Framework Directive (2008/98/EC).

Hazardous waste is primarily regulated by the Law on Waste Management ("Official Gazette of RS", no. 36/09 and 88/10) and the Regulation on Categories, Testing and Classification of Waste ("Official Gazette of the RS", No 56/10).

4.1.2.7 Geology and Seismicity

Depending on the ground conditions and the seismic characteristics of the region, design and design verification will be carried out according to Eurocode 8[1].

Law on Mining and Geological Explorations ("Official Gazette of RS", No. 88/11) regulates andregulate measures activities of the mineral policy and the manner of implementation thereof, conditions and manner of execution of geological researches of mineral and other

[1] The code applies to the design and construction of buildings and civil engineering works in seismic regions.

geological resources, researching of geological environment, as well as geological researches for the purpose of spatial and urban planning, designing, construction of buildings and remediation of terrain, manner of classification of resources and reserves of mineral raw materials and ground waters, exploitations of reserves of mineral raw materials and geothermal resources, construction, use and maintenance of mining facilities, plants, machines and equipment, execution of mining works, mining waste management, remediation and re-cultivation of abandoned mining facilities, as well as inspection over the implementation of this Law.

4.1.2.8 Nature Conservation

The Law on Nature Conservation ("Official Gazette of RS", No. 9/10) adopted EU Habitats Directive and the Birds Directive. The Decree on Ecological Network ("Official Gazette of RS", No. 102/10) identifies ecological network areas in Serbia and sets the management, financing, monitoring and protection requirements.

Table 4-3 presents the Serbian legal framework for the protection of habitats and species.

Table 4-3. Serbian Legal Framework on Habitats and Species,

Name of the Regulation	Official Gazette No. and Date
Regulation on the criteria for separation of habitat types, habitat types, sensitive, vulnerable, rare, and for the protection of priority habitat types and protection measures for their preservation	Official Gazette of No. 35 Dated on 2010
Regulation on cross-border trade and trade in protected species	Last amended on: 2014 Official Gazette No: 6
Regulation on special technical and technological solutions that enable undisturbed and safe communication of wild animals	Official Gazette of No. 72 Dated on: 2010
Regulation on control of use and trade of wild flora and fauna	Last amended on: 2011 Official Gazette No: 69
Rulebook on cross-border trade and trade in protected species	Last amended on: 2014 Official Gazette No: 6
Regulation on the proclamation and protection of strictly protected and protected wild species of plants, animals and fungi	Last amended on: 2016 Official Gazette No: 98

4.1.3 Relevant Legal Framework for Social Matters

4.1.3.1 Assets

The Law on Foundations of Property Law Relations ("Official Gazette of RS", No. 6/80, 36/90) provides fundamental provisions of property relations as; ownership rights substance, subjects of ownership rights, co-ownership and joint ownership rights, acquiring the right of ownership, right on yields emanating from owned thing, possession rights, ownership acquired by adverse possession, ownership relations deriving in situations when structures was built on someone else's land, protection of ownership rights, protection of possession, cessation of ownership

rights, etc. The Law states that ownership rights and other proprietary rights may only be limited or taken away in public interest and under the conditions defined by the Law ("Official Gazette of the RS", No.115/05).

Law on Planning and Construction (“Official Gazette of the RS, No. 72/09, corr. Official Gazette No. 81/09) administrates the conditions and modalities of spatial planning and development, development and use of construction land and the construction facilities, predominant use of land in case the land has multiple functions, etc. The Spatial Plan of the Project is prepared in accordance with the provisions of this Law. Last, this Law enables the subsequent issuing of a permit for construction, by the Municipal Council.

Law on Non-Contentious Proceedings (“Official Gazette of RS", No. 25/82 and 48/88, amended Official Gazette of the RS No 46/95, 18/05, 85/12, 45/13, 55/14, 6/15 and 106/15) describes the decision making rules of the courts on personal, family, property-related and other rights and legal interests. According to this Law, the court in extra-judicial proceedings determines compensation for an expropriated property after it establishes the important facts and approves a decision which defines the type and amount of compensation. The participants may conclude an agreement about type and amount of compensation, and the court will later determine its decision on their agreement, if the court finds that the agreement is not contrary to mandatory regulations.

Law on State Surveying and Cadastre of Immovable Property (“Official Gazette of RS" No 72/09, amended on 18/10, 65/13 and 15/15) regulates the matters related to land, buildings and other structures survey, real estate cadastre, records and registration of property, registration of possession, registration of illegal buildings and buildings legalized according to Law on Building Legalization (“Official Gazette of the RS ", No. 96/15). Records of property possessors are kept in the land registry.

The Law on Public Property (“Official Gazette of RS”, No. 95/18) regulates terms, method and procedure for the restitution of and compensation for the property which was confiscated on the territory of the Republic of Serbia with the application of regulations on agrarian reform, nationalization, sequestration, and other regulations, on the basis of nationalization acts, after 9 March 1945, from natural persons and legal entities and transferred into all people, national, state, social or cooperative property.

The main positive aspects of the Law on Public Property are in that it (i) decentralizes the ownership entitlements, (ii) provides specific rules for use and disposal of public property and (iii) sets the framework for potential public-private partnerships.

The law regulates the conditions and the manner of performing immovable property valuation by licensed valuers, the professional capacity of a person and the conditions for obtaining the licence for performing immovable property valuation, the obligation of valuating immovable property in line with this Law, the supervision over the performance of immovable property

valuation, reviewing the operations of licensed valuers, disciplinary liability of licensed valuers, the foundation and competence of the Expert Committee, the accredited associations of valuers, as well as other issues pertaining to the performance of immovable property valuation by licensed valuers.

4.1.3.2 Expropriation

Expropriation Law ("Official Gazette RS", No. 53/95, including changes of 23/01, 20/09, and 55/13) guides expropriation and serves as a general framework for expropriation in the Republic of Serbia. The Law also enshrines the principle of compensation at market value.

The Law regulates the conditions and procedure for expropriation of property for construction of facilities in the Public Interest, compensation eligibility and amounts, handling of grievances and disputes and other issues pertaining to the expropriation process.

The most important features of the Law on Expropriation are summarized in the Table 4-4.

Table 4-4. Law on Expropriation

Subject	Reference	Details
Temporary facilities	**Article 6**	The land intended to serve for a certain purpose in connection with construction of buildings may be occupied on a temporary basis for up to three years (temporary occupancy). Temporary occupancy shall be terminated once the purpose for which it was established ceases to exist and the land shall be restored upon that.
	Article 38	A complaint filed against a decision establishing temporary occupancy of land shall not stay the execution of that decision
Partial expropriation	**Article 10**	If in the expropriation of a part of a real estate it is found that the owner has no economic interest in using the rest of that real estate or that because of it, the owner's livelihood in the rest of has been rendered impossible or substantially aggravated, that part of the real estate shall also be expropriated at the owner's request.
Compensation and Entitlement	**Article 11**	The compensation for expropriated real estate shall be set in money, unless otherwise provided by this law.
	Article 41	The value of the building the title to which is transferred to one or several parties as compensation and the value of the expropriated building shall be determined in accordance with the market value of such buildings at the time of establishment of the ownership or co-ownership rights. If the real estate is conveyed to the beneficiary of expropriation before the effective date of the expropriation order, the former owner shall have the right to opt for the compensation to be set in accordance with the circumstances existing at the time of conveyance of real estate or at the time when the first-instance decision on compensation was rendered. If different kinds of real estate owned by a single owner are expropriated, the compensation for each individual kind of real estate (land, buildings, devices, etc.) shall be specified in the agreement on the amount of compensation or in the court decision.
	Chapter 6 Of the Law	The Law of Expropriation does not recognize the rights of informal landowners or users that may be affected by the infrastructure projects. Usually, houses or other structures are built on such land, or the land is used for agriculture. The Law on Fundamentals of Property Relations entitles such possessors to compensation of costs of structures and installations in terms of made

Subject	Reference	Details
		investment the assessed value of materials used, crops, woods, trees, fruit bearing trees, vineyards, the age of crops and the time needed to reproduce them. For the resettlement of formal owners of immovable property except agricultural land; Option 1: Cash compensation at market value +Moving costs Option 2: Relocation - Appropriate replacement at owner request offered; other land in the vicinity equal in quality, cultivation, class and value For the acquisition of agricultural land: appropriate replacement land offered; other land in the vicinity equal in quality, cultivation, class and value. For the resettlement of informal owners of buildings: the Project Affected Persons is entitled to building construction costs - building material and labour. For resettlement of the tenant of agricultural land: the Project Affected Person is entitled to cash compensation for any improvements made on the land, such as irrigation, drainage, perennial crops, objects, woods, trees, fruit bearing trees, vineyards, crops and the time needed to reproduce them etc. For annual crops (owner or tenant): the Project Affected Person is entitled to harvest the crops or value at market price of that type of crops or fruits decreased by cost of harvest. For business property: Option 1: Cash compensation at market value and Moving costs Option 2: Relocation - Appropriate replacement at owner request offered - other property in the vicinity equal in quality, size and value.
Natural Disaster	**Article 37**	In the areas affected by earthquake, flood, fire, ecological accident or some other major natural disaster, expropriation for the purpose of constructing buildings and executing works conducive to the elimination of consequences of such disaster, shall be carried out in conformity with the provisions stated by this Law.
Physical displacement	**Article 16**	At the request of the former owner of a residential building or apartment or business premises, the beneficiary of expropriation shall transfer to him the right of ownership or co-ownership to another residential building or apartment or business premises at the same place or nearby, the structure and area of which correspond to the conditions for dwelling or conduct of business the former owner had prior to expropriation.
	Article 17	If there is a difference in value between the expropriated building and the building the right of ownership or co-ownership to which is transferred as compensation, either the beneficiary of expropriation or the former owner shall pay the difference in price to the other party.
	Article 18	If the former owner is not requesting to be given the right of ownership or co-ownership to another real estate, the beneficiary of expropriation shall pay compensation to him in money, without being bound to provide him with another real estate.
	Article 39	If a residential building, an apartment as part of a building or business premises are being expropriated, the beneficiary of expropriation shall provide the former owner, holder of the right of occupancy or lessee with another apartment or business premises to be owned/co-owned, occupied or leased by them, within six months from the date of moving out from the expropriated building, apartment or business premises.
Public Interest Decision	**Article 20**	The proposal for the determination of public interest for expropriation should be filed with the Government through the Ministry of Finance. The Government shall render a decision on the proposal for the determination of public interest within 90 days. The Government decision adopting the

Subject	Reference	Details
		proposal for determining public interest shall be published in the Službeni glasnik Republike Srbije.
Expropriation Proposal	**Article 25**	The beneficiary of expropriation may file the proposal for expropriation only after public* interest for expropriation of real estate has been determined. The Republic Public Legal Officer may file the proposal for expropriation on behalf of the Republic of Serbia. The proposal for expropriation may be filed with the authorities of the municipality in the territory of which the real estate proposed to be expropriated is situated, within a year from the date of determination of public* interest for expropriation.
	Article 26	The following shall be indicated in the proposal for expropriation: Name and registered office of the submitter of the proposal for expropriation (the beneficiary of expropriation); Real estate proposed to be expropriated and place where that real estate is situated; Owner of the real estate proposed to be expropriated and his/its address or registered office; 4) Purpose for which the expropriation is proposed.
	Article 28	The beneficiary of expropriation shall file a commercial bank guarantee made out for the amount of dinars necessary for the payment of compensation for the expropriated real estate.
Grievance Mechanism	**Article 29**	The ministry in charge of finance shall decide on complaints filed against first-instance decisions on proposed expropriation.
Land Entry	**Article 32**	The beneficiary of expropriation shall file a request for the expropriation to be entered in the land registry or in other public books in which the rights to real estate are entered. The conveyance of the real estate concerning which the expropriation was entered, as well as the change of relations affecting the real estate (change of holder of the right of occupancy, etc.) that could affect the duties of the beneficiary of expropriation, shall have no legal effect in relation to the beneficiary of expropriation.
	Article 34	The beneficiary of expropriation shall have the right to take possession of the expropriated real estate on the effective date of the decision on compensation or the date of the agreement on compensation for the expropriated real estate, unless otherwise provided
Access to land under special circumstances	**Article 35**	At the request of the beneficiary of expropriation, the ministry in charge of finance may decide to convey the real estate to the beneficiary of expropriation before the effective date of the decision on compensation or the date of the agreement on compensation for the expropriated real estate, but not before the date of the second-instance decision on the complaint filed against the expropriation order, if it finds that so is necessary because of the urgent need for the building to be constructed or works to be executed. If the real estate was conveyed to the beneficiary of expropriation prior to the effective date of the decision on compensation or conclusion of the agreement on compensation, and the proposal for expropriation gets effectively rejected in further proceedings, the beneficiary of expropriation shall restore the real estate to its owner and pay damages.
Voiding the Expropriation Proposal	**Article 36**	The beneficiary of expropriation may desist from the proposal for expropriation before the effective date of the expropriation order. An effective expropriation order shall be annulled or amended whenever the beneficiary of expropriation and the former owner file a request for that jointly.
Governmental Land Users	**Article 43a**	The user of expropriated state or public owned building land shall have the right to compensation as follows:

Subject	Reference	Details
		1) In the case of previous owner or some other person who derives the right of use from the previous owner's rights pursuant to Article 84 of the Planning and Construction Law (the market price of land) 2) In the case of a person who became the user of state-owned building land before 13 May 2003 pursuant to Article 87 of the Planning and Construction Law (the amount of money spent on the acquisition of that land) The money spent on the acquisition of land shall not mean the money paid for the development and use of building land and the building legalisation costs.
Tenants	**Article 54**	In the case of a leasing arrangement, the compensation is set in the amount of rent on the market for the nearest similar land. Compensation shall be set as a lump sum for the whole lease period or in periodical payments to be made at equal time intervals. Compensation shall be due as of the day on which the land was handed over to the lessee. If the leasing arrangement is causing actual damage to the owner of land, compensation for such damage shall be payable, too.

4.1.3.3 Labour and Working Conditions

Serbia was a member state of the International Labour Organisation (ILO) between 1919 and 1992 and restarted its membership in 2000. The country has ratified 77[2] ILO International Labour Standards (Conventions), including the eight fundamental Conventions that are;

- Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
- Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
- Forced Labour Convention, 1930 (No. 29)
- Abolition of Forced Labour Convention, 1957 (No. 105)
- Minimum Age Convention, 1973 (No. 138)
- Worst Forms of Child Labour Convention, 1999 (No. 182)
- Equal Remuneration Convention, 1951 (No. 100)
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

Labour and human resource management in Serbia are primarily addressed through the Labour Law ("Official Gazette of RS", No. 75/14). Compliance with labour laws is monitored by the Labour Inspectorate of the Ministry of Labour and Social Policy of the Republic of Serbia.

Occupational health and Safety matters are under the responsibility of the Ministry of Labour and Social Policy. The Occupational Health and Safety Law ("Official Gazette of RS", No. 101/05) is the main law on Occupational Health and Safety issues in Serbia. The Law was

[2] Out of 77 Conventions ratified by Serbia, of which 61 are in force, 14 Conventions have been denounced; 1 has been ratified in the past 12 months.

enforced in 2005 and incorporated the principles of the EU Workplace Health and Safety Directive (89/391/EEC). The Law is based on the objectives as;

- Training;
- Protective measures on workers;
- Appropriate work environment;
- Evaluation of the risks;
- Risk prevention;
- Reduce the impact on potential risks; and,
- Immediate action against the risk.

The Law on Gender Equality ("Official Gazette of RS", No. 104/09) prescribes the establishment of equal opportunities to accomplish rights and obligations, undertaking of special measures to prevent and eliminate gender-based discrimination and the procedure of legal protection of persons exposed to discrimination.

Gender-based discrimination is any unjustified differentiation or unequal treatment or failure to treat (exclusion, restriction or prioritizing) aimed at hindering, jeopardizing, preventing or denying exercising or enjoyment of human rights and freedoms to a person or a group of persons in the area of politics, economy, social, cultural, civil, family life or any other area. It is also considered discrimination if a person is unjustifiably treated or might be treated in worse manner than another person, explicitly or mainly because such person is seeking or intends to seek legal protection against discrimination or if a person offered or intends to offer evidence of discriminatory treatment (Article 4).

Any employer is obliged to provide to employees, regardless of their sex, equal opportunities and treatment, in relation to the accomplishment of rights resulting from employment and work-related rights, in accordance with the relevant labor law. The following shall not be considered discrimination or violation of the principle of equal opportunities:

- Special measures to increase employment and employment possibilities of the less employed sex;
- Special measures to increase the participation of the less represented sex in professional training and provision of equal opportunities for advancement;
- Other special measures, established in accordance with the Law (Article 11).

The Law on the Prohibition of Discrimination ("Official Gazette of RS", No. 22/09) states that it is forbidden to exercise discrimination in the sphere of labour; that is to say, to violate the principle of equal opportunity for gaining employment or equal conditions for enjoying all the rights pertaining to the sphere of labour, such as the right to employment, free choice of employment, promotion, professional training and professional rehabilitation, equal pay for

work of equal value, fair and satisfactory working conditions, paid vacation, joining a trade union and protection from unemployment (Article 16).

The Law on Preventing Discrimination against Persons with Disabilities ("Official Gazette of RS", No. 33/06 and 13/16) states that the term "persons with disabilities" refers to people with inherent or acquired physical, sensory, intellectual or emotional disability, who due to social or other obstructions, do not have the opportunities or have limited opportunities to join the social activities at the same level as other people, regardless of whether they can perform the said activities with the assistance of technical aids or support services. In that regards the purpose of this Law is to:

- prohibit discrimination against persons with disabilities,
- highlight the necessity of respecting human rights and dignity of persons with disabilities,
- include the persons with disabilities into all spheres of social life on an equal basis,
- include persons with disabilities into all processes in which decisions are made on their rights and obligations.

The Law on Retirement and Disability Insurance ("Official Gazette of RS", No.64/04) regulates mandatory pension and disability insurance. This Law shall also regulate mandatory and disability insurance for persons not covered by mandatory insurance, in compliance with this Law and having entered mandatory insurance scheme. This Law assures rights to certain benefits in cases of certain risks such as old-age risk, the risk of full loss of working ability – namely disability, the risk of death, the risk of bodily damage caused by industrial injury or occupational disease.

The Law on Prevention of Harassment at Work ("Official Gazette of RS", No.36/10) regulates regulate: the prohibition of harassment at work and related to work; measures to prevent harassment and improve relations at work; procedure for protection of persons exposed to harassment at work and related to work and other issues of importance for the prevention and protection from harassment at work and related to work.

Harassment, under this Law, shall be any active or passive behavior toward an employee or a group of employees of an employer that is repeated, which is aimed at or represents a violation of dignity, reputation, personal and professional integrity, health and status of an employee, which also causes fear or creates a hostile, humiliating or offensive environment, deteriorates conditions of work or leads an employee to isolate himself or to terminate the employment contract or other contract on its own initiative.

The Law on Employment of Foreigners ("Official Gazette of RS", No.128/14) recognizes two types of labour permits as labour permit, and personal labour permit. A personal labour permit

shall be issued to: (i) employees who have acquired a residence permit, (ii) persons who have the refugee status, (iii) persons belonging to a special category (seeking asylum, etc.), (iv) immediate family members of persons covered in points (i) and (ii), (v) immediate family members of a Serbian citizen, and (vi) foreigners with Serbian origin up to the third degree of consanguinity in the direct line.

On the other hand, the Labour permits are issued for (i) employment, (ii) special cases of employment, and for (iii) self-employment. Based on a labour permit, employees can be employed only for the particular job for which the permit was issued for. It is worth noting that the employer at whose request the labour permit was issued must comply with the following: the employer (i) cannot assign particular employee to another employer, (ii) must register employees in the social security system, and (iii) must bear the costs of issuing the labour permit; such costs cannot be transferred to the employee.

Last, the Law prescribes certain cases when foreigners can work in Serbia without labour permit. For instance, the Act provides that a foreigner can work in Serbia without a labour permit if he/she resides in Serbia for less than 90 days within a period of six months as of the day of their first entry into the country and if, inter alia, such person (i) is a shareholder, founder, legal representative or a member of a corporate body of a Serbian legal entity and if he/she is not employed there, (ii) is assigned to perform work in Serbia based on agreement on purchasing goods, purchasing or leasing of equipment, delivery, instalment, repair or training for work on those machines or equipment and in other cases prescribed by the Act.

4.1.3.4 Stakeholder Engagement

The Law on Free Access to Information of Public Importance (“Official Gazette of RS”,No. 120/04) regulates the rights to access information of public importance held by public authority bodies, with the purpose of the fulfillment and protection of the public interest to know and attain a free democratic order and an open society. According to the Law;

- Everyone shall have the right to be informed whether a public authority holds specific information of public importance and/or whether such is otherwise accessible to him/her.
- Everyone shall have the right to access information of public importance by being allowed to examine a document containing information of public importance, by being entitled to make a copy of that document, and by being entitled to receive a copy of such document on request, by mail, fax, electronic mail or otherwise (Article 5).

The Law on the Protector of Citizens (“Official Gazette of RS” No.54/07) establishes an independent state authority which protects the human and minority rights and freedoms of citizens (domestic and foreign physical and legal entities) and controls the work of all administrative authorities

4.2 Lender Requirements

4.2.1 UKEF Requirements

UK Export Finance (UKEF) is the United Kingdom's Export Credit Agency (ECA). UKEF determines whether applications for support fall within the scope of the Organisation for Economic Co-operation and Development (OECD)'s Common Approaches and Equator Principles for funding.

The OECD Common Approaches recognizes that the primary role of ECAs is to promote trade in a competitive environment (in contrast to development banks and agencies which focus primarily on development assistance) and that ECAs have a responsibility to consider the positive and negative Environmental and Social Human Rights risks (ESHR) and impacts of projects, in particular those in sensitive sectors and/or located in or near sensitive areas, and the ESHR risks associated with existing operations, in deciding whether to offer support.

All projects are initially screened to determine whether the project falls under the Guidelines of the Common Approaches (2016) and to categorize them as A (sensitive), B (potential environmental and/or social impact) or C (minimal or no potentially adverse environmental and/or social impacts).

Impact Assessments and Environmental and Social Management Plans produced by the project sponsor against host country laws and the relevant international standards, typically the International Financial Corporation (IFC) PSs. UKEF, also adopted the Equator Principles. Similarly, Equator Principles refers to IFC Performance Standards on Environmental and Social Sustainability and the World Bank Group Environmental, Health and Safety Guidelines for the project type (Toll Roads), which is of concern for financial support. UK Export Finance's assessment of the potential ESHR impacts takes account impacts, receptors and issues during the construction and operations phases including but not limited to:

- Health and safety (of workers and local communities)
- Emissions to the atmosphere
- Waste water treatment;
- Waste and hazardous materials management;
- Labour camps;
- Community engagement;
- Grievance mechanisms;
- Emergency Response; and
- Traffic Management.

4.2.2 MIGA Requirements

The Multilateral Investment Guarantee Agency (MIGA) is a member of the World Bank Group. MIGA's Sustainability Framework (2013) articulates the Agency's strategic commitment to sustainable development and is an integral part of MIGA's approach to risk management. The Sustainability Framework comprises MIGA's Policy and Performance Standards on Environmental and Social Sustainability, and MIGA's Access to Information Policy. The Policy on Environmental and Social Sustainability describes MIGA's commitments, roles, and responsibilities related to environmental and social sustainability. There are 8 Performance Standards (PS) esblished for the client to meet throughout the life of an investment supported by MIGA as:

- **PS 1: Assessment and Management of Environmental and Social Risks and Impacts;** underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.
- **PS 2: Labor and Working Conditions;** recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company.
- **PS 3: Resource Efficiency and Pollution Prevention;** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations.
- **PS 4: Community Health, Safety and Security;** recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.

- **PS 5: Land Acquisition and Involuntary Resettlement;** recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood1) as a result of project-related land acquisition2 and/or restrictions on land use.
- **PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;** recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."
- **PS 7: Indigenous Peoples;** recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat.
- **PS 8: Cultural Heritage;** recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

MIGA's Access to Information Policy reflects MIGA's commitment to transparency and good governance on its operations, and outlines the Agency's institutions disclosure obligations regarding its guarantee and limited advisory services. The Performance Standards are directed towards clients, providing guidance on how to identify risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of MIGA guarantee (including project and/or corporate finance provided through financial intermediaries), MIGA requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. MIGA uses the

Sustainability Framework along with other strategies, policies, and initiative to direct the business activities of the Agency in order to achieve overall development objectives.

4.2.3 IFC Requirements

The IFC is an international financial institution, which offers investment, advisory, and asset management services to encourage private sector development in projects. It was established in 1956 as the private sector arm of the World Bank Group to advance economic development by investing in strictly for-profit and commercial projects, which reduce poverty and promote development. To provide a means of managing the social and environmental risks and impacts on projects, the IFC has developed Performance Standards on Social and Environmental Sustainability (amended in 2012). The Performance Standards are designed to help avoid, mitigate, and manage risks and impacts as a means of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project level activities. In other words, IFC requires the Project Parties to carry out an environmental and social assessment of Project-related impacts according to the PSs, which are listed as follows:

- **PS 1: Assessment and Management of Environmental and Social Risks and Impacts;** applies to all projects that have environmental and social risks and impacts. It underscores the importance of managing environmental and social performance throughout the life of a project.
- **PS 2: Labour and Working Conditions;** recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. The requirements set out in PS 2 have been in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations (UN).
- **PS 3: Resource Efficiency and Pollution Prevention;** recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. PS 3 outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices
- **PS 4: Community, Health Safety and Security;** recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, PS 4 addresses the client's responsibility to avoid or minimize

the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups

- **PS 5: Land Acquisition and Involuntary Resettlement;** recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/ or restrictions on land use.
- **PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;** recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.
- **PS 7: Indigenous Peoples;** recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development.
- **PS 8: Cultural Heritage;** recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, PS 8 aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this PS on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

In addition, the following Guidelines of the IFC, which are deemed relevant to the Project, have been followed during the preparation of the ESIA study:

- The IFC General EHS Guidelines, dated April 30, 2007;
- The IFC Environmental, Health, and Safety Guidelines for Construction Materials Extraction, dated April 30, 2007
- The IFC Environmental, Health, and Safety Guidelines for Toll Roads, dated April 30, 2007
- The IFC and EBRD Workers' Accommodation: Processes and Standards, dated September 2009.

4.2.4 Equator Principles

The Equator Principles are a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk related to certain project finance projects. The Equator Principles are a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk related to certain project finance projects. International Financial Institutions adopt the Equator Principles in order to ensure that financed projects are developed in a manner that is socially responsible and reflects sound environmental management practices.

This framework is based on the IFC Performance Standards and the World Bank Group EHS Guidelines. Financial Institutions adopt the Equator Principles in order to ensure that financed projects are developed in a manner that is socially responsible and reflects sound environmental management practices. The principles comprise a set of ten broad principles that are underpinned by the environmental and social policies, standards and guidance of the IFC. The Equator Principles are as follows:

- Principle 1: Review and Categorization;
- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Environmental and Social Standards;
- Principle 4: Environmental and Social Management System and Action Plan;
- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: Reporting and Transparency (Equator Principles Financial Institutions, 2013).

4.3 Gaps between National EIA and International ESIA Processes

The most prominent topic, which requires further elaboration in national EIA legislation is the assessment of social impact. Additional studies and procedures are required for internationally financed projects to achieve alignment with international standards. For example, undertaking of detailed socio-economic baseline surveys at Project AoI and the establishment of a Grievance Mechanism which are not stipulated by the national EIA legislation.

Table 4-5 presents the further work that is not required by the Serbian EIA , however, needs to be incorporated in the scope of international ESIA.

Table 4-5. Gap Assessment of National EIA and International ESIA Processes

Process	ESIA	EIA	Description
Categorization	Yes	Yes	International Finance Institutions and national legislation categorizes the infrastructure projects in order to determine what type of documents are required to be prepared by the related parties.
Stakeholder Engagement Plan	Yes	No	Unlike the necessity of stakeholder consultation and preparation of SEP in ESIA studies, formal stakeholder engagement plan is not required under national legislation.
Consideration of Alternatives	Yes	Yes	Both the impact assessment process for international and national regulatory requirements, require the consideration of other feasible approaches, including alternative locations, technologies, scales and 'no project' options
Environmental Impact Assessment	Yes	Yes	The environmental impact assessment requirements are generally aligned. The standards adopted in the environmental assessment undertaken for the ESIA should be in line with European and other international best practice. The requirements under the national EIA regulatory process need to ensure compliance with national legislation and not the regulatory requirements outside of the country.
Social Impact Assessment	Yes	Limited	The national regulatory requirements for impact assessment are primarily focused on environmental requirements with other requirements encompassed in other regulatory (e.g. 'planning') mechanisms. A formal socio-economic impact assessment is not required under national legislation. However, the local national legislation does require assessment of effects where impacts are associated with impacts to human health.
Expropriation	Yes	Limited	Although there is strong encouragement in the wording in the IFC PS 5 in particular to enter into negotiated settlements, rather than expropriate by use of eminent domain power, the National legislation does not offer such encouragement.
Environmental and Social Management Plan	Yes	No	ESMP is not typically included as a requirement in the national legislation.
Labour and Working Conditions	Yes	Limited	The main gap is that IFC requires the inclusion of contractors' involvement in Project Standards.
Non – Technical Summary	Yes	Yes	NTS is required for international requirements for use as a disclosure document. It is recognized as good practice to produce an NTS to provide readily accessible summary of the project key features, an assessment of its effects, the proposed mitigation measures and a summary of the residual impacts.
Public Consultation and Disclosure	Yes	Yes	The public consultation process for both international and national regulatory purposes is required.
Grievance Mechanism	Yes	No	A Grievance Mechanism is not a formal requirement under the national regulatory requirements. However, grievances are reported under the consultation process and are encompassed under other regulatory mechanisms (e.g. the local 'planning' process).

5 BASELINE CONDITIONS

5.1 Definition of the Area of Influence

The Area of Influence (AoI) is an important element in assessing environmental and social impacts of a proposed development since it informs about the physical and/or social extent onto which the assessment should be performed. According to the definition in IFC PS-1, the AoI encompasses the followings:

- The area likely to be affected by:
  - (i) the project[1] and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project[2];
  - (ii) impacts from unplanned, but predictable developments caused by the project that may occur later or at a different location; or
  - (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.
- Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable[3].
- Cumulative impacts[4] that result from the incremental impact on areas or resources used or directly influenced by the project, from other existing, planned or reasonably defined developments at the time when the risks and impacts identification process is conducted.

For this study, two different definitions of AoI have been used for social and environmental baseline studies.

[1] Examples include the project's sites, the immediate air shed and watershed, and/or transport corridors.

[2] Examples include canals, tunnels, relocation and access roads, borrow and disposal areas, construction camps, power transmission corridors, pipelines and contaminated land (e.g., soil, groundwater, surface water, and sediments).

[3] Associated facilities may include permanent facilities such as railways, roads, captive power plants or transmission lines, pipelines, utilities, warehouses, logistics terminals which are already existing in the region or non-permanent facilities such as capms, quarries, borrow pits and asphalt plants which are planned to be used directly for the project.

[4] Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities. Examples of cumulative impacts include: incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways.

5.1.1 Environmental Area of Influence

The relevant environmental AoI for the Project can be divided into two main parts. The first part covers the followings;

- The Proposed Motorway Route,
- The extended AoI of the Project, including access roads, quarries, asphalt and batch plants, maintenance areas, and construction camps to be realized due to the Project,
- Area of receptors (i.e. soil, surface water and ground water) that may be impacted from supply and waste management operations.

For the intense and direct impacts associated with the project activities in construction and operational phases, the immediate vicinity of the Proposed Motorway Route covering above mentioned three items is considered to be a corridor of 1,000 m width (500 m on each side of the motorway) along the Proposed Motorway Route. This is the first part of the Environmental AoI along the Proposed Motorway Route. In addition, the following areas compose the second part of the Environmental AoI due to the fact that the there can be impacts (e.g., handling of wastes and transportation of the supply materials to the site from a long distance) associated with the activities in relation to the Project outside the corridor of 1,000 m width:

- Waste disposal facilities and the roads associated with waste management (i.e. sanitary landfills, waste recycling facilities), and
- Material supply locations and the roads associated with transport of such materials.

A total of 700 m wide corridor is specified as the protection zone in the Spatial Plan of E-761 Motorway Infrastructure Corridor (see Chapter-3 for the detailed information about the zone). When determining the AoI as 1,000 m, the first intension was to cover this 700 m wide protection zone. Then, activities causing impacts on a wider range were considered. In this respect, the most important aspect that was taken into account is the impact area regarding the air pollutant emissions which are expected to have impact on a wider area than the other impacts of the Project such as noise or impacts on surface water and soil.

In this respect, a total of 1,000 m width was chosen as the first part of the Environmental AoI. The size of the chosen area depends upon the types of the emission sources, mass of the emissions, and types of the pollutants being emitted as well as the topography and meteorological conditions of the area. The map for specified environmental AoI is given in Figure 5-1.

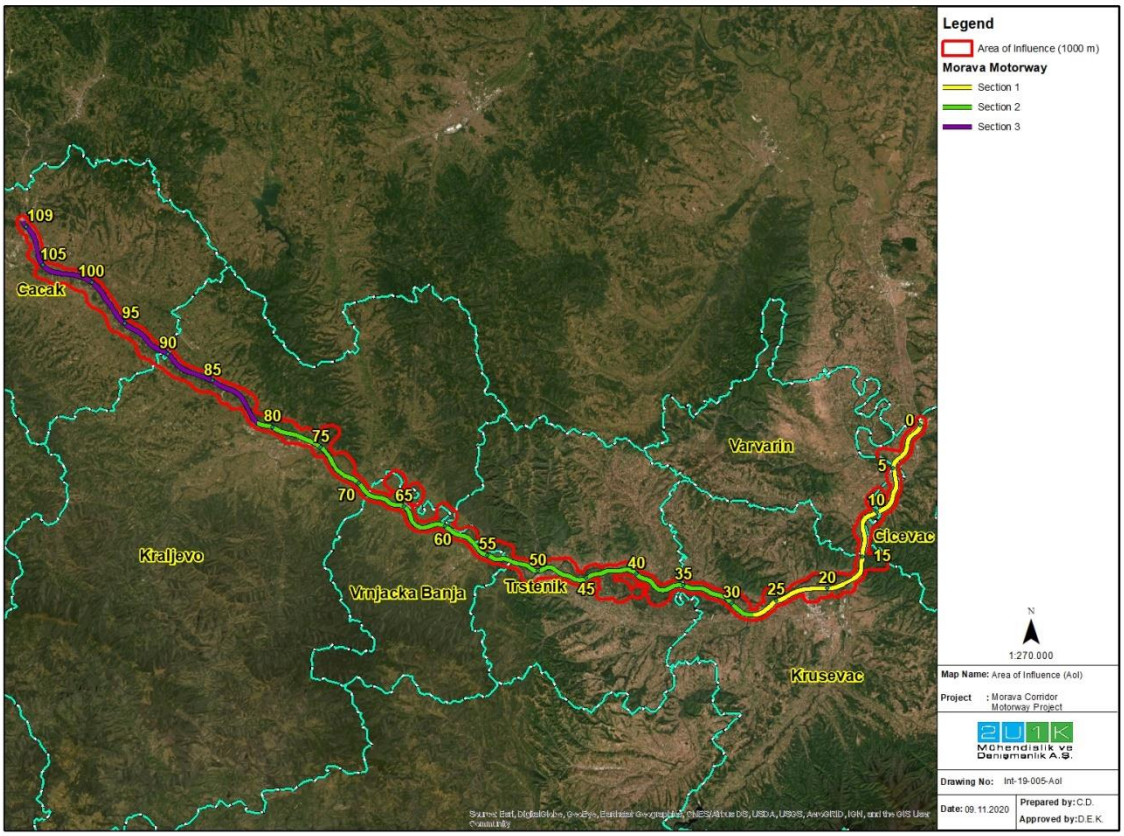


Figure 5-1. Environmental Area of Influence

5.1.2 Social Area of Influence

The social impacts have been determined by both environmental and social factors including different spatial and temporal scopes.

The spatial scope of the Social Area of Influence (AoI) includes the following areas:

- **The Primary AoI**: The primary area of influence encompasses a corridor of 500 m (being 250 m on each side of the Motorway centerline). This corridor is potentially expected to experience the land acquisition impacts in addition to other environmental and social impacts.
- **The Secondary AoI:** Area of potential socioeconomic impacts directly associated with the Project activities (e.g. health impact caused by traffic movement, air pollution, and impact on resources used by the villages.)
- **Area of Indirect Impacts:** Area of potential socioeconomic impacts indirectly induced by the Project activities (e.g. increase in the local employment rate and incomes, contacts with the Project personnel, labour migration).

Temporal scope of the Project includes,

- **Immediate** (<1 year)
- **Short term** (1-4 years),
- **Medium term** (5-15 years),
- **Long term** (the impact will cease after the operational life span of the project)
- **Permanent** (no mitigation measure of natural process will reduce the impact after construction).

Table 5-1. Potential Social Impacts According to Settlements in the Area of Influence

Impact zones	Distance to centerline	Expected impacts
Primary AoI	250 m	Physical displacement at Project footprint Economic displacement at Project footprint Cultural heritage Access to ecosystem services Employment opportunities Economic development Impacts on infrastructure and services Community health and safety impacts
Secondary AoI	500 m	Employment opportunities Economic development at village level Impacts on infrastructure and services at village level Community health and safety impacts at village level
Area of Indirect Impacts	500m+	Economic development at municipal level Impacts on infrastructure and services at municipal level

When determining the primary and secondary AoI, the zones specified in the Spatial Plan of E-761 Motorway Infrastructure Corridor were taken into consideration (detailed information about zones are provided in Chapter-3 of the ESIA Report). In this plan, a total of 700 m wide protection zone is specified and the AoI is determined to cover this zone.

There are 7 municipalities located in the Social AoI, including 48 affected villages within those municipalities. Table 5-2 presents the respective information on each affected municipalities of the Project.

Table 5-2. Municipalities Located in the Social AoI

Municipality	Number of settlements within the AoI of the Project
Ćićevac	4
Varvarin	2
Kruševac	7
Vrnjačka Banja	6
Trstenik	8
Kraljevo	11
Čačak	10
TOTAL	**48**

5.2 Hydrology

The proposed Project is located in the West (Zapadna) Morava River basin, and the Proposed Motorway Route mainly follows the West Morava River opposite to the river flow direction of west to south. Due to the flooding risks, the West Morava River has been studied by the Jaroslav Cerni Institute for Water Management in terms of hydrotechnical aspects.

In the following subsections, the study area of the hydrological studies, the methodology and data sources, general information about hydrology of the West Morava River are given, and then hydrologic baseline information about the area where the Project is located is provided more specifically.

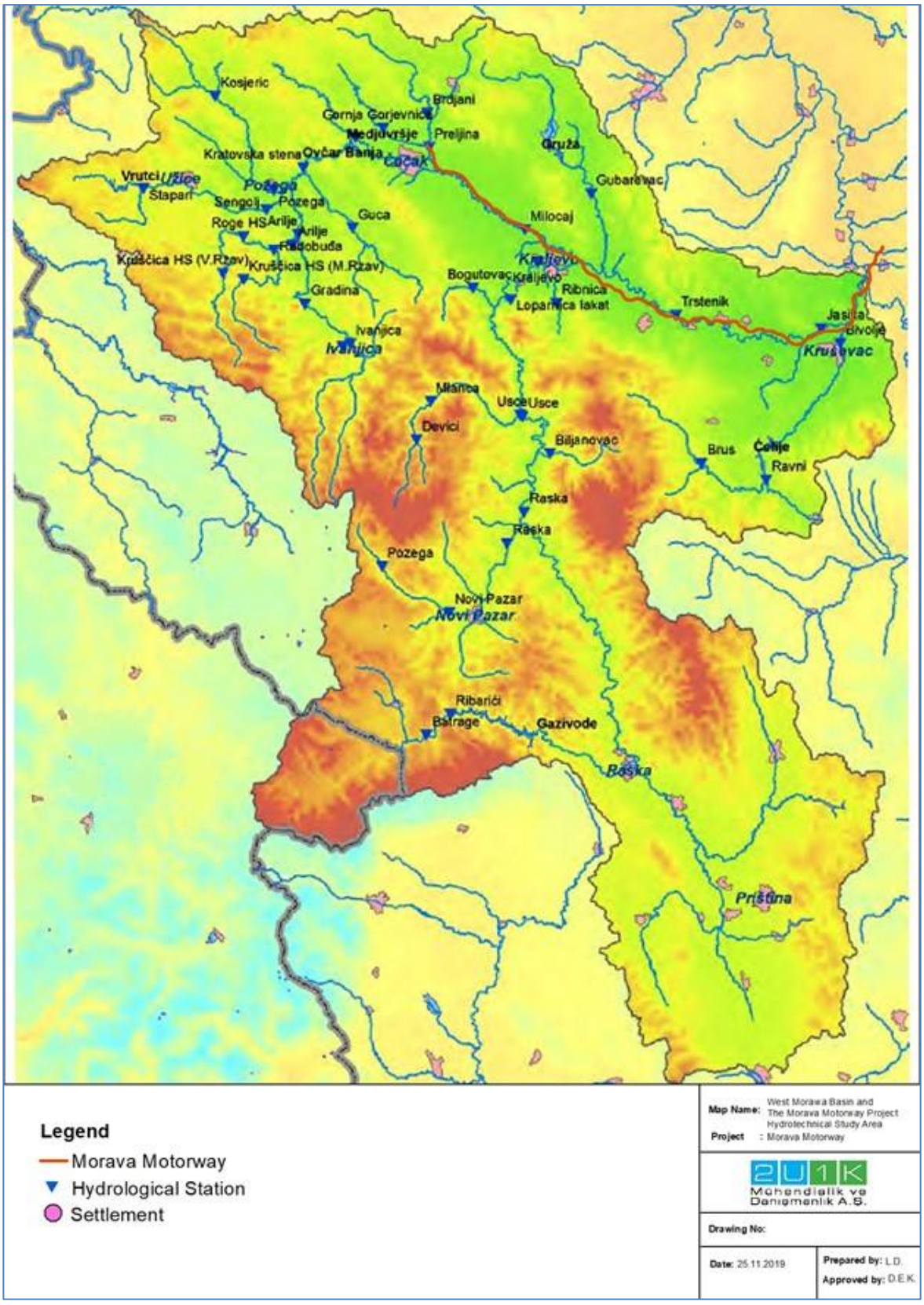
5.2.1 Study Area

The Study Area of the Hydrotechnical Study Report for the Corridor of the Highway E-761 covers a large area expending along the West River and its tributaries. Therefore, it was aimed to reduce the coverage area of the baseline data to be provided in the scope of the ESIA studies of the Morava Corridor Motorway Project. In this respect, the Study Area of this hydrology baseline section has been chosen as the overlapping parts of the West Morava River with the Project, which is shown in Figure 5-2.

5.2.2 Methodology and Data Source

The following documents have been reviewed during the desktop study of the Project:

- EIA Reports for Section-1 and Section 3 (incl. Sector 8 and Sector 9) prepared by CIP and Highways Institute, respectively, (Highway Institute, 2019);
  Hydrotechnical Study Report for Corridor of the Highway E-761, Section Pojate-Preljina, prepared by Jaroslav Cerni Institute for Water Management, (Roads of Serbia, 2016);
- Sub-Basin Level Flood Action Plan - Velika Morava River Basin and Right Danube Tributaries between the Sava River Mouth and RSBG Border (Republic of Serbia & Republic of Bulgaria, 2009);
- West Morava River Basin Zoning based on Low Flow Regime Evaluation (Simić & Matić, West Morava river basin zoning based on low flow regime evaluation, 2018); and
- Hydrotechnical Regulation of The West Morava River within the Infrastructure Corridor of Highway E-761.



Source: **(Simić & Matić, West Morava river basin zoning based on low flow regime evaluation, 2018)**

Figure 5-2. West Morava Basin and the Morava Motorway Project Hydrotechnical Study Area

5.2.3 Baseline Conditions

The West Morava River, which forms the headwater of the Greater Morava River, arises at the confluence of the Moravica (1,513 km^2 basin area) and Djetinja (1,210 km^2 basin area) rivers, and it has about 210 km long course. There are many tributaries of the West Morava River. Ibar River, which joins to the West Morava River (7,925 km^2 basin area) at Kraljevo, is the most important tributary in the basin. Ibar River rises in the most eastern part of Montenegro, at very high mountains and it contributes the 50% of the West Morava River discharge. Other important tributaries of the West Morava are the Rasina (990 km^2), Emernica (629 km^2 basin area) and Gruža (617 km^2 basin area). The map of the basin is given in Figure 5-3.

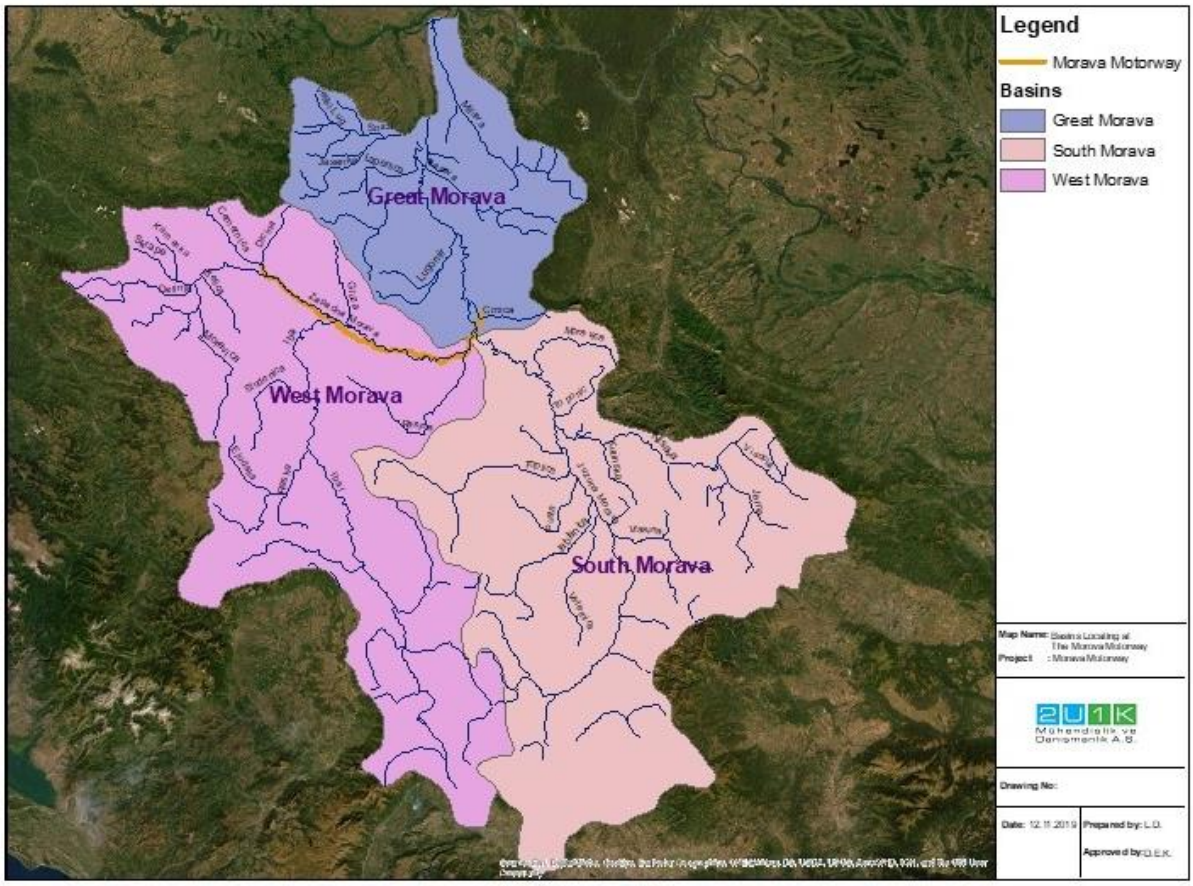


Figure 5-3. Basin Map of the Project Area

The upstream of the West Morava River basin is located in the mountainous area (Kopaonik, Prokletije, etc.), where the alpine climate with long winters and a lot of snow cover dominates the region. In the downstream part of the West Morava River basin, the climate is moderate continental with less fluctuation in temperature and higher yearly precipitation totals. In the rain-snow regime, there are two precipitation maximums, with frequent and intensive summer rainfalls (June), secondary autumn maximum (November), and generally dry in winters. Typical to this climate, more than 50% of yearly precipitation occurs during the warmer

seasons, and frequently induce floods. During the spring period runoff is produced by precipitation and melting of snow from mountainous regions.

The West Morava River basin has significant agricultural potential and the West Morava River flows through settlements. In addition to the agricultural potential, the West Morava River water is used for industrial purposes in important industrial centers such as Čačak and Kraljevo where the West Morava River flows through. The West Morava River has great social and economic importance besides water management issues due to its above-stated characteristics. In this respect, a separate and detailed Hydrotechnical Study Report has been prepared by Jaroslav Černi Institute. The Hyrotechnical Study Report covers 139 km part of the basin where the Project is located. The aim of the Report is to provide a harmonized motorway project together with all project construction facilities and activities in line with the West Morava River regime (i.e. flood protection, design of civil structures such as bridges etc.) as well as the existing water facilities and future water management plans. With this intention, the study provides the following measures for the flooding risks and the related impacts of the Project:

- regulating the watercourses and protection of coastal areas;
- minimizing the negative impacts construction of the motorway;
- sustaining the stability of the West Morava Riverbed and other water users and resources in coastal areas.

The study also defines the basic parameters for the protection measures as the changed hydrological conditions in the West Morava River by considering the flood which occurred in May 2014. The measures provide information for design of the Project to understand the level of protection of the Project from floods as well as erosion effects of the watercourses.

Hydrological Study

As a part of the Hydrotechnical Study Report, flow monitoring is carried out to understand the hydrological characteristics of the West Morava River basin. In this respect, the existing hydrological stations of the Republic Hydrometeorological Service of Serbia (RMHS) with long water level measurements are used. In the Hydrotechnical Study Report, it is given that in the framework of the general planning of the West Morava River, the river course is divided into 237 cross-sectional areas with the 500 m intervals from the South Morava to the mouth Čemernica near Čačak and these transverse profiles are grouped as 25 characteristic locations. In addition to these profiles, there are two more locations which are as follows:

- Additional cross-sections at locations which are designed bridges on the motorway E-761; and
- Control profiles on specific locations (in the zone of water facilities, planned bridges, landfills, etc.).

Location of the profiles are given in Table 5-3.

Table 5-3. The Profiles which are considered during Hydrotechnical Study Report

River	Hydrological Station	Work (start/end)	Level (mnm)	Distance from the mouth (km)	Surface of the basin (km^2)	Method of registering water levels w.r.t years		
						Lath	Limnigraf	Digitally
West Morava	The swing bridge	1922/1978	295.44	209.8	2688	1922	1958	-
West Morava	Kratovska Stena	1978	290.44	206	3077	1978	1978	2002
West Morava	Kraljevo	1955/1986	184.54	104.5	4721	1955	1957	-
West Morava	Miločaj	1986	194.27	119	4568	1923	1986	2002
West Morava	Trstenik	1940	160.63	63.5	13902	1940	-	-
West Morava	Jasika	1940	138.56	20.5	14721	1940	1968	-
Ibar	Lopatnica Elbow	1935	224.68	26.5	7818	1935	1976	2007
Rasina	Bivolje	1922	141.96	5.50	958	1922	1960	-

Source: Hydrotechnical Study Report for Corridor of the E-761

The fieldwork on the West Morava conducted by Jaroslav Cerni Institute in the scope of the Hidrotechnical Study Report, was carried out in the period from 26 July to 29 July 2016. Cross sections were recorded at the same position, or at the same directions with transverse profiles that have been recorded in May 2007, for the purposes "General Project Planning West Morava".

As stated above, the West Morava River discharge calculations are based on the measurements of RMHS at the study area of the Hydrotechnical Study Report. The list of the stations and approximate positions regarding motorway KPs (Kilometer Points) are provided in Table 5-4. All discharge values after 2009 are based on the analysis made in the context of Water Master Plan of Serbia of 2009.

Table 5-4. Maximum Flow Calculations based on RMHS Measurements

Section		The Facility	Document		Station	Q (m3 / s) for different p (%)		
			Number	Date		0,1	1	2
Pojate Section - Kruševac (km 0 + 000- km 27 +600)								
1	Bridge over the South Morava (km 0 + 000- km 8 + 830)	Bridge over South Morava (km 8+522.37)	92/I/1-624/2011	19.09.2011	Mojsinje / J. Morava	3122	2131	1855
2	Bridge over South Morava	Bridge 9 + 844.46 Bridge 16 + 030.12			J. Jasika / Z. Morava	2941	1844	1582
3	Makresane-Koshevi	-	-	-	-			

Section		The Facility	Document		Station	Q (m3 / s) for different p (%)		
			Number	Date		0,1	1	2
	(km 16+722-km 27+600)							
	Kruševac - Adrani Section (km 27 + 600-km 80 + 450)							
4	Kruševac (Koshevi) - Lopaska river (km 27+600-km 41+500)	Bridge P218	92/I/1-114/2013	20.03.2013	Trstenik / Z. Morava	2465	1784	1588
5	Lopaska River-Lower Mala (km 41+500-km 55+900)	Bridge km 48+059 Bridge km 51+850 Bridge km 54+375			-	-	-	-
6	Lower Mala / Vrba (km 55+900-km 67+125)	Bridge km 48+059			Trstenik / Z. Morava	2830	1793	1542
7	Vrba- Adrani (km 67+125-km 80+449.97)	km 74+700 to km 77+100	92/I/1-32/2006	21.02.2006	Kraljevo-Mipočaj	1858	1222	1058
		km 78+100 to km 79+100	92/I/1-114/2013	20.03.2013	Trstenik / Z. Morava	2465	1784	1588
		km 79+400 to km 80+800	-	-	-	-	-	-
	Adrani-Mrcajevci Section (km 79+000 – km 97+000							
8	Adrani - Mrcajevci section (km 79+000-km 97+000)	Bridge km 81 +900	92/I/1-294/2011	18.04.2011	Kraljevo-Mipočaj Z. Morava	2070	1230	1040
	Mrcajevci-Preljina Section (km 97+000 – km 109+663,8}							
9	Mrcajevci - Preljina section (km 97+000 km 109+663,8)	Facility at Z. Moravi	92/I/1-294/2011	18.04.2011	Kraljevo-Mipočaj / Z. Morava	2070	1230	1040
		Facilitiy at Čemernici			Preljina / Čemernica	656	351	284

Source: Hydrotechnical Study Report for Corridor of the E-761

Calculation of Maximum Flow (Flood)

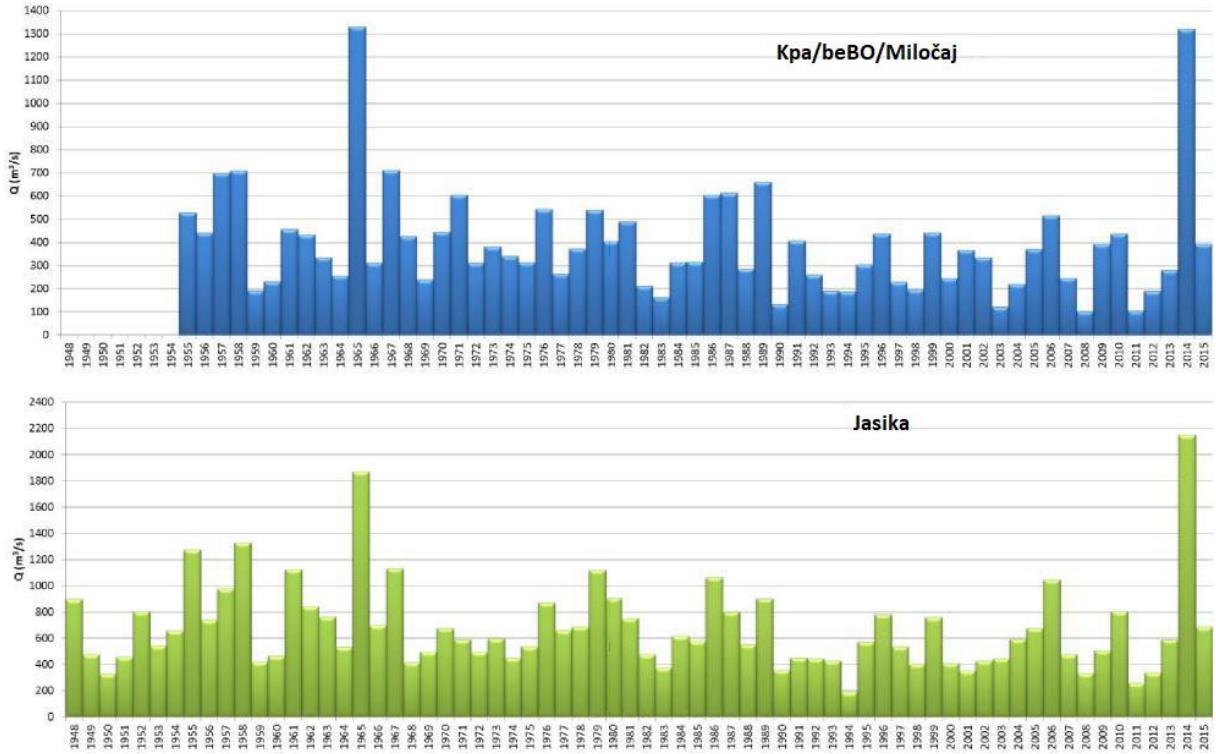
From the context of Water Master Plan of Serbia, a long series of maximum annual flow profile has been used for H.S. (Hydrological Station) of Miločaj and Jasika since 2015. Considering the last 9 years, extremely maximum flow rate occurred in May 2014. The causes of this maximum flow rate are the heavy rains and cyclones formed as a phenomenon as a result of the penetration of cold air from the region of the Alps, which is across the Adriatic. Between May 14 and 16, 2014, the cyclone was positioned at all heights,

resulting in heavy precipitation of 200 L/m^2 in many areas and more than 300 L/m^2 in the local areas. The consequence of this phenomenon is the extreme rain runoff, which led to series of maximum flow discharges to Western Morava: Skrapež, Moravice, Rzava and Bjelica.

The purpose of this study, computing the values of the West Morava River's maximum annual flow profiles at H.S. Miločaj and H.S. Jasika and computing maximum flow rates at River Ibar H.S. Lopatnica elbow and River Rasina H.S. Bivolje (see Table 5-5) is to evaluate the historical exceptional changes in the water regime.

Heavy rainfall caused a large increase in water level on May 13 and 14, 2014 at tributaries of the West Morava River. Maximum flow rates of the West Morava River, when water levels at H. S. Miločaj and H. S. Jasika were above limit value of emergency flood protection level in the period from May 16 to 18, 2014 are as follows:

- at H. S. Miločaj was Qmax 2014 = 1320 m^3/s and for H.S.
- at Jasika was Qmax 2014 = 2150 m^3 /s.



Source: Hydrotechnical Study Report for Corridor of the E-761

Figure 5-4. Absolute Annual Maximum Flows of Western Morova on Profiles H.S. Milocaj and H.S. Jasika in the Period of Observation

For computation, prolonged series of maximum annual flow data, which are adapted to the theoretical distribution function probability have been used since 2015. The Pilot Harvey Test, which is commonly used for measurement historical events when dealing with extreme values, was performed within the scope of Hydrotechnical Study Report to check whether the upstreams contain statistical exceptions and it is noted that Ibar River does not contain a statistical exception.

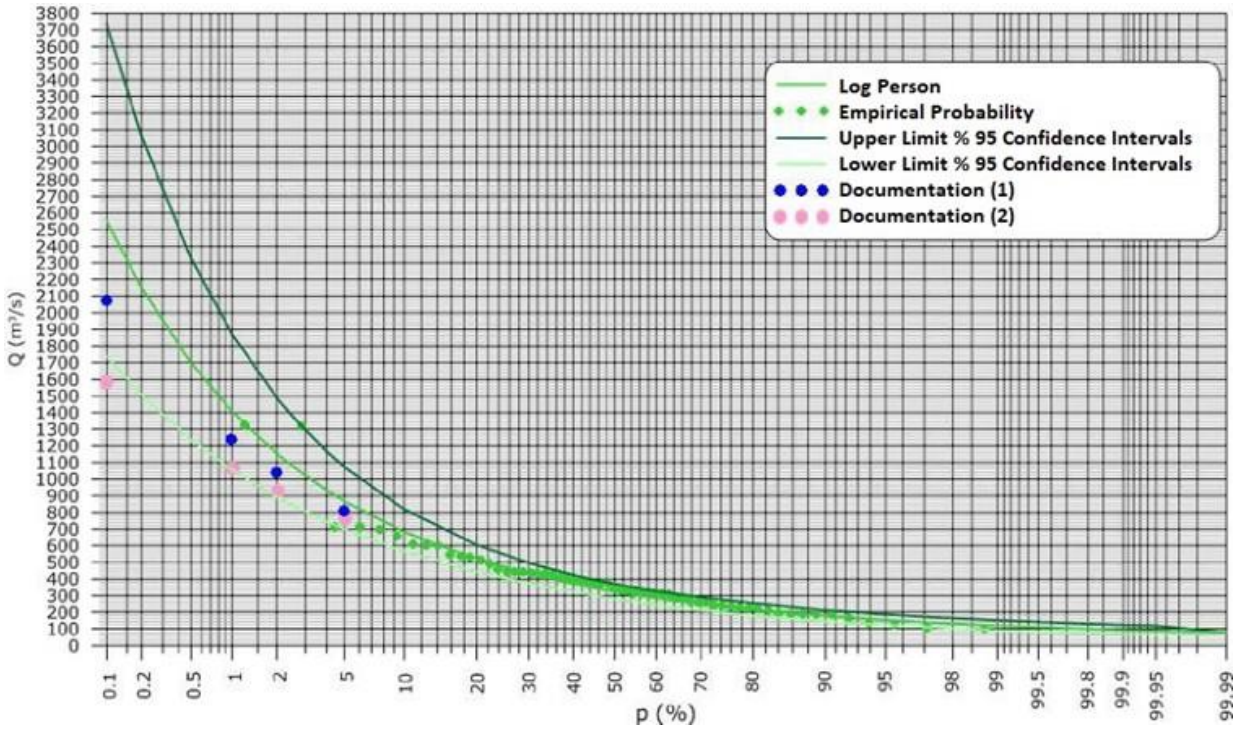
Four theoretical distribution probability functions; namely, i) Pearson III, ii) Log Pearson III, iii) Gumbel and iv) Weibull Log Normal distribution are used for data analysis. Quality adjustment is verified by using x^2 and Kolmogorov-Smirnov test. It is seen that the data best fits with Log Pearson III distribution.

The estimated values of maximum annual flows according to Log Pearson III distribution are given in Table 5-5 and the graphical analysis of distributions are shown in Figure 5-5, Figure 5-6, Figure 5-7, Figure 5-8.

Table 5-5. The Calculated Values of the Maximum Annual Flow Qmax (m^3/s) and Western Morava Flow for Typical Probabilities, p (%)

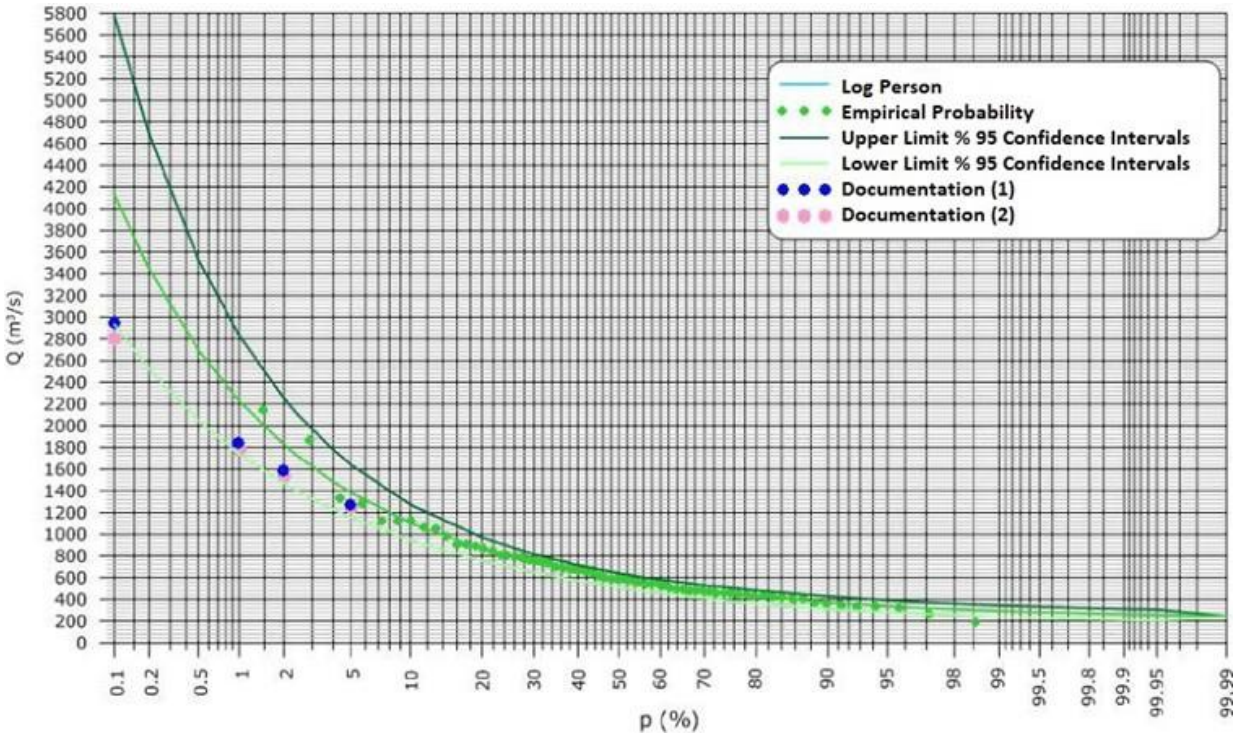
River/ Hydrological station	Period	Q max (m3/s) p(%)			
		0,1	1	2	5
West Morava/ Kraljevo / Mipočaj	1955-2005	1579	1067	930	759
	1955-2006	2068	1234	1038	810
	1955-2015	2555	1409	1156	870
West Morava / Jasika	1948-2005	2794	1781	1536	1244
	1948-2006	2941	1844	1582	1274
	1948-2015	4122	2224	1823	1381
Ibar / Lopatnica Elbow	1948-2005	2432	1324	1086	820
	1948-2006	2600	1368	1111	831
	1948-2015	2623	1364	1105	823
Rasina / Bivolje	1949-2005	678	446	380	297
	1949-2006	638	430	370	292
	1949-2015	721	445	373	285

Source: Hydrotechnical Study Report for Corridor of the E-761



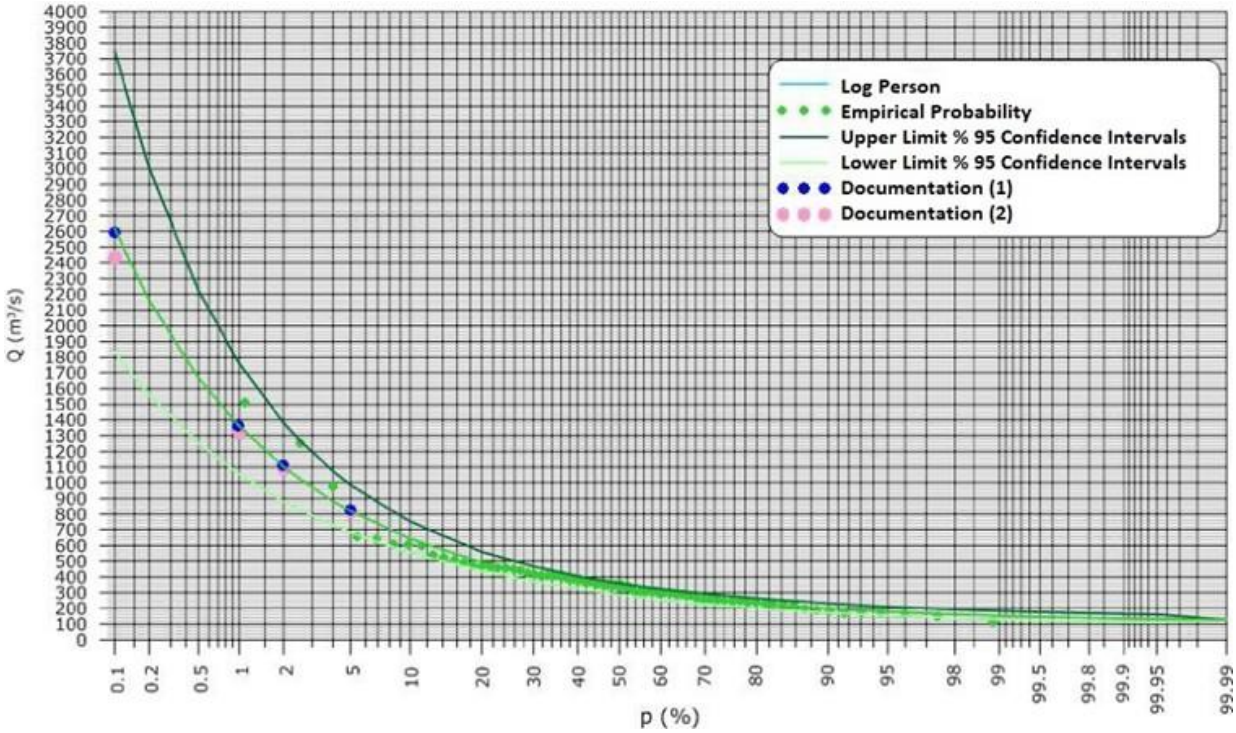
Source: Study Report for Corridor of the E-761

Figure 5-5. Calculation Values of Maximum Annual Flows of the Western Morava H.Š. Miločaj with a 95% Confidence Interval



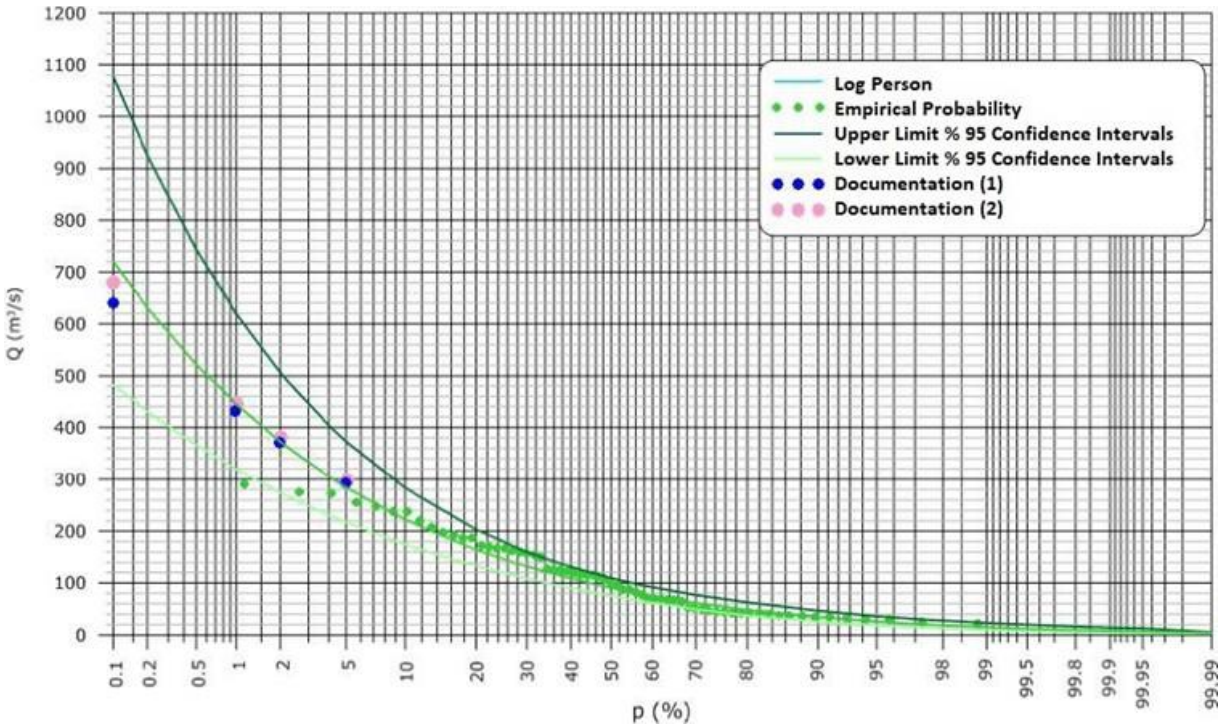
Source: Hydrotechnical Study Report for Corridor of the E-761

Figure 5-6. Calculation Values of Maximum Annual Flows of the Western Morava H.Š. Jasika with a 95% Confidence Interval



Source: Hydrotechnical Study Report for Corridor of the E-761

Figure 5-7. Calculation Values of Maximum Annual Flow of the River Ibar Hydrological Station Lopatnica elbow with a 95% Confidence Interval



Source: Hydrotechnical Study Report for Corridor of the E-761

Figure 5-8. Calculation Values of Maximum Annual Flow of the River Rasina Hydrological Station Bivolje with a 95% Confidence Interval

The study concludes that;

- During the flood in May 2014, significant flows of Western Morava occurred are Q_{max} 2014 = 1320 m^3/s with a return period $T_{Miločaj2014}$ ≈ 80 years at the H.S. Miločaj and Q_{max} 2014 = 2150 m^3/s with a return period $T_{Jasika2014}$ ≈ 85 years at the H.S. Jasika.
- On the profile of H.S. Miločaj, 100-year flow of Western Morava is obtained as 342 m^3/s.
- On the profile of H.S. Jasika, 100-year flow of Western Morava is obtained as 443 m^3/s.

Hydraulic analysis

In Hydrotechnical Study Report, hydro-morphological (Hydro-Model) of the present situation of the West Morava River is based on 237 cross-sections, recorded in 2007, and includes data provided for 9 existing bridges, in such a way that each object is represented by the profile of 4 (i.e., 2 downstream and 2 upstream) and geometric characteristics of the bridges (position and width of the columns, position and shape of the abutments, the alignment of the upper and lower edge of the structure, the width of pavement).

The model also includes existing embankments, with dimensions that correspond current condition. Data on Manning's coefficient of resistance of the West Morava Riverbed are taken from the General Project Planning West Morava prepared by Jaroslav Černi in 2008 (hereinafter “General Design”) and these are:

- The section of the composition of the South Morava to H.S. Asp n = 0.036 $m^{-1/3}$ s
- Section of H.S. Jasika to H.S. Trstenik n = 0.038 $m^{-1/3}$ s
- Section of H.S. Trstenik to H.S. Miločaj n = 0.050 $m^{-1/3}$ s
- Section of H.S. Miločaj to the mouth Čemernica n = 0.038 $m^{-1/3}$ s

The coefficient of flow resistance in the floodplain is evaluated in the General Design based on the status and usage of the area given that;

i) mainly agricultural area,
ii) degraded land and
iii) a large number of sites where the larger depression filled with water.

The Manning coefficient of inundations in the above stated flood plain types is estimated as 0.08 $m^{-1/3}$ s (General Design, 2008).

In the hydraulic analysis, calculations were made for conditions of a 100-year maximum flow return period of the West Morava River, which has physical similarities with the Great Morava River. Therefore, the downstream boundary condition defines the water level in the upstream profile of the Great Morava River. Then, using the 100-year maximum flow return period,

water elevation (Z) has been estimated as 134.01 m at connection point of two rivers, namely West Morava and Great Morava.

Flood zone in the current and projected state of the watercourse are very similar. According to the hydraulic analysis that the Project and the access roads will be flooded as a results of flood with the 100-year maximum flow return period. Therefore, in the scope of the detailed design of the Project, the 100-year maximum flow return period should be considered.

Morphology of the West Morava River:

The study area of West Morava, from the junction with the South Morava to the mouth Čemernica, have similar characteristics regarding meandering and wandering in the West Morava Riverbed.

The dynamics of morphological changes in West Morava River depend on variations in the water flow and sediment from the basin. The relation between the value of the water flow (Q) and the sediment discharge (Pg) have inverse ratio of Q / Pg, not only caused by natural origin, but also resulted by the anthropogenic impacts such as impact of regulation works including construction of the West Morava River embankments and buildings, as well as longitudinal cuts of meanders. Regarding the anthropogenic impacts, in addition to the regulation works, there are morphological processes, exploitation of material from the West Morava Riverbed and from the coastal sides and dredging material from the riverbed in some sections of the watercourse are very significant. Therefore, morphological processes in Western Morava interact with natural and anthropogenic impacts..

The curvature of the Proposed Motorway Route of the West Morava River is highly variable, with a radius ranging from 100 m to 1,000 m. Some parts of the West Morava River are straight but they are very few and short. Radii of the downstream river are generally greater than 200 m, and radii of the upstream river are smaller than 200 m. The section of the West Morava River from km 90 to km 135 (from Kraljevo to Čemernica) with a series connected of the West Morava Riverbeds has radii of from 80 m to 200 m.

The study defines four categories of morphological changes in the West Morava River. These categories and locations along the West Morava River are provided in Table 5-6.

Table 5-6. Category of Morphological Changes in the West Morava River

Part of the West Morava River	Location	Explanation
Stable parts of the West Morava River course with minimal changes.	• From the connection point with the South Morava to the village of Bela Voda. • From Počekovina to the village to the mouth of the River Vrnjačka Banja. • From the mouth to Kraljevo.	Total length of all stable parts of The West Morava River is 62 km, i.e. 45% of the length of the West Morava. Almost there is no change in the watercourses from 1961 and 2007.

Part of the West Morava River	Location	Explanation
The West Morava River course parts subject to minor changes.	• From the mouth of the West Morava River to the River Vrnjačka Banja. • From Kraljevo to Miločaj • From the mouth of Ostrovki to Čemernica	Total length of parts with minor changes in the Proposed Motorway Route of The West Morava River is 46 km, or 33% of the length of The West Morava River. These parts are characterized by overall stability of the route of the watercourse, or slow river route changes.
The West Morava River course parts subject to major changes.	• From Bela Voda to Prokuplje. • From Miločaj to the mouth of the Bresnica.	Total length of part with unstable the West Morava River route is 22 km, i.e. 16% considered the length of the West Morava River. These changes created as a result of wandering riverbed. This part of the route is formed by multiple sharp and short curvatures, wherein the concave side of the curvature to occur intensively along the dredging coast
Artificial changes in the the West Morava River course	• From the mouth of Bresnica (near villages Katrga) to the delta Ostrovki • Changes within the aforesaid sections in Trstenik.	Local changes in the route of the West Morava River seen in several places, mainly because of the dredging material from the West Morava River.

Source: Hydrotechnical Study Report for Corridor of the E-761

Morphological changes in the West Morava River given in Table 5-6 have been integrated into the maps given in the figures below.

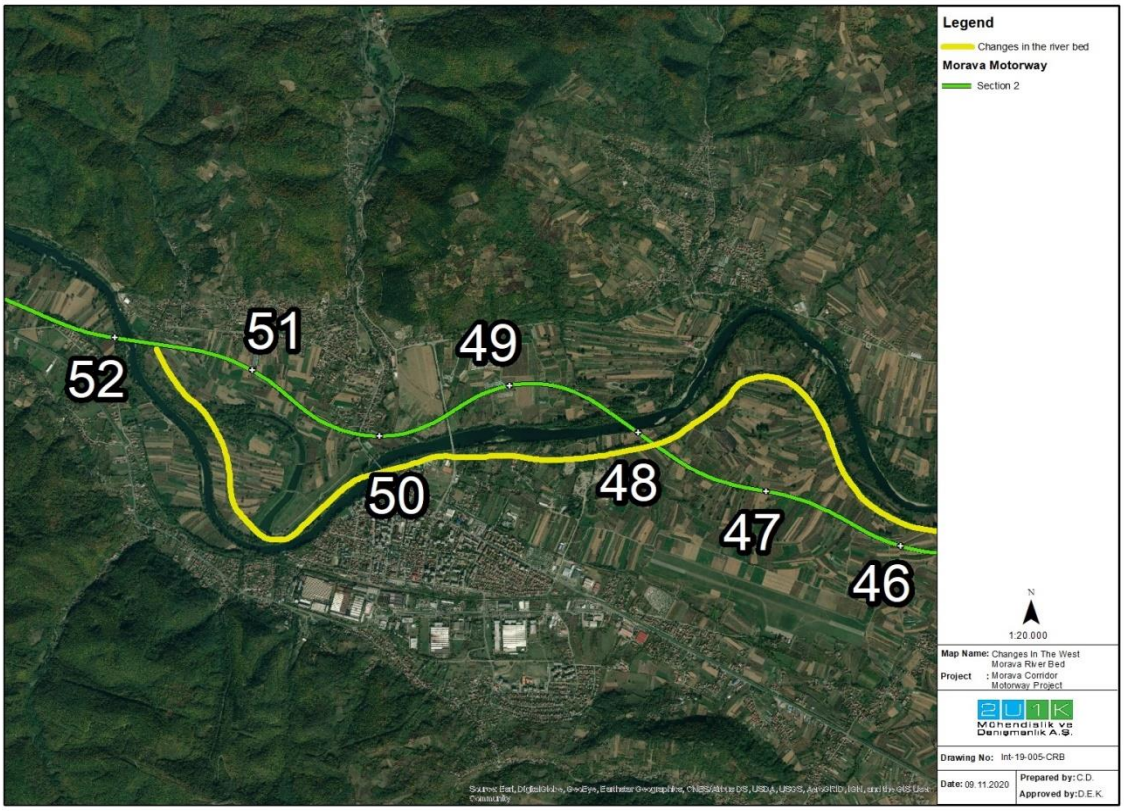


Figure 5-9. Example of Stable Section, from km 46 to km 52

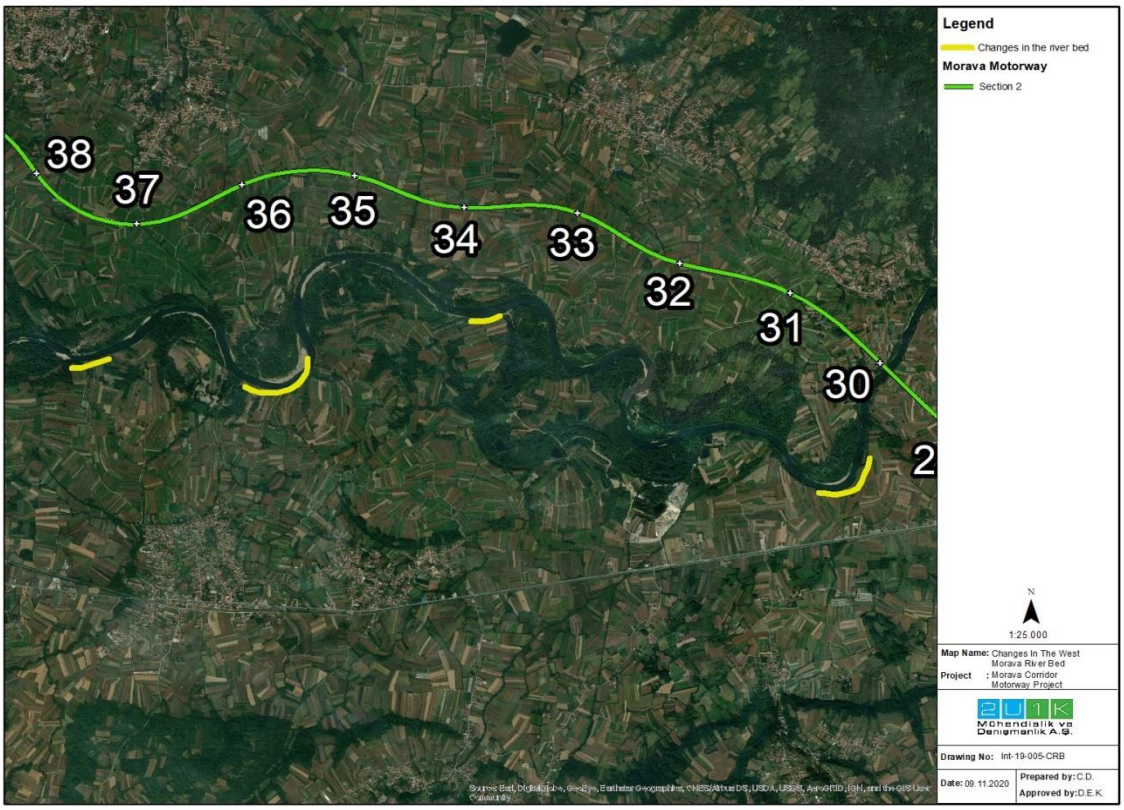


Figure 5-10. Example of Unstable Section, from km 30 to km 38

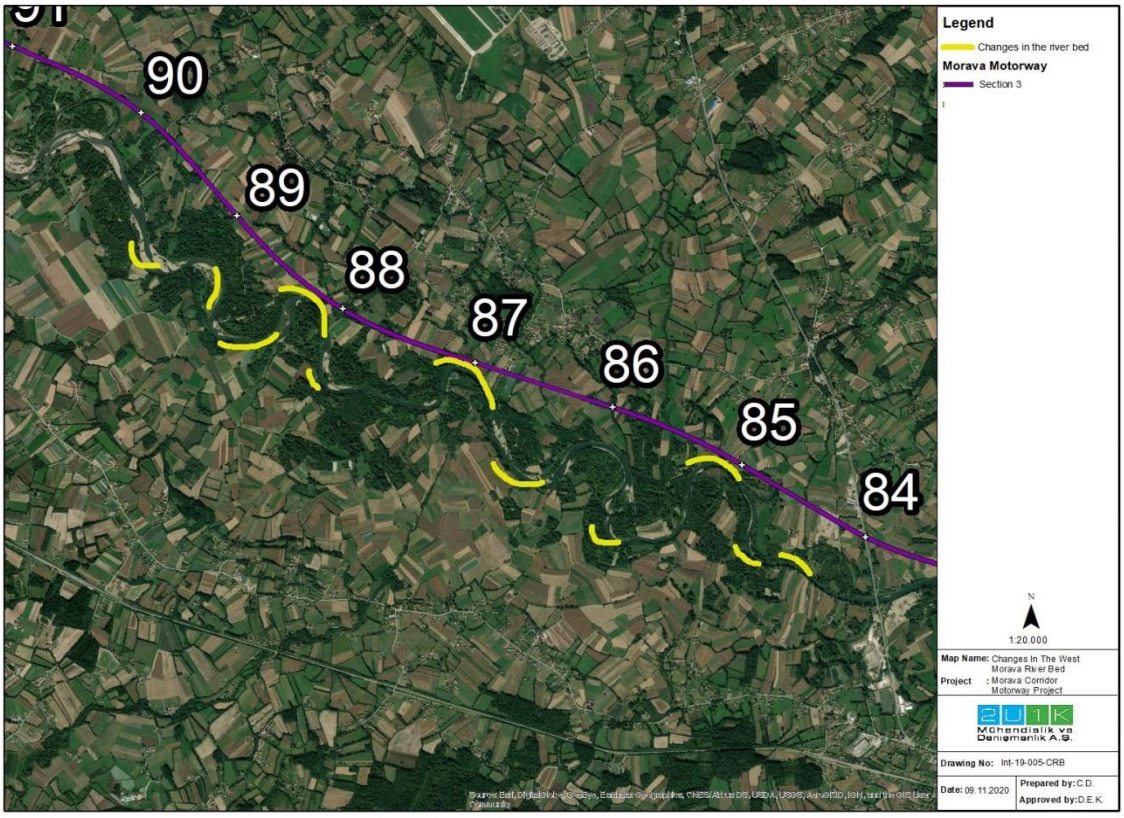


Figure 5-11. Example of Unstable Sections from km 87 to km 92

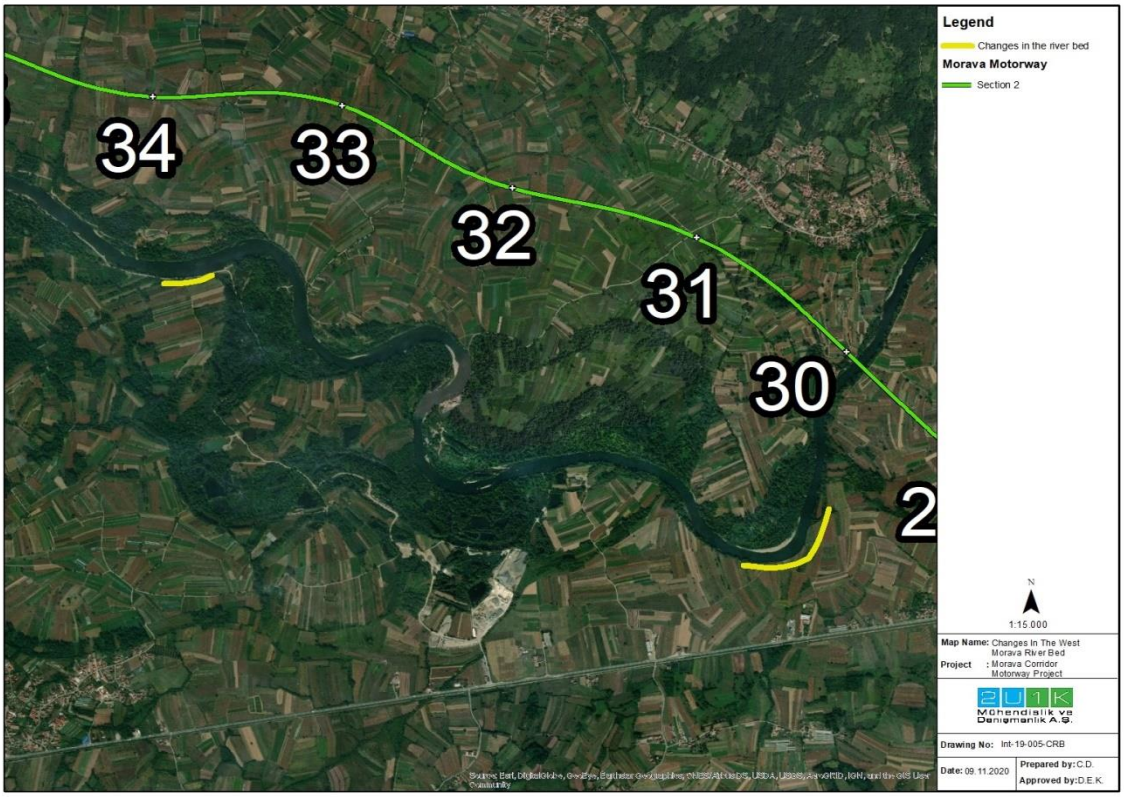


Figure 5-12. Condition Troughs from km 30 to km 35, a Large Number of Borrow Pits

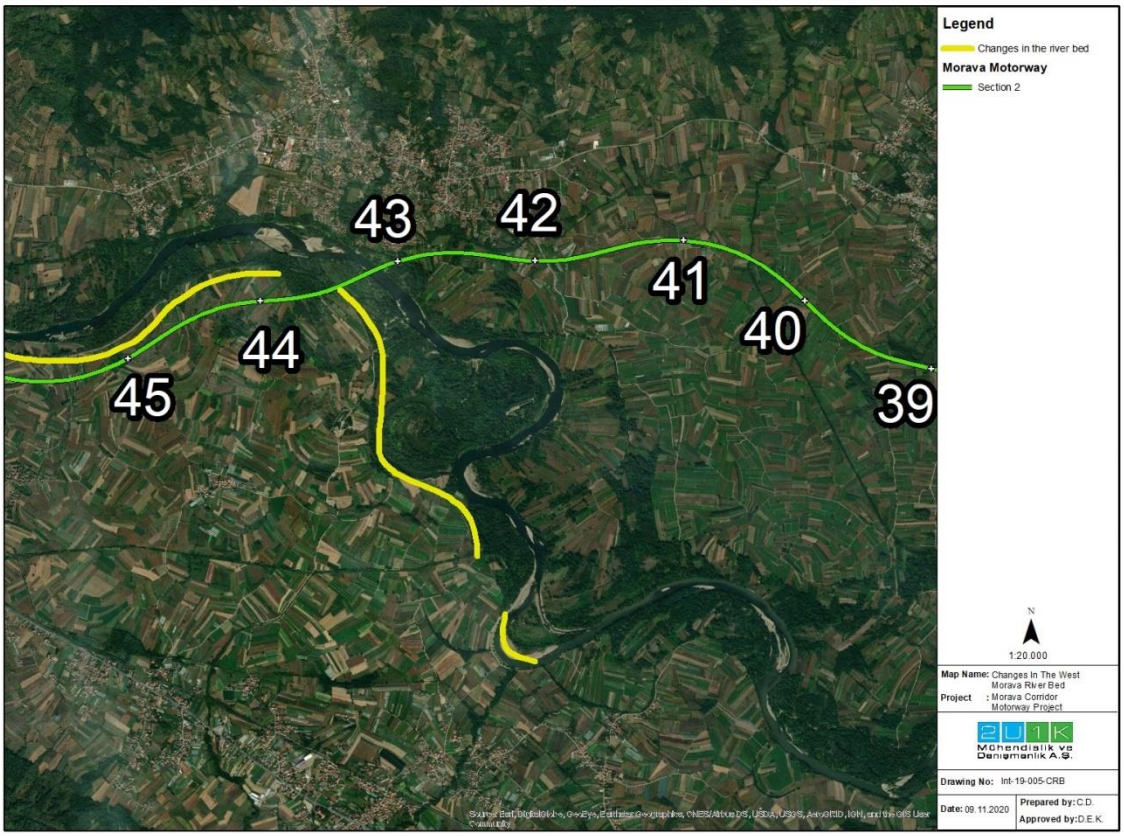


Figure 5-13. Condition Trough from km 42 to km 44, Slitting of the Meander km 44-46

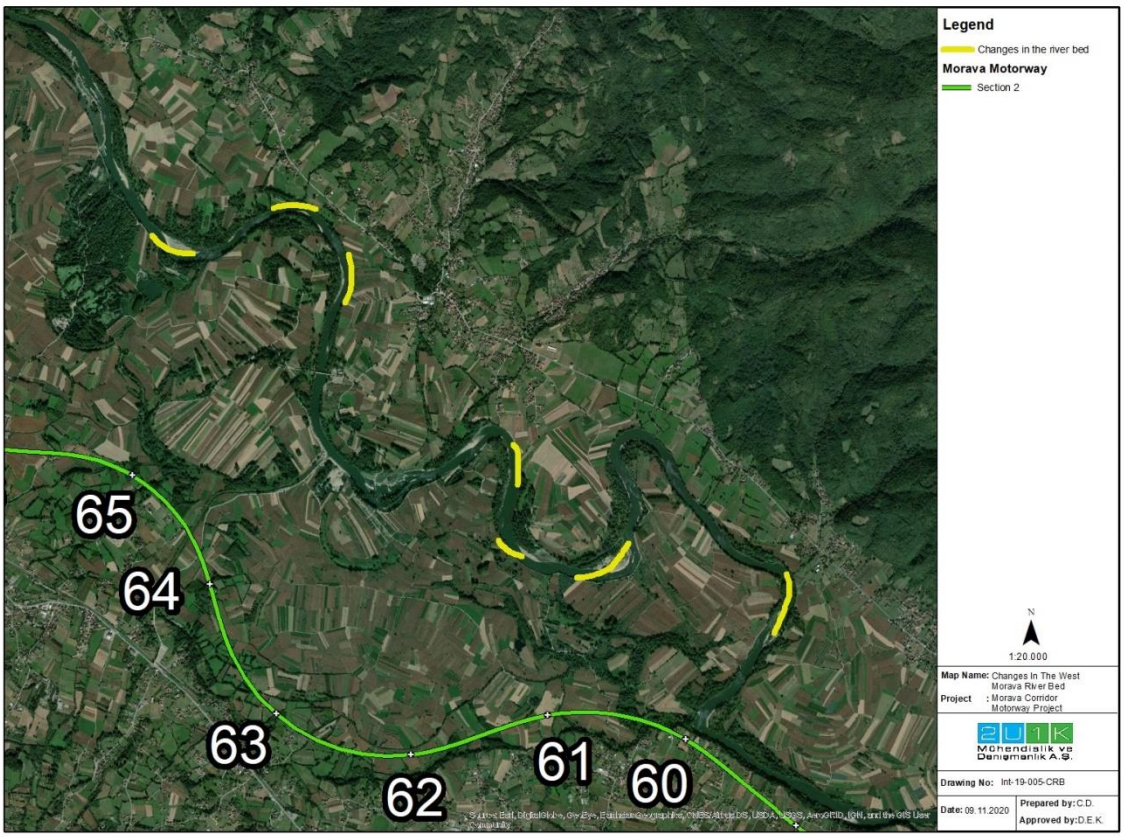


Figure 5-14. Condition Troughs from km 59 to km 65

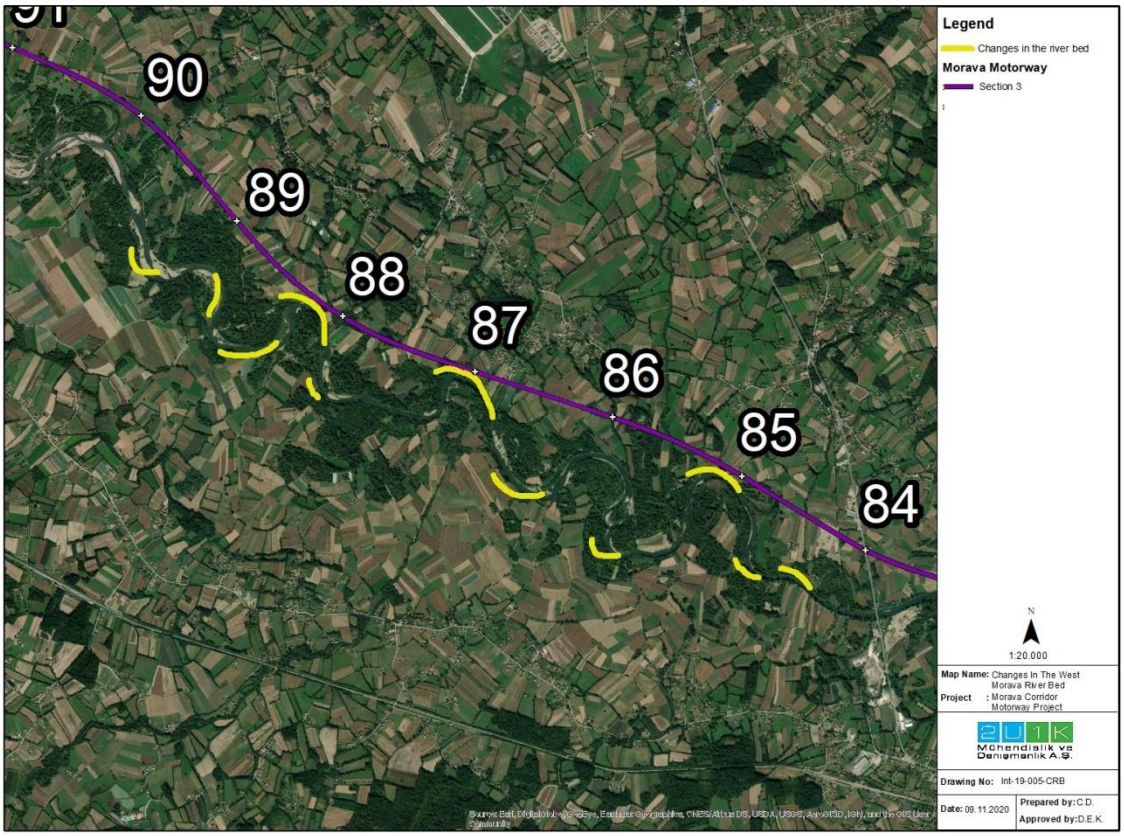


Figure 5-15. Condition Troughs from 87 km to 92 km, a Large Number of Borrow Pits

Changes in the West Morava Riverbed

The bed of the West Morava was formed in the river valley with certain geomorphological characteristics along the longitudinal profile of the riverbed. The longitudinal profile is variable in time due to changes in the position of the riverbed in the plan and vertical oscillation at the West Morava River bottom, which occurs during the morphological process.

Erosion through the West Morava, in the period of 1961-2007 years, was generally due to the reduction of alluvial deposits from the entrance of the basin where dams are located (i.e., upper part of the basin) and dredging the riverbed. However, in the latest period (from 2007 to 2016 year), recorded control profiles show no significant change in the bottom of the West Morava River because there is no pronounced erosion or siltation.

Erosion along the West Morava River

As indicated in the section “Morphology of the West Morava River” of Hyrotechnical Study Report, the basic characteristic of the morphological processes in the West Morava River is a meandering and wandering riverbed. Both of these processes are caused by fluvial erosion. The distance between the coasts varies between 300 m and 1,500 m where the coastline borders the meanders in the period from 1961 to 2007. During the years the coasts shifted between 15 m to 400 m with an average of about 100 m where the height of the erosion at the banks varies between 2 m to 11 m. The major erosion on coasts has occurred at the mouth of the tributary Lopaška River.

Another aspect of fluvial erosion along the West Morava is associated with morphological process of wandering riverbed. During the field survey in 2016 within the scope of Hydrotechnical Study Report, it is seen that fluvial erosion is still present along the West Morava River, as a result of material extraction from the riverbed and the West Morava River banks. Along the West Morava River, there are numerous abandoned borrow pits which are in operation or abandoned.

According to Hydrotechnical Regulation of The West Morava River within the Infrastructure Corridor of Highway E-761 Report (the Hydrotechnical Regulation Report), the West Morava is a typical alluvial watercourse whose bed is formed in its own sediment, i.e. in alluvial deposits formed in the long-term process of geomorphological genesis of watercourses. The material structure in riverbed and coast is very similar to the structure of the river sediment.

The alluvial river bed of the West Morava is very unstable and deformable, with the occurrence of bed wandering, meandering and pronounced fluvial erosion (see Figure 5-16). According to the stability of the ZM route, the following reaches can be differed:

- Reaches with stable route, i.e. with the minimal variations of the river route: from the confluence with Južna Morava to the village of Bela Voda (River Chainage of the West Morava River (r.km) 0 - r.km 27), from the village of Počekovina to the mouth of the Vrnjačka river (r.km 37 - r.km) 62) and from the mouth of the Gruža to Kraljevo (r.km 82.3 - r.km 92.2);
- *Reaches with minor changes* of the route: from the mouth of the Vrnjačka river to the mouth of Gruža (r.km 62 - r.km 82,3), from Kraljevo to Miločaj (r.km 92,2 - r. km 107,2) and from the mouth of Ostrovka to the mouth of Kamenica (r. km 127.8 - r.km 153.2);
- *Reaches with very unstable route* from the village of Bela Voda to the village of Počekovina (r.km 27 - r.km 37) and from Miločaj to the mouth of the Bresnica (r.km 107.2 - r.km 119).

Figure 5-16. Examples of Localities with Pronounced Fluvial Coastal Erosion (left km 42, right km 100)

Some river regulation works (mostly stone embankments) were carried out mainly from 1965 to 1969. The existing river structures do not have their original function anymore (see Figure 5-17).

Figure 5-17. The Existing Embankments (left km 75, right km 120)

Accordin to the Hydrotechnical Regulation Report, the general erosion trend of river bed bottom of the West Morava was observed and it is seen that in the period 1961-2007, thalweg was lowered from 0.3 to 3.8 m, while the average values were from 1 to 2 m. The most significant erosion of the river bed is from r.km 18 to r.km and from r.km 102 to r.km 112. It is assumed that erosion is the consequence of reduced sediment input from the basin due to the construction of dams and anti-erosion works in the West Morava basin, as well as the material exploitation from the river bed.

The West Morava does not have a continuous flood protection system (there are longer stretches of watercourses without dikes or with dikes only along one river bank), so that the city zones are protected, and the agricultural areas are left to floods. Most of the existing embankments would be overflowed with flood discharge of return period 100 (Q100) years because they were designed with a lower protection degree. Total area of the floodplain zone with Q100 is about 122 km^2, while the estimated areas by reaches of the West Morava are given in Table 5-7. The floodplain zones include rural settlements (as a whole or in the parts), traffic infrastructure and arable agricultural land, as well as the localities where gravel and sand are exploited.

Table 5-7. The West Morava floodplain areas, discharge (Q100)

River bank	Area	Floodplain area (ha)
Right	Confluence with the J.Morava – the mouth of Rasina	514
	The mouth of Pepeljuše-the villagy of Odžaci	2030
	Trstenik – the mouth of Ibar	1994
	The mouth of Ibar – Čačak	2708
Left	Connection with the J.Moravom – the villagy of Kukljin	594
	The village of Kukljin – Trstenik	1546
	Trstenik – the mouth of Ibar	1048
	The mouth of Ibar – the mouth of Čemernica	1825
	Total	**12259**

Planned Dams and Water Structures on the West Morava River

The Hydrotechnical Study Report states that a cascade small hydropower dam system is planned to use the hydropower potential of the West Morava River. In this respect, 10 small run of river type hydropower dams are proposed to be cascaded in approximately 75 km distance along the cities Kraljevo, Vrnjačka Banja, Trstenik, Kruševac and Varvarin, where the total energy head on the concerned section is approximately 50.0 m. The locations of the proposed dams are shown in Figure 5-18 and the coordinate lists are provided in Table 5-8. Design flow rate of the dams is estimated as 180 m^3/s.

Table 5-8. Coordinates and Station System MHE on the West Morava River

Run of River Dam	Kp	Y	X	Length	Head (m)
MHE 01 “Vitanovac”	km 83+966	4840670.1	7483174.5	1250	4.1
MHE 02 “Vraneši”	km 79+540	4839850.1	7486546.4	2800	4.1
MHE 03 “Stubal”	km 69+455	4837137.6	7491490.7	4600	5.85
MHE 04 “Grabovac”	km 59+881	4832756.1	7497300.1	4050	5.85
MHE 05 “Medvedja”	km 48+878	4831258.0	7505249.2	5300	5.85
MHE 06 “Počekovina”	km 41+631	4828405.4	7507734.6	5100	4.1
MHE 07 “Selište”	km 35+595	4828330.1	7512006.5	2900	4.1
MHE 08 “Globoder”	km 26+800	4827123.2	7517764.2	4800	4.5
MHE 09 “Kukljin”	km 19+734	4828470.0	7522619.0	3500	4.1
MHE 09 “Bošnjane”	km 8+640	4833175.6	7530940.6	4000	5.85

Source: Hydrotechnical Study Report for Corridor of the E-761

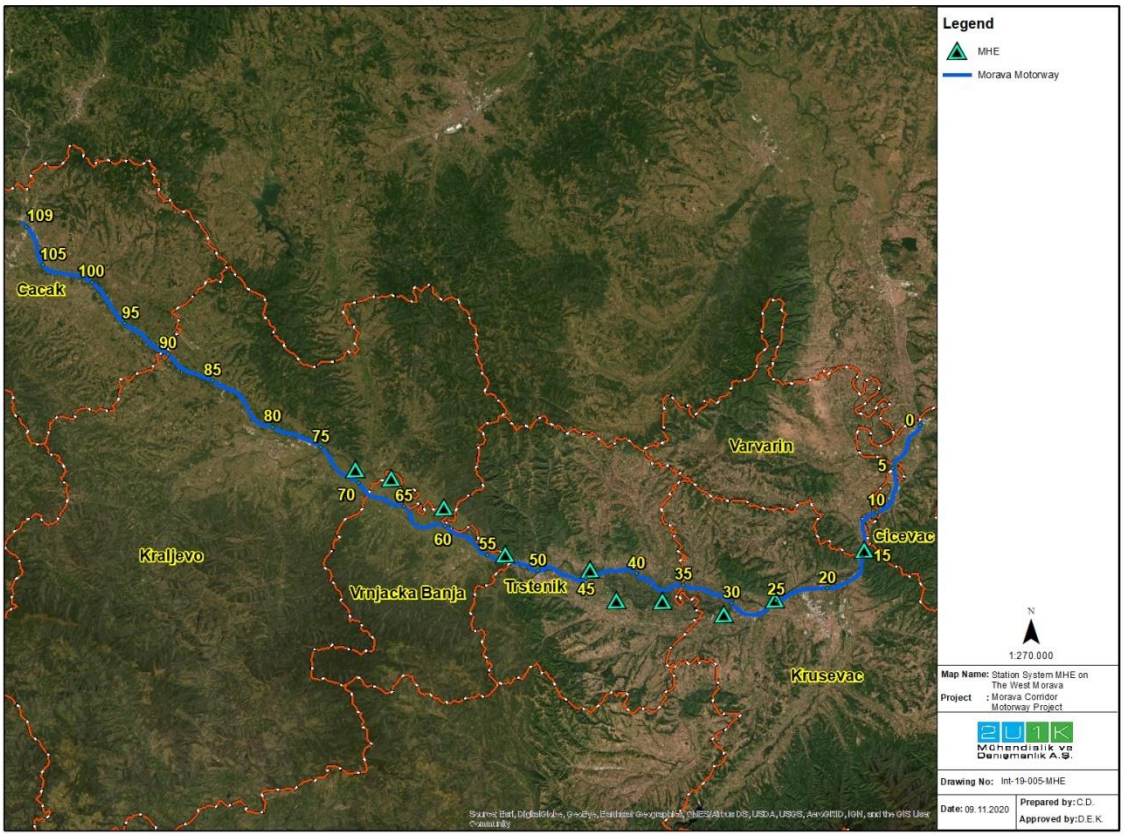


Figure 5-18. Cascade Run of River Type Dams on the West Morava River

According to the statement in the Hydrotechnical Study Report, potential locations of the dams are in further discussion at the decision-making level within the Government of Serbia in terms of actual physical, geomorphological, hydrological and other constraints such as efficiency potential available in the given conditions. Existing infrastructures including existing railway and highway as well as proposed Morava Corridor Motorway Project are the major limiting factors of those dam projects. In the future, during the detailed design phase of the hydroprojects (i.e., dams), these infrastructures will be taken into account. According to information given in the Hydrotechnical Study Report, there is no plan for the construction of new irrigation system in the Plain of the West Morava River.

5.2.4 Sensitive Receptors/Locations

The findings including sensitive locations which were outlined in accordance with the Hydrotechnical Study Report is summarized in Table 5-9.

Table 5-9. Summary of Findings from the Hydrotechnical Study Report

Sector	Summary of Findings
Sector 1	• Main part of the Proposed Motorway Route in this sector passes through the potential flood zone of the Great Morava River and the South Morava River. • No regulation works on the existing water course is planned in this sector. • There will be bridges over major watercourses. • There is no critical locations in terms of relative positions of the motorway and the the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the motorway.
Sector 2	• Main part of the Proposed Motorway Route in this sector passes through unprotected flood zone of the West Morava River. • Regulation work is required at the sector (between from KP 10+500 to KP 12+900). Regulation work comprises the cut of existing meander. • There are two bridges proposed on the West Morava River. Location of the Bridge at km 8 + 739 has no impact to the course and has the necessary height of the structure. On the other hand, second bridge at km 16 + 080 may have a negative impact on the West Morava river due a difficult angle and arrangement of bridge piers. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the Motorway.
Sector 3	• The part of the Motorway between Rasine and Čitluk passes through the potential flood zone of the West Morava River. • It is necessary to reconstruct the existing embankments at "Čitluk". • No regulation works on the existing water course is planned in this sector. • There are two critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the motorway.
Sector 4	• All sectors of the Proposed Motorway Route are located in unprotected flood zone of the West Morava River. • No regulation works on the existing water course is planned in this sector. • A new bridge over the West Morava River on the access road near to junction Drenova will be constructed. • There are three critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the Motorway.

Sector	Summary of Findings
Sector 5	• Main part of the Proposed Motorway Route in this sector passes through the flood zone of the West Morava River. • Height of the embankments at Trstenik and Medvedja does not sustain requirement. Therefore, reconstruction is required. • Regulation work is required at the sector (between from KP 42+900-KP 45+300 and KP 46+500- KP 47+800) • Three new bridges are designed over the West Morava River. Bridge at km 48 + 000 has the required height, but access ramps are getting closer to major river body and it can cause backwater which may have adverse impact on upstream. Bridges on km 51 + 896 and km 54 + 369 have sufficient height and do not create any risk. • The Proposed Motorway Route intersects with the existing embankment located on the right bank of the West Morava River. During the construction special precaution regarding hindering the movement of machinery at the crest of the embankment and the embankment should not be demolished during the construction works in order to preserve existing flood protection. • There are two critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the Motorway.
Sector 6	• All sectors of the Proposed Motorway Route are located in unprotected flood zone of the West Morava River. • No regulation works on the existing water course is planned in this sector. • There is one bridge proposed on the West Morava River near Vrini. The position of the bridge is critical in terms of water flow in relation to the Proposed Motorway Route. In the hydrotechnical study report, there is recommendation for the culver box type of passages for water flow in between both sides of the motorway. Construction of embankments is required between the motorway and high terrain at the left end of the valley to prevent flow from floodplain. • There are no other critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the motorway.
Sector 7	• All sectors of the Proposed Motorway Route are located in unprotected flood zone of the West Morava River. • Regulation works are required near Kraljevo. The works comprises construction of three new channels. • There is one bridge proposed on the West Morava River on the access road near junction to Ratina. The bridge structure has sufficient height in relation to the level of 100-years return period water flow. Due to the bridge and access road to the embankment that blocks flow after inundation creates a back pressure of about 1 m. • There are five critical locations in terms of relative positions of the motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the Motorway.

Sector	Summary of Findings
Sector 8	• The part of section near Zadran is located in potential flood zone of the West Morava River where other part of the sector is situated at unprotected flood zone of the West Morava River. • Regulation works are required at the bridge location which is explained in the following bullet. • There is one bridge proposed on the West Morava River. The position of the bridge poses disadvantage due to the West Morava River flows at both side of the Motorway. • Height and condition of exiting embankment near to Zadran do not sustain the design requirements. • There are six critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the motorway.
Sector 9	• Main part of the sector of the Proposed Motorway Route is located in unprotected flood zone of the West Morava River. Other part of the Proposed Motorway Route, to Preljina passes through potential flood zone of the Čemernica River. • Regulation work is required on the existing water course is planned in this sector. • No new bridge proposed over the West Morava River. On the other hand, there are three bridges, proposed over Čemernica River (two for the motorway and one for the access road junction for Čačak. • Reconstruction of the embankment Čemernica is in progress. • There are five critical locations in terms of relative positions of the Motorway and the West Morava River course. • According to the available data, existing and planned sources of water supply and treatment plants are not threatened by the construction of the Motorway.

5.3 Climate

This Section starts with the general information on Serbia's climate and focuses on detailed information of the baseline conditions of the AoI.

5.3.1 Study Area

In order to determine meteorological characteristics of the AoI, observation data of the nearest meteorology station were used. Since the Project covers a large area and it is not possible to represent all area by using one station data set, all possible representative meteorology stations' data were used.

Figure 5-19 shows the Proposed Motorway Route and the national meteorology station of Serbia.

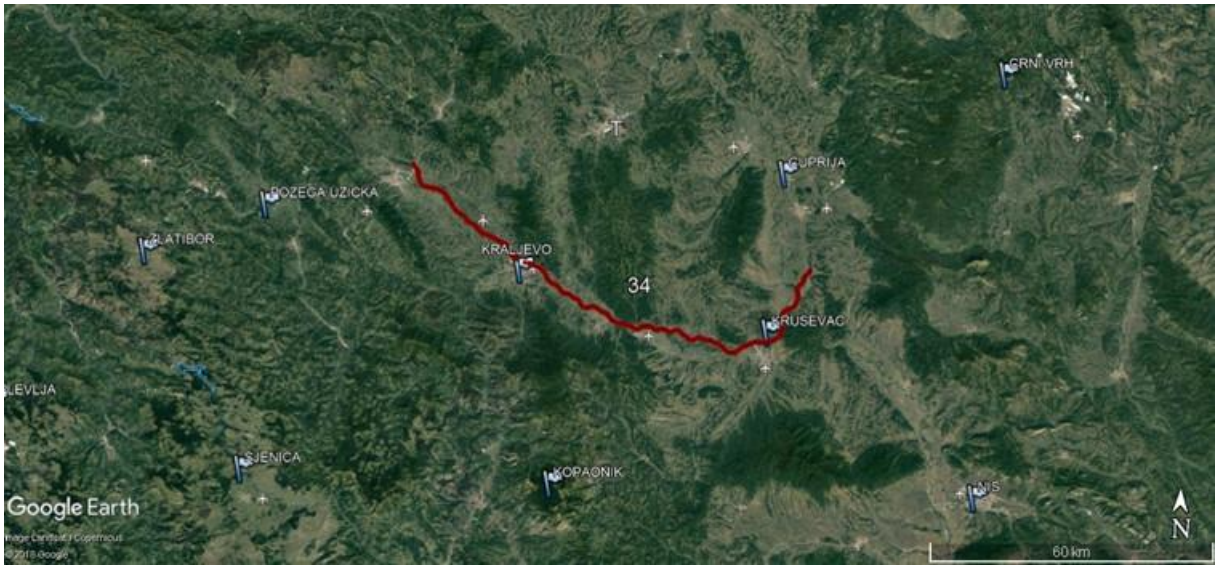


Figure 5-19. The Proposed Motorway Route and the locations of meteorology stations

According to satellite map, which is shown in figure above, it is seen that several stations surrounding the Proposed Motorway Route. Some stations and their distances to the Proposed Motorway Route are shown in Table 5-10.

Table 5-10. Meteorology Stations in the vicinity of the Proposed Motorway Route

Meteorology Station	Distance to Project Line (Km)
Kruševac	1.2
Kraljevo	4.5
Cumrija	18
Pozega Uzica	32
Kopaonik	38
Valvejo	56
Zlatibor	60

According to Table 5-10 and the satellite map in Figure 5-19, Kruševac and Kraljevo meteorology stations are the closest stations and they can represent the AoI better than other stations because of the change of meteorological parameters with regard to distance, topography and vegetation. Therefore, in order to identify meteorological characteristics, Kruševac and Kraljevo meteorology stations' observation data were used.

5.3.2 Methodology and Data Source

At the first part of this subsection of the Report, it is aimed to give general information about the meteorological data gathered from the EIA Reports. As there is no information on meteorological conditions of Section 3 in the pertinent EIA Report and there is no EIA Report available for Section 2, only meteorological information provided in Section 1's EIA Report was presented here.

Meteorological data (from 1980 to 2009) of Kruševac station are given in Table 5-11 for the area from Pojate to Koševo:

Table 5-11. Average values of Climate parameters from 1980 to 2009

	Jan.	Feb.	March	Apr.	May	June	July	Ags.	Spt.	Oct.	Nov.	Dec.	Annual Avg.
Tsr(ºC)	0	2	6.6	11.6	16.7	20	21.7	21.4	16.7	11.7	5,7	1,5	11,3
Tx(ºC)	4.5	7.2	12.4	17.9	23	26.3	28.7	28.9	24.1	18.7	11,1	5,5	17,4
Tn(ºC)	-3.6	-2.3	1.4	5.5	10.2	13.5	14.9	14.5	10.6	6.4	1,5	-1,9	5,9
ApsTx(ºC)	20.4	23.4	29.6	31.9	34.7	39.6	43.7	42.4	36.8	33.8	27,4	20	43,7
ApsTn(ºC)	-26	-23.7	-15	-6.1	0.8	4.1	5.8	3	1.2	-6.6	-15,8	-23,9	-26
U (%)	85	79	73	71	73	72	70	70	74	78	82	86	76
SS (h)	54	79.4	129.3	154	204.5	223.6	267.7	260.7	191	138.8	77,4	41,6	1822
N	7	6	6	6	5	5	4	3	4	5	6	7	5
RR(mm)	41	36.7	47.6	55.5	60.7	70.1	55.1	49.4	50.2	48.3	57,7	57,3	629,5
maxRR(mm)	36.4	61.6	35.8	51.4	52.8	60.5	73.3	41.2	45.1	39.5	50,2	68,8	73,3

T_{sr} : Mean air temperature (ºC)
T_x : Average Maximum Air Temperature (ºC)
T_n : Average Minimum Air Temperature (ºC)
$A_{ps}T_x$: Absolute Maximum Air Temperature (ºC)
$A_{ps}T_n$: Absolute minimum air temperature (ºC)
U : Relative humidity (%)
SS : Sunset in hours total
N : Cloudiness in 10/10
RR : Precipitation (mm)
maxRR : Daily maximum rainfall (mm)

Precipitation

Depending on the atmospheric processes and relief characteristics of Serbia's territory, precipitation amount varies depending on the temperature and space. The general annual precipitation amount in the Country is 896 mm. The annual amount of precipitation increases with altitude. Annual precipitation over the Country ranges from 600 mm to 1,000 mm.

The majority part of Serbia has a higher amount of continental precipitation during warmer times of the year. Precipitation usually occurs in June and May. 12-13% of total annual precipitation falls in June. The least amount of precipitation occurs in February and October with 5-6% of total annual precipitation. On the other hand, southwestern part of Serbia has Mediterranean precipitation regime based on relief, Mediterranean climate influence and mountain ranges' slopes and maximum precipitation occurs in November, December, and January while minimum precipitation occurs in August.

There is no precipitation data specific to the AoI from the selected two stations namely Kraljevo and Kruševac. Therefore, other meteorological stations where the precipitation data is available were chosen and used.

In addition, for analyzing climatic conditions of the Project area, data obtained from the Republic Hydrometeorological Institute of Serbia website are obtained.

In the scope of the air quality two different methodologies were used to further examine the climate and meteorological parameters of the AoI. These are global data assimilation system (GDAS) and ERA5 reanalysis data, which are described in the following paragraphs.

Global Data Assimilation System (GDAS)

GDAS data is generated using Global Forecast System (GFS) model data produced by the National Centres for Environmental Prediction (NCEP), operating under the United States' National Oceanic and Atmospheric Administration (NOAA). GDAS model data have many resolutions which expressed in degrees. GDAS data indicates a data assimilation process with meteorological station measurement data (actual data) and GFS model analysis data. Typically, GDAS ingests about 10% more observations than GFS. If simply stated, GDAS data is more current than GFS data. GDAS data has various pressure levels up to 10 hPa from the surface level. GDAS data contains approximately 45 meteorological variables like air temperature, albedo, heat flux, vorticity.

In relation to the Project, GDAS data from January 1, 2018 to April 1, 2018 with a resolution of 0.25 degrees were used as input for Weather Research and Forecasting (WRF) model. The reason behind using WRF model is to achieve meteorological data with higher resolution like 3 km. Physics options used in WRF is shown in Table 5-12.

Table 5-12. Physics Options used in WRF Initialization

WRF Physics Options	Value	Selected Scheme
Microphysics	8	Thompson
Longwave Radiation	4	Rapid Radiactive Transfer Model for Global Models (RRTMG)
Planetary Boundary layer	2	Mellor-Yamada-Janjic (MYJ)
Surface Layer	2	Janjic Eta
Land-Surface	2	NOAH

Meteorological variables' outputs from WRF model are Wind speed and Wind direction (10 m), Temperature (2 m), Pressure (sea level pressure) and Relative Humidity (2 m). WRF model outputs are obtained hourly for 3 months only for Kraljevo location.

ERA5

ERA-5 data is 5th generation reanalysis data of European Centre for Medium Range Weather Forecast (ECMWF) for the global climate and weather variables that can up to 70 years but currently data is only available from January 1979. Reanalysis covers combining observations worldwide, law of physics with data assimilation method. ERA-5 data contains 16 atmospheric variables and 37 pressure levels up to 1 hPa (~80 km from surface).

The type of ERA-5 data is Grid data which can create an accessible data set for the target point. ERA-5 data used in the Project is based on monthly averaged ERA-5 reanalysis data from January 1979 to July 2019 for only surface level (1000 hPa). Its resolution is regular latitude-longitude grid of 0.25 degrees (~22-25 km). Meteorological variables used for this study are Pressure (mb), Temperature (^{o}C), Wind Speed (m/s) and Wind Direction. For this Project, meteorological variables are found and used for Kraljevo and Kruševac locations. Visualizations are made by using all monthly averages of 40 years for each meteorological variable in order to create climate data such as prevailing wind and heat zones.

In addition, the following sources have been reviewed during the desktop study of the Project:

- The website of the Republic Hydro-meteorological Service of Serbia.
- EIA Reports for Section-1 and Section-3 (CIP, 2018), (Highway Institute, 2019)

5.3.3 Baseline Conditions

5.3.3.1 Data

5.3.3.1.1 Global Data Assimilation System

Moisture

Average daily moisture data for January, February and March of 2018 are presented in Figure 5-20. The average maximum daily moisture and the average minimum daily moisture are approximately 95% and 48%, respectively.

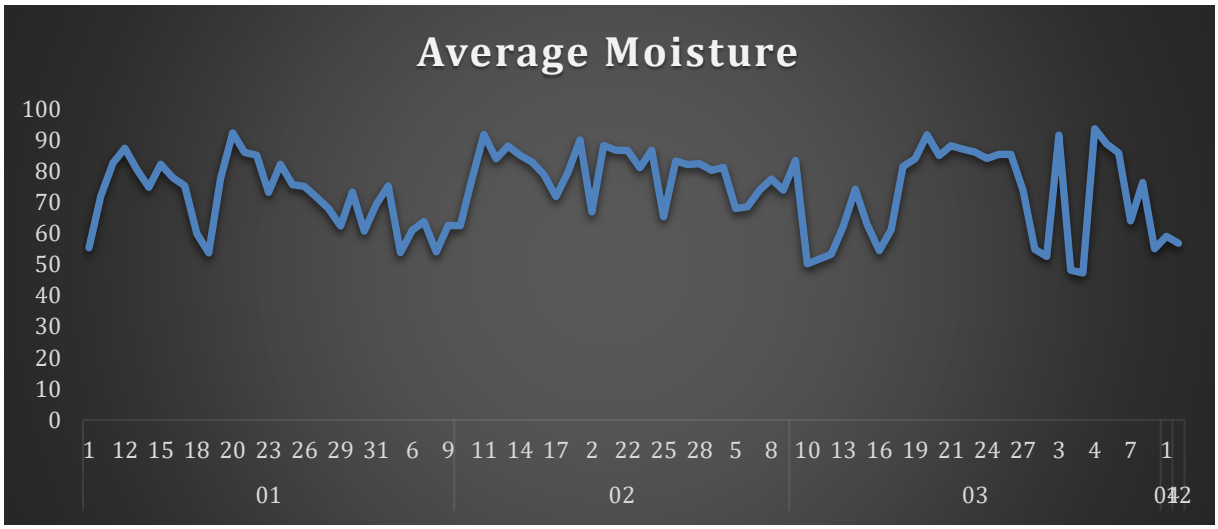


Figure 5-20. Average Daily Moisture in Kraljevo

Pressure

Average daily pressure data for January, February and March of 2018 are presented in Figure 5-21. The average maximum daily pressure and the average minimum daily pressure are approximately 1035 and 995 mb, respectively.

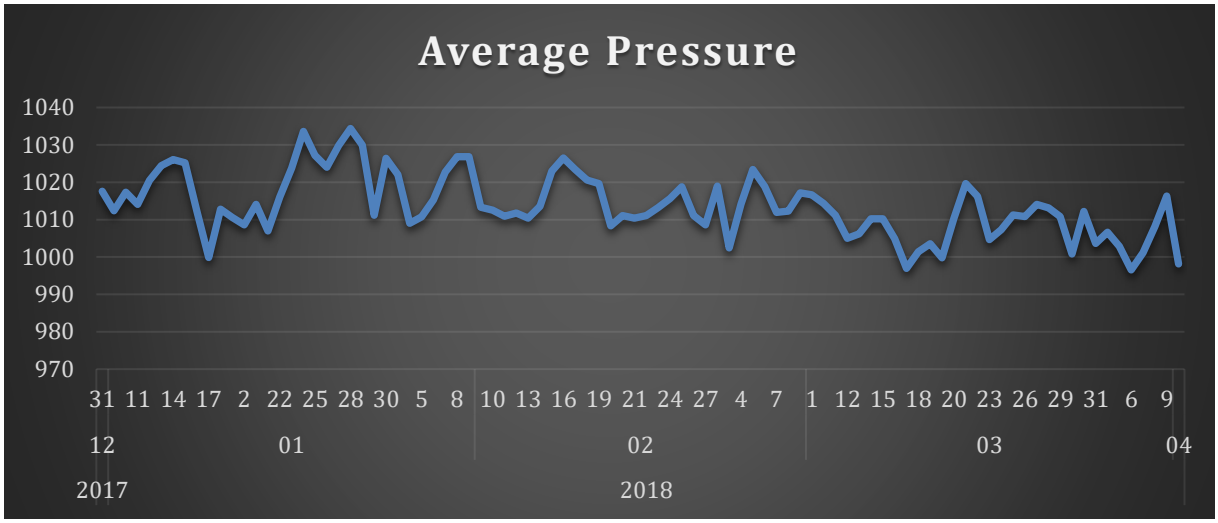


Figure 5-21. Average Daily Pressure in Kraljevo

Wind Velocity

Average daily wind velocity data for January, February and March of 2018 are presented in Figure 5-22. The average maximum daily wind velocity and the average minimum daily wind velocity are approximately 11 and 1 m/s, respectively.

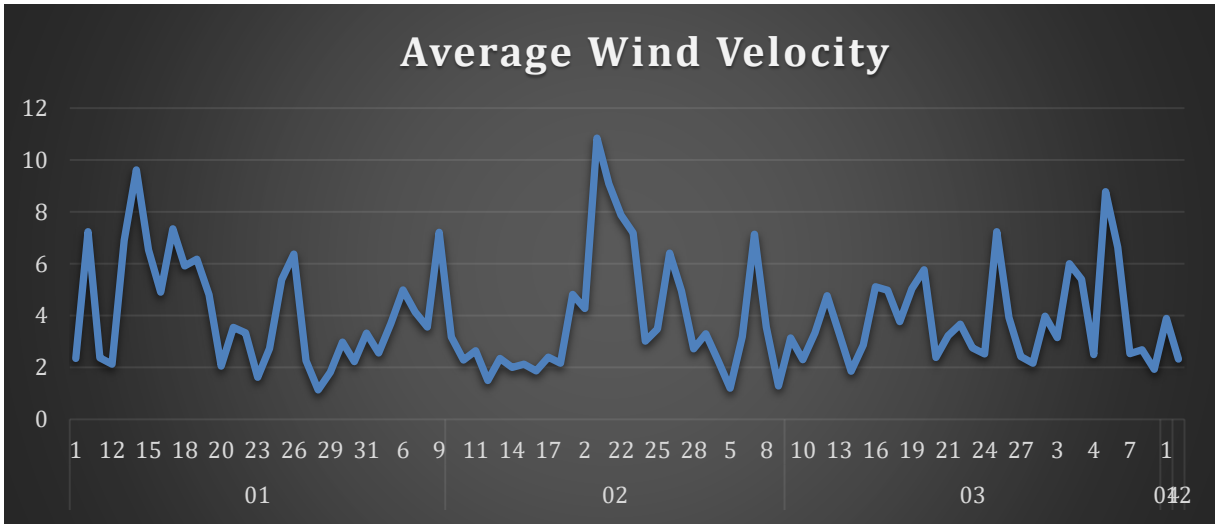


Figure 5-22. Average Daily Wind Velocity in Kraljevo

Wind Direction

Average daily wind direction data for January, February and March of 2018 are presented in Figure 5-23.

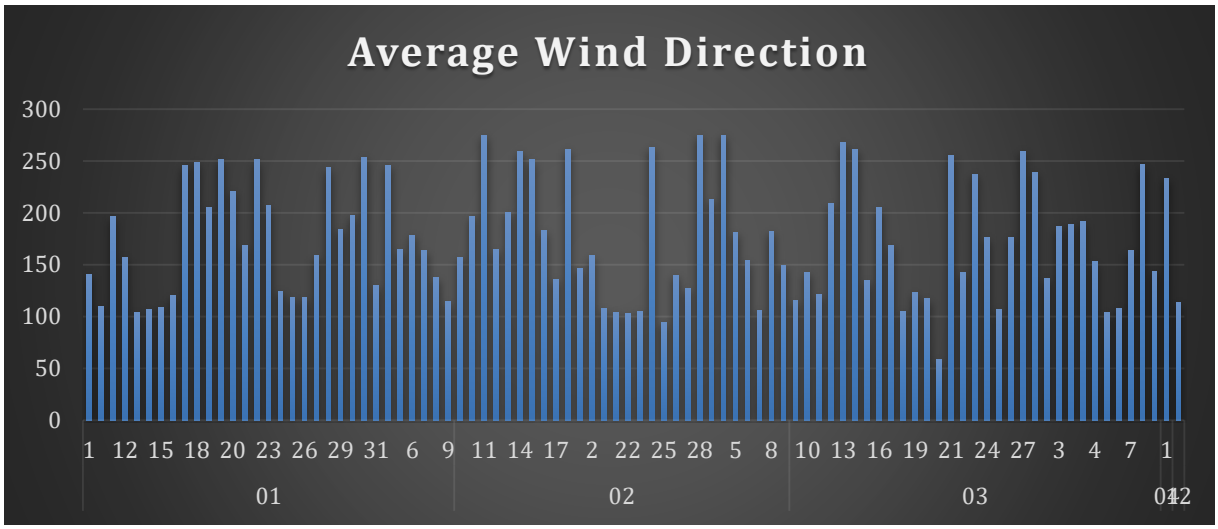


Figure 5-23. Average Daily Wind Direction in Kraljevo

Temperature

Average daily temperature data for January, February and March of 2018 are presented in Figure 5-24. The average maximum daily temperature and the average minimum daily temperature are approximately 17 and -9 °C, respectively.

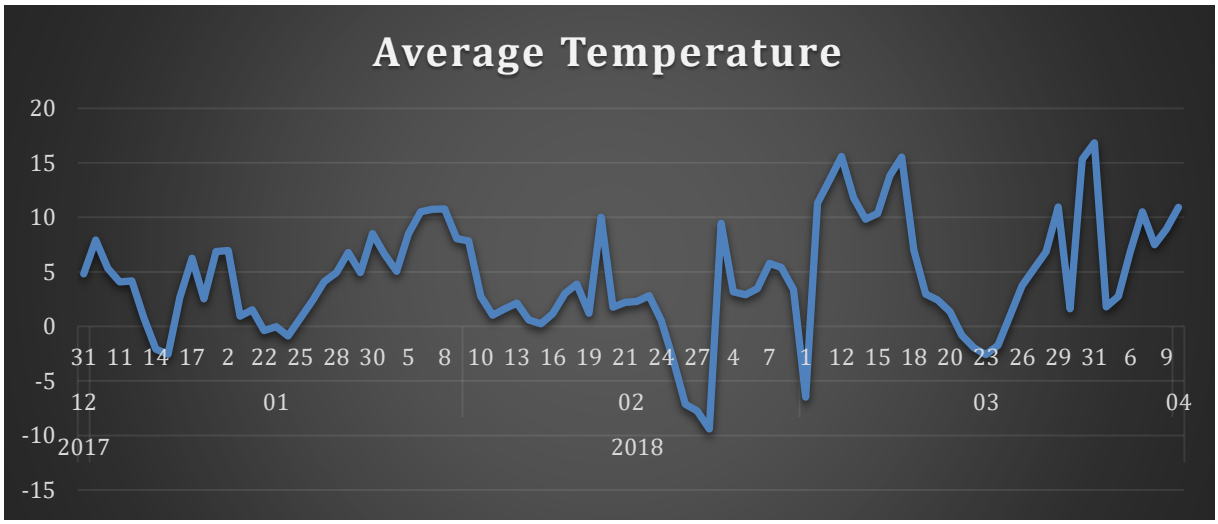


Figure 5-24. Average Daily Temperature in Kraljevo

5.3.3.1.2 5th Generation Reanalysis Data of European Centre for Medium Range Weather Forecast (ERA5)

Pressure

Average monthly pressure data from 1979 to 2019 in Kruševac are presented at Figure 5-25 and Table 5-13. The average maximum monthly pressure and the average minimum monthly pressure are approximately 959.8 and 954.8 mb respectively.

Average monthly pressure data from 1979 to 2019 in Kraljevo are presented at Figure 5-26 and Table 5-14. The average maximum monthly pressure and the average minimum monthly pressure are approximately 971.5 and 966.3 mb, respectively. The data indicates that the pressure at Kraljevo is almost 11.5-11.7 mb higher than at Kruševac.

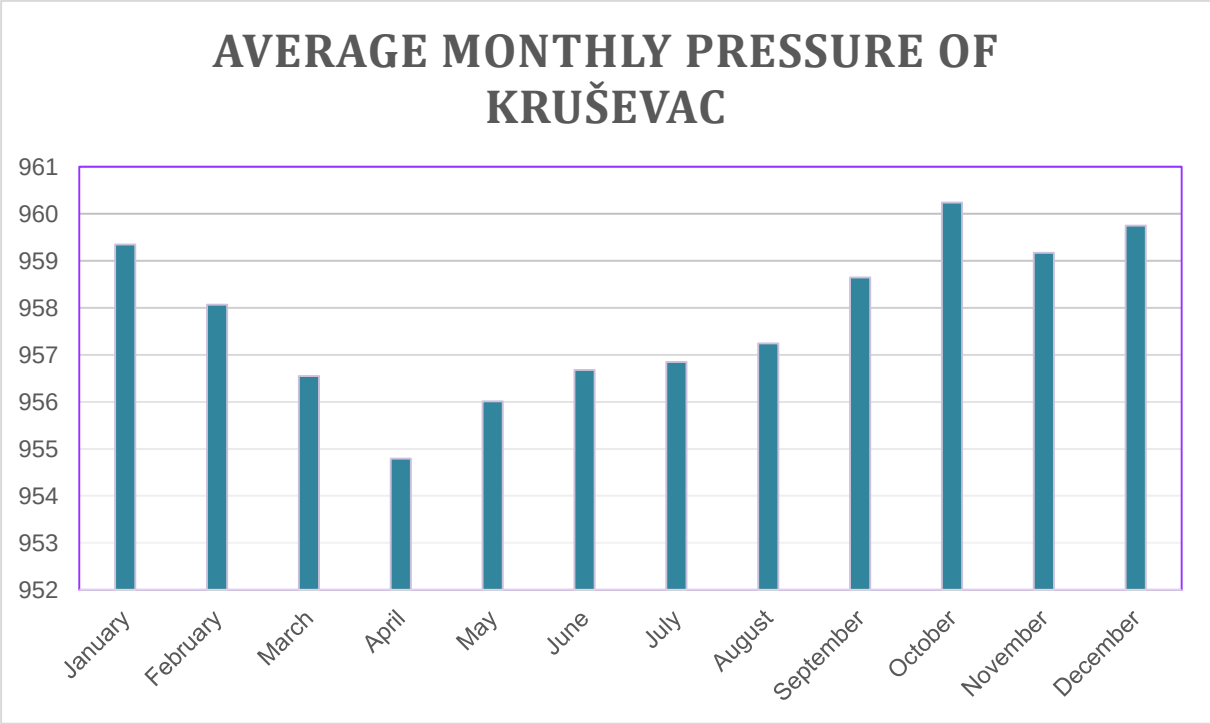


Figure 5-25. Average Monthly Pressure in Kruševac

Table 5-13. Average Monthly Pressure in Kruševac Between 1919-2019

Month	Jab.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Pressure	959.3	958.1	956.5	954.8	956.0	956.7	956.9	957.2	958.6	960.2	959.2	959.8

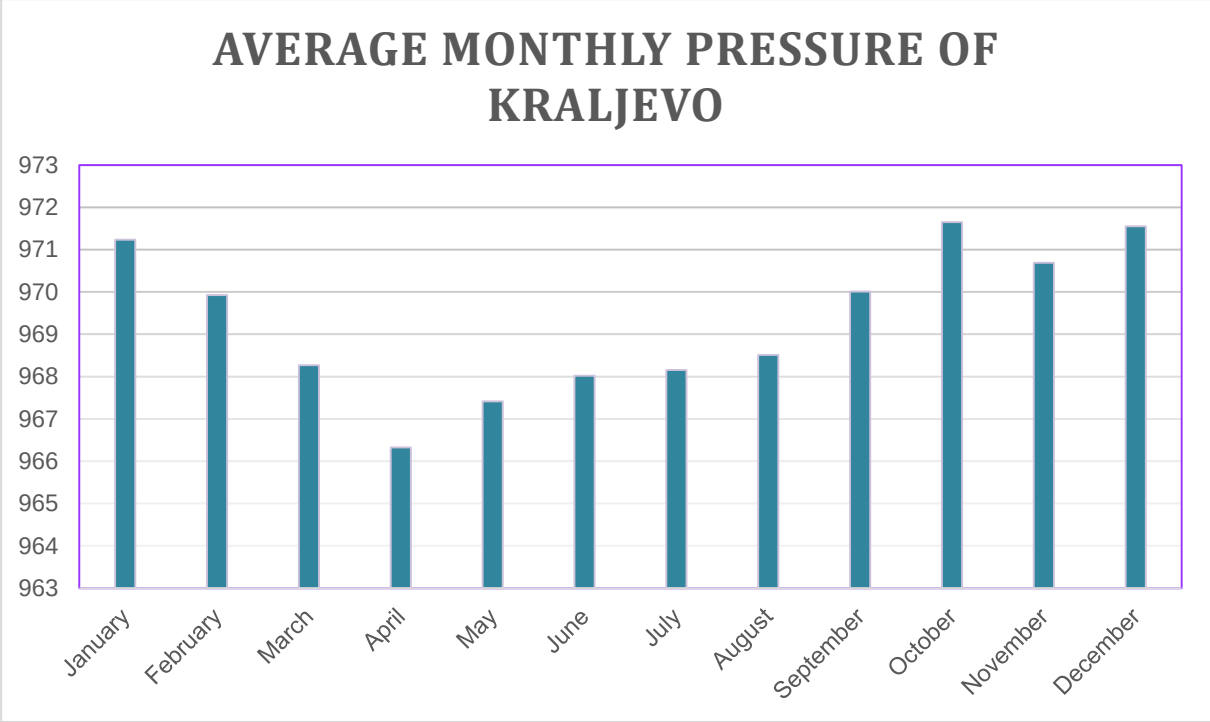


Figure 5-26. Average Monthly Pressure in Kraljevo

Table 5-14. Average Monthly Pressure in Kraljevo Between 1979-2019

Month	Jab.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Pressure	971.2	969.9	968.3	966.3	967.4	968.0	968.2	968.5	970.0	97.7	970.7	971.5

Average pressure map of the AoI which is created by ECMWF data is shown in Figure 5-27.

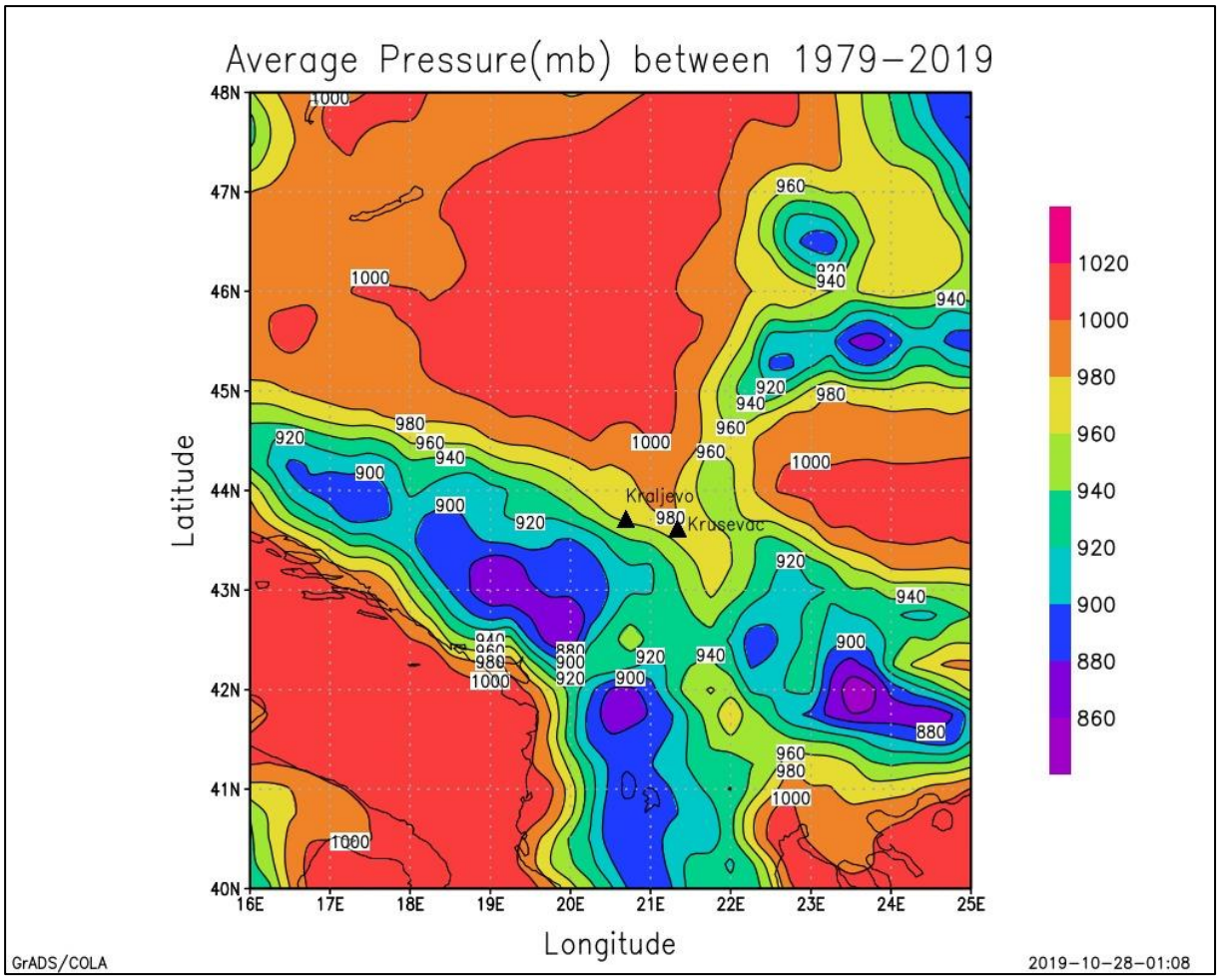


Figure 5-27. Average Pressure Map

Temperature

Average monthly temperature data from 1979 to 2019 in Kruševac are presented at Figure 5-28 and Table 5-15. The average maximum monthly temperature and the average minimum monthly temperature are approximately 21.01 and -0.62°C, respectively. Average monthly temperature data from 1979 to 2019 in Kraljevo are presented at Figure 5-29 and Table 5-16. The average maximum monthly temperature and the average minimum monthly temperature are approximately 21.34 and 0°C, respectively. The data indicates that the temperature variations in Kraljevo and Kruševac are similar, the regions have similar temperature profiles, and there are only small differences up to 0.62°C.

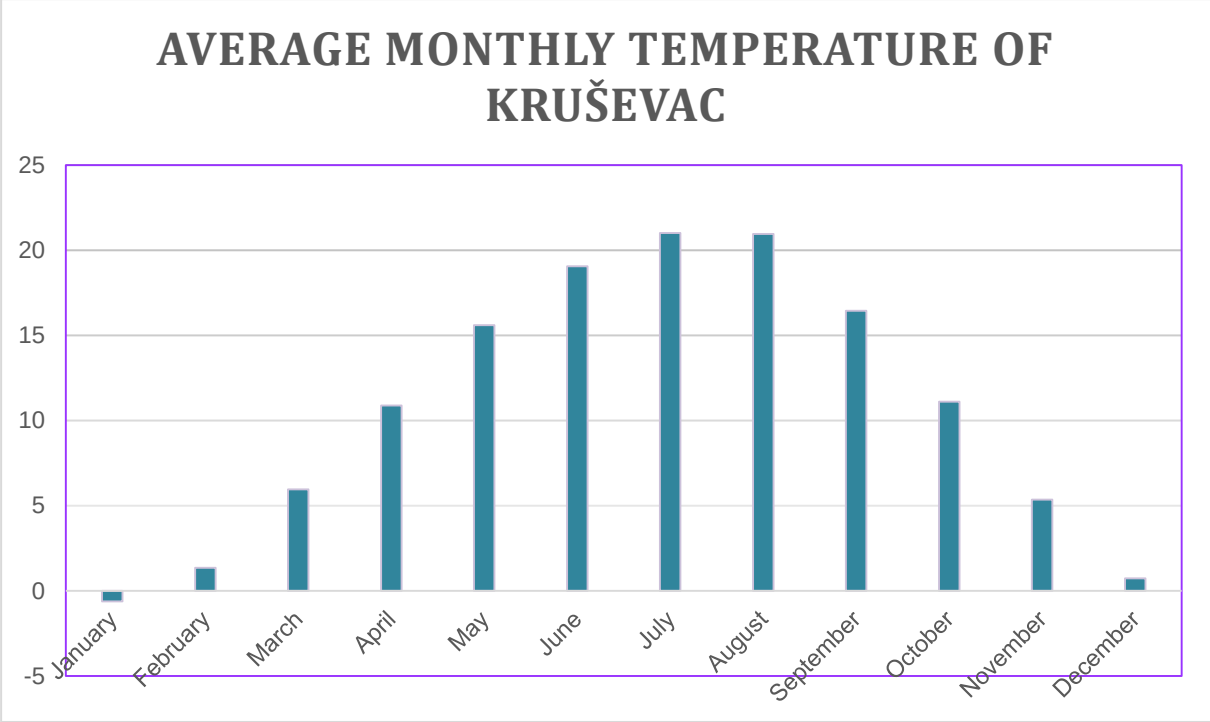


Figure 5-28. Average Monthly Temperature in Kruševac

Table 5-15. Average Monthly Temperature in Kruševac Between 1979-2019

Month	Jab.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Temperature	-0.62	1.36	5.95	10.88	15.59	19.05	21.01	20.96	16.45	11.11	5.36	0.73

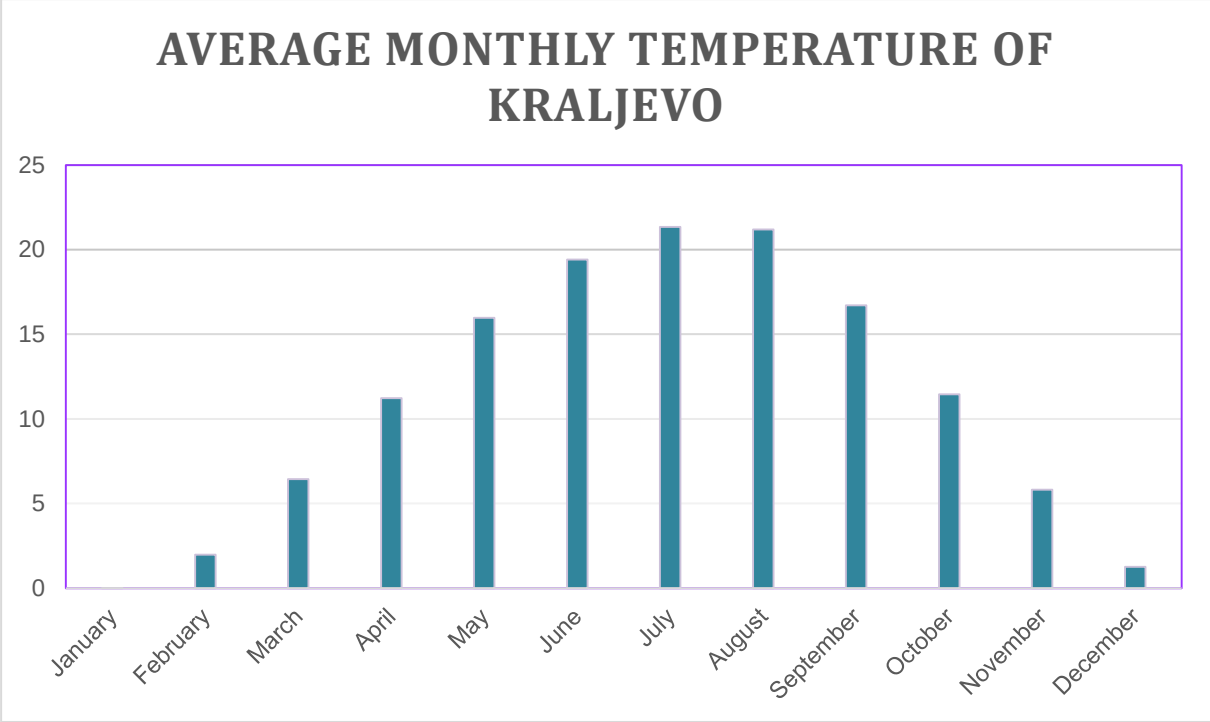


Figure 5-29. Average Monthly Temperature in Kraljevo

Table 5-16. Average Monthly Temperature in Kraljevo Between 1979-2019

Month	Jab.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Temperature	0.00	1.97	6.44	11.24	15.98	19.41	21.34	21.19	16.70	11.45	5.82	1.26

Average temperature map of the project area which is created by ECMWF data is shown in Figure 5-30.

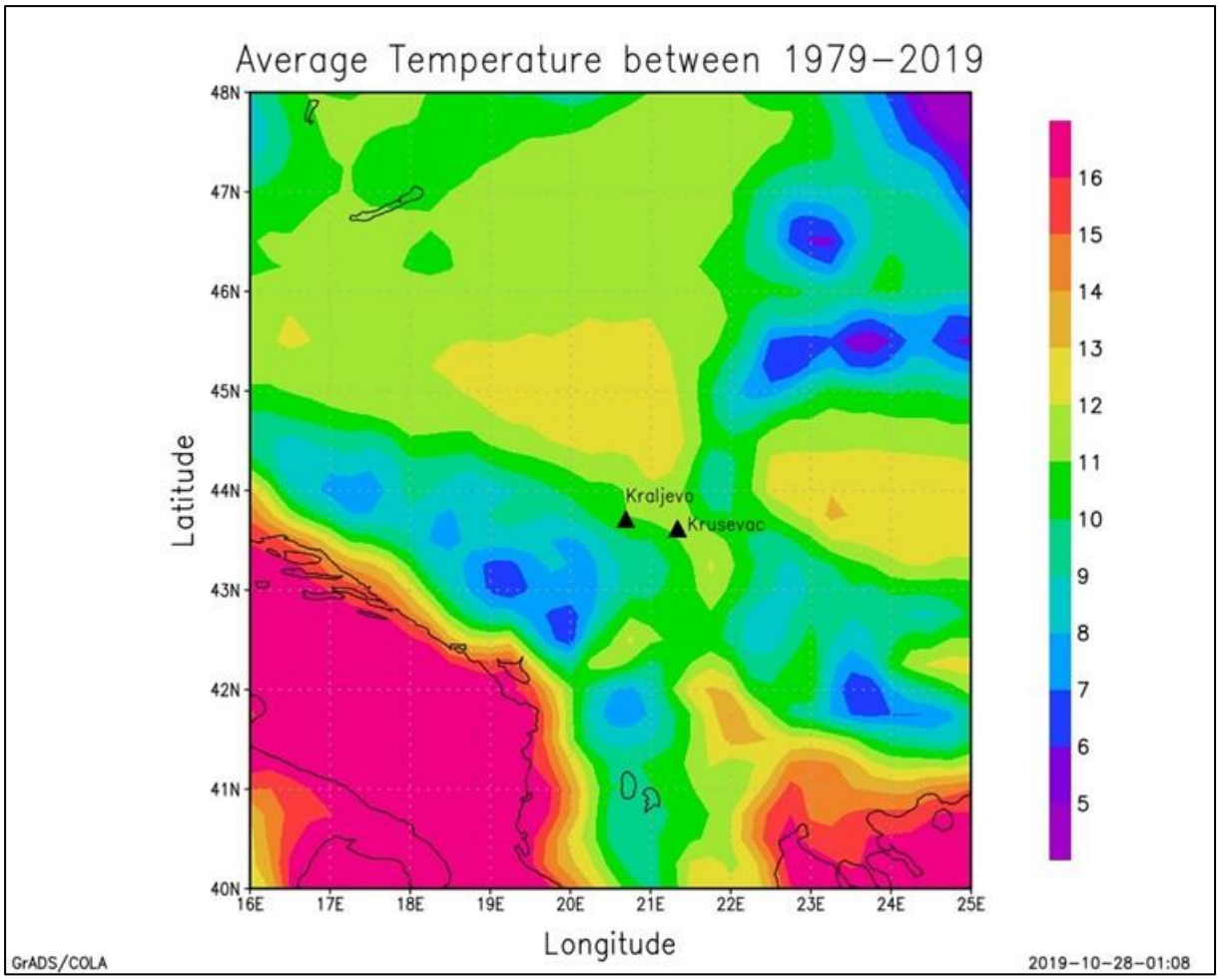


Figure 5-30. Average Temperature Map

Wind Direction

Average monthly wind direction data from 1979 to 2019 in Kruševac is presented at Figure 5-31 and Table 5-17. Average monthly wind direction data from 1979 to 2019 in Kraljevo is presented at Figure 5-32 and Table 5-18. The data indicates that the wind direction variations in Kraljevo and Kruševac are similar. The wind direction profiles of these two regions are quite different comparing to temperature profiles.

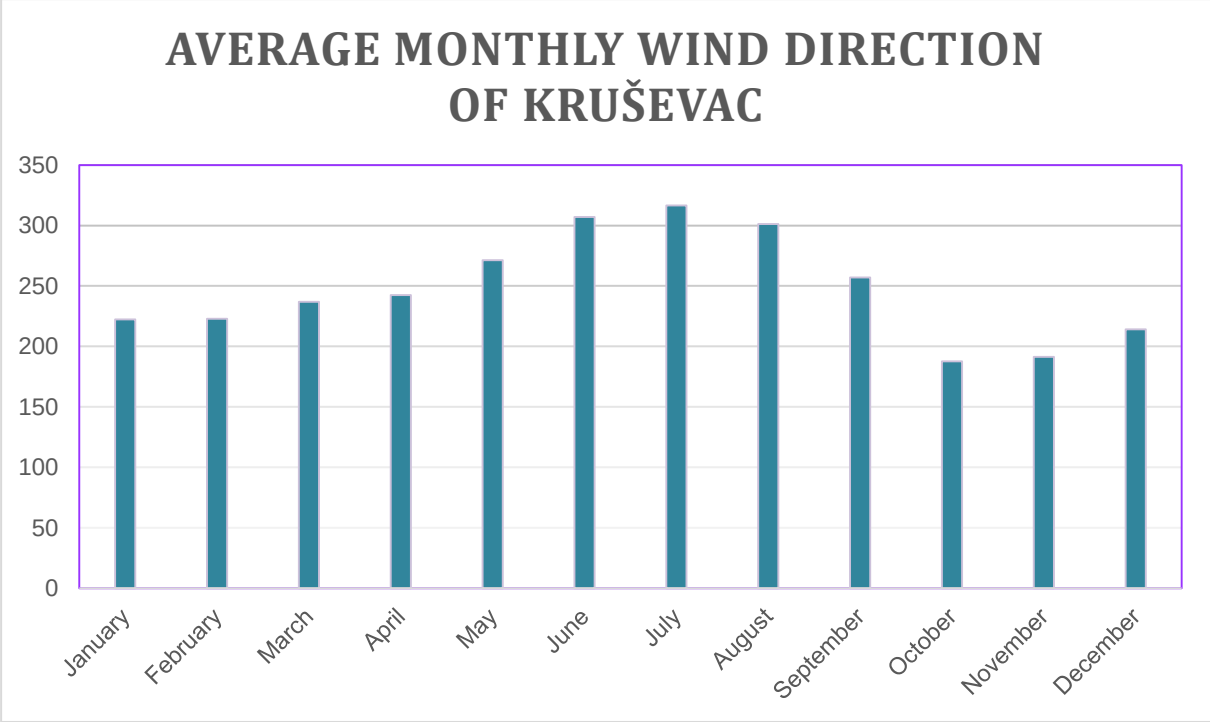


Figure 5-31. Average Monthly Wind Direction in Kruševac

Table 5-17. Average Monthly Wind Direction in Kruševac Between 1979-2019

Month	Jab.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Wind Direction	222	223	237	242	271	307	316	301	257	188	191	214

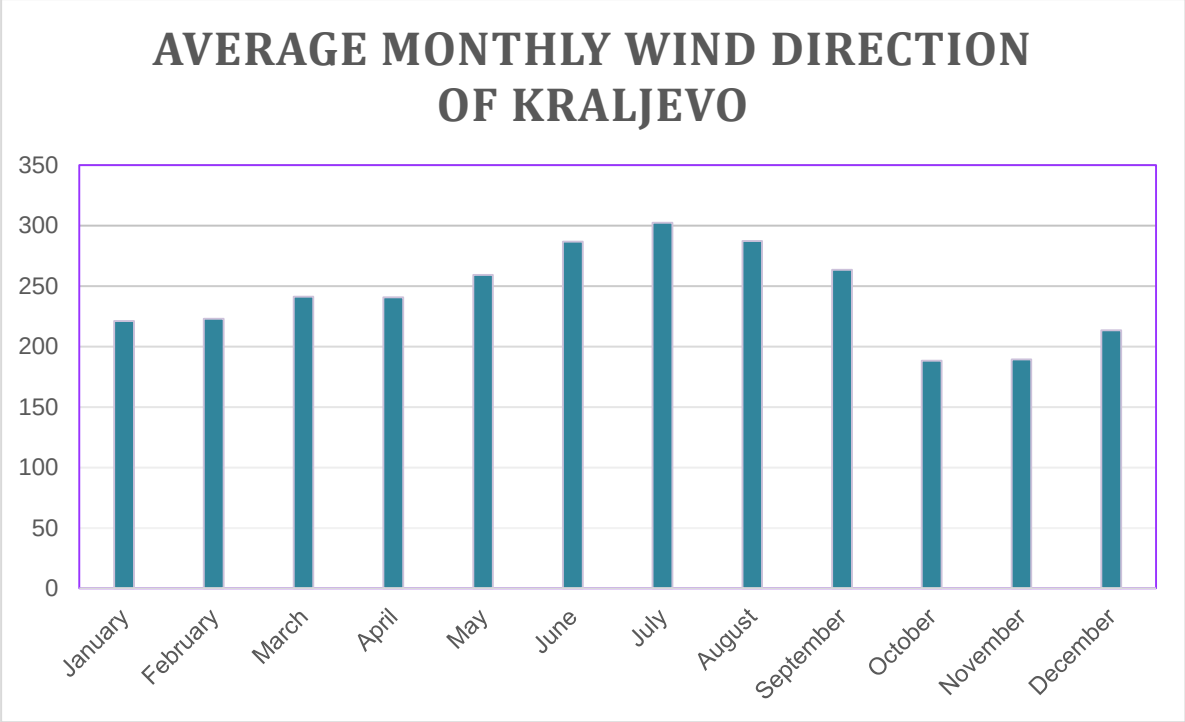


Figure 5-32. Average Monthly Wind Direction in Kraljevo

Table 5-18. Average Monthly Wind Direction in Kraljevo Between 1979-2019

Month	Jab.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Wind Direction	221	223	241	241	259	287	302	287	263	188	189	213

Average wind speed and direction map of the project area which is created by ECMWF data is shown in Figure 5-33.

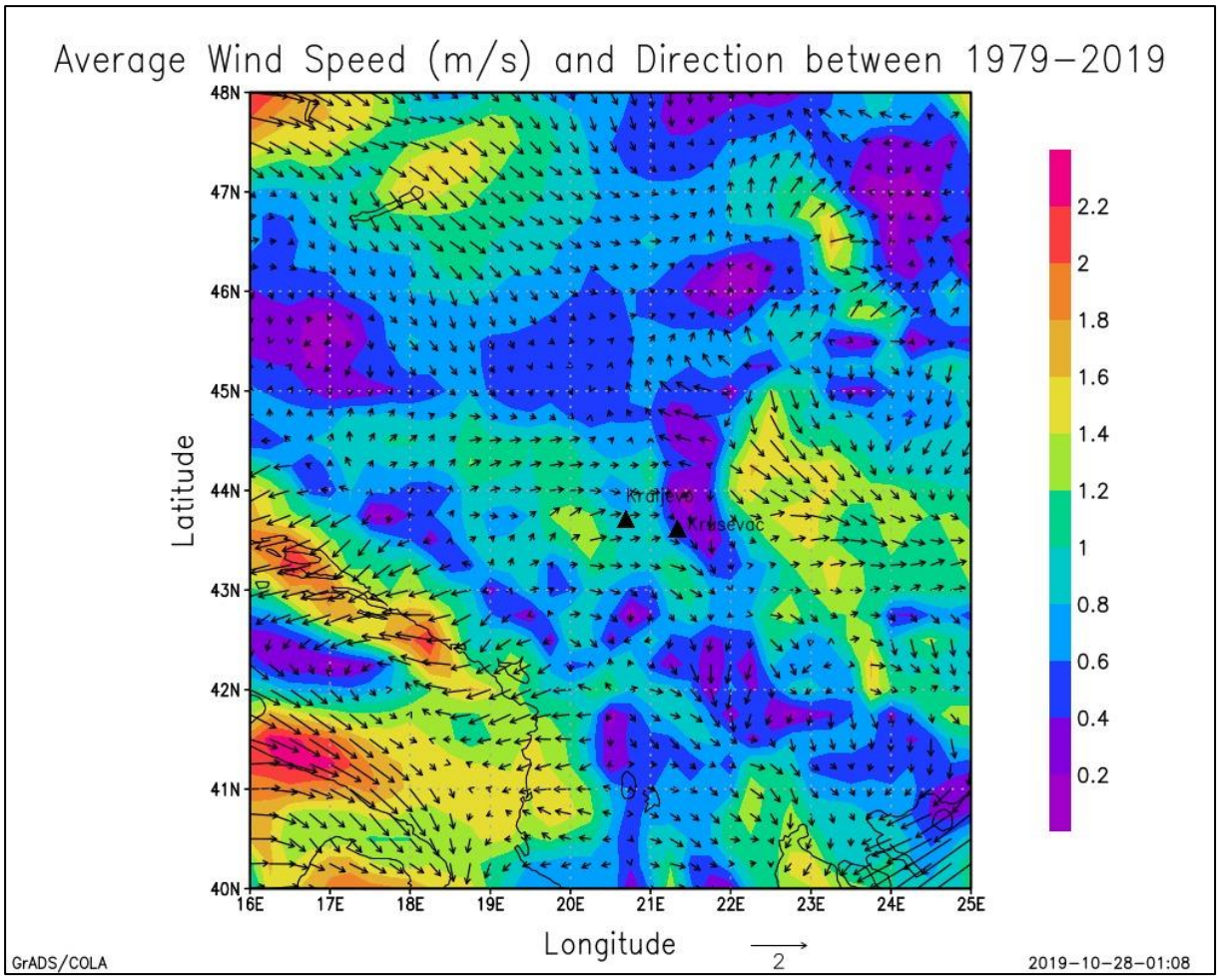


Figure 5-33. Average Wind Map

Wind Velocity

Average monthly wind velocity data from 1979 to 2019 in Kruševac is presented at Figure 5-34 and Table 5-19. The average maximum daily wind velocity and the average minimum monthly wind velocity are approximately 1.12 and 0.50 m/s, respectively. Average monthly wind velocity data from 1979 to 2019 in Kraljevo is presented at Figure 5-35 and Table 5-20. The average maximum monthly wind velocity and the average minimum monthly wind velocity are approximately 0.80 and 0.41 m/s, respectively. The data indicates that the wind velocity variations in Kraljevo and Kruševac are quite different and the wind velocity in Kruševac tends to be approximately 0.02 to 0.32 m/s greater than the wind velocity in Kraljevo.

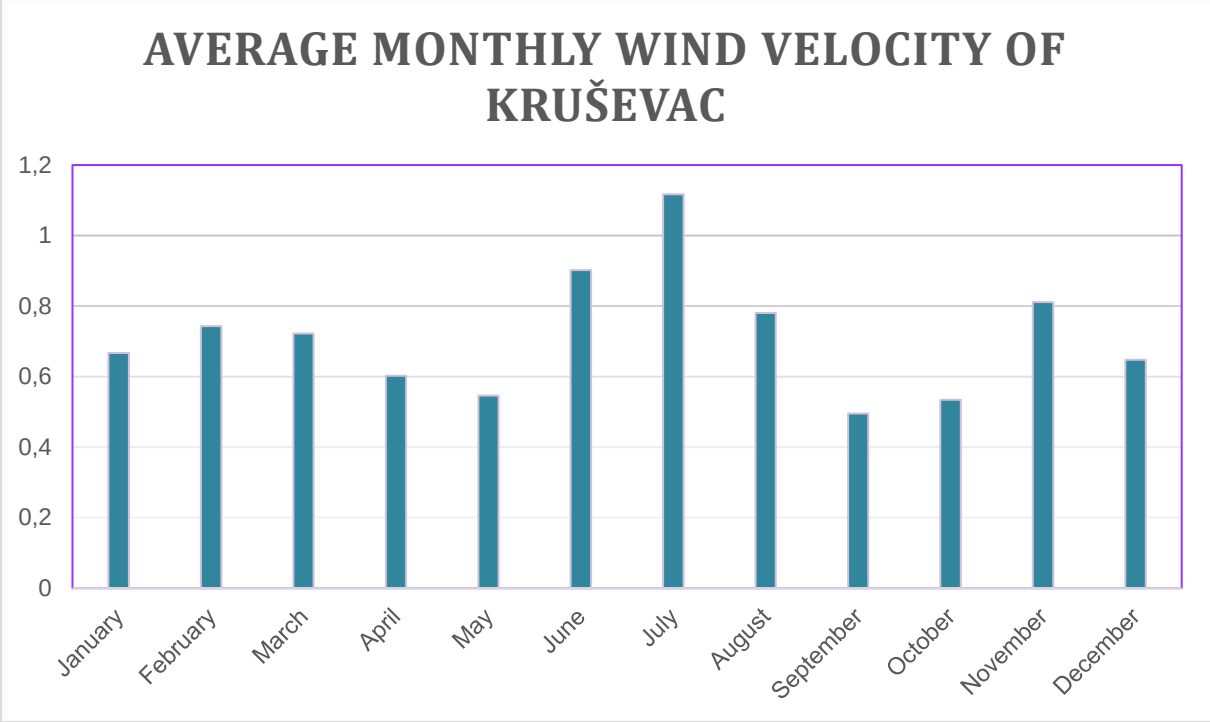


Figure 5-34. Average Monthly Wind Velocity in Kruševac

Table 5-19. Average Monthly Wind Velocity in Kruševac Between 1979-2019

Month	Jab.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Wind Velocity	0.67	0.74	0.72	0.60	0.55	0.90	1.12	0.78	0.50	0.53	0.81	0.65

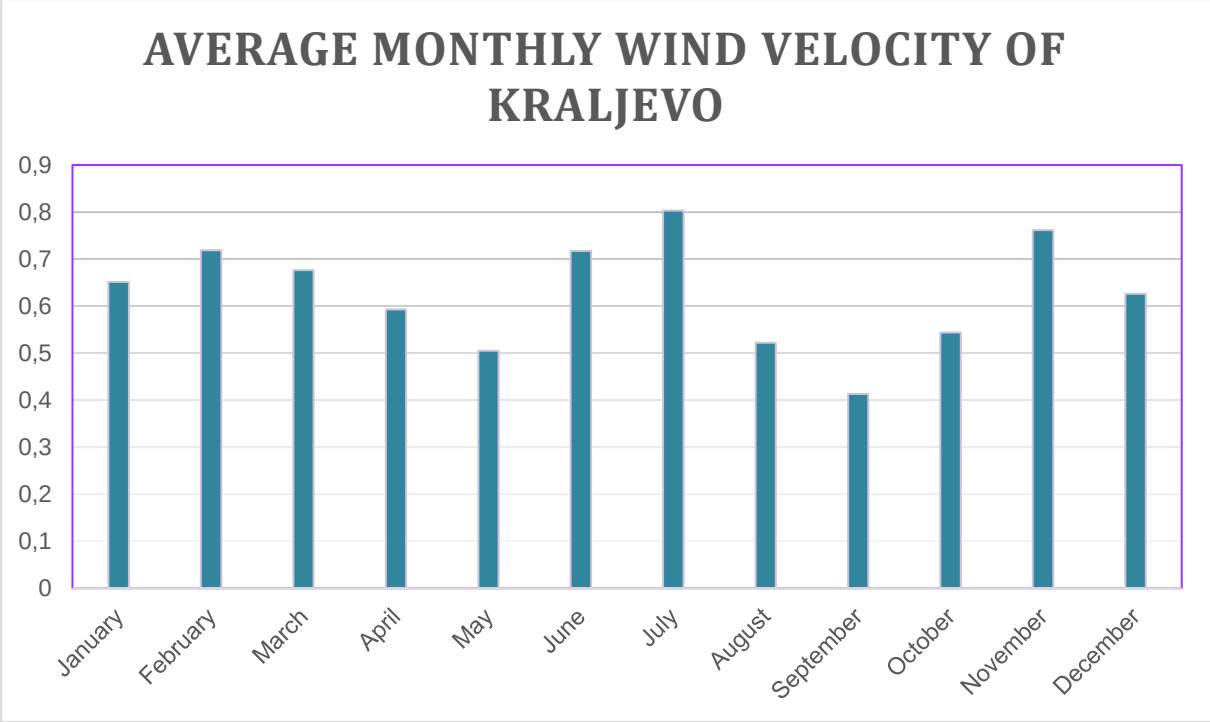


Figure 5-35. Average Monthly Wind Velocity in Kraljevo

Table 5-20. Average Monthly Wind Velocity in Kraljevo Between 1979-2019

Month	Jab.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sep.	Oct.	Nov.	Dec.
Average Wind Velocity	0.65	0.72	0.68	0.59	0.50	0.72	0.80	0.52	0.41	0.54	0.76	0.63

The prevailing wind direction and speed in the region were determined by evaluating the data obtianed from the annual reports of the Serbian Meteorological Service. According to the data, the first dominant wind direction is W (west), the second dominant wind direction is E (east) for Kruševac and the first dominant wind direction is S (south), the second dominant wind direction is E (east) for Kraljevo. Wind count by years are given below.

Table 5-21. Annual Wind Count for Kraljevo

Year	N	NE	E	SE	S	SW	W	NW
2018	62	65	204	132	114	117	191	117
2017	64	67	142	117	125	115	211	152
2016	61	76	170	117	124	115	200	133
2015	65	74	184	105	122	130	198	111
2014	46	48	206	158	97	95	156	99
2013	NA	NA	NA	NA	NA	NA	NA	NA
2012	48	54	155	90	92	99	187	138
2011	NA	NA	NA	NA	NA	NA	NA	NA
2010	56	62	208	151	109	96	195	121
2009	42	54	149	104	95	78	175	110

Year	N	NE	E	SE	S	SW	W	NW
2008	64	58	167	111	88	82	139	126
2007	89	56	126	78	82	95	186	171
2006	74	55	135	76	53	78	135	180
2005	67	55	164	72	73	77	189	148
2004	77	45	141	111	80	71	157	162
2003	56	37	106	145	91	83	162	139
2002	43	24	74	261	100	102	140	138
2001	54	25	77	207	94	97	184	162
2000	44	27	91	222	101	88	120	125
1999	47	19	78	179	93	87	125	120
1998	55	18	90	164	89	73	142	117
1997	60	18	63	162	64	80	161	171
1996	47	12	105	220	49	50	137	98
1995	36	25	101	150	95	63	159	116
1994	34	20	103	129	71	95	178	132
1993	36	21	144	117	109	124	174	87
1992	26	23	117	116	87	106	173	99
1991	18	30	132	101	52	70	201	94
1990	38	25	113	103	64	62	187	96
1989	NA	NA	NA	NA	NA	NA	NA	NA
1988	NA	NA	NA	NA	NA	NA	NA	NA
1987	NA	NA	NA	NA	NA	NA	NA	NA
1986	NA	NA	NA	NA	NA	NA	NA	NA
1985	NA	NA	NA	NA	NA	NA	NA	NA
1984	29	20	231	46	7	25	83	22
1983	NA	NA	NA	NA	NA	NA	NA	NA
1982	100	42	105	41	67	12	55	65
1981	28	26	172	46	20	15	66	30
1980	NA	NA	NA	NA	NA	NA	NA	NA
1979	47	17	256	43	35	25	150	56
Total	1613	1198	4309	3874	2542	2505	4916	3635

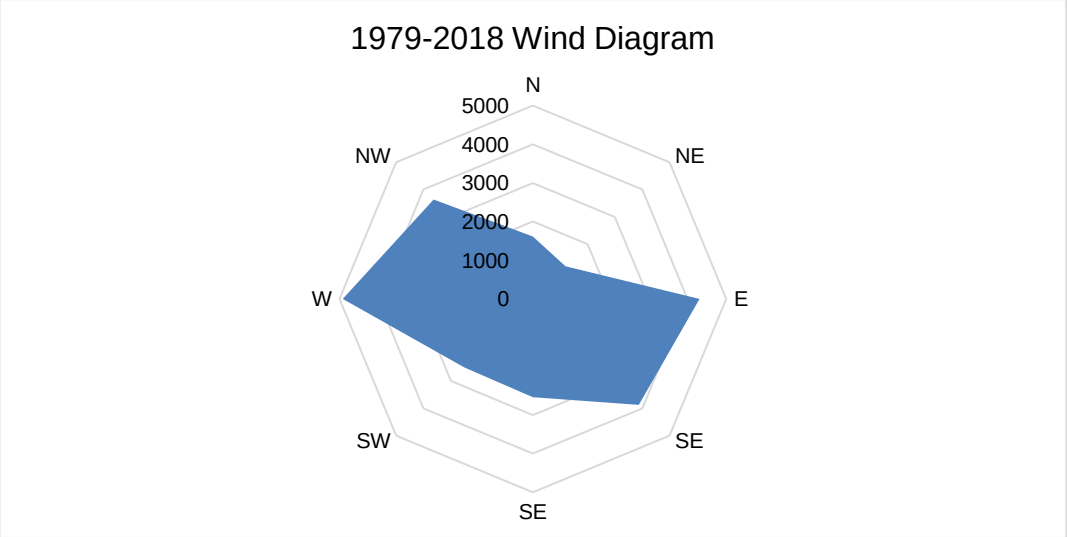


Figure 5-36. Wind Diagram for Kraljevo

Table 5-22. Annual Wind Count for Kruševac

Year	N	NE	E	SE	S	SW	W	NW
2018	97	88	165	138	257	75	86	79
2017	98	87	125	155	243	77	103	111
2016	111	90	140	155	235	63	103	112
2015	99	81	127	148	236	72	112	96
2014	94	83	201	144	232	82	97	77
2013	107	82	159	181	208	44	91	114
2012	119	96	137	168	209	56	108	101
2011	121	89	155	134	229	64	97	94
2010	114	76	179	103	235	75	125	86
2009	114	74	150	132	243	52	106	94
2008	96	22	124	36	117	22	69	63
2007	96	23	95	26	110	18	102	65
2006	89	11	94	18	96	13	84	50
2005	100	20	96	27	85	16	97	52
2004	85	22	102	24	78	18	75	72
2003	125	28	94	27	75	14	59	76
2002	77	35	135	29	82	15	72	47
2001	121	19	102	24	84	13	100	67
2000	74	24	106	28	90	23	62	67
1999	87	30	97	25	81	15	88	58
1998	-	-	-	-	-	-	-	-
1997	121	21	108	36	108	15	125	75
1996	110	49	223	83	150	30	102	71
1995	123	47	151	65	264	48	106	83
1994	128	60	150	76	242	61	99	92
1993	88	39	149	53	180	33	74	84

Year	N	NE	E	SE	S	SW	W	NW
1992	112	52	110	76	232	56	88	90
1991	113	47	120	50	142	29	113	70
1990	69	21	63	23	57	21	52	66
1989	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-
1987	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1984	62	26	115	39	64	5	82	64
1983	63	23	73	33	72	10	61	76
1982	29	20	210	36	12	15	55	33
1981	77	29	99	39	77	21	81	74
1980	-	-	-	-	-	-	-	-
1979	85	30	95	31	74	30	73	55
Total	3204	1544	4249	2362	4899	1201	2947	2514

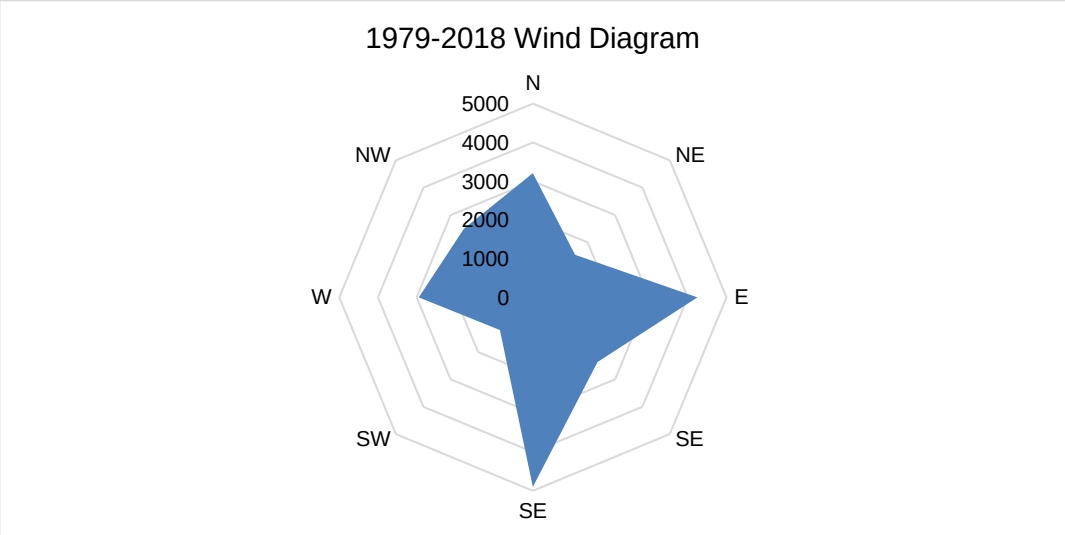


Figure 5-37. Wind Diagram for Kraljevo

In addition to these information given above, the Republic Hydro-meteorological Service of Serbia website is also reviewed and information about precipitation in Serbia is obtained. According to the Website, the general climate is described as moderate-continental. However, there are some factors such as geographic location, distribution of air pressure of major scale, etc. that affect the spatial distribution of climate parameters.

The Alps, Mediterranean Sea and Genoa Bay, Panonia plain and the valley of the Morava, the Carpathian and Rodopi mountains as well as hilly-mountainous part with ravines and highland plains are among geographic characteristics influencing the weather and climate of Serbia. Polar air masses flow into Serbia due to Prevailing location of the West Morava River ravines and plains in the northern area of the country.

5.3.4 Sensitive Receptors

Climate has a global feature and due to the fact that the whole the Proposed Motorway Route alignment was affected by flooding in 2014, the AoI has been considered as sensitive receptor.

5.4 Air Quality

In this section, at first, general information about the air quality of Serbia is given. Then, after specifying the methodology and data sources used to write the baseline conditions, and then soil quality baseline information about the area where the Project is located is given more specifically.

5.4.1 Study Area

In order to determine the current air quality within the AoI PM measurements was carried out in the AoI of the Project and passive-sampling methods was used for NO_2, SO_2 and H_2S. For these parameters, measurements were made at 42 different points for Sections in the nearest settlements along the Proposed Motorway Route which were selected based on the proximity to the potential pollution sources of the Project such as motorway itself and the associated facilities.

Measurement locations for air quality and noise are provided in Table 5-23, Table 5-24 and Table 5-25 and have been integrated into the Measurement Locations' Map (see Appendix-5.1).

Table 5-23. Measuring Points for NO_2, SO_2 and H_2S and Noise for Section-1

Measuring Point	WGS84 UTM Zone34		Measuring
	X	Y	Date
Section-1			
Air Quality-Noise-1	535884	4843898	22.08.2019
Air Quality-Noise-2	534309	4841371	22.08.2019
Air Quality-Noise-3	534074	4840946	23.08.2019
Air Quality-Noise-4	533384	4838495	23.08.2019
Air Quality-Noise-5	533200	4837191	23.08.2019
Air Quality-Noise-6	531107	4836274	24.08.2019
Air Quality-Noise-7	529773	4834433	24.08.2019
Air Quality-Noise-8	530938	4834074	23.08.2019
Air Quality-Noise-9	530135	4829842	24.08.2019
Air Quality-Noise-10	524173	4828788	24.08.2019
Air Quality-11(BTEX)	524770	4828522	23.08.2019
Air Quality-Noise-12	521403	4827732	24.08.2019
Air Quality-Noise-13	521734	4826922	24.08.2019

Table 5-24. Measuring Points for NO_2, SO_2 and H_2S and Noise for Section-2

Measuring Point	WGS84 UTM Zone34		Measuring
	X	Y	Date
Section-2			
Air Quality-Noise-14	535884	4843898	22.08.2019
Air Quality-Noise-15	534309	4841371	22.08.2019
Air Quality-Noise-16	534074	4840946	23.08.2019
Air Quality-Noise-17	533384	4838495	23.08.2019
Air Quality-Noise-18	533200	4837191	23.08.2019
Air Quality-Noise-19	531107	4836274	24.08.2019
Air Quality-Noise-20	529773	4834433	24.08.2019
Air Quality-Noise-21	530938	4834074	23.08.2019
Air Quality-Noise-22	530135	4829842	24.08.2019
Air Quality-23	524173	4828788	24.08.2019
Air Quality-Noise-24	524770	4828522	23.08.2019
Air Quality-Noise-25	521403	4827732	24.08.2019
Air Quality-Noise-26	521734	4826922	24.08.2019
Air Quality-Noise-27	488387	4834417	23.10.2019
Air Quality-Noise-28	487096	4835906	23.10.2019
Air Quality-Noise-29	480594	4839718	21.10.2019
Air Quality-Noise-30	479789	4841539	21.10.2019
Air Quality- 31	479326	4841661	21.10.2019
Air Quality-Noise-32	477466	4843059	21.10.2019
Air Quality-Noise-33	474563	4843710	21.10.2019

Table 5-25. Measuring Points for NO_2, SO_2 and H_2S and Noise for Section-3

Measuring Point	WGS84 UTM Zone34		Measuring Date
	X	Y	
Section-3			
Air Quality-Noise-34	471455	4845855	28.09.2019
Air Quality-Noise-35	470271	4847799	28.09.2019
Air Quality-Noise-36	467368	4848748	28.09.2019
Air Quality-Noise-37	460998	4853607	27.09.2019
Air Quality-Noise-38	454725	4858447	27.09.2019
Air Quality-Noise-39	453097	4859553	27.09.2019
Air Quality-Noise-40	452675	4860947	26.09.2019
Air Quality-Noise-41	452348	4862030	26.09.2019
Air Quality-Noise-42	451548	4862475	26.09.2019

PM measurement locations in the AoI of the Project are given in the Table 5-26.

Table 5-26. Measuring Points for PM_{10} and $PM_{2.5}$ for Section-1

Measuring Point	GPS coordinates		Parameters	Measuring Date
	X	Y		
Measuring Point 1: The courtyard of Budimir Ognjanović`s house in the village of Pojate	21° 26' 44,48"	43°44'50,11"	PM_{10} – $PM_{2.5}$	20.09.2019 - 21.09.2019.
Measuring Point 2: The courtyard of Biljana Krstić`s house in Ćićevac	21° 26' 02,44"	43° 43' 22,01"	PM_{10}	..
Measuring Point 3: The courtyard of Radovan Vasić`s house, 3 Slobodan Penezić street, Ćićevac	21° 25' 53,81"	43° 43' 13,03"	PM_{10} – $PM_{2.5}$	21.09. 2019 - 22.09.2019.
Measuring Point 4: The courtyard of Srbislav Vasić`s house, 93 Solunskih ratnika street, Stalać.	21° 24' 51,49"	43° 41' 55,4"	PM_{10}	
Measuring Point 5: The courtyard of Igor Stefanović`s, 8 Todora od Stalaća street, Stalać.	21° 24' 46,71"	43° 41' 17,57"	PM_{10} – $PM_{2.5}$	22.09. 2019 - 23.09.2019.
Measuring Point 6: The courtyard of Bojan Mihajlović`s house in the village of Maskare.	21° 23' 08,81"	43° 40' 43,88"	PM_{10}	
Measuring Point 7: The courtyard of Ljubiša Janićijević`s house in the village of Bošnjane.	21° 22' 8,74"	43° 39' 45,27"	PM_{10} – $PM_{2.5}$	23.09. 2019 - 24.09.2019.
Measuring Point 8: The courtyard of Aleksandar Marković`s house, 4 Moravska street in the village of Mrzenica.	21° 23' 01,23"	43° 39' 28,76"	PM_{10}	
Measuring Point 9: The courtyard of Radoslav Davidović`s house, 193 Savska street in the village of Makrešane.	21° 22' 24,28"	43° 37' 13,37"	PM_{10} – $PM_{2.5}$	24.09. 2019- 25.09.2019.
Measuring Point 10: The courtyard of Milivoje Milovanović`s house, 17 Stanislava Biničkog street in the village of Jasika.	21° 17' 49,46"	43° 36' 37,57"	PM_{10}	
Measuring Point 11: The yard of the company KRUŠEVAC PUT AD, 65 Jasički put, Kruševac.	21° 18' 25,86"	43° 36' 25,57"	PM_{10} – $PM_{2.5}$	25.09. 2019 - 26.09.2019.
Measuring Point 12: The courtyard of Miodrag Jovanović`s house 2 Sedmojulska street in the village of Kukljin.	21° 15' 54,69"	43° 36' 8,35"	PM_{10}	
Measuring Point 13: The courtyard of Jelena Todorović`s house, 3 Jelena Anžujska street in the village of Čitluk.	21° 16' 09,59"	43° 35' 41,44"	PM_{10}	26.09. 2019 - 27.09.2019.
Measuring Point 14: Dvorište kuće Bobana Marinkovića, selo Koševi kod Kruševca.	21°14'43,09"	43°35'13.27"	PM_{10}	13.11.2019 - 14.11.2019
Measuring Point 15: Dvorište kuće Miladinovića, selo Kukljin kod Kruševca	21° 14' 44,08"	43° 36' 6,54"	PM_{10} – $PM_{2.5}$	12.11.2019 – 13.11.2019
Measuring Point 16: Dvorište kuće Dragana Živkića, selo Selište kod Trstenika.	21° 8' 52,01"	43°36' 47,39"	PM_{10}	
Measuring Point 17: Dvorište kuće Miće Promicaća, selo Medveđa kod Trstenika.	21° 5' 23,55"	43°37' 32,02"	PM_{10} – $PM_{2.5}$	11.11.2019- 12.11.2019

Measuring Point	GPS coordinates		Parameters	Measuring Date
	X	Y		
Measuring Point 18: Dvorište kuće Miće Stanojevića, selo Medveđa kod Trstenika	21° 5' 23,55"	43°37' 34,39"	PM_{10}	10.11.2019-11.11.2019
Measuring Point 19: Dvorište kuće Rade Bojanića, selo Bogdanje kod Trstenika.	21° 2' 16,60"	43°37' 52,87"	PM_{10} – $PM_{2.5}$	07.11.2019-08.11.2019
Measuring Point 20: Dvorište kuće Nebojše Stojkovića, Trstenik	21° 0' 25,21"	43°37' 17,55"	PM_{10}	
Measuring Point 21: Dvorište kuće Slađane Lukić, Trstenik.	20° 59' 50,31"	43°37' 29,32"	PM_{10} – $PM_{2.5}$	09.11.2019-10.11.2019
Measuring Point 22: Benzinska stanica KNEZ PETROL, selo Vrnjci kod Vrnjačke Banje.	20° 57' 48,57"	43°37' 54,36"	PM_{10} – $PM_{2.5}$	08.11.2019-09.11.2019
Measuring Point 24: Dvorište kuće Blagoja Petrovića, selo Štulac kod Vrnjačke Banje.	20° 57' 29,02"	43° 38' 0,35"	PM_{10} – $PM_{2.5}$	06.11.2019-07.11.2019
Measuring Point 25: Dvorište kuće Gorana Spasojevića, selo Lozna kod Trstenika.	20° 57' 3,95"	44°38' 33,08"	PM_{10} – $PM_{2.5}$	02.11.2019-03.11.2019
Measuring Point 26: Dvorište kuće Zorana Crnoglavca, selo Vrnjci kod Vrnjačke Banje.	20° 54' 50,80"	43°39' 12,58"	PM_{10}	30.10.2019-31.10.2019
Measuring Point 27: Dvorište kuće Dragić Đurovića, selo Pojate kod Vrnjačke Banje.	20° 51' 21,48"	43°39' 45,59"	PM_{10} – $PM_{2.5}$	01.11.2019-02.11.2019
Measuring Point 28: Dvorište kuće Aleksandra Debeljaka, selo Podunavci kod Vrnjačke Banje.	20° 50' 23,70"	43°40' 33,78"	PM_{10} – $PM_{2.5}$	31.10.2019-01.11.2019
Measuring Point 29: Dvorište kuće Milana Katića, selo Vrba kod Kraljeva.	20° 45' 32,83"	43°42' 36,83"	PM_{10}	03.11.2019-04.11.2019
Measuring Point 30: Dvorište kuće Stevana Sretenovića, Kraljevo.	20° 44' 56,61"	43°43' 35,78"	PM_{10}	03.11.2019-04.11.2019
Measuring Point 32: The courtyard of Slavica Anđelković`s house, village Sirca near Kraljevo	20° 43' 12,57"	43° 44'24,81"	PM_{10} – $PM_{2.5}$	29.10.2019-30.10.2019
Measuring Point 33: The courtyard of Vlada Marković`s house, village Grdica near Kraljevo	20° 41' 2,66"	43°44' 45,57"	PM_{10}	
Measuring Point 34: The courtyard of Milan Sinđelić`s house, village Adrani near Kraljevo	20°38' 43,29"	43°45' 54,69"	PM_{10} – $PM_{2.5}$	25.10.2019-26.10.2019
Measuring Point 35: The courtyard of Miodrag Radomirović`s house, village Miločaj near Kraljevo	20°35' 13,80"	43°36' 42,32"	PM_{10}	
Measuring Point 36: The courtyard of Slavica Rajčić`s house, village Obrva near Kraljevo	20° 37' 49,94"	43°46' 57,53"	PM_{10}	
Measuring Point 37: The courtyard of Milić Vučković`s house, village Mrčajevci near Čačak	20° 44' 56,61"	43°43' 35,78"	PM_{10}	27.10.2019-28.10.2019

Measuring Point	GPS coordinates		Parameters	Measuring Date
	X	Y		
Measuring Point 38: The courtyard of Velimir Petrović`s house, village Stančići near Čačak	20° 26' 11,21"	43°52' 39,82"	PM_{10} – $PM_{2.5}$	24.10.2019-25.10.2019
Measuring Point 39: The courtyard of Marko Tripković`s house, village Baluga near Čačak	20° 25' 0,96"	43°53'14,61"	PM_{10} – $PM_{2.5}$	23.10.2019-24.10.2019
Measuring Point 40: The courtyard of Momčilo Mikavica`s house, village Konjevići near Čačak	20° 24' 40,43"	43° 54' 1,27"	PM_{10}	
Measuring Point 41: The courtyard of Ljuban Grbović`s house, village Preljina near Čačak	20° 24' 27,15"	43°54'38,97"	PM_{10} – $PM_{2.5}$	22.10.2019-23.10.2019
Measuring Point 42: The courtyard of Stanimirka Vasović`s house, Čačak	20° 23' 59,14"	43°54'35,33"	PM_{10}	28.10.2019-29.10.2019

All measurement points conducted within the scope of environmental baseline studies are presented in Figure 5-38.

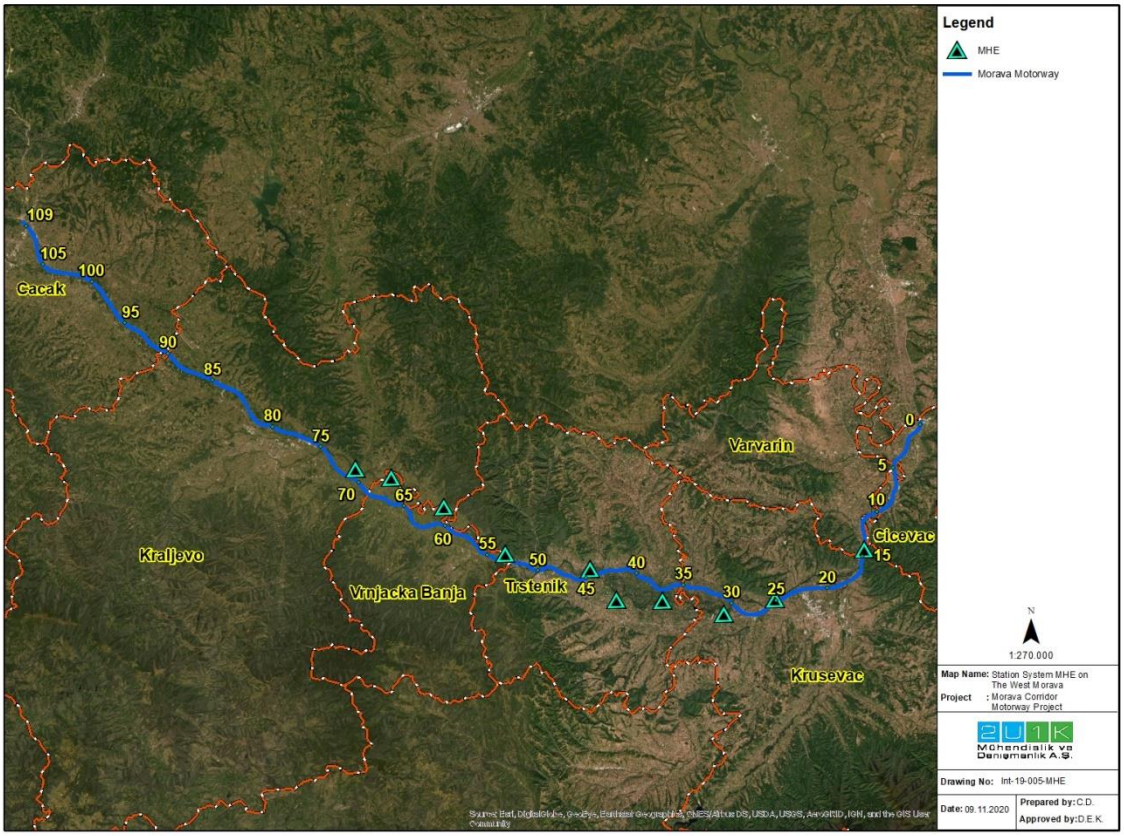


Figure 5-38. All Measurement Points within the scope of Environmental Baseline Studies

5.4.2 Methodology and Data Source

Measurements were carried out by laboratories with national and international competence (see Appendix-2 for certificates of competence). The measurements were taken over a total of 30 days, which is sufficient according to Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

Measuring air quality to determine background concentrations of air pollutants is based on the usage of passive sampling equipment i.e., diffusion tubes for gaseous pollutants which is internationally acceptable technique based on EN ISO/IEC 17025:2005 standard.

To track and document each step in the testing process until the results are released, a Chain of Custody Form (CCF) was used.

Ambient air - Standard gravimetric measurement method is used for the determination of the PM_{10} and $PM_{2.5}$ mass concentration of suspended particulate matter which is internationally acceptable technique based on EN 12341:2015 standard.

Following documents have been reviewed during the desktop study of the project as;

- WHO Ambient Air Quality Guideline;
- Regulation on the Conditions for Monitoring and Air Quality Requirements (Official Gazette of RS, No. 11/10 and 75/10, Amend 63/13);
- Degree on monitoring conditions and air quality requirements ("Official Gazette of RS" No. 11/2010, 75/2010 and 63/2013), Attachment X, Part B).

5.4.3 Baseline Conditions

In general, air quality conditions in Serbia is known to be a major concern according to the results of some measurement studies conducted in Serbia for different purposes in the past. One of such measurements campaign is dated to 2013 and its results show that the air is to be harmful to health due to the fact that $PM_{2.5}$ and PM_{10} concentrations are well above the limit values set by the EU and the World Health Organization (WHO) to protect health ((HEAL), 2014).

Regarding the baseline air quality conditions in relation to the AoI of the Project, Serbian EIA Reports for each Section of the motorway were taken into account and much more detailed baseline air quality assessment was provided by using the results of the extensive air quality measurements conducted by 2U1K.

Serbian EIA reports have been reviewed to find out about the current air pollution in the project area. According to the assessments in the EIA Reports, there are two types of contributaries to the air pollution in this section; i) mobile/linear soruces (e.g., traffic) and ii) point/stationary sources (e.g., industry, heating facilities and individual heating units).

Regarding the air pollution due to the traffic, the existing main roads M-5, M-22, M-23.1 are the only sources.

- ***Section 1***: no specific measurement of air pollution has been made.
- ***Section 2***: no information is available due to the absence / incomplete EIA Report.
- ***Section 3***: EIA Report of Sector 8 states that the Adrani-Mrcajevci part of this Section is assumed to be the dominant line of air pollutants orginated from traffic. In this part of the section, there is no point sources of air pollution whereas Kraljevo that is the settlement before Adrani in this Section has industry, heating facilities and individual heating units as point sources. During the heating season, most of the pollutant components in the populated suburban areas are caused by individual heating furnaces. As a result, during the heating season, air pollution in the municipality of Kraljevo is mainly due to the generation of thermal energy for heating, followed by transport and industry. It is noted that traffic and industry are pollutants throughout the year. No special traffic assessment has been conducted in the municipality of Kraljevo. EIA Report of Sector 9 states that M22 and M23 are the main linear sources of air pollution in the Sector and there are no major point sources in this Sector. According to the air quality measurements made in 2017 for monitoring of impacts of air quality on agricultural products in the Municipality of Čačak, the air quality conditions prevailing in this Sector is defined as first category, which is clean or slightly polluted air where no limit values for any pollutant have been exceeded.

Baseline air quality is examined by evaluating the measurement results of the air quality tests for H_2S, SO_2, and NO_2 that are given in Table 5-27.

Table 5-27. Measurement Results of H_2S, SO_2, NO_2, Toluene, Ethylbenzene, O-Xylene, P-M-Xylene, Benzene for Section-1

Air Quality Measurement Location	$H_2S(\mu g/m^3)$	$SO_2(\mu g/m^3)$	$NO_2(\mu g/m^3)$	TOLUENE ($\mu g/m^3$)	ETHYLBENZENE ($\mu g/m^3$)	O- XYLENE ($\mu g/m^3$)	P-M- XYLENE ($\mu g/m^3$)	BENZENE ($\mu g/m^3$)
Air Quality-1	< 2.00	15.84	4.49	*	*	*	*	*
Air Quality-2	< 2.00	12.57	1.34	*	*	*	*	*
Air Quality-3	< 2.00	14.67	2.45	*	*	*	*	*
Air Quality-4	< 2.00	11.68	1.78	*	*	*	*	*
Air Quality-5	< 2.00	<2.92	2.50	*	*	*	*	*
Air Quality-6	< 2.00	19.68	0.49	*	*	*	*	*
Air Quality-7	< 2.00	<2.92	1.39	*	*	*	*	*
Air Quality-8	< 2.00	22.84	2.00	*	*	*	*	*
Air Quality-9	< 2.00	24.79	7.86	*	*	*	*	*
Air Quality-10	< 2.00	23.25	1.78	*	*	*	*	*
Air Quality-11	*	*	*	6.42	<0.68	0.77	0.78	0.61
Air Quality-12	< 2.00	5.93	1.64	*	*	*	*	*
Air Quality-13	< 2.00	4.53	2.27	*	*	*	*	*
Limit Values		**125 - Interim target 1; 50 - Interim target 2; 20 – guideline (for an averaging period of 24-hour)[1]**	**40 – guideline (for an averaging period of 1-year) 200 – guideline (for an averaging period of 1-hour)[1]**	**260[2] µg/m³**	**435,000**	**4,800[1] µg/m³**	**4,800[1] µg/m³**	**16.25[3] µg/m³**
The values prescribed by the Regulation on the Conditions for Monitoring and Air Quality Requirements* ($\mu g/m^3$)		125	85					

[1]WHO Ambient Air Quality Guideline Value
[2]WHO (2000)
[3]UK Expert Panel on Air Quality Standarts (EPAQS)

There is an asphalt plant in the same measurement location that is Air Quality-11. Therefore, Toluene, Benzene o-xylene and m-p-xylene measurements are conducted to evaluate the air quality. As it is shown in the table above, results are well below the limit values.

Table 5-28. Measurement Results of H_2S, SO_2, NO_2 for Section-3

Air Quality Location	H_2S(µg/m^3)	SO_2(µg/m^3)	NO_2(µg/m^3)
Air Quality-34	< 2.0	4,87	2,78
Air Quality-35	< 2.0	7,51	1,78
Air Quality-36	< 2.0	8,02	1,78
Air Quality-37	< 2,0	8,59	1,32
Air Quality-38	< 2,0	5,16	2,78
Air Quality-39	< 2,0	6,07	3,74
Air Quality-40	< 2,0	5,12	3,56
Air Quality-41	-	-	-
Air Quality-42	< 2,0	13,24	1,41
WHO Ambient Air Quality Guideline Value (µg/m^3) (To avoid odour annoyance, a 30-min average ambient air concentration not exceeding 7 µg/m^3 is recommended)*	150 µg/m^3 (24-hour limit value)*	125 - Interim target 1; 50 - Interim target 2; 20 – guideline (for an averaging period of 24-hour)	40 – guideline (for an averaging period of 1-year) 200 – guideline (for an averaging period of 1-hour)
The values prescribed by the Regulation on the Conditions for Monitoring and Air Quality Requirements[1] **(µg/m^3)**		125	85

[1] Official Gazette of RS, No. 11/10 and 75/10, Amend 63/13

[2] During a fuel-lean phase, sulfur storage occurs by unmodified three-way catalysts where platinum-group metals are supported on CeO2-Al2O3. Then, it will be realesed as a large H_2S. Spike. These values were measured as indicators.

As a result of the measurements, the daily average values are below Serbian limit values and IFC Guideline Limits for Ambient Air Quality (125 µg/m^3 as interim target-1). In addition, the contribution from the Project should not exceed 25% of the limit value, which is 31.25 µg/m^3. Accordingly, the AoI can be considered as having a non-degraded air shed.

In addition, baseline air quality is examined by evaluating the measurement results of the air quality tests for PM_{10} and $PM_{2.5}$ that are given in Table 5-29.

Table 5-29. Measurement Results for PM_{10} and $PM_{2.5}$

Measuring Point	Parameter	Result of Measurement (µg/m^3)	Limit Value
Measuring Point 1	PM_{10}	27.2 ± 17%	50[5]
	$PM_{2.5}$	9.1 ± 17%	25[6]
Measuring Point 2	PM_{10}	19.9 ± 17%	50
Measuring Point 3	PM_{10}	27.2 ± 17%	50
	$PM_{2.5}$	14.5 ± 17%	25
Measuring Point 4	PM_{10}	18.1 ± 17%	50
Measuring Point 5	PM_{10}	41.7 ± 17%	50
	$PM_{2.5}$	23.6 ± 17%	25
Measuring Point 6	PM_{10}	27.2 ± 17%	50
Measuring Point 7	PM_{10}	23.6 ± 17%	50
	$PM_{2.5}$	10.9 ± 17%	25
Measuring Point 8	PM_{10}	14.5 ± 17%	50
Measuring Point 9	PM_{10}	32.6 ± 17%	50
	$PM_{2.5}$	19.0 ± 17%	25
Measuring Point 10	PM_{10}	30.8 ± 17%	50
Measuring Point 11	PM_{10}	42.3 ± 17%	50
	$PM_{2.5}$	23.6 ± 17%	25
Measuring Point 12	PM_{10}	24.5 ± 17%	50
Measuring Point 13	PM_{10}	20.7 ± 17%	50
Measuring Point 14	PM_{10}	21.7 ± 17%	50
Measuring Point 15	PM_{10}	20.7 ± 17%	50
	$PM_{2.5}$	15.8 ± 17%	25
Measuring Point 16	PM_{10}	21.2 ± 17%	50
Measuring Point 17	PM_{10}	20.1 ± 17%	50
	$PM_{2.5}$	16.9 ± 17%	25
Measuring Point 18	PM_{10}	20.7 ± 17%	50
Measuring Point 19	PM_{10}	24.2 ± 17%	50
	$PM_{2.5}$	17.9 ± 17%	25
Measuring Point 20	PM_{10}	29.6 ± 17%	50
Measuring Point 21	PM_{10}	29.8 ± 17%	50
	$PM_{2.5}$	21.8 ± 17%	25
Measuring Point 22	PM_{10}	30.6 ± 17%	50

[5] Limit value referring to the 1 - day averaging period
[6] Limit value referring to the calendar year averaging period

Measuring Point	Parameter	Result of Measurement (µg/m^3)	Limit Value
	$PM_{2.5}$	21.8 ± 17%	25
Measuring Point 24	PM_{10}	26.3 ± 17%	50
	$PM_{2.5}$	18.3 ± 17%	25
Measuring Point 25	PM_{10}	23.6 ± 17%	50
	$PM_{2.5}$	17.4 ± 17%	25
Measuring Point 26	PM_{10}	28.3 ± 17%	50
Measuring Point 27	PM_{10}	24.5 ± 17%	50
	$PM_{2.5}$	17.9 ± 17%	25
Measuring Point 28	PM_{10}	29.6 ± 17%	50
	$PM_{2.5}$	19.2 ± 17%	25
Measuring Point 29	PM_{10}	30.3 ± 17%	50
Measuring Point 30	$PM_{2.5}$	40.4 ± 17%	25
Measuring Point 32	PM_{10}	31.7 ± 17%	50
	$PM_{2.5}$	21.6 ± 17%	25
Measuring Point 33	PM_{10}	27.7 ± 17%	50
Measuring Point 34	$PM_{2.5}$	38.4 ± 17%	25
	PM_{10}	24.9 ± 17%	50
Measuring Point 35	$PM_{2.5}$	37.1 ± 17%	25
Measuring Point 36	PM_{10}	30.7 ± 17%	50
Measuring Point 37	PM_{10}	27.6 ± 17%	50
Measuring Point 38	PM_{10}	41.3 ± 17%	50
	$PM_{2.5}$	29.8 ± 17%	25
Measuring Point 39	PM_{10}	42.1 ± 17%	50
	$PM_{2.5}$	31.2 ± 17%	25
Measuring Point 40	PM_{10}	38.4 ± 17%	50
Measuring Point 41	PM_{10}	41.7 ± 17%	50
	$PM_{2.5}$	30.1 ± 17%	25
Measuring Point 42	PM_{10}	40.4 ± 17%	50

Comparing results of concentrations of suspended PM_{10} particles to the limit value (Degree on monitoring conditions and air quality requirements, "Off. Gazette of RS" No. 11/2010, 75/2010 and 63/2013, Attachment X, Part B) can be concluded that measured values of PM_{10} particles do not exceed the limit value.

For $PM_{2.5}$ particles, no limit value was defined for the one - day averaging period. The above limit value refers to the averaging period for the calendar year. Comparing results of concentrations of $PM_{2.5}$ particles with that limit values (Degree on monitoring conditions and air quality requirements, "Off. Gazette of RS" No. 11/2010, 75/2010 and 63/2013, Attachment X, Part B) can be concluded that measured values of $PM_{2.5}$ particles do not exceed the limit value.

5.4.4 Sensitive Receptors

Since the results of the measurements for PM_{10}, $PM_{2.5}$, SO_2 and NO_2 do not exceed the limit values, all measurement locations along the entire AoI, are determined as sensitive receptors and the impact assessment will be carried out accordingly.

5.5 Noise

In this section, at first, the methodology and data sources used to write the baseline conditions is specified, and then air quality baseline information about the area where the Project is located is given more specifically.

5.5.1 Study Area

The existing noise level of the AoI was determined by taking samples from surface waters on the Proposed Motorway Route. For this purpose, a total of 39 different measurement locations were determined through the Proposed Motorway Route.

Measurement locations for noise are provided in Table 5-30 and they are integrated into the Measurement Locations' Map which is prepared by 2U1K (see Appendix-5.2).

5.5.2 Methodology and Data Source

Following documents have been reviewed during the desktop study of the Project;

- EIA Reports for Section-1 (CIP, 2018) and Section-3 (Highway Institute, 2019); and
- WHO Noise Guideline.

In order to determine the current situation along the motorway line, 24 hours of background noise measurements was carried out by SEGAL at 39 points, which were determined as the sensitive receptors in close proximity to the noise sources of the Project such as the Proposed Motorway Route and construction facilities such as borrow pits.

Instrument (Type I noise measurement instruments i.e., SVANTEK SVAN957 model and SVAN 971 model) approved by the International Electronic Commission was used for noise measurements. The equipment was calibrated by the technician before each measurement (see Appendix-2 for all accreditation certificates about noise measurements).

Ambient noise sources such as traffic, human and animal sounds, natural events, etc. will be observed and recorded for the measurement. The noise measurement methodology is described below;

- Noise measurement locations was minimum 2 m away from reflective surfaces the buildings, walls, stone blocks, etc.

- The weather conditions observed by the measuring personnel were recorded for reporting and in case of rainfall or heavy storm/strong winds, measurements or the recorded results are cancelled.
- The measurement equipment automatically saves the measurements in its memory.

5.5.3 Baseline Conditions

Section-1: Noise is one of the most important sources of pollution in motorway construction projects. The local legislation and standards dealt with for noise pollution are;

- The Law on Environmental Noise (Official Gazette No.88/ last amended in 2010)
- The Nuisance and the Harmful Effects (Official Gazette No.75/ last amended on 2010)

According to EIA Report for Section-1, the residential buildings are observed to be affected from traffic noise caused by existing state road of II B (Corridor 11) line number 23, state roads of the II A line number 187, line number 207 and more local roads.

Railway traffic along line number 55 is another source of noise pollution that affects the neighboring residents. According to the EIA Report, the residential buildings are observed to have most of the impacts of traffic pollution.

Section-2: No information is available due to the absence / incomplete EIA Report .

Section-3: According to the EIA Report for Section-3, the existing infrastructure facilities are specified as the sources of current noise pollution in the study area of the EIA and no data obtained about the current noise pollution. As stated in the EIA Report, after the construction of Sector 8 and Sector 9 of the Morava Corridor Motorway, the dominant noise pollution source will be derived from the proposed motorway traffic.

In addition to the EIA studies, within the scope of ESIA studies, noise level measurements are conducted and the results of measurements are provided in Table 5-30.

Table 5-30. Noise Measurement Results for Section-1

Measurement Point	Date	Measurement Time Scale	Measurement Results (dBA)			WHO Limit Value		
						Residential Areas		Industrial
						Leq-den	LeqAnight 22:00-07:00	LeqAden and LeqAnight
			Leq-den	L90	LCmax	Leq-den	Leq-night	Leq-den/ Leq-night
Noise-1	22.08.2019	Leq-den	51,13	49,49	71,2	55		70
34T 535884 E 4843898 N	23.08.2019	Leq-night	44,08	42,39	59,1		45	
Noise-2	22.08.2019	Leq-den	50,15	48,66	71,96	55		70
34T 534958 E 4841175 N	23.08.2019	Leq-night	44,11	42,38	59,51		45	
Noise 3	23.08.2019	Leq-den	52,1	50,28	72,85	55		70
34T 534714 E 4840832 N	24.08.2019	Leq-night	44,77	43,18	59,93		45	
Noise 4	23.08.2019	Leq-den	52,03	50,05	72,35	55		70
34T 533384 E 4838495 N	24.08.2019	Leq-night	44,99	43,25	60,45		45	
Noise 5	23.08.2019	Leq-den	50,2	48,38	69,33	55		70
34T 533304 E 4837331 N	24.08.2019	Leq-night	43,48	41,87	57,85		45	
Noise 6	24.08.2019	Leq-den	50,97	49,27	71,59	55		70
34T 531096 E 4836278 N	25.08.2019	Leq-night	44,69	43,16	61		45	
Noise-7	24.08.2019	Leq-den	48,07	46,62	66,41	55		70
34T 529759 E 4834463 N	25.08.2019	Leq-night	41,93	40,52	55,91		45	
Noise-8	23.08.2019	Leq-den	49,11	47,47	67,67	55		70
34T 530937 E 4833959 N	24.08.2019	Leq-night	42,54	41,9	57,12		45	
Noise-9	24.08.2019	Leq-den	50,85	48,57	71,3	55		70
34T 530135 E 4829842 N	25.08.2019	Leq-night	42,5	40,87	56,53		45	
Noise-10	24.08.2019	Leq-den	49,78	47,95	59,11	55		70
34T 524064 E 4828666 N	25.09.2019	Leq-night	43,04	41,55	57,27		45	
Noise-11	24.08.2019	Leq-den	52,2	50,26	72,19	55		70
34T 521403 E 4827732 N	25.08.2019	Leq-night	44,76	43,36	60,18		45	
Noise-12	24.08.2019	Leq-den	51,85	50,32	72,74	55		70
34T 521734 E 4826922 N	25.08.2019	Leq-night	44,75	42,93	59,43		45	

As shown in Table 5-30, the measurement results do not exceed the limit values which is given according to WHO Noise Guideline. In the Guideline, as shown in the table above, limit values are given as 55 dBA (nighttime) and 45 dBA (daytime) for residential areas, and 70 dBA as noise limit value for industrial areas.

5.5.4 Sensitive Receptors

Sensitive receptors were determined as the closest settlements to the Proposed Motorway Route because locals who live in these settlements are the ones affected mostly from noise pollution, considering that the measurement results were close to the limit values. These settlements are Pojate, Stalac, Grad Stalac, Maskare, Mrzenica, Bosnjane, Makresane, Bivolje, Jasika and Citluk.

5.6 Soil Quality

In this section, at first, general information about the soil types of Serbia is given. Then, after specifying the methodology and data sources used to write the baseline conditions, soil quality baseline information about the area where the project is located is given more specifically. Due to the fact that there is no information on the soil quality in the EIA Reports, baseline surveys conducted in the scope of the ESIA studies were considered in order to present the baseline soil quality conditions along the AoI.

5.6.1 Study Area

The study area for soil quality is determined to cover 500 m on both sides of the Proposed Motorway Route.

The existing soil quality of the AoI have been determined by taking samples, using the necessary equipment and the technician, from soil on the Proposed Motorway Route. Soil sampling was carried out by SEGAL at 16 different points for Section-1, at 28 different points for Section-2 and at 12 different points for Sector-3 along the Proposed Motorway Route in order to determine the existing soil pollution of the AoI of the Project.

Measurement locations for soil quality are provided in Table 5-31, Table 5-32, Table 5-33 and they are integrated into the Measurement Locations' Map which is prepared by 2U1K (see Appendix-5.2).

Table 5-31. Measurement Locations for Section-1 Soil Quality

Soil Measurement Location	WGS84 UTM Zone34		Measurement Date
	X	Y	
Section-1			
Soil-1	533336	4840681	23.08.2019
Soil-1B	533213	4838837	23.08.2019
Soil-2	531784	4836496	23.08.2019
Soil-2B	532117	4836091	23.08.2019
Soil-3	531529	4835513	23.08.2019
Soil-4	531008	4834572	23.08.2019
Soil-4B	530173	4833869	24.08.2019
Soil-4C	531210	4832039	24.08.2019
Soil-5	529122	4828749	24.08.2019
Soil-5B	527685	4829008	24.08.2019
Soil-5C	528672	4828772	24.08.2019
Soil-5D	526623	4828278	24.08.2019
Soil-6	525284	4827999	24.08.2019
Soil-7	524770	4828522	23.08.2019
Soil-7A	525149	4828805	24.08.2019
Soil-8	521683	4827794	23.08.2019

Table 5-32. Measurement Locations for Section-2 Soil Quality

Soil Measurement Location	WGS84 UTM Zone34		Measurement Date
	X	Y	
Section-2			
Soil-9	519194	4826970	27.10.2019
Soil-10	510802	4828130	27.10.2019
Soil-10B	509225	4828206	27.10.2019
Soil-11	507739	4828714	26.10.2019
Soil-12	507860	4830372	26.10.2019
Soil-13	502018	4830464	26.10.2019
Soil-14	501457	4830515	25.10.2019
Soil-15	497131	4831037	25.10.2019
Soil-16	496724	4831212	25.10.2019
Soil-16B	496874	4831516	25.10.2019
Soil-17	496845	4831905	24.10.2019
Soil-18	495927	4831501	24.10.2019
Soil-19	496046	4832186	24.10.2019
Soil-19B	493185	4833590	24.10.2019
Soil-20	491143	4835346	23.10.2019
Soil-21	488075	4837003	23.10.2019
Soil-21B	486630	4837112	23.10.2019
Soil-22	486499	4838280	23.10.2019
Soil-23	481084	4840425	22.10.2019

Soil Measurement Location	WGS84 UTM Zone34		Measurement Date
	X	Y	
Soil-23B	480742	4840176	22.10.2019
Soil-24	479291	4841679	22.10.2019
Soil-24B	479354	4841464	22.10.2019
Soil-25	479097	4842175	22.10.2019
Soil-26	479290	4842539	22.10.2019
Soil-27	478833	4842398	22.10.2019
Soil-28	478093	4843007	22.10.2019
Soil-28B	476128	4843383	22.10.2019
Soil-29	475002	4844041	22.10.2019

Table 5-33. Measurement Locations for Section-3 Soil Quality

Soil Measurement Location	WGS84 UTM Zone34		Measurement Date
	X	Y	
Section-3			
Soil-30	471425	4846036	28.09.2019
Soil-31	470601	4846646	28.09.2019
Soil-32	466676	4848875	27.09.2019
Soil-33	463134	4851396	27.09.2019
Soil-33B	460685	4853458	27.09.2019
Soil-34	458476	4856107	27.09.2019
Soil-35	454937	4857983	27.09.2019
Soil-36	454704	4858268	27.09.2019
Soil-36B	454042	4858492	27.09.2019
Soil-36C	452415	4861408	27.09.2019
Soil-37	451711	4862456	27.09.2019
Soil-37B	451855	4862240	27.09.2019

5.6.2 Methodology and Data Source

Soil samples collected from the coordinates given in the tables above were sent to the accredited laboratories (see Appendix-2 for accreditation certificates of the laboratories) and antimony, arsenic, beryllium, mercury, zinc, iron, cadmium, chromium, lead, nickel, selenium, TPH parameters were analyzed.

To track and document each step in the testing process until the results are released, a Chain of Custody Form (CCF) was used.

In addition, the following documents have been reviewed during the desktop study of soil quality of the AoI of the Project;

- The Soils of Serbia (Pavle Pavlović, Kostić, Mitrović, & Karadžić, 2016)
- The Soils of Serbia and Their Degradation (Nešić, et al., 2011)

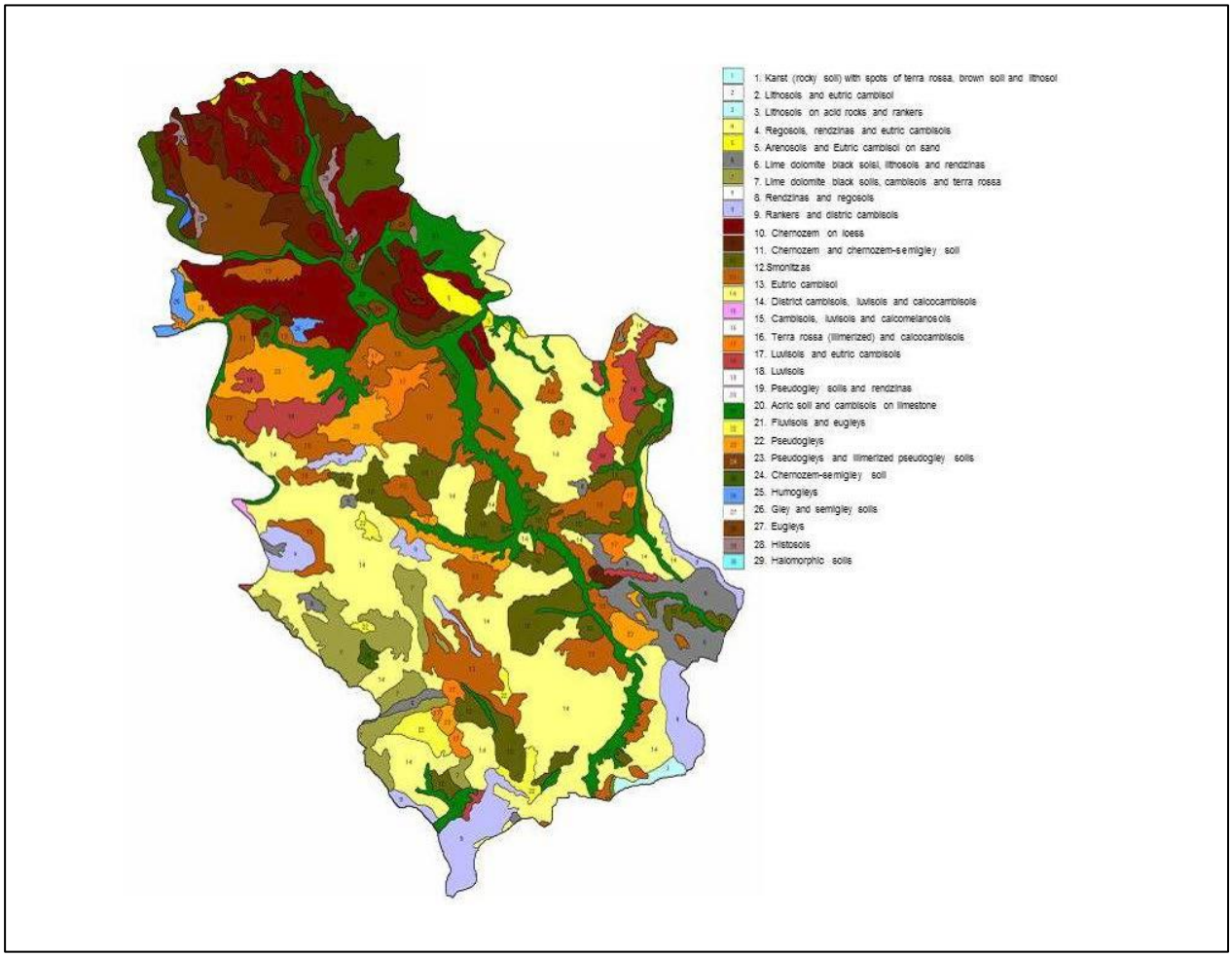
5.6.3 Baseline Conditions

In this part of the Report, general information on the baseline soil conditions of the country is provided and then, the Project specific soil quality survey results are presented and assessed.

The Soil Map of Serbia (see Figure 5-39) consists of a large number of soil types and subclasses, each with a unique set of morphological, chemical and water-physical properties, each with different production characteristics (Licina, et al., 2011).

According to the census of agriculture (in 2012), 73.1% of the land in agricultural areas is cultivated. 20.7% of these areas consist of pastures and meadows. 4.8% of this area is used for fruit cultivation, 0.6% for vineyard and 0.7% for the garden (Pavlovic, Costic, Karadzic, & Mistrovi, 2017).

Regarding the soil quality conditions along the Proposed Motorway Route, analyses results of the soil samples are given in Table 5-34.



Source: **(Serbian Environmental Protection Agency, 2015)**

Figure 5-39. Soil Map of Serbia

Table 5-34. Measurement Results of Soil Sampling for Section-1

Parameter-Unit	Soil-1	Soil-1B	Soil-2	Soil-2B	Soil-3	Soil-4	Soil-4B	Soil-4C	Soil-5	Soil-5B	Soil-5C	Soil-5D	Soil-6	Soil-7	Soil-7A	Soil-8	Serbian Limits for pollutants and hazardous materials in the soil
Antimony (mg/kg)	<1.25	<1.25	<1.25	<1.25	1.47	1.5	1.4	<1.25	<1.25	<1.25	<1.25	<1.25	1.27	<1.25	<1.25	<1.25	**3**
Arsenic (mg/kg)	17.5	17	13.4	16.3	19.2	20	15.3	6.75	11.25	10.2	18.3	19.4	17.98	18.4	11.6	13.5	**29**
Beryllium (mg/kg)	0.42	0.61	<0.25	0.42	0.37	0.33	0.52	0.4	0.5	0.65	0.34	0.4	0.5	0.33	0.34	0.67	**1.1**
Mercury (mg/kg)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.3**
Zinc (mg/kg)	84.4	90.8	78.06	100.7	91.2	122.6	93.1	99.5	64.25	151.4	102.3	78.97	89.4	87.6	92.4	51.3	**140**
Iron (mg/kg)	24848	26132	17121	23840	23452	23238	22882	11675	19575	21872	16545	21026	22603	20024	18681	21500	**N/A**
Cadmium (mg/kg)	<0.25	<0.25	<0.25	<0.25	<0.25	0.33	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.8**
Chromium (mg/kg)	**135.7**	91	**102.9**	**123.6**	**156.3**	**160.5**	**141.6**	76.75	97.75	**113.2**	98.7	**130.8**	**141.7**	**150**	**123.3**	97.4	**100**
Lead (mg/kg)	53.6	45.3	41.1	48.1	71.4	50.2	46.06	35.75	26.75	25.07	**116.7**	**88.4**	60.9	68.2	72.5	20.9	**85**
Nickel (mg/kg)	**166.9**	**58.7**	**130.1**	**127.3**	**197.05**	**202.4**	**173.2**	**101.5**	**93.5**	**88.6**	**186.6**	**182.1**	**200.9**	**215.3**	**201.7**	**87.4**	**35**
Selenium (mg/kg)	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**0.7**
Total Petroleum Hydrocarbons (mg/kg)	256.3	128.8	142.2	534.8	128.4	123.6	149.2	149.2	128.2	129.8	124.6	229.2	153.4	229.4	163.6	169.4	**N/A**

Table 5-35. Measurement Results of Soil Sampling for Section-2

Parameter-Unit	Soil-9	Soil-10	Soil-10B	Soil-11	Soil-12	Soil-13	Soil-14	Soil-15	Soil-16	Soil-16B	Soil-17	Soil-18	Soil-19	Soil-19B	Soil-20	Soil-21	Soil-21B	Soil-22	Soil-23	Soil-23B	Soil-24	Soil-24B	Soil-25	Soil-26	Soil-27	Soil-28	Soil-28B	Soil-29	Serbian Limits for pollutants and hazardous materials in the soil
Antimony (mg/kg)	1.77	1.49	<1.25	<1.25	<1.25	2.02	<1.25	2.41	1.5	1.51	2.08	1.75	1.7	2.04	1.32	1.36	1.63	1.55	1.59	1.59	1.88	1.85	1.38	1.35	1.33	<1.25	1.45	1.44	**3**
Arsenic (mg/kg)	26.4	12.9	12.6	13.5	11.75	**29.2**	**31.05**	**32.03**	**29.75**	24.8	27.7	**32.6**	28.9	28.7	22	24.3	27.04	24.6	26.8	23.8	27.3	28.4	16.8	16.8	15.3	14.5	19.5	20.9	**29**
Beryllium (mg/kg)	0.5	0.43	0.4	0.55	0.475	0.52	0.55	0.35	0.375	0.35	0.35	0.43	0.37	0.32	0.67	0.57	0.63	0.63	0.72	0.57	0.43	0.42	0.49	0.43	0.39	0.42	0.53	0.53	**1.1**
Mercury (mg/kg)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.3**
Zinc (mg/kg)	**150.5**	56.1	41	36.3	48.25	117.1	136.6	108.5	113.5	96.9	117.6	117	128.7	114	105.8	114.7	128.7	70.4	74.7	109.7	129.5	94.3	59.3	131.8	71.4	111.5	102.05	92.3	**140**
Iron (mg/kg)	19848	11860	12044	12081	12243	21365	20271	20469	19330	16401	19480	20110	18021	17663	15629	17555	19114	20033	20169	17560	20526	19189	17910	15168	14301	14599	17311	17101	**N/A**
Cadmium (mg/kg)	0.57	<0.25	<0.25	<0.25	<0.25	0.65	**0.87**	0.62	0.6	0.55	0.54	0.68	0.6	0.57	0.35	0.45	0.45	0.33	0.4	0.4	0.68	0.5	0.25	<0.25	<0.25	0.65	0.65	0.68	**0.8**
Chromium (mg/kg)	**144.8**	**103.6**	71.4	77.8	72.75	**170.7**	**146.5**	**198.4**	**192**	**142.8**	**210.5**	**186.6**	**203.8**	**214.7**	**140.04**	**122.6**	**131.7**	**112.5**	**130.5**	**134.06**	**185.4**	**177.6**	**106**	**117.3**	**113.7**	**123.7**	**139.3**	**136.5**	**100**
Lead (mg/kg)	**101**	31.08	30.6	33.3	28.75	**120.1**	**106.3**	**86.1**	82.5	84.8	76.8	**91.4**	83.08	77.3	53.2	51.8	50.6	43.4	49.1	48.2	**140.8**	**122.03**	29.6	30.3	26.8	41.6	43.02	41.4	**85**
Nickel (mg/kg)	**176.6**	**102.07**	**93.6**	**78.04**	**77**	**221.2**	**244.4**	**268.1**	**300**	**217.4**	**274.9**	**313.1**	**326.8**	**299.3**	**137.04**	30.7	**69.6**	**68.9**	**55.8**	<1.25	**355.7**	**234.5**	**158.1**	**160.6**	**152.8**	**230.4**	**191.6**	**201.3**	**35**
Selenium (mg/kg)	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**0.7**
Total Petroleum Hydrocarbons (mg/kg)	455.1	160.1	179	188.6	195.3	204.9	229.3	173.9	144.7	475.3	162.4	186.2	154.7	167.5	237.3	181.1	181.8	230.9	170.7	215.9	1003	175.3	187.8	223.6	264.4	216.06	336	372.6	**N/A**

Table 5-36. Measurement Results of Soil Sampling for Section-3

Parameter-Unit	Soil-30	Soil-31	Soil-32	Soil-33	Soil-33B	Soil-34	Soil-35	Soil-36	Soil-36B	Soil-36C	Soil-37	Soil-37B	Serbian Limits for pollutants and hazardous materials in the soil
Antimony (mg/kg)	1.402	1.5	1.43	1.62	1.27	1.29	15.27	<1.25	1.89	1.847	2.12	1.83	**3**
Arsenic (mg/kg)	17.28	19.55	14.59	20.15	18.96	13.4	22.53	22.33	23.95	26.98	17	14.8	**29**
Beryllium (mg/kg)	0.5	0.326	0.413	0.614	0.624	<0.25	0.576	0.558	0.726	0.705	0.689	0.626	**1.1**
Mercury (mg/kg)	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	**0.3**
Zinc (mg/kg)	112.92	67.42	130.8	131.9	126.2	81.7	90.89	88.35	83.94	120.8	102.3	**222**	**140**
Iron (mg/kg)	21003	17761	17648	25246	23672	13685	17248	18973	20447	16833	19820	16934	**N/A**
Cadmium (mg/kg)	0.351	0.401	0.365	0.368	0.274	0.495	0.525	0.388	0.435	0.681	<0.25	0.276	**0.8**
Chromium (mg/kg)	**138.7**	**129**	**123.3**	**154.5**	**139.7**	**123.3**	**131.4**	**139.3**	**208.5**	**179.6**	**269.6**	**234**	**100**
Lead (mg/kg)	31.3	25.81	27.7	35.87	34.4	21.3	53.8	45.87	47.89	79.73	38.2	38.13	**85**
Nickel (mg/kg)	**161.7**	**165.2**	**153**	**170.3**	**174.2**	**171.9**	**169.5**	**174.3**	**275.8**	**210.3**	**500**	**467**	**35**
Selenium (mg/kg)	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**<1.25**	**0.7**
Total Petroleum Hydrocarbons (mg/kg)	336.9	125.4	137.8	126.4	91	121.6	107	154.9	72.4	91	110.1	83.8	**N/A**

The analysis of the soil samples was conducted according to the the Law on Land Protection (Official Gazette of RS, No. 112/15) and Article 42, paragraph 1 of the Law on Government (Official Gazette of RS, No. 55/05, 71/05 - correction, 101/07, 65/08, 16/11, 68/12 - US, 72/12, 7/14 - US and 44/14),

The soil analysis results presented in the Table 5-34, Table 5-35 and Table 5-36 indicates that the thresholds levels for the parameters As, Zn, Cd, Se, Cr, Pb, and Ni are exceeded at several locations in the Project study area, which are indicated in red and bold in the pertinent tables. The section wise exceedance levels are provided in Table 5-37.

Table 5-37. The Section Vise Exceedance Levels

Parameter	Section 1	Section 2	Section 3
Arsenic	Not exceeded	5 locations /28 in total	Not exceeded
Zinc	Not exceeded	Not exceeded	1 location / 12 in total
Cadmium	Not exceeded	1 locations / 28 in total	Not exceeded
Chromium	11 locations /16 in total	25 locations / 28 in total	12 location / 12 in total
Lead	2 locations / 16 in total	7 locations / 28 in total	Not exceeded
Nickel	16 locations / 16 in total	26 locations / 28 in total	12 location / 12 in total
Selenium	16 locations / 16 in total	28 locations / 28 in total	12 location / 12 in total

Table 5-37 implies that there is a soil contamination potential in the alluvial plain of the West Morava River, which covers the AoI of the Project. The literature about this contamination first points the major flood event occurred in 2014 as the major cause about this contamination. On the other hand, the detailed studies in the region signify the characteristics of the soils are mostly similar to those in the West Morava River. These findings imply that their sources in the soils might be similar to those of the flood sediments in the study area. During long-term flood events materials from both, geogenic and anthropogenic sources are carried by flood waves and deposited in flooded areas. The contents and origin of Ni and Cr contents in the soils might be directly related to ultramafic peridotite and serpentinite on the fringes of the Dinaride Ophiolite Zone in western Serbia (Dill et al. 2008; Antic´-Mladenovic´ et al. 2017). As, Pb, Cd, and Zn in the soils and sediments from the studied sub-catchments might originate from point sources such as ore bodies, mixed with anthropogenic diffuse sources like agriculture, road and railroad traffic, and the metal, chemical and textile industries as previously reported by Mrvic´etal.(2009) (Antic´-Mladenovic´, et al., 2018). The analysis results present the existing conditions before the Project is realized. These results will be referred to in the future in case of any suspicion on soil pollution due to the Project activities.

Table 5-38. Measurement results of Sediment Qulity

Parameter-Unit	N-45202/19	N-45203/19	N-45204/19	N-45205/19	N-45205/19
	Sediment-1	Sediment-2	Sediment-3	Sediment-4	Sediment-5
	Oct.19	Oct.19	Oct.19	Oct.19	Oct.19
Antimony (mg/kg)	<1,25	2,98	**3,25**	**3,22**	<1,25
Arsenic (mg/kg)	6,51	24,6	22	17,6	15
Beryllium (mg/kg)	<0,25	0,27	<0,25	<0,25	<0,25
Mercury (mg/kg)	<0,25	<0,25	<0,25	<0,25	<0,25
Zinc (mg/kg)	59,09	**208,1**	**172,5**	**132,4**	19,5
Iron (mg/kg)	10180	16327	19168	21314	14590
Cadmium (mg/kg)	0,45	**1,14**	0,575	0,54	<0,25
Chromium (mg/kg)	54,3	**280,3**	**317,5**	**361,4**	**127,3**
Lead (mg/kg)	19,3	63,7	57,75	37,6	20
Nickel (mg/kg)	17,8	**347,2**	**385**	**631,2**	**187,6**
Selenium (mg/kg)	**<1,25**	**<1,25**	**<1,25**	**<1,25**	**<1,25**
Total Petroleum Hydrocarbons (mg/kg)	148,4	211,1	168	314,9	165,6

As it is seen in the sediment measurement results, 5 parameters (indicated in red and bold in Table 5-38) which are high in soil quality are also high in sediment quality.

As mentioned above, the reasons for the high output of these parameters are the same.

5.6.4 Sensitive Receptors

The sensitive receptors were determined as all soil temporary storage and disposal sites; these areas are not defined yet, (before construction, sitespecific baseline studies are required for all defined temporary storage areas and permanent disposal sites) nearby settlements that are under the dust impact, the West Morava River and its tributaries in relation to storage and disposal areas and the campsites.

5.7 Water Quality

In this section, at first, general information about the water quality of Serbia is given. Then, after specifying the methodology and data sources used to write the baseline conditions including the site surveys, sampling and analyses specific to the Project, baseline information on the water quality about the AoI of the Project is given more specifically.

5.7.1 Study Area

The existing surface water quality was determined at the study areas which were determined within the AoI by taking samples, from surface waters along the Proposed Motorway Route. Water quality sampling was carried out for Sector-1 at 10 different points, for Sector-2 at 9 different points and for Sector-3 at 8 different points along the Proposed Motorway Route by SEGAL in order to determine the existing soil pollution of the AoI of the Project.

Measurement locations for surface water quality are provided in Table 5-39, Table 5-40 and Table 5-41 and they are integrated into the Measurement Locations' Map which is prepared by 2U1K (see Appendix-5.2).

Table 5-39. Measurement Locations for Section-1 Surface Water Quality

Water Measurement Location	WGS84 UTM Zone34		
	X	Y	Date
Section-1			
Water-1	535026	4842990	22.08.2019
Water-2	533230	4839791	23.08.2019
Water-3	532912	4836538	23.08.2019
Water-4	530762	4833576	24.08.2019
Water-5	530458	4831904	24.08.2019
Water-6	530176	4830435	24.08.2019
Water-7	528823	4829168	24.08.2019
Water-8	524254	4828335	24.08.2019
Water-9	521337	4826651	24.08.2019
Water-10	521326	4826735	24.08.2019

Table 5-40. Measurement Locations for Section-2 Surface Water Quality

Water Measurement Location	WGS84 UTM Zone34		
	X	Y	Date
Section-2			
Water-11	519172	4826224	24.10.2019
Water-12	518096	4827101	24.10.2019
Water-13	502020	4830479	23.10.2019
Water-14	498116	4830858	23.10.2019
Water-15	496798	4831875	23.10.2019
Water-16	479789	4841539	22.10.2019
Water-17	478856	4842395	22.10.2019
Water-18	477682	4842722	22.10.2019
Water-19	475017	4844046	22.10.2019

Table 5-41. Measurement Locations for Section-3 Surface Water Quality

Water Measurement Location	WGS84 UTM Zone34		Date
	X	Y	
Section-3			
Water-20	472495	4845655	28.09.2019
Water-21	471775	4846736	28.09.2019
Water-22	469352	4847359	28.09.2019
Water-23	466476	4848595	27.09.2019
Water-23B	462629	4851468	27.09.2019
Water-24	458419	4856215	27.09.2019
Water-24B	454525	4857609	27.09.2019
Water-25	452095	4862215	27.09.2019

5.7.2 Methodology and Data Source

Sample points were sent to accredited laboratories to measure antimony, arsenic, beryllium, mercury, zinc, iron, cadmium, COD, chromium, lead, nickel, selenium (see Appendix-2 for accreditation certificates of the laboratories). Samples that will not be analysed on the same day will be stabilized and protected in accordance with standard analytical methods. For short-term storage (up to 24 hours), cooling at 4ºC will be applied.

To track and document each step in the testing process until the results are released, a Chain of Custody Form (CCF) is used.

Wastewater and water samples are taken according to TS ISO 5667-10, TS ISO 5667-18, TS ISO 5667-6 and TS ISO 5667-11 standards and sedimen is taken according to TS EN ISO 5667-13, TS 9547 ISO 5667-12 and TS 12090 standards.

Following documents have been reviewed during the desktop study of soil quality of the AoI of the Project;

- Regulation on Water Classification (Off. Gazette of the SRS No. 5/68); and
- EIA Reports for Section-1 (CIP, 2018) and Section-3 (Highway Institute, 2019).

5.7.3 Baseline Conditions

There are two main categorization of the surface water bodies in Serbia. The first categorization is defined as Water Quality Classes and the second categorization is the type of surface water bodies. The parameters which define the class and the type of the water body is presented in Appendix-4.

According to the Decree on Water Classification (Official Gazette of RS, 05/68), all surface waters are classified between I, II, IIa, IIb, III and IV river class. This Decree provides division of waters into 4 main classes (I-IV, with IIa and IIb subclasses), according to the degree of pollution and purpose. Class I rivers are the best quality (could be used for drinking in natural condition or after disinfection) surface waters while class IV surface waters are the worst (could be used after special treatment).

Decree on Water Classification (Official Gazette of RS, 05/68) adopted specific water quality characteristics to define four classes of surface water quality, and these are provided in the table below.

Table 5-42. Classes of Surface Water Quality

Class	Description
I	Water bodies that are in their natural state or after disinfection can be used or exploited for supplying settlements with potable water, food industry and for breading of some certain species of fish (salmonids).
II	Water bodies that are suitable for swimming, recreation, water sports and for breeding some certain species of fish (cyprinids) and waters which are subject to normal methods of processing, and which, after processing, can be used to supply settlements with potable water and the food industry.
III	Water bodies that can be used for irrigation and industry, except the food industry.
IV	Water bodies that can be used or exploited for other purposes only after special treatment.

Source: (CIP, 2018)

According to the Decree on Water Classification, water quality classes of the West Morava River, the Rasina River, the South Morava River, and the Great Morava River are given in Table 5-43.

Table 5-43. Classification of surface water bodies according to the Decree on the Categorization of Watercourses

RIVER NAME	BOUNDRY	QUALITY CLASS (Official Gazette of the SFRY, No. 5/68)
West Morava River	From the mouth of the Ibra River to the mouth of the Rasina River	II a
	From the mouth of the Rasina River to Stalać	II b
Rasina River	To the confluence of the West Morava River	II a
South Morava River	From the village of Praskovraca to Stalać	II a
Great Morava River	From Stalać to the confluence of the Danube River	II a

Source: (CIP, 2018)

In addition to these classification stated above, water bodies are divided into 6 types. According to the Regulation on Parameters of Ecological and Chemical Status of Surface Waters and Parameters of Chemical and Quantitative Status of Groundwater (Official Gazette of RS, No. 74/11), thresholds for ecological status and class limits for ecological potential of surface water are prescribed for 6 types of waters, which are even more described through the Regulation on Determination of Surface and Groundwater Water Bodies (Official Gazette of RS, No. 96/10). Types are valid only for Class I and Class II of surface watercourses due to the fact that excellent and good ecological status can only exist in these classes of watercourses.

The definitions of type classification are given in the table below (The Republic of Serbia, 2015).

Table 5-44. Types of Surface Water Quality

Type	Description
1	Large lowland rivers dominated by fine sediments (the Danube River, the Sava River, the Great Mor River, the Tisza River, the Tamiš River, the Begej River and the Stari Begej River):
2	Large rivers dominated by medium sediments, excluding rivers in the Pannonian Plain
3	Small and medium watercourses up to 500 m.s.l. (mean sea level) dominated by coarse sediments
4	Small and medium watercourses above 500 m.s.l. dominated by coarse sediments
5	Watercourses in the Pannonian Plain (excluding type 1 watercourses)
6	Small watercourses outside of the Pannonian Plain not included in other types and watercourses included in the rulebook that regulates this area

Section-1, according to the Rulebook on Parameters of Ecological and Chemical Status of Surface Waters, and Quantitative and Chemical Status of Ground Waters ("Official Gazette RS" No. 74/11), types of water bodies is given in Table 5-45.

Table 5-45. Type Classification of Main Water Bodies in AoI of the Project

RIVER NAME	QUALITY CLASS (Official Gazette of RS, No. 74/11)
West Morava River	Type 2
South Morava River	Type 2
Rasina River	Type 3

Source: (CIP, 2018)

The Environmental Protection Service within the Municipality of Kruševac performs continuous control and monitoring of the state of the environment. The Public Health Institute Kruševac did the monitoring of surface waters, rivers and streams which are located in Kruševac in 2018.

According to the EIA Report for Section-1, by examining the effects of the water quality of the Rasina River (pre-flowing to the West Morava), some parameters had been discovered to deviate from the prescribed restriction values. The values of total nitrogen, ammonium ion, biochemical oxygen demand have been inside the class III, and other different analysed parameters of chemical analysis are inside *the Class II of waters*. In the microbiological aspect, the presence of a massive variety of whole coliform bacteria, enterococci faecalis and faecalis coliform bacteria in the III-IV classification have been recorded in the samples.

By evaluating the consequences of the water quality of Pepeljuga River (pre-flowing to the West Morava), the values of phosphate and all phosphorus values are inside the class IV. The values of ammonium ion, nitrate, nitrite, dissolved oxygen, biochemical oxygen consumption and complete nitrogen are within the class III, the suspended solids depend is out of type II, and other different examined parameters of chemical analysis are inside the *class II of water*. In microbiological terms, the presence of total coliform bacteria, enterococci faecalis starting place and faecalis coliform bacteria in the III – IV classification are recorded. (CIP, 2018)

In the analysis of water sample taken from Vučačka, it was realized that nitrite values are included in Class V and ammonium ion values, phosphate, biological oxygen consumption, total nitrogen and total phosphorus are included in Class IV. Likewise, nitrate values, chemical consumption of oxygen and dissolved oxygen are within the class III, while the remaining parameters of chemical analysis within Class II. (CIP, 2018)

Section-3, the water quality of the river is tested on Gugaljski Most, Kratovska Stena, Kraljevo, Jasika and Maskare sites. In order to assume the water quality of the West Morava River, Kratovska Stena and Kraljevo profile were considered as reference level with respect to the corridor Section Adrani – Mrcajevci of Motorway E–761. So, the water quality profile is classified as Class III.

According to the EIA report for Section-3, class of the water quality of the West Morava River for the Section mentioned in the previous paragraph is figured out as class III. More detailed information about water quality assessment for this subsection is the followings:

- Changes in organoleptic features were noted during the sampling of water so that the color of water occasionally was corresponded to class III.
- The percentage values of water saturation with oxygen on Jasika and Maskare profiles were sometimes classified as class III, whereas the suspended solids were sometimes classified as class III/IV.
- When the value of ammonia nitrogen (NH_3-N) and nitrite nitrogen (NO_2-N) were analysed on all profiles apart from Maskare, the result is obtained as Class III/IV of water quality.
- Hazardous and harmful substances, iron (Fe) (III/IV class) and zinc (Zn) (III/IV class) concentrations from Kraljevo profile were recorded, and iron (Fe) concentrations (III/IV Class) from Jasika profile were recorded.

In addition to above information, baseline surface water quality is also examined by evaluating the measurement results of the surface water quality tests with taken water samples which are given in Table 5-46, Table 5-47 and Table 5-48. Parameters analysed was mainly chosen as the indicator of any contamination that may arise due to spill of fuel from heavy machineries working near the water courses during construction phase of the Project.

Table 5-46. Measurement Results of Water Sampling for Section-1

Parameter Unit	Water-1	Water-2	Water-3	Water-4	Water-5	Water-6	Water-7	Water-8	Water-9	Water-10
Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (mg/L)	<0.005 (I)*	0.0083 (II)	0.0067 (II)	0.01 (II)	0.011 (I)	0.0098 (II)	<0.005 (I)	0.0099 (II)	0.011 (I)	0.01 (II)
Beryllium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury (mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (mg/L)	0.058 (I)*	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	0.049
Cadmium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chemical Oxygen Demand (mg/L)	36	70	63	<10	<10	41	<10	<10	<10	<10
Chromium (mg/L)	0.0031 (I)*	0.003 (I)	0.0056 (I)	0.0048 (I)	0.0052 (I)	0.0055 (I)	0.0033 (I)	0.0036 (I)	0.0063 (I)	0.0051 (I)
Lead (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Selenium (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Table 5-47. Measurement Results of Water Sampling for Section-2

Parameter Unit	Water-11	Water-12	Water-13	Water-14	Water-15	Water-16	Water-17	Water-18	Water-19
Antimony	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005
Arsenic (mg/L)	0,01 (II)*	0,0095 (II)	0,0092 (II)	0,009 (II)	0,0097 (II)	0,011 (III)	<0,005 (I)	<0,005 (I)	<0,005 (I)
Beryllium (mg/L)	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
Mercury (mg/L)	<0,0005	<0,0005	<0,0005	<0,0005	<0,0005	<0,0005	<0,0005	<0,0005	<0,0005
Zinc (mg/L)	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
Iron (mg/L)	<0,01 (I)*	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)
Cadmium (mg/L)	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001	<0,001
Chemical Oxygen Demand (mg/L)	<10	<10	<10	<10	<10	<10	<10	13	<10

Parameter Unit	Water-11	Water-12	Water-13	Water-14	Water-15	Water-16	Water-17	Water-18	Water-19
Chromium (mg/L)	<0,002 (I)*	<0,002 (I)	<0,002 (I)	<0,002 (I)	<0,002 (I)	<0,002 (I)	<0,002 (I)	<0,002 (I)	<0,002 (I)
Lead (mg/L)	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005
Nickel (mg/L)	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005
Selenium (mg/L)	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005	<0,005

Table 5-48. Measurement Results of Water Sampling for Section-3

Parameter Unit	Water-20	Water-21	Water-22	Water-23	Water-23B	Water-24	Water-24B	Water-25
Antimony	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic (mg/L)	<0.005 (I)*	0.0083 (II)	0.0067 (II)	0.01 (II)	0.011 (III)	0.0098 (II)	<0.005 (I)	0.0099 (II)
Beryllium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury (mg/L)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron (mg/L)	0.058 (I)*	<0.01 (I)	0.02 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)	<0,01 (I)
Cadmium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chemical Oxygen Demand (mg/L)	36	70	63	<10	<10	41	<10	<10
Chromium (mg/L)	0.0031 (I)*	0.003 (I)	0.0056 (I)	0.0048 (I)	0.0052 (I)	0.0055 (I)	0.0033 (I)	0.0036 (I)
Lead (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Selenium (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

**Class of the parameters*

The limit values of the above parameters, given in table below, according to national legislations are provided in Table 5-49.

Table 5-49. Limit Values of Some Parameters for Surface Water Quality Analysis

Surface water				
Parameter-Unit	**Maximum accepted concentrations[1]**	**Maximum accepted concentrations[2]**	**Limit values for river class 2 [3]**	**Maximum quantities of dangerous materials in water, for river class 2[4]**
Antimony (mg/kg)	-	-	-	0.05
Arsenic (mg/kg)	0.05	-	0.01	0.05
Beryllium (mg/kg)	-	-	-	0.0002
Mercury (mg/kg)	0.001	0.07	-	0.001
Zinc (mg/kg)	1		0.3 (water hardness, T =10) 0.7 (T=50) 1 (T=100) 2 (T=500) mikro	0.2
Iron (mg/kg)	-	-	0.5	0.3
Cadmium (mg/kg)	0.01	0.08 (river class 2)	-	0.005
Chromium (mg/kg)	-	-	15 (bichromate method) 10 (permanganate method)	-
Lead (mg/kg)	0.5	-	0.05	0.1
Nickel (mg/kg)	0.1	14	-	0.05
Selenium (mg/kg)	0.1	34	-	0.05
Total Petroleum Hydrocarbons (mg/kg)	-	-	-	0.01
COD	-	-	-	-

[1] Maximum accepted concentration of pollutant in soil and water which could damage or change production of agricultural land and water quality for irrigation - Regulation on permitted quantities of hazardous and damage materials in soil and water for irrigation and methods for their testing (Official Gazette of RS, No. 23/94).

[2] Regulation on limit values for priority and priority hazardous substances that pollute surface water and deadlines for reaching them (Official Gazette of RS, No. 24/2014)

[3] Regulation on limit values for pollutants in surface, groundwater and sediments and deadlines for reaching them (Official Gazette of RS, No. 50/12)

[4] Regulation on hazardous substances in waters (Official Gazette of SRS, No. 31/82)

Note: West Morava is declared as IIa or IIb river class between Čačak and Stalac (depending of which part) in accordance to the Regulation on water categorization (Official Gazette of SRS, No. 05/68)

The analysis results have been compared with the Serbia national water quality standards for rivers, streams and lakes. International standards give only drinking water limit values and surface waters in the AoI are not used for drinking purpose. Therefore, these standards were not used to determine surface water quality. According to the analysis results, measured parameters comply with the Serbia national water quality standards for rivers, streams and lakes.

5.7.4 Sensitive Receptors

The measurement results did not exceed the limit values at any point. However, since the impacts on the West Morava River during the construction and operation period of the Project, cannot be ignored, the West Morava River has been identified as a sensitive receptor.

5.8 Terres Terial and freshwater ecology

5.8.1 Study Area

A study area is defined within the AoI, by considering the Proposed Motorway Project, including all project facilities, and West Morava River for biodiversity studies. In the scope of the biodiversity field studies, sampling points, which represent different habitat types and natural and/or sensitive were chosen. Sampling locations were determined as a result of a detailed desktop analysis together with available satellite imagery (i.e. GoogleTM Earth) of the AoI. As the desktop study, initial baseline assessment provided from local EIAs togetger with literature survey and findings of the reconnaissance survey performed during scopping phase of the Project were examined and the habitat map covering the proposed AoI was prepared before the start of ecological survey. The habitat map prepared as the outcome of the desktop study was mainly used the determination field study locations.

In the determination of the field study locations, general habitat distribution of the AoI was considered at prime level. The habitat distribution in the AoI shows that majority of the habitats composed of modified areas (68%), which are agricultural fields, borrow areas in the alluvial plan and settlements. Field study locations were designed to include all habitats represented in the AoI by considering the major impact sources of the Project. Additional control locations were also provided during the first field survey. With this intention, in total, 44 different points (18 aquatic and 26 terrestrial) decided on desktop and 8 additional points were decided on the field studies. The areas, where the study is conducted, are the Proposed Motorway Route, project facilities and the West Morava River sections subject to river regulation.

As it is stated above, for selection of field survey locations, major impact sources of the proposed project were also considered. In particular, major river regulation area along Section 3, where the potential major impact is expected due to river regulation works, was studied in a total of 9 fresh water ecology survey locations. Terrestrial studies were also focussed on major impact sources such as the proposed new river course location. Details of the selected field survey locations are provided in “Biodiversity Baseline Report Annex-1”.

Selected sampling points located within each Section (1-2-3) in the study area are shown in Table 5-50 and Table 5-51 and maps of the study area and sampling points are given in Figure 5-40, Figure 5-41, Figure 5-42 and Figure 5-43.

Table 5-50. Sampling Locations within each Section

Sector	Terrestrial Sampling points (T)	Aquatic Sampling points (A)	Additional Sampling points (X)
Section -1	4 (T1-T4)	6 (A1-A6)	2 (X1-X2)
Section -2	16 (T5-T20)	8 (A7-A14)	2 (X3-X4)
Section -3	6 (T21-T26)	4 (A15-A18)	4 (X5-X8)

Table 5-51. Coordinates of Sampling Locations

Sector	ID	X	Y
Aquatic Sampling Locations			
Section -1	A1	534982	4842945
	A2	533059	4839726
	A3	532941	4836542
	A4	531932	4835558
	A5	528813	4829148
	A6	521326	4826663
Section -2	A7	518177	4827010
	A8	505753	4830408
	A9	502106	4830860
	A10	498118	4830894
	A11	491700	4835188
	A12	487068	4838491
	A13	479746	4841506
	A14	477412	4842688
Section -3	A15	472097	4846280
	A16	466463	4849156
	A17	458463	4856284
	A18	454777	4857892
Terrestrial Sampling Locations			
Section -1	T1	533582	4840958
	T2	531673	4836592
	T3	531540	4835470
	T4	524836	4828519
Section -2	T5	519121	4827084
	T6	516481	4827259
	T7	512043	4828613
	T8	510800	4828102
	T9	508105	4828228
	T10	501433	4830514
	T11	496920	4831126
	T12	495986	4832268
	T13	490887	4835940
	T14	488378	4836958
	T15	486969	4838652
	T16	481112	4840474

Sector	ID	X	Y
	T17	479305	4841787
	T18	479315	4842385
	T19	477863	4842799
	T20	474677	4843904
Section -3	T21	471340	4846107
	T22	466889	4848807
	T23	463124	4851348
	T24	458725	4856234
	T25	454706	4857820
	T26	451613	4862542
Additional Sampling Locations			
Section -1	X1	525200	4827999
	X2	521860	4827835
Section -2	X3	507813	4830520
	X4	490793	4830520
Section -3	X5	467117	4848310
	X6	465682	4848896
	X7	463614	4850455
	X8	460419	4853089

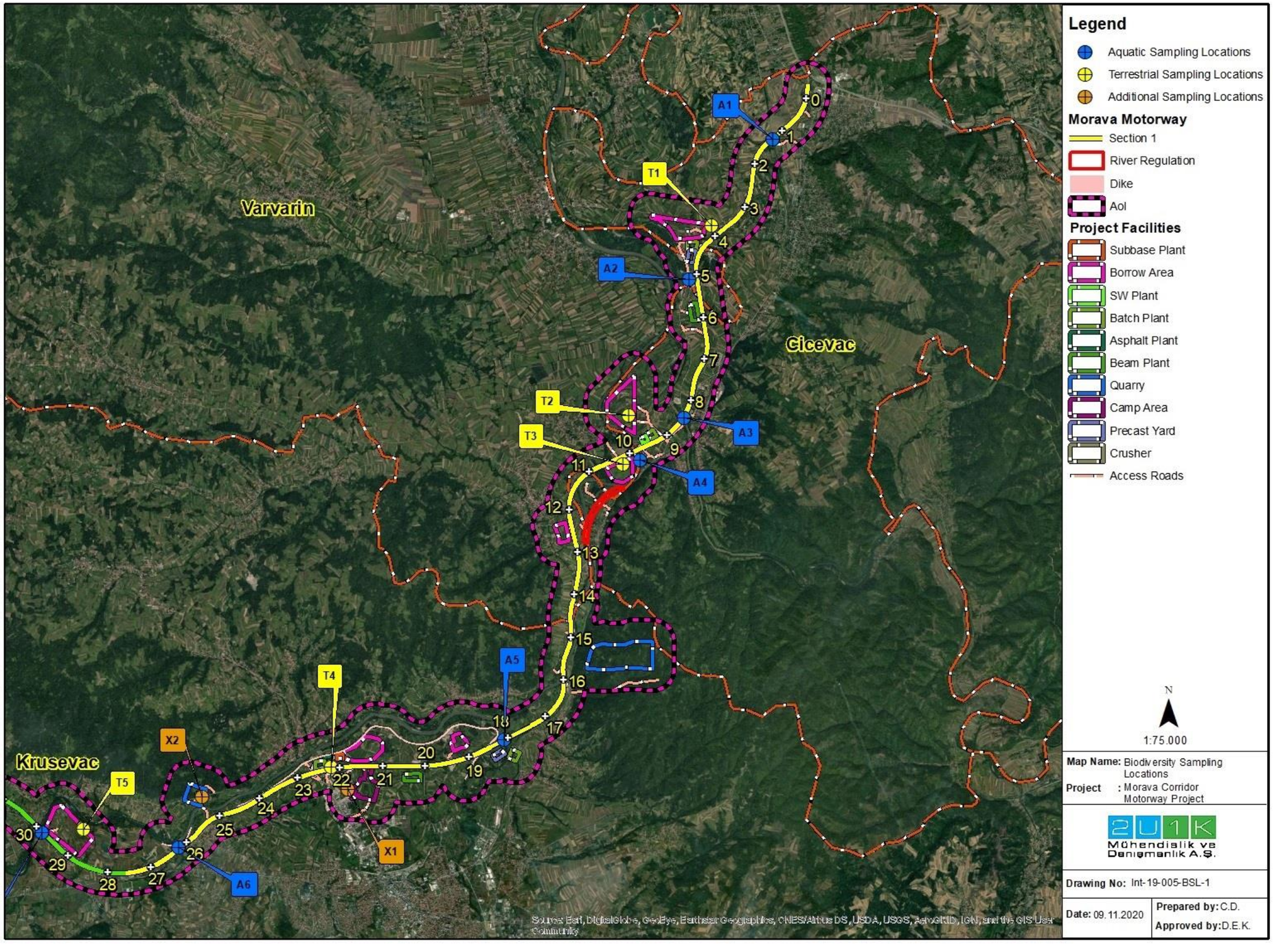


Figure 5-40. Biodiversity Sampling Points (Section-1)

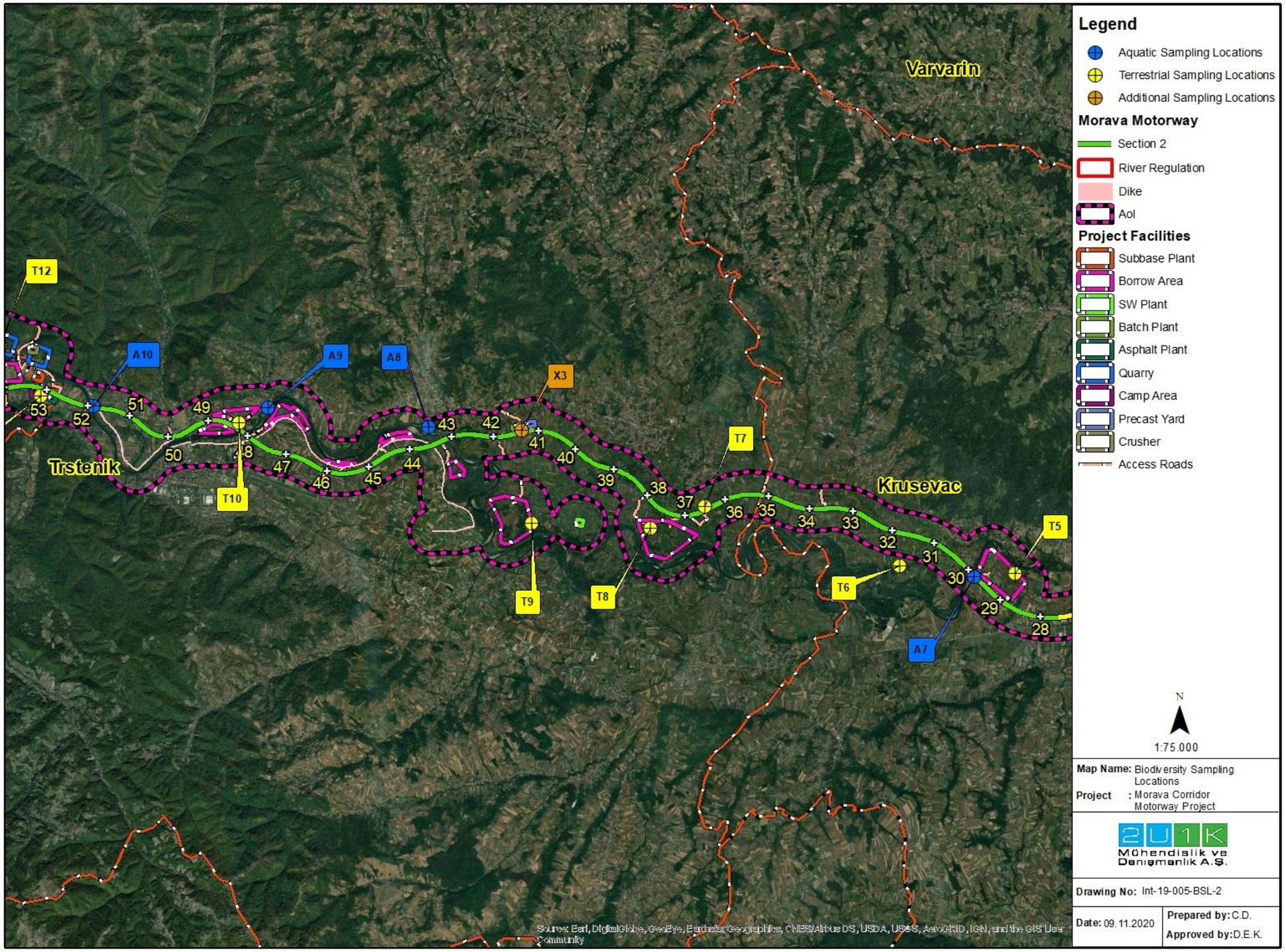


Figure 5-41. Biodiversity Sampling Points (Section-2)

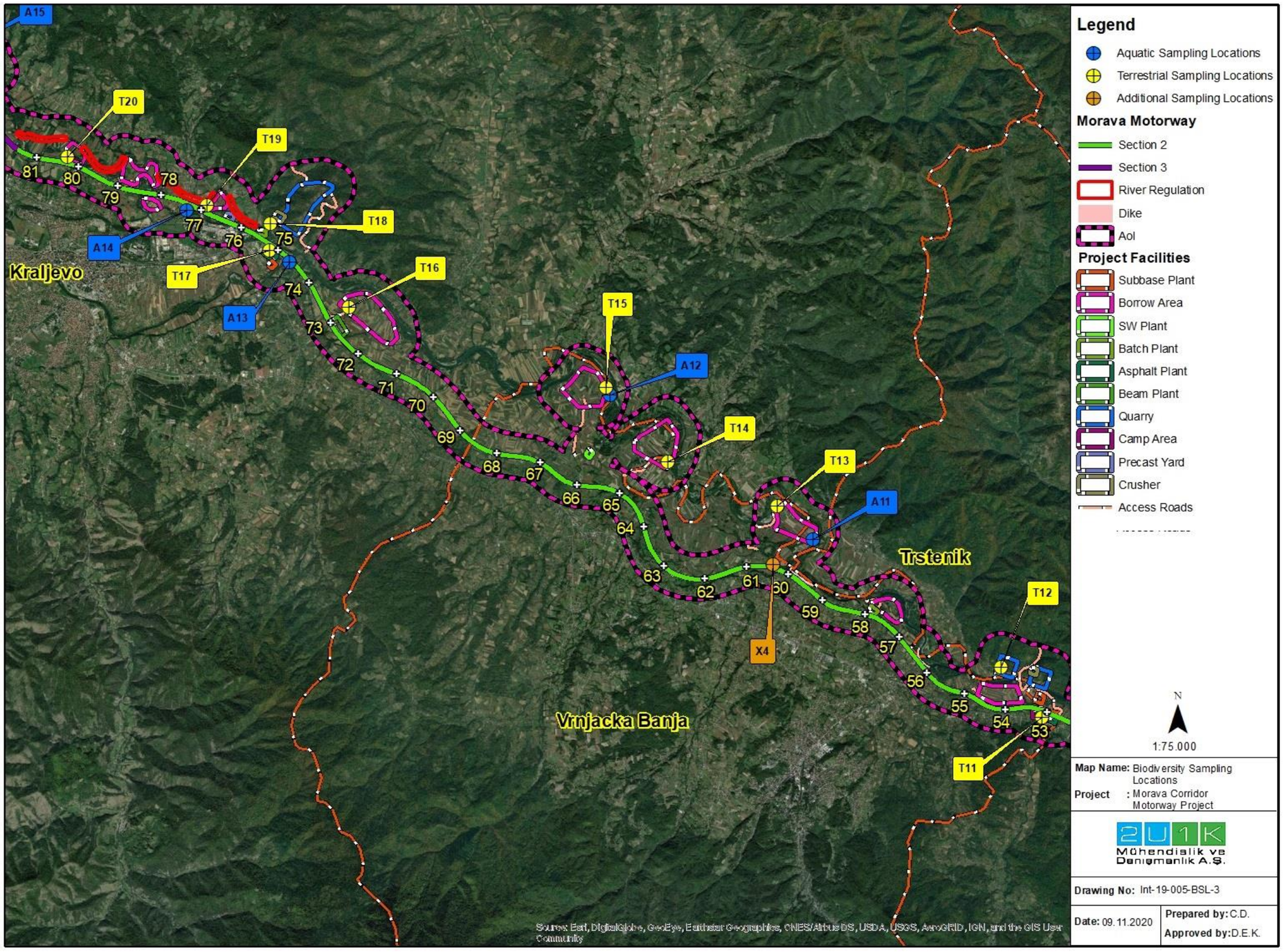


Figure 5-42. Biodiversity Sampling Points (Section-2)

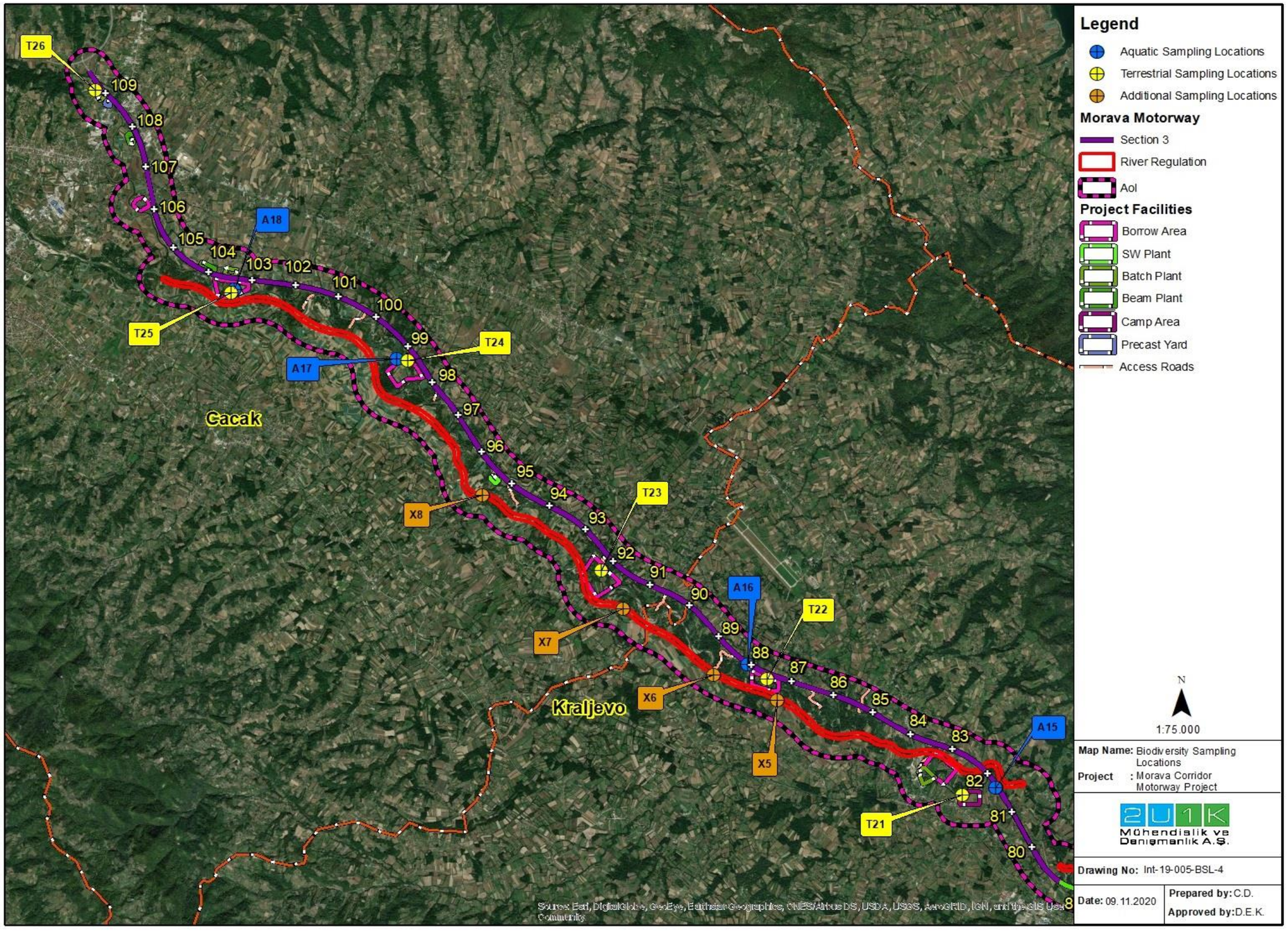


Figure 5-43. Biodiversity Sampling Points (Section-3)

5.8.2 Methodology and Data Source

Methodology was determined and fieldwork was performed with local experts by the field team consisting of Specialist Haşim Altınözlü (Botanist), Prof. Dr. İrfan Kandemir (Entomologist), Ass. Prof. Dr. S. Cevher Özeren (Hydrobiologist), Celal Denizli (Herpatologist), Ass. Prof. Dr. Şafak Bulut (Ornithologist) and Prof. Dr. Ş. Önder Özkurt (Mammologist) and local experts David Bakic (Fauna expert), Milos Zbillijic (Botanist) and Dmitrije Sekulic (Botanist), in addition to writing the report.

The information gathered included data on the followings:

- Biological components on terrestrial environment,
  - Terrestrial habitats and ecosystems
  - Terrestrial flora and ecosystems,
    - Flora species
  - Terrestrial fauna components
    - Invertebrates,
    - Amphibians and reptiles,
    - Aves,
    - Mammals.
  - Aquatic ecosystems
- Key biodiversity areas,
- Important Bird Areas,
- Important Wetlands (Ramsar Sites),
- Potential sensitive areas.

Desktop research and field study of the Motorway Route, River Regulation areas and the project facilities' locations were conducted by experts in both terrestrial and aquatic environment. In this scope, biodiversity on spring and summer seasons terrestrial and aquatic environment studies were carried out for three seasons. The dates of the field surveys are provided below:

- 30 April - 5 May 2019, 28 – spring season;
- June - 1 July 2019 - summer season;
- 28 August – 01 September 2019 – fall season.

The methodology to determine the baseline conditions included the followings:

- Review of pertinent literature and previous works.
- Field studies carried out in the Project area.
- Satellite image interpretation, as available.
- Communication with the inhabitants in the study area during the field studies.

- Consultation with nature conservation administration and related agencies and institutions concerned.

All the data regarding the Project area and project facilities such as asphalt plants, batch plants, quarries, borrow areas and camp sites were supplied by the Contractor. All international and national regarding biodiversity of Serbia were reviewed. Supports of the local Serbian experts were provided for review of the national literature as well as assistance for the translation for the interviews performed with local people during field surveys.

In addition, a detailed review of data was completed with the aim of obtaining readily available information on ecological sampling points in the study areas to represent the surrounding area (including designated sites, habitats and species). This was then used to inform the scope and planning of the detailed methodologies for the field surveys. The data review also provided contextual information about the status of ecological circumstances (e.g., local, regional and global distribution, population size and level of extinction risk) and ecological information about the biodiversity (e.g., habitat requirements and behavior of species) to assist with the evaluation and assessment of potential impacts. The data review included an extensive review of published scientific literature, websites and other sources. General aspects of the baseline studies are provided below:

I. Within the scope of the field studies, a review of the existing information was undertaken and ecological composition of the Project area in terms of terrestrial and aquatic flora and fauna elements; potential sensitive areas and sensitive species were identified. River flow conditions were also considered at the field surveys.

II. The study area for both terrestrial and aquatic environment has aligned with the Section (1-2-3) of Project. In this context for terrestrial environment studies, the survey encompassed as much of the habitat along the Proposed Motorway Route, river regulation and project facilities as access and topography allowed. At each sampling point and their vicinity, the features of the landscape and environment include the dominant habitats and species of note.

III. In total, 44 sampling locations were studied for Spring, Summer and Autumn season. The coordinates of the sampling locations were recorded with GPS to provide a ground-truth for the habitat classifications as well as a reference for future field surveys.

IV. For terrestrial habitat studies, field survey locations chosen by experts according to representativeness of each habitat type within the study area. These locations are named as sampling points. Sampling points were chosen to ensure that each of the habitat types displayed in the European Nature Information System (EUNIS) habitat classification were visited so that all of the different habitats were ground truthed in the study area. Some of the sampling points were revised during the field surveys observations to determine more representative sampling points.

V. For aquatic habitat studies, the West Morava River and tributaries in the AoI, which have well-conditioned flow, were named as sampling points and studied during the aquatic field surveys. Within the context of aquatic studies, river regulations, rivers crossings on the Proposed Motorway Route and some streams, which were chosen according to importance by Hydrobiology expert, were investigated.

VI. Distribution, population, ecology and reproductive biology of the threatened and endemic plant species that are likely to occur within study area of interest were studied. The literature surveys were intended to give information on identification of endemic, endangered, and rare species and species defined under the national and international conservation status. Accordingly, species that are under the risk of being affected due to the Project and therefore, require special attention and protection measures were determined.

VII. A species inventory for the baseline conditions are established as well as description of the habitats, having been recorded in a systematic way. Also, Endemic, restricted-range, CR, EN and VU category flora and fauna species were determined as the target species within the scope of the study. The Project area covers mostly invasive plant species habitats and agricultural lands. Therefore, mainly natural habitats were chosen for sampling locations. Potential target species of each habitat were identified as a result of literature review and the identified target species were confirmed through field studies.

VIII. Additionally, determined target species were evaluated on the basis of habitat characteristic. In context of the Proposed Motorway habitats were assessed along the Proposed Motorway Route according to sensitive species, sensitive habitats and/or ecosystems to determine whether there is a critical habitat in the Project area

Terrestrial Flora and Ecosystems

Within the scope of the terrestrial flora studies, the flora and vegetation types within the study area were identified to serve as a basis for determination of the impacts of the Project on biological resources and to develop appropriate mitigation measures, where necessary. The aim of the baseline studies for terrestrial flora species and vegetation were to collect data throughout the field surveys for explanation of the environmental conditions in the study area through selected sensitivity elements. In this context, floristic studies were conducted including both desktop and field studies to determine the baseline conditions in the study area.

The objectives of the desktop study were to review and organize the existing information on terrestrial flora, habitats and ecosystems within the study area. Therefore, Potential species of conservation concern, potential natural habitats and potential critical habitats present in the study area were determined before the field study and examined to verify during field visits. Terrestrial flora studies were carried out light on the following key baseline issues:

- Determining the species of terrestrial flora present in the Project area, their distribution and conservation status (such as critically endangered species, endangered species, as well as any endemic species),
- Defining natural and critical terrestrial habitats and ecosystems present in the Project area, their distribution and the list of species associated to each habitat.

The baseline data/information collection provide an overall picture of the conditions and sensitivities in the areas that were considered in the assessment of potential impacts and development of relevant mitigation measures for design, construction and operation phases of the Project. Terrestrial flora and ecosystem studies were investigated in the following two parts:

- Terrestrial habitats and ecosystems,
- Terrestrial flora.

Terrestrial Habitats and Ecosystems

In general, terrestrial habitats within baseline study area are categorized as modified, natural or critical habitats according to IFC (2012), as the definition of critical habitats is dependent on the presence of endemic, threatened, restricted-range species. As a result, distribution of the endemic, threatened, restricted-range species and EUNIS Level 3 habitat distribution within the Project area were obtained and mapped.

The habitat classification follows the EUNIS habitat type classification, a comprehensive pan-European system that facilitates the harmonized description and collection of data across Europe, through the use of habitat identification criteria. The preliminary habitat distribution in the study area is determined based on EUNIS Level 3 habitat type classification. A variety of habitat types were determined by analyzing appropriate satellite imagery and aerial photos (most of the territory of the Republic of Serbia is covered by satellite imagery available through Google Earth). Since there are different habitat types within the study area, the European Nature Information System (EUNIS) habitat classification is used to determine the number of different habitat types.

The habitats within the Project Area determined with desktop studies according to EUNIS Habitat Classifications used satellite imagery. After the field studies, which were conducted in spring (30 April - 5 May 2019), summer (28 June - 1 July 2019) and autumn (28 August – 01 September 2019) season, habitat types were verified by expert observations.

Terrestrial Flora

Survey locations were selected by the Project botanist and local botanists in different habitats during the field study. The best sampling points were selected using a varied array of datasets such as geological maps, the Proposed Motorway Route plans and satellite images. At these selected sampling points, the existing plant types have been collected. The collected samples are dried and ready to be identified. At each sampling point, at least 30 minutes have been spent for working. The dominant plant species were identified by taking photographs of the sampling points studied (see Figure 5-44).

The flora lists, families and species are given in alphabetical order. The collected plant samples were identified by using Flora Sırbije (Pančić, J., 1976).. Common and identifiable species were not collected in study area. The samples were not taken for well-known species in study area. However, 1-2 samples of species, which cannot be diagnosed as known species, were taken and they were brought to herbarium material for identification.

The coordinates of the survey locations were taken according to UTM, the general photograph of habitat, and the pictures of the plants in the study area were taken. During the field study, data were generated for the report stage by taking notes according to the characteristics of the sampling points studied.

Figure 5-44. Flora Expert and Local Botanists in the Survey Area

Terrestrial Fauna

The main objectives of fauna studies are i) to identify the fauna elements (invertebrates, amphibians, reptiles, birds and mammals) of the study area, ii) to define the habitats that these fauna elements inhabit, and iii) to make evaluations on faunal and ecological characteristics of the study area. Terrestrial fauna field studies were conducted in 1,000 m length buffer, which was determined by experts with desktop studies according to different habitat types. During the terrestrial fauna field studies, four different experts investigated and reported each fauna groups as invertebrates, amphibian-reptiles, birds and mammals.

Beside these above stated main goals, objectives of the terrestrial fauna survey within the study area can be described as follows;

- To determine the characteristics and importance of the project area in terms of terrestrial fauna species,
- To determine the important and sensitive habitats and critical fauna species,
- To determine the protection status of the fauna species according to national and international conventions, decisions and requirements.
- To determine population densities of these species according to project sub-areas,

Fauna studies include mammals (Mammalia), birds (Aves), reptiles (Reptilia), amphibian (Amphibia) and invertebrate groups. The information obtained by conducting a 30-45-minute survey at each point is recorded. Habitats at each point determined during the field study were examined in detail, species of fauna were recorded. The species list where fauna species are given was prepared according to the observations during the survey. Any information gathered from the local people, hunters, and/or any literature study on fauna species within the area were also used for the preparation of the fauna species list. The species lists were systematically prepared based on the names of the ordo, family species names. Common names of species, hazard and protection categories in IUCN, Bern Convention, CITES and nationally protected species are also given in detail in the tables.

- Direct observation was made in determining the species, as well as traces and signs (nests, nestlings and tracks of species, excrete and food wastes; horn and bone remains, feathers, pellets, etc.) of suitable fauna species.
- Line transect methods were used. Transect method consisted of terrestrial fauna sampling points of the Proposed Motorway Route along which visual and audial observations were conducted. In terms of the line transect method, observer walked along 500 m lengths or 30 minutes duration whichever was reached first but with the aim never to be less than 20 minutes duration in each sampling points of the Proposed Motorway Route and recorded observations.

- No hunting-gathering-killing was done during the identification of species in the area during field work in line with ethical rule IFC PS6. Observations made directly (using advanced optical instruments) have been utilized for species identification of fauna species.
- For the identification of fauna species in the identification of fauna elements, no trapping by using nets or other kind of trapping was used. Line methods have been applied in the identification of fauna species.
- In general, Camera/Photo trapping is the most efficient method for mammals, especially large size mammal species. Camera traps (Bushnell trophy cam) were utilized in forested habitats and forest opening. During the field studies, a sufficient number of camera traps were placed in appropriate habitats.
- Ultrasonic bat detectors (Pettersson d500x model) were utilized in forested habitats and forest opening to detect the bat species that are active at night (nocturnal) at the project site. The sonograms of the bat voices recorded by these devices were analyzed with Bat sound and/or BatExplorer programs and the bat species at the project site and its close vicinity were detected.
- Maps and satellite images have been used for field studies.
- A GPS was also used in mapping studies for determining elevations and geographical coordinates.
- During the fieldwork, some species were photographed and added to the report.

Methodologies applied for each fauna class during the faunal studies are summarized below.

Invertebrates

A detailed literature study was conducted to present potential invertebrate species at the Project's AoI. In context of this literature research, study, invertebrate expert determined the general habitat types in the area by evaluating the habitats in terms of seasonality, and depending on the habitat types and season of the field survey, invertebrates likely to be present in each habitat type was identified. During the field surveys, interviews with the local people were also considered in addition to the information provided from literature and habitat assessment. Most of the field data is obtained through the field observation, and observed species were recorded with photographs (see Figure 5-45).

Figure 5-45. Searching and Photographing for Invertebrates

Amphibians and Reptiles

A detailed literature study was conducted to present potential amphibian and reptile species at the Project's AoI. In line with this literature research, before the start of field study, expert determined the general habitat types in the area by evaluating the habitats in terms of seasonality, and depending on the habitat types and season of the field survey, amphibians and reptiles likely to be present in each habitat type was identified. In this respect, field studies regarding amphibian species (salamanders and frogs), have been carried out at suitable habitats for these species such as backwater, drainage channels, arcs, and humid areas. These field survey locations comprise suitable areas for feeding, sheltering and breeding of the amphibians. Field observations were mainly focused on temporary stream sides (riparian zone) and where water flow is rather slow and/or stagnant.

During the field survey, underneath the plants and rocks, which are the potential locations for nests, tadpoles and adult individuals of salamanders and frogs, were checked. Individuals were identified through direct observation, or caught with a net and released back after being identified and photographed.

Habitat-based assessment was also used to identify the field study locations. In this respect, field studies on reptiles mainly were mainly focused on rocky part of the habitats and tree hollows. These areas were searched for nests, eggs, and adult individuals of reptiles. As part of the amphibian field survey methodology, underneath of the plants and rocks at the project site were checked, and individuals were identified through direct observation or caught by catcher sticks and released back after being identified and photographed (see Figure 5-46). During the field surveys, interviews with the local people were also conducted in addition to the information provided from literature and habitat assessment.

Figure 5-46. Searching for Reptile Species Underneath the Rocks

Birds

A detailed literature study was conducted to present potential bird species at the Project's AoI. As a result of the literature survey, suitable habitats for the bird species in the AoI were identified as field survey locations. Field survey locations were studied in terms of potentially for presence of nests, offspring and adult individuals. Observed individuals were photographed whenever possible (see Figure 5-47).

The main part of the survey was comprised of line transects (Bibby et. al. 1998, 2000) walked along the centerline of the Proposed Motorway Route.

Transect comprises 500 m length or 30-minutes duration whichever was reached first but with the aim never to be less than 20-minutes duration. All identified birds seen or heard were recorded as within or without a 100 m distance parallel with the observer's track. Majority of the survey area is composed of agricultural fields or forests. Therefore, a broader band of 100 m is preferred to 25 or 50 m bands.

Transects were followed simultaneously by observer walking in a direction along the route from Identification Points (IPs) selected randomly in advance and located to within 10 m by GPS.

Sampling Points were selected on desktop study prior to the field study to ensure random selection of habitats to reflect their distribution along the route. A total of 52 transect point were surveyed along the Proposed Motorway Route. The survey was started at 08:00 and was ceased at 18:00, unless it is cool and cloudy, and the bird activity continues.

The transects are already clustered into four groups according to general habitats. Moreover, at each transect the habitats were recorded to make a habitat specific analysis of bird communities.

In addition to transect survey, stream crossings were also surveyed. The major river crossings already defined during previous route surveys were selected as prime bird sampling points. In addition to these major stream crossings, additional sampling points considering their potential habitat characteristics for birds were considered.

During the field surveys, interviews with the local people were also conducted in addition to the information provided from literature and habitat assessment.

Observing bird species with a telescope

Photographing bird species with a tele-objective

Survey with farmer

Point transect with local expert

Figure 5-47. Bird observation and photographing

Mammals

A detailed literature study was conducted to present potential mammal species at the Project AoI. As a result of the literature survey, suitable habitats for mammal species in the AoI were identified as field survey locations. Four photo-traps were used for identification of large and medium-size mammals.

For bats sound recording devices were utilized. For identification of small mammals' baits and burrows were used. Photographs of photo-trap and bat sound recording studies are provided in Table 5-52. During the field surveys, interviews with the local people were also conducted in addition to the information provided from literature and habitat assessment.

- Camera-trapping Studies: For identification of large (fox, Stone marten, wild boar) and medium-sized (squirrel, hedgehog, weasel), photo-traps were located at 4 different points to various proximities to the study location.
- Bat Studies: For identification of nocturnal bat species at the project site, 2 ultrasonic bat sound recording devices were used. One device was located within the concerned field study location, while the other was located outside the site at a distant point. Sonograms of bat sounds recorded by the devices were analyzed to identify bat species within the AoI.

Table 5-52. Photo-Trap and Bat Sound Recording Study

CAM-TRAP STUDIES			
			
Photo-Trap No	: 1	**Photo-Trap No**	:2
Coordinates	: 34 T 525244 - 4827945	**Coordinates**	: 34 T 525244 - 4827945
Altitude	: 150 m	**Altitude**	: 150 m
Habitat	: Plantation nearby the setlement	**Habitat**	: Plantation nearby the setlement
			
Photo-Trap No	: 3	**Photo-Trap No**	: 4
Coordinates	: 34 T 479075 - 4842984	**Coordinates**	: 34 T 479075 - 4842984
Altitude	: 230 m	**Altitude**	: 230 m
Habitat	: Forest	**Habitat**	: Forest
BAT SOUND RECORDER STUDIES			
			
Bat-Sound No	: 1	**Bat-Sound No**	:2
Coordinates	: 34 T 463614 - 4850455	**Coordinates**	: 34 T 463559 - 4850338
Altitude	: 200 m	**Altitude**	: 200 m
Habitat	: Forest	**Habitat**	: Forest

Aquatic Biodiversity

Aquatic ecosystems are composed of the following organisms; phytoplanktonic organisms at the producer level (free or attached algae), zooplanktonic and benthic organism that feed on these, which are primary and secondary consumers, and tertiary consumer fish species, which depending on their food preference can feed on either zooplanktonic and benthic organisms or smaller fish.

In this context, the main links of the aquatic food chain are algae (attached or free forms, phytoplanktonic organisms), zooplanktonic organisms, benthic organisms, and fish. Changes in aquatic systems can cause changes on these organisms.

Within the scope of the aquatic studies carried out specifically for the Project, fish and benthic species, which are expected to be affected by the Project activities, have been taken into consideration. The objectives of these studies are mainly to identify aquatic freshwater species as accurately as possible in the AoI. Within this context following studies were carried out:

- Detailed literature survey in order to define the existing aquatic species inhabiting the aquatic ecosystems in the study area.
- Determining the endemism status of species.
- Evaluating the existing species according to the Bern Convention and the Red List of International Union for Conservation of Nature (IUCN).
- Defining the status of globally threatened species and restricted-range species within the aquatic ecosystems both within the AoI and the adjacent catchments.
- Defining and listing the target species within the aquatic ecosystems that might be affected from the construction and operation activities of the project.

As the general methodology of the aquatic survey, transect study covering the up-stream and down-stream of the field study locations (transect length is about 500 m) was applied. Additionally, tributaries of the West Morava River were also covered in the study. Fish samples, which constitute an important indicator of aquatic vertebrates, were sampled with a Samus 725 mp electro shocker where the current rate and water depth are low. At higher depths and where flow rate is higher a casting net and fyke-net were used. The fish specimens caught from the sampling points were identified then they released back to the capture area after they were counted.

Sampling methods for benthic organisms will vary depending on the floor structure of the water body and on type of benthic organisms. Field study were carried out via 2 methods by considering applicability for collecting Mollusca, Annelidae, Platyhelmintes and Arthropoda (especially Insecta family) samples. Hand collection was mostly preferred when collecting Crustacean samples; however, in some cases pond nets in the form of dipper were used

(Elliot and Mann, 1979; Biro, 1981; Edington, 1981; Bellman, 1988; Glöer, 1992; Ludwig, 1993).

The aquatic species that exist in the AoI were identified and recorded during field studies. During the field surveys, interviews with the local people were also conducted in addition to the information provided from literature and habitat assessment.

5.8.3 Baseline Conditions

5.8.3.1 Protected Areas

Internationally Recognized Areas within the Area of Influence and Surroundings

Key Biodiversity Areas

Internationally Recognised Areas are located in the surroundings of the Project Area located in the provinces of Ćićevac to Čačak. These areas include Key Biodiversity Areas (KBA), Important Plant Areas (IPA) and Important Bird Areas (IBA). There are no any internationally recognized areas within the AoI

KBAs are the most important areas according to their characteristics in terms of supporting biological components. Considering that all sections of the Project area, there are 3 internationally recognized areas have been found.

The internationally recognized areas are shown in Figure 5-48. Distance of the KBAs from the Project area and the provinces, are summarized in Table 5-53.

Table 5-53. KBAs Located in vicinity of the Project Area

Internationally Recognised Areas	Province	Distance (km)
Gornje Pomoravlje KBA	Paracin	8.5
Akumulacija Gruza KBA	Knic	13.3
Ovcar-Kablar gorge KBA	Čačak	8

Gornje Pomoravlje KBA Common Kingfisher (*Alcedo atthis*) is resident species in this IBA and is breeding about 10-15 breeding pairs. On the other hand, the island is important breeding area for Sand Martin (*Riparia riparia*) as 1300-1700 breeding pairs. The KBA is located in 8.5 km distance from Section 1 of the Proposed Motorway Route.

Surface Area: 1701 ha
Province(s): Paracin
IBA Criteria met B2 (2009)

Akumulacija Gruza KBA is about the 75 individuals of Ferruginous Duck (*Aythya nyroca*), which is an NT category as IUCN.

Surface Area: 4,038 ha
Province(s): Knic
IBA Criteria met: A1 (2009)

Ovcar-Kablar gorge KBA: This area is situated between the towns of Čačak and Pozega in western Serbia. Limestone cliffs and rocky terrain are interspersed with sparse tree cover and thickets comprising oak (Quercus), ash (Fraxinus), hornbeam (Carpinus), elm (Ulmus) and lime (Tilia). Areas of meadow and pasture, small reservoirs, houses and orchards are also present. It is also important for a variety of breeding raptors. The main threats are disturbance, hunting and infrastructure development.

Surface Area: 6,174 ha
Province(s): Čačak
IBA Criteria met: B2, B3 (2009)

Ramsar Sites

There is no Ramsar Sites located in the surroundings of the Project Area.

Nationally Recognized Areas within the Area of Influence and Surroundings

There is one nationally recognized nature reserve area located outside the AoI (Section-2). There is no any nationally recognized area within the AoI "Osredak" is located in central Serbia on the banks of the Western Morava, 14 km northwest of Kruševac and 20 km east of Trstenik, in the villages of Bela Voda, Kukljin, Globoder and Bresno Polje.

The “Osredak” Special Nature Reserve protected area is situated 530 m distance to the Proposed Motorway and thus, does not overlap with the proposed project area. Pursuant to Article 42, paragraph 8 of the Law on Nature Protection ("Official Gazette of the Republic of Serbia" No. 36/09, 88/10, 91/10-correction and 14/16), the Ministry of Environmental Protection informs the public about the procedure for initiating protection of the natural of the category II (other) category, as the Special Nature Reserve "Osredak".

The protected nature reserve proposed for protection possesses the characteristic of the constant displacement of the western Moravian basin. "Osredak" has great significance from the aspect of protection of rare and protected plant and animal species: it is part of the migration corridor and the nesting site of numerous wetland birds; it is a significant habitat for amphibians and reptiles; the floating parts are ideal natural fishes for the fish fund; The strictly protected species in Serbia - yellow lupus (*Nuphar lutea*) is included in the floating vegetation.

The total area of "Osredak" is 245.75 ha. According to the structure of the area of cadastral municipalities by ownership, private ownership rate is 97.31%, and the state owned 2.69% of

area. In the protected area, protection regimes of II (second) and III (third) levels have been established.

According to the Rulebook on Criteria for Evaluation and Procedure for Categorization of Protected Areas ("Official Gazette of the Republic of Serbia", No. 97/15), the Nature Reserve "Osredak" is classified in category II - a protected area of great significance.

According to the Regulation on the ecological network ("Official Gazette of the Republic of Serbia", No. 102/10), the area of "Osredak" belongs to a part of an ecologically significant area under number 52 - "Osredak".

The Osredak Nature Reserve area is shown in Figure 5-49.

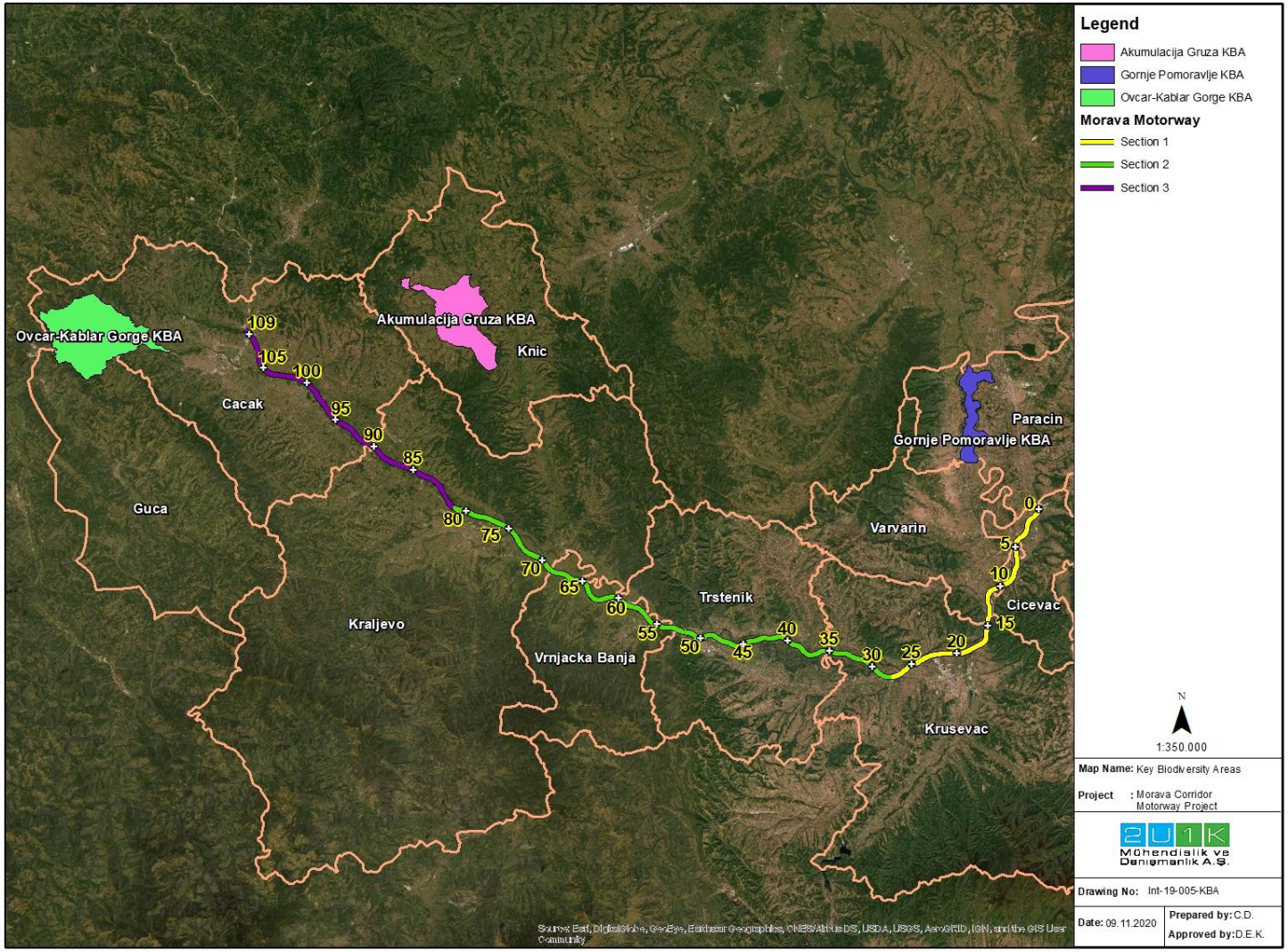


Figure 5-48. Key Biodiversity Areas in the vicinity of the AoI

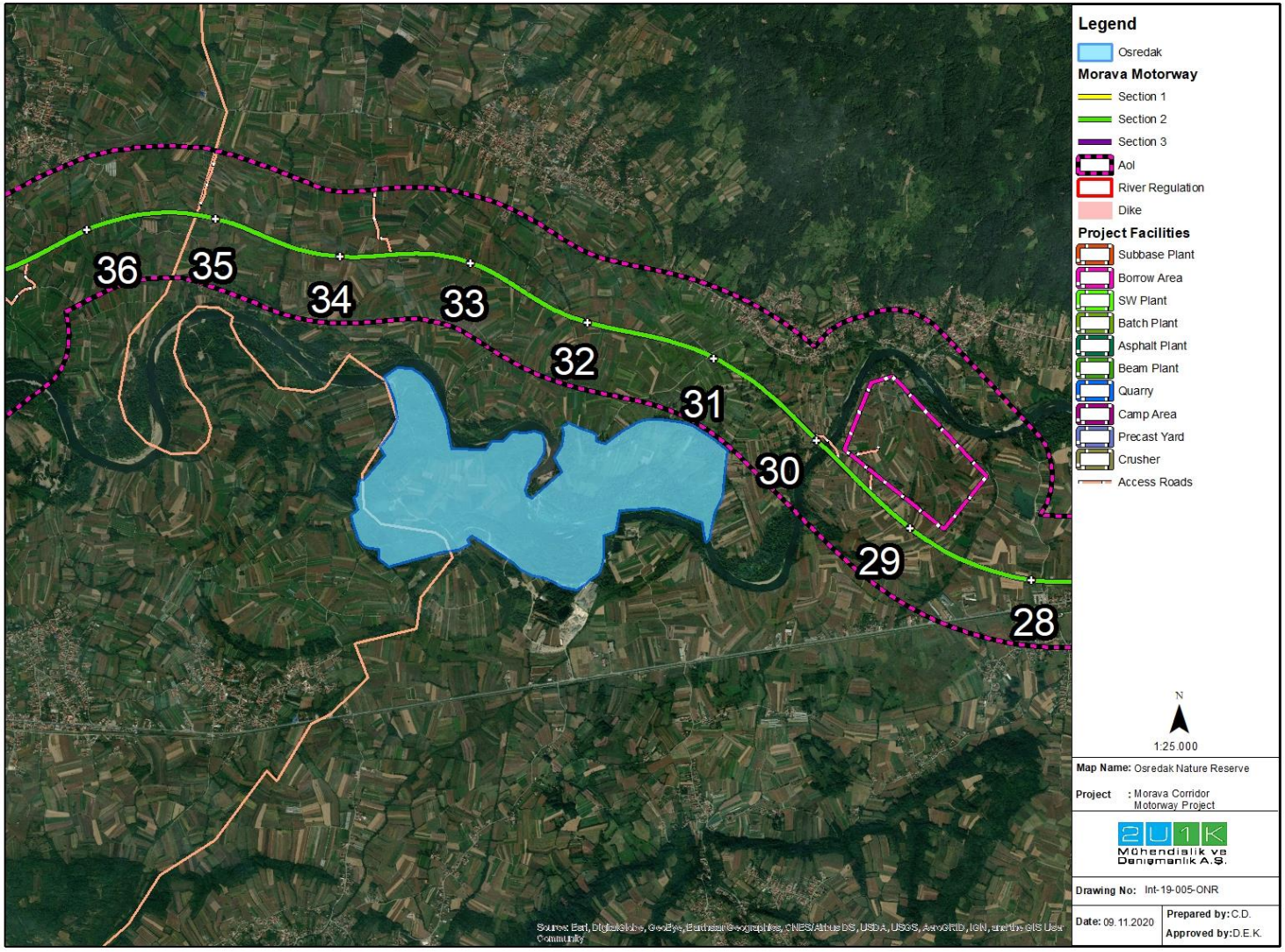


Figure 5-49. Osredak Nature Reserve in the vicinity of the AoI

5.8.3.2 Terrestrial Flora and Ecosystems

Habitats

In the field study conducted on 30 April - 5 May 2019, 28 June - 1 July 2019 and 28 August – 01 September 2019, nine different 3rd level EUNIS habitat types were identified in the Proposed Motorway Route. Each of these habitats has different types of vegetation. Natural habitats are usually not continuous but intermittent. EUNIS habitat types and coverage areas were given in Table 5-54.

Table 5-54. List of EUNIS Level 3 Habitat Types

	Habitat Code	Habitat Type	Area (ha)
Natural Habitats	C2.3	Permanent non-tidal, smooth-flowing watercourses	685.95
	E2.1	Permanent mesotrophic pastures and aftermath-grazed meadows	188.42
	G1.1	Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	2710.59
	G1.7	Thermophilous deciduous woodland	2211.62
	J5.3*	Highly artificial non-saline standing waters	19.94
Modified Habitats	I1.1	Intensive unmixed crops	11312.16
	J1.2	Residential buildings of city and town centres	863.65
	J2.3	Rural industrial and commercial sites still in active use	142.92
	J3.2	Active opencast mineral extraction sites, including quarries	74.43
	J5.3	Highly artificial non-saline standing waters	96.68

In the AoI, the most common habitat is agricultural areas with 61.8% (I1.1). The second common habitat Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix with 14.8% (G1.1) Ratio of these habitats are given in Figure 5-50.

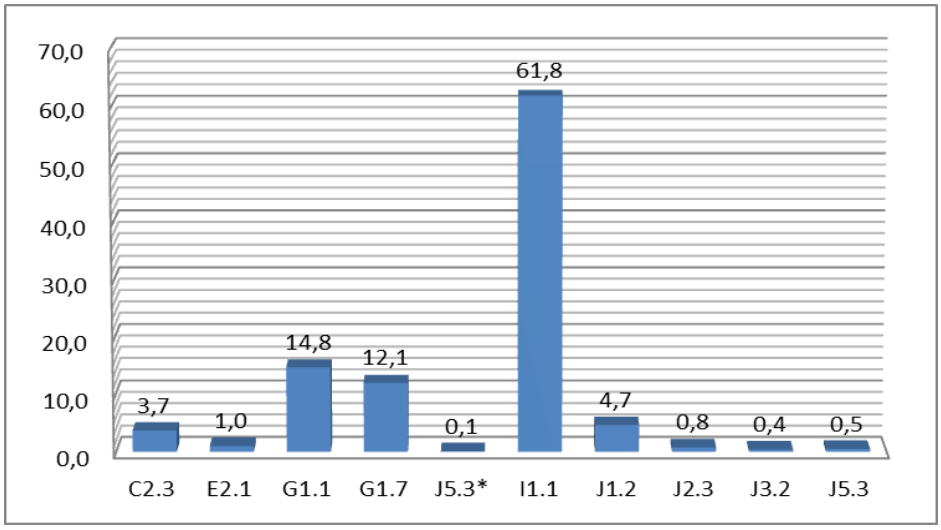


Figure 5-50. Ratio of the Habitats within the AoI

Flora

In terms of flora species, 176 genus and 234 species belonging to 65 families were identified as a result of literature and field studies. There is no endemic species in the samples collected in the field study.

14 invasive species were found in the AoI. These species are: *Fallopia japonica, Amorpha fructicosa, Robinia pseudoacacia, Xanthium spinosum, Ailanthus altissima, Datura stramonium, Xanthium strumarium, Erigeron annuus, Acer negundo, Erigeron canadensis, Phytolacca americana, Amaranthus retroflexus* and *Datura stramonium.*

As given in the Table 5-56, the flora species identified in the project AoI are listed as LC by IUCN. On the other hand, one of the plant species, *Nuphar lutea,* is nationally listed as strictly protected (Ann-I). In addition to *Nuphar lutea*, 10 other species, *Arctium lappa, Hypericum perforatum, Iris pseudoacorus, Acinos hungaricus, Lamium album, Althea officinalis, Crataegus monogyna, Rosa canina, Galium odoratum* and *Viola odorata* species listed as protected species in Ann-II were identified in the AoI.

Table 5-55. Conservation Status of Flora Species

IUCN						BERN	CITES			Habitat Directive			National Regulation	
CR	EN	VU	NT	LC	DD	Ann-I	Ann-I	Ann-II	Ann-II	Ann-II	Ann-IV	Ann-V	Ann-I	Ann-II
-	-	-	-	87	-	-	-	-	-	-	-	-	1	10

Nuphar lutea is widely distribute in Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France (France (mainland)); Germany; Greece (Greece (mainland)); Hungary; Iran, Islamic Republic of; Ireland; Isle of Man; Italy (Sardegna, Italy (mainland)); Kazakhstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Palestine, State of; Poland; Portugal (Portugal (mainland)); Romania; Russian Federation (Northwest European Russia, North European Russia, Central European Russia, East European Russia, Kaliningrad); Serbia; Slovakia; Slovenia; Spain (Spain (mainland)); Sweden; Switzerland; Syrian Arab Republic; Turkey (Turkey-in-Europe, Turkey-in-Asia); Ukraine; United Kingdom (Great Britain, Northern Ireland). Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

The local EIA report also indicates the protection status of the *Nupher lutea* and other species listed with protection status. On the other hand, local EIA reports concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

In the Project AoI, *Nuphar lutea* species were observed in small water ponds mainly located at old borrow areas. There is only one such habitat, where the species is concentrated, and that habitat is identified in the AoI. Project activities including river diversion have no direct impact on this habitat. This habitat is already included in the constraint maps (Appendix -5) and special measures are suggested to avoid any impact on the habitat.

Table 5-56. Terrestrial Flora Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
ACERACAEA	*Acer campeste*	Field Maple	-	-	-	-	-	-	HS,L,FO
ACERACAEA	*Acer negudno*	Boxelder	-	-	-	-	-	-	HS,L,FO
AMARANTHACEAE	*Amaranthus retroflexus*	Redroot Pigweed		-	-	-	-	-	HS,L,FO
APIACEAE	*Angelica sylvestris*	Wild angelica	LC	-	-	-	-	-	HS,L
APIACEAE	*Conium maculatum*	Deadly hemlock	-	-	-	-	-	-	HS,L,FO
APIACEAE	*Daucus carota*	Carrot	LC	-	-	-	-	-	HS,L,FO
APIACEAE	*Eryngium campestre*	Field eryngo	-	-	-	-	-	-	HS,L,FO
APIACEAE	*Heracleum sphondylium*	Bear's breech		-	-	-	-	-	HS,L,FO
APIACEAE	*Torilis arvensis*	Hedge parsley	-	-	-	-	-	-	HS,L,FO
APOCYNACEAE	*Vinca herbacea*	Herbaceous periwinkle	-	-	-	-	-	-	HS,L,FO
ARACEAE	*Arum maculatum*	Cuckoo pint	-	-	-	-	-	-	HS,L,FO
ARALIACEAE	*Hedera helix*	İvy	LC	-	-	-	-	-	HS,L,FO
ARISTOLOCHIACEAE	*Aristolochia clematitis*	Birthwort	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Achillea millefolium*	Common Yarrow		-	-	-	-	-	HS,L,FO
ASTERACEAE	*Ambrosia artemisiifolia*	Common Ragweed		-	-	-	-	-	HS,L,FO
ASTERACEAE	*Anthemis austriaca*	Corn chamomile	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Arctium lappa*	Great burdock	LC	-	-	-	ANN-II	-	HS,L,FO
ASTERACEAE	*Arctium minus*	Lesser burdock	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Artemisia absinthum*	Wormwood	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Artemisia vulgaris*	Mugwort	LC	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Bellis perennis*	Daisy	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Cichorium intybus*	Chicory	LC	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Cirsium arvense*	Canada thistle	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Crepis biennis*	Rough hawkbeard	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Crepis vesicaria*	Beaked Hawk's Beard	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Erigeron annuus*	Daisy fleabane		-	-	-	-	-	HS,L,FO
ASTERACEAE	*Erigeron canadensis*	Horseweed	-	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
ASTERACEAE	*Hieracium pilosella*	Mouseear hawkweed	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Inula britannica*	British yellowhead		-	-	-	-	-	HS,L,FO
ASTERACEAE	*Lactuca serriola*	Prickly lettuce	LC	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Matricaria chamomilla*	Chamomille	LC	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Carduus nutans*	Musk thistle		-	-	-	-	-	HS,L,FO
ASTERACEAE	*Senecio vernalis*	Eastern groundsel	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Sonchus asper*	Prickly sow-thistle	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Tanacetum vulgare*	Tansy	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Taraxacum officinale*	Dandelion	LC	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Tragopogon longirostris*	Collared Pratincole Greek	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Xanthium spinosum*	Spiny cockleburr	-	-	-	-	-	-	HS,L,FO
ASTERACEAE	*Xanthium strumarium*	Heart-leaf cocklebur	-	-	-	-	-	-	HS,L,FO
BETULACEAE	*Alnus glutinosa*	Black alder	LC	-	-	-	-	-	HS,L,FO
BETULACEAE	*Carpinus betulus*	Common Hornbeam	LC	-	-	-	-	-	HS,L,FO
BORAGINACEAE	*Anchusa officinalis*	Common bugloss	-	-	-	-	-	-	HS,L,FO
BORAGINACEAE	*Echium italicum*	Italian bugloss	-	-	-	-	-	-	HS,L,FO
BORAGINACEAE	*Echium vulgare*	Viper's bugloss	-	-	-	-	-	-	HS,L,FO
BORAGINACEAE	*Myosotis arvensis*	Common Forget-me-not		-	-	-	-	-	HS,L,FO
BORAGINACEAE	*Symphytum officinale*	Common comfrey	LC	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Alliaria petiolata*	Garlic-root	-	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Brassica nigra*	Black mustard	LC	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Calepina irregularis*	White ballmustard		-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Capsella bursa-pastoris*	Shepherd's purse	-	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Erysimum repandum*	Bushy wallflower		-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Lepidium draba*	whitetop	-	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Nasturtium officinale*	watercress		-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Raphanus raphanistrum*	Charlock	LC	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
BRASSICACEAE	*Sinapis arvensis*	California rape	LC	-	-	-	-	-	HS,L,FO
BRASSICACEAE	*Thlaspi perfoliatum*	Perfoliate pennycress	-	-	-	-	-	-	HS,L,FO
BUTOMACEAE	*Butomus umbellatus*	Flowering rush	LC	-	-	-	-	-	HS,L
CHENOPODIACEAE	*Chenopodium album*	Fat hen	-	-	-	-	-	-	HS,L,FO
CANNABACEAE	*Humulus lupulus*	Common hop	LC	-	-	-	-	-	HS,L,FO
CAPRIFOLIACAE	*Lonicera caprifolium*	Chèvre-feuille des jardins	-	-	-	-	-	-	HS,L,FO
CAPRIFOLIACAE	*Sambucus ebulus*	Dwarf Elder	LC	-	-	-	-	-	HS,L,FO
CAPRIFOLIACAE	*Sambucus nigra*	Black elder	LC	-	-	-	-	-	HS,L,FO
CAPRIFOLIACAE	*Viburnum opulus*	Guelder-rose	LC	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Agrostemma githago*	Common corncockle	-	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Holostemum umbellatum*	Jagged chickweed	-	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Lychnis coronaria*	Catchfly	-	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Lychnis flos-cuculi*	Ragged robins	-	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Saponaria officinalis*	Common soapwort		-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Silene latifolia*	Bladder campion	-	-	-	-	-	-	HS,L,FO
CARYOPHYLLACEAE	*Stellaria media*	Common chickweed	LC	-	-	-	-	-	HS,L,FO
CELASTRACEAE	*Euonymus europaeus*	European spindletree	LC	-	-	-	-	-	HS,L,FO
CONVOLVULACEAE	*Calystegia sepium*	Great bindweed	LC	-	-	-	-	-	HS,L,FO
CONVOLVULACEAE	*Convolvulus arvensis*	Bindweed	-	-	-	-	-	-	HS,L,FO
CORNACEAE	*Cornus mas*	Cornelian cherry	LC	-	-	-	-	-	HS,L,FO
CORNACEAE	*Cornus sanguinea*	Common Dogwood	-	-	-	-	-	-	HS,L,FO
CUCURBITACEAE	*Bryonia alba*	White bryony	-	-	-	-	-	-	HS,L,FO
CUCURBITACEAE	*Sicyos angulatus*	One seed burcucumber	-	-	-	-	-	-	HS,L,FO
CYPERACEAE	*Carex acutiformis*	lesser pond-sedge	LC	-	-	-	-	-	HS,L
CYPERACEAE	*Carex hirta*	Down	LC	-	-	-	-	-	HS,L,FO
CYPERACEAE	*Carex echinata*	Star Sedge	LC	-	-	-	-	-	HS,L,FO
CYPERACEAE	*Carex pendula*	Down	LC	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
CYPERACEAE	*Carex remota*	Remote sedge	LC	-	-	-	-	-	HS,L
DENNSTAEDTIACEAE	*Pteridium aquilinum*	Bracken	LC	-	-	-	-	-	HS,L,FO
DIPSACACEAE	*Dipsacus laciniatus*	Cutleaf teasel	-	-	-	-	-	-	HS,L,FO
EQUISETACEAE	*Equisetum arvense*	Bottlebrush	LC	-	-	-	-	-	HS,L,FO
EUPHORBIACEAE	*Euphorbia amygdaloides*	Wood spurge		-	-	-	-	-	HS,L,FO
EUPHORBIACEAE	*Euphorbia helioscopia*	Sun spurge	-	-	-	-	-	-	HS,L,FO
EUPHORBIACEAE	*Euphorbia villosa*	Spurge	-	-	-	-	-	-	HS,L,FO
EUPHORBIACEAE	*Euphorbia cyparissias*	cypress spurge	-	-	-	-	-	-	HS,L,FO
EUPHORBIACEAE	*Euphorbia stricta*	Golden Foam Spurge	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Amorpha fructicosa*	bastard indigo	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Genista tinctoria*	Dyers greenweed	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Medicago coronata*	Crown medic	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Medicago lupulina*	Trefoil	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Medicago minima*	Little burclover	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Medicago sativa*	Alfalfa	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Melilotus officinalis*	Field melilot		-	-	-	-	-	HS,L,FO
FABACEAE	*Pisum sativum*	Pea	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Robinia pseudoacacia*	False Acacia	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Trifolium nigrescens*	Small white clover	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Trifolium pratense*	Red clover	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Trifolium repens*	White clover	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Trifolium tomentosum*	Woolly clover		-	-	-	-	-	HS,L,FO
FABACEAE	*Trigonella monspeliaca*	Star-fruited Fenugreek	-	-	-	-	-	-	HS,L,FO
FABACEAE	*Vicia angustifolia*	Vetch	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Vicia cracca*	Cow Vetch	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Vicia grandiflora*	Garden vetch	LC	-	-	-	-	-	HS,L,FO
FABACEAE	*Vicia sativa*	Tare	-	-	-	-	-	-	HS,L,FO
FAGACEAE	*Fagus sylvatica*	Beech	LC	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
FAGACEAE	*Quercus cerris*	Oak	LC	-	-	-	-	-	HS,L,FO
FAGACEAE	*Quercus frainetto*	Hungarian Oak	LC	-	-	-	-	-	HS,L,FO
FAGACEAE	*Quercus robur*	Oak	LC	-	-	-	-	-	HS,L,FO
GERANIACEAE	*Erodium cicutarium*	redstem stork's bill	-	-	-	-	-	-	HS,L,FO
GERANIACEAE	*Geranium molle*	Dove's foot Crane's Bill	-	-	-	-	-	-	HS,L,FO
GERANIACEAE	Geranium robertianum	Herb Robert	-	-	-	-	-	-	HS,L,FO
HAMAMELIDACEAE	*Aesculus hippocastanum*	Horse chestnut	-	-	-	-	-	-	HS,L,FO
HYPERICACEAE	*Hypericum perforatum*	Common St John's wort	LC	-	-	-	ANN-II	-	HS,L,FO
IRIDACEAE	*Iris pseudoacorus*	Yellow flag	LC	-	-	-	ANN-II	-	HS,L,FO
JUGLANDACEAE	*Juglans regia*	Walnut	LC	-	-	-	-	-	HS,L,FO
JUNCACEAE	*Eleocharis palustris*	Common Spikerush	LC	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Acinos hungaricus*	Simonkai	-	-	-	-	ANN-II	-	HS,L,FO
LAMIACEAE	*Ajuga reptans*	-	-	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Ballota nigra*	Black horehound		-	-	-	-	-	HS,L,FO
LAMIACEAE	*Clinopodium acinos*	Basil	-	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Glechoma hederacea*	Alehoof	LC	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Lamium album*	White dead-nettle	LC	-	-	-	ANN-II	-	HS,L,FO
LAMIACEAE	*Lamium maculatum*	Spotted Deadnettle	-	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Mentha aquatica*	Water mint	LC	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Lycopus europaeus*	Gypsywort	LC	-	-	-	-	-	HS,L
LAMIACEAE	*Mentha piperita*	Pippermint	-	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Mentha pulegium*	Peppermint	LC	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Mentha spicata*	Sanskrit	LC	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Prunella vulgaris*	carpenter weed		-	-	-	-	-	HS,L,FO
LAMIACEAE	*Salvia nemorosa*	Sawge	-	-	-	-	-	-	HS,L,FO
LAMIACEAE	*Thymus pannonicus*	Thyme	-	-	-	-	-	-	HS,L,FO
LEMNACEAE	*Lemna* sp.	Duckweed	-	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
LILIACEAE	*Ornithogalum umbellatum*	Star of Bethlehem	-	-	-	-	-	-	HS,L,FO
LILIACEAE	*Polygonatum multiflorum*	Solomon's Seal	-	-	-	-	-	-	HS,L,FO
LYTHRACEAE	*Lythrum salicaria*	Purple Loosestrife		-	-	-	-	-	HS,L,FO
MALVACEAE	*Althea officinalis*	Mallow	-	-	-	-	ANN-II	-	HS,L,FO
MALVACEAE	*Malva sylvestris*	Mallow	LC	-	-	-	-	-	HS,L,FO
MORACEAE	*Morus alba*	White Mulberry	-	-	-	-	-	-	HS,L,FO
NYMPHAEACEAE	*Nuphar lutea*	Yellow water-lily	LC	-	-	-	ANN-I	-	HS,L,FO
OLEACEAE	*Fraxinus angustifolia*	Narrow-leaved Ash	LC	-	-	-	-	-	HS,L,FO
OLEACEAE	*Fraxinus ornus*	Manna ash	LC	-	-	-	-	-	HS,L,FO
OLEACEAE	*Ligustrum vulgare*	Gewone liguster	-	-	-	-	-	-	HS,L,FO
ONAGRACEAE	*Epilobium lanceolatum*	-		-	-	-	-	-	HS,L,FO
OXALIDACEAE	*Oxalis acetosella*	Wood-sorrel	-	-	-	-	-	-	HS,L,FO
PAPAVERACEAE	*Chelidonium majus*	Greater celandine	LC	-	-	-	-	-	HS,L,FO
PAPAVERACEAE	*Fumaria officinalis*	Fumitory	-	-	-	-	-	-	HS,L,FO
PAPAVERACEAE	*Papaver rhoeas*	Poppy	LC	-	-	-	-	-	HS,L,FO
PLANTAGINACEAE	*Plantago lanceolata*	Narrowleaf Plantain	LC	-	-	-	-	-	HS,L,FO
PLANTAGINACEAE	*Plantago major*	Broadleaf plantain	LC	-	-	-	-	-	HS,L,FO
PLATANACEAE	*Platanus orientalis*	Oriental plane-tree	-	-	-	-	-	-	HS,L,FO
POACEAE	*Agropyron repens*	Quackgrass		-	-	-	-	-	HS,L,FO
POACEAE	*Alopecurus pratensis*	Meadow foxtail	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Bromus tectorum*	Downy brome	-	-	-	-	-	-	HS,L,FO
POACEAE	*Bromus sterilis*	Barren brome	-	-	-	-	-	-	HS,L,FO
POACEAE	*Dactylis glomerata*	Cocksfoot grass	-	-	-	-	-	-	HS,L,FO
POACEAE	*Calamagrostis epigeios*	Bushgrass	-	-	-	-	-	-	HS,L
POACEAE	*Festuca rubra*	Red fescue	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Hordeum murinum*	Wall Barley	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Hordeum sativum*	Barley	-	-	-	-	-	-	HS,L,FO
POACEAE	*Phleum phleoides*	Boehmer's cat's-tail	LC	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
POACEAE	*Phragmites australis*	Common reed	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Poa annua*	Annual bluegrass	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Poa bulbosa*	bulbous bluegrass	-	-	-	-	-	-	HS,L,FO
POACEAE	*Poa pratensis*	Meadow Grass	LC	-	-	-	-	-	HS,L,FO
POACEAE	*Zea mays*	Corn		-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Reynoutria japonica*	Japanese knotweed	-	-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Polygonum aviculare*	Knotweed	LC	-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Polygonum lapathifolium*	Pale smartweed		-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Rumex acetosa*	Common Sorrel learn	-	-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Rumex crispus*	Curly Dock	LC	-	-	-	-	-	HS,L,FO
POLYGONACEAE	*Rumex tuberosus*	Tuberous-rooted dock	-	-	-	-	-	-	HS,L,FO
PORTULACACEAE	*Portulaca oleraceae*	Purslane		-	-	-	-	-	HS,L,FO
POTAMOGETONACEAE	*Potamogeton natans*	Brod-leaved Pondweed	LC	-	-	-	-	-	HS,L,FO
PRIMULACEAE	*Anagallis arvensis*	Red scarlet		-	-	-	-	-	HS,L,FO
PRIMULACEAE	*Lysimachia vulgaris*	Yellow Loosestrife		-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Clematis vitalba*	Old man's beard	-	-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Consolida regalis*	Larkspur		-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Helleborus odorus*	Hellebore	-	-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Ranunculus sp.*	-	-	-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Ranunculus acer*	buttercup	-	-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Ranunculus arvensis*	meadow buttercup	-	-	-	-	-	-	HS,L,FO
RANUNCULACEAE	*Ranunculus repens*	buttercup	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Cerasus avium*	Wild cherry	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Crataegus monogyna*	hawthorn	-	-	-	-	ANN-II	-	HS,L,FO
ROSACEAE	*Cydonia oblonga*	Quince	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Filipendula hexapetala*	-	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Fragaria vesca*	wood strawberry	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Geum urbanum*	Wood Avens	LC	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
ROSACEAE	*Malus domestica*	Apple	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Malus sylvestris*	Crab Apple	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Potentilla recta*	sulphur cinquefoil	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Potentilla reptans*	Creeping Cinquefoil	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Prunus dometica*	plum		-	-	-	-	-	HS,L,FO
ROSACEAE	*Prunus spinosa*	Blackthorn	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Prunus amygdalus*	-	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Prunus avium*	Bird cherry	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Rosa canina*	Dog Rose	LC	-	-	-	ANN-II	-	HS,L,FO
ROSACEAE	*Rubus caesius*	Dewberry	LC	-	-	-	-	-	HS,L,FO
ROSACEAE	*Rubus candidus*	Black berry	-	-	-	-	-	-	HS,L,FO
ROSACEAE	*Sanguisorba minor*	Salad Burnet	-	-	-	-	-	-	HS,L,FO
RUBIACEAE	*Cruciata glabra*	Crosewort	-	-	-	-	-	-	HS,L,FO
RUBIACEAE	*Galium aparine*	Cleavers	LC	-	-	-	-	-	HS,L,FO
RUBIACEAE	*Galium odoratum*	Sweet Woodruff	LC	-	-	-	ANN-II	-	HS,L,FO
SALICACEAE	*Populus alba*	White poplar	LC	-	-	-	-	-	HS,L,FO
SALICACEAE	*Populus canadensis*	Poplar	-	-	-	-	-	-	HS,L,FO
SALICACEAE	*Populus nigra*	Black poplar	-	-	-	-	-	-	HS,L,FO
SALICACEAE	*Salix alba*	White willow	LC	-	-	-	-	-	HS,L,FO
SALICACEAE	*Salix pentandra*	Bay willow	LC	-	-	-	-	-	HS,L,FO
SALICACEAE	*Salix tetranda*	-	-	-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Digitalis ferruginea*	Rusty foxglove	-	-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Kickxia elatine*	Sharpleaf cancerwort		-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Linaria genistifolia*	Broom-leaf toadflax	-	-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Scrophularia nodosa*	Woodland figwort	LC	-	-	-	-	-	HS,L
SCROPHULARIACEAE	*Scrophularia scopolii*	Italian figwort	-	-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Verbascum sp.*	-	-	-	-	-	-	-	HS,L,FO
SCROPHULARIACEAE	*Veronica polita*	Grey Field-speedwell	-	-	-	-	-	-	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
SIMAROUBACEAE	*Ailanthus altissima*	Tree of heaven	-	-	-	-	-	-	HS,L,FO
SOLANACEAE	*Datura stramonium*	Thorn-apple	-	-	-	-	-	-	HS,L,FO
SOLANACEAE	*Physalis alkekengi*	Chinese-lantern	-	-	-	-	-	-	HS,L,FO
SOLANACEAE	*Solanum nigrum*	Black nightshade		-	-	-	-	-	HS,L,FO
SOLANACEAE	*Solanum dulcamara*	Bittersweet nightshade	LC	-	-	-	-	-	HS,L
TILIACEAE	*Tilia tomentosa*	Silver lime	-	-	-	-	-	-	HS,L,FO
TYPHACEAE	*Typha angustifolia*	Cattail	-	-	-	-	-	-	HS,L,FO
ULMACEAE	*Ulmus campestris*	Elm	-	-	-	-	-	-	HS,L,FO
URTICACEAE	*Parietaria judaica*	Pellitory-of-the-wall	-	-	-	-	-	-	HS,L,FO
URTICACEAE	*Urtica dioica*	Stinging nettle	LC	-	-	-	-	-	HS,L,FO
VALERIANACEAE	*Valeriana sp.*	-	-	-	-	-	-	-	HS,L,FO
VALERIANACEAE	*Valerianella sp.*	-	-	-	-	-	-	-	HS,L,FO
VIOLACEAE	*Viola odorata*	Sweet violet	-	-	-	-	ANN-II	-	HS,L,FO
VIOLACEAE	*Viola tricolor*	Heart sease	-	-	-	-	-	-	HS,L,FO
VITACEAE	*Vitis vinifera*	Grapevine	LC	-	-	-	-	-	HS,L,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation*

5.8.3.3 Terrestrial Fauna

Invertebrates

Invertebrate studies were performed between 28 June and 1 July 2019. A total of 30 Lepidoptera (Butterflies), 7 Odonata (Dragonflies) and 12 species belonging to other groups were identified as a result of literature and field studies.

As it is given in Table 5-58, Table 5-59 and Table 5-60, among the lepidoptera species one (*Zerynhia cerisy*) found to be in the NT (Near Threatened). The others are all LC (Least Concern). The same for Odonata and the other insect species observed, they are all in LC category according to IUCN list. None of the invertebrate species listed in Bern Convention, CITES and Habitat Directive. According to the National legislation, there are 2 species *Papilio machaon* and *Pieris brassicae* listed as s strictly protected (Ann-I).None of the invertebrate species are endemic.

The local EIA reports also indicate the protection status of the *Papilio machaon* and *Pieris brassicae*. On the other hand, local EIA reports concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

Within the study area, there are bee colonies especially in forested areas at Kruševac. As they are very important for ecosystem services, bees are used for apiculture, however they are recognized as important source of pollination.

The photographs of representative species of invertebrate fauna observed during the field studies are given in Biodiversity Baseline Report (see. Appendix-7)

Table 5-57. Conservation Status of Invertebrates

IUCN							BERN		CITES			Habitat Directive			National Regulation	
CR	EN	VU	NT	LC	DD	NE	Ann-II	Ann-III	Ann-I	Ann-II	Ann-II	Ann-II	Ann-IV	Ann-V	Ann-I	Ann-II
-	-	-	1	48	-	-	-	-	-	-	-	-	-	-	2	-

Papilio machaon is widely distribute in Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czechia; Estonia; Finland; France; Germany; Greece; Hungary; Italy; Latvia; Liechtenstein; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Ukraine; United Kingdom. Population status of this species is stable and “LC” – Least Concern as IUCN criteria (van Swaay, C et al, 2010).

Pieris brassicae is widely distribute in Albania; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus; Czechia; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Liechtenstein; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Ukraine; United Kingdom. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Table 5-58. Butterfly Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Butterflies Lepidoptera											
Papilionidae	*Zerynthia cerisyi*	Earstern festoon	NT	-	-	-	-	-	X	X	HS,L,FO
Papilionidae	*Zerynthia polyxena*	Southern festoon	LC	-	-	-	-	-	X	X	HS,L,FO
Papilionidae	*Iphiclides podalirius*	Scarce swallowtail	LC	-	-	-	-	-	X	X	HS,L,FO
Papilionidae	*Papilio machaon*	Common swallowtail	LC	-	-	-	ANN-I	-	X	X	HS,L,FO
Pieridae	*Pieris rapae*	Small white	LC	-	-	-	-	-	X	X	HS,L,FO
Pieridae	*Pieris brassicae*	Large white	LC	-	-	-	ANN-I	-	X	X	HS,L,FO
Pieridae	*Pieris ergane*	Mountain small white	LC	-	-	-	-	-	X	X	HS,L,FO
Pieridae	*Pontia edusa*	New Bath White	LC	-	-	-	-	-	X	X	HS,L,FO
Pieridae	*Colias crocea*	Dark Clouded Yellow	LC	-	-	-	-	-	X	X	HS,L,FO
Pieridae	*Anthocharis cardamines*	Orange Tip	LC	-	-	-	-	-	X	X	HS,L,FO
Argynnidae	*Neptis rivularis*	Hungarian glider	LC	-	-	-	-	-	X	X	HS,L,FO
Argynnidae	*Vanessa atalanta*	Red admiral	LC	-	-	-	-	-	X	X	HS,L,FO
Argynnidae	*Vanessa cardui*	Painted lady	LC	-	-	-	-	-	X	X	HS,L,FO
Argynnidae	*Argynnis paphia*	Silver washed fritillary	LC	-	-	-	-	-	X	X	HS,L,FO
Argynnidae	*Melitaea didyma*	Spotted Fritillary	LC	-	-	-	-	-	X	X	HS,L,FO
Satyridae	*Melanargia galathea*	Marbled white	LC	-	-	-	-	-	X	X	HS,L,FO
Satyridae	*Maniola jurtina*	Meadow Brown	LC	-	-	-	-	-	X	X	HS,L,FO
Satyridae	*Coenonympha pamphilus*	Small Heath	LC	-	-	-	-	-	X	X	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Satyridae	*Pararge aegeria*	Speckled Wood	LC	-	-	-	-	-	X	X	HS,L,FO
Lycaenidae	*Satyrium spini*	Blue-spot Hairsreak	LC	-	-	-	-	-	X	X	HS,L,FO
Lycaenidae	*Polyommatus icarus*	Common Blue	LC	-	-	-	-	-	X	X	HS,L,FO
Lycaenidae	*Lycaena phlaeas*	Small Copper	LC	-	-	-	-	-	X	X	HS,L,FO
Lycaenidae	*Lycaena tityrus*	Sooty copper	LC	-	-	-	-	-	X	X	HS,L,FO
Lycaenidae	*Lycaena candens*	Balkan copper	LC	-	-	-	-	-	X	X	HS,L,FO
Hesperidae	*Pyrgus malvae*	Grizzled Skipper	LC	-	-	-	-	-	X	X	HS,L,FO
Hesperidae	*Carcharodus alceae*	Mallow Skipper	LC	-	-	-	-	-	X	X	HS,L,FO
Hesperidae	*Ochlodes venatus*	Large skipper	LC	-	-	-	-	-	X	X	HS,L,FO
Nymphalidae	*Inashic io*	Peacock butterfly	LC	-	-	-	-	-	X	X	HS,L,FO
Nymphalidae	*Polygonia c-album*	Comma butterfly	LC	-	-	-	-	-	X	X	HS,L,FO
Sphingidae	*Macroglossum stellatorum*	Hummingbird hawk moth	LC						X	X	HS,L,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation*

Table 5-59. Dragonfly Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Dragonflies, Odonata											
Aeshnidae	*Anax imperator*	Emperor Dragonfly	LC	-	-	-	-	-	X	X	HS,L,FO
Libellulidae	*Orthetrum cancellatum*	Black-tailed skimmer	LC	-	-	-	-	-	X	X	HS,L,FO
Libellulidae	*Libellula fulva*	Blue chaser	LC	-	-	-	-	-	X	X	HS,L,FO
Libellulidae	*Crocothemis erythraea*	Broad scarlet	LC	-	-	-	-	-	X	X	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Calopterygidae	*Calopteryx splendens*	Banded Demoiselle	LC	-	-	-	-	-	X	X	HS,L,FO
Platycnemididae	*Platycnemis pennipes*	White-legged Damselfly	LC	-	-	-	-	-	X	X	HS,L,FO
Coenagrionidae	*Ischnura elegans*	Blue-tailed Damselfly	LC	-	-	-	-	-	X	X	HS,L,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation*

Table 5-60. Other Insect Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Other Incest Orders											
Cantharidae	*Cantaris annularis*		LC	-	-	-	-	-	X	X	HS,L,FO
Scarabeidae	*Polyphylla variosolo*		LC	-	-	-	-	-	X	X	HS,L,FO
Scarabeidae	*Cetonia aurata*		LC	-	-	-	-	-	X	X	HS,L,FO
Lucanidae	*Lucanus nobilis*		LC	-	-	-	-	-	X	X	HS,L,FO
Chleridae	*Trichodes apiarius*	Bee beetle	LC	-	-	-	-	-	X	X	HS,L,FO
Coccinellidae	*Psylloborta vigintiduopunctata*	Ladybug	LC	-	-	-	-	-	X	X	HS,L,FO
Coccinellidae	*Coccinella semptempunctata*	Ladybug	LC	-	-	-	-	-	X	X	HS,L,FO
Syrphidae	*Eritharis tenax*		LC	-	-	-	-	-	X	X	HS,L,FO
Syrphidae	*Chrysotoxum cautum*		LC	-	-	-	-	-	X	X	HS,L,FO
Pentatomidae	*Graphosoma lineatum*		LC	-	-	-	-	-	X	X	HS,L,FO
Apidae	*Apis mellifera*	Honeybee	LC	-	-	-	-	-	X	X	HS,L,FO
Vespidae	*Vespa crabro*		LC	-	-	-	-	-	X	X	HS,L,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation*

Amphibians and Reptiles

A total of 10 Amphibian species belonging to 2 order and 5 families and 12 Reptilian species belonging to 2 order and 7 family species were identified as a result of literature and field studies. Two tailed frog (Urodela) and 8 tailless frog (Anura) species were identified in the project area. A total of 12 reptilian species identified along the Proposed Motorway Route were 2 turtles, 5 lizards and 5 snake species.

Amphibians

According to IUCN criteria given in Table 5-62, amphibian species were identified as a result of literature and field studies, it is seen that only *Triturus macedonicus* is classified as DD. The other 9 species are in LC (least concern) category. According to Bern Convention, 4 species are in the list of Annex-II and the other 6 species are in the list of Annex-III. None of the amphibian species is listed in CITES.

According to the Habitat Directive, 5 species listed in Annex-IV and 2 species listed in Annex-V.

According to the National legislation, 8 of the Amphibian species listed as strictly protected (Ann-I). Only, *Rana temporaria* species listed as protected species (Ann-II). The local EIA reports also indicate the protection status of the amphibian species. On the other hand, local EIA reports concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

Among these species, *Pelophylax ridibundus* was abundant. *Salamandra salamandra, Triturus macedonicus, Hyla arborea* and *Bufo bufo* species were rarely observed. None of the amphibian species are endemic. However, it is composed of widely spread species.

Reptiles

According to IUCN criteria given in Table 5-62, *Emys orbicularis, Testudo hermanni* and *Darevskia praticola* are included in NT category. *Emys orbicularis*, has spread in Central and Southern Europe, North Africa and Western Asia. *Testudo hermanni* is a wide-spread turtle species which spreads in large regions of Southern Europe. Other reptile species identified in Project area are listed in LC category. According to the Bern Convention, 9 species are listed in Annex-2, the other 3 reptilian species are listed in Annex-3.

According to the Habitat Directive, 5 species listed in Annex-II and 3 species listed in Annex-IV.

According to the National legislation, 7 of the Reptile species listed as strictly protected (Ann-I). The local EIA reports indicate the protection status of the Reptile species. On the other hand,

local EIA reports concluded that these species are not concentrated in the project AoI. Teherefore, project does not pose any risk to these species.

Among these species, *Lacerta viridis* and *Darevskia praticola* were abundant, *Natrix tessellata* had a moderate density, and the other species were rarely observed. None of the reptilian species identified in project area are endemic but are widely distributed species.

Table 5-61. Conservation Status of Amphibians and Reptiles

	IUCN							BERN		CITES			Habitat Directive			National Regulation	
	CR	EN	VU	NT	LC	DD	NE	Ann-II	Ann-III	Ann-I	Ann-II	Ann-II	Ann-II	Ann-IV	Ann-V	Ann-I	Ann-II
Amphibia	-	-	-	-	9	1	-	4	6	-	-	-		5-	2	8	1
Reptile				3	9			9	3				5	3		7	

Salamandra salamandra is widely distribute in Albania; Andorra; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; France; Germany; Greece; Hungary; Italy; Liechtenstein; Luxembourg; Montenegro; Netherlands; North Macedonia; Poland; Portugal; Romania; San Marino; Serbia; Slovakia; Slovenia; Spain; Switzerland; Ukraine. Population status of this species and “LC” – Least Concern as IUCN criteria.

Hyla arborea is widely distribute in Albania; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; France; Georgia; Germany; Greece; Hungary; Italy; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Poland; Portugal; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Ukraine. Population status of this species is “LC” – Least Concern as IUCN criteria.

Bufo bufo is widely distribute in Albania; Algeria; Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Germany; Gibraltar; Greece; Hungary; Italy; Kazakhstan; Latvia; Lebanon; Liechtenstein; Lithuania; Luxembourg; Moldova; Monaco; Montenegro; Morocco; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russian Federation; San Marino; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Syrian Arab Republic; Tunisia; Turkey; Ukraine; United Kingdom. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Pseudepidalea viridis is widely distribute in Albania; Austria; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Estonia; France; Germany; Greece; Hungary; Italy; Kazakhstan; Latvia; Lithuania; Malta; Moldova; Montenegro; North Macedonia; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Ukraine Population status of this species is "LC" – Least Concern as IUCN criteria.

Rana dalmatina is widely distribute in Albania; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; France; Germany; Greece; Hungary; Italy; Luxembourg; Montenegro; North Macedonia; Romania; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Ukraine; United Kingdom. Population status of this species is "LC" – Least Concern as IUCN criteria.

Rana graeca is widely distribute in Albania; Bosnia and Herzegovina; Bulgaria; Greece; Montenegro; North Macedonia; Serbia Population status of this species is stable and "LC" – Least Concern as IUCN criteria.

Rana temporaria is widely distribute in Albania; Andorra; Austria; Belarus; Belgium; Bulgaria; Croatia; Czechia; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Liechtenstein; Luxembourg; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; San Marino; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; United Kingdom Population status of this species is stable and "LC" – Least Concern as IUCN criteria.

Pelophylax ridibundus is widely distribute in Afghanistan; Armenia; Austria; Azerbaijan; Bahrain; Belarus; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Denmark; France; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Iraq; Kazakhstan; Kyrgyzstan; Latvia; Lithuania; Moldova; Montenegro; Netherlands; North Macedonia; Poland; Romania; Russian Federation; Saudi Arabia; Serbia; Slovakia; Slovenia; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan Population status of this species is increasing and "LC" – Least Concern as IUCN criteria.

Pelobates syriacus is widely distribute in Armenia; Azerbaijan; Bulgaria; Georgia; Greece; Iran, Islamic Republic of; Israel; Lebanon; North Macedonia; Romania; Russian Federation; Serbia; Syrian Arab Republic; Turkey Population status of this species is "LC" – Least Concern as IUCN criteria.

Emys orbicularis is widely distribute in Albania; Algeria; Armenia; Austria; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; France; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Latvia; Liechtenstein; Lithuania; Malta; Moldova; Monaco; Montenegro; Morocco; Netherlands; North Macedonia; Poland; Portugal; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Switzerland; Syrian Arab

Republic; Tunisia; Turkey; Turkmenistan; Ukraine. Population status of this species is “NT” – Near Threatened as IUCN criteria.

Ablepharus kitaibelii is widely distribute in Albania; Bulgaria; Croatia; Greece; Hungary; North Macedonia; Romania; Serbia; Slovakia; Turkey. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Darevskia praticola is widely distribute in Armenia; Azerbaijan; Bulgaria; Georgia; Greece; Iran, Islamic Republic of; Romania; Russian Federation; Serbia; Turkey. Population status of this species is “NT” – Near Threatened as IUCN criteria.

Dolichophis caspius is widely distribute in Albania; Bulgaria; Croatia; Georgia; Greece; Hungary; Kazakhstan; Moldova; Montenegro; North Macedonia; Romania; Russian Federation; Serbia; Turkey; Ukraine. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Natrix natrix is widely distribute in Albania; Algeria; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; China (Xinjiang); Croatia; Cyprus; Czechia; Denmark; Estonia; Finland; France (Corsica); Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Latvia; Lithuania; Luxembourg; Moldova; Mongolia; Montenegro; Morocco; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russian Federation; Serbia; Slovenia; Spain; Sweden; Switzerland; Syrian Arab Republic; Tunisia; Turkey; Turkmenistan; Ukraine; United Kingdom. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Natrix tessellata is widely distribute in Afghanistan; Albania; Armenia; Austria; Azerbaijan; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Egypt; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Iraq; Israel; Italy; Jordan; Kazakhstan; Kyrgyzstan; Lebanon; Moldova; Montenegro; North Macedonia; Pakistan; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Switzerland; Syrian Arab Republic; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan; Yemen. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Zamenis longissimus is widely distribute in Albania; Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; France; Georgia; Germany; Greece; Hungary; Italy; Moldova; Montenegro; North Macedonia; Romania; Serbia; Slovakia; Slovenia; Spain; Switzerland; Turkey; Ukraine. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Table 5-62. Amphibian-Reptilian Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Amphibian											
Salamandridae	*Salamandra salamandra*	Fire Salamander	LC	ANN-III	-	-	ANN-I	-	X	X	HS,L,FO
Salamandridae	*Triturus macedonicus*	Macedonian Crested Newt	DD	ANN-III	-	-	-	-	X	X	HS,L
Hylidae	*Hyla arborea*	European Tree Frog	LC	ANN-II	-	ANN-IV	ANN-I	-	X	X	HS,L,FO
Bufonidae	*Bufo bufo*	Common Toad	LC	ANN-III	-	-	ANN-I	-	X	X	HS,A,L,FO
Bufonidae	*Pseudepidalea viridis*	Green Toad	LC	ANN-II	-	ANN-IV	ANN-I	-	X	X	HS,L,FO
Ranidae	*Rana dalmatina*	Agile Frog	LC	ANN-II	-	ANN-IV	ANN-I	-	X	X	HS,L,FO
Ranidae	*Rana graeca*	Stream Frog	LC	ANN-III	-	ANN-IV	ANN-I	-	X	X	HS,L
Ranidae	*Rana temporaria*	Common Frog	LC	ANN-III	-	ANN-V	ANN-I	-	X	X	HS,L,FO
Ranidae	*Pelophylax ridibundus*	Marsh Frog	LC	ANN-III	-	ANN-V	ANN-II	-	X	X	HS,A,L,FO
Pelobatidae	*Pelobates syriacus*	Eastern Spadefoot	LC	ANN-II	-	ANN-IV	ANN-I	-	X	X	HS,L
Reptilian											
Emydidae	*Emys orbicularis*	European Pond Turtle	NT	ANN-II	-	ANN-II	ANN-I	-	X	X	HS,A,L
Testudinidae	*Testudo hermanni*	Hermann's Tortoise	NT	ANN-II	ANN-II	ANN-II	-	-	X	X	HS,A,L
Anguidae	*Anguis fragilis*	Slow Worm	LC	ANN-III	-	-	-	-	X	X	HS,L
Scincidae	*Ablepharus kitaibelli*	Juniper Skink	LC	ANN-II	-	ANN-IV	ANN-I	-	X	X	HS,L,FO
Lacertidae	*Darevskia praticola*	Meadow Lizard	NT	ANN-III	-	-	ANN-I	-	X	X	HS,L
Lacertidae	*Lacerta viridis*	European Green Lizard	LC	ANN-II	-	ANN-IV	-	-	X	X	HS,A,L,FO
Lacertidae	*Podarcis muralis*	Common Wall Lizard	LC	ANN-II	-	ANN-IV	-	-	X	X	HS,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Distributions		Source
									Project Site	Sorrounding Area	
Colubridae	*Dolichophis caspius*	Large Whip Snake	LC	ANN-II	-	-	ANN-I	-	X	X	HS,L
Colubridae	*Natrix natrix*	Grass Snake	LC	ANN-III	-	-	ANN-I	-	X	X	HS,L,FO
Colubridae	*Natrix tessellata*	Dice Snake	LC	ANN-II	-	ANN-II	ANN-I	-	X	X	HS,L,FO
Colubridae	*Zamenis longissimus*	Aesculapian Ratsnake	LC	ANN-II	-	ANN-II	ANN-I	-	X	X	HS,L
Viperidae	*Vipera ammodytes*	Nose Horned Viper	LC	ANN-II	-	ANN-II	-	-	X	X	HS,A,L

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation*

Birds

A total of 115 bird species belonging to 18 ordo, 40 families were identified as a result of literature and field studies. These bird species are widely spread in Serbia and Europa and they are not endemic. 55 bird species belong to the non-Passerine group and 60 of them belong to the Passerine group.

According to the IUCN Red List (see Table 5-64), 111 bird species those have been identified in the study area are in the category "LC: Least Concern". *Aquila heliaca* and *Streptopelia turtur* are classified as VU: Vulnerable and *Milvus milvus* and *Falco vespertinus* species are listed as NT: Near Threatened.

73 of 115 bird species are listed as strictly protected fauna species in Annex 2 of the Bern Convention. In addition, 34 species, together with a few exceptions, "protected fauna species" covering most of the species not included in Annex 2, are listed in Annex 3 of the Bern Convention. The remaining 8 species are not included in any conservation status of the Bern Convention. From this point of view, 107 of 115 bird species detected in the field are protected species according to the criteria of the Bern Convention. But according to the Bern Convention, 90% of the European ornithofauna seem to be species that need protection. This is why the Bern Convention aims to protect the species of birds precisely against the risk of a fall in the populations of European bird species. However, depending on its rich ecosystem, its location on migration routes, its diverse climatic characteristics and various habitat types for bird species, and the vast majority of the diversity and density of the Western Palearctic bird population, Serbia is not at a high risk as it is in the European ornithological system.

According to the CITES, 2 species listed in Annex-I and 1 species listed in Annex-II.

According to the Bird Directive, 28 species listed in Annex-I and 20 species listed in Annex-II.

According to the National legislation, 75 of the bird species listed as strictly protected (Ann-I). And 19 species listed as protected species (Ann-II). The local EIA reports indicate the protection status of the bird species. On the other hand, local EIA reports concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

The population density of bird species has been recorded as very low and has been found to be between 1 and 10 in most populations except for crows. There were no bird species and/or habitats in flocks and/or colonies observed in the study area.

Table 5-63. Conservation Status of Birds

IUCN							BERN		CITES			Bird Directive		National Regulation	
CR	EN	VU	NT	LC	DD	NE	Ann-II	Ann-II	Ann-I	Ann-II	Ann-III	Ann-I	Ann-II	Ann-I	Ann-II
-	-	2	2	111	-	-	73	34	2	1	-	28	20-	75	19

Two field studies were carried out covering the spring migration period and reproduction period. In these studies, bird species were listed, and their national and international conservation status was determined. In addition, ecological information was investigated on how the bird species use the recorded area.

Artificial ponds around the project site have been studied for three seasons in terms of bird species. The baseline study indicates that the populations of water birds are low due to small sizes of the artificial ponds. In addition to these artificial ponds, water birds were also observed, where the riverbed is expanded.

The third field study, which includes the autumn migration period and the pre-winter period, revealed habitats and important areas rich in bird species. Accordingly, monitoring studies have been carried out in habitats which are rich and important for bird species and are given in Biodiversity Baseline Report (see Appendix-7)

Potential Wintering Birds on Proposed Motorway Route

Wetlands are ecosystems with a high biodiversity that allow them to carry out their basic vital activities such as feeding, sheltering and breeding for species. Identification of wetlands cannot be easily achieved due to variations in the use of birds and vegetation of wetlands, variable water regimes and ranging from inlands to marine waters. Although the definitions of wetlands are made in different ways, the most widely accepted definition in the world is the RAMSAR Convention. According to international Ramsar Convention wetlands are defined as *"...areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters...*" and waterfowl is defined as *"...birds ecologically dependent on wetlands...*".

Different types of wetlands provide to increase the ecosystem diversity and species using these wetlands are increasing biological and genetic diversity. Wetlands are important hotspots for conservation of biodiversity and wetlands are taking up less than 2% of the continental surface of the world and are still shrinking. Changes in land use such as urbanization and conversion to agricultural land due to population growth causes wetland decreasing in proportion to the increase in human population. Water birds are considered as indicators of wetland quality and

restoration as parameters of local biodiversity, and many ecologists think that birds are one of the visible indicators of total productivity of biotic systems.

The preferred areas for wintering birds are generally large water bodies and reservoirs. Serbia got its fifth E-Bird hotspot with more than 150 species (followed by 45 more 100+ hotspots), so, here is the choice of the top-5 hotspots – all of them wetlands – as chosen by local birders (see Figure 5-51).

Figure 5-51. Important Wintering-Bird Areas Recommended in Serbia by Local Birdwatchers

E-bird is a network where bird watchers share their data worldwide. From being able to manage lists, photos and audio recordings, to seeing real-time maps of species distribution, to alerts that let you know when species have been seen, e-bird strives to provide the most current and useful information to the birding community. E-bird has been used extensively in the desktop studies in Serbia. Important areas for the wintering birds that could not be determined in the field studies were also determined using e-bird data.

Artificial small ponds cold be considered wintering area for birds. On the other hand, literature shows that, these areas located in the AoI were not ideal for wintering due to small size of the ponds. Long distance between the pond groups in addition to heavy anthropogenic influences are other factors limiting the wintering activity of the birds. E-Bird records indicates that only a few individuals belonging to some winter birds have been observed in the region. For example, according to records on February 10, 2019, there are 5 Common Coots and 8 Great Cormorants observations. Therefore, area is not considered as a critical wintering site for the birds.

Table 5-64. Bird Species Identified in the Studies

Family	Code	Scientific Name	English Name	IUCN	BERN	CITES	Bird Directive	National Regulation	Source
Podicipedidae	70	*Tachybaptus ruficollis*	Little Grebe	LC	ANN-II	-	-	-	HS,L,FO
	90	*Podiceps cristatus*	Great Crested Grebe	LC	ANN-III	-	-	ANN-I	HS,L,FO
Phalacrocoracidae	720	*Phalacrocorax carbo*	Great Cormorant	LC	Ann-III	-	-	-	HS,L,FO,eB
Ardeidae	950	*Botaurus stellaris*	Eurasian Bittern	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	1190	*Egretta garzetta*	Little Egret	LC	ANN-II	-	ANN-I	ANN-I	HS,A,L,FO
	1210	*Ardea alba*	Great White Egret	LC	ANN-II	-	ANN-I	-	HS,A,L,FO,eB
	1220	*Ardea cinerea*	Grey Heron	LC	Ann-III	-	-	ANN-II	HS,A,L,FO
Ciconiidae	1310	*Ciconia nigra*	Black Stork	LC	ANN-II	ANN-II	ANN-I	ANN-I	HS,A,L,FO
	1340	*Ciconia ciconia*	White Stork	LC	ANN-II	-	ANN-I	ANN-I	HS,A,L,FO
Anatidae	1840	*Anas crecca*	Teal	LC	Ann-III	-	ANN-II-A,ANN-III-B	ANN-II	HS,L,FO
	1860	*Anas platyrhynchos*	Mallard	LC	Ann-III	-	ANN-II-A, ANN-III-A	ANN-II	HS,L,FO,eB
Accipitridae	2310	*Pernis apivorus*	Honey Buzzard	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2380	*Milvus migrans*	Black Kite	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2390	*Milvus milvus*	Red Kite	NT	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2560	*Circaetus gallicus*	Short-Toed Eagle	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2600	*Circus aeruginosus*	Marsh Harrier	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2690	*Accipiter nisus*	Sparrowhawk	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2870	*Buteo buteo*	Buzzard	LC	ANN-II	-	-	ANN-I	HS,A,L,FO,eB
	2880	*Buteo rufinus*	Long-Legged Buzzard	LC	ANN-II	-	ANN-I	ANN-I	HS,A,L,FO
	2920	*Clanga pomarina*	Lesser Spotted Eagle	LC	ANN-II	-	ANN-I	-	HS,L,FO
	2950	*Aquila heliaca*	Imperial Eagle	VU	ANN-II	ANN-I	ANN-I	ANN-I	HS,L,FO
	2960	*Aquila chrysaetos*	Golden Eagle	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
	2980	*Hieraaetus pennatus*	Booted Eagle	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
Falconidae	3040	*Falco tinnunculus*	Kestrel	LC	ANN-II	-	-	ANN-I	HS,L,FO
	3070	*Falco vespertinus*	Red-Footed Falcon	NT	ANN-II	-	ANN-I	ANN-I	HS,L,FO

Family	Code	Scientific Name	English Name	IUCN	BERN	CITES	Bird Directive	National Regulation	Source
	3200	*Falco peregrinus*	Peregrine	LC	ANN-II	ANN-I	ANN-I	ANN-I	HS,L,FO
Phasianidae	3700	*Coturnix coturnix*	Quail	LC	Ann-III	-	ANN-II-B	ANN-II	HS,L,FO,eB
	3970	*Phasianus colchicus*	Pheasant	LC	Ann-III	-	ANN-II-A,ANN-III-A	ANN-II	HS,A,L,FO
Rallidae	4240	*Gallinula chloropus*	Moorhen	LC	Ann-III	-	ANN-II-B	ANN-II	HS,L,FO
	4290	*Fulica atra*	Coot	LC	Ann-III	-	ANN-II-A,ANN-III-B	ANN-II	HS,L,FO,eB
Recurvirostridae	4550	*Himantopus himantopus*	Black-Winged Stilt	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO,eB
Charadriidae	4690	*Charadrius dubius*	Little Ringed Plover	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Scolopacidae	5010	*Calidris minuta*	Little Stint	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	5170	*Calidris pugnax*	Ruff	LC	Ann-III	-	ANN-II-B	-	HS,L,FO,eB
	5530	*Tringa ochropus*	Green Sandpiper	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	5560	*Actitis hypoleucos*	Common Sandpiper	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
Laridae	5820	*Larus ridibundus*	Black-Headed Gull	LC	Ann-III	-	ANN-II-B	ANN-II	HS,L,FO,eB
	6150	*Sterna hirundo*	Common Tern	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO,eB
Columbidae	6650	*Columba livia*	Rock Dove	LC	Ann-III	-	ANN-II-A	ANN-I	HS,A,L,FO,eB
	6700	*Columba palumbus*	Woodpigeon	LC	-	-	ANN-II-A,ANN-III-A	ANN-II	HS,L,FO,eB
	6840	*Streptopelia decaocto*	Collared Dove	LC	Ann-III	-	ANN-II-B	ANN-II	HS,L,FO,eB
	6870	*Streptopelia turtur*	Turtle Dove	VU	Ann-III	-	ANN-II-B	ANN-II	HS,L,FO,eB
Cuculidae	7240	*Cuculus canorus*	Cuckoo	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
Strigidae	7390	*Otus scops*	Scops Owl	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	7440	*Bubo bubo*	Eagle Owl	LC	ANN-II	-	ANN-I	ANN-I	HS,A,L,FO
	7570	*Athene noctua*	Little Owl	LC	ANN-II	-	-	ANN-I	HS,L,FO
	7610	*Strix aluco*	Tawny Owl	LC	ANN-II	-	-	ANN-I	HS,L,FO
Caprimulgidae	7780	*Caprimulgus europaeus*	Nightjar	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
Apodidae	7950	*Apus apus*	Swift	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
Alcedinidae	8310	*Alcedo atthis*	Kingfisher	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO
Meropidae	8400	*Merops apiaster*	Bee-Eater	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB

Family	Code	Scientific Name	English Name	IUCN	BERN	CITES	Bird Directive	National Regulation	Source
Upupidae	8460	*Upupa epops*	Eurasian Hoopoe	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Picidae	8550	*Picus canus*	Grey-Headed Woodpecker	LC	ANN-II	-	ANN-I	ANN-I	HS,A,L,FO,eB
	8630	*Dryocopus martius*	Black Woodpecker	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO,eB
	8760	*Dendrocopos major*	Great-Spotted Woodpecker	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO,eB
Alaudidae	9720	*Galerida cristata*	Crested Lark	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
	9740	*Lullula arborea*	Woodlark	LC	Ann-III	-	ANN-I	ANN-I	HS,L,FO,eB
	9760	*Alauda arvensis*	Skylark	LC	Ann-III	-	ANN-II-B	ANN-I	HS,L,FO,eB
Hirundinidae	9920	*Hirundo rustica*	Swallow	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	10010	*Delichon urbicum*	House Martin	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Motacillidae	10090	*Anthus trivialis*	Tree Pipit	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	10170	*Motacilla flava*	Yellow Wagtail	LC	ANN-II	-	-	ANN-I	HS,L,FO
	10190	*Motacilla cinerea*	Grey Wagtail	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	10200	*Motacilla alba*	Pied Wagtail	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Troglodytidae	10660	*Troglodytes troglodytes*	Wren, Winter Wren	LC	ANN-II	-	ANN-I	-	HS,L,FO,eB
Muscicapidae	10990	*Erithacus rubecula*	Robin	LC	ANN-II	-	-	-	HS,L,FO,eB
	11040	*Luscinia megarhynchos*	Nightingale	LC	ANN-II	-	-	-	HS,L,FO,eB
	11210	*Phoenicurus ochruros*	Black Redstart	LC	ANN-II	-	-	-	HS,L,FO
	11220	*Phoenicurus phoenicurus*	Redstart	LC	ANN-II	-	-	-	HS,L,FO,eB
	11390	*Saxicola torquata*	Stonechat	LC	ANN-II	-	-	-	HS,L,FO
	11460	*Oenanthe oenanthe*	Northern Wheatear	LC	ANN-II	-	-	-	HS,L,FO,eB
	11480	*Oenanthe hispanica*	Black-Eared Wheatear	LC	ANN-II	-	-	-	HS,L,FO,eB
	11660	*Monticola solitarius*	Blue Rock Thrush	LC	ANN-II	-	-	-	HS,L,FO,eB
	13350	*Muscicapa striata*	Spotted flycatcher	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Turdidae	11870	*Turdus merula*	Blackbird	LC	Ann-III	-	ANN-II-B	ANN-I	HS,A,L,FO,eB

Family	Code	Scientific Name	English Name	IUCN	BERN	CITES	Bird Directive	National Regulation	Source
	11980	*Turdus pilaris*	Fieldfare	LC	Ann-III	-	ANN-II-B	ANN-I	HS,L,FO,eB
	12020	*Turdus viscivorus*	Mistle Thursh	LC	Ann-III	-	ANN-II-B	ANN-I	HS,L,FO,eB
Sylviidae	12200	*Cettia cetti*	Cetti's Warbler	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
	12510	*Acrocephalus scirpaceus*	Reed Warbler	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
	12530	*Acrocephalus arundinaceus*	Great Reed Warbler	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
	12550	*Hippolais pallida*	Olivaceous Warbler	LC	Ann-III	-	-	ANN-I	HS,L,FO,eB
	12670	*Sylvia melanocephala*	Sardinian Warbler	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	12740	*Sylvia curruca*	Lesser Whitethroat	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	12750	*Sylvia communis*	Whitethroat	LC	ANN-II	-	-	-	HS,L,FO,eB
	12770	*Sylvia atricapilla*	Blackcap	LC	ANN-II	-	-	-	HS,L,FO,eB
	13110	*Phylloscopus collybita*	Chiffchaff	LC	ANN-II	-	-	-	HS,L,FO,eB
Reguliidae	13140	*Regulus regulus*	Goldcrest	LC	ANN-II	-	-	-	HS,L,FO
Aegithalidae	14370	*Aegithalos caudatus*	Long-Tailed Tit	LC	Ann-III	-	-	-	HS,L,FO,eB
Paridae	14410	*Parus lugubris*	Sombre Tit	LC	ANN-II	-	-	ANN-I	HS,L,FO
	14620	*Parus caeruleus*	Blue Tit	LC	ANN-II	-	-	ANN-I	HS,L,FO
	14640	*Parus major*	Great Tit	LC	ANN-II	-	-	ANN-I	HS,L,FO
Sittidae	14790	*Sitta europaea*	Nuthatch	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Oriolidae	15080	*Oriolus oriolus*	Golden Oriole	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Laniidae	15150	*Lanius collurio*	Red-Backed Shrike	LC	ANN-II	-	ANN-I	ANN-I	HS,L,FO,eB
	15200	*Lanius excubitor*	Great Grey Shrike	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	15230	*Lanius senator*	Woodchat Shrike	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
Corvidae	15390	*Garrulus glandarius*	Jay, Eurasian Jay	LC	-	-	ANN-II-B	ANN-II	HS,A,L,FO,eB
	15490	*Pica pica*	Magpie, Black-billed Magpie	LC	-	-	ANN-II-B	ANN-II	HS,A,L,FO
	15600	*Corvus monedula*	Jackdaw, Eurasian Jackdaw	LC	-	-	ANN-II-B	ANN-II	HS,L,FO
	15630	*Corvus frugilegus*	Rook	LC	-	-	ANN-II-B	ANN-II	HS,L,FO,eB

Family	Code	Scientific Name	English Name	IUCN	BERN	CITES	Bird Directive	National Regulation	Source
	15670	*Corvus cornix*	Hooded Crow	LC	-	-	ANN-II-B	ANN-II	HS,L,FO
	15720	*Corvus corax*	Raven	LC	Ann-III	-	-	ANN-II	HS,A,L,FO
Sturnidae	15820	*Sturnus vulgaris*	Starling	LC	-	-	ANN-II-B	-	HS,A,L,FO,eB
Passeridae	15910	*Passer domesticus*	House Sparrow	LC	-	-	-	ANN-II	HS,A,L,FO,eB
	15920	*Passer hispaniolensis*	Spanish Sparrow	LC	Ann-III	-	-	ANN-I	HS,A,L,FO,eB
	15980	*Passer montanus*	Tree Sparrow	LC	Ann-III	-	-	ANN-II	HS,L,FO
Fringillidae	16360	*Fringilla coelebs*	Chaffinch	LC	Ann-III	-	ANN-I	ANN-I	HS,L,FO,eB
	16400	*Serinus serinus*	Serin	LC	ANN-II	-	-	ANN-I	HS,L,FO
	16490	*Carduelis chloris*	Greenfinch	LC	ANN-II	-	-	ANN-I	HS,L,FO
	16530	*Carduelis carduelis*	Goldfinch	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	16540	*Carduelis spinus*	Siskin	LC	ANN-II	-	-	ANN-I	HS,L,FO
Emberizidae	18580	*Emberiza cirlus*	Cirl Bunting	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	18660	*Emberiza hortulana*	Ortolan	LC	Ann-III	-	ANN-I	ANN-I	HS,L,FO
	18810	*Emberiza melanocephala*	Black-Headed Bunting	LC	ANN-II	-	-	ANN-I	HS,L,FO,eB
	18820	*Miliaria calandra*	Corn Bunting	LC	Ann-III	-	-	-	HS,L,FO,eB

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation, eB:eBird*

Mammals

A total of 50 mammal species belonging to 7 ordo, 15 families were identified as a result of literature and field studies. These mammal species are widely spread in Serbia and Europe and are not endemic.

Of the 50 mammal species, 13 belong to medium and large-sized mammals and 37 belong to small mammals.

According to the IUCN Red List, the mammal species those have been identified in the project area are in 45 of them the category "LC: Least Concern", 1 of them "DD= Data Deficient", 3 of them is "NT= Near Threatened" these are *Rhinolophus Euryale, Myotis bechsteinii* and *Lutra lutra* (=Eurasian otter) and 1 of them VU= "Vulnerable" that is *Myotis capaccinii* (=Long-fingered Bat) and no mammal species classified as dangerous and/or threatened (CR-EN) (see Table 5-66)

16 of the mammal species are listed as strictly protected fauna species in Annex 2 of the Bern Convention. In addition, 14 species, together with a few exceptions, "protected fauna species" covering most of the species not included in Annex 2, are listed in Annex 3 of the Bern Convention. The remaining 20 species are not included in the lists of the Bern Convention.

According to the CITES, 1 species listed in Annex-II and 3 species listed in Annex-III.

According to the Habitat Directive, 7 species listed in both Annex-II and Annex IV and 4 species listed in Annex-IV.

According to the National legislation, 33 of the mammal species are listed as strictly protected (Ann-I). And 1 species listed as protected species (Ann-II). The local EIA reports indicate the protection status of the mammal species. On the other hand, local EIA reports concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

Table 5-65. Conservation Status of Mammals

IUCN							BERN		CITES			Habitat Directive		National Regulation	
CR	EN	VU	NT	LC	DD	NE	Ann-II	Ann-III	Ann-I	Ann-II	Ann-III	Ann-II,IV	Ann-IV	Ann-I	Ann-II
-	-	-	1	45	1	-	16	14	-	1	3	7	4	33	1

The survey indicates potential Bat species uses the area only for feeding purposes. During the surveys, no permanent bat-roost, which can be impacted by project units or activities are identified.

According to available data and knowledge in Serbia there are 2 potential invasive species of mammals recorded: *Ondatra zibethicus* – muskrat and *Myocastor coypus* – nutria (Coypu).

Ondatra zibethicus is from North America. It inhabits coastal habitats of fresh and slow flowing waters, ponds, swamps, lakes, fisheries and canals with dense coastal vegetation, and mountain areas. In Serbia it is present in northern and central parts, and rarely in southern parts (part of the South Morava River basin and Vlasina accumulation). It is present along all major and minor watercourses along Danube, Sava, Great Morava, Tisa and DTD channel in Vojvodina. There are also reports from Lim, Ibar and the West Morava River. Muskrat is potentially invasive species.

It is possible that it has competitive relationship with European water vole (*Arvicola amphibius*), autochthones species. Though insignificant according to current knowledge, there is digging activity of the species present which creates some damage on river dams and dykes along channels and rivers. In large abundances it can cause damages on agriculture in the vicinity of lair, even though its nutrition is primarily based on hydrophilic and aquatic plants. Animal nutrition is also present, but occasionally and of smaller percentage in total nutrition intake. It is made of fish, fish eggs, snails, river shells, freshwater crustaceans, and according to some reports even smaller poultry and juvenile birds.

Nutria (*Myocastor coypus*) comes from South America. It is adapted to semi aquatic life, and it inhabits rivers, streams, lakes, and puddle areas, natural and artificial wetlands with developed coastal vegetation. In Serbia it is present in Srem and Banat along Danube (Vojvodina), conflux of rivers Great Morava, Mlava and Pek into Danube, and occasionally along Tisa River. Species is potentially invasive. Outside of natural habitat and for short time it can grow in abundant numbers, causing damages to crops, drainage systems and to autochthonous plants. Therefore introduced populations are usually regarded as pest. Species can serve as vector for larger number of infections for different animal species, and in some cases for humans: leptospirosis, salmonellosis, pastelosis, botulism, some virus and fungal infections and parasitic infections such as toxoplasmosis.

Table 5-66. Mammal Species Identified in the Studies

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	Hunting Status	National Regulation	End.	Distribution		Source
										Project Site	Sorrounding Area	
ERINACEOMORPHA												
ERINACEIDAE	*Erinaceus roumanicus*	Southern White-Breasted Hedgehog	LC	-	-	-	-	ANN-I	-	X	X	HS,L,FO,PT
SORICOMORPHA												
SORICIDAE	*Sorex araneus*	Common Shrew	LC	ANN-III	-	-	-	ANN-I	-	X	X	HS,FO,L
	Neomys anomalus	Mediterranean Water Shrew	LC	ANN-III	-	-	-	ANN-I	-	X	X	HS,FO,L
	Crocidura suaveolens	Lesser White-Toothed Shrew	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,FO,L
	Crocidura leucodon	Bicolored Shrew	LC	ANN-III	-	-	-	ANN-I	-	X	X	HS,FO,L
TALPIDAE	*Talpa europea*	European Mole	LC	-	-	-	-	ANN-I	-	X	X	HS,FO,L,B
CHIROPTERA												
RHINOLOPHIDAE	*Rhinolophus euryale*	Mediterranean Horseshoe Bat	NT	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
	Rhinolophus ferrumequinum	Greater Horseshoe Bat	LC	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
	Rhinolophus hipposideros	Mehely's Horseshoe Bat	LC	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
VESPERTİLİONİDAE	*Myotis blythii*	Lesser Mouse-Eared Bat	LC	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
	Myotis bechsteinii	Bechstein's Bat	NT	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
	Myotis daubentonii	Daubenton's Bat	LC	ANN-II	-	AN-IV	-	ANN-I	-	X	X	HS,L
	Myotis capaccinii	Long-Fingered Bat	VU	ANN-II	-	AN-IV	-	ANN-I	-	X	X	HS,L
	Myotis myotis	Whiskered Bat	LC	ANN-II	-	ANN-II, IV	-	ANN-I	-	X	X	HS,L
	Myotis mystacinus	Whiskered Myotis	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,L

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	Hunting Status	National Regulation	End.	Distribution		Source
										Project Site	Sorrounding Area	
	Hypsugo savii	Savi's Pipistrelle	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,L
	Nyctalus noctula	Noctule	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,L
	Pipistrellus pipistrellus	Common Pipistrelle	LC	ANN-III	-	-	-	ANN-I	-	X	X	HS,L
	Pipistrellus nathusii	Nathusius' Pipistrelle	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,L
	Plecotus auritus	Brown Big-Eared Bat	LC	ANN-II	-	-	-	ANN-I	-	X	X	HS,L
LAGOMORPHA												
LEPORIDAE	*Lepus europaeus*	European Hare	LC	ANN-III	-	-	15.10.-30.11.	ANN-I	-	X	X	HS,A,L,FO
RODENTIA												
SCIURIDAE	*Sciurus vulgaris*	Red Squirrel	LC	ANN-III	-	-	1.8.-28.2.	-	-	X	X	HS,A,L,FO
MURIDAE	*Cricetus cricetus*	European Hamster	LC	ANN-II	-	AN-IV	-	-	-	X	X	HS,A,L,FO
	Nannospalax leucodon	Lesser Mole-Rat	DD	-	-	-	-	-	-	X	X	HS,A,L,FO,B
	Cletrhrionomys glareolus	Bank Vole	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Arvicola amphibius	European Water Vole	LC	-	-	-	-	ANN-I	-	X	X	HS,A,L,FO
	Ondatra zibetica	Muskrat	LC	-	-	-	1.1.-31.12.	-	-	X	X	HS,A,L,FO
	Pitymys subterraneus	European Pine Vole	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Microtus arvalis	Common Vole	LC	-	-	-	-	-	-	X	X	HS,A,L,FO,B
	Micromys minutus	Eurasian Harvest Mouse	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Apodemus flavicollis	Yellow-Necked Mouse	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Apodemus sylvaticus	Wood Mouse	LC	-	-	-	-	-	-	X	X	HS,A,L,FO

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	Hunting Status	National Regulation	End.	Distribution		Source
										Project Site	Sorrounding Area	
	Apodemus agrarius	Striped Field Mouse	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Rattus rattus	Black Rat	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Rattus norvegicus	Brown Rat	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
	Mus musculus	House Mouse	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
GLIRIDAE	*Glis glis*	Edible Dormouse	LC	ANN-III	-	-	1.8.-28.2	ANN-I	-	X	X	HS,A,L,FO
	Dryomys nitedula	Forest Dormouse	LC	ANN-III	-	-	-	ANN-I	-	X	X	HS,A,L,FO
MYOCASTORIDAE	*Myocastor coypus*	Coypu	LC	-	-	-	-	-	-	X	X	HS,A,L,FO
CARNIVORA												
CANIDAE	*Canis aureus*	Golden Jackal	LC	-	ANN-III	-	1.1.-31.12.	ANN-I	-	X	X	HS,A,FO,PT
	Vulpes vulpes	Red Fox	LC	-	ANN-III	-	1.1.-31.12	ANN-I	-	X	X	HS,A,FO,PT
MUSTELIDAE	*Mustela nivalis*	Least Weasel	LC	ANN-III	-	-	Forbiden	ANN-I	-	X	X	HS,A,FO
	Mustela putorius	European Polecat	LC	ANN-III	-	-	Forbiden	ANN-I	-	X	X	HS,A,FO
	Martes foina	Beech Marten	LC	ANN-III	ANN-III	-	1.10.-28.02.	ANN-I	-	X	X	HS,A,FO,PT
	Meles meles	European Badger	LC	ANN-III	-	-	1.07.-28.02.	ANN-I	-	X	X	HS,A,FO,PT
	Lutra lutra	Eurasian Otter	NT	ANN-II	-	ANN-II, IV	Forbiden	ANN-I	-	X	X	HS,A,L
FELIDAE	*Felis silvestris*	Wildcat	LC	ANN-II	ANN-II	AN-IV	-	ANN-I	-	X	X	HS,A,FO
ARTRIODACTYLA												

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	Hunting Status	National Regulation	End.	Distribution		Source
										Project Site	Sorrounding Area	
SUIDAE	*Sus scrofa*	Wild Boar	LC	ANN-III	-	-	Male 15.04-28.02. Female. 1.07.-15.01. Young 15.04-28.02.	ANN-I	-	X	X	HS,A,FO,FP
CERVIDAE	*Capreolus capreolus*	European Roe Deer	LC	ANN-III	-	-	Male 15.04-30.09 F. And Y. 1.09.-31.01.	ANN-II	-	X	X	HS,A,FO,FP

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation, BVR: Bat Voice Records,B: Burrow,FP: Footprint,PT. Photo-traps*

5.8.3.4 Aquatic Ecosystems

Streams / rivers located within the boundaries of Kruševac, Kragujevac and Čačak Provinces are found in the Morava River Basin. All of the river crossing points in the Proposed Motorway Route is known as the West Morava River.

14 species (*Alburnus alburnus, Alburnoides bipunctatus, Barbus barbus, Barbus balcanicus, Carassius auratus, Carassius carassius, Cyprinus carpio, Gambusia holbrooki, Leuciscus idus, Pesudorasbora parva, Sander lucioperca, Squalius cephalus, Esox lucius, Cobitis elongate*) belonging to the Cyprinidae (Carp), Cobitidae (Spine Loach) and Esocidae (Pike-Perch), Percidae (European Perch), Poecilidae (Poeciliids) families were identified as a result of literature and field studies

Within the ichthyofauna, 6 species (*Carassius aurata, Ctenopharyngodon idella, Gambusia holbrooki, Lepomis gibbosus, Oncorhynchus mykiss, Pseudorasbora parva*) are known as exotic species. One of the species, *Cyprinus carpio* (Wild Carp) is classified as 'Vulnerable Species-VU' due to the IUCN Red List.

7 species (*Alburnoides bipunctatus, Alburnus chalcoides, Chondrostoma nasus, Cobitis elongate, Leucaspius delineates, Romanogobio uranoscopus, Silurus glanis*) are protected under Bern Convention, Annex III. The freshwater fish species living in the Morava River Basin are listed in below according to the literature, local people and observation.

None of the fish species are listed in CITES and EU Habitat Directive.

According to the National legislation, 4 of the fish species listed as strictly protected (Ann-I). 9 species listed as protected species (Ann-II), as specified in Table 5-68. The local EIA reports indicate the protection status of the fish species. On the other hand, local EIA reports also concluded that these species are not concentrated in the project AoI. Therefore, project does not pose any risk to these species.

Within the macrobenthic organisms, *Hirudo medicinalis* is classified as 'Near Threatened Species-NT',*Astacus astacus* classified as 'Vulnerable-VU' and *Unio crassus* classified as 'Endangered-EN' due to the IUCN Red List.

According to the National legislation, 2 of the macrobenthic species listed as strictly protected (Ann-I). *Hirundo medicinalis* species listed as protected species (Ann-II), as specified in Table 5-69. Same as the fish species, the local EIAs concluded the project has no major impact on macrobentic species.

Table 5-67. Conservation Status of Fishes

IUCN							BERN		CITES			Habitat Directive		National Regulation	
CR	EN	VU	NT	LC	DD	NE	Ann-II	Ann-III	Ann-I	Ann-II	Ann-III	Ann-II,IV	Ann-IV	Ann-I	Ann-II
-	1	1	1	32	-	2	-	7	-	-	-	-	-	6	10

Abramis brama is widely distribute in Afghanistan; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Ireland; Italy; Kazakhstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Turkmenistan; Ukraine; United Kingdom; Uzbekistan. Population status of this species is “LC” – Least Concern as IUCN criteria.

Barbus balcanicus is widely distribute in Albania; Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Greece; Hungary; Italy; Montenegro; North Macedonia; Romania; Serbia; Slovenia. Population status of this species is “LC” – Least Concern as IUCN criteria.

Carassius carassius is widely distribute in Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Sweden; Switzerland; Turkey; Ukraine; United Kingdom; Uzbekistan. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Chondrostoma nasus is widely distribute in Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; France; Germany; Hungary; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Switzerland; Ukraine. Population status of this species is stable and “LC” – Least Concern as IUCN criteria.

Cyprinus carpio is widely distribute in Afghanistan; Armenia; Austria; Azerbaijan; Bulgaria; China; Croatia; Georgia; Germany; Hungary; Iran, Islamic Republic of; Kazakhstan; Kyrgyzstan; Moldova; Pakistan; Romania; Russian Federation; Serbia; Slovakia; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan. Population status of this species is stable and “VU” – Vulnerable as IUCN criteria.

Squalius cephalus is widely distribute in Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland;

France; Georgia; Germany; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Norway; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Turkmenistan; Ukraine; United Kingdom. Population status of this species is "LC" – Least Concern as IUCN criteria.

Tinca tinca is widely distribute in Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Gibraltar; Greece; Holy See (Vatican City State); Hungary; Iran, Islamic Republic of; Italy; Jersey; Kazakhstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Monaco; Mongolia; Montenegro; Netherlands; North Macedonia; Norway; Poland; Portugal; Romania; Russian Federation; San Marino; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Turkey; Turkmenistan; Ukraine; United Kingdom; Uzbekistan. Population status of this species is "LC" – Least Concern as IUCN criteria.

Cobitis elongata is widely distribute in Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Montenegro; North Macedonia; Romania; Serbia; Slovenia. Population status of this species is "LC" – Least Concern as IUCN criteria.

Esox lucius is widely distribute in Albania; Austria; Belgium; Bosnia and Herzegovina; Bulgaria; Canada; China; Croatia; Czechia; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Monaco; Mongolia; Netherlands; North Macedonia; Norway; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Sweden; Switzerland; Turkey; Turkmenistan; Ukraine; United Kingdom; United States; Uzbekistan. Population status of this species is stable and "LC" – Least Concern as IUCN criteria.

Perca fluviatilis is widely distribute in Afghanistan; Albania; Andorra; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Guernsey; Hungary; Iran, Islamic Republic of; Ireland; Isle of Man; Italy; Jersey; Kazakhstan; Kyrgyzstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Monaco; Mongolia; Montenegro; Netherlands; North Macedonia; Norway; Pakistan; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Spain; Sweden; Switzerland; Tajikistan; Turkey; Turkmenistan; Ukraine; United Kingdom; Uzbekistan. Population status of this species is "LC" – Least Concern as IUCN criteria.

Sander lucioperca is widely distribute in Afghanistan; Armenia; Austria; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Denmark; Estonia; Finland; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Kyrgyzstan; Latvia; Lithuania; Moldova; Montenegro; North Macedonia; Norway; Pakistan; Poland; Romania;

Russian Federation; Serbia; Slovakia; Slovenia; Sweden; Switzerland; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan. Population status of this species is “LC” – Least Concern as IUCN criteria.

Zingel zingel is widely distribute in Austria; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Germany; Hungary; Moldova; Montenegro; North Macedonia; Poland; Romania; Serbia; Slovakia; Slovenia; Ukraine. Population status of this species is “LC” – Least Concern as IUCN criteria.

Silurus glanis is widely distribute in Afghanistan; Albania; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Italy; Kazakhstan; Kyrgyzstan; Latvia; Liechtenstein; Lithuania; Luxembourg; Moldova; Montenegro; Netherlands; North Macedonia; Pakistan; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Sweden; Switzerland; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan. Population status of this species is “LC” – Least Concern as IUCN criteria.

Hirudo medicinalis is widely distribute in Austria; Belarus; Croatia; Czechia; France; Germany; Hungary; Latvia; Lithuania; Netherlands; Norway; Poland; Russian Federation; Slovenia; Sweden; Switzerland; Ukraine; United Kingdom. Population status of this species is “NT” – Near Threatened as IUCN criteria.

Unio crassus is widely distribute in Albania; Armenia; Austria; Azerbaijan; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France (France (mainland)); Georgia; Germany; Greece; Hungary; Iran, Islamic Republic of; Iraq; Latvia; Liechtenstein; Lithuania; Luxembourg; Netherlands; North Macedonia; Poland; Romania; Russian Federation (Central European Russia); Serbia; Slovakia; Slovenia; Sweden; Switzerland; Turkey; Ukraine. Global population status of this species is “EN” – Endangered as IUCN criteria.

Astacus astacus is widely distribute in Andorra; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Hungary; Latvia; Lithuania; Moldova; Netherlands; North Macedonia; Poland; Romania; Russian Federation (Kaliningrad); Serbia; Slovakia; Slovenia; Switzerland. Population status of this species is “VU” – Vulnerable as IUCN criteria. Considering the literature studies and their ecological features, *Astacus astacus* preferred mainly lakes, ponds and deep river systems with slow flow and the species is mostly found at the regions close to the Danube River. According to the SIMIC et. Al 2008, the Zeta River is given as an optimal habitat for *Astacus astacus*. In the same study, West Morava River defined as poor habitat in terms of *Astacus astacus* specie. On the other hand, according to the morphometric of the streams and physical,

chemical and biotic parameters, a large number of river habitats in Serbia have similar characteristics as the Zeta river, but populations of river crayfish in those habitats are rare or have completely disappeared (SIMIC et. Al 2008).

Ecological Water Quality of the West Morava River[7]

Ecological status assessment of the West Morava River was performed by using macro invertebrates as bio indicators and taking into consideration community structure and composition.

For saprobiological analyses, a list of bio indicator organisms according to Moog was applied (Moog, 1995). Some taxa were not identified to the species level due to low level of confidence and the complex identification process. The metrics calculation was performed using ASTERICS software (AQEM, 2002). Indicative status assessment was carried out according to the national legislation (Official Gazette of the Republic of Serbia 74/2011), based on the class boundaries for rivers Type 2 (large rivers with medium grain-size mineral substrates, except the Pannonian plain rivers). The recommendations provided by the EU Water Framework Directive were applied (WFD, 2000).

According to the results of this study, it is concluded that the West Morava River is primarily under the influence of moderate organic pollution as well as various types of hydro morphological pressures. Therefore, an overall status of the river could be assessed as moderate (Class III).

Detailed descriptions of sampling points are given in Biodiversity Baseline Report (see. Appendix-7)

[7] Indicative Ecological Status Assessment of the Zapadna Morava River Based on Aquatic Macroinvertebrate Community 2013

Table 5-68. Freshwater Fish Species and Their Protected Status Inhabited in Morava River

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
CYPRINIDAE	*Abramis brama*	Freshwater Bream	LC	-	-	-	ANN- II	-	L,A,FO
	Alburnoides bipunctatus	Schneider	NE	ANN-III	-	-	-	-	L,FO
	Alburnus alburnus	Bleak	LC	-	-	-	-	-	L,FO
	Alburnus chalcoides	Danube Bleak	LC	ANN-III	-	-	-	-	L,A,FO
	Barbus balcanius	Balkan Barb	LC	-	-	-	ANN- II	-	L,FO
	Barbus barbus	Barbel	LC	-	-	-	-	-	L,FO
	Blicca bjöerkna	White Bream	LC	-	-	-	-	-	L
	Carassius auratus	Goldfish	LC	-	-	-	-	-	L
	*Carassius carassius***		LC	-	-	-	ANN- I	-	L,A,FO
	Chondrostoma nasus	Common Nase	LC	ANN- III	-	-	ANN- II	-	L,A,FO
	*Ctenopharyngodon idella***	Grass Carp	-	-	-	-	-	-	L
	Cyprinus carpio	Common Carp	VU	-	-	-	ANN- II	-	L,A,FO
	Gobio bulgaricus	Gudgeon	LC	-	-	-	-	-	L
	Leucaspius delineatus	Belica	LC	ANN-III	-	-	-	-	L
	Leuciscus aspius	Mesopotamian Asp	LC	-	-	-	-	-	L
	Leuciscus idus	Ide	LC	-	-	-	-	-	L,FO
	Leuciscus leuciscus	Common Dace	LC						L
	*Pseudorasbora parva***	Topmouth Gudgeon	LC	-	-	-	-	-	L,FO
	Romanogobio kesslerii	Kessler's Goby	LC	-	-	-	-	-	L
	Romanogobio uranoscopus	Danubian longbarbel gudgeon	LC	ANN-III	-	-	-	-	L
	Rhodeus meridionalis	Bitterling	LC	-	-	-	-	-	L
	Rutilus rutilus	Roach	LC	-	-	-	-	-	L

Family	Scientific Name	English Name	IUCN	BERN	CITES	Habitat Directive	National Regulation	Endemism	Source
	Scardinius erythrophthalmus	Rudd	LC	-	-	-	-	-	L
	Squalius cephalus	Chub	LC	-	-	-	ANN- II	-	L,FO
	Tinca tinca	Tench	LC	-	-	-	ANN- I	-	L
	Vimba vimba	Vimba Bream	LC	-	-	-	-	-	L
BALITORIDAE	*Barbatula barbatula*	Stone Loach	LC	-	-	-	-	-	L
CENTRARCHIDAE	*Lepomis gibbosus**	Pumpkinseed	LC	-	-	-	-	-	L
COBITIDAE	*Cobitis elongata*	Balkan Loach	LC	ANN- III	-	-	ANN- I	-	L,FO
ESOCIDAE	*Esox lucius*	Northen Pike	LC	-	-	-	ANN- II	-	L,A,FO
PERCIDAE	*Perca fluviatilis*		LC	-	-	-	ANN- II	-	L,A
	Sander lucioperca	Pike-perch	LC	-	-	-	ANN- II	-	L,A,FO
	Zingel zingel	Zingel	LC	-	-	-	ANN- I	-	L
POECILIDAE	*Gambusia holbrooki**	Mosquitofish	LC	-	-	-	-	-	L,FO
SALMONIDAE	*Oncorhynchus mykis**	Rainbow trout	NE	-	-	-	-	-	L
SILURIDAE	*Silurus glanis*	Wels Catfish	LC	ANN- III	-	-	ANN- II	-	L,A,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation, BVR: Bat Voice Records,B: Burrow,FP: Footprint,PT. Photo-traps*

***Exotic Species*

Table 5-69. Macrobenthic Organisms Inhabited in Morava River

Class	Ordo	Family	Source
ANNELIDA			
CITELLATA	ARHYNCHOBDELLIDA	Hirudinidae (*Hirundo medicinalis)*NT Nat:Ann-II	L,A,FO
OLIGOCHAETA	LUMBRICULIDA	Lumbriculidae	L
OLIGOCHAETA	LUMBRICULIDA	Tubificidae	L
MOLLUSCA			
GASTROPODA	HYGROPHIA	Lymnaeidae	L,FO
GASTROPODA	HYGROPHIA	Physidae	L
BIVALVIA	UNIONIDA	Unionidae (*Unio pictorum*) LC	L,FO
BIVALVIA	UNIONIDA	Unionidae (*Unio carassus*) VU Nat:Ann-I	L
ARTHROPODA			
MALACOSTRACA	AMPHIPODA	Gammaridae	L,FO
MALACOSTRACA	DECAPODA	Potamidae	L,FO
MALACOSTRACA	DECAPODA	Astacidae (*Astacus astacus*) EN Nat:Ann-I	L
INSECTA	EPHEMEROPTERA	Baetiae	L,FO
INSECTA	EPHEMEROPTERA	Caenidae	L,FO
INSECTA	ODONATA	Gomphidae	L,FO
INSECTA	HEMIPTERA	Geriidae	L,FO
INSECTA	HEMIPTERA	Notonectidae	L,FO
INSECTA	PLEOCOPTERA	Perlidae	L
INSECTA	TRICOPTERA	Hydropsychidae	L,FO
INSECTA	DIPTERA	Chrinomidae	L,FO
INSECTA	DIPTERA	Simuliidae	L,FO

** HS: Habitat Suitability, A: Survey with Local People and Local Expert, L: Literature, FO: Field Observation, BVR: Bat Voice Records,B: Burrow,FP: Footprint,PT. Photo-traps*

Supplemental Biodiversity Assessment ("SBA") including Critical habitat assessment (CHA), Updated biodiversity impact assessment, Offset strategy and Biodiversity Management Plan following IFC Performance Standard 6 is currently underway to more fully understand the national and global significance of the habitats and species which may be affected, which will enable targeted mitigation to be put in place where required. SBA will be presented in addition to ESIA.

5.8.3.5 Ecosystem Services

Baseline condition assessment for "Ecosystem Services" is given in Chapter 5.15.3.4.

5.8.4 Sensitive Receptors

Within the AoI, terrestrial and aquatic habitats described as priority habitat according to the EU Habitats Directive (92/43/EEC) are determined as sensitive receptors (Table 5-70)

Table 5-70. Sensitive Habitats

Habitat Code	Habitat Type	Rationale
C2.3	Permanent non-tidal, smooth-flowing watercourses	These habitat are described as a priority Habitat according to the EU Habitats Directive (92/43/EEC)
E2.1	Permanent mesotrophic pastures and aftermath-grazed meadows	
G1.1	Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	
G1.7	Thermophilous deciduous woodland	

Terrestrial and aquatic flora and fauna species protected by national and international conventions and species included in the threatened category in IUCN Red List are determined as sensitive receptors (see Table 5-71).

Table 5-71. Sensitive Flora and Fauna Species

Species		Rationale
Flora	• *Nuphar lutea*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I)
	• *Arctium lappa* • *Hypericum perforatum* • *Iris pseudoacorus* • *Acinos hungaricus* • *Lamium album* • *Althea officinalis* • *Crataegus monogyna* • *Rosa canina* • *Galium odoratum* • *Viola odorata*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-II)
Invertebrates	• *Zerynhia cerisy*	Evaluated as NT (Near Threatened) according to IUCN Red List
	• *Papilio machaon*	Regulation on Proclamation and Protection of

Species		Rationale
	• *Pieris brassicae*	Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I)
Amphibians and Reptiles	• *Emys orbicularis* • *Testudo hermanni* • *Darevskia praticola*	Evaluated as NT (Near Threatened) according to IUCN Red List
	• *Salamandra salamandra* • *Hyla arborea* • *Bufo bufo* • *Pseudepidalea viridis* • *Rana dalmatina* • *Rana graeca* • *Rana temporaria* • *Pelobates syriacus* • *Emys orbicularis* • *Ablepharus kitaibelli* • *Darevskia praticola* • *Dolichophis caspius* • *Natrix natrix* • *Natrix tessellata* • *Zamenis longissimus*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I)
	• *Pelophylax ridibundus*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-II)
Birds	• *Aquila heliaca* • *Streptopelia turtur*	Evaluated as NT (Near Threatened) according to IUCN Red List
	• *Milvus milvus* • *Falco vespertinus*	Evaluated as VU (Vulnerable) according to IUCN Red List
	List of bird species was given in tables 75 species in Ann-I 19 species in Ann-II	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I and Ann-II)
Mammals	• *Rhinolophus Euryale* • *Myotis bechsteinii* • *Lutra lutra*	Evaluated as NT (Near Threatened) according to IUCN Red List
	• *Myotis capaccinii*	Evaluated as VU (Vulnerable) according to IUCN Red List
	List of mammal species was given in tables 33 species in Ann-I	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I)
	• *Capreolus capreolus*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-II)
Aquatic	• *Cyprinus carpio*	Evaluated as VU (Vulnerable) according to IUCN Red List
	• *Carassius carassius* • *Tinca tinca* • *Cobitis elongata* • *Zingel zingel* • *Unio carassus* • *Astacus astacus*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-I)
	• *Abramis brama* • *Barbus balcanius* • *Chondrostoma nasus* • *Cyprinus carpio*	Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi (Ann-II)

Species		Rationale
	• *Squalius cephalus* • *Esox lucius* • *Perca fluviatilis* • *Sander lucioperca* • *Silurus glanis* • *Hirundo medicinalis*	

5.9 Geology, tectonics and seismicity

In this section, at first, general information about geology, tectonics and seismicity of Serbia are given. Then, after specifying the methodology and data sources used to write the baseline conditions, geology, tectonics and seismicity baseline information about the area where the Project is located are given more specifically.

5.9.1 Study Area

The Proposed Motorway Route is located in the valley sections along the course of the West Morava River from the Čačak valley, across the Kraljevo and Kruševac basins to the Great Moravian valley in the Ćićevac zone, as well as the hilly rim of the West Morava valley in the north and south. It extends between 130 m above sea level (zone near Velika Morava, downstream of Varvarin) and 1127 m above sea level (Goč, Krnja Jela, Zborište).

The peripheral parts of the low hill and the mountain are:

- the Southwestern parts of the Kotlenik and Gledić Mountains
- the northest branches of Goč,
- the Northwestern parts of Great Jastrebac.

The Morava Corridor Motorway passes through the West Morava valley and connects all major settlements in the region: Stalać, Kruševac, Trstenik, Vrnjačka Banja, Kraljevo and Čačak.

The geological composition and tectonic composition of the Study Area are very complex. In the area of exploration, from Pojate to Preljina, various rock masses and soil - both in terms of age and genetic affiliation - are represented in the geological structure of the terrain. That means numerous lithostratigraphic units of complex internal structure and interrelationships are represented.

5.9.2 Methodology and Data Source

The following documents have been reviewed during the desktop study of the project as;

- The Spatial Plan of the Project (CIP, The Spatial Plan of the Morava Motorway Corridor Project, 2019)
- Geological atlas of Serbia (The Ministry of Natural Resourceses and Environmental Protection, 2002)
- Geological and Geotechnical Research and Analysis for Motorway E-761 and Associated Facilities (CIP, 2018)

5.9.3 Baseline Conditions

Basic Geological Structure of the Terrain

Serbia belongs to the Pannonian and particularly Peri-Pannonian regions in the scope of geological classification (Marovic, Djokovic, Pesic, Radovanovic, Toljic, & Gerzina, 2002). According to Horvath, et al. (2006), the Pannonian Basin is located in Eastern Europe. The Alpine, Carpathian and Dinaric mountain belts environ the extensional basin of Neogene-Quaternary age. The basin is a wide zone of convergence between the Eurasian and African plates and as it given in the Figure 5-52, the territory of Serbia can be defined in five geologic group that are i) Pannonian Basin ii) Dinarides, iii) Vardar Zone, iv) Serbo-Macedonian Massif, v) Carpatho-Balkanides.

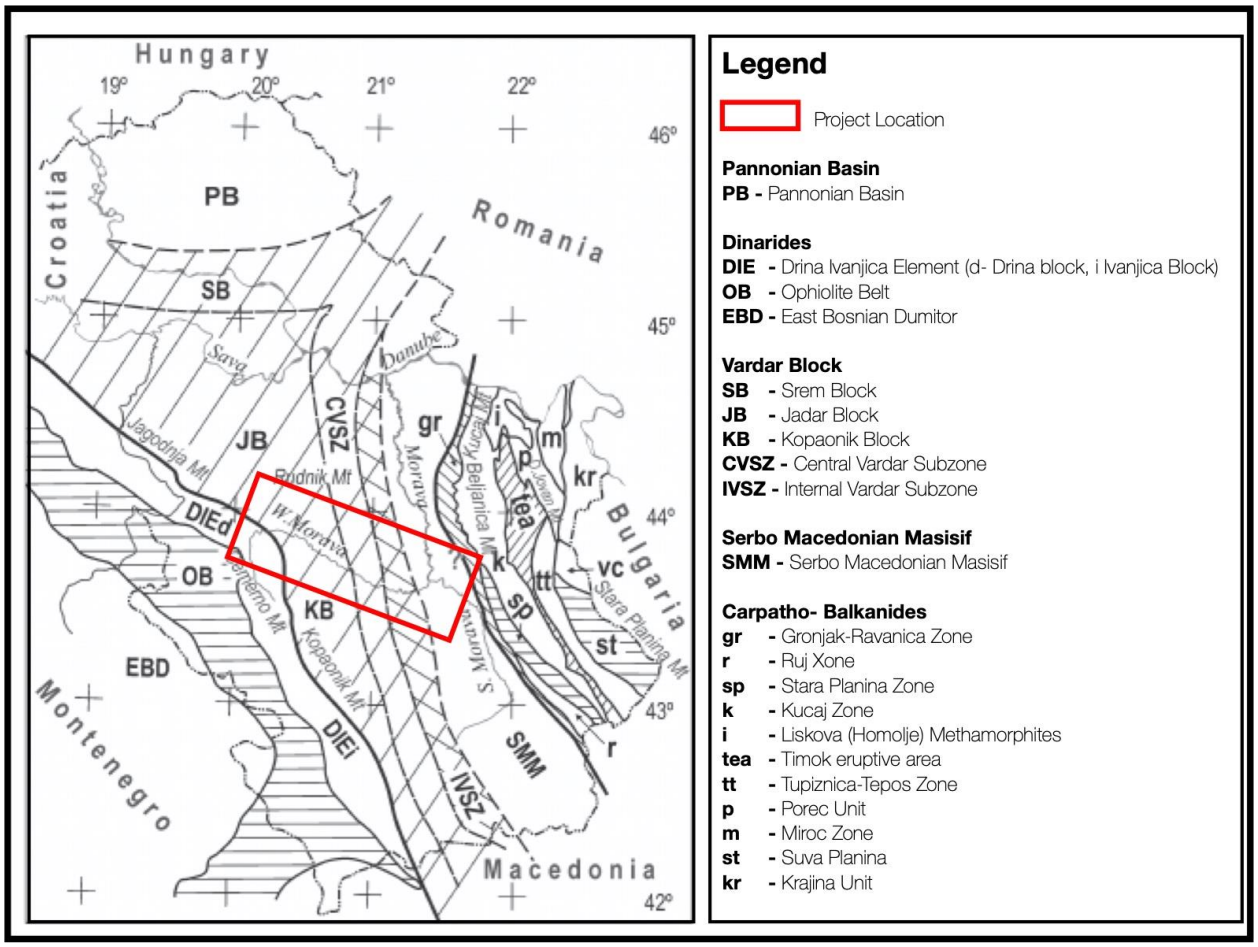


Figure 5-52. Geological Formations in Serbia and Project Location

Figure 5-52, shows that the Project Area is located over mainly three blocks regarding Serbo Macedonian Massif, Vardar Block and Dinarides Block, respectively. The subsidiaries of these blocks and their explanations are provided below (source: Geological Atlas of Serbia).

The Serbian-Macedonian Massif consists of two complexes of crystalline schists - the lower and the upper (Vlasina) one (recently regarded as the Ranovac-Vlasina terrane by some students). Relations of these complexes are in the national territory tectonic. The lower complex is composed of rocks pertaining to the amphibolite facies group, with magmatization and Paleozoic granitoids; it is in places covered by shallow-marine Cretaceous and the Eocene clastics of the P~inja Group. The Vlasina complex bears Riphean-Cambrian greenschists, covered by weakly metamorphosed Ordovician to Carboniferous strata. It is intruded by granitoids of Paleozoic (Vlajna, stitching with the lower complex) to Tertiary age (Surdulica). Beneath this massif from both sides adjacent terranes are down thrust.

The Internal Vardar Subzone, which can be regarded also as the border of the Serbian-Macedonian massif, consists of crystalline schists of unknown age, overlain by the Senonian Toplica Flysch and Tertiary volcanics (Lece).

The Central Vardar Subzone bears the outstanding basin of the Lower Cretaceous Gledi}i Paraflysch, over 150 km long, above the Ophiolite mélange and metamorphics, the age of which is still not completely cleared.

The Drina-Ivanjica element is composed of a Paleozoic base (intense tectonization, with Variscan axes oriented NE-SW, and Alpine rework), and a Triassic carbonate platform. In the W and NW part of the belt some shallow marine Upper Cretaceous occurs, and the eastern boundary of the element is fringed by products of the Kosovska Mitrovica Flysch trough (basal rudites, rudist limestone, preflysch, flysch), deposited the most probably in the back-arc basin of the boundary toward the Vardar ocean.

The Jadar block has a base of Paleozoic strata with a different and not sufficiently clear history and structure (possible exotic terranes); Triassic with a volcanogenic-sedimentary formation follows, ultramafics (Maljen, Suvobor) with some mélange, Cretaceous flysches (Ljig, Ugrinovci) and paraflysches (Rudnik), Tertiary granitoids (Cer, Boranja, Bukulja) and volcanics (Bora~, Kotlenik). Along the SW border a thin band of the Upper Cretaceous ophiolitic mélange runs, common with the Kopaonik block.

As seen in Figure 5-53, the Proposed Motorway Route is mainly located over Quertanary and Neogene Sediments of Western Morova River where the sub elements of the sediments are Quaternary sediments, Neogene basin sediments, Younger, Kotlenic volcanic complex and Marine sediments.

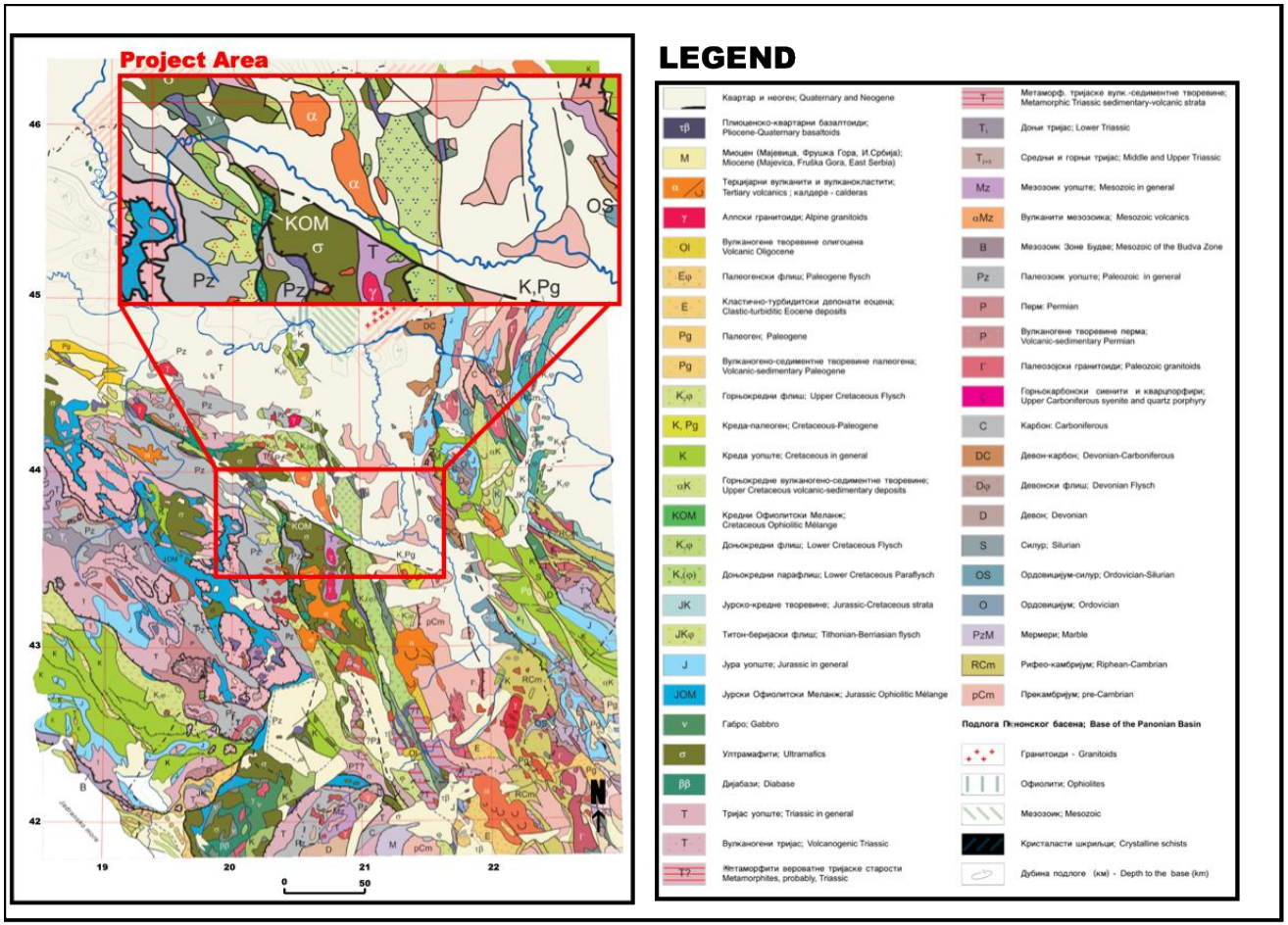


Figure 5-53. General Geological Map of Project Area

Groundwaters

The hydrogeological conditions of the terrain in the AoI of the Project are dictated by the geological structure that is the lithological composition and position of individual members of the complex within the terrain. The geological structure of the terrain in this area is very diverse and complex.

Based on the hydrogeological characteristics of individual lithological environments, as well as on the basis of structural types of porosity in the AoI of the Project, following types of aquifers are identified:

- phreatic type unconfined aquifers with free groundwater level; The aquifer is common for the West Morava River Flood plain.
- sub arterial type semi confined aquifers (captured type released under low pressure); in general, deeper section of the plain (under unconfined aquifer) and at higher elevations above natural flood level
- crack type and broken crack type aquifers; Especially, sandstone and lime stone hills bounding the north side of the West Morava River Valley. The terrain also features areas that can be considered waterless.

Seismic Terrain

Serbia is located on a seismic active zone where the tectonic stresses caused by the NW subduction of the African under the Europian plate. Movement of the Adriatic massif (the promontory of Afrika) is pushed between the Apenines and the Dinarides along collision-compression faults developed across the Adriatic coast. The stresses are transmitted to the hinterland from the subduction zone and the faults. In the nearest, primary compression zone (I), about 250 km wide, foci occur of earthquake magnitudes from 7.5 to 6.5 and intensities from 9° to over 10° MSK. In the second (II) zone, at distances from 250 km to 400 (460) km, earthquakes of magnitudes from 6.4 to 5.7 and intensities from 9° to 8° MSK are likely to occur at seismo-active faults. In the third (III), most distant zone, earthquakes can have magnitudes up to 5.6 and intensities in epicentre to 8° MSK.

Young (neotectonic) faults of this territory have general strike directions NW-SE, NE-SW, N-S, W-E, dividing it into blocks of different vertical movements and forming a network of seismogenic faults. Recent vertical movements of these blocks amount from -2mm/yr to +6mm/yr. The foci of past and future shocks are associated with the faults bounding on blocks. Seismogenic structures are mainly concentrated in the Adriatic coast or marginally on Neogene depressions, where vertical displacements vary between -1mm/yr and +1mm/yr.

There are 116 recognized seismogenic faults: 70% in the Dinarides and Vardar zone, 14% in Pannonian region and the Serbian-Macedonian Massif, and 16% in the Carpatho-

Balkanides. General seismo tectonic map showing movement of the plates and major fault lines in the region is given in Figure 5-54.

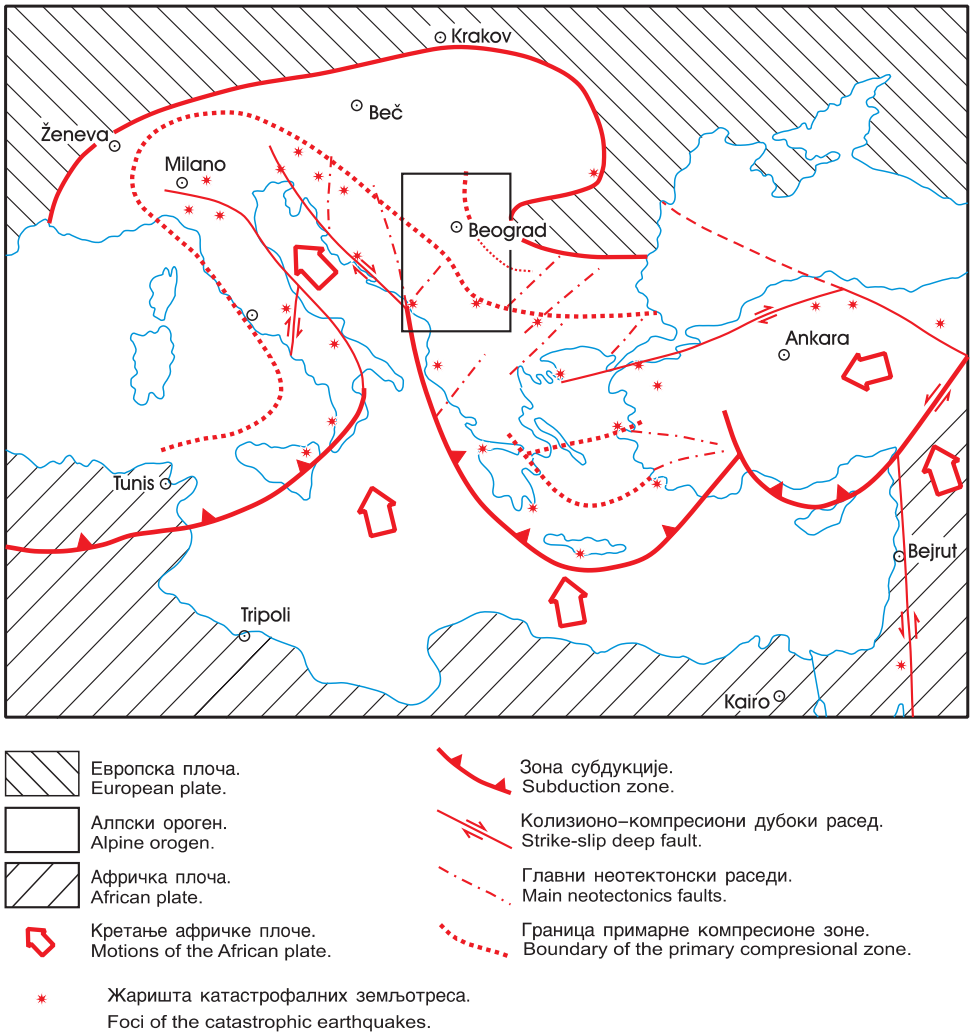


Figure 5-54. Mediterranean-Trans-Asian Seismic Zone

As it seen in Figure 5-55[8], the AoI of the Project is located along to a seismic fault line situated in the West Morava River Valey. According to the seismological data, magnitutes of the Major Earthquakes are varies between 4.8 to 6.1 where the corresponding intensity levels are in between 7º and 9º. The Proposed Motorway Route is located in an area that is classified as II degree Zone.

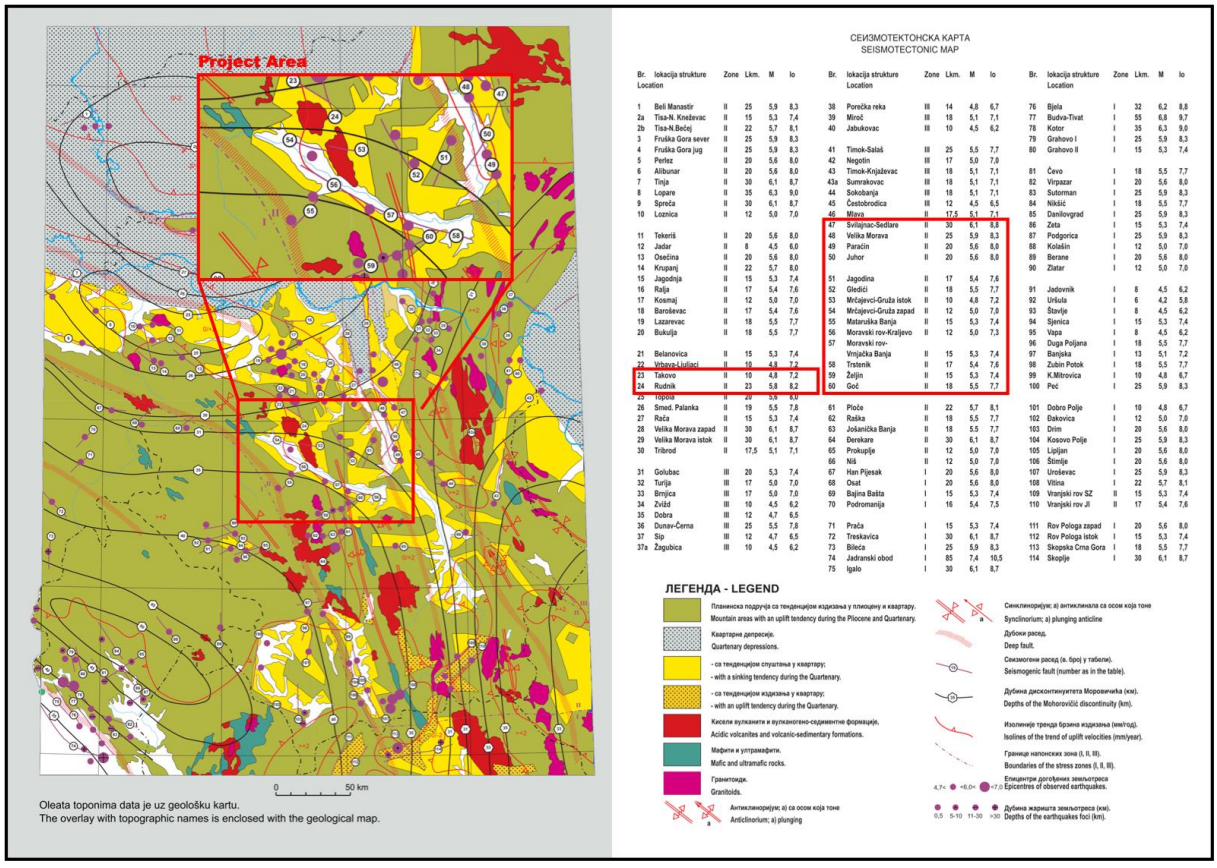


Figure 5-55. Seismo-tectonic Map of Serbia and Project area

[8] The table given in the legend shows the potential of the seismic energy in relation to the distance from the primary collision contact (I, II, III), the lenght (L, km), the maximum magnitude that can be generated (M), and respective intensity in epicentre (Io). Numbers in the table are the same as those on the seismo- tectonic map.

Earthquake intensities are defined in the twelve-degree scale devised by Medvedev, Spanheuer and Karnik (MSK) in terms of the effects on three types of buildings: (A) of unfired bricks, mud and straw, packed earth, or unhewn stone; (B) masonry, logs, dressed stone, or prefabricated materials; and (C) of reinforced concrete (skeleton construction) or well jointed timber.

Earthquake intensity on the MSK scale and respective effects:

1" - Not felt.

2° - Barely felt.

3" - Partly noticeable.

4" - Moderate (buildings vibrate, windows rattle, furniture creaks, suspended objects swing).

5" - Strong (buildings shake, type A buildings damaged to the first degree).

6" - Frightening (fragile objects overturned and broken, furniture moved, objects failed out from shelves, ceiling joists creak, visible damage to the second degree on 50% of type A and about 5% of type B buildings.

7" - Damaging (heavy furniture items moved and light ones overturned, objects from cupboards and shelves fall; about 5% of A type buildings damaged to the fourth degree and about 75% of B type buildings to the third degree; about 50% of B type buildings got damage to the second degree, and about 50% of C type buildings to the first degree).

8" - Much damaging (heavy furniture moved and overturned, suspended objects fall down, poorly fixed doors and windows unhinged; about 50% of type A buildings damaged to the fourth degree, and about 5% destroyed; about 50% of type B buildings damaged to the third degree, and about 5% to the fourth degree; about 75% of C type buildings damaged to the second degree, and only few to the third degree.

9' Disastrous (chimneys topple, roof slates slide down, wooden roofs and trusses thrown out of joints, eaves collapsed; over 50% of A type buildings collapse and others are not safe, about 50% of B type buildings damaged to the fourth degree with some collapse; about 50% of C type buildings damaged to the third degree, others to the fourth degree).

10' Destructive (stacks and tall structures topple; all type A and about 75% of B type buildings destroyed; about 50% of C type buildings damaged to the fourth degree, some collapse).

11" - Devastating (all structures and infrastructures: dams, bridges, etc. destroyed or heavily damaged).

12° - Apocalyptic (all man-made structures destroyed, ground surface changed, rivers change courses, cracks in ground of dekametric gape).

The intensities of earthquakes in Serbia have been up to 9° on MSK scale. The foci of major earthquakes are located in eight areas, viz.:

(1) Adriatic coastal zone (8° - 9° MSK); (2) Vojvodina (Kanjiza, Becej, Novi Sad, Ruma; 8° MSK); (3) Western Serbia (Loznica, Krupanj, Bajina Basta; 8° MSK); (4) Central Serbia (Lazarevac, Arandelovac, Rudnik, Kraljevo, Kopaonik; 8° - 9° MSK); (5) Velika Morava region (Svilajnac, Jagodina, Stalafi; 8° - 9° MSK); (6) Eastern Serbia (Golubac, Negotin; 8° MSK); (7) Area between the Nisava and the middle and upper course of the Juzna Morava (Dimitrovgrad, Bosiljgrad, Ni5, Vranje; 8° - 9° MSK); (8) Kosmet (Peb, Prizren, Pribtina, Lipljan, Urobevac; 8° - 9° MSK).

Earthquake intensity hazards in Serbia in respect to the percentage of the national territory are the following: 6° MSK - 13%, 7" MSK - 59%, 8" MSK - 23%, 9° MSK - 5%, or about 87% of the territory of Serbia is susceptible to destructive earthquakes, which calls for paraseismic codes and standards in the housing and building projects

Table 5-72. Seismic Terrain

Return Period (Years)	Degree of Seismicity on MCS Rocks
50	7°
100	7°-8°
200	8°-9°
500	8°-9°
1000	9°

5.9.4 Sensitive Receptors/Locations

Terrain and Ground Stability

On the basis of the overall results of the research and analysis carried out for the Project, the Proposed Motorway Route is classified according to the terrain's advantage in terms of stability, load-bearing capacity and erodibility. These are;

- Favorable (Stable) Terrains:
  - Terrains belonging to the complex of alluvial lake sediments.
  - The West Morava River terrain sediments are classified into parts of terrain with favorable design conditions
- Conditionally Favorable (Conditionally Stable) Terrains: The following complexes are included in the group of conditionally favorable terrains:
  - Quaternary sediments
  - Neogene sedimentary basin
  - The younger, volcanic complex of Kotlenica
  - Flysch develops lower chalk
  - Proterozoic metamorphic rocks - crystalline shales of high degree of metamorphism
- Unfavorable (Unstable) Terrains: Following complexes are classified into unfavorable (unstable) terrains:
  - Parts of the terrain representing colluvial deposits (chaotically mixed material of Miocene sandy clayey deposits with varying fractions) affected by the slip process; the material thus initiated has generally completely altered structural-textural characteristics from the primary ones, by slipping of uncovered sediments
  - Parts of the terrain made up of alluvial fine-grained sand, sandstone and siltstones and silt deposits (siltstones with organogenic matter) that make the facies dead
  - Parts of the terrain with traces of intense dredging, rinsing, drifting, tearing and less often block slippage are also indicated as partially conditional slopes if there are deformable substrates in the zone. They are located around the perimeter of the infrastructure corridor exploration area. These are mostly terrain of large or medium gradients in decayed and cracked rock mass (dacitic-andesitic mass of Kotlenik, gneisses, youngest Neogene materials and Cretaceous flysch with variable influence of torrential waters)
  - Special zones in terrain such as wetlands and restricted areas in abandoned parts of riverbed - often flooded areas

- Zones of special importance such as existing water sources for settlements; the narrower protection zones of the spring are located at two locations, one in the vicinity of Kruševac and the other near Trstenik.

Groundwater

- More abundant unconfined aquifers, which are the main groundwater source in the Project Area, are located on the left and right valley sides of the West Morava River, the Great Morava River, these aquifers are;
  - in the area of the Čačak-Kraljevo valley (including the alluvial plain Ibra);
  - on the right valley side of the West Morava River in the area of Ratino-Oslonica Basin;
  - on the left and right side of West Morava in the area of the Reed Basin;
  - on the left and right sides of the West and the Great Morava in the area of Bošnjani-Varvarin;
  - in the West and South Morava intersections and on the right valley side of the Great Morava.
- The Proposed Motorway Route has abundant groundwater reservoirs. On the other hand, in the narrower parts of the West Morava, aquifer capacities are low and local.
- Over 15 groundwater sources have been formed for public water supply to rural settlements and some industrial plants. Catching facilities are mostly wells. The springs do not have a defined or narrow sanitary protection zone.
- Major use of groundwater for public water supply is done locally in the area of Trstenik and Kruševac.
- Groundwater reservoirs in other aquifers (sandy-gravel deposits) of older river terraces are locally used for the pu denoted in general by EN 1998blic water supply of rural settlements (Medvedja, Bogdanje, Lađevci).

Seicmicity

According to the Spatial Plan of E-761 Motorway Infrastructure Corridor, the given return period for the eartquakes with intensity level between 7 and 9 is 50 to 1000 years. The degree of probability of an intense event present at the faults situated in the project area is given as 63% as the legal requirement all Project units will be designed and constructed in accordance to Eurocode 8.

Eurocode 8: The code applies to the design and construction of buildings and civil engineering works in seismic regions.

It covers common structures and, although its provisions are of general validity, special structures, such as nuclear power plants, large dams or offshore structures are beyond its scope. Its seismic design should satisfy additional requirements and be subject to complementary verifications.

The objectives of seismic design in accordance with Eurocode 8 are explicitly stated. Its purpose is to ensure that in the event of earthquakes:

- o human lives are protected;
- o damage is limited; and
- o structures important for civil protection remain operational.

These objectives are present throughout the code and condition the principles and application rules therein included.

Eurocode 8 is composed by 6 parts dealing with different types of constructions or subjects: o EN1998-1: General rules, seismic actions and rules for buildings

- o EN1998-2: Bridges
- o EN1998-3: Assessment and retrofitting of buildings
- o EN1998-4: Silos, tanks and pipelines
- o EN1998-5: Foundations, retaining structures and geotechnical aspects o EN1998-6: Towers, masts and chimneys

The above-mentioned increased seismic risk in relation to the one prescribed by the Eurocode EC8 is valorized in the definition of seismic design parameters.

Our National Regulation since 1990 requires the use of an earthquake with a return period of 500 years, that is, the fulfillment of the requirement that the building does not collapse.

5.10 Road traffic and transportation

In this section, at first, study area for road traffic and transportation are specified. Then, after specifying the methodology and data sources used to write the baseline conditions, road traffic and transportation baseline information about the area where the Project is located are given more specifically.

5.10.1 Study Area

The Study Area for this part of the Report i.e., road and transportation infrastructure has decided based on the “Preliminary Economic Analyses and Feasibility Study for the E761 Morava Corridor Motorway of the Republic of Serbia”. It was aimed to cover the potential impacted area due to the Project related activities (e.g., hauling of the excavated material outside the construction corridor, roads to be used for transportation of the equipment to the site etc.).

5.10.2 Methodology and Data Source

The following document has been reviewed during the desktop review:

- Preliminary Economic Analyses and Feasibility Study for the E761 Morava Corridor Motorway of the Republic of Serbia (The Ministry of Finance, 2019)

5.10.3 Baseline Conditions

The Proposed Motorway Route will enable the connection in the part Pojate - Kruševac - Kraljevo - Preljina, with branches to A1 and A2 state roads at its ends. Currently, at this section, movement predominantly takes place along the IB category state road number 23 (Pojate-Kruševac-Trstenik-Kraljevo), and further on (due to overlapping of alignments of state roads) along IB category state road number 22 (Kraljevo-Mrčajevci-Preljina). The abovementioned two state roads, with their extensions, i.e. with the use of other intersecting road routes, enable the movement of persons and goods across the west, central and east part of Serbia. In parallel, by constructing the concerned project, conditions are to be created for connecting the parts of the Republic of Srpska, i.e. Bosnia and Herzegovina with the road route E-763 (Belgrade – South Adriatic) and the Corridor X, i.e. the Proposed Motorway route Belgrade - Niš, and further on with east parts of Serbia and the Republic of Bulgaria.

Currently, the traffic on the entire route of the planned IA category state road number is circulating along IB category state roads, with all the disadvantages and deficiencies of mainly two-lane road, with increased impact of activities generated by nearby settlements on the conditions in the traffic flow. It currently takes around two hours, to drive from Pojate to Preljina, but this can easily be increased, as transit through city and town centers is required.

The planned Morava Motorway from Pojate to Preljina, within the primary road network of Serbia, is to take over long-distance flows from the existing state roads IB-22 and IB-23 with partial change in the conditions on the roads that are directly connected to it. It will represent a quality connection in the area of: Ćićevac, Varvarin, Kruševac, Trstenik, Vrnjačka Banja, Kraljevo and Čačak near Preljina. In the new situation with the motorway, the transit time between Pojate and Preljina will be less than one hour.

Two important motorway routes will be connected, primarily at the level of road network of the Republic of Serbia, and beyond as well:

- IA category state road, A1 (former designation M-1, part of the international road route E-75, i.e. part of road Corridor 10), via which the central part of Serbia is connected, in the north, with Belgrade and Vojvodina, i.e. Central and Western Europe, and, in the south, with the southern parts of the republic, i.e. with North Macedonia, Bulgaria and further on with Middle East and Asia,
- Partially constructed IA category state road, A2, which is located on the international road route E - 763, Belgrade – South Adriatic. Via this route, the region would gain the shortest connection with west Serbia, Montenegro, and via Bar Port with south Italy, as well as connections with sea ports on the Adriatic Sea and the Mediterranean.

On the road route E-763, which the state recognized as one of the priorities regarding the road infrastructure, works are completed before November, 2016 on the section Ljig-Takovo-

Preljina and the road on that section is in operation as of beginning of November 2016 and works on the section from Belgrade to Ljig are expected to be finalized during 2019. At the same time in 2019, construction works will commence on the construction of the motorway section of IA category state road number 2, from Preljina to Požega (towards Bosnia and Montenegro).

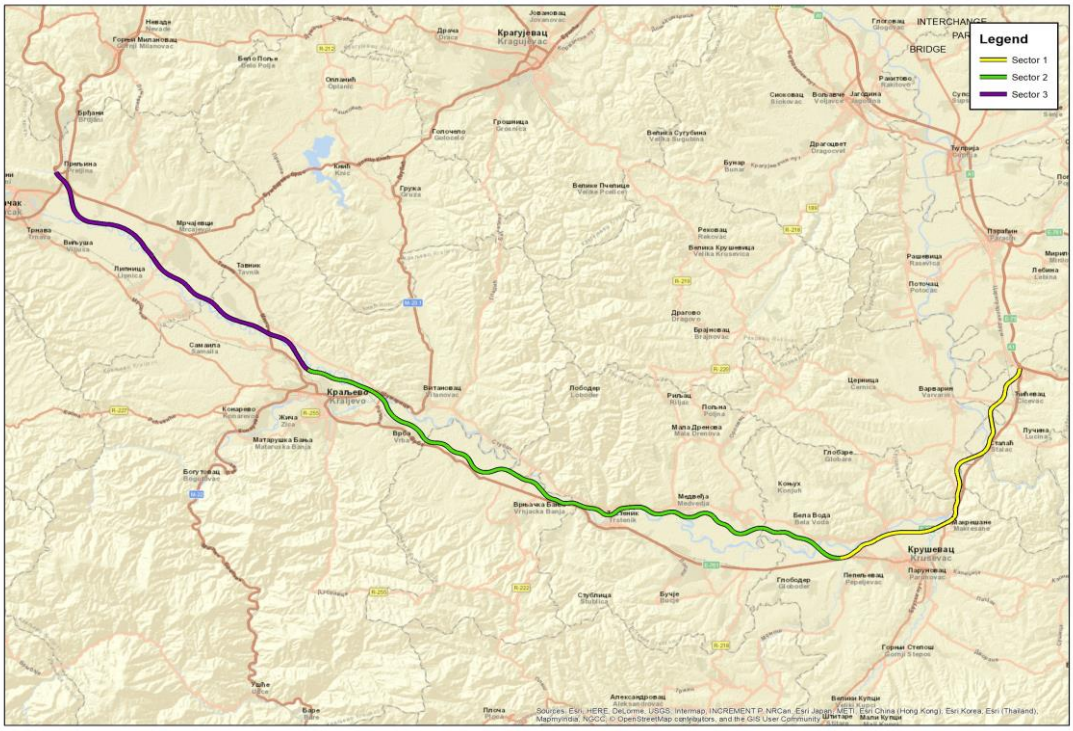


Figure 5-56. Map of the Motorway E-761

In the current condition (preliminary data of the PE “Roads of Serbia” for 2018), the value of average annual daily traffic between Pojate and Preljina ranges from 3,609 vehicles/day (section Ratina - Kraljevo (Kamidžora)) to 12,743 vehicles/day (section Mrčajevci - Preljina). The average value, which accounts for the lengths of individual sections, is 8,205 vehicles/day[9]. Forecast values of Annual Average Daily Traffic (AADT) on motorway sections for the first and the last year of analysis are shown in Table 5-73, Table 5-74 and Table 5-75.

[9] As it is stated, this part of text is about current traffic volumes, on existing roads. Section Mrčajevci - Preljina is part of state road IB category state road number 22. Below table is with forecasted traffic volumes on Motorway sections. After contructing Motorway, part of traffic will stay on existing roads and other part will be on Motorway sections.

Table 5-73. Section Pojate - Kruševac updated forecast 2018

Section	Year	PC	BUS	LFV+MFV	HFV+TT	Total
Pojate - Ćićevac	2023	4664	49	266	706	5686
	2043	7773	69	413	1124	9380
Ćićevac - Kruševac east	2023	6001	224	449	1031	7706
	2043	10002	316	697	1644	12658
Kruševac east - Kruševac west	2023	3853	0	315	899	5067
	2043	6420	1	489	1434	8344
Kruševac west - Koševi	2023	3570	0	383	566	4520
	2043	5957	0	593	904	7455

Table 5-74. Section: Kruševac (Koševi) - Adrani initial forecast 2011

Section	Year	PC	BUS	LFV+MFV	HFV+TT	Total
Koševi - Velika Drenova	2015	9477	176	328	511	10493
	2035	19704	280	640	1008	21631
Velika Drenova - Trstenik	2015	7774	134	301	508	8716
	2035	16292	214	596	1001	18103
Trstenik - Vrnjačka Banja	2015	7749	123	306	528	8705
	2035	16238	196	605	1040	18080
Vrnjačka Banja - Ratina	2015	7798	162	322	557	8839
	2035	16342	259	638	1098	18336
Ratina - Kamidžora	2015	8141	122	276	482	9021
	2035	17061	194	546	938	18739
Kamidžora - Adrani	2015	4380	143	255	519	5298
	2035	9158	225	498	1019	10899

Table 5-75. Section Adrani - Mrčajevci - Preljina updated forecast 2018

Section	Year	PC	BUS	LFV+MFV	HFV+TT	Total
Adrani - Mrčajevci	2023	5193	118	387	982	6680
	2042	8526	165	595	1542	10828
Mrčajevci - Preljina	2023	8682	181	630	1266	10759
	2042	14895	252	969	1988	18104
Preljina - Preljina AP	2023	11623	233	625	1402	13883
	2042	19081	324	962	2202	22569

5.10.4 Sensitive Receptors

For this section, the existing roads and the roads to be used for the construction of the Project and all existing roads and railways intersected by the Project are identified as sensitive receptors. Furthermore, the Project is crossing with 78 earth road. The list of existing roads and railways intersected with the Project is given in below tables;

Table 5-76. Existing Roads intersected by the Project

Road Crossings (KP)
1+300
3+700
9+100
36+550
49+650
50+250
52+500
58+300
65+950
75+350
77+400
80+350
81+600
84+000
95+800
100+250
106+500
107+250
108+450
109+300

Table 5-77. Railways intersected by the Project

Railway Crossings (KP)
1+350
75+400

5.11 Archaeological and cultural resources

In this section, at first, general information about archaeological and cultural resources of Serbia are given. Then, after specifying the methodology and data sources used to write the baseline conditions, archaeological and cultural resources baseline information about the area where the project is located are given more specifically.

5.11.1 Study Area

An archaeological study was carried out in the Spatial Plan indicating the nearby cultural and archeological sites along the Proposed Motorway Route and measures to be taken in order to preserve mentioned sites. The Spatial Plan presents the list of cultural heriage sites and assets that are required to be protected according to the Law on Cultural Property (See Table 5-78 and Table 5-79). The Study Area for the cultural heritage is determined as 500 m on each side of the Proposed Motorway Route.

5.11.2 Methodology and Data Source

Following documents have been reviewed during the desktop study of the project as;

- EIA Reports for Section-1, Section-3. (CIP, 2018) (Highway Institute, 2019)
- The Spatial Plan of the Project (CIP, The Spatial Plan of the Morava Motorway Corridor Project, 2019)

5.11.3 Baseline Conditions

According to the Spatial Plan of the Project, the archaeological sites and buildings in and near the area of influence of the Project determined was listed in Table 5-78 and Table 5-79.

Table 5-78. Archaeological Sites near to the Project Area

Archaeological Sites			
Section-1		**68**	Vrnjačka Banja, Rudjinci, St. Luke's Church
1	Ćićevac, Pojate, Staro selo	**69**	Vrnjačka Banja, Rudjinci, Church in Radenkovi
2	Ćićevac, Stalac, Ukosa,	**70**	Vrnjačka Banja, Rudjinci, Podine
3	Ćićevac, Radosevac, Cerje	**71**	Vrnjačka Banja, Rudjinci, Carp Code
4	Varvarin, Mascara, Bedem - fort	**72**	Vrnjačka Banja, Rudjinci, Magdin lug
5	Varvarin, Mascara, Necropolis in road profile	**73**	Vrnjačka Banja, Rudjinci, Lazic
6	Varvarin, Bosniaks, Ornice	**74**	Vrnjačka Banja, Vrnjci, Draskovic
7	Varvarin, Mascara, Ledine	**75**	Vrnjačka Banja, Vrnjci, Kostovo brdo
8	Varvarin, Mascara, Selište	**76**	Vrnjačka Banja, Vrnjci, Vitojevic Springs
9	Varvarin, Mascara, Gradine	**77**	Vrnjačka Banja, Vrnjci, Duboki brook
10	Varvarin, Barbarian Village, Guy	**78**	Vrnjačka Banja, Vrnjci, Martacici
11	Varvarin, Šanac, Kolarac	**79**	Vrnjačka Banja, Vrnjci, Skela Crnoglavaca
12	Varvarin, Bošnjane, Cernjak	**80**	Vrnjačka Banja, Vrnjci, Grkkara-Trnara
13	Varvarin, Bošnjane, Slatina	**81**	Vrnjačka Banja, Novo Selo, Sibenik houses
14	Varvarin, Bošnjane, Gaj	**82**	Vrnjačka Banja, Novo Selo, Grabovi
15	Varvarin, Bošnjane, Ornice	**83**	Vrnjačka Banja, Novo Selo, Veselinovici
16	Kruševac, Makresane, Jazbine	**84**	Vrnjačka Banja, Novo Selo, Duboki brook
17	Kruševac, Bivolje, Ingredients,	**85**	Vrnjačka Banja, Novo Selo, Zajecevac
18	Kruševac, Makresane, Cair	**86**	Vrnjačka Banja, Novo Selo, Stevanovici
19	Kruševac, Makresane, Tepelija	**87**	Vrnjačka Banja, Novo Selo, Miodragovici
20	Kruševac, Makresane, Old Cemetery	**88**	Vrnjačka Banja, Gracac, Sveta Petka
21	Kruševac, Makresane, Long field	**89**	Vrnjačka Banja, Gracac, Turkish Cemetery
22	Kruševac, Makrešane, Reka	**90**	Vrnjačka Banja, Gracac, Caliija
23	Kruševac, Lazarica, Buzdovani	**91**	Vrnjačka Banja, Gracac, Kenja dishes
24	Kruševac, Lazarica, Jasički put	**92**	Vrnjačka Banja, Podunavci, Cemetery
25	Kruševac, Dedina, Turkish Cemetery	**93**	Vrnjačka Banja, Podunavci, Rakovica
26	Kruševac, Dedina, Turkish Cemetery	**94**	Vrnjačka Banja, Podunavci, Usinka
27	Kruševac, Citluk, Konopljara	**95**	Vrnjačka Banja, Podunavci, Bare
28	Kruševac, Bela Voda, Kod česme	**96**	Vrnjačka Banja, Vranesi, Trnovaca

Archaeological Sites			
29	Kruševac, Kukljin, Dinina Djula	**97**	Kraljevo, Vrba, Donje Polje
30	Kruševac, Bela Voda, Bunjiste	**98**	Kraljevo, Ratina, Divlje polje
31	Kruševac, Kukljin, Bogomoljiste	**99**	Kraljevo, Ratina, Roman Cemetery
32	Kruševac, Jasika, Latin Bar	**100**	Kraljevo, Ratina, Turkish Cemetery
33	Kruševac, Jasika, Odžinac -Miljkovićka	**101**	Kraljevo, Ratina, Crkvina
34	Kruševac, Jasika, Krstići	**102**	Kraljevo, Ratina, Staro selo
35	Kruševac, Globoder, Seliste	**103**	Kraljevo, Ratina, Old Cemetery- Dumbar
36	Kruševac, Mackovac, Ivlje	**104**	Kraljevo, Ratina, Djurovac Church
37	Kruševac, Globoder, Ratkovac	**105**	Kraljevo, Sijaće Polje, Mosque
38	Kruševac, Globoder, Božinovo brdo	**106**	Kraljevo, Sirča, Roman Cemetery
39	Kruševac, Globoder, Staro selo	**107**	Kraljevo, Miločaj, School code
40	Kruševac, Mackovac, Grobljanski brook	**108**	Kraljevo, Miločaj, Gorelo polje
41	Kruševac, Mackovac, Crkvina	**109**	Kraljevo, Mrsać, Ade, necropolis
42	Kruševac, Mackovac, Cemetery	**110**	Kraljevo, Eyebrow, cemetery
Section-2		**Section-3**	
43	Vrnjačka Banja, Stulac Nemrak	**111**	Kraljevo, Miločaj, Velika gradina
44	Trstenik, Grabovac, Turkish Cemetery	**112**	Čačak, Katrga, Giant Cemetery
45	Trstenik, Trstenik, Stražba	**113**	Čačak, Katrga, Grobljuša
46	Trstenik, Počekovina, Grabak	**114**	Čačak, Mršinci, Crkvište
47	Trstenik, Počekovina, Selište	**115**	Čačak, Goričani, Crkvina
48	Trstenik, Počekovina, Staro selo	**116**	Čačak, Kukic, Turkish Cemetery
49	Trstenik, Počekovina, Tunnel Cemetery	**117**	Čačak, Mrčajevci, Grdeška bara
50	Trstenik, Stari Trstenik, Trnovaca	**118**	Čačak, Mrčajevci, Livade
51	Trstenik, Stari Trstenik, Ključ	**119**	Čačak, Mrcajevci, Gušavac, necropolis
52	Trstenik, Stopanja, off the coast of West Morava	**120**	Čačak, Donja Gorevnica, Crkvina
53	Trstenik, Stopanja, stoves on the Savic estate	**121**	Čačak, Donja Gorevnica, Giant Cemetery
54	Trstenik, Odzaci, Cara Lazar Cellars	**122**	Čačak, Donja Gorevnica, Crkvine
55	Trstenik, Medveđa, Savran mala,	**123**	Čačak, Mojsinje, Bent, Lugovi
56	Trstenik, Velika Drenova, Toponicka River	**124**	Čačak, Zablaće, Komadinići
57	Trstenik, Velika Drenova, Caves	**125**	Čačak, Vapa, Vojinovića Brdo
58	Trstenik, Selište, Panjak	**126**	Čačak, Vapa, Crkvina
59	Trstenik, Selište, Ključić	**127**	Čačak, Baluga (Trnavska), Makva
60	Trstenik, Bogdanje, Djurovaca	**128**	Čačak, Baluga, The Vulicevic Estate
61	Trstenik, Lozno, Cemeteries-Turkish Cemetery	**129**	Čačak, Baluga, Rainci, Old Cemetery
62	Trstenik, Osaonica, Petkovica Church	**130**	Čačak, Preljina, Estate of Ban Sovic, necropolis
63	Trstenik, Stari Trstenik, Church	**131**	Čačak, Preljina, Hippodrome
64	Trstenik, Osaonica, Turkish Cemetery	**132**	Čačak, Konjevic, Greek Cemetery
65	Vrnjačka Banja, Grabovac, Brod na Moravi	**133**	Čačak, Ljubić, Mutaovina
66	Vrnjačka Banja, Rudjinci, Blagojevici		
67	Vrnjačka Banja, Rudjinci, Karan's Breg		

**Archaeological sites within the AoI of the Project*
Source: (CIP, The Spatial Plan of the Morava Motorway Corridor Project, 2019), (CIP, 2018)

Table 5-79 presents the cultural heritage sites along the Proposed Motorway Route (500 m for each side of the Project).

Table 5-79. Heritage Buildings near to the Project Area

Heritage Buildings			
Section-1		**38**	Trstenik, Medvedja, Milan Bradic's house
1	Varvarin, Bosniak, Church of St.Petke,	**39**	Trstenik, Medveđa, Vladislav Vukomirović House
2	Varvarin, Bošnjane, Zoran Jankovic's house,	**40**	Trstenik, Medveđa, Radomir Vukomirovoć House
3	Varvarin, Mascara, Milan Savic's house,	**41**	Trstenik, Medvedja, house of the Katic family
4	Varvarin, Mascara, Mitic House,	**42**	Trstenik, Medveđa, house of the Radosavljevic family
5	Kruševac, Dedina, school	**43**	Trstenik, Medvedja, Milen Nauparac's house
6	Kruševac, Citluk, Miladin Kitanovic House	**44**	Trstenik, Medvedja, house in Medvedja
7	Kruševac, Citluk, Nikola Ciric's house	**45**	Trstenik, Velika Drenova, house of Vasily Kostic
8	Kruševac, Lazarica, National Construction Facility	**46**	Trstenik, Velika Drenova, the house of Zorica Nedeljković and Zvonko Puniševac
9	Kruševac, Pepeljevac, Ljubodraga Egeric House	**47**	Trstenik, Velika Drenova, Church of the Holy Ascension
Section-2		**48**	Trstenik, Velika Drenova, Church of St. Elijah
10	Trstenik, Bresno Polje, cemetery	**49**	Trstenik, Velika Drenova, school building
11	Trstenik, Bresno Polje, school building	**50**	Trstenik, Velika Drenova, house of the Jaćović family
12	Trstenik, Bresno Polje, house of Ristic	**51**	Trstenik, Velika Drenova, house of Dzekic family (Cosic)
13	Trstenik, Stopanja, Mirko Radovanovic's house,	**52**	Trstenik, Velika Drenova, Health Center
14	Trstenik, Stopanja, village cemetery	**53**	Trstenik, Velika Drenova, house of the Đulaković family
15	Trstenik, Stopanja, school building	**54**	Trstenik, Velika Drenova, Library
16	Trstenik, Stopanja, house near school in Stopanja	**55**	Trstenik, Velika Drenova, Spasojevic House
17	Trstenik, Stopanja, Ranka Ristic House	**56**	Trstenik, Selište, house of Milen Celicanin
18	Trstenik, Stari Trstenik, cemetery	**57**	Trstenik, Selište, Miloja Gasic's house
19	Trstenik, Stari Trstenik, house of Milan Ristic	**58**	Trstenik, Selište, school building
20	Trstenik, Stari Trstenik, Pavle Bogicevic House	**59**	Trstenik, Seliste, Dragutin Stanojlovic House
21	Trstenik, Stari Trstenik, house of Rada Glidzic	**60**	Trstenik, Selište, house of Milos Stanojlovic
22	Trstenik, Stari Trstenik, Milosije Ilic House	**61**	Trstenik, Bogdanje, Cedomir Dimitrijevic's house
23	Trstenik, Stari Trstenik, school building	**62**	Trstenik, Bogdanje, house of Mico Stojanovic
24	Trstenik, Odzaci, Milos Batoćanin House	**63**	Trstenik, Bogdanje, Vukoman Stojanović House
25	Trstenik, Trstenik, Milka Karavesovic House	**64**	Trstenik, Počekovina, train station building
26	Trstenik, Osaonica, school building	**65**	Trstenik, Počekovina, house of the Markovic family
27	Trstenik, Medvedja, Isidore Andrejić's house	**66**	Kraljevo, Mrsać, Church of St. Peter and Paul
28	Trstenik, Medvedja, house of Avram Zivkovic	**Section-3**	
29	Trstenik, Medvedja, Dragan Jovanovic's house	**67**	Čačak, Sokolici, Radomir Lukovic's house
30	Trstenik, Medvedja, Milan Janosevic's house	**68**	Čačak, Mrčajevci, Church of Sv. Peter and Paul

Heritage Buildings			
31	Trstenik, Medvedja, house of Jovan Karamarkovic	**69**	Čačak, Mrcajevci, village cemetery
32	Trstenik, Medvedja, Radomir Raskovic's house	**70**	Čačak, Mrcajevci, Tosic House
33	Trstenik, Medvedja, Dragan Sremac's house	**71**	Čačak, Goricani, Dejan Cvetkovic's Chardak
34	Trstenik, Medvedja, house church of Sv. Nicholas	**72**	Čačak, Zablace, Church of Sv. Archangel Gabriel
35	Trstenik, Medvedja, school building	**73**	Čačak, Preljina, Church of Sv. Joachim and Anna
36	Trstenik, Medvedja, house of priest Bradic		
37	Trstenik, Medvedja, Miodrag Toplicic House		

**Heritage buildings within the Study Area*

Source: (CIP, The Spatial Plan of the Morava Motorway Corridor Project, 2019) (CIP, 2018)

As shown in the Table 5-78 and Table 5-79, it is determined archaeological sites and immovable cultural assets in the AoI of Project. In addition, according to Spatial Plan, National EIAs and the interviews with focus groups, it was determined that there are intangible cultural heritage which are two monumental trees given in Figure 5-57 and Figure 5-58 below and the route of the motorway and area of the river regulation was determined in line with these information. Thus, the Motorway route and area of the river regulation works will not coincide with any archaeological area, immovable cultural assets and intangible heritage and it is expected project will not impact these areas.

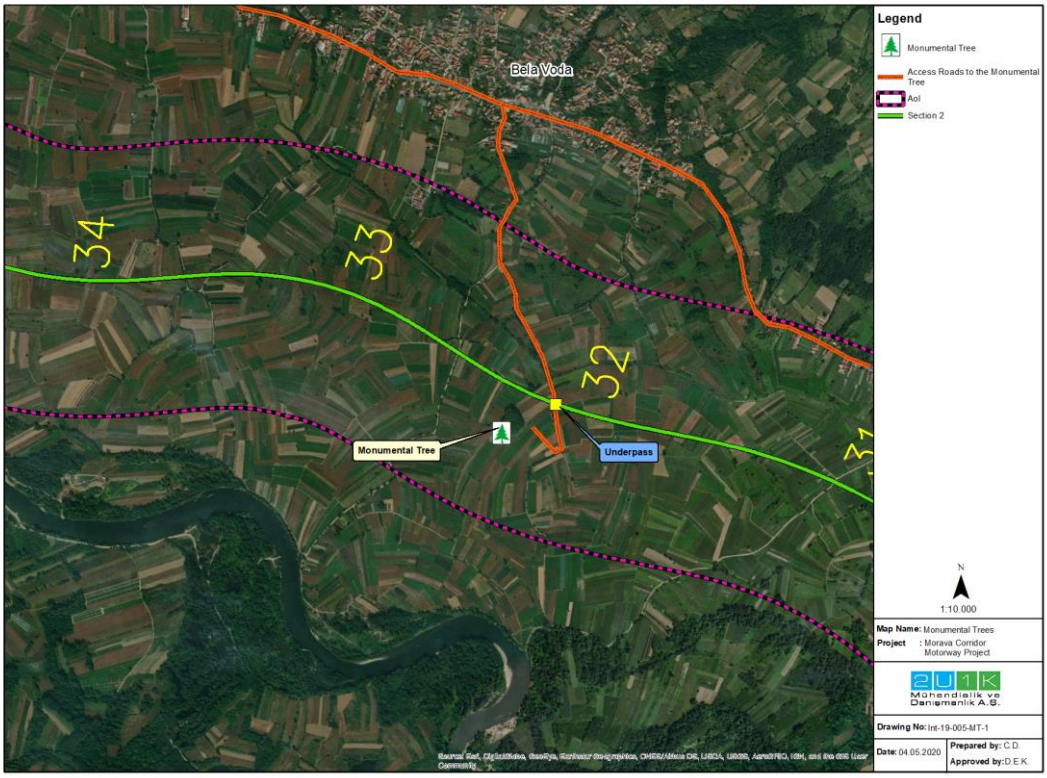


Figure 5-57. Monumental Tree in KP32

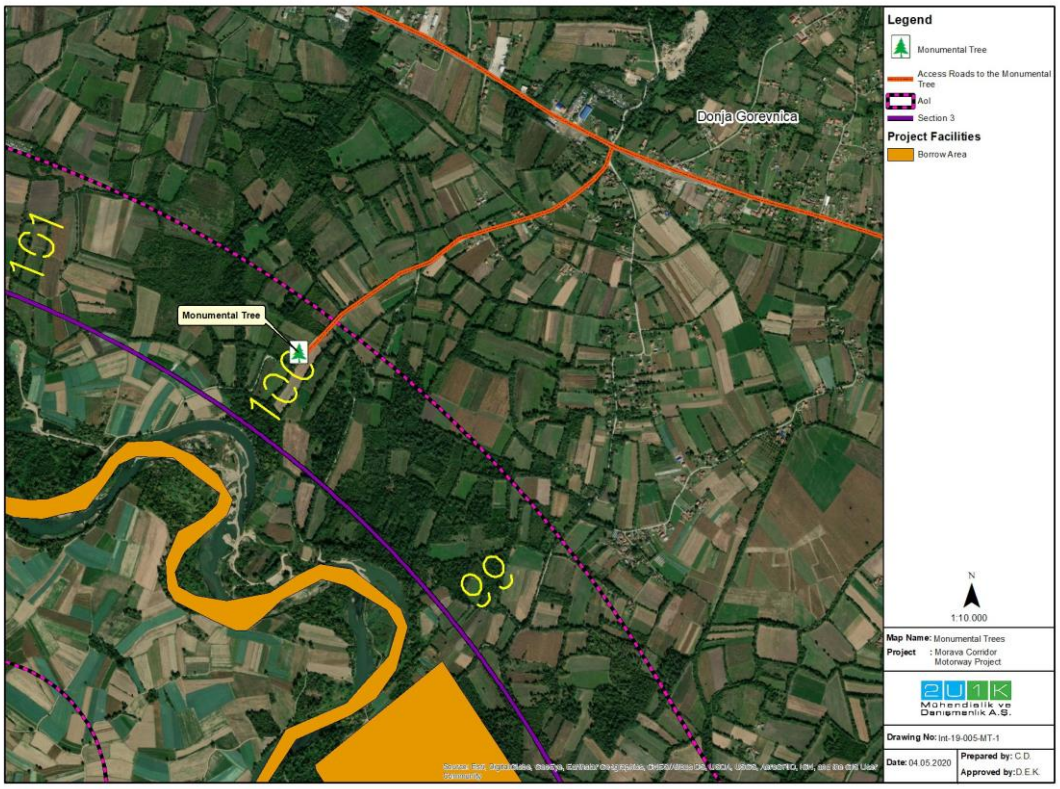


Figure 5-58. Manumental Tree in KP 100

All registered archaeological points and heritage buildings the nearby to the Proposed Motorway Route (500 m for each side of the Project) are given in Appendix-5.3.

5.11.4 Sensitive Receptors

The areas and buildings indicated in orange and red in Table 5-78 and Table 5-79 are the areas that overlap area of influence of the Project and construction facilities. Therefore, they have been identified as sensitive areas. In addition,

5.12 Visual landscape, land use and soil types

In this section, at first, study area for visual landscape, land use and soil types countrywide are identified. Then, after specifying the methodology and data sources used to write the landscape, land use and soil types baseline conditions, general information about the landscape, land use and soil types prevailing in the country is given and then a more specific landscape, land use and soil types baseline information is given about the area where the project is located.

5.12.1 Study Area

The study area for visual landscape, land use and soil types is determined to cover 500 m right and 500 m left along the Proposed Motorway Route.

5.12.2 Methodology and Data Source

Following documents have been reviewed during the desktop study:

- The EIA Reports for Section-1 and Section-3,
- Government of Serbia website,
- Statistical Yearbook 2018 of the Republic of Serbia,
- European Environmental Agency
- Copernicus Land Monitoring Service
- The Soils of Serbia
- European Soil Data Center (ESDAC)

5.12.3 Baseline Conditions

According to the web site of the Government of Serbia, Serbia has a total area of 8,840,000 hectares that is composed of 5,734,000 hectares of agricultural lands. 4,867,000 hectares of these agricultural areas are arable land (Government of Serbia, no date). Agricultural land is almost 70 % of Serbia's territory and the rest is covered by forests. 3,355,859 hectares is the total area of utilized agricultural land on Serbia's territory.

The above part provides information on land use and landscape across Serbia and in order to better understand the land use and landscape in the area where the project site is located, a land use map was prepared for a the AoI of the Project, 500 m on each side of the Project along the Proposed Motorway Route (see Appendix-5.5). Detailed information about the land use and landscape in the the AoI of the Project is given in subsection 5.12.3.

According to The Soils of Serbia Book, Serbia contains different geological units of composite structures and complex composition. Soil of Serbia contains quartz, mica, feldspars, calcite, dolomite, and chlorite in the scope of mineralogical composition. Chlorite, vermiculite and mixed layered silicates are found in the clay fraction together with illite, smectite and kaolinite. The mild climate and low precipitation are favorable for the biogeochemical weathering of primary minerals to clay minerals: smectite, illite and vermiculite during bisiallitisation processes (Pavlovic, Costic, Karadzic, & Mistrovi, 2017).

The above part provides information on soil types country-wide and in order to better understand the soil types in the area where the project site is located, a soil map was prepared for a the AoI of the Project, 500 m on each side of the Project along the Proposed Motorway Route (see Appendix-5.4). Soil types in the AoI of the Project and detailed information about the soil types are given in subsection 5.12.3.

5.12.3.1 Landscape

There are a total of 7 municipalities (Ćićevac, Varvarin, Kruševac, Vrnjačka Banja, Trstenik, Kraljevo and Čačak) and 49 settlements within AoI

In terms of water bodies including riparian section, there are three streams of large rivers: the Great, the South and the West Morava's, which with the rich river basin dominate the landscape image as well as the extensive arable land along their coasts.

Sector-1 is located in the Great Morava basin, while the initial part of Sector-2 is located in the South Morava basin. And all remaining sectors are also located in the west Morava Basin.

In Sector 2, the Proposed Motorway Route runs through a narrow valley. The valley is expanding in other sectors.

The Proposed Motorway Route generally located on flat topography. The starting point of Pojate, the lowest point of the Proposed Motorway Route, is 150 m above sea level and the end point in Čačak is 250 m above sea level. The elevation changes around 100 m along the Proposed Motorway Route.

500 m right and 500 m left along the Proposed Motorway Route comprises a number of visually distinct areas.

Landscape types are classified into three groups based on anthropogenic influence;

- Natural and semi-natural landscapes (forest and semi natural areas, wetlands, water bodies)
- Anthropogenic landscapes (agricultural land, settlements, roads and industrial areas)

According to field studies conducted during the biodiversity baseline studies and desktop studies, majority of the landscape is composed of agricultural areas. Agricultural land is divided into three categories that are arable land, pastures, and heterogeneous agricultural areas.

Figure 5-59. Agricultural field

In addition, natural and semi natural areas covers about 20% of the total area of AoI. Natural and semi natural areas is divided into two categories that are forests and scrub and/or herbaceous vegetation associations.

In Sections 1 and 2, forests are generally located on slopes that are located along Valley edges. In Section 3, forests are densely located along the West Morava River.

Figure 5-60. Forest Areas

One of the most important landscape value within the AoI is the West Morava River. The banks of the West Morava River are densely covered with riparian vegetation. Riparian vegetation is also present with abandoned riverbeds.

Figure 5-61. The West Morava River and Riparian Vegetation

AoI includes artificial ponds, which were previously used as borrow areas and which have become wetlands over time. These ponds are old and the coastal areas are heavily covered by riparian vegetation.

Figure 5-62. Artificial Ponds

5.12.3.2 Land Use

After obtaining necessary information about land use in Serbia during the site observation and literature review, a land use map of Serbia is prepared by 2U1K. The map is provided in Appendix-5.5 According to the data obtained, arable land (non-irrigated arable land) and heterogeneous agricultural areas (with complex cultivation patterns) covers the largest area within the AoI. The AoI also includes urban fabric, industrial, commercial and transport units, mine, dump and construction sites, artificial, non-agricultural vegetated areas, pastures, heterogeneous agricultural areas, forests, scrub and/or herbaceous vegetation associations, inland wetlands, inland waters.

Table 5-80 shows the surface area occupied by the AoI and the percentage of these areas in the AoI. In the Table 5-80, the CORINE Land Cover (CLC) nomenclature is used for the land use classification. This nomenclature is a 3-level hierarchical classification system (Level 1, Level 2 and Level 3) and has 44 classes at the third (For more detailed information about CLC nomenclature, please visit the website: https://land.copernicus.eu/eagle/files/eagle-related-projects/pt_clc-conversion-to-fao-lccs3_dec2010)

Table 5-80. Land Use Areas in the AoI

Level 1	Level 2	Level 3	Area	%
Artificial surfaces	Urban fabric	Discontinuous urban fabric	6015802	3.496257757
Artificial surfaces	Industrial, commercial and transport units	Industrial or commercial units	1849106	1.074661618
Artificial surfaces	Mine, dump and construction sites	Mineral extraction sites	1795514	1.043514824
Artificial surfaces	Artificial, non-agricultural vegetated areas	Sport and leisure facilities	273789.9	0.159120914
Agricultural areas	Arable land	Non-irrigated arable land	80005032	46.49724103
Agricultural areas	Pastures	Pastures	569055.3	0.330722948
Agricultural areas	Heterogeneous agricultural areas	Complex cultivation patterns	51133158	29.71751564
Forest and semi natural areas	Forests	Broad-leaved forest	6084865	3.53639559
Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Transitional woodland-shrub	15290777	8.886677675
Wetlands	Inland wetlands	Inland marshes	1293644	0.751838426
Water bodies	Inland waters	Water courses	7753298	4.50605357

In addition, In order to obtain information on land use, EIA reports are reviewed and the information obtained is given below;

Section-1, according to the EIA Report of the Project, the most common land in the AoI of the Project (the AoI of the Project defined in the EIA Report covers 250 m left and 250 m right of the Proposed Motorway Route) is agricultural land (arable land, orchards, vineyards etc.), as well as smaller areas of forestland. Other areas in the Project include construction land, existing built-up land (housing), and land which is planned for construction. The housing in the observed AoI of the Project mainly includes individual housing with purposes related to the rural settlement.

Section-2, to be filled.

Section-3, the highest percentage of the occupied area (85 %) is under the category of high-quality agricultural land (one of the most important natural potentials) and is threatened by the construction the section of the AoI of the Project. A much smaller proportion of the AoI of the Project includes the forest area (9 %), 4 % meadows and 1.2 % vineyards and orchards. The engagement of areas within the existing land use at the Section Adrani - Mrcajevci includes about 115 ha.

5.12.3.3 Soil Types

The soil types throughout the Proposed Motorway Route were identified using the European Soil Data Center (ESDAC) and during fieldwork. Unfortunately, there is no current pedological map of the territory of Serbia. The European Soil Data Center defines only general soil types and gives their distribution. The soil map prepared by 2U1K is given in Appendix-5.4.

As it seen from the Map, the Project passes through four different types of soil. The explanation of these soil types are given below:

Fluvisol type of soils has well sorted soil layers. They have water permeability and alluvial soils have little humus (under 1%). Alluvial soils are poor in humus (less than 1%). There are many alluvial soil types depending on some characteristics. These types are alluvial fine sorted carbonates, alluvial shallow soils on gravel materials, alluvial covered soils and so on. Alluvial fine-sorted soils are the most distributed ones.

Eugley are soils dominated by the hydrogenation process. The accumulation of organic matter is in the upper region, oxido-reduction occurs in the middle region, and there is a reduction process in the lower region. The texture is heterogeneous and the micro-aggregates in the carbonate-free clay soils are less stable. These soils are rich in humus (5.8% on average) and the humus horizon is 20-40 cm deep.

Smonitzas (Vertisols) are formed in plain and mild hillside terrains and drained wetlands and lakes areas. Vertisols are clay-rich soils. Therefore, they are highly fertile. Vertisols are typically form from highly basic rocks, such as basalt, in climates that are seasonally humid or subject to erratic droughts and floods, or that impeded drainage. Depending on the parent material and the climate, they can range from grey or red to the more familiar deep black. Humus, total nitrogen, and potassium are generally well supplied, while phosphorus content is rather poor.

Ilimerized Pseudogyle soils are Pseuodogley soils undergone the ilimesrisation proces (the process of eluvial-illuvial migration of colloidal clay). The process of ilimerisation leads to differentiation of eluvial horizon depleted by base cations and colloidal clay and the iluvial horizon enriched with base cations and colloidal clay.

Fluvisol and Eugley soil types observed to be dominant through Section-1 and Section-2 of the Proposed Motorway Route, in other words, approximately 88 km of the Project is mainly covered by the mentioned soil types. Between the 88 km and 90 km points of the Proposed Motorway Route, fluvisol, eugley, smonitzas, pseudogyles and ilimerized pseudogyle soil types were observed to be dominant. From the 90 km point to the end of the Proposed Motorway Route; smonitzas type of soil was observed to be common.

5.12.4 Sensitive Receptors/Locations

In the evaluations made in the GIS study, the Proposed Motorway Route is located in a flat topography and there is no barrier other than vegetation.

Within the AoI, sensitive receptors consist of residential and commercial areas and road users. List of Sensitive receptors was given in Appendix 5.6 "Visibility Map".

5.13 Water Use (industrial, agriculture, domestic)

In this section, at first, study area for the water use is indicated. Then, after specifying the methodology and data sources used to write the baseline conditions, water use baseline information about the area where the project is located are given.

5.13.1 Study Area

The study area for industrial, agricultural and domestic water use is determined to cover 500 m right and 500 m left along the Proposed Motorway Route.

5.13.2 Methodology and Data Source

The water use in the Region was assessed during the social field studies through community level and household level surveys with the locals by 2U1K.

5.13.3 Baseline Conditions

Social field studies were conducted in all affected municipalities, details of the surveys can be found below.

Municipality of Čačak

According to social field studies conducted within the scope of the Project, the West Morava River is stated to be used for fishing activities by the locals. Spring water is commonly used by the drinking purposes by the locals of the Municipality. Last, according to outcomes of the field study, drinking, irrigation and water resources are provided from water network, well water and the West Morava River.

Municipality of Ćićevac

Based on the social field studies, the West Morava River is stated to be used for fishing and irrigation purposes by locals. Locals stated during the field studies spring water are used for drinking and technical purposes. In addition, some locals stated that they use rural water supply and some locals stated that they have their own water supply from the West Morava River.

Municipality of Kaljevo

According to the information obtained from the social field study, locals of the Municipality stated that the West Morava River is used for fishing activities. Locals of the Municipality state spring water as a source of drinking water and it is used for domestic purposes as well. Some villages in the Municipality stated to use wells. Most of the locals stated that they have water from rural water supply. As an outcome of the survey, it was stated that spring water and well water were used both for domestic and irrigation purposes.

Municipality of Kruševac

As an outcome of the social field study, the West Morava River is found to be used for sport fishing, irrigation and drinking purposes. The existence of a natural water source which is used for drinking purposes by locals is indicated in the village of Bela Voda. Some locals in the Municipality indicated well and spring water is used for drinking purposes. In addition, it was observed that some locals have their own source of water.

Municipality of Trstenik

As a result of the social field study, the West Morava River is found to be used for various purposes such as irrigation and sport fishing. Spring water is stated to be used for drinking and domestic purposes by locals and most locals stated that they use wells for domestic purposes. Water sources are indicated as water supply network, spring water, water tank and well water. The locals states that they use springs and well water both for drinking and irrigation purposes.

Municipality of Vrnjačka Banja

According to the social survey, In Municipality of Vrnjačka Banja, it is found that the West Morava River is used by locals for irrigation and sport fishing. Spring water is stated as a source for drinking purpose and for domestic purposes, some locals stated they have wells for irrigation activities. In the Municipality, water supply network, spring water and wells are stated to be used for drinking, irrigation purposes and water sources for other activities.

Municipality of Varvarin

For the Municipality of Varvarin, conducted field study shows that the West Morava River is used for irrigation and fishing purposes by locals. It is also stated that locals use spring water for drinking purpose and wells are used by very few locals for drinking purpose.

5.13.4 Sensitive Receptors

The West Morava River is being used by the near settlements for various purposes including; irrigation, fishing and transportation. In that regards, the West Morava River is quite sensitive among the locals for social and environmental purposes.

5.14 Social Baseline

5.14.1 Study Area

The Study Area is decided by considering the impacts sourced from transportation route, workers accommodation, noise during construction and operation phases, labour influx, land use, changes on dust and air quality.

There are 7 municipalities and 48 settlements within the envisaged the Project and construction facilities.

In order to obtain baseline information and assess the possible social impacts of the Project, a wider area of 1 km is determined as the Study Area. Municipalities located within the Study Area are presented in Table 5-81.

Table 5-81. Municipalities located within the Study Area

Municipality	Number of settlements within th AoI of The Project
Ćićevac	4
Varvarin	2
Kruševac	7
Vrnjačka Banja	7
Trstenik	8
Kraljevo	11
Čačak	9
TOTAL	**48**

Details regarding the 48 settlements within the AoI of the Project are presented in Table 5-82.

Table 5-82. Settlements Located in the Study Area

Project Sectors	Settlement	Located within 0 - 100 meter to the closest Project unit	Located within 100 - 250 meter to the closest Project unit	Located within 250 - 500 meter to the closest Project unit	Closest Project Unit
1	**Pojate**	X			Motorway
	Stalać	X			Motorway
	Grad Stalać			X	Borrow & Batch
	Maskare		X		Borrow
	Mrzenica	X			Borrow & River Reg.
	Bošnjane		X		Borrow
	Makrešane	X			Batch
	Bivolje	X			Camp & Dike & Asphalt & Batch
	Jasika		X		Batch & Asphalt & Dike
	Čitluk	X			River Reg.
2	**Koševi**	X			Borrow
	Kukljin	X			Quarry & Borrow
	Bela Voda			X	Motorway
	Selište		X		Motorway
	Velika Drenova		X		Motorway
	Medveđa	X			Batch & River
	Bogdanje		X		Borrow
	Grabovac			X	Motorway

Project Sectors	Settlement	Located within 0 - 100 meter to the closest Project unit	Located within 100 - 250 meter to the closest Project unit	Located within 250 - 500 meter to the closest Project unit	Closest Project Unit
	Lozna	X			Quarry
	Štulac	X			Borrow & Asphalt & Camp
	Ruđinci	X			Camp & Asphalt & Borrow
	Vrnjci	X			Borrow & Batch
	Ugljarevo			X	Borrow
	Novo Selo		X		Motorway
	Stubal			X	Borrow
	Podunavci	X			Motorway
	Gračac			X	Batch
	Vraneši		X		Motorway
	Vrba	X			Motorway
	Zaklopača	X			Motorway
	Ratina	X			
	Šumarice		X		Borrow
	Sirča	X			River Reg. & Borrow
3	**Grdica**	X			Borrow & River Reg.
	Adrani	X			Borrow & Camp & River Reg.
	Popovići	X			River Reg.
	Miločaj	X			River Reg.
	Obrva	X			Borrow
	Goričani	X			Borrow & River Reg.
	Katrga		X		Motorway
	Mrčajevci		X		Motorway
	Donja Gorevnica			X	Motorway
	Stančići		X		Batch & Borrow
	Baluga (Ljubićska)	X			Motorway
	Konjevići	X			Motorway
	Preljina	X			Batch
	Rakova	X			Motorway
	Sokolići	X			Motorway

The Study Area for the social baseline is presented here once and is applicable throughout the subsections of the social baseline.

5.14.2 Methodology and Data Source

The Social Baseline methodology describes the approach adopted for data collection to develop a socio-economic baseline survey for the Project. This baseline study was performed in order to:

- understand the characteristics of the social context that may be subject to change, either as:
  - a result of the Project's direct and indirect potential impacts or
  - that are showing changes and trends that are independent of the Project impacts. This will enable monitoring of the socio-economic situation in the social context over time, using the present baseline as the pre-Project comparison point.
- understand what resources are available at the household level in terms of livelihoods strategies and coping/resilience mechanisms through profiling households' economic, social and cultural activities.
- identify particular groups deemed vulnerable in the local context and potentially less able to cope with the changes brought about by the Project, or less able to benefit from its positive effects.

5.14.2.1 Primary Data Collection

The primary data collection will focus on verification or supplementation, where existing data were insufficient. The objective of primary data collection is to gather recent data, to triangulate it with secondary data and to gather first-hand information from potentially impacted communities.

The Table below presents the number of surveys and interviews conducted respectively and following sub-sections provide details of the surveys conducted.

Table 5-83. Surveys and Interviews Conducted by 2U1K

Type of Survey/ Interview	Number of Surveys/Interviews/ Meetings
Household Surveys	1563
Community Level Surveys	48
Key Informant Interviews (KIIs) during the Gap Assessment	6
KIIs with Non-Governmental Organizations	9
KIIs with Affected Municipalities	7
Focus Group Discussions	7
Business Surveys	110

5.14.2.1.1 Community Level Surveys (CLS)

The aim of the Community Level Surveys (CLS) is to determine the socio-economic status of each settlement inclusive of population, migration and reasons of migration, ethnic composition, age and gender distributions, social facilities education level, local conflicts and problems, livelihoods and main income generation activities, economic production in the settlement, land use, land ownership, river and forest usage, services and infrastructure, vulnerable groups and perceptions of project impacts in the settlement.

CLS was performed with the village heads designated by Municipal authorities or opinion leaders who have a representative position and deep knowledge about each settlement.

5.14.2.1.2 Household Surveys (HHS)

In the Serbian context, a household is defined as family or other community of persons who live together and jointly spend funds for meeting their basic life needs (food, housing, etc.), regardless of whether all members are permanently at the place where the household resides or some of them temporarily reside in some other place in the country or abroad on account of work, education or for some other reason.

The sampling approach included households in the closest proximity to the Project infrastructure and local transport routes, to ensure that these were well understood, as well as those further afield (and therefore likely to include secondary/indirect impacts). Despite falling under the jurisdiction of particular villages, individual households were widely dispersed in the area.

The sampling methodology took into account by identifying the final sample through use of Geographic Information System (GIS) imagery (to identify areas where households were targeted for proximity) as well as taking part of the sample from households not as obviously affected, but which were nonetheless within the wider area of influence and relevant in terms of employment, service provision and secondary impacts such as traffic.

The total number of household surveys for both zones were 1,563 for all rural settlements in the Project buffer area.

5.14.2.1.3 Key Informant Interviews (KII)

Key informant interviews (KIIs) were held with relevant local leaders and subject-matter experts like health care professionals, education professionals, local government officers, local Non-Governmental Organizations (NGOs) and other individuals that are able to provide specific information. KIIs would involve specific ‘deep dives’ into certain topics to close any remaining data gaps.

During the Gap Assessment for Scoping Studies prepared in March 2019 for the ESIA Report, following authorities were interviewed:

Institute for Nature Protection of Serbia	Determination of protected biodiversity areas and the preparation of protection procedures.
CIP	Institute of Transportation CIP Ltd, Belgrade is a company registered with the Serbian Business Registers Agency mainly for works for Engineering services and technical consulting. CIP is responsible party for preparation of EIA Reports for Section-1 and Section-2.
Highway Institute	It is engineering and technical consulting company and responsible party for preparation of EIA Report for Section-3.
Roads of Serbia	Responsible party for maintenance and preservation, exploitation, construction, reconstruction, organization and control of toll collection, development and management of I and II category state roads in the Republic of Serbia.
Jaroslav Černi	Responsible party to conduct Hydro Technical Study corridor of the Project, also known as the Project.

The aim of the interviews was to:

- understand the background and justification for the Project;
- obtain updated information on the EIAs prepared for the different phases of the Project; and
- understand the possible environmental and social impacts
- understand the approach to impact mitigations.

In the period of social baseline data gathering studies from 10.09.2019 to 18.10.2019, nine NGO FGDs were held by the local social team with the supervision of 2U1K.

The list of the interviewed NGOs is provided below:

- NGO Treehouse;
- Kruševac's Educational Center;
- Eurokontakt;
- Association of Professional Beekeepers;
- White Tree Organization;
- NGO EKO IBAR;
- NGO Morava Fishing Association, former president of the municipality;
- West Morava Water Sports Association and Ecology Society; and
- Women Entrepreneur Association.

In order to understand the economic impacts of the Project on the local businesses, Business Suveys conducted with local businesses. These businesses were during the consultation with the Municipalities and land registry institutions and site walkover in the AoI.

In the business survey 110 companies are selected as representative example of impact of a Project.

Table 5-84. Number of Business Surveys on each Affected Municipalities

Municipality	Number of Surveys
Ćićevac	12
Varvarin	11
Kruševac	19
Vrnjačka Banja	13
Trstenik	8
Kraljevo	18
Čačak	29
TOTAL	**110**

In addition, all affected municipalities were interviewed during the social field study conducted in August 2019 by 2U1K.

5.14.2.1.4 Key Informant Interviews for the Land Acquisition

Key Informant Interviews (KII) were held with the the Corridors of Serbia (CoS) to understand;

- Land acquisition process;
- Roles and responsibilities of different parties involved in the land acquisition process;
- Implementation schedule;
- Information related to potential physical resettlement and measures/actions will be taken by the institutions;
- Official grievance and court processes;
- Land acquisition steps;
- Determination of landowners;
- Negotiation process;
- Valuation;
- Agreements;
- Compensation strategy;
- Resolution of desputes; and
- Monitoring process.

5.14.2.1.5 Focus Group Discussions (FGD)

Another method was used for qualitative primary data collection to focus group discussions (FGDs) with different women groups within the social AoI. The aim of the study was not only targetting women for the general population, but also women belonging to specific groups, including Roma women, young women, elderly women, unemployed women.

In total seven focus group discussions with 66 participants were conducted in the following municipalities: Preljina, Vrnjačka Banja (two FGDs), Adrani, Baluga, Maskare, and Kruševac. Further information on the FGDs can be found in Table 5-85.

Table 5-85. Details on the Focus Group Discussions

Settlement	Target Group	Number of Participants	Date of FGD
1. Preljina	Women from general population	10	15/10/2019
2. Vrnjačka Banja	Young Women	7	10/10/2019
	Roma Women	12	
3. Adrani	Women from general population	8	15/10/2019
4. Baluga	Farmer Women	8	14/10/2019
5. Maskare	Elderly Women	11	16/10/2019
6. Kruševac	Unemployed Women	10	16/10/2019

5.14.2.2 Secondary Data Collection

The following secondary data sources were used as key tools to understand the socioeconomic baseline:

- Sub-Basin Level Flood Action Plan;
- Flood Action Plan in the West Morava River Basin;
- General Master Plan for Transport in Serbia, Final Report;
- Spatial Plan for the Republic of Serbia;
- Development Partnership Framework 2016-2020;
- Other strategic documents adopted by local self-governments which could serve as the data source.

5.14.2.3 Sampling for the Social Impact Assessment

In the context of the Social Impact Assessment (SIA) study, a random sampling strategy was used. The key to random sampling is that each unit in the population has an equal probability of being selected in the sample. In this way, the social team avoided any bias in the sampling process. Each individual was chosen entirely by chance and each member of the population had an equal chance of being included in the sample. Every possible sample of a given size will have the same chance of selection (Valerie J. Easton and John H. McColl, 1997).

Rural settlements within the AoI of the Project have a varying number of households: from 56 in Sokolići (Čačak) to 1331 in Novo Selo (Vrnjačka Banja). List of settlements within the

500 m the AoI of the Project and the number of HH survey sample size is given in Table 5-86 below.

Table 5-86. List of Settlements and HH Sample Size

Settlement	Total Households	Average number of members	Household survey sample size
1. Vraneši	451	3.10	45
2. Vrnjci	696	3.25	70
3. Novo Selo	1331	3.35	133
4. Podunavci	454	3.31	45
5. Ruđinci	787	3.13	79
6. Štulac	390	3.04	39
7. Adrani	726	3.07	73
8. Vrba	432	3.16	43
9. Grdica	251	3.26	25
10. Zaklopača	341	3.42	34
11. Miločaj	296	3.44	30
12. Obrva	201	3.25	20
13. Popovići	92	3.34	9
14. Ratina	983	3.27	98
15. Sirča	436	3.07	44
16. Šumarice	168	2.97	9
17. Baluga (Ljubićska)	122	3.40	12
18. Donja Gorevnica	313	2.80	15
19. Katrga	277	3.17	14
20. Mrčajevci	913	3.03	45
21. Preljina	552	3.33	55
22. Rakova	211	3.13	21
23. Sokolići	56	2.86	6
24. Stančići	83	3.99	4
25. Bošnjane	530	3.23	25
26. Maskare	172	2.90	9
27. Bela Voda	311	3.91	15
28. Bivolje	86	3.20	9
29. Jasika	554	3.22	27
30. Koševi	97	3.95	10
31. Kukljin	455	3.37	45
32. Makrešane	412	3.43	41
33. Čitluk	901	3.46	90
34. Bogdanje	292	3.33	15
35. Velika Drenova	708	3.34	35
36. Lozna	115	2.92	12
37. Medveđa	722	3.14	72
38. Selište	228	3.76	12
39. Grad Stalać	202	3.43	10
40. Mrzenica	69	2.71	7

Settlement	Total Households	Average number of members	Household survey sample size
41. Pojate	246	3.44	20
42. Stalać	477	3.28	47
43. Gračac	595	3.08	30
44. Konjevići	269	3.19	13
45. Grabovac	50	2.62	3
46. Ugljarevo	164	2.74	8
47. Stubal	357	3.34	18
48. Goričani	225	3.10	22
Total Number of Household Surveys			**1,563**

The total number of household surveys for both zones were 1,563 for all rural settlements in the Project buffer area. Data for urban centres such as Trstenik and Kraljevo will be obtained via other methods and mostly from the secondary data available and KIIs with the governmental institutions.

5.14.3 Baseline Conditions

5.14.3.1 Administrative Structure of Serbia

Serbia is a unitary country with a one tier structure of government. In terms of administrative and territorial division, the country is divided into five regions: Belgrade; Vojvodina; Šumadija and West Serbia; South and East Serbia; and Kosovo and Metohija. The lower administrative and territorial division includes the City of Belgrade, as a special territorial unit, and 29 other administrative districts (UNECE, 2018). Municipalities (usually>10,000 habitants), has an assembly, public service property and a budget. They comprise local communities. Cities (>100,000 habitants) have an assembly and budget of its own. Municipalities and cities are gathered into larger entities known as districts which are regional centers of state authority. Besides five Regions created for statistical purposes, there are also 2 autonomous Provinces, Pokrajine Vojvodina and Kosovo. Local governments' existence and autonomy are enshrined in the Constitution of Republic of Serbia (2006) and the Law on Local Governments (2007).

The main sub-national governments responsibilities are infrastructure services including urban water supply, sanitation and sewerage, local road maintenance, solid waste management, urban planning and housing as well as transport, heating, kindergartens and preschool education, facilities in the field of sport and culture, public lighting. Competences on primary and secondary education and on social care are shared with the central State level, with staff wages being paid by local governments, and facilities and investment costs being covered by municipal budgets. Other shared responsibilities include management of local airports and social housing centers for the youth (OECD, 2016).

5.14.3.2 Population and Demography

The Republic of Serbia is located in South-Eastern Europe and covers the area of 88,361 km^2. Serbia shares a border with eight neighboring countries as; Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, Romania and the former Yugoslav Republic of Macedonia (United Nations Economic Commission for Europe, 2007).

According to Statistical Office of the Republic of Serbia, the estimated population is 6,982,604 (2018). The natural increase rate equals -5.4‰. The birth rate equals 9.2‰, and the death rate equals 14.6‰. The population average age is 43.2 years. In 2018 the life expectancy for males equals 73 years, and for females 78 years. The average age of mother at giving first live birth is 28.6. The leading death causes, both for male and female population, are bloodstream system diseases (Statistical Office of the Republic of Serbia, 2019).

The official language is Serbian written in Cyrillic, although Latin script is also widely used. In the areas inhabited by ethnic minorities, the languages and scripts of the minorities are in official use (United Nations Economic Commission for Europe, 2007).

In terms of religious practices, among Serbian's 84.5% are Orthodox, 5% Roman Catholic, 3% Islamic, 1% Protestant, 1.1% Atheist or Agnostic, 0.1% Other and 4.4% unspecified (BTI 2018 | Serbia Country Report, 2018). Figure 5-63 presents the map of Serbia.

Source: (Political Map of Serbia, 2019)

Figure 5-63. Map of Serbia

5.14.3.2.1 Section 1: Ćićevac Municipality

The Municipality of Ćićevac is located in central Serbia, in the northeastern part of the Rasina District, on the right bank of the Velika Morava. Municipal territory covers an area of 124 km². There are 10 settlements within the border of the Municipality. The total population of the Municipality is 8,711. The largest settlement in the Municipality is Ćićevac and it is also the administrative, economic and cultural center of the municipality. The second largest populated place is Stalac, followed by Pojate, Lucina, town of Stalac, Plocnik, Mrzenica, Trubarevo, Braljina and Mojsinje. Table 5-87 presents details on the population figures of Ćićevac Municipality.

Table 5-87. Age Groups in Ćićevac Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	198	220
Children 7–14 years old (elementary school age)	307	336
Children ages 15-18 (high school age)	172	184
Children 0–17 years old	642	687
Number of young people (15–29 years)	667	793
Working contingent of population (15–64 years)	2702	2920
TOTAL	**4381**	**4330**

Source: Statistical Office of the Republic of Serbia, 2018

There are important international transportation routes within the borders of the Municipality including the European road E75 and the longest international highway which connects Belgrade south to Thessaloniki, Athens and the Aegean Sea and southwest to Podgorica, Bar and Adriatic Sea.

There are four villages located in the Social Area of Influence within the borders of the Municipality that includes; Grad Stalać, Mrznica, Pojate and Stalać. Figure 5-64 presents the villages located in the Ćićevac Municipality within the 1 km AoI of the Project.

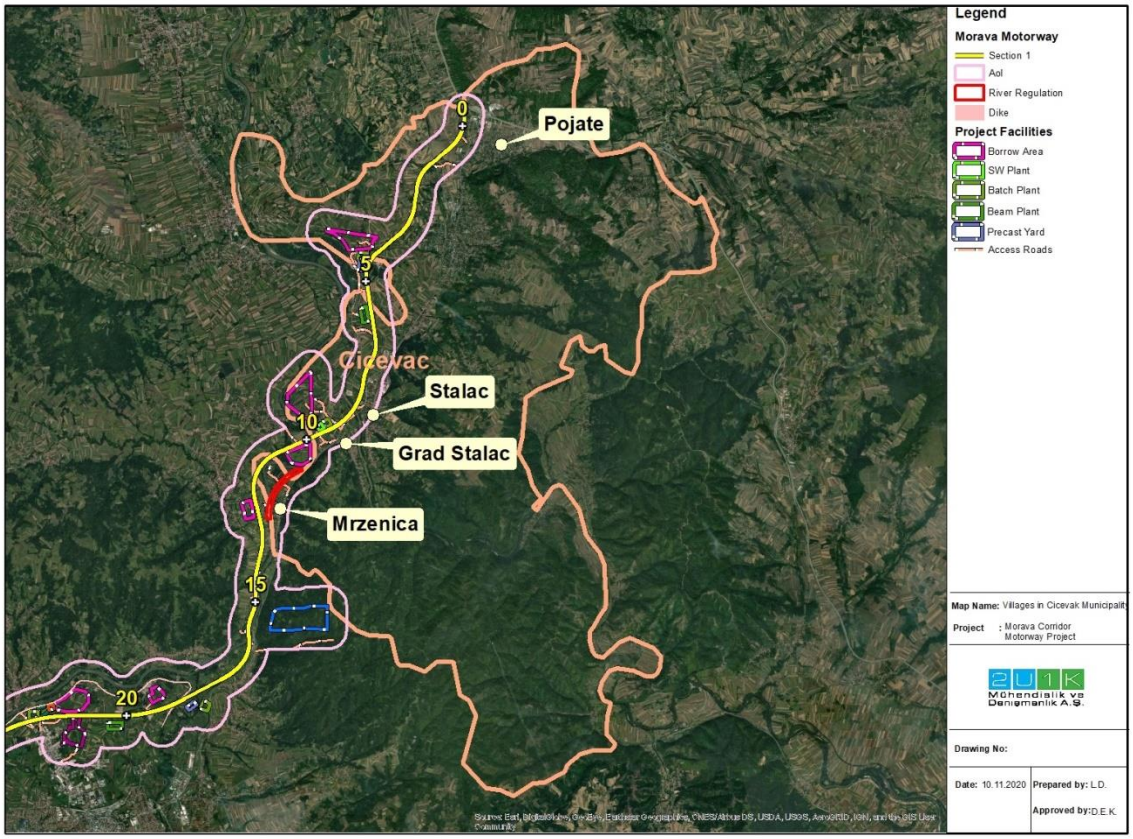


Figure 5-64. Villages located in the Ćićevac Municipality

Through the CLS with the head of villages, total population, number of houses, percentage of cottages population change tendency and the reason of the population changes have been asked. According to the outputs of the CLSs, total of 3,576 people live in four villages. The average household size between settlements varies between 3 and 4. In all settlements interviewed, it is stated that the population decreases due to economic reasons. Detailed information about the villages is given in Table 5-88.

Table 5-88. Demographic Characteristics of the Affected Villages in Ćićevac Municipality

	Grad Stalać	Mrzenica	Pojate	Stalać
Population	814	224	1017	1521
Number of households	203	74	295	568
Percentage of cottages	2%	3%	2%	4%
Population changes	Decreased	Decreased	Decreased	Decreased
Main reason for decrease/increase	Economy	Economy	Economy	Economy

The common language used by the villagers is Serbian. Other languages and religion constitute 1% of the total population. The use of other languages is a consequence of migration from other countries of the former Yugoslavia, so some families from Montenegro, Macedonia, Croatia or Bosnia and Herzegovina can be found in these villages.

They make up 1% of the population only in Grad Stalać. The same situation is with religion and 1% are Catholic or Muslim, the rest are Christian Orthodox.

According to the outputs of the Household Surveys, 90% of the respondents are married, 8% are divorced and 2% of them are widowed within Section-1.

5.14.3.2.2 Section 1: Kruševac Municipality

The City of Kruševac covers an area of 854 km², encompassing 101 settlements with over 122,437 inhabitants. The city itself, as an urban area, has the population of 65,000 citizens.

In compliance with the economic opportunities in the Municipality, it hosts younger generation and the average age of 39.2 years (38.2 for men and 40.1 for women). There are 19,342 households in the Municipality.

Table 5-89 presents details on the the population figures of Kruševac Municipality.

Table 5-89. Age Groups in Kruševac Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	3435	3838
Children 7–14 years old (elementary school age)	4656	4956
Children ages 15-18 (high school age)	2523	2635
Children 0–17 years old	9987	10769
Number of young people (15–29 years)	9657	10423
Working contingent of population (15–64 years)	39897	39739
TOTAL	**62575**	**59862**

Source: Statistical Office of the Republic of Serbia, 2018

There are seven villages located in the Social Area of Influence within the Kruševac Municipality including; Bela Voda, Čitluk, Bivolje, Jasika, Koševi, Kukljin and Makrešane.

Figure 5-65 presents the villages in the social AoI in Kruševac Municipality.

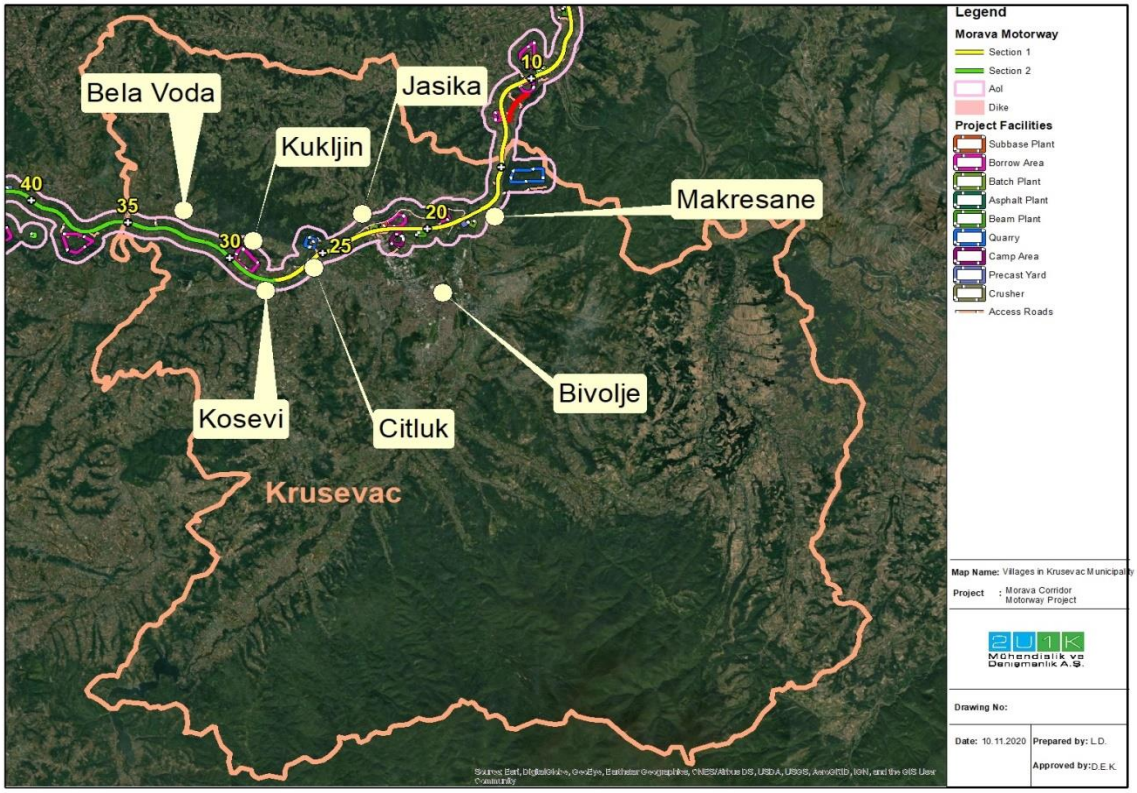


Figure 5-65. Villages located in the Kruševac Municipality

Unlike the other municipalities where Community Level Surveys were conducted, it was observed that in some settlements of Kruševac Municipality, population increase was observed directly related to job opportunities. Total population of the villages in the AoI is 9,538.

In other settlements where there is a decrease in population, it is stated that the main reason for the decrease is marriage. The average household size varies between 2.6 and 4.3 in Kruševac. The population figures of the affected villages within the Municipality is presented in Table 5-90.

Table 5-90. Demographic Characteristics of the Affected Villages in Kruševac Municipality

	Bela Voda	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makreša ne
Population	1387	3154	332	1370	450	1415	1430
Number of households	328	873	106	487	169	413	332
Percentage of cottages	11%	13%	2%	2,3%	0%	5%	9%
Population changes	Decreased	Increased	Decreased	Decreased	Increased	Decreased	Decreased
Main reason for decrease/increase	Marriage, Economy	Economy	Other	Marriage, Economy	Marriage , Economy	Migration, Unemplo yment	Mortality

Last, according to Household Surveys and Community Level Surveys, Serbian is spoken in all settlements. All of the villagers are Christians and 93% of them are Orthodox and 7% are Catholics.

5.14.3.2.3 Section 1: Varvarin Municipality

The Municipality of Varvarin is located in central Serbia and territorially belongs to the Rasina District. It is located on the left bank of the Great Morava and Kalenicka Rivers, in the Temnic region. It covers an area of 249 square kilometers and Rekovac Municipality is located in the northwest, Jagodina in the north, Paracin in the northeast, Trstenik in the west and Kruševac in the south. There are 17,966 inhabitants in the Municipality.

Table 5-91 presents details on the population figures of Varvarin Municipality.

Table 5-91. Age Groups in Varvarin Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	367	421
Children 7–14 years old (elementary school age)	611	611
Children ages 15-18 (high school age)	348	358
Children 0–17 years old	1231	1302
Number of young people (15–29 years)	1303	1455
Working contingent of population (15–64 years)	5067	5427
TOTAL	**8319**	**8242**

Source: Statistical Office of the Republic of Serbia, 2018

There are two villages located in the AoI of the Project in Varvarin Municipality as follows:

- Bošnjane
- Maskare

Figure 5-66 presents the villages located in the Varvarin Municipality within the 1 km AoI of the Project.

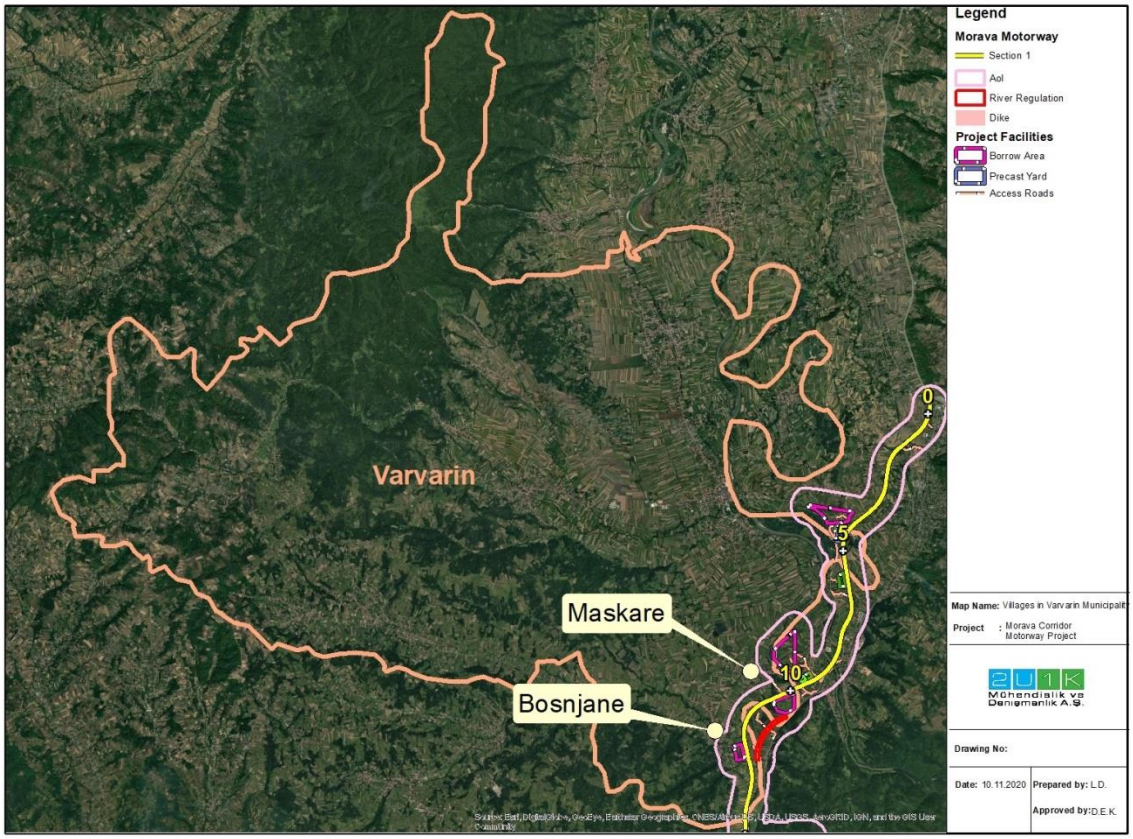


Figure 5-66. Villages located in the Varvarin Municipality

The total population in the AoI of Varvarin is 2,700. The average household size of Bošnjane is 4.3 and the average household size of Maskare is 3.1. According to CLS results, Bošnjane is experiencing the population increase as a result of economic opportunities and the population of the Maskere decreases due to lack of employment opportunities.

The population figures of the affected villages within the Municipality are presented in Table 5-92.

Table 5-92. Demographic Characteristics of the Affected Villages in Varvarin Municipality

	Bošnjane	Maskare
Population	2161	539
Number of households	502	172
Percentage of cottages	2%	1%
Population changes	Increased	Decreased
Main reason for decrease/increase	Economy	Economy

All villagers in Maskare Village speak Serbian and Bošnjane village other languages constitutes 1%.

5.14.3.2.4 Section 2: Kraljevo Municipality

The city of Kraljevo occupies the area of 1,529 km². According to Statistical Office of the Republic of Serbia, the total population of Kraljevo Municipality is 119,585.

Table 5-93 presents details on the the population figures of Kraljevo Municipality.

Table 5-93. Age Groups in Kraljevo Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	3458	3733
Children 7–14 years old (elementary school age)	4662	5167
Children ages 15-18 (high school age)	2523	2620
Children 0–17 years old	10017	10853
Number of young people (15–29 years)	9707	10519
Working contingent of population (15–64 years)	38889	38968
TOTAL	60848	58737

Source: Statistical Office of the Republic of Serbia, 2018

There are 11 villages located in the Social Area of Influence within the borders of the Municipality that includes; Adrani, Vrba, Grdica, Zaklopača, Miloča, Obrva, Popovići, Ratina, Sirča, Šumarice and Stuba.

Figure 5-67 presents the affected villages located in the Kraljevo Municipality.

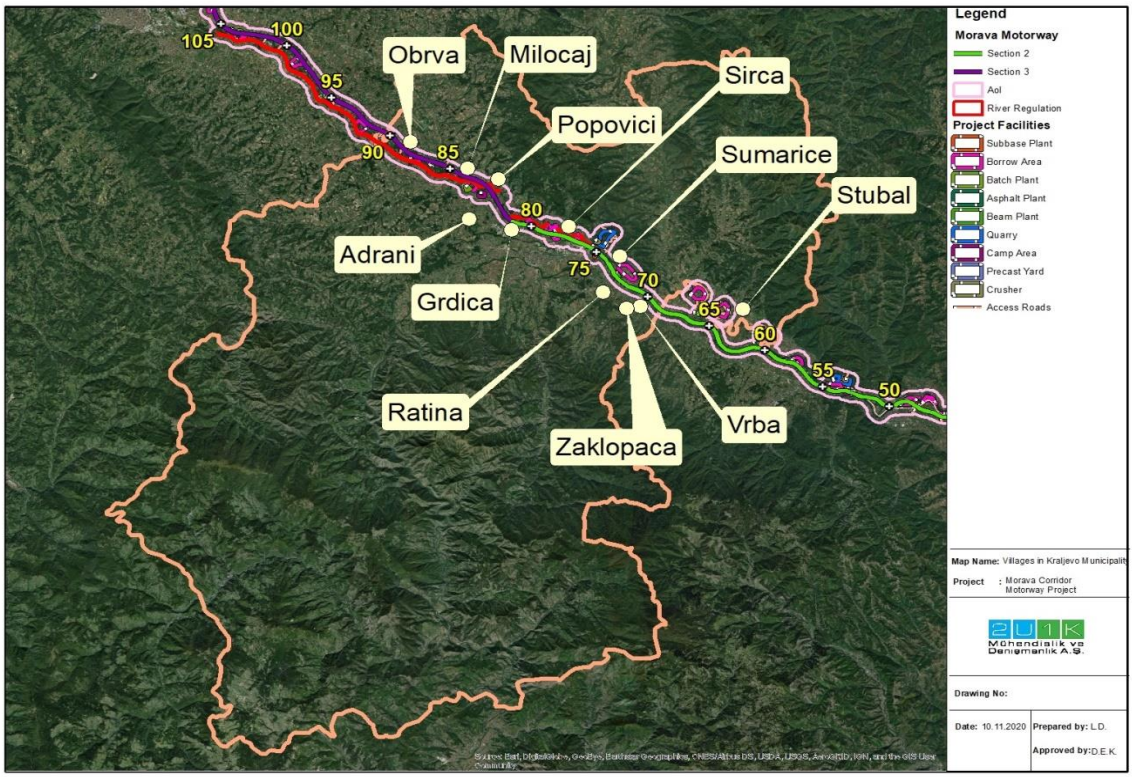


Figure 5-67. Villages located in the Kraljevo Municipality

When the municipalities in the impact area are analyzed, it was observed that Kraljevo is the most affected Municipality in terms of number of the villages in the AoI of the Project. There are 11 villages located in the 1 km AoI of the Project with the total population of 14,249. The economy has been cited as the main cause of both population growth and the population decrease. The average household size varies between 2.8 and 3.4.

The population figures of the affected villages within the Municipality are presented in Table 5-94.

Table 5-94. Demographic Characteristics of the Affected Villages in Kraljevo Municipality

	Adrani	Vrba	Grdica	Zaklopača	Miloča	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Population	2257	1347	748	1000	1019	653	307	3210	1966	544	1198
Number of households	677	412	262	312	296	223	92	859	642	178	371
Percentage of cottages	3%	2%	2%	2%	20%	20%	3%	2%	8%	2%	20%
Population changes	Decreased	Increased	Increased	Increased	Decreased	Decreased	Increased	Increased	Decreased	Decreased	Decreased
Main reason for decrease/increase	Economy	Economy	Economy	Economy	Economy	Economy	Marriage	Economy	Economy	Economy	Economy

All villagers in Kraljevo speak Serbian and other languages constitutes 1-2% of the total population.

5.14.3.2.5 Section 2: Vrnjačka Banja Municipality

The Municipality of Vrnjačka Banja is located in the borders of the Raška administrative district in Serbia. The center of the municipality is Vrnjačka Banja. Vrnjačka Banja has 8,421 adults, with an average age of 44.2 years (42.6 for men and 45.6 for women). There are 3,703 households in the settlement, and the average number of members per household is 2.67.

There are seven villages located in the Social Area of Influence within the borders of the Municipality that includes;

- Vraneši;
- Vrnjci;
- Novo Selo;
- Podunavci;
- Ruđinci;
- Štulac;
- Gračac.

Figure 5-68 presents the affected villages located in the Vrnjačka Banja Municipality.

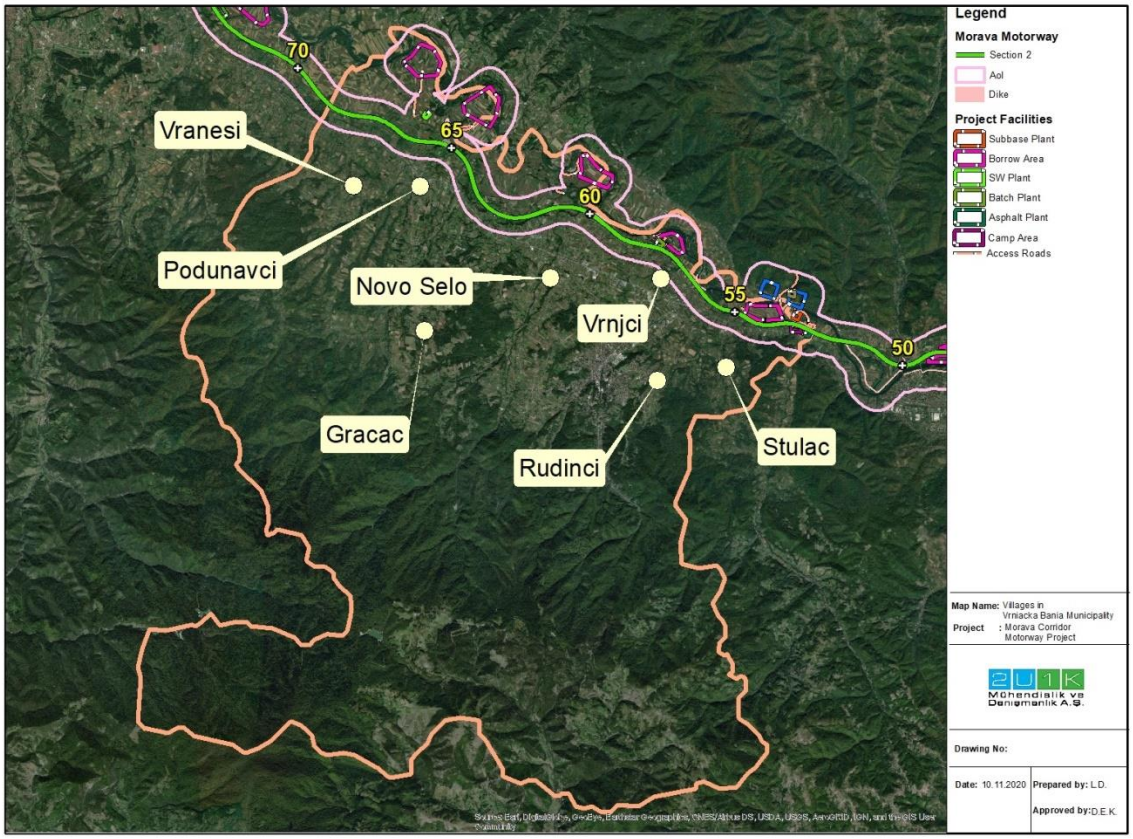


Figure 5-68. Villages located in the Vrnjačka Banja Municipality

Total of 15,115 people live in the affected villages located in 1 km zone of Vrnjačka Banja Municipality. The average household size varies from 2.8 and 3.8 within the villages. Detailed population figures are provided in Table 5-95.

Table 5-95. Demographic Characteristics of the Affected Villages in Vrnjačka Banja Municipality

	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Population	1400	2268	4461	1502	2466	1185	1833
Number of households	424	664	1170	422	685	348	652
Population changes	Decreased	Increased	Increased	Increased	Decreased	Decreased	Decreased
Main reason for decrease/ increase	Economy	Economy	Economy	Economy	Economy	Economy	Economy

The common language used in Vrnjačka Banja is Serbian: However, this Municipality is more heterogeneous in terms of ethnic composition when compared to the other Municipalities. There are 7% of Roma in Gracac and 1-3% of Bulgarians and Hungarians in the other villages. The communities are mainly Christian Orthodox. With 98% and the remaining part of the villages are Catholic.

5.14.3.2.6 Section 2: Trstenik Municipality

The municipality of Trstenik is bordered by the town of Kraljevo in the west, the municipality of Vrnjačka Banja in the southwest, the municipality of Aleksandrovac in the south and southeast, the city of Kruševac in the east, the municipality of Rekovac in the north and the municipality of Varvarin in the northeast. Trstenik municipality is located in the West Morava valley, covering an area of 448 km². In this area, there are approximately 43,000 inhabitants in 51 settlements.

Table 5-96 presents details on the population figures of Trstenik Municipality.

Table 5-96. Age Groups in Trstenik Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	949	1058
Children 7–14 years old (elementary school age)	1358	1407
Children ages 15-18 (high school age)	687	747
Children 0–17 years old	2821	3041
Number of young people (15–29 years)	2865	3076
Working contingent of population (15–64 years)	12500	12678
TOTAL	20088	19422

Source: Statistical Office of the Republic of Serbia, 2018

There are seven villages located in the Social Area of Influence within the borders of the Municipality that includes;

- Bogdanje;
- Velika Drenova;
- Lozna;
- Medveđa;
- Selište;
- Grabovac;
- Ugljarevo.

Figure 5-69 presents the affected villages located in Trstenik Municipality.

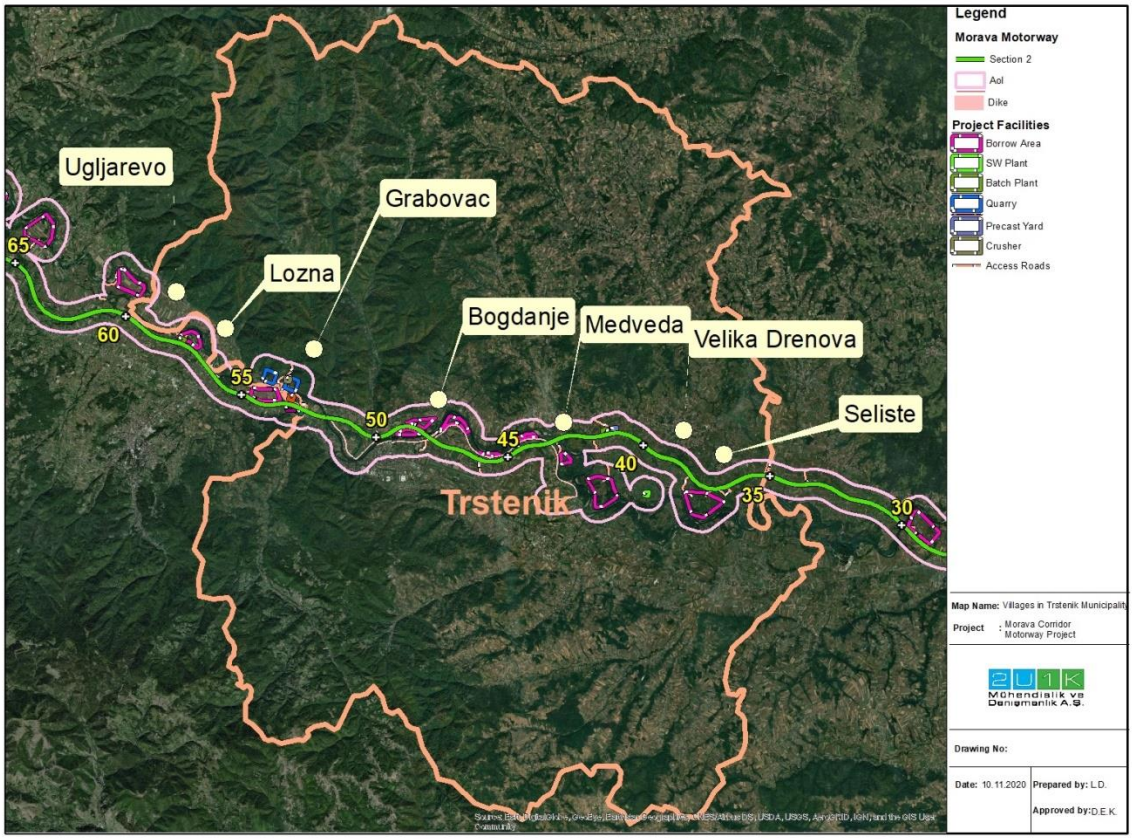


Figure 5-69. Villages located in the Trstenik Municipality

The average household size of the villages varies between 2.5 and 4. In all villages, there is a decrease in the population due to economic reasons. Population information of the affected villages is given in the Table 5-97.

Table 5-97. Demographic Characteristics of the Affected Villages in Trstenik Municipality

	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Population	1055	2363	380	2694	928	125	478
Number of households	292	708	115	722	228	50	164
Population changes	Decreased	Decreased	Decreased	Decreased	Decreased	Decreased	Decreased
Main reason for decrease/increase	Economy	Economy	Economy	Economy	Economy	Economy	Economy

The common language used in the villages is Serbian and there are also people moved from Montenegro, Macedonia, Croatia or Bosnia and Herzegovina within all villages up 1-3% and there are also Catholic and Muslim minorities is approximately 1 to 3%.

5.14.3.2.7 Section 3: Čačak Municipality

The Municipality of Čačak is located in the Moravica District. The center of the Municipality is city of Čačak.

Table 5-98 presents details on the the population figures of Čačak Municipality.

Table 5-98. Age Groups in Čačak Municipality

Age Groups	Women	Men
Children up to 6 years old (preschool age)	5768	6375
Children 7–14 years old (elementary school age)	7304	7737
Children ages 15-18 (high school age)	3874	4129
Children 0–17 years old	16035	17274
Number of young people (15–29 years)	15211	16510
Working contingent of population (15–64 years)	64127	64854
TOTAL	101847	98358

Source: Statistical Office of the Republic of Serbia, 2018

There are ten villages located in the Social Area of Influence within the borders of the Municipality that includes;

- Baluga;
- Donja Gorevnica;
- Katrga;
- Mrčajevci;
- Preljina;
- Rakova;
- Sokolići;
- Stančići;
- Konjevići;
- Goričani.

The Figure 5-70 presents the affected villages located in the Čačak Municipality.

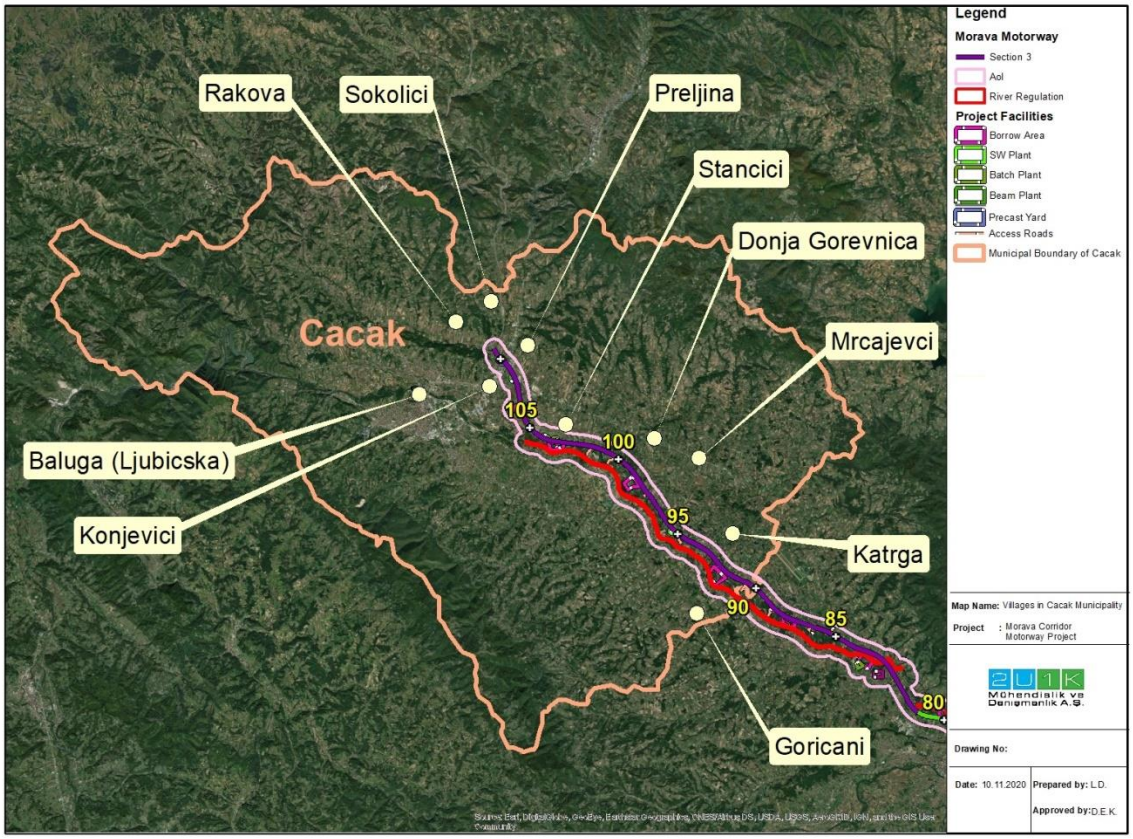


Figure 5-70. Villages located in the Čačak Municipality

Population information of the affected villages is given in the Table 5-99.

Table 5-99. Demographic Characteristics of the Affected Villages in Čačak Municipality

	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Population	726	877	877	2767	1840	661	160	331	859	780
Number of households	217	288	323	870	522	234	68	89	246	250
Population changes	Decreased	Decreased	Decreased	Increase	Increase	Decreased	Decreased	Decreased	Increased	Decreased
Main reason for decrease/increase	Economy	Economy	Economy	Economy	Economy	Economy	Economy	Economy	Economy	Economy

There are 1-2% families from Montenegro in the villages of Donja Gorevnica, Mrčajevci, Preljina and Goričani. In the village of Baluga, Katrga, Rakova, Sokolići, Stančići and Konjevići all residents are Serbs and in terms of religion all villagers are Orthodox.

5.14.3.2.8 Sensitive Receptors

The sensitive receptors are considered where the Project may create population change including population influx and population decrease. Although the population increase in the close vicinity of the construction area may create some positive impacts including job opportunities and local procurement; it may also create some negative impacts on the existing social environment including, pressure on the local infrastructure and services, community health and safety impacts due to interaction with the Project workers and social conflicts. In addition, the majority of the land acquisition of the Project will be acquired from agricultural lands from the private owners and it may cause Project affceted landowners being landless. As a result of this acquisition, out-migration may occur. At the same time in-migration may occur from the neighbouring communities due to direct and indirect job opportunities caused by the Project.

5.14.3.3 Economy

Serbia is an upper middle-income country, according to the World Bank economy classification. The country relies on manufacturing and exports, directed largely by foreign investment. According to Fiscal Strategy, a document made by the Serbian Ministry of Finance, predicts that in 2019 GDP will grow around 3.5%, and 4% in 2020 and 2021. Top five sections in export were: Electrical machines and apparatus, road vehicles, iron and steel, rubber products and non-ferrous metals (as of 2018) (China - CEE Institute, 2019).

Serbia is one of the top 10 European countries that exports agricultural and food products (Public Policy Research Center, 2019). In 2018, the area of 754,048 ha was sown in the autumn sowing season, which in comparison to the final results of the autumn sowing season 2017 indicates a decrease by 7.3%. Observed by crop cultures, decreased values were noted for wheat (by 10.6%), barley (by 2.0%), ray (by 19.7%), oat (by 26.7%) and oilseed rape (by 17.2%). When related to the ten-year average of autumn sowing values (2008 – 2017), the areas under wheat are larger by 0.5% (Statistical Office of the Republic of Serbia, 2019).

In 2018, the average gross salaries and wages amounted to RSD 68,629, while the average net salaries and wages (tax and contributions excluded) amounted to RSD 49,650. Related to 2017, the average gross salaries and wages increased by 6.0% in nominal terms, and by 3.9% in real terms, while the average net salaries and wages (tax and contributions excluded) increased by 6.5% in nominal terms, and by 4.4% in real terms. In 2018 the total number of registered employed amounted to 2,131,079, presenting increase of 3.3% if related to 2017. In comparison to the year 2017 the number of employed persons increased

in all regions. The employment growth rate was most expressive in Region Vojvodine (4.1%), while the lowest growth rate was notable in Region Južne i Istočne Srbije (1.8%).

Last, in 2018, the average monthly income in Serbia, amounted to RSD 63,734 per household, and when related to 2017 it was increased by 3.8% in nominal terms. The largest share in income generated from regular employment by 49.1%, then pensions by 32.3%, income from from agriculture, hunting and fishing by 4.5%, natural consumption by 3.3%, income coming out of regular employment by 2.8%, social insurance allowances by 2.7%, and 5.3% goes to income from other sources. The largest share in individual consumption of households goes to expenditures for food and non-alcoholic beverages by 34.3% and housing, water, electricity, gas and other fuels by 16.7% (Statistical Office of the Republic of Serbia, 2019).

5.14.3.3.1 Section 1: Ćićevac Municipality

The local economy in the Ćićevac Municipality is mainly based on private sector. The 70% of adults (aged over 18 +) are employed, whereas the remaining 30% are unemployed.

Further information on the employment data of Ćićevac was derived from the Statistical Office of the Republic of Serbia in Table 5-100.

Table 5-100. Employment data of Ćićevac Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	2273	(2018)
by municipalities of residence	2409	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	28	(2018)
Net average salaries and wages (RSD)[1]	36751	(2018)
Registered unemployed[2]	802	(2018)
Registered unemployed per 1,000 inhabitants[2]	93	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

During the Community Level Surveys with the village heads the majority of the villagers are salaried employees and farmers. The main local sectors in terms of occupation in the affected villages are agriculture, wood and construction industries (Rasina Administrative District, s. 2019).

Almost all participants of the household survey indicated that unemployment is the significant issue in their villages. Unemployment is observed to be more common in local women, whereas, retired pensions observed to be received equally among local men and women.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

The most cultivated crops are corn (73%), vegetables (7%), wheat (13%), and barley (7%). According to household surveys, very few locals indicated that they were selling these crops, instead they either use it for household purposes or to feed livestock.

Farmers of the affected villages stated that the income from agriculture was decreased because of the floods and droughts happened in recent years. During the household surveys, the reasons of decreasing agriculture activities were also asked and Table 5-101 presents the village vise households opinions on reasons of decrease.

Table 5-101. Reasons of decrease in agricultural activities stated by the villagers

Village	Reasons
Grad Stalac	Lack of manpower Abandoning the usage of fertilizers and pesticides Low prices given for the products
Mrzenica	Drought Low prices given for the products Lack of manpower
Pojate	Drought Low prices given for the products Lack of manpower
Stalac	Drought Low prices given for the products Lack of manpower.

As stated above, some of the agricultural products are used to feed livestock. Although majority of the villages are engaged in livestock, it is usually for household purposes. The largest percentage of livestock belongs to pigs and poultry farming, while cattle and sheep occupy a smaller share. According to Household Surveys, the main livestock products are stated as cheese, milk, eggs and meat, respectively. However, in these villages, these products are rarely sold for extra income generation. Household survey results indicates that approximately 60% of the households engages with livestock.

Besides agriculture, pensions and salary-based income sources are also common in affected villages. In all affected villages, the average family income ranges from 255 to 850 Euros. Further details on the income sources of the affected villages can be found in Table 5-102.

Table 5-102. Income sources of the affected villages in the Ćićevac Municipality

Village	Income Sources
Baluga	1. Agriculture 2. Pension 3. Salaried Employee 4. Seasonal agriculture
Donja Gorevnica	1. Agriculture 2. Salaried Employee 3. Pension
Katrga	1. Agriculture 2. Pension 3. Salaried Employee
Mrčajevci	1. Pension 2. Agriculture 3. Salaried Employee 4. Seasonal agriculture
Preljina	1. Agriculture 2. Salaried Employee 3. Pension
Rakova	1. Agriculture 2. Pension 3. Salaried Employee 4. Seasonal agriculture
Sokolići	1. Agriculture 2. Salaried Employee 3. Pension
Stančići	1. Agriculture 2. Pension 3. Salaried Employee
Konjevići	1. Salaried Employee 2. Agriculture 3. Pension
Goričani	1. Agriculture 2. Salaried Employee 3. Pension

The main expenses of the households stated as food, agricultural expenses and household utility bills.

5.14.3.3.2 Section 1: Kruševac Municipality

The local economy in the Kruševac Municipality is mainly based on private sector and services, and 75% of the adults (aged over 18+) are stated as employed, whereas remaining 25% is unemployed.

Further information on the employment data of Kruševac was derived from the Statistical Office of the Republic of Serbia in Table 5-103.

Table 5-103. Employment data of Kruševac Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	31611	(2018)
by municipalities of residence	33287	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	27	(2018)
Net average salaries and wages (RSD)[1]	42981	(2018)
Registered unemployed[2]	11861	(2018)
Registered unemployed per 1,000 inhabitants[2]	98	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

Kruševac is a strong economic center with a specially developed metal processing chemical industry. There is also a factory of alcoholic and non-alcoholic beverages. In addition to large social collectives, the Kruševac has over 1,200 private companies and over 2,500 independent shops of various activities.

During the Community Level Surveys with the village heads, it was stated that majority of the villagers are salaried employees and farmers. The head of villages in Kruševac Municipality were able to provide further information on the economic structure of the affected villages, in which, outcomes are summarized through gender ratio in Table 5-104.

Table 5-104. Economic Structures of the Villages in Kruševac Municipality

Category	Female	Male	Total
Unemployed	55 %	45 %	100 %
Farmer	57 %	43 %	100 %
Self-employed	55 %	45 %	100 %
Salaried employees	55 %	45 %	100 %
Retired	45 %	55 %	100 %

The given information on the economic structures according to the village heads were assessed together with the information derived from the household surveys. As a result, agriculture, manufacturing industry, trade and construction are the main economic sectors of the affected villages. In all affected villages in Kruševac, the average family income ranges from 255 to 850 Euros.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

In terms of agricultural activities, the most cultivated crops are wheat (19%), barley (8%), oats (8%) and corn (65%). As given information, 97% of the affected households produce food for themselves, in other words, the entire crop yield is spent on livestock farming, and

livestock is used for household nutrition. Only 3% of the households stated to sell farmland products and excess livestock.

The largest percentage of the livestock belongs to poultry farming (83%), followed by pigs, (10%) while cattle (4%) and sheep (3%) occupy a smaller percentage. The main livestock products are cheese, milk, eggs and meat. These products are mostly made for household use. Besides, 40 families in the village of Kukljin is selling cheese, eggs and milk for income. The village of Koševi follows Kukljin with 15 households, who are selling milk, cheese and similar products, whereas 2-3 households in other villages of Kruševac deal with selling livestock products.

Besides agriculture, small businesses and pensions are also common income sources in affected villages. Further details on the income sources of the affected villages can be found in Table 5-105.

Table 5-105. Income sources of the affected villages in Kruševac Municipality

Village	Income Sources
Bela voda	1. Agriculture 2. Seasonal agriculture 3. Pension 4. Government social support 5. State job
Čitluk	1. Small business owner 2. Seasonal agriculture 3. Governmental job 4. Retired 5. Government social support
Bivolje	1. Small business owner 2. Seasonal agriculture 3. Governmental job 4. Retired 5. Government social support
Jasika, Koševi, Kukljin, Makrešane	1. Agriculture 2. Seasonal agriculture 3. Pension 4. Government social support 5. State job

The main expenses of the households stated to be household utility bills and health expenses.

5.14.3.3.3 Section 1: Varvarin Municipality

The main economic segments within the Varvarin Municipality are mainly based on private sector, tourism, and services, 75% of the adults (aged over 18+) are stated to be employed, whereas remaining 25% is stated as unemployed.

Further information on the employment data of Varvarin was derived from the Statistical Office of the Republic of Serbia in Table 5-106.

Table 5-106. Employment data of Varvarin Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	3298	(2018)
by municipalities of residence	3598	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	22	(2018)
Net average salaries and wages (RSD)[1]	36260	(2018)
Registered unemployed[2]	974	(2018)
Registered unemployed per 1,000 inhabitants[2]	60	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

During the CLS, conducted in the scope of the social baseline studies of ESIA, with the village heads, it was stated that majority of the villages are populated by salaried employees and farmers. In all affected villages, the average family income ranges from 255 to 850 Euros.

The village heads in the Varvarin Municipality were able to provide further information on the economic structure of the affected villages, in which, outcomes are summarized through gender ratio in Table 5-107.

Table 5-107. Economic Structures of the Villages in Varvarin Municipality

Category	Female	Male	Total
Unemployed	85 %	15 %	100 %
Farmer	45 %	55 %	100 %
Self-employed	50 %	50 %	100 %
Salaried employees	45 %	55 %	100 %
Retired	50 %	50 %	100 %

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore, further information on agriculture conditions of the affected villages are given below.

The most cultivated crops are corn (58%), vegetables (21%), barley (11%) and wheat (10%). All families use agricultural products for household purposes as well as to feed livestock. The largest percentage of livestock belongs to poultry farming (90%), followed by pigs, (1%) while cattle (1%) and sheep (1%) occupy a very smaller percentage. The main livestock products are cheese, milk, eggs and meat. These products are mostly made for household use.

Besides agriculture, pensions and salary-based employments are also common income sources in affected villages. Further details on the income sources of the affected villages can be found in Table 5-108.

Table 5-108. Sources of the affected villages in Varvarin Municipality

Village	Income Sources
Bošnjane	1. Agriculture 2. Seasonal agriculture 3. Pension 4. Government social support 5. State job
Maskare	1. Pension 2. Agriculture 3. Seasonal agriculture 4. Agriculture

The main expenses of the households stated to be household utility bills and health expenses.

5.14.3.3.4 Section 2: Kraljevo Municipality

The main economic sectors within the Kraljevo Municipality are mainly based on private sector, agriculture and livestock and 75% of the adults (aged over 1+) are stated to be employed, whereas remaining 25% is stated as unemployed.

Further information on the employment data of Kraljevo was derived from the Statistical Office of the Republic of Serbia in Table 5-109.

Table 5-109. Employment data of Kraljevo Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	29937	(2018)
by municipalities of residence	32349	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	27	(2018)
Net average salaries and wages (RSD)[1]	42708	(2018)
Registered unemployed[2]	10459	(2018)
Registered unemployed per 1,000 inhabitants[2]	88	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

The majority of the locals within the affected villages of Kraljevo Municipality are self-employed, farmers and salaried employers. During the Community Level Surveys with the village heads, the economic structure of the villages was asked and outcomes are summarized through gender ratio in Table 5-110.

Table 5-110. Economic Structures of the Villages in Kraljevo Municipality

Category	Female	Male	Total
Unemployed	77 %	23 %	100 %
Farmer	57 %	43 %	100 %
Self-employed	25 %	75 %	100 %
Salaried employees	58 %	42 %	100 %
Retired	50 %	50 %	100 %

During the Householde Survey, it was observed that more than 90% of the respondents stated that unemployment is a very significant issue in their villages. Also, cost of living and low income stated to be very significant according to all respondents of the household surveys.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

The most cultivated crops 8%), wheat (11%), vegetables (11%) and barley (5%). According to household surveys, very few locals indicated that they were selling these crops. The agricultural products usually for household purposes and to feed livestock. In regard to livestock activities, pigs (32%) and cows (32%), sheep (18%) and poultry (18%) were observed to be a common type of farming animals.

The main livestock products are cheese, milk, eggs and meat. According to outcomes from the CLS, Stubal is very active in dairy production and the village has numerous mini dairies, approximately 70% of the households in the village are engaged in dairy products production.

According to outcomes of the Household Surveys, the common income sources are stated to be agriculture, salary and pension. In all affected villages, the average family income ranges from 255 to 850 Euros. Further information on the income sources of each affected village are presented in Table 5-111.

Table 5-111. Income sources of the affected villages in Kraljevo Municipality

Village	Income Sources
Adrani	1. Salaried Employee 2. Agriculture 3. Pension 4. Seasonal agriculture 5. Livestock
Vrba	1. Salaried Employee 2. Rent income 3. Pension
Grdica	1. Salaried Employee 2. Pension 3. Agriculture
Zaklopača	1. Salaried Employee 2. Agriculture 3. Small business owner

Village	Income Sources
	4. Pension
Miločaj	1. Agriculture 2. Pension
Obrva	1. Agriculture 2. Salaried Employee 3. Seasonal agriculture 4. Government social support 5. Pension
Popovići	1. Agriculture 2. Salaried Employee 3. Seasonal agriculture
Ratina	1. Pension 2. Salaried Employee 3. Agriculture 4. Seasonal agriculture 5. Animal husbandry
Sirča	1. Agriculture 2. Salaried Employee 3. Seasonal agriculture
Šumarice	1. Agriculture 2. Seasonal agriculture 3. Animal husbandry
Stubal	1. Agriculture 2. Seasonal agriculture 3. Animal husbandry

The main expenses of the households stated to be household utility bills, health expenses and food expenses.

5.14.3.3.5 Section 2: Vrnjačka Banja Municipality

The main economic sectors within the Vrnjačka Banja Municipality are mainly based on private sector, agriculture and livestock and 75% of the adults (aged over 18+) are stated to be employed, whereas remaining 25% is stated as unemployed.

Further information on the employment data of Vrnjačka Banja was derived from the Statistical Office of the Republic of Serbia in Table 5-112.

Table 5-112. Employment data of Vrnjačka Banja Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	7247	(2018)
by municipalities of residence	7371	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	28	(2018)
Net average salaries and wages (RSD)[1]	38544	(2018)
Registered unemployed[2]	3005	(2018)
Registered unemployed per 1,000 inhabitants[2]	115	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

The majority of the locals within the affected villages of Vrnjačka Banja are salary employed, farmers and retired. The village heads in Vrnjačka Banja Municipality were able to provide further information on the economic structure of the affected villages, in which, outcomes are summarized through gender ratio in Table 5-113.

Table 5-113. Economic Structures of the Villages in Vrnjačka Banja Municipality

Category	Female	Male	Total
Unemployed	60 %	40 %	100 %
Farmer	35 %	65 %	100 %
Self-employed	35 %	65 %	100 %
Salaried employees	45 %	55 %	100 %
Retired	45 %	55 %	100 %

The given information on the economic structures according to the village heads were assessed together with the information derived from the household surveys. As a result, agriculture, manufacturing industry and trade are the main economic sectors of the affected villages. In all affected villages in Vrnjačka Banja, the average family income ranges from 255 to 850 Euros.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

The most cultivated crops are vegetables (36%), corn (28%), fruits (20%), and wheat (16%). According to the locals, corn and wheat are mainly used to feed livestock, whereas, vegetables and fruits are used for household purposes. The largest percentage of livestock belongs to pigs (53%) and poultry farming (23%), while cattle (12%) and sheep (12%) occupy a smaller percentage. The main livestock products are cheese, milk, eggs and meat. According to Household Surveys, livestock products are mainly used for household purposes.

According to outcomes of the Household Surveys, income sources of each affected village are presented in Table 5-114.

Table 5-114. Income sources of the affected villages in Vrnjačka Banja Municipality

Village	Income Sources
Vraneši	1. Agriculture 2. Salaried Employee 3. Seasonal agriculture 4. Pension
Vrnjci	1. Salaried Employee 2. Pension 3. Agriculture
Novo Selo	1. Salaried Employee 2. Pension 3. Seasonal agriculture 4. Agriculture
Podunavci	1. Salaried Employee 2. Agriculture 3. Pension
Ruđinci	1. Pension 2. Salaried Employee
Štulac	1. Salary 2. Pension 3. Agriculture
Gračac	1. Salaried Employee 2. Agriculture 3. Pension

The main expenses of the households stated to be household utility bills, health expenses and food expenses.

5.14.3.3.6 Section 2: Trstenik Municipality

The main economic sector within the Trstenik Municipality is mainly based on private sector and 66% of the adults (aged over 18+) are stated to be employed, whereas remaining 34% is stated as unemployed.

Further information on the employment data of Trsnetik was derived from the Statistical Office of the Republic of Serbia in Table 5-115.

Table 5-115. Employment data of Trstenik Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	9121	(2018)
by municipalities of residence	9705	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	25	(2018)
Net average salaries and wages (RSD)[1]	39466	(2018)
Registered unemployed[2]	4326	(2018)
Registered unemployed per 1,000 inhabitants[2]	111	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

The majority of the locals within the affected villages of Trstenik are salary employed, farmers and retired. During the Community Level Surveys with the village heads, they were able to provide further information on the economic structure of the affected villages, and outcomes are summarized through gender ratio in Table 5-116.

Table 5-116. Economic Structures of the Villages in Trstenik Municipality

Category	Female	Male	Total
Unemployed	50 %	50 %	100 %
Farmer	45 %	55 %	100 %
Self-employed	45 %	55 %	100 %
Salaried employees	45 %	55 %	100 %
Retired	40 %	60 %	100 %

The given information on the economic structures according to head of villages were assessed together with the information derived from the household surveys. As a result, agriculture, manufacturing industry and trade are the main economic sectors of the affected villages. In all affected villages in Trstenik, the average family income ranges from 255 to 850 Euros.

During the Household Surveys, it was observed that more than 90% of the respondents stated that unemployment is a very significant issue in their villages.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

The most cultivated crops are wheat (13%), barley (3%), vegetable (28%), fruits (8%), vine (6%), clover (6%) and corn (36%). Almost all of the affected households produce food for themselves, in other words, the entire crop yield is spent on livestock farming, and livestock is used for household nutrition. The largest percentage of livestock belongs to pigs and poultry farming, while cattle and sheep occupy a smaller percentage. The main livestock products are cheese, milk, eggs and meat.

According to outcomes of the Household Surveys, the common income sources are stated to be agriculture, salary and pension further details can be found in Table 5-117.

Table 5-117. Income sources of the affected villages in Trstenik Municipality

Village	Income Sources
Bogdanje	1. Salaried Employee 2. Agriculture 3. Seasonal agriculture 4. Pension
Velika Drenova	1. Pension 2. Agriculture 3. Salaried Employee
Lozna	1. Salaried Employee 2. Pension 3. Agriculture

Village	Income Sources
Medveđa	1. Salaried Employee 2. Agriculture 3. Small business owner 4. Pension
Selište	1. Agriculture 2. Pension
Grabovac	1. Salaried Employee 2. Pension 3. Agriculture 4. Seasonal agriculture
Ugljarevo	1. Salaried Employee 2. Pension 3. Agriculture

The main expenses of the households stated to be household utility bills, health expenses and food expenses.

5.14.3.3.7 Section 3: Čačak Municipality

The main economic sectors within the Čačak Municipality are private sector, services and tourism. In terms of employment, 80% of the adults (aged over 18+) are stated to be employed, whereas remaining 20% is stated as unemployed. Čačak also contains industries such as metal, non-metals, chemical industry products.

Further information on the employment data of Čačak was derived from the Statistical Office of the Republic of Serbia in Table 5-118.

Table 5-118. Employment data of Čačak Municipality

Employment and Earnings		
Registered employees*[1]		
by municipalities of work	35141	(2018)
by municipalities of residence	35501	(2018)
Registered employees* by municipalities of residence comparing to population number (%)[1]	32	(2018)
Net average salaries and wages (RSD)[1]	43260	(2018)
Registered unemployed[2]	7229	(2018)
Registered unemployed per 1,000 inhabitants[2]	66	(2018)

Source:
[1] *Statistics of Employment and Earnings, SORS*
[2] *National Employment Service*

The majority of the locals within the affected villages of Čačak Municipality are self-employed, farmers and salaried employers. The village heads in Čačak Municipality were able to provide further information on the economic structure of the affected villages, in which, outcomes are summarized through gender ratio in Table 5-119.

Table 5-119. Economic Structures of the Villages in Čačak Municipality

Category	Female	Male	Total
Unemployed	60 %	40 %	100 %
Farmer	33 %	67 %	100 %
Self-employed	44 %	56 %	100 %
Salaried employees	35 %	65 %	100 %
Retired	58 %	42 %	100 %

During the Household Surveys, it was observed that more than 90% of the respondents stated that unemployment is a very significant issue in their villages. Also, both “cost of living” and “low income” were stated to be very significant according to all respondents of the household surveys. In all affected villages in Čačak, the average family income ranges from 255 to 850 Euros.

Agriculture is one of the main occupations in all affected villages and agricultural activities are expected to experience Project related impacts the most, therefore further information on agriculture conditions of the affected villages are given below.

The most cultivated crops are vegetables (33%), fruits (25%), corn (19%), clover (9%), barley (7%), wheat (4%) and vine (3%). According to Household Surveys, very few locals indicated that they were selling these crops. Farmers of the affected villages stated that the income from agriculture was decreasing over the years because in recent years the villages had been affected by floods and droughts, so the crops they cultivated were barely able to feed the livestock. In all villages, corn, barley and clover are used to feed livestock.

In regard to livestock activities, the largest percentage of livestock belong to pigs, sheep, cattle and poultry. The main livestock products are stated to be cheese, milk, eggs and meat. However, in these villages, it is rare for anyone to sell these products to generate extra income. According to the Household Surveys, approximately 85% of the households in all villages are engaged in livestock.

According to outcomes of The Household Surveys, income sources of each affected village are presented in Table 5-120.

Table 5-120. Income sources of the affected villages in Čačak Municipality

Village	Income Sources
Baluga	1. Agriculture 2. Pension 3. Salaried Employee 4. Seasonal agriculture
Donja Gorevnica	1. Agriculture 2. Salaried Employee 3. Pension
Katrga	1. Agriculture 2. Pension 3. Salaried Employee
Mrčajevci	1. Pension 2. Agriculture

Village	Income Sources
	3. Salaried Employee 4. Seasonal agriculture
Preljina	1. Agriculture 2. Salaried Employee 3. Pension
Rakova	1. Agriculture 2. Pension 3. Salaried Employee 4. Seasonal agriculture
Sokolići	1. Agriculture 2. Salaried Employee 3. Pension
Stančići	1. Agriculture 2. Pension 3. Salaried Employee
Konjevići	1. Salaried Employee 2. Agriculture 3. Pension
Goričani	1. Agriculture 2. Salaried Employee 3. Pension

The main expenses of the households stated to be household utility bills, health expenses and agricultural expenses.

5.14.3.3.8 Sensitive Receptors

The local employment opportunities of the Project are expected to occur especially during the construction phase of the Project. According to the results of the baseline studies, sensitive receptors are high considering the unemployment rate of each affected settlement. Also considering the indirect job opportunities, local suppliers are determined to be highly sensitive since the local procurement opportunities have not been settled at this stage of the Project.

5.14.3.4 Ecosystem Services

5.14.3.4.1 Section 1: Ćićevac Municipality

The West Morava River

In Ćićevac Municipality, communities use the West Morava River for recreational, irrigation and fishing purposes. It is also used for the transportation in Grad Stalac Village.

The types of the fishes are; carp, whitefish and catfish. The communities use the West Morava River during Spring period and each individual stated to catch around 10 kg in each season for the household consumption.

Forests

In Ćićevac, there is no state-owned forest land and the size of privately-owned forests are 2,598 ha according to the Department of Forestry, SORS, 2017. In this Municipality,

approximately, 90% of people use forest to collect firewood for their household consumption. There are no lumber manufacturers. Approximately 5% of the people collect plants for household purposes. The forest area within the borders of the Municipality also used for hunting and deer, rabbit, wild boar and pheasant are being hunted. In general, forest lands are not being used for the income generation. It has been used for the household consumption. For households who generate income from collectin herbs; although the Project activities require forest utilization, no affectation is foreseen on this ecosystem service, since most of the plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use.

Spring water

The villages located in the Municipality of Ćićevac use groundwater for drinking. However, it is stated by the village representatives of Stalac and Mrzenica that groundwater cannot be used due to pollution. According to the observation of the experts, the cause of the pollution is potentially sourced from uncontrolled use of agricultural pesticites and fertilizers. In Pojate and Stalac, almost 50% of the population uses wells for technical and drinking purposes.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in the Table 5-121.

Table 5-121. Ecosystem services in the Ćićevac Municipality

Questions	Yes-No	Grad Stalać	Mrzenica	Pojate	Stalać
Do you use the West Morava River?	Yes	75%	50%	42%	25%
	No	25%	50%	58%	75%
Do you use the West Morava River for fishing?	Yes	50%	33%	17%	25%
	No	50%	67%	83%	75%
Do the households from your village generate income from the West Morava River?	Yes	25%	17%	0%	0%
	No	75%	83%	100%	100%
Do you use the West Morava River for irrigation?	Yes	50%	17%	42%	100%
	No	50%	83%	58%	0%
Do you use the West Morava River for transportation?	Yes	38%	0%	0%	0%
	No	62%	100%	100%	100%
Do you use the West Morava River for leisure activities?	Yes	62%	50%	8%	25%
	No	38%	50%	92%	75%
Do you collect wood from the forest?	Yes	100%	67%	83%	75%
	No	0%	17%	17%	25%
Do you collect herbs from the forest?	Yes	25%	17%	25%	0%
	No	75%	83%	75%	100%
Do you collect herbs from the forest for income generation?	Yes	25%	33%	0%	0%
	No	75%	67%	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	62%	0%	25%	12%
	No	38%	100%	75%	88%
Is there a recreation area in the borders of your village?	Yes	38%	0%	100%	12%
	No	62%	100%	0%	88%

Questions	Yes-No	Grad Stalać	Mrzenica	Pojate	Stalać
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	88%	17%	100%	50%
	No	12%	83%	0%	50%
Do you use spring water?	Yes	88%	0%	100%	0%
	No	12%	0%	0%	0%
Do you use water well (groundwater)?	Yes	88%	17%	83%	75%
	No	12%	83%	17%	25%
Do you go hunting?	Yes	13%	17%	33%	62%
	No	87%	0%	67%	38%

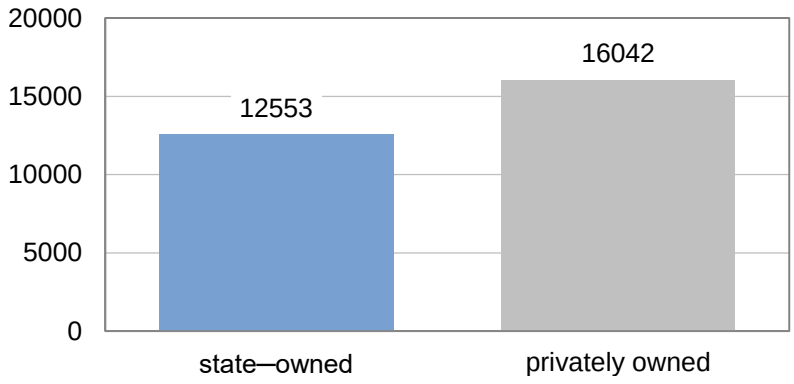
5.14.3.4.2 Section 1: Kruševac Municipality

The West Morava River

Residents of Bela Voda and Citluk use the West Morava River for fishing. The types of the fishes are karash, skobalj, chub, whitefish and catfish. The Village of Bivolje uses the West Morava River for irrigation. The village of Jasika uses the West Morava River for fishing, irrigation and tourism. The only village uses the West Morava River for transportation is Kukljin. The village of Koševi use the West Morava River for irrigation, recreation and tourism. No one in this village uses the West Morava River for income generation. In the village of Makrešane, the West Morava River is used for fishing, irrigation and recreation.

Forests

Total forest area of the Municipality is 28,596 ha. The size of the forest lands within the borders of the Kruševac according to the Department of Forestry is given in Figure 5-71.



Source: Department of Forestry, SORS, 2017.

Figure 5-71. The size of the forest lands within the borders of the Kruševac

The majority of the villagers are using forest for wood collection. In Bela Voda locals go to the forest to collect mushrooms for household usage. Hunting is not represented in Citluk, however, in Bela Voda, few residents go hunting and the most frequently caught animals are pheasant, rabbit and wild boar. According to the statement of the locals, hunting activities are

for household consumption. In the village of Jasika, locals collect timber and 70% of them generates income from timber collection. Approximately 70% of them collect timber to generate income. The villagers of Kukljin collect wood from the forest for household needs. The wood collection is not expected to be affected as most of the ecosystem services plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use.

There are 114 hunters in the village of Kukljin. In the village of Makrešane, most people collect wood from the forest for household purposes and there are several hunters in the village.

Spring water

There is a source of natural water in the village of Bela Voda and it is considered to be high quality and it is used by the villagers for drinking purposes. There is no spring water in the village of Jasika. In Kukljin both spring and well water are used. Well and spring water is used for drinking. 50 households from this village own wells. There is no spring water or wells water usage in Makrešane.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in Table 5-122.

Table 5-122. Ecosystem services in Ćićevac Municipality

Questions	Yes-No	Bela Voda	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Do you use The West Morava River?	Yes	75%	35%	11%	40%	0%	55%	14%
	No	25%	65%	89%	60%	100%	45%	86%
Do you use the West Morava River for fishing?	Yes	35%	43%	12%	40%	0%	45%	29%
	No	65%	57%	89%	60%	100%	55%	71%
Do the households from your village generate income from the West Morava River?	Yes	0%	0%	0%	20%	0%	9%	0%
	No	100%	100%	100%	80%	100%	91%	100%
Do you use the the West Morava River for irrigation?	Yes	0%	0%	0%	0%	0%	27%	14%
	No	100%	100%	100%	100%	100%	73%	86%
Do you use the West Morava River for transportation?	Yes	0%	0%	0%	40%	0%	27%	14%
	No	100%	100%	100%	60%	100%	73%	86%
Do you use the West Morava River for leisure activities?	Yes	50%	50%	11%	20%	0%	45%	29%
	No	50%	50%	89%	80%	100%	55%	71%
Do you collect wood from the forest?	Yes	95%	80%	0%	40%	0%	73%	71%
	No	5%	20%	100%	60%	100%	27%	29%
Do you collect herbs from the forest?	Yes	85%	0%	11%	40%	0%	36%	0%
	No	15%	100%	89%	60%	100%	64%	100%
Do you collect herbs from the forest for income generation?	Yes	0%	0%	0%	0%	0%	18%	0%
	No	100%	100%	100%	100%	100%	82%	100%
How many households	Yes	100%	100%	0%	60%	0%	45%	0%

Questions	Yes-No	Bela Voda	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
collect herbs from the forest for household consumption?	No	0%	0%	78%	40%	100%	55%	100%
Is there a recreation area in the borders of your village?	Yes	100%	100%	22%	0%	0%	18%	0%
	No	0%	0%	78%	100%	100%	82%	100%
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	100%	100%	33%	0%	0%	36%	57%
	No	0%	0%	67%	100%	63%	64%	29%
Do you use spring water?	Yes	100%	0%	44%	20%	25%	36%	57%
	No	0%	100%	56%	80%	75%	64%	43%
Does you use spring water?	Yes	100%	0%	11%	40%	12%	64%	43%
	No	0%	100%	89%	60%	88%	36%	57%
Do you use water well (groundwater)?	Yes	63%	95%	66%	100%	13%	45%	14%
	No	37%	5%	44%	0%	87%	55%	86%

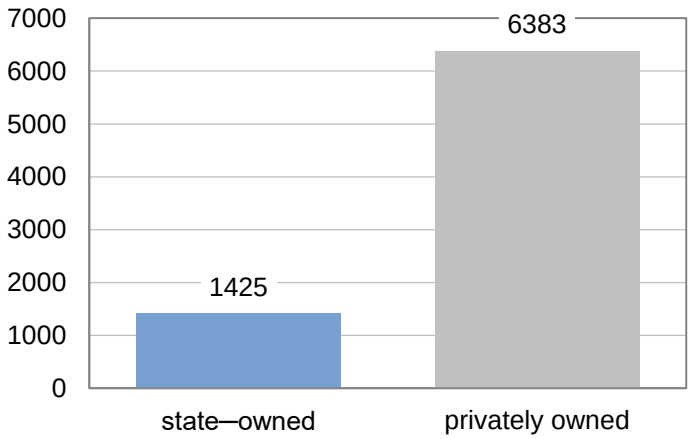
5.14.3.4.3 Section 1: Varvarin Municipality

The West Morava River

In the Municipality of Varvarin, usage of the West Morava River has the similar patterns. The locals use the West Morava River for recreational, irrigation and fishing purposes and it is not used transportation. The types of the fishes are carp, whitefish and catfish, locals' fish in spring period and approximately 10 kg of fish can be catch in a season by an individual. Fishing is not an income generating activity.

Forests

In Varvarin, the size of the total forest area is 7,808 ha and 75% of the forest lands are privately owned. Figure 5-72 below represents the size and the ownership status of the forest lands located in the Municipality of Varvarin.



Source: Department of Forestry, SORS, 2017.

Figure 5-72. The size of the forest lands within the borders of the Varvarin

In terms of forest usage in the the villages located in Varvarin have similarities and 90% of people go to the forest and collect wood for their household consumption. There are no lumber manufacturers and 5% of the total population collect plants from the forest. There are hunters in the community and deer, rabbit, wild boar and pheasant are being hunted.

Spring water

The villages located in Varvarin spring water for drinking and for irrigation purposes. Almost 95% of Bosniak residents use wells for drinking and irrigation purposes.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in the Table 5-123.

Table 5-123. Ecosystem services in Varvarin Municipality

Questions	Yes-No	Bošnjane	Maskare
Do you use the West Morava River?	Yes	14%	40%
	No	86%	60%
Do you use the West Morava River for fishing?	Yes	29%	30%
	No	71%	70%
Do the households from your village generate income from the West Morava River?	Yes	14%	10%
	No	86%	90%
Do you use the West Morava River for irrigation?	Yes	0%	10%
	No	0%	0%
Do you use the West Morava River for transportation?	Yes	0%	20%
	No	100%	80%
Do you use the West Morava River for leisure activities?	Yes	0%	20%
	No	100%	80%
Do you collect wood from the forest?	Yes	86%	80%
	No	14%	20%
Do you collect herbs from the forest?	Yes	14%	10%
	No	86%	90%
Do you collect herbs from the forest for income generation?	Yes	0%	0%
	No	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	0%	20%
	No	100%	80%
Is there a recreation area in the borders of your village?	Yes	14%	40%
	No	86%	60%
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	71%	0%
	No	29%	100%
Do you use spring water?	Yes	71%	50%
	No	29%	40%
Do you use water well (groundwater)?	Yes	57%	30%
	No	43%	70%
Do you go hunting?	Yes	43%	30%

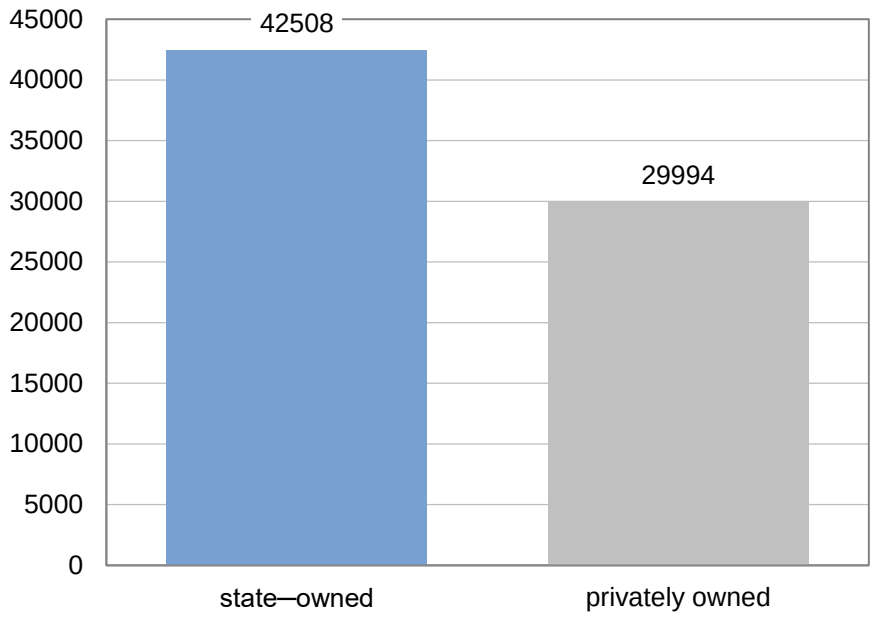
5.14.3.4.4 Section 2: Kraljevo Municipality

The West Morava River

All villages use the West Morava River for recreation, fishing and less for tourism. None of the villages belonging to Kraljevo municipality use the West Morava River for transportation. Almost 15% of the people from each village are fishing, fishing for pike, chub, catfish, skobalj and white. Fishing activities are carried out in Spring and Autumn.

Forests

The total forest lands located in the Municipality of Kraljevo is 72,503 ha and 60% of the total forest areas are owned by the state.



Source: Department of Forestry, SORS, 2017.

Figure 5-73. The size of the forest lands within the borders of the Kraljevo

In Kraljevo majority of the residents collect wood from the forests. The wood collection is not expected to be affected as most of the ecosystem services plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use.

In the village of Miločaj there is one household engaged with timber production. Hunting is also represented in the villages by few residents. Most frequently caught animals are pheasant, rabbit and wild boar. Very few people in each village collect plants from the forest for household consumption. Nobody hunts or collects plants for reasons of additional income.

Spring water

All villages use spring water for drinking purposes. The residents of this villages also use spring water for domestic purpose. However, in the villages of Obrva, Sirča, well water is not used.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in the Table 5-124.

Table 5-124. Ecosystem services in Kraljevo Municipality

Questions	Yes-No	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Do you use the West Morava River?	Yes	60%	0%	0%	0%	0%	50%	25%	67%	50%	30%	60%
	No	40%	100%	100%	100%	100%	50%	75%	33%	50%	70%	40%
Do you use the West Morava River for fishing?	Yes	40%	0%	0%	0%	17%	0%	12%	33%	0%	20%	0%
	No	60%	100%	100%	100%	83%	100%	88%	67%	100%	80%	100 %
Do the households from your village generate income from the West Morava River?	Yes	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	20%
	No	100%	80%	100%	100%	100%	100%	100%	100%	100%	100%	80%
Do you use the West Morava River for irrigation?	Yes	0%	0%	0%	0%	17%	25%	25%	33%	25%	10%	40%
	No	100%	100%	100%	100%	83%	75%	75%	67%	75%	90%	60%
Do you the West Morava River for transportation?	Yes	0%	40%	0%	40%	0%	0%	12%	0%	40%	0%	40%
	No	100 %	60%	100%	60%	100%	100%	88%	100%	60%	100%	60%
Do you use the river for leisure activities?	Yes	20%	20%	0%	20%	0%	25%	25%	0%	20%	10%	20%
	No	80%	80%	100%	80%	100%	75%	75%	100%	80%	90%	80%
Do you collect wood from the forest?	Yes	60%	60%	0%	60%	50%	50%	88%	33%	80%	70%	80%
	No	40%	40%	100%	40%	50%	50%	12%	67%	20%	30%	20%
Do you collect herbs from the forest?	Yes	40%	40%	0%	0%	0%	0%	25%	33%	20%	10%	20%
	No	60%	60%	100%	100%	100%	100%	75%	67%	80%	90%	80%
Do you collect herbs from the forest for income generation?	Yes	0%	0%	0%	0%	0%	0%	37%	0%	37%	0%	0%
	No	100%	100%	100%	100%	100%	100%	63%	100%	63%	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	20%	60%	0%	60%	17%	0%	12%	0%	12%	0%	0%
	No	80%	40%	100%	40%	83%	100%	88%	100%	88%	100%	100%
Is there a recreation area in the borders of your village?	Yes	0%	20%	0%	0%	0%	0%	37%	67%	0%	0%	40%
	No	100%	80%	100%	100%	100%	100%	63%	33%	100%	100%	60%

Questions	Yes-No	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	80%	0%	0%	80%	67%	75%	37%	0%	75%	40%	100%
	No	20%	100%	0%	20%	33%	25%	63%	100%	25%	60%	0%
Do you use spring water?	Yes	40%	80%	100%	40%	33%	25%	25%	100%	25%	10%	80%
	No	60%	20%	0%	60%	67%	75%	75%	0%	75%	90%	20%
Do you use water well (groundwater)?	Yes	20%	60%	100%	20%	67%	25%	25%	67%	25%	30%	80%
	No	80%	40%	0%	80%	33%	75%	75%	33%	75%	70%	20%
Do you go hunting?	Yes	20%	60%	100%	20%	0%	0%	25%	33%	0%	0%	60%
	No	80%	40%	0%	80%	67%	100%	50%	67%	100%	100 %	20%

Box 5-1. Ecological Movement Ibar Kraljevo

Ecological Movement Ibar Kraljevo is an independent, voluntary, independent and not-for-profit civil society organization whose mission is to support the settlement of environmental problems in the Raska District and the Republic of Serbia. It was registered in 1990 and was created in response to the pollution of the Ibar River, which has an impact on the water quality of the Kraljevo water supply. Eco Ibar sees the achievement of its mission in collaboration between NGOs, government institutions, the business sector and others interested in the environment.

According to the NGO, within the Project alignment only Kraljevo has relatively importance in terms of flora and fauna and the NGO expect objection from the community against the Project. The role of the Government should be well defined for the construction and operation Sectors. In Kraljevo they would like to learn the number of the tree cutting and would like to learn the responsible party for replanting. The Municipality has 15 types of mushrooms in red list that needs to be protected.

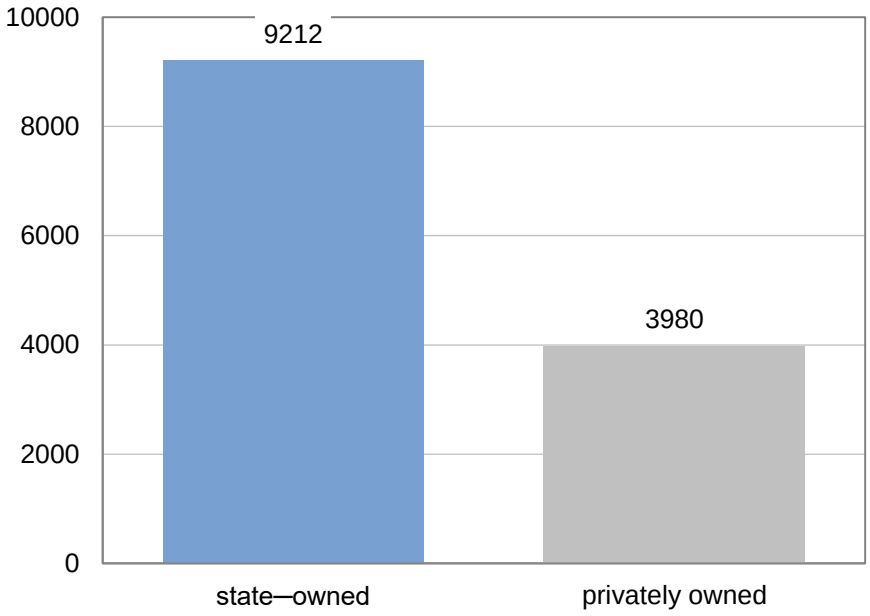
5.14.3.4.5 Section 2: Vrnjačka Banja Municipality

The West Morava River

In the Municipality of Vrnjačka Banja, the West Morava River is being used by locals for various purposes. In the village of Vraneši, Podunavci, Ruđinci and Gračac residents use the West Morava River for irrigation. In all seven villages, households use the West Morava River for fishing for household consumption.

Forests

Total forest areas in Vrnjačka Banja is 13,192 ha. Approximately %70 of the forest lands are state owned. Ownership distribution and the size of the forest lands are given in Figure 5-74 below.



Source: Department of Forestry, SORS, 2017.

Figure 5-74. The size of the forest lands within the borders of the Vrnjačka Banja

The majority of the locals collects wood for household consumptionfrom the forest. The wood collection is not expected to be affected as most of the ecosystem services plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use.

The average number of woods consumed during the winter per household in these seven village is 16.25 m^3. In the villages of Ruđinci and Gračac people do not go to the forest to collect plants, however in the villages of Vraneši, Vrnjci, Podunavci, Štulac and Novo Selo, people go to the forest and most often collect mushrooms for household needs. Hunting is not represented in villages of Štulac, however, in other six villages, few residents go hunting and the most frequently caught animals are pheasant, rabbit and wild boar.

Spring water

There are sources of spring water in the all seven village. Water from springs is used for drinking purposes. Also, most households in their home have a well from which they use water for irrigation and domestic purposes.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in Table 5-125.

Table 5-125. Ecosystem services in Vrnjačka Banja Municipality

Questions	Yes-No	Vraneši	Vrnjci	Novo Selo	Podunavci	Rudinci	Štulac	Gračac
Do you use the West Morava River?	Yes	13%	6%	11%	13%	16%	5%	17%
	No	87%	94%	89%	87%	84%	95%	83%
Do you use the West Morava River for fishing?	Yes	4%	6%	9%	9%	8%	5%	7%
	No	96%	94%	91%	91%	92%	95%	93%
Do the households from your village generate income from the West Morava River?	Yes	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%
Do you use the West Morava River for irrigation?	Yes	7%	0%	0%	7%	13%	-	13%
	No	93%	100%	100%	93%	87%	100%	87%
Do you use the West Morava River for transportation?	Yes	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%
Do you use the West Morava River for leisure activities?	Yes	4%	6%	9%	9%	8%	5%	7%
	No	96%	94%	91%	91%	92%	95%	93%
Do you collect wood from the forest?	Yes	29%	30%	52%	64%	28%	49%	70%
	No	71%	70%	48%	36%	72%	51%	30%
Do you collect herbs from the forest?	Yes	7%	13%	10%	4%	0%	5%	0%
	No	93%	87%	90%	96%	100%	95%	100%
Do you collect herbs from the forest for income generation?	Yes	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	7%	13%	10%	4%	0%	5%	0%
	No	93%	87%	90%	96%	100%	95%	100%
Is there a recreation area in the borders of your village?	Yes	33%	100%	11%	100%	100%	64%	57%
	No	67%	-	89%	-	-	36%	43%
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	100%	100%	100%	100%	100%	100%	0%
	No	0%	0%	0%	0%	0%	0%	100%
Do you use spring water?	Yes	67%	24%	92%	60%	25%	63%	80%
	No	33%	76%	8%	40%	75%	37%	20%
Do you use water well (groundwater)?	Yes	65%	90%	71%	42%	62%	48%	80%
	No	35%	10%	29%	58%	38%	52%	20%
Do you go hunting?	Yes	4%	7%	11%	31%	10%	-	7%
	No	96%	93%	89%	69%	90%	100%	93%

5.14.3.4.7 Section 2: Trstenik Municipality

The West Morava River

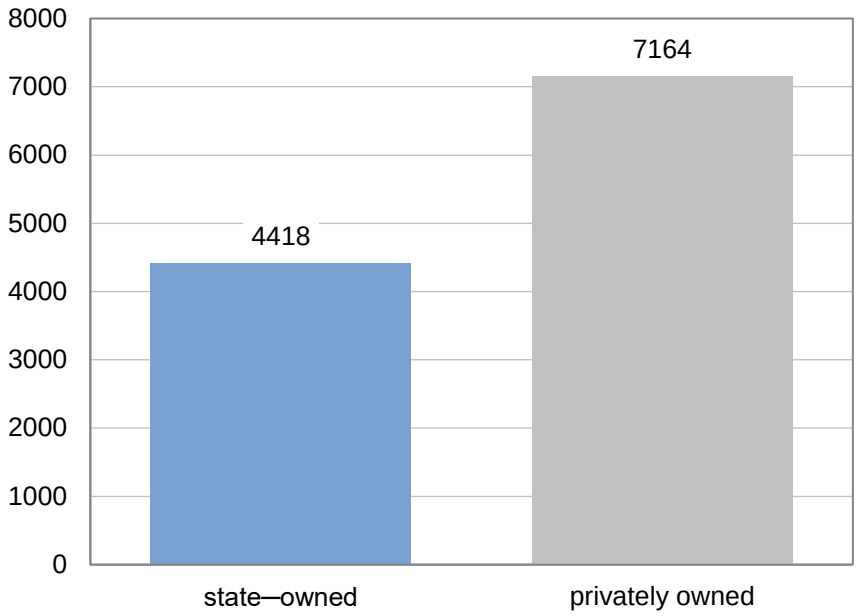
The West Morava River is used in all villages for various purposes. In the village of Bogdanje and Medveđa, residents use the West Morava River for irrigation. The residents of village of Velika Drenova and Lozna use the West Morava River for irrigation, fishing and leisure activities.

Box 5-2. West Morava Water Sports Association and Ecology Society

West Morava Water Sports Association and Ecology Society was established for the water sports: NGO's mentioned that the Project is passing through very critical spot of Tristenik as it is close to the airport, used for sportive purposes.

Forests

Total size of the forest lands in Trestenik is 11,582 ha and 60% of the forest lands are privately owned. Figure 5-75 below shows the size and the ownership status of the Forest lands.



Source: Department of Forestry, SORS, 2017.

Figure 5-75. The size of the forest lands within the borders of the Trstenik

The majority of the villages collect wood from the forest for heating. The wood collection is not expected to be affected as most of the ecosystem services plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use. The average number of woods consumed during the winter per household in these seven village is 14.8 m^3. In the villages of Bogdanje and Selište, people do not go to the forest to collect plants, however in the villages of Velika Drenova, Grabovac, Lozna, Ugljarevo and Medveđa, people go to the forest and most often collects mushrooms for household usage. Hunting is also not represented in villages of Bogdanje and Grabovac, however, in other five villages, few residents go hunting and the most frequently hunted animals are pheasant, rabbit and wild boar.

Spring water

There are sources of spring water in the all seven villages used for drinking purposes. The residents of this villages also use spring water for domestic purpose, especially in the village of Selište which has no water supply network. Also, most households use well for irrigation and domestic purposes.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in Table 5-126.

Table 5-126. Ecosystem services in Trstenik Municipality

Questions	Yes-No	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Do you use the West Morava River?	Yes	13%	43%	42%	10%	8%	%0	25%
	No	87%	57%	58%	90%	92%	100%	75%
Do you use the West Morava River for fishing?	Yes	%0	14%	17%	%0	%0	%0	12.5%
	No	100%	86%	83%	100%	100%	100%	87.5%
Do the households from your village generate income from the West Morava River?	Yes	%0	%0	%0	%0	%0	%0	%0
	No	100%	100%	100%	100%	100%	100%	100%
Do you use the West Morava River for irrigation?	Yes	13%	29%	42%	7%	%0	%0	12.5%
	No	87%	71%	58%	93%	100%	100%	87.5%
Do you use the West Morava River for transportation?	Yes	%0	%0	%0	%0	%0	%0	%0
	No	100%	100%	100%	100%	100%	100%	100%
Do you use the West Morava River for leisure activities?	Yes	%0	14%	8%	7%	%0	%0	%0
	No	100%	86%	92%	93%	100%	100%	100%
Do you collect wood from the forest?	Yes	73%	83%	83%	62.5%	42%	33%	100%
	No	27%	17%	17%	37.5%	58%	67%	%0
Do you collect herbs from the forest?	Yes	%0	26%	25%	19%	%0	33%	37.5%
	No	100%	74%	75%	81%	100%	67%	62.5%
Do you collect herbs from the forest for income generation?	Yes	%0	%0	%0	%0	%0	%0	%0
	No	100%	100%	100%	100%	100%	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	%0	26%	25%	19%	%0	33%	37.5%
	No	100%	74%	75%	81%	100%	67%	62.5%
Is there a recreation area in the borders of your village?	Yes	33%	100%	100%	65%	83%	100%	75%
	No	67%	%0	%0	35%	17%	%0	25%
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	100%	100%	100%	100%	100%	100%	100%
	No	%0	%0	%0	%0	%0	%0	%0
Do you use spring water?	Yes	67%	26%	100%	15%	%0	33%	50%
	No	33%	74%	%0	85%	100%	67%	50%
Do you use water well (groundwater)?	Yes	33%	57%	83%	68%	75%	33%	25%
	No	67%	43%	17%	32%	25%	67%	75%
Do you go hunting?	Yes	%0	11%	33%	15%	%0	%0	50%
	No	100%	89%	67%	85%	100%	100%	50%

5.14.3.4.8 Section 3: Čačak Municipality

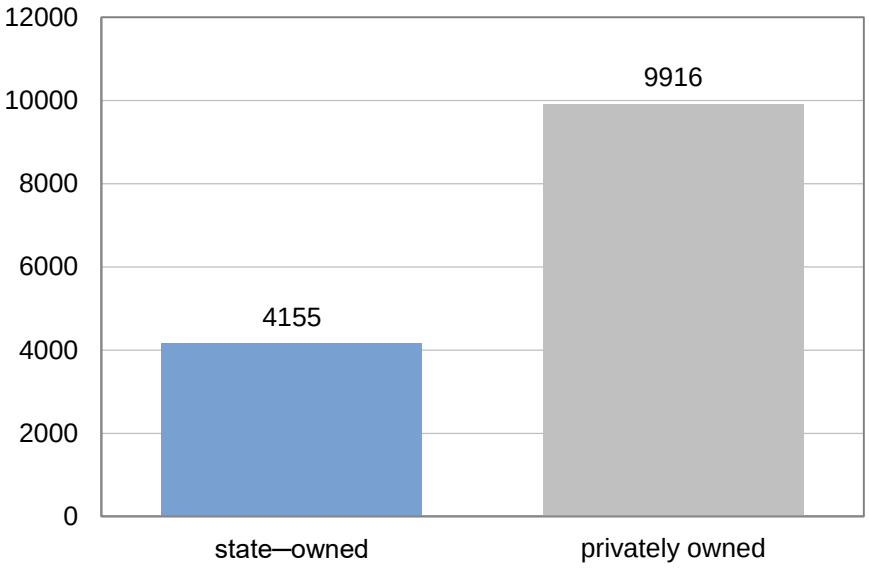
The West Morava River

The West Morava River in all villages is used by citizens for various purposes. In the village of Preljina, Rakova and Sokolići, residents use the West Morava River for fishing and leisure activities. The residents of village of Baluga, Dona Gorevnica, Katrga, Mrčajevci, Stančići, Konjevići and Goričani locals use the West Morava River for irrigation, fishing and leisure activities.

Annual amount of fishing per household is an average of 18 kg. Locals do not generate income from fishing. In these villages, the West Morava River is not used for transportation.

Forests

Total size of the forest lands in Čačak is 14,071 hectares and 60% of the forest lands are privately owned. Figure 5-76 shows the size and the ownership status of the Forest lands of Čačak Municipality.



Source: Department of Forestry, SORS, 2017.

Figure 5-76. The size of the forest lands within the borders of the Čačak

The majority of the locals collects wood for household consumption from the forest. The wood collection is not expected to be affected as most of the ecosystem services plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use. The average number of woods consumed during the winter per household is 13.4 m3. In the villages of Baluga, Dona Gorevnica, Katrga, Rakova Sokolić, Stančići, Konjevići and Goričani people do not go to the forest to collect plants, however in the villages of Mrčajevci and Preljina people go to the forest and collect mushrooms for household usage. Hunting is not represented in all villages; however, few residents go hunting and the most frequently caught animal is pheasant, rabbit and wild boar.

Spring water

There are sources of spring water in municipality of Čačak and all villages located in the AoI use spring water for drinking.

The usage level of the ecosystem services was asked to locals through household surveys and results are provided in Table 5-127.

Table 5-127. Ecosystem services in the Čačak Municipality

Questions	Yes-No	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Do you use the West Morava River?	Yes	33%	80%	29%	12%	6%	19%	17%	75%	39%	18%
	No	67%	20%	71%	88%	94%	81%	83%	25%	61%	82%
Do you use the West Morava River for fishing?	Yes	8%	27%	7%	7%	6%	19%	17%	0%	15%	5%
	No	92%	73%	93%	93%	94%	81%	83%	100%	85%	95%
Do the households from your village generate income from the West Morava River?	Yes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Do you the West Morava River for irrigation?	Yes	33%	80%	29%	2%	0%	0%	0%	75%	39%	18%
	No	67%	20%	71%	98%	100%	100%	100%	25%	61%	82%
Do you use the West Morava River for transportation?	Yes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Do you use the West Morava River for leisure activities?	Yes	8%	27%	7%	7%	6%	19%	17%	-	15%	5%
	No	92%	73%	93%	93%	94%	81%	83%	100%	85%	95%
Do you collect wood from the forest?	Yes	17%	27%	21%	13%	13%	14%	33%	25%	8%	14%
	No	83%	73%	79%	87%	87%	86%	67%	75%	92%	86%
Do you collect herbs from the forest?	Yes	0	0	0	2%	4%	0%	0%	0%	0%	9%
	No	100%	100%	100%	98%	96%	100%	100%	100%	100%	91%
Do you collect herbs from the forest for income generation?	Yes	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	No	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
How many households collect herbs from the forest for household consumption?	Yes	0%	0%	0%	2%	4%	0%	0%	0%	0%	9%
	No	100%	100%	100%	98%	96%	100%	100%	100%	100%	91%
Is there a recreation area in the borders of your village?	Yes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	No	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Is there a tree or a natural structure with a spiritual meaning within the boundaries of the village?	Yes	0%	100%	100%	100%	0%	0%	0%	0%	0%	0%
	No	100%	0%	0%	0%	100%	100%	100%	100%	100%	100%
Do you use spring water?	Yes	0%	13%	7%	9%	7%	10%	17%	25%	23%	32%
	No	100%	87%	93%	91%	93%	90%	83%	75%	77%	68%
Do you use water well (groundwater)?	Yes	58%	80%	64%	91%	96%	90%	100%	100%	61%	77%
	No	42%	20%	36%	9%	4%	10%	0%	0%	39%	23%
Do you go hunting?	Yes	0%	7%	7%	4%	6%	5%	0%	0%	8%	9%
	No	100%	93%	93%	96%	94%	95%	100%	100%	92%	91%

5.14.3.4.9 Sensitive Receptors

According to results of the social surveys it has been observed that the ecosystem services are being used for household purposes and consumption.

The villages are considered to be highly sensitive where the West Morava River is being used for; transportation, fishing, irrigation and leisure activities.

In terms of forest usage, the majorty of the Project affected people is using forest to collect wood for heating purposed and hunting.

As a result sensitive receptors will be the villages where disturbance will be occur on the West Morava River due to river regulation and forestry areas where Project components will be established.

5.14.3.5 Health

The health care system in Serbia is based on a network of public health institutions funded by the National Health Insurance and from the state budget. Access to public health institutions is free. Preventive and curative services are provided at the local level in primary health care centers. Secondary medical care is offered in pediatric departments of local and regional general hospitals or outpatient clinics, and in specialized hospitals for children or adults. Tertiary medical care is provided by inpatient or outpatient subspecialty services in 5 major university children's clinics (Bogdanovic, Lozanovic, Milica, & Jovanovic, 2016).

The average life expectancy of Serbian people is 75.9 years, where for males it is 73 years and for females 79 years. The death rate is estimated to be 13.6 death per 1000 people and the birth rate is 8.6 births for every 1000 people. The fertility rate is pretty low being 1.44 children per woman and takes 208th place in the world rating (Central Intelligence Agency, 2018).

5.14.3.5.1 Section 1: Ćićevac Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-128 presents the details on the health indicators of the Municipality.

Table 5-128. Health Indicators of the Ćićevac Municipality

Health Indicators of the Municipality	
Number of doctors	12
Number of doctors per 1,000 inhabitants	1.4
Doctors – child healthcare (per 1,000 inhabitants)	4.8
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	1.9
Doctors – adult population healthcare (per 1,000 inhabitants)	0.8
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.0
Doctors – women's healthcare (per 1,000 inhabitants)	0.26

Health Indicators of the Municipality	
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	93.9
Coverage of pregnant women by visiting nurse service (Number)	1.2
Number of Tuberculosis cases	3
Incidence of tuberculosis (per 100,000 population)	35
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	100.0
Proportion of children vaccinated against measles (%)	89.9

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the village heads were asked if there are any health centers or hospitals within the borders of their villages. The following Table 5-129 presents the responds of the village heads for each settlement, respectively.

Table 5-129. Availability of health centers in affected villages of Ćićevac Municipality

Services	Yes/No			
	Grad Stalać	Mrzenica	Pojate	Stalać
Health centre/hospital	No	No	Yes	Yes

Pojate and Stalac villages have health centers whereas Grand Stalac and Mrzenica do not have any. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car. Further information on access to health facilities presented in Table 5-130.

Table 5-130. Access to health facilities in affected villages of Ćićevac Municipality

Access to health facility	Grad Stalać	Mrzenica	Pojate	Stalać
On foot	100%	0%	0%	50%
Minibus / bus	0%	33%	0%	12%
Taxi	0%	0%	0%	0%
Private car	0%	67%	100%	38%
Car of relatives	0%	0%	0%	0%
Car of neighbors	0%	0%	0%	0%

Furthermore, during the Household Surveys, number of households with chronic diseases were asked and the highest number of households (64%) with chronic diseases observed in Grad Stalac village, whereas, Pojate village observed to have no number of households with chronic diseases. Table 5-131 presents households with chronic diseases for each affected village in Ćićevac Municipality, respectively.

Table 5-131. Households with chronic diseases for each affected village in Ćićevac Municipality

Percentage of households with chronic disease	Grad Stalać	Mrzenica	Pojate	Stalać
	64%	60%	0%	40%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that blood pressure and heart disease are common chronic diseases majority of the affected villages. Further details on common chronic diseases of the affected villages of Ćićevac Municipality can be found in Table 5-132.

Table 5-132. Common chronic diseases of the affected villages of Ćićevac Municipality

Type of Chronic Diseases	Grad Stalać	Mrzenica	Pojate	Stalać
Accident	14%	0%	0%	0%
Blood pressure	29%	0%	50%	50%
Diabetic Patient	14%	33%	0%	0%
Heart Disease	43%	33%	0%	25%
Cancer	0%	0%	25%	25%
Allergy	0%	33%	25%	0%

5.14.3.5.2 Section 1: Kruševac Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-133 below presents the details on the health indicators of the Municipality.

Table 5-133. Health Indicators of the Kruševac Municipality

Health Indicators of the Municipality	
Number of doctors	348
Number of doctors per 1,000 inhabitants	2.9
Doctors – child healthcare (per 1,000 inhabitants)	1.3
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	0.6
Doctors – adult population healthcare (per 1,000 inhabitants)	0.6
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.8
Doctors – women's healthcare (per 1,000 inhabitants)	0.13
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	83.7
Coverage of pregnant women by visiting nurse service (Number)	0.5
Number of TB cases	12
Incidence of tuberculosis (per 100,000 population)	10
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	98.7
Proportion of children vaccinated against measles (%)	71.2

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the village heads were asked if there are any health centers or hospitals within the borders of their villages. The following Table 5-134 presents the responds of the village heads for each settlement, respectively.

Table 5-134. Availability of health centers in affected villages of Kruševac Municipality

Services	Yes/No						
	Bele Vode	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Health centre/hospital	No	Yes	Yes	Yes	No	Yes	No

Bele Vode, Kosevi and Makresane villages do not have any health centers within their settlement. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car or minibus/bus. Further information on access to health facilities presented in Table 5-135 below.

Table 5-135. Access to health facilities in affected villages of Kruševac Municipality

Access to the health facilities	Čitluk	Bele Vode	Bivolje	Jasika	Koševi	Kukljin	Makrešane
On foot	10%	5%	100%	25%	14%	0%	0%
Minibus / bus	10%	25%	0%	25%	43%	40%	29%
Taxi	1%	5%	0%	0%	0%	20%	0%
Private car	54%	45%	0%	50%	43%	40%	71%
Car of relatives	13%	11%	0%	0%	0%	0%	0%
Car of neighbours	12%	9%	0%	0%	0%	0%	0%

Furthermore, during the Household Surveys, the number of households with chronic diseases were asked and the highest number of households (84%) with chronic diseases observed in Bela Voda village, whereas, Bivolje village observed to have the least number of households (36%) with chronic diseases. Table 5-136 below presents households with chronic diseases for each affected village in Kruševac Municipality, respectively.

Table 5-136. Households with chronic diseases for each affected village in Kruševac Municipality

Settlement	Bela Voda	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Percentage of households with chronic disease	84%	73%	36%	40%	50%	40%	57%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that blood pressure and diabetes are common chronic disease majority of the affected villages. Further details on common chronic diseases of the affected villages of Kruševac Municipality can be found in Table 5-137 below.

Table 5-137. Common chronic diseases of the affected villages of Kruševac Municipality

Type of Chronic Diseases	Čitluk	Bela Voda	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Accident	3%	11%	0%	0%	0%	0%	0%
Blood pressure	40%	53%	50%	0%	50%	25%	25%
Diabetic Patient	31%	27%	0%	50%	25%	25%	25%
Heart Disease	12%	4%	0%	0%	25%	50%	25%
Lung and respiratory diseases	0%	5%	0%	0%	0%	0%	25%
Allergy	9%	0%	50%	50%	0%	0%	0%

5.14.3.5.3 Section 1: Varvarin Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-138 presents the details on the health indicators of the Municipality.

Table 5-138. Health Indicators of the Varvarin Municipality

Health Indicators of the Municipality	
Number of doctors	18
Number of doctors per 1,000 inhabitants	1.1
Doctors – child healthcare (per 1,000 inhabitants)	1.3
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	0.5
Doctors – adult population healthcare (per 1,000 inhabitants)	0.8
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.7
Doctors – women's healthcare (per 1,000 inhabitants)	0.28
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	64.2
Coverage of pregnant women by visiting nurse service (Number)	0.9
Number of TB cases	2
Incidence of tuberculosis (per 100,000 population)	12
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	90.7
Proportion of children vaccinated against measles (%)	98.2

Source: Institute of Public Health of Serbia.

The village heads were asked if there are any health centers or hospitals within the borders of their villages during the Community Level Survey. The following Table 5-139 presents the responds of the head of villages for each settlement, respectively.

Table 5-139. Availability of health centers in affected villages of Varvarin Municipality

Services	Yes/No	
	Bošnjane	Maskare
Health centre/hospital	No	No

All of the affected settlements do not have any health centers within their settlements. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as on foot or by private car. Further information on access to health facilities presented in Table 5-140.

Table 5-140. Access to health facilities in affected villages of Varvarin Municipality

Access to the health facilities	Bošnjane	Maskare
On foot	57%	0%
Minibus / bus	14%	30%
Taxi	0%	0%
Private car	29%	70%

Furthermore, during the Household Surveys, the number of households with chronic diseases were asked and the highest number of households (20%) with chronic diseases observed in Bosnhane village, whereas, Maskare village observed to have least number of households (17 %) with chronic diseases. Table 5-141 presents households with chronic diseases for each affected village in Varvarin Municipality, respectively.

Table 5-141. Households with chronic diseases for each affected village in Varvarin Municipality

Settlements	Bošnjane	Maskare
Percentage of households with chronic disease	20%	17%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that diabetes is common chronic disease in majority of the affected villages. Further details on common chronic diseases of the affected villages of Varvarin Municipality can be found in Table 5-142.

Table 5-142. Common chronic diseases of the affected villages of Varvarin Municipality

Type of Chronic Diseases	Bošnjane	Maskare
Diabetic patient	80%	85%
Heart disease	13%	0%
Lung and respiratory diseases	7%	0%
Infectious disease	0%	15%

5.14.3.5.4 Section 2: Kraljevo Municipality

General health indicators of the Municipality was derived from the Institute of Public Health of Serbia (2018). Table 5-143 presents the details on the health indicators of the Municipality.

Table 5-143. Health Indicators of the Kraljevo Municipality

Health Indicators of the Municipality	
Number of doctors	343
Number of doctors per 1,000 inhabitants	2.9
Doctors – child healthcare (per 1,000 inhabitants)	1.1
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	0.8
Doctors – adult population healthcare (per 1,000 inhabitants)	0.7
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.9
Doctors – women's healthcare (per 1,000 inhabitants)	0.21
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	71.2
Coverage of pregnant women by visiting nurse service (Number)	1.1
Number of TB cases	8
Incidence of tuberculosis (per 100,000 population)	7
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	100.0
Proportion of children vaccinated against measles (%)	90.1

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the head of villages were asked if there is any health centers or hospitals within the borders of their villages. The following Table 5-144 presents the responds of the head of villages for each settlement, respectively.

Table 5-144. Availability of health centers in affected villages of Kraljevo Municipality

Services	Yes/No										
	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirca	Sumarice	Stubal
Health centre/hospital	No	Yes	No	Yes	Yes	No	No	Yes	No	No	Yes

Half of the affected villages do not have any health centers within their settlements. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car. Further information on access to health facilities presented in Table 5-145.

Table 5-145. Access to health facilities in affected villages of Kraljevo Municipality

How do you access the health facilities	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
On foot	0%	0%	0%	33%	40%	0%	0%	67%	0%	0%	33%
Minibus / bus	50%	33%	25%	33%	0%	25%	43%	0%	43%	40%	33%
Taxi	0%	0%	0%	0%	0%	0%	14%	0%	14%	10%	0%
Private car	50%	67%	75%	33%	60%	75%	43%	33%	43%	50%	33%

Furthermore, during the Household Surveys, the number of households with chronic diseases were asked and the highest number of households (87%) with chronic diseases were observed in Zaklopača village, whereas, Miločaj village was observed to have least number of households (14%) with chronic diseases. Table 5-146 presents households with chronic diseases for each affected village in Kraljevo Municipality, respectively.

Table 5-146. Households with chronic diseases for each affected village in Kraljevo Municipality

Settlement	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Percentage of households with chronic disease	27%	67%	89%	87%	14%	27%	40%	25%	67%	70%	80%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that blood pressure is common chronic disease majority of the affected villages. Further details on common chronic diseases of the affected villages of Kraljevo Municipality can be found in Table 5-147.

Table 5-147. Common chronic diseases of the affected villages of Kraljevo Municipality

Type of Chronic Diseases	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Accident	3%	11%	0%	0%	2%	0%	7%	10%	0%	11%	10%
Blood pressure	40%	53%	33%	0%	1%	35%	70%	45%	35%	53%	45%
Diabetic Patient	31%	27%	33%	5%	0%	0%	0%	40%	0%	27%	40%
Heart Disease	12%	4%	0%	14%	0%	0%	0%	0%	0%	4%	0%
Lung and respiratory diseases	0%	5%	0%	14%	3%	2%	0%	0%	2%	5%	0%
Infectious disease	0%	0%	0%	0%	4%	5%	0%	2%	5%	0%	2%
Malnutrition / anemia	0%	0%	0%	0%	56%	0%	0%	0%	0%	0%	0%
Gynecological	0%	0%	0%	0%	36%	0%	0%	3%	0%	0%	3%
Allergy	9%	0%	33%	0%	0%	58%	23%	0%	58%	0%	0%
Other	3%	11%	0%	67%	0%	0%	0%	0%	0%	11%	0%

5.14.3.5.5 Section 2: Vrnjačka Banja Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-148 presents the details on the health indicators of the Municipality.

Table 5-148. Health Indicators of the Vrnjačka Banja Municipality

Health Indicators of the Municipality	
Number of doctors	81
Number of doctors per 1,000 inhabitants	3.1
Doctors – child healthcare (per 1,000 inhabitants)	1.3
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	0.9
Doctors – adult population healthcare (per 1,000 inhabitants)	0.5
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.8
Doctors – women's healthcare (per 1,000 inhabitants)	0.17
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	68.0
Coverage of pregnant women by visiting nurse service (Number)	0.9
Number of TB cases	1
Incidence of tuberculosis (per 100,000 population)	4
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	100.0
Proportion of children vaccinated against measles (%)	94.7

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the village heads were asked if there are any health centers or hospitals within the borders of their villages. The following Table 5-149 presents the responds of the village heads for each settlement, respectively.

Table 5-149. Availability of health centers in affected villages of Vrnjačka Banja Municipality

Services	Yes/No						
	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Health centre/hospital	Yes	No	Yes	Yes	No	No	Yes

Majority of the villages were observed to have a health centers within their settlement. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car or car of relatives. Further information on access to health facilities presented in Table 5-150.

Table 5-150. Access to health facilities in affected villages of Vrnjačka Banja Municipality

Access to the health facilities	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
On foot	22.22%	0%	23.31%	20%	0%	0%	26.67%
Minibus / bus	0%	32.86%	0%	4.44%	26.58%	33.33%	0%
Taxi	0%	2.86%	0%	0%	7.59%	0%	0%
Private car	64.44%	51.43%	62.41%	57.78%	44.3%	46.15%	53.33%
Car of relatives	13.33%	12.86%	9.77%	17.78%	16.45%	20.51%	20%
Car of neighbours	0%	0%	4.51%	0%	5.06%	0%	0%

Furthermore, during the Household Surveys, the number of households with chronic diseases were asked and the highest number of households (65%) with chronic diseases observed in Rudinci village. Table 5-151 presents households with chronic diseases for each affected village in Vrnjačka Banja Municipality, respectively.

Table 5-151. Households with chronic diseases for each affected village in Vrnjačka Banja Municipality

Settlement	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Percentage of households with chronic disease	31.1%	61.4%	35.5%	0%	64.5%	39.8%	20%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that blood pressure and diabetes are common chronic disease majority of the affected villages. Further details on common chronic diseases of the affected villages of Vrnjačka Banja Municipality can be found in Table 5-152.

Table 5-152. Common chronic diseases of the affected villages of Vrnjačka Banja Municipality

Type of Chronic Diseases	Vraneši	Vrnjci	Novo Selo	Ruđinci	Štulac	Gračac
Accident	0%	2.32%	0%	0%	0%	0%
Blood pressure	28.57%	18.6%	6.38%	0%	25%	16.67%
Diabetic Patient	14.29%	0%	0%	11.76%	16.67%	0%
Heart Disease	14.29%	9.3%	8.51%	13.72%	0%	16.67%
Lung and respiratory diseases	0%	0%	0%	1.96%	0%	0%
Cancer	7.14%	6.98%	4.25%	1.96%	0%	0%
Malnutrition / anemia	0%	4.65%	0%	0%	0%	0%
Gynecological	0%	0%	0%	3.92%	0%	0%
Allergy	0%	4.65%	10.64%	0%	0%	0%
Other	35.71%	53.49%	70.21%	66.67%	58.33%	66.67%

5.14.3.5.6 Section 2: Trstenik Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-153 below presents the details on the health indicators of the Municipality.

Table 5-153. Health Indicators of the Trstenik Municipality

Health Indicators of the Municipality	
Number of doctors	50
Number of doctors per 1,000 inhabitants	1.3
Doctors – child healthcare (per 1,000 inhabitants)	1.5
Doctors – healthcare of school children and youth (per 1,000 inhabitants)	0.9
Doctors – adult population healthcare (per 1,000 inhabitants)	0.6
Dentists – dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.9
Doctors – women's healthcare (per 1,000 inhabitants)	0.23
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	51.8
Coverage of pregnant women by visiting nurse service (Number)	0.7
Number of TB cases	7
Incidence of tuberculosis (per 100,000 population)	18
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	98.1
Proportion of children vaccinated against measles (%)	99.4

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the village heads were asked if there are any health centers or hospitals within the borders of their villages. The following Table 5-154 presents the responds of the head of villages for each settlement, respectively.

Table 5-154. Availability of health centers in affected villages of Trstenik Municipality

Services	Yes/No						
	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Health centre/hospital	No	Yes	No	Yes	No	No	No

Only Velika Drenova and Medveda villages observed to have a health centers within their settlement. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car or minibus/bus. Further information on access to health facilities presented in Table 5-155.

Table 5-155. Access to health facilities in affected villages of Trstenik Municipality

Access to the health facilities	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
On foot	0%	37.14%	0%	68.05%	25%	0%	0%
Minibus / bus	26.67%	0%	0%	0%	0%	33.33%	37.5%
Taxi	13.33%	0%	16.67%	0%	0%	0%	0%
Private car	40%	51.43%	75%	23.61%	58.33%	66.67%	62.5%
Car of relatives	20%	11.43%	8.33%	8.33%	16.67%	0%	0%

Furthermore, during the Household Surveys, number of households with chronic diseases were asked and the highest number of households (81%) with chronic diseases observed in Medveda village, whereas, Grabovac and Ugljarevo village observed to no chronic diseases. Table 5-156 presents households with chronic diseases for each affected village in Trstenik Municipality, respectively.

Table 5-156. Households with chronic diseases for each affected village in Trstenik Municipality

Settlement	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Percentage of households with chronic disease	73.33%	42.86%	66.67%	80.55%	66.67%	0%	0%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have, and it was observed that blood pressure and diabetes are common chronic disease majority of the affected villages. Further details on common chronic diseases of the affected villages of Trstenik Municipality can be found in Table 5-157.

Table 5-157. Common chronic diseases of the affected villages of Trstenik Municipality

Type of Chronic Diseases	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište
Blood pressure	0%	20%	25%	0%	25%
Diabetic Patient	50%	0%	0%	0%	0%
Heart Disease	0%	13.33%	0%	0%	50%
Lung and respiratory diseases	0%	0%	0%	0%	0%
Cancer	0%	13.33%	50%	0%	0%
Allergy	25%	0%	0%	0%	25%
Other	25%	53.33%	25%	100%	0%

5.14.3.5.7 Section 3: Čačak Municipality

General health indicators of the Municipality were derived from the Institute of Public Health of Serbia (2018). Table 5-158 presents the details on the health indicators of the Municipality.

Table 5-158. Health Indicators of the Čačak Municipality

Health Indicators of the Municipality	
Number of doctors	279
Number of doctors per 1,000 inhabitants	2.5
Doctors — child healthcare (per 1,000 inhabitants)	1.4
Doctors — healthcare of school children and youth (per 1,000 inhabitants)	0.6
Doctors — adult population healthcare (per 1,000 inhabitants)	0.5
Dentists — dental healthcare of children, school children and youth (per 1,000 inhabitants)	0.8
Doctors — women's healthcare (per 1,000 inhabitants)	0.18
Coverage of women in the first trimester of pregnancy by modern healthcare (%)	65.9
Coverage of pregnant women by visiting nurse service (Number)	1.0
Number of TB cases	6
Incidence of tuberculosis (per 100,000 population)	5
Proportion of infants vaccinated against diphtheria, tetanus and pertussis (%)	97.0
Proportion of children vaccinated against measles (%)	98.8

Source: Institute of Public Health of Serbia, 2018

During the Community Level Survey, the village heads were asked if there are any health centers or hospitals within the borders of their villages. The following Table 5-159 presents the responds of the head of villages for each settlement, respectively.

Table 5-159. Availability of health centers in affected villages of Čačak Municipality

Services	Yes/No									
	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Health centre/hospital	No	Yes	No	Yes	No	No	No	No	No	No

Except, Donja Gorevnica and Mrčajevci villages, all villages do not have a health centers within their settlement. During the Household Surveys, the respondents were asked on how they access to the health facilities and majority of the respondents stated as by private car. Further information on access to health facilities presented in Table 5-160.

Table 5-160. Access to health facilities in affected villages of Čačak Municipality

Access to health facility	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
On foot	0%	33.3%	0%	35.6%	10.9%	0%	0%	50%	23.1%	0%
Minibus / bus	16.7%	0%	21.4%	0%	20%	28.6%	33.3%	0%	0%	36.4%
Taxi	0%	0%	0%	0%	7.3%	0%	0%	0%	0%	0%
Private car	66.7%	60%	71.4%	64.4%	45.4%	61.9%	66.7%	50%	61.5%	59.1%
Car of relatives	16.7%	6.7%	7.2%	0%	16.4%	9.5%	0%	0%	15.4%	4.5%
Car of neighbours	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Furthermore, during the Household Surveys, number of households with chronic diseases were asked and the highest number of households (100%) with chronic diseases observed in Stancici village, whereas, Mrcajevci village observed to have least number of households (29%) with chronic diseases. Table 5-161 presents households with chronic diseases for each affected village in Čačak Municipality, respectively.

Table 5-161. Households with chronic diseases for each affected village in Čačak Municipality

Viilage	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Percentage of households with chronic disease	53%	73%	36%	29%	47%	48%	67%	100%	62%	41%

The respondents who have chronic diseases were asked further questions regarding the type of diseases that they have and it was observed that blood pressure is a common chronic disease in all affected villages. Further details on common chronic diseases of the affected villages of Čačak Municipality can be found in Table 5-162.

Table 5-162. Common chronic diseases of the affected villages of Čačak Municipality

Type of Chronic Disease	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Konjevići	Goričani
Accident	0%	0%	0%	3.1%	0%	0%	0%	0%	0%
Blood pressure	14.3%	25%	33.3%	21.9%	34.5%	18.2%	50%	20%	15.4%
Diabetic Patient	0%	25%	11.1%	15.6%	3.5%	9.1%	0%	20%	23.1%
Heart Disease	28.6%	25%	22.2%	6.2%	17.2%	18.2%	50%	20%	0%
Cancer	0%	25%	0%	3.1%	0%	9.1%	0%	0%	7.7%
Other	57.1%	0%	66.6%	50.1%	44.8%	45.4%	0%	40%	53.8%

5.14.3.5.8 Sensitive Receptors

According to baseline studies not every settlement in the social AoI have health facilities within its borders. Therefore, Project related potential incidents may cause high sensitivity in those settlements with no health services also, population influx during the construction phase of the Project may result pressure on the health services.

Construction related impacts (dust, noise) may increase vulnerability of the persons who has chronic diseases.

5.14.3.6 Education

The educational system in Serbia includes preschool, primary, secondary and higher education. The total duration of compulsory education in Serbia is 9 years. Children enter compulsory education at the age of 5½, when they start the pre-school preparatory programme, followed by 8 years of primary education (EURYDICE).

In 2018 the total of 1,248,280 persons were covered by educational activity on certain level: preschool education (17.5%); primary education (42.3%), upper-secondary education (20.2%), and higher education (20%). (Statistical Office of the Republic of Serbia, 2019)

However, Roma people have low enrollment and completion of education due to received discrimination. (EU's Country Report on Serbia , 2019) One-third of Roma do not complete compulsory education and only 11.5% of them graduate secondary school, only 0.7% of Roma people receive a university degree. (Bertelsmann Stiftung's Transformation Index, 2018).

5.14.3.6.1 Section 1: Ćićevac Municipality

Statistics on education of the Ćićevac Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-163 presents details of the education indicators of the Municipality, in depth.

Table 5-163. Education Indicators of Ćićevac Municipality

Preschool Education	
Number of institutions	1
Number of facilities	7
Children aged 0–3 attending preschool education	34
Coverage of children aged 0–3 by preschool education (%)	19.2
Children aged from 3 to the age when they start attending the preparatory preschool programme	102
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	67.5
Children attending preparatory preschool programme	76
Primary Education	
Primary schools – main schools	2
Primary schools – satellite classrooms	5
Students enrolled in primary school – main schools	
in lower grades (I – IV)	187
to higher grades (V – VIII)	307
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	89
to higher grades (V – VIII)	0
Primary school net attendance ratio (%)	88.5
Students who completed the 8th grade of primary school	102
Primary completion rate (%)	121.4
Drop-out rate in regular primary schools (%)	0.0
Number of children covered by primary education for children with disabilities	0
Number of adults covered by primary education	0
Secondary Education	
Secondary schools	1
Students enrolled in secondary school	112
Coverage of children by secondary education (%)	0
Students completing the secondary school	17
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	0.0
Number of children covered by secondary education for children with disabilities	0

Source: Statistics on Education, SORS, 2018

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Grad Stalać: There is a primary school in the village of Stalac, which has 35 students and has 2 teachers. For the further education, the students travel to Ćićevac located 6 km distance from the village. In Grad Stalac, 20 students go to high school and 10 students go to college to Ćićevac according to village head.

Mrzenica: The village of Mrzenica has an elementary school with 8 students and 1 teacher. Two students from this village go the centre of Ćićevac for secondary school and 1 for high school, located 10 km away from the village of Mrzenica.

Pojate and Stalać: Pojate and Stalac have a primary school, and for further education students travel to Ćićevac, which is 3 km away from Pojate and 5km from Stalac. The number of the students are not known by the village heads.

Overall, all participants of the social surveys are literate. While the lowest level of education among the participants is primary school graduates, Pojate is the most concentrated elementary school graduates with 50%. Secondary school graduates constitute the most crowded group among the villages. Although Stalac has the highest education rate, university graduates constitute 7% of the population.

Table 5-164 presents education indicators of all affected villages within Ćićevac Municipality according to Community Level Surveys.

Table 5-164. Education Indicators of Affected Villages in Ćićevac Municipality

Education	Grad Stalać	Mrzenica	Pojate	Stalać
Never attended to school	0%	0%	0%	0%
Primary school student	0%	6%	0%	7%
Primary school dropout	0%	0%	0%	0%
Primary school graduated	26%	19%	50%	30%
Secondary school student	4%	10%	0%	7%
Secondary school dropout	0%	0%	0%	0%
Secondary school graduated	61%	65%	50%	33%
Technical high school	4%	0%	0%	0%
Technical high school dropped out	0%	0%	0%	0%
Technical high school graduated	0%	0%	0%	0%
High school student	0%	0%	0%	0%
High school dropout	0%	0%	0%	0%
High school graduated	0%	0%	0%	0%
University student	0%	0%	0%	15%
University dropout	0%	0%	0%	0%
University graduated	0%	0%	0%	7%
Not in school age	5%	0%	0%	0%

5.14.3.6.2 Section 1: Kruševac Municipality

Statistics on education of the Kruševac Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-165 presents details of the education indicators of the Municipality, in depth.

Table 5-165. Education Indicators of Kruševac Municipality

Preschool Education	
Number of institutions	1
Number of facilities	52
Children aged 0–3 attending preschool education	723
Coverage of children aged 0–3 by preschool education (%)	24.9
Children aged from 3 to the age when they start attending the preparatory preschool programme	1559
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	59.5
Children attending preparatory preschool programme	1007
Primary Education	
Primary schools – main schools	17
Primary schools – satellite classrooms	51
Students enrolled in primary school – main schools	
in lower grades (I – IV)	3472
to higher grades (V – VIII)	4702
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	904
to higher grades (V – VIII)	151
Primary school net attendance ratio (%)	96.5
Students who completed the 8th grade of primary school	1288
Primary completion rate (%)	100.4
Drop-out rate in regular primary schools (%)	0.4
Number of children covered by primary education for children with disabilities	143
Number of adults covered by primary education	141
Secondary Education	
Secondary schools	8
Students enrolled in secondary school	5280
Coverage of children by secondary education (%)	0
Students completing the secondary school	1281
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	0.5
Number of children covered by secondary education for children with disabilities	44

Source: Statistics on Education, SORS, 2018

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Bela Voda: In the village of Bele Voda there is one elementary school called "Brana Pavlović". The school is attended by 120 students and it has 8 teachers. For the further education most students travel to Kruševac. All residents of Bela Voda are literate.

Čitluk: "Sveti Sava" School is located in Čitluk and is attended by approximately 491 students. The school has 15 teachers. For the further education most students travel to Kruševac. All residents of Čitluk are literate.

Bivolje: Bivolje has a primary school and a kindergarten and school has 27 teachers. For the further education most students travel to Kruševac. The number of children in primary school is 57.

Jasika: Jasika has a primary school and kindergarten. For the further education most students travel to Kruševac which is 5 km away from the village. The school has 67 teachers and approximately 300 students.

Koševi: The village of Koševi does not have any educational institution, for the needs of kindergartens and elementary schools Koševi locals go to Čitluk, which is 3 km away from the village. For high school they have to go to Kruševac which is 6km away. The number of children attending all levels of education in the village of Koševi is 60.

Kukljin: There are a kindergarten and an elementary school in his village, the number of children attending school is 50 with all levels and there are 5 teachers in this village. For the further education students go to Kruševac which is 12km away.

Makrešane: Makrešane has a kindergarten and an elementary school. The number of children attending school is 125 and, 41 of them continue to primary, 50 of them continue to secondary and 30 them continue to high school.

In general, the only village which has illiterate residents is Bela Voda and 1% of the total population is illiterate. Secondary school graduates make up the majority of the population. In the Village of Bivoje 76% of the total population is composed of secondary school graduates. Although there are no university graduates in the village of Jasika, the village Kosevi has the highest number of university graduates with 12%.

Table 5-166 presents education indicators of all affected villages within Kruševac Municipality according to Community Level Surveys.

Table 5-166. Education Indicators of Affected Villages in Kruševac Municipality

Education	Čitluk	Bela Voda	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Never attended to school	0%	1%	0%	0%	0%	0%	0%
Primary school student	0%	12%	3%	0%	0%	4%	4%
Primary school dropout	0%	0%	0%	0%	4%	7%	7%
Primary school graduated	60%	46%	3%	13%	19%	22%	22%
Secondary school student	0%	0%	0%	3%	0%	4%	4%
Secondary school dropout	0%	0%	0%	0%	0%	0%	0%
Secondary school graduated	25%	27%	76%	71%	62%	44%	44%
Technical high school	0%	0%	3%	0%	0%	4%	4%
Technical high school dropped out	0%	0%	0%	0%	0%	0%	0%
Technical high school graduated	10%	4%	6%	0%	0%	0%	0%
High school student	0%	0%	0%	3%	0%	4%	4%
High school dropout	0%	0%	0%	0%	0%	0%	0%
High school graduated	0%	0%	0%	0%	0%	7%	7%
University student	0%	0%	3%	3%	4%	0%	0%
University dropout	0%	0%	0%	0%	0%	0%	0%
University graduated	5%	4%	6%	0%	12%	4%	4%
Not in school age	0%	0%	0%	6%	0%	0%	0%

5.14.3.6.3 Section 1: Varvarin Municipality

Statistics on education of the Varvarin Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-167 presents details of the education indicators of the Municipality, in depth.

Table 5-167. Education Indicators of Varvarin Municipality

Preschool Education	
Number of institutions	1
Number of facilities	11
Children aged 0–3 attending preschool education	53
Coverage of children aged 0–3 by preschool education (%)	16.6
Children aged from 3 to the age when they start attending the preparatory preschool programme	96
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	35.0
Children attending preparatory preschool programme	125
Primary Education	
Primary schools – main schools	5
Primary schools – satellite classrooms	13
Students enrolled in primary school – main schools	

in lower grades (I – IV)	374
to higher grades (V – VIII)	514
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	154
to higher grades (V – VIII)	41
Primary school net attendance ratio (%)	89.3
Students who completed the 8th grade of primary school	155
Primary completion rate (%)	88.1
Drop-out rate in regular primary schools (%)	0.2
Number of children covered by primary education for children with disabilities	0
Number of adults covered by primary education	0
Secondary Education	
Secondary schools	1
Students enrolled in secondary school	401
Coverage of children by secondary education (%)	0
Students completing the secondary school	94
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	5.8
Number of children covered by secondary education for children with disabilities	0

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Bošnjane: Bosniacs have a kindergarten and primary school "Dragan Matic". In order to continue secondary education, the students of Bošnjan go to Varvarin, which is 7 km away and for the high school education and university education, the closest center is Kruševac which is 15 km away from the village.

Maskare: In the village of Mascara there is an elementary school which has 15 students and three teachers. Secondary education is given to the residents of Mascara in Varvarin, which is 5km away, and the high education and the university service can be provided in Kruševac, which is 18 km away. 13 students go to high school and 8 to college in Kruševac.

Overall, all participants in the interviewed villages are literate and the lowest level of education is primary school graduated. On average 25% of the total participants are primary school graduated. Similar to other municipalities, the secondary school graduates constitute the most populous group in the Varvarin Municipality. The proportion of university graduates in the village of Bošnjane is 12%, while in Maskare it is 3%.

Table 5-168 presents education indicators of all affected villages within Varvarin Municipality according to Community Level Surveys.

Table 5-168. Education Indicators of Affected Villages in Varvarin Municipality

Education	Bošnjane	Maskare
Never attended to school	0%	0%
Primary school student	0%	8%
Primary school dropout	0%	0%
Primary school graduated	24%	26%
Secondary school student	0%	0%
Secondary school dropout	0%	0%
Secondary school graduated	59%	55%
Technical high school	0%	0%
Technical high school dropped out	0%	0%
Technical high school graduated	0%	0%
High school student	0%	0%
High school dropout	0%	0%
High school graduated	6%	0%
University student	0%	3%
University dropout	0%	0%
University graduated	12%	3%
Not in school age	0%	5%

5.14.3.6.4 Section 2: Kraljevo Municipality

Statistics on education of the Varvarin Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-169 presents details of the education indicators of the Municipality, in depth.

Table 5-169. Education Indicators of Kraljevo Municipality

Preschool Education	
Number of institutions	2
Number of facilities	50
Children aged 0–3 attending preschool education	696
Coverage of children aged 0–3 by preschool education (%)	23.7
Children aged from 3 to the age when they start attending the preparatory preschool programme	1261
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	49.0
Children attending preparatory preschool programme	1024
Primary Education	
Primary schools – main schools	22
Primary schools – satellite classrooms	38
Students enrolled in primary school – main schools	

in lower grades (I – IV)	3325
to higher grades (V – VIII)	4543
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	992
to higher grades (V – VIII)	474
Primary school net attendance ratio (%)	95.8
Students who completed the 8th grade of primary school	1320
Primary completion rate (%)	99.8
Drop-out rate in regular primary schools (%)	0.5
Number of children covered by primary education for children with disabilities	59
Number of adults covered by primary education	104
Secondary Education	
Secondary schools	9
Students enrolled in secondary school	4960
Coverage of children by secondary education (%)	0
Students completing the secondary school	1130
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	1.3
Number of children covered by secondary education for children with disabilities	22

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Adrani: Adrani has a kindergarten and an elementary school. Children go to Kraljevo to continue higher education, which is 4 km away from the village. The total number of students attending the “Dragan Marinković” School in Adrani is 140 and the school has 9 teachers.

Vrba: The Vrba village has a kindergarten and a primary school. The students go to Kraljevo for higher education which is 9 km away.

Grdica: There is a kindergarten and elementary school in Grdica up to the 4th grade, the remaining 4 classes continue in Kraljevo which is 3 km away from the village. There are 52 students and 4 teachers at the “Vilotijević Brothers” School.

Zaklopača: There is a kindergarten and an elementary school in the village of Zaklopača. For the further education students travel to Kraljevo. The number of the students and teachers are not known by the village head.

Miločaj: Miločaj has a kindergarten and elementary school up to 4 grades, for the higer education students go to Kraljevo, which is 10 km away. The number of children attending school is 30 and there are 2 teachers in the village school.

Obrva: There is a kindergarten and an elementary school in the village of Obrva, in order to continue higher education, students go to Kraljevo, which is 13 km away from the village. The school is attended by 17 students and has 2 teachers.

Popovici: This village has a kindergarten and an elementary school. The closest high school in Adrani which is 3km away and in Kraljevo which is 4 km away. The village has 17 students and 3 teachers.

Ratina: Ratina has a kindergarten and an elementary school. The high is located in Kraljevo, which is 7 km away. The total number of children attending school from this village is about 500. Of these, 350 go to primary school, 100 go to high school and 50 go to high school and college. There are 35 teachers in the village school.

Sirča: Sirča has a primary school attended by 150 students, for high school students go to Kraljevo which is 5 km away from the village.

Šumarice: Šumarice has a primary school and a kindergarten. The primary school has 2 students and has 1 teacher. To continue to high school, the remaining 16 students go to Kraljevo, which is 6 km away from the village.

Stubal: In the village of Stubal, for the elementary education, children travel to Vitkovac village which is 9 km away from Stubal and for high school they have two option; one is Kraljevo (20km) and the other one is Trstenik (14km). The number of children attending elementary school is 90, and the number of secondary school students is 45 and the number of highschool students is 15. There are 3 teachers in the village school.

In general, Stubal and in Zaklopača has the highest illiterate population among the villages including the other Municipalities. The proportion of the people who never attended to school is 6% is Zaklopača and 12% in Stubal. Similar to other municipalities, the secondary school graduates constitute the most populous group in the Kraljevo Municipality. Kraljevo is also the municipality where university graduates are heavly populated compared with the other Municipalitie, 38% of Ratine village are university graduated.

Table 5-170 presents education indicators of all affected villages within Kraljevo Municipality according to Community Level Surveys.

Table 5-170. Education Indicators of Affected Villages in Kraljevo Municipality

Education	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Never attended to school	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	12%
Primary school student	0%	7%	0%	0%	0%	0%	9%	0%	7%	-	6%
Primary school dropout	0%	0%	0%	6%	0%	6%	0%	0%	0%	0%	0%
Primary school graduated	24%	0%	3%	12%	0%	25%	13%	0%	0%	3%	6%
Secondary school student	0%	0%	3%	0%	0%	6%	0%	0%	0%	3%	12%
Secondary school dropout	0%	0%	0%	52%	0%	0%	0%	0%	0%	0%	0%
Secondary school graduated	59%	53%	70%	0%	88%	63%	74%	62%	53%	70%	46%

Education	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Technical high school	0%	0%	3%	0%	0%	0%	0%	0%	0%	3%	0%
Technical high school dropped out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Technical high school graduated	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High school student	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	0%
High school dropout	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%
High school graduated	6%	0%	0%	6%	0%	0%	0%	0%	0%	0%	6%
University student	0%	27%	3%	0%	6%	0%	0%	0%	27%	3%	6%
University dropout	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%
University graduated	11%	13%	17%	0%	0%	0%	0%	38%	13%	18%	6%
Not in school age	0%	0%	0%	6%	6%	0%	0%	0%	0%	0%	0%

5.14.3.6.5 Section 2: Vrnjačka Banja Municipality

Statistics on education of the Vrnjačka Banja Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-171 presents details of the education indicators of the Municipality, in depth.

Table 5-171. Education Indicators of Vrnjacka Banka Municipality

Preschool Education	
Number of institutions	1
Number of facilities	12
Children aged 0–3 attending preschool education	184
Coverage of children aged 0–3 by preschool education (%)	30.9
Children aged from 3 to the age when they start attending the preparatory preschool programme	362
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	63.3
Children attending preparatory preschool programme	197
Primary Education	
Primary schools – main schools	4
Primary schools – satellite classrooms	9
Students enrolled in primary school – main schools	
in lower grades (I – IV)	559
to higher grades (V – VIII)	624
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	314
to higher grades (V – VIII)	313
Primary school net attendance ratio (%)	92.6
Students who completed the 8th grade of primary school	304
Primary completion rate (%)	112.2
Drop-out rate in regular primary schools (%)	0.3

Number of children covered by primary education for children with disabilities	3
Number of adults covered by primary education	43
Secondary Education	
Secondary schools	2
Students enrolled in secondary school	1132
Coverage of children by secondary education (%)	0
Students completing the secondary school	275
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	1.2
Number of children covered by secondary education for children with disabilities	0

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Vraneši, Gračac and Podunavci: In the village of Vraneši, there is one elementary school “Branko Radičević”. This elementary school has separate unit in five villages: Gračac, Podunavci, Donji Gračac, Gornji Gračac and Otroci. Total of 412 students from these villages are attending classes and the school has 41 teachers. There are no high school in villages of Vraneši, Gračac and Podunavci, as a result, students go to Vrnjačka Banja for higher education. All residents of Vraneši, Gračac and Podunavci are literate.

Vrnjci and Štulac: In the village of Vrnjci there is one elementary school called “Mladost”. This elementary school has separate unit in the village of Štulac. Total of 320 students from are attending classes. The school has 31 teachers. There are no high school in villages of Vrnjci and Štulac. All residents of Vrnjci and Štulac are literate.

Novo Selo: The village of Velika Drenova has its own elementary school "Bane Milenković". This elementary school have 353 students and 30 teachers. All residents of Novo Selo are literate.

Ruđinci: The village of Ruđinci does not have its own elementary school. The students from this village go to Vrnjačka Banja or Vrnjci which is 2 km away. All residents of Ruđinci are literate.

The lowest level of education within the villages starts with primary school graduates. There are also university graduates in each settlement, with values ranging from 1% to 7%. Secondary school graduates constitute the most intensive group with a value ranging from 30% to 55%.

Table 5-172 below presents education indicators of all affected villages within Vrnjačka Banja Municipality according to Community Level Surveys.

Table 5-172. Education Indicators of Affected Villages in Vrnjačka Banja Municipality

Education	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Never attended to school	0%	0%	0%	0%	0%	0%	0%
Primary school student	6.67%	5.45%	7.34%	3.16%	8.33%	6%	10.13%
Primary school dropout	0%	0%	0%	0%	2.01%	4%	0%
Primary school graduated	5.71%	12.12%	13.64%	9.47%	10.34%%	16%	19.62%
Secondary school student	12.38%	6.06%	6.29%	7.37%	3.16%	0%	10.76%
Secondary school dropout	0%	0%	0%	0%	0%	0%	0%
Secondary school graduated	55.24%	44.24%	42.66%	50.53%	52.01%	56%	31.01%
Technical high school	0%	16.97%	8.39%	9.47%	8.62%	0%	1.9%
Technical high school dropped out	0%	0%	0%	0%	0%	0%	0%
Technical high school graduated	0%	0%	0%	0%	0%	0%	0%
High school student	0%	0%	0%	0%	0%	0%	0%
High school dropout	0%	0%	0%	0%	0%	0%	0%
High school graduated	0%	0%	2.1%	3.16%	0%	0%	5.06%
University student	3.81%	4.24%	1.75%	2.1%	0%	0%	1.26%
University dropout	0%	0%	0%	0%	0%	0%	0%
University graduated	0.95%	3.03%	6.64%	4.21%	3.16%	4%	6.96%
Not in school age	15.24%	7.88%	11.19%	10.53%	12.36%	14%	13.29%

5.14.3.6.6 Section 2: Trstenik Municipality

Statistics on education of the Trstenik Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-173 presents details of the education indicators of the Municipality, in depth.

Table 5-173. Education Indicators of Trstenik Municipality

Preschool Education	
Number of institutions	1
Number of facilities	21
Children aged 0–3 attending preschool education	172
Coverage of children aged 0–3 by preschool education (%)	20.7
Children aged from 3 to the age when they start attending the preparatory preschool programme	529
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	76.1
Children attending preparatory preschool programme	299
Primary Education	
Primary schools – main schools	8
Primary schools – satellite classrooms	34

Students enrolled in primary school – main schools	
in lower grades (I – IV)	761
to higher grades (V – VIII)	1329
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	439
to higher grades (V – VIII)	47
Primary school net attendance ratio (%)	93.3
Students who completed the 8th grade of primary school	394
Primary completion rate (%)	103.7
Drop-out rate in regular primary schools (%)	0.2
Number of children covered by primary education for children with disabilities	5
Number of adults covered by primary education	0
Secondary Education	
Secondary schools	2
Students enrolled in secondary school	1107
Coverage of children by secondary education (%)	0
Students completing the secondary school	251
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	0.9
Number of children covered by secondary education for children with disabilities	0

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Bogdanje: In the village of Bogdanje there is one elementary school. Total of 540 students from Trstenik and Bogdan are getting service from this school. There are no high school in village of Bogdanje, most students go in the city of Trsteni for high school. All residents of Bogdanje are literate.

Lozna, Grabovac and Ugljarevo: The villages of Lozna, Grabovac and Ugljarevo, uses the same elementary school called "Miodrag Čajetinac Čajka" from Trstenik. The school has 606 students. The village of Lozna, Grabovac and Ugljarevo don't have high schools. The nearest high school to these villages is in Trstenik.

Velika Drenova: The village of Velika Drenova has its own elementary school "Kneginja Milica". This elementary school have 310 students and 34 teachers. All residents of Velika Drenova are literate.

Medveđa: The village of Medveđa has its own elementary school "Ljubivoje Bajić". This elementary school have 199 students and 29 teachers. All residents of Medveđa are literate.

Selište: There is no education facility in the village of Selište the students from this village travels to Velika Drenova. All residents of Selište are literate.

Overall, all villages within the Trstenik Municipality are literate. The lowest level of education is 3.45% in Grobovac as primary school dropout, with the highest rate of education in Grobovac and 25% of peasants are university graduates.

Table 5-174 presents education indicators of all affected villages within Trstenik Municipality according to Community Level Surveys.

Table 5-174. Education Indicators of Affected Villages in Trstenik Municipality

Education	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Never attended to school	0%	0%	0%	0%	0%	0%	0%
Primary school student	10%	8.57%	13.33%	6.45%	0%	0%	14.28%
Primary school dropout	0%	0%	0%	0%	0%	3.45%	0%
Primary school graduated	6.67%	22.86%	6.67%	3.23%	18.18%	10.34%	17.14%
Secondary school student	0%	2.86%	0%	6.45%	0%	10.34%	5.71%
Secondary school dropout	0%	0%	0%	0%	0%	0%	0%
Secondary school graduated	66.67%	45.71%	46.67%	48.39%	54.54%	22.86%	51.43%
Technical high school	0%	5.71%	0%	9.68%	0%	6.9%	0%
Technical high school dropped out	0%	0%	0%	0%	0%	0%	0%
Technical high school graduated	0%	0%	0%	0%	0%	0%	0%
High school student	0%	0%	0%	0%	0%	0%	0%
High school dropout	0%	0%	0%	0%	0%	0%	0%
High school graduated	6.67%	2.86%	13.33%	0%	0%	10.34%	0%
University student	0%	0%	0%	3.23%	18.18%	3.45%	0%
University dropout	0%	0%	0%	0%	0%	0%	0%
University graduated	0%	8.57%	6.67%	12.9%	0%	24.14%	8.57%
Not in school age	10%	0%	13.33%	9.68%	9.09%	3.45%	2.86%

5.14.3.6.7 Section 3: Čačak Municipality

Statistics on education of the Čačak Municipality was derived from the Statistical Office of the Republic of Serbia data of 2018. Table 5-175 presents details of the education indicators of the Municipality, in depth.

Table 5-175. Education Indicators of Čačak Municipality

Preschool Education	
Number of institutions	5
Number of facilities	37
Children aged 0–3 attending preschool education	1163
Coverage of children aged 0–3 by preschool education (%)	38.5
Children aged from 3 to the age when they start attending the preparatory preschool programme	1886
Coverage of children aged from 3 to the age when they start attending the preparatory preschool programme by preschool education (%)	76.9
Children attending preparatory preschool programme	1086
Primary Education	
Primary schools – main schools	16
Primary schools – satellite classrooms	24
Students enrolled in primary school – main schools	
in lower grades (I – IV)	3812
to higher grades (V – VIII)	4397
Students enrolled in primary school – satellite classrooms	
in lower grades (I – IV)	360
to higher grades (V – VIII)	8
Primary school net attendance ratio (%)	98.3
Students who completed the 8th grade of primary school	1241
Primary completion rate (%)	107.4
Drop-out rate in regular primary schools (%)	0.0
Number of children covered by primary education for children with disabilities	46
Number of adults covered by primary education	0
Secondary Education	
Secondary schools	7
Students enrolled in secondary school	5193
Coverage of children by secondary education (%)	0
Students completing the secondary school	1138
Secondary school completion rate (%)	0
Drop-out rate in regular secondary schools (%)	08
Number of children covered by secondary education for children with disabilities	21

In terms of education information of the Social Area Influence following information were derived from the Community Level Surveys and Household Surveys.

Stančići: There is an elementary school in the village of Stančići. The school has 93 students from Stančići and Donja Trepča villages and 20 teachers. All residents of Stančići are literate.

Mrčajevci, Katrga and Donja Gorevnica: The village of Mrčajevci has its own elementary school called "Tatomir Anđelić". This elementary school have 466 students and 44 teachers. The school serves students from the villages of Katrga and Donja Gorevnica. All residents of Mrčajevci, Katrga and Donja Gorevnjača are literate.

Preljina and Rakova: The village of Preljina has its own elementary school called "Preljina". This elementary school have 377 students and 39 teachers. The school serves nearby villages as well including Prislonica and Rakova. All residents of Preljina and Rakova are literate.

Baluga: The village of Baluga does not have its own elementary school. The students from this village go to village of Preljina or Čačak which is both 5 km away. All residents of Baluga are literate.

Sokolići: The village of Sokolići does not have its own elementary school. The students from this village go to village of Preljina which is 6 km away. All residents of Sokolići are literate.

Konjevići: The village of Konjevići does not have its own elementary school. The students from this village go to city of Čačak which is 6 km away. All residents of Konjevići are literate.

Goričani: The village of Goričani does not have its own elementary school. The students from this village go to Village of Slatina which is 9 km away. All residents of Goričani are literate.

Table 5-176 presents education indicators of all affected villages within Čačak Municipality according to Community Level Surveys.

Table 5-176. Education Indicators of Affected Villages in Trstenik Municipality

Education	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Never attended to school	0.6%	0%	0%	0%	0%	1.5%	0%	0%	0%	0%
Primary school student	7.8%	8%	6.6%	8.5%	6.7%	6%	4%	11.1%	8.7%	9.2%
Primary school dropout	0.6%	0.4%	0%	0.4%	0%	0%	0%	0%	0%	1.8%
Primary school graduated	25.1%	29.5%	28.5%	26.8%	23.1%	26.9%	28%	14.8%	27.6%	29.4%
Secondary school student	3.6%	8%	6%	7.7%	6%	7.4%	8%	0%	4.3%	0%
Secondary school dropout	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Secondary school graduated	50.9%	44.2%	49.7%	47.3%	52.3%	47.8%	48%	66.7%	52.2%	45.9%

Education	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Technical high school	1.2%	0%	1.1%	0.4%	1.5%	1.5%	0%	0%	2.9%	0%
Technical high school dropped out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Technical high school graduated	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High school student	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High school dropout	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High school graduated	1.2%	0%	0%	0%	0.7%	0%	0%	0%	0%	1.8%
University student	0%	0%	0%	0%	0.7%	0%	4%	3.7%	1.4%	0%
University dropout	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
University graduated	0.6%	0.4%	0.5%	0.8%	1.5%	1.5%	0%	3.7%	2.9%	0%
Not in school age	8.4%	9.4%	7.6%	8.1%	7.5%	7.4%	8%	0%	0%	11.9%

5.14.3.6.8 Sensitive Receptors

In all phases of the Project, skilled and unskilled labour force will be required. In this respect, it is expected from the Contractor to provide skill development programmes to the local unskilled labour force to maximize local employment.

5.14.3.7 Infrastructure and Services

This section presents the outcomes of the Community Level Survey and Household Survey in terms of infrastructure conditions of each affected settlement of the Project.

5.14.3.7.1 Section 1: Ćićevac Municipality

Services

The village heads of each affected settlement in Ćićevac Municipality were asked about the availability of services within their border of villages, Table 5-177 presents the type of services available in each affected village, respectively.

Table 5-177. Type of services available in each affected village of Ćićevac Municipality

Services	Yes/No			
	Grad Stalać	Mrzenica	Pojate	Stalać
Health centre/hospital	No	No	Yes	Yes
Gendarmerie / police station	No	No	No	No
Fire Brigade	Yes	No	No	No
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes
Post office	No	No	Yes	Yes
Coffee shop	No	No	Yes	No
Restaurant	No	No	Yes	No
Touristic facilities (hotel, hostel, camp site)	Yes	No	No	No

Services	Yes/No			
	Grad Stalać	Mrzenica	Pojate	Stalać
Village room	Yes	Yes	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	No	No	No
Church	Yes	Yes	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No
Cooperative / Association	No	No	No	Yes
Public transportation (bus)	Yes	Yes	Yes	Yes

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, solid waste collections, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Ćićevac Municipality is presented in Table 5-178.

Table 5-178. Available infrastructure services in affected villages of Ćićevac Municipality

Yes/No				
Type of Infrastructure	Grad Stalać	Mrzenica	Poijate	Stalać
Electrical infrastructure	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	No	Yes
Domestic water source	Yes	No	No	Yes
Irrigation water source	No	No	No	No
Sewer system	No	No	No	No
Heating source	No	No	No	No
Domestic solid waste collection	Yes	Yes	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes
Asphalt road	Yes	Yes	Yes	Yes
Other	No	No	No	No

Furthermore, according to village heads, the water sources of the villages were polluted due to the flooding from the West Morava. As for the sewage system, all the houses use septic tanks, however the village heads stated that a sewage system will be established soon.

Household Conditions

In general, Grad Stalać, Mrzenica, Pojate and Stalać households stated to have average conditions in the house, with a size larger than 50 m^2. Majority of the households heated by wood, residents of Stalac stated that 13% of them use electricity as a heating source. Last, the waste is dumped in a landfill in general. Further information and details for each affected settlement can be found in Table 5-179.

Table 5-179. Household conditions of each affected settlements of Ćićevac Municipality

Conditions		Grad Stalać	Mrzenica	Pojate	Stalać
What is the condition of your house when compared with the other houses in the area?	Better	0%	0%	0%	13%
	Averege	100%	100%	100%	88%
	Worse	0%	0%	0%	0%
Surface area	0-25 m²	0%	0%	0%	0%
	25-50 m²	0%	17%	36%	25%
	50-200 m²	89%	50%	74%	75%
	200 m²	11%	33%	0%	0%
Owernship of the house	Owner	100%	100%	100%	100%
	Rental	0%	0%	0%	0%
	Occupier	0%	0%	0%	0%
	Other	0%	0%	0%	0%
Water source of drinking water	Open source water	11%	0%	0%	0%
	Well water	0%	0%	0%	0%
	River	11%	17%	0%	0%
	Tap Tank	78%	83%	100%	100%
Water source of the irrigation water	Open source water	0%	17%	0%	0%
	Well water	0%	0%	0%	0%
	River	22%	0%	0%	0%
	Tap tank	78%	83%	100%	100%
Water source of the domestic water	Open source water	0%	17%	0%	0%
	Well water	0%	0%	0%	0%
	River	11%	0%	0%	0%
	Tap Tank	89%	83%	100%	100%
Do you generally have electricity in the house you live in?	Yes	100%	100%	100%	100%
	No	0%	0%	0%	0%
Are the electricity cut offs	Rarely	67%	33%	0%	38%
	No cut/offs	33%	67%	100%	62%
Toiler facilities	In the house	100%	100%	100%	88%
	Outside the house	0%	0%	0%	12%
Toilet system	Sewer system	100%	100%	100%	100%
	Septic tank	0%	0%	0%	0%
Heating source	Coal	0%	17%	0%	13%
	Electricity	0%	0%	0%	12%
	Gas	0%	0%	0%	0%
	Wood	100%	83%	0%	75%
	Solar power	0%	0%	0%	0%
Waste management	Bury	0%	0%	0%	0%
	Incineration	0%	0%	0%	0%
	Landfill	44%	83%	0%	100%
	Unsanitary disposal	0%	0%	0%	0%
	Other	56%	17%	100%	0%

During the ESIA Disclosure Meeting[10] on September 23, 2020 the attendees of the meeting informed 2U1K regarding an unsanitary landfill located in Ćićevac for further assessment (See Figure 5-77).

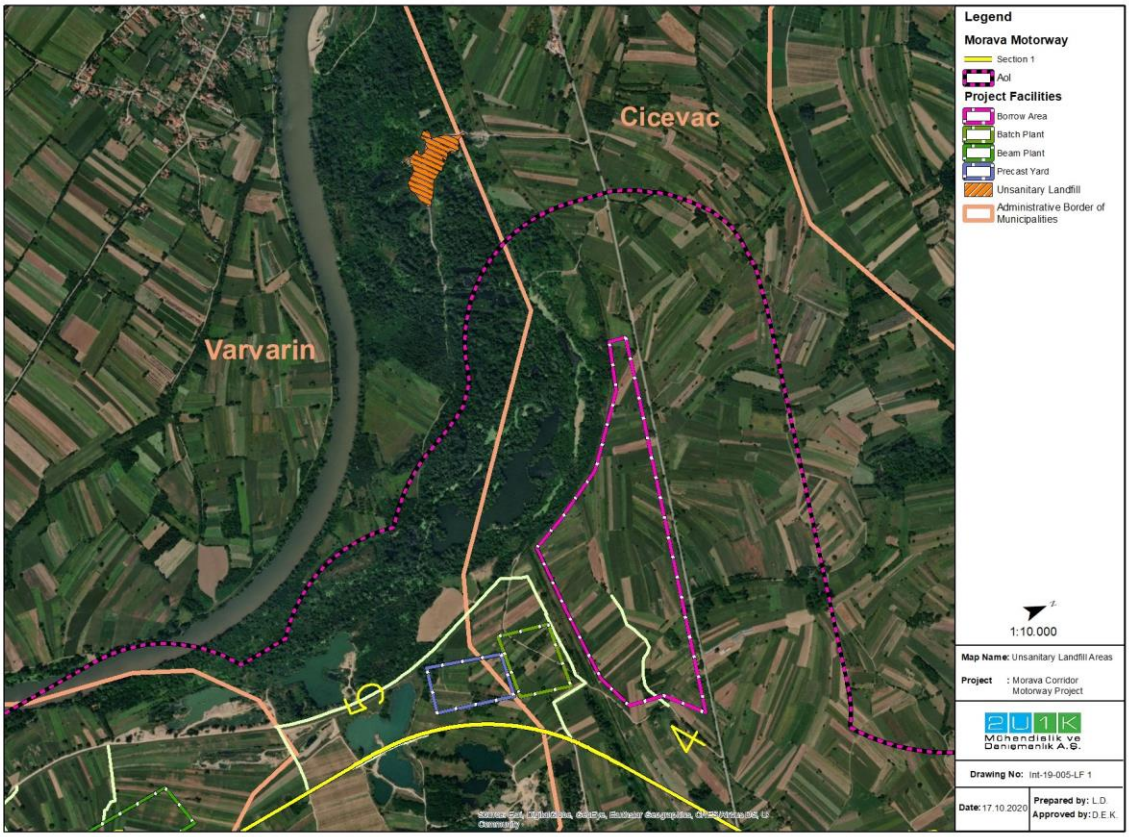


Figure 5-77. Unsanitary Landfill Located in Ćićevac Municipality

The location of the unsanitary landfill was assessed by the 2U1K after the Disclosure Meeting in Ćićevac to obtain exact coordinates of the landfill and observe potential impacts could arise from the landfill. To conclude, the unsanitary landill is outside of the AoI and expected to not cause any negative impacts to the Project or its facilities.

[10] Details of the ESIA Disclosure Meeting can be obtained from the Stakeholder Engagement Plan.

5.14.3.7.2 Section 1: Kruševac Municipality

Services

Each village head of affected settlements in Kruševac Municipality was asked about the availability of services within their border of villages, Table 5-180 presents the type of services available in each affected village, respectively.

Table 5-180. Type of services available in each affected village of Kruševac Municipality

Services	Yes/No						
	Bele Vode	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Health centre/hospital	No	Yes	Yes	Yes	No	Yes	No
Gendarmerie / police station	No	Yes	No	No	No	No	No
Fire Brigade	No	No	No	No	no	No	No
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post office	Yes	Yes	Yes	Yes	No	Yes	No
Coffee shop	No	Yes	Yes	Yes	No	No	No
Restaurant	Yes	Yes	Yes	Yes	No	No	No
Touristic facilities (hotel, hostel, camp site)	No	Yes	Yes	No	No	No	No
Village room	Yes	Yes	yes	no	No	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	Yes	Yes	No	No	No	No
Church	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No	No	No	No
Cooperative / Association	No	No	Yes	No	No	No	No
Public transportation (bus)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, irrigation water source, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Kruševac Municipality is presented in Table 5-181.

.

Table 5-181. Available infrastructure services in affected villages of Kruševac Municipality

Yes/ No							
Type of Infrastructure	**Čitluk**	**Bela Voda**	**Bivolje**	**Jasika**	**Koševi**	**Kukljin**	**Makrešane**
Electrical infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	Yes	Yes	No	Yes	Yes
Domestic water source	Yes	Yes	Yes	Yes	No	Yes	Yes
Irrigation water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sewer system	No	Yes	No	No	No	No	No
Heating source	No	No	Yes	Yes	No	Yes	No
Domestic solid waste collection	No	No	Yes	No	No	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asphalt road	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other	No	No	No	No	No	No	No

Furthermore, for heating, almost 95% of the population in all villages is heated by wood and supplies coal to some households. All villages are covered by landline, mobile and internet.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately 50 m². All of the locals were stated to be heated by wood. Further information and details for each affected settlement can be found in Table 5-182.

Table 5-182. Household conditions of each affected settlements of Kruševac Municipality

Conditions		**Bela Voda**	**Čitluk**	**Bivolje**	**Jasika**	**Koševi**	**Kukljin**	**Makrešane**
What is the condition of your house when compared with the other houses in the area?	Better	45%	35%	10%	25%	0%	30%	14%
Surface area	Averege	55%	65%	70%	75%	88%	60%	71%
	Worse	0%	0%	20%	0%	13%	10%	14%
	0-25 m²	0%	0%	0%	0%	0%	0%	0%
	25-50 m²	52%	65%	10%	25%	13%	10%	71%
	50-200 m²	48%	35%	90%	75%	87%	90%	29%
	200 m²	0%	0%	0%	0%	0%	0%	0%
Owernship of the house	Owner	100%	100%	90%	100%	100%	70%	86%
	Rental	0%	0%	0%	0%	0%	0%	0%
	Occupier	0%	0%	0%	0%	0%	0%	0%
	Other	0%	0%	10%	0%	0%	20%	14%

Conditions		Bela Voda	Čitluk	Bivolje	Jasika	Koševi	Kukljin	Makrešane
Water source of drinking water	Open source water	0%	0%	0%	0%	0%	0%	0%
	Well water	0%	0%	0%	0%	0%	0%	0%
	River	0%	0%	0%	0%	0%	10%	14%
	Tap tank	100%	100%	100%	100%	100%	90%	86%
Water source of the irrigation water	Open source water	85%	100%	10%	0%	0%	0%	14%
	Well water	15%	0%	0%	0%	0%	0%	0%
	River	0%	0%	20%	50%	63%	40%	0%
	Tap tank	0%	0%	70%	50%	37%	60%	86%
Water source of the domestic water	Open source water	100%	100%	0%	0%	0%	10%	0%
	Well water	0%	0%	0%	0%	0%	0%	0%
	River	0%	0%	20%	25%	38%	30%	14%
	Tap tank	0%	0%	80%	75%	63%	60%	86%
Do you generally have electricity in the house you live in?	Yes	100%	100%	100%	100%	100%	100%	100%
	No	0%	0%	0%	0%	0%	0%	0%
Are the electricity cut offs	Rarely	100%	100%	30%	75%	38%	50%	29%
	No cut/offs	0%	0%	60%	0%	63%	40%	57%
Toiler facilities	In the house	100%	100%	100%	100%	100%	100%	100%
	Outside the house	0%	0%	0%	0%	0%	0%	0%
Toilet system	Sewer system	0%	78%	0%	0%	0%	0%	0%
	Septic tank	100%	22%	0%	0%	0%	0%	0%
Heating source	Coal	0%	15%	0%	0%	0%	10%	0%
	Electricity	5%	35%	0%	0%	0%	0%	0%
	Gas	0%	0%	0%	0%	0%	0%	0%
	Wood	95%	50%	90%	100%	88%	90%	86%
	Solar power	0%	0%	0%	0%	0%	0%	0%
Waste management	Bury	0%	0%	0%	0%	0%	0%	0%
	Incineration	0%	0%	0%	0%	0%	0%	0%
	Landfill	100%	100%	60%	75%	88%	90%	43%
	Unsanitary disposal	0%	0%	0%	0%	0%	0%	0%
	Other	0%	0%	30%	25%	13%	10%	43%

5.14.3.7.3 Section 1: Varvarin Municipality

Services

The village heads of each affected settlement in Varvarin Municipality were asked about the availability of services within their border of villages, Table 5-183 presents the type of services available in each affected village, respectively.

Table 5-183. Type of services available in each affected village of Varvarin Municipality

Services	Yes/No	
	Bošnjane	Maskare
Health centre/hospital	No	No
Gendarmerie / police station	Yes	No
Fire Brigade	Yes	Yes
Stores (grocery store, butcher, bakery etc.)	Yes	Yes
Post office	Yes	No
Coffee shop	No	No
Restaurant	No	No
Touristic facilities (hotel, hostel, camp site)	No	No
Village room	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	No
Church	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No
Cooperative / Association	No	No
Public transportation (bus)	Yes	Yes

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, irrigation water source, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Varvarin Municipality is presented in Table 5-184.

Table 5-184. Available infrastructure services in affected villages of Varvarin Municipality

Yes/No		
Available infrastructure	**Bošnjane**	**Maskare**
Electrical infrastructure	Yes	Yes
Drinking water source	Yes	No
Domestic water source	No	No
Irrigation water source	Yes	No
Sewer system	No	No
Heating source	No	No
Domestic solid waste collection	Yes	Yes
Communication Landline	Yes	Yes

Yes/No		
Available infrastructure	**Bošnjane**	**Maskare**
Mobile Phone	Yes	Yes
Internet	Yes	Yes
Asphalt road	Yes	Yes

All villages are covered by landline, mobile and internet.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately 50 m^2. All of the locals were stated to be heated by wood. Further information and details for each affected settlement can be found in Table 5-185.

Table 5-185. Household conditions of each affected settlements of Varvarin Municipality

Conditions	Village	Bošnjane	Maskare
What is the condition of your house when compared with the other houses in the area?	Better	29%	20%
	Averege	71%	80%
	Worse	0%	0%
Surface area	0-25 m²	0%	0%
	25-50 m²	0%	0%
	50-200 m²	86%	90%
	200 m²	14%	10%
Owernship of the house	Owner	57%	80%
	Rental	0%	0%
	Occupier	0%	0%
	Other	43%	20%
Water source of drinking water	Open source water	0%	0%
	Well water	0%	0%
	River	100%	90%
	Tap Tank	0%	10%
Water source of the irrigation water	Open source water	0%	0%
	Well water	100%	90%
	River	0%	0%
	Tap tank	0%	10%
Water source of the domestic water	Open source water	0%	10%
	Well water	43%	10%
	River	0%	0%
	Tap Tank	57%	80%
Do you generally have electricity in the house you live in	Yes	100%	100%
	No	0%	0%
Are the electricity cut offs	Rarely	100%	90%
	No cut/offs	0%	10%

Conditions	Village	Bošnjane	Maskare
Toiler facilities	In the house	0%	10%
	Outside the house	0%	0%
Toilet system	Sewer system	0%	0%
	Septic tank	0%	0%
Heating source	Coal	100%	20%
	Electricity	0%	0%
	Gas	0%	0%
	Wood	0%	0%
	Solar power	100%	80%
Waste management	Bury	0%	0%
	Incineration	0%	0%
	Landfill	29%	20%
	Unsanitary disposal	71%	80%

5.14.3.7.4 Section 2: Kraljevo Municipality

Services

The village heads of each affected settlement in Kraljevo Municiplaity were asked about the availability of services within their border of villages, Table 5-186 presents the type of services available in each affected village, respectively.

Table 5-186. Type of services available in each affected village of Kraljevo Municipality

Services	Yes/No										
	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Health centre/hospital	No	Yes	No	Yes	Yes	No	No	Yes	No	No	Yes
Gendarmerie / police station	No	Yes	No	No	No	No	No	No	No	No	No
Fire Brigade	No	No	No	Yes	Yes	No	No	No	No	No	Yes
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post office	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No
Coffee shop	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Restaurant	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
Touristic facilities (hotel, hostel, camp site)	Yes	No	No	No	No	No	No	No	No	No	Yes
Village room	No	No	No	No	No	No	No	Yes	No	No	No
Financial (eg	No	Yes	No	No	No	No	No	Yes	No	No	No

Services	Yes/No										
	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
banks, ATMs, foreign exchange bureaus)											
Church	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No	No	No	No	No	No	No	No
Cooperative / Association	No	No	No	Yes	Yes	No	No	No	No	No	No
Public transportation (bus)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Kraljevo Municipality is presented in Table 5-187.

Table 5-187. Available infrastructure services in affected villages of Kraljevo Municipality

Type of Infrastructure	Yes/No										
	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarce	Stubal
Electrical infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Domestic water source	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Irrigation water source	Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	No
Sewer system	Yes	No	Yes	No	No	No	No	Yes	No	No	No
Heating source	No	No	No	No	No	No	No	No	No	No	No
Domestic solid waste collection	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Yes/No											
Type of Infrastructure	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarce	Stubal
Asphalt road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other	No	No	No	No	No	No	No	No	No	No	No

Furthermore, for heating, all of the population in villages are heated by wood. All villages are covered by landline, mobile and internet. Each village have one or two waste containers where for disposal. Containers are emptied mostly once a week, and the waste ends up in wild waste dump areas.

During the ESIA Disclosure Meeting[11] on September 24, 2020 the attendees of the meeting informed 2U1K regarding an unsanitary landfill located in Kraljevo for further assessment (See Figure 5-77).

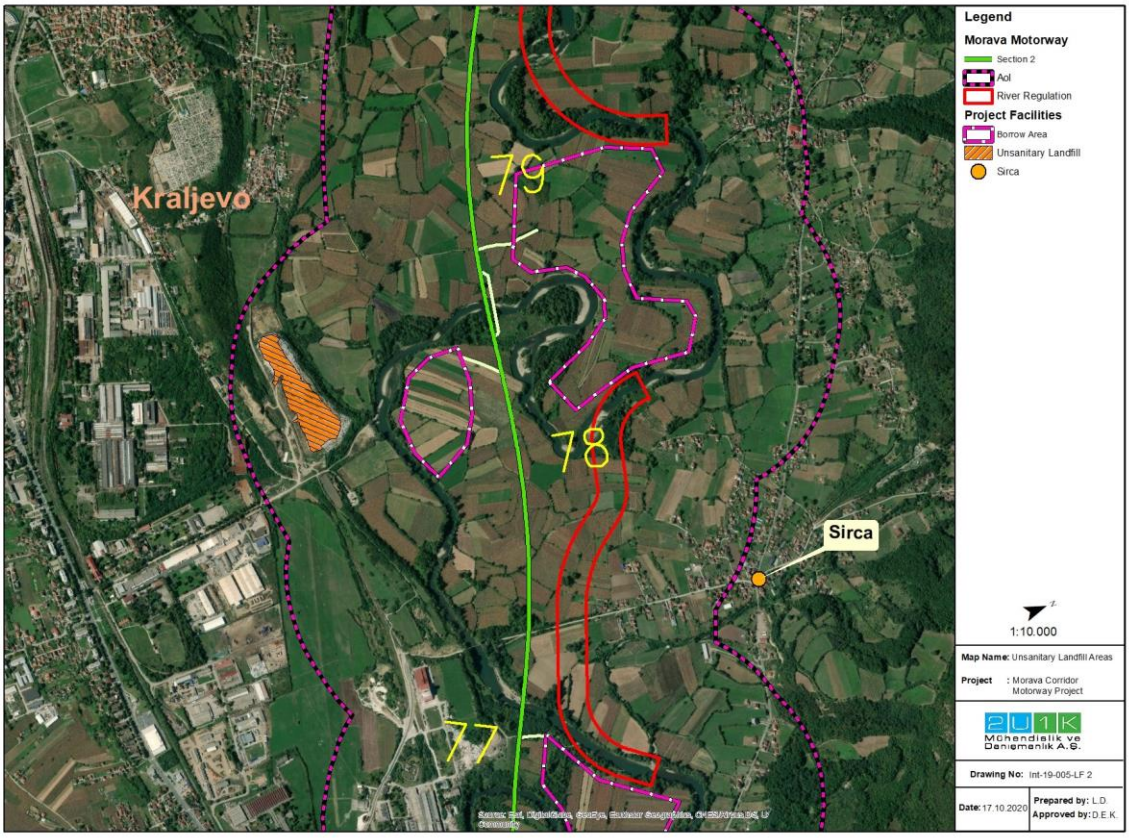


Figure 5-78. Unsanitary Landfill Located in Kraljevo Municipality

[11] Details of the ESIA Disclosure Meeting can be obtained from the Stakeholder Engagement Plan.

The location of the unsanitary landfill was assessed by the 2U1K after the Disclosure Meeting in Ćićevac to obtain exact coordinates of the landfill and observe potential impacts could arise from the landfill. To conclude, the unsanitary landill is outside of the AoI and expected to not cause any negative impacts to the Project or its facilities.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately 50 -200m^2. All of the locals were stated to be heated by wood. Last, the waste is dumped in a landfill in general. Further information and details for each affected settlements can be found in Table 5-188.

Table 5-188. Household conditions of each affected settlements of Kraljevo Municipality

Conditions		Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Condition of house	Better	0%	0%	0%	0%	8%	0%	0%	67%	0%	11%	12%
	Average	60%	50%	50%	50%	42%	100%	73%	33%	50%	42%	18%
	Worse	40%	50%	50%	50%	8%	0%	0%	0%	50%	47%	70%
Surface area	0-25m2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	25m^2 - 50 m^2	40%	0%	0%	40%	0%	0%	0%	0%	0%	5%	0%
	50 m^2-200 m^2	60%	50%	50%	60%	75%	100%	73%	100%	100%	47%	94%
	More than 200 m^2	0%	50%	50%	0%	25%	0%	27%	0%	0%	47%	6%
Ownership of the house	Owner	80%	100%	100%	100%	75%	100%	91%	67%	100%	84%	94%
	Rental	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%
	Occupier	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Other	20%	0%	0%	0%	25%	0%	9%	0%	0%	16%	6%
Water source of drinking water	Spring water	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	12%
	Well water	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Water tank	20%	0%	0%	0%	17%	50%	55%	33%	0%	16%	6%
	Water supply network	60%	100%	100%	100%	75%	50%	45%	67%	100%	84%	82%
Water source of the irrigation water	Spring water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%
	Well water	100%	0%	0%	100%	17%	25%	36%	33%	0%	37%	6%
	Water tank	0%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%
	Water supply network	0%	100%	100%	100%	83%	75%	64%%	67%	100%	63%	88%
Water source of the domestic water	Spring water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%
	Well water	100%	0%	0%	100%	17%	25%	36%	33%	0%	37%	6%
	Water tank	0%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%
	Water supply network	0%	100%	100%	100%	83%	75%	64%%	67%	100%	63%	88%
Electricity in the house	Yes	40%	10%	50%	0%	25%	25%	36%	33%	0%	16%	6%
	No	60%	90%	50%	0%	75%	75%	64%	77%	100%	84%	94%

Conditions		Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal
Electricity cut offs	Rarely	100%	100%	100%	100%	84%	100%	99%	0%	100%	5%	100%
	No cut/offs	0%	0%	0%	0%	8%	0%	1%	0%	0%	95%	0%
	Once a week	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%
Toiler facilities	In the house	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Outside the house	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Toilet system	Other	0%	50%	0%	0%	1%	0%	0%	0%	0%	0%	0%
	Septic tank	100%	50%	50%	0%	99%	100%	100%	100%	0%	100%	100%
Heating source	Coal	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Electricity	0%	0%	0%	0%	45%	0%	0%	0%	0%	0%	0%
	Wood	100%	100%	100%	0%	55%	100%	100%	100%	100%	5%	0%
Waste management	Landfill	100%	100%	50%	100%	25%	100%	100%	0%	0%	47%	29%
	Other	0%	0%	50%	0%	75%	0%	0%	100%	100%	63%	71%

5.14.3.7.5 Section 2: Vrnjačka Banja Municipality

Services

The village heads of each affected settlement in Vrnjačka Banja Municipality were asked about the availability of services within their border of villages, Table 5-189 presents the type of services available in each affected village, respectively.

Table 5-189. Type of services available in each affected village of Vrnjačka Banja Municipality

Services	Yes/No						
	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Health centre/hospital	Yes	No	Yes	Yes	No	No	Yes
Gendarmerie / police station	No	No	No	Yes	No	No	No
Fire Brigade	No	No	No	No	No	No	No
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post office	Yes	Yes	Yes	Yes	No	No	No
Coffee shop	No	Yes	Yes	Yes	No	No	Yes
Restaurant	No	Yes	Yes	Yes	No	Yes	No
Touristic facilities (hotel, hostel, camp site)	No	No	No	No	No	No	No
Village room	No	No	No	No	No	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	Yes	No	Yes	No	No	No
Church	Yes	Yes	No	No	Yes	No	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No	No	No	No
Cooperative / Association	No	No	No	No	No	No	No
Public transportation (bus)	Yes	Yes	Yea	Yes	Yes	Yes	Yes

In case the services are not available in the villages, all of the locals stated to visit Vrnjačka Banja to obtain additional services.

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, drinking water source, irrigation water source, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Vrnjačka Banja Municipality is presented in Table 5-190.

Table 5-190. Available infrastructure services in affected villages of Vrnjačka Banja Municipality

Yes/No							
Services	**Vraneši**	**Vrnjci**	**Novo Selo**	**Podunavci**	**Ruđinci**	**Štulac**	**Gračac**
Electrical infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Domestic water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Irrigation water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sewer system	No	No	Yes	Yes	Yes	No	Yes
Heating source	No	No	No	No	No	No	No
Domestic solid waste collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asphalt road	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other	No	No	No	No	No	No	No

Furthermore, septic tanks are stated to be available septic tank in each household in villages of Vraneši, Vrnjci, Štulac and Gračac. As for heating, majority of the locals in villages are heated by wood. However, Gračac and Ruđinci are the villages where some households use electricity as a heating source. All villages are covered by landline, mobile and internet. Each village has one or two containers where waste is disposed of. Containers are emptied mostly once a week, and the waste ends up in heavy landfills.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately between 50 to 200 m^2. Majority of the locals are heated by wood 96%, but there are some households that use electricity 4%. Further information and details for each affected settlement can be found in Table 5-191.

Table 5-191. Household conditions of each affected settlements of Vrnjačka Banja Municipality

Conditions		**Vraneši**	**Vrnjci**	**Novo Selo**	**Podunavci**	**Ruđinci**	**Štulac**	**Gračac**
Condition of house	Better	4%	6%	6%	4%	8%	10%	0%
	Average	89%	87%	83%	96%	90%	85%	100%
	Worse	7%	7%	11%	0	2%	5%	0%
Surface area	0-25m^2	0%	0%	0%	0%	0%	0%	0%
	25m^2 - 50 m^2	0%	3%	2%	4%	10%	8%	0%
	50 m^2-200 m^2	93%	90%	89%	73%	86%	79%	80%
	More than 200 m^2	7%	7%	9%	23%	4%	13%	20%

Conditions		Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac
Ownership of the house	Owner	100%	100%	100%	100%	100%	100%	100%
	Rental	0%	0%	0%	0%	0%	0%	0%
	Occupier	0%	0%	0%	0%	0%	0%	0%
	Other	0%	0%	0%	0%	0%	0%	0%
Water source of drinking water	Spring water	33%	24%	92%	60%	63%	24%	20%
	Well water	0%	0%	0%	0%	0%	0%	0%
	Water supply network	67%	76%	8%	40%	37%	76%	80%
Water source of the irrigation water	Spring water	0%	0%	39%	0%	0%	0%	0%
	Well water	65%	90%	47%	42%	48%	90%	80%
	Water supply network	35%	10%	14%	58%	52%	10%	20%
Water source of the domestic water	Spring water	0%	0%	13%	18%	0%	0%	30%
	Well water	27%	11%	1%	2%	23%	46%	10%
	Water supply network	73%	89%	86%	80%	77%	54%	60%
Electricity in the house	Yes	100%	100%	100%	100%	100%	100%	100%
	No	0%	0%	0%	0%	0%	0%	0%
Electricity cut offs	Rarely	69%	73%	7%	64%	67%	54%	43%
	No cut/offs	31%	27%	93%	31%	33%	38%	57%
	Once a week	0%	0%	0%	5%	0%	8%	0%
Toiler facilities	In the house	100%	100%	100%	100%	100%	100%	100%
	Outside the house	0%	0%	0%	0%	0%	0%	0%
Toilet system	Sewer system	0%	0%	33%	38%	83%	0%	13%
	Septic tank	100%	100%	67%	62%	17%	100%	87%
Heating source	Electricity	0%	0%	0%	4%	0%	0%	23%
	Wood	100%	100%	100%	96%	100%	100%	77%
Waste management	Landfill	100%	100%	100%	100%	100%	100%	100%
	Other	0%	0%	0%	0%	0%	0%	0%

5.14.3.7.6 Section 2: Trstenik Municipality

Services

The village heads of each affected settlement in Trstenik Municipality were asked about the availability of services within their border of villages, Table 5-192 presents the type of services available in each affected village, respectively.

Table 5-192. Type of services available in each affected village of Trstenik Municipality

Services	Yes/No						
	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Health centre/hospital	No	Yes	No	Yes	No	No	No
Gendarmerie / police station	No	Yes	No	No	No	No	No
Fire Brigade	No	No	No	No	No	No	No
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post office	No	Yes	No	Yes	No	No	No
Coffee shop	No	Yes	No	Yes	No	No	Yes
Restaurant	No	Yes	No	No	No	Yes	No
Touristic facilities (hotel, hostel, camp site)	No	No	No	No	No	No	No
Village room	No	No	No	No	No	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	Yes	No	Yes	No	No	No
Church	No	Yes	No	Yes	Yes	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No	No	No	No
Cooperative / Association	No	No	No	Yes	No	No	No
Public transportation (bus)	Yes	Yes	Yea	Yes	Yes	Yes	Yes

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, drinking water source, irrigation water source, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Trstenik Municipality is presented in Table 5-193.

Table 5-193. Available infrastructure services in affected villages of Trstenik Municipality

Yes/No							
Type of Infrastructure	**Bogdanje**	**Velika Drenova**	**Lozna**	**Medveđa**	**Selište**	**Grabovac**	**Ugljarevo**
Electrical infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Domestic water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Irrigation water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sewer system	No	No	No	No	No	No	No
Heating source	No	No	No	No	No	No	No
Domestic solid waste collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asphalt road	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Furthermore, septic tanks are stated to be available in each household, and several households in villages of Bogdanje also have septic tanks and a toilet outside the house.

As for heating, majority of the locals in villages is heated by wood. However, the village of Medveđa, where 7% of residence use electricity, and 6% of residence use coal as a heating source. All villages are covered by landline, mobile and internet.

Each village has one or two containers where waste is disposed of. Containers are emptied mostly once a week, and the waste ends up in wild waste dump area.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately between 50 to 200 m^2. Almost all of the locals stated to be heated by wood. Further information and details for each affected settlement can be found in Table 5-194.

Table 5-194. Household conditions of each affected settlements of Trstenik Municipality

Conditions		Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo
Condition of house	Better	7%	11%	0%	12.5%	0%	33%	25%
	Average	80%	74%	100%	86%	100%	67%	75%
	Worse	13%	14%	0%	1.5%	0%	0%	0%
Surface area	0-25m2	0%	0%	0%	0%	0%	0%	0%
	25m^2 - 50 m^2	0%	11%	0%	7%	17%	0%	12.5%
	50 m^2-200 m^2	73%	89%	100%	85%	83%	100%	87.5%
	More than 200 m^2	27%	0%	0%	8%	0%	0%	0%
Owernship of the house	Owner	100%	100%	100%	100%	100%	100%	100%
	Rental	0%	0%	0%	0%	0%	0%	0%
	Occupier	0%	0%	0%	0%	0%	0%	0%
	Other	0%	0%	0%	0%	0%	0%	0%
Water source of drinking water	Spring water	53%	0%	42%	0%	0%	0%	12.5%
	Well water	0%	34%	58%	37.5%	25%	0%	37.5%
	Water tank	13%	0%	0%	0%	0%	0%	0%
	Water supply network	33%	66%	-	62.5%	75%	100%	50%
Water source of the irrigation water	Spring water	53%	0%	0%	0%	0%	0%	0%
	Well water	13%	46%	100%	82%	42%	33%	25%
	Water tank	13%	0%	0%	0%	0%	0%	0%
	Water supply network	20%	54%	0%	18%	33%	67%	75%
Water source of the domestic water	Spring water	53%	0%	25%	0%	0%	0%	0%
	Well water	0%	46%	75%	37.5%	25%	0%	0%
	Water tank	13%	0%	0%	0%	0%	0%	0%
	Water supply network	13%	54%	0%	62.5%	75%	100%	100%
Electricity in the house	Yes	100%	100%	100%	100%	100%	100%	100%
	No	0%	0%	0%	0%	0%	0%	0%
Electricity cut offs	Rarely	100%	86%	83%	29%	67%	33%	37.5%
	No cut/offs	0%	14%	17%	71%	0%	67%	62.5%
	Once a week	0%	0%	0%	0%	33%	0%	0%
Toiler facilities	In the house	87%	100%	100%	100%	100%	100%	100%
	Outside the house	13%	0%	0%	0%	0%	0%	0%
Toilet system	Other	13%	0%	0%	0%	0%	0%	0%
	Septic tank	87%	100%	100%	100%	100%	100%	100%
Heating source	Coal	0%	0%	0%	6%	0%	0%	0%
	Electricity	0%	0%	0%	7%	0%	0%	0%
	Wood	100%	100%	100%	87%	100%	100%	100%
Waste management	Landfill	100%	89%	100%	100%	100%	100%	100%
	Other	0%	11%	0%	0%	0%	0%	0%

5.14.3.7.7 Section 3: Čačak Municipality

Services

The village heads in Čačak Municipality were asked about the availability of services within their border of villages, Table 5-195 presents the type of services available in each affected village, respectively.

Table 5-195. Type of services available in each affected village of Čačak Municipality

Services	Yes/No									
	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Health centre/hospital	No	Yes	No	Yes	No	No	No	No	No	No
Gendarmerie / police station	No	No	No	Yes	No	No	No	No	No	No
Fire Brigade	No	No	No	No	No	No	No	No	No	No
Stores (grocery store, butcher, bakery etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Post office	No	Yes	No	Yes	Yes	No	No	No	No	No
Coffee shop	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Restaurant	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No
Touristic facilities (hotel, hostel, camp site)	No	No	No	Yes	Yes	No	No	No	Yes	No
Village room	No	No	No	No	No	No	No	No	No	No
Financial (eg banks, ATMs, foreign exchange bureaus)	No	No	No	Yes	Yes	No	No	No	Yes	No
Church	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Any other praying buildings? (Mosque or synagogue, please specify)	No	No	No	No	No	No	No	No	No	No
Cooperative / Association	No	No	No	Yes	Yes	Yes	No	No	Yes	No
Public transportation (bus)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

As can be seen from the Table above, the village of Mrčajevci has the highest number of services. For services that do not exist in any of the villages, the village heads stated that Čačak is the common location to visit to inquire any additional services.

Infrastructure

The village heads were also asked about the infrastructure conditions of their settlement, it was observed that electricity, drinking water source, domestic water source, irrigation water source, solid waste collections, communication land lines and asphalt roads are available in all villages. Further information on available infrastructure services in affected villages of Čačak Municipality is presented in Table 5-196.

Table 5-196. Available infrastructure services in affected villages of Čačak Municipality

Type of infrastructure	Yes/No									
	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Electrical infrastructure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drinking water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Domestic water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Irrigation water source	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sewer system	No	No	No	Yes	Yes	No	No	No	Yes	No
Heating source	No	No	No	No	No	No	No	No	No	No
Domestic solid waste collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Communication Landline	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mobile Phone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asphalt road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Furthermore, according to village heads, there are septic tank in each household in villages of Baluga, Donja Gorevnica, Katrga, Rakova, Sokolići, Stančići and Goričani. The villages of Mrčajevci, Preljina and Konjevići have a sewer system but do not cover all houses.

As for heating, 100% of the population in villages is heated by wood. However, in villages of Mrčajevci and Preljina, some of residence stated to use coal as a heating source.

All villages are covered by landline, mobile and internet. As for the asphalt roads in all ten villages, only the most used streets are asphalted. Also, it was observed that overall sewage systems was insufficient.

For waste, each affected village have one or two containers where waste is disposed of. Containers are emptied mostly once a week, and the waste ends up in heavy landfills. Electricity infrastructure present in all ten villages, during the household surveys, the residents of the settlements were not satisfied with the electricity services. In villages of Goričani, Donja Gorevnica and Katrga stated to experience frequent power outage.

Household Conditions

In general, majority of respondents of the Household Surveys live on a house sized approximately 50 -200 m^2. Mostly, drinking, irrigation and water sources are stated to be from water supply network, well water. All of the locals were stated to be heated by wood. Last, the waste is dumped in a landfill in general. Further information and details for each affected settlement can be found in Table 5-197.

Table 5-197. Household conditions of each affected settlements of Čačak Municipality

Conditions		Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Condition of house	Better	0%	13%	8%	9%	11%	0%	17%	0%	0%	5%
	Average	92%	74%	93%	87%	85%	90%	83%	100%	85%	86%
	Worse	8%	13%	-	4%	4%	10%	0%	0%	15%	9%
Surface area	0-25 m^2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	25m^2 - 50 m^2	17%	7%	14%	11%	14%	18%	17%	0%	8%	14%
	50 m^2-200 m^2	83%	93%	86%	84%	78%	82%	83%	100%	92%	82%
	More than 200 m^2	0%	0%	0%	5%	8%	0%	0%	0%	0%	4%
Owernship of the house	Owner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Rental	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Occupier	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Water source of drinking water	Spring water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Well water	0%	27%	11%	2%	13%	14%	17%	0%	15%	4%
	Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	82%
	Water supply network	100%	73%	79%	98%	87%	86%	83%	100%	85%	14%
Water source of the irrigation water	Spring water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Well water	58%	20%	64%	91%	96%	90%	25%	100%	61%	77%
	River	33%	80%	29%	2%	0%	0%	75%	0%	39%	18%
	Water supply network	9%	0%	7%	7%	4%	10%	0%	0%	0%	5%
Water source of the domestic water	Spring water	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Well water	0%	27%	11%	2%	13%	14%	17%	0%	15%	4%
	Water tank	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Water supply network	100%	73%	79%	98%	87%	86%	83%	100%	85%	96%

Conditions		Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani
Electricity in the house	Yes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	No	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Electricity cut offs	Rarely	84%	20%	29%	40%	74%	86%	100%	100%	78%	0%
	No cut/offs	8%	0%	0%	0%	16%	14%	0%	0%	22%	0%
	Almost always	0%	0%	0%	0%	0%	0%	0%	0%	0%	64%
	Once a week	8%	80%	71%	60%	10%	0%	0%	0%	0%	36%
Toiler facilities	In the house	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Outside the house	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Toilet system	Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Sewer system	0%	0%	0%	87%	91%	0%	0%	0%	61%	0%
	Septic tank	100%	100%	100%	13%	9%	100%	100%	100%	39%	100%
Heating source	Coal	0%	0%	0%	4%	6%	0%	0%	0%	0%	0%
	Electricity	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Wood	100%	100%	100%	96%	94%	100%	100%	100%	100%	100%
Waste management	Landfill	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

5.14.3.7.8 Sensitive Receptors

From the baseline studies, it was observed that the existing infrastructure are not sufficient especially waste management system system, sewage system, conditions of the local roads and the capacity of the electricity system. Considering the heavy traffic load expected to be caoused during the construction activities all villages in the social AoI are highly sensitive. Also, labour influx may cause weight on the existing insufficient infrastructures of the affected settlements.

5.14.3.8 Land Use

5.14.3.8.1 Section 1: Ćićevac Municipality

Table 5-198 presents land use information derived on each affected village of the Ćićevac Municipality.

Table 5-198. Land use of villages located in Ćićevac Municipality

Village	Land Use
Grad Stalać	The average size is 3 ha, and they use the land without irrigation for agriculture.
Mrzenica	The land is used for agriculture. The average size of land is 4 ha. The type of land is 100% dry agriculture.
Pojate	The land is used for agriculture. The average size of land is 3 ha. The type of land is 58.3% irrigated land and 41.7% dry agriculture.
Stalać	The average size of the land is 1.6 ha. The type of land is 60% irrigated land and 40% dry agriculture.

Furthermore, in Stalac village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.2 Section 1: Kruševac Municipality

Table 5-199 presents land use information derived on each affected village of the Kruševac Municipality.

Table 5-199. Land use of villages located in Kruševac Municipality

Village	Land Use
Bele-Vode	The average size of the land is 3ha and the type of land is 100% dry agriculture and it is used for agriculture.
Citluk	The average size is 4 ha and the type of land is 100% dry agriculture land. The agricultural land is mainly used for agricultural products by the elder households.
Bivolje	The average land size is 3ha and it is dry land and used for agriculture.
Jasika	The average land size 2ha. It is dry land and used for agriculture.
Kosevi	The average land size is 3ha and it is dry land used for agriculture.
Kukljin	Most of the villagers use the land for agriculture, 2% stated that it has pastures and one respondent said it was land in a commercial zone. Some respondents lease land, but most use land for agriculture
Makrenesi	The average land size is 2ha, 50% is irrigated land and land without irrigation. Also, used as a greenhouse or for agriculture.

Furthermore, in Jasika village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.3 Section 1: Varvarin Municipality

Table 5-200 presents land use information derived on each affected village of the Varvarin Municipality.

Table 5-200. Land use of villages located in Varvarin Municipality

Village	Land Use
Bošnjane	The average size is 3ha and type of land is 20% dry agriculture and 80% irrigated land.
Maskare	The average size is 3ha and type of land is 40% dry agriculture and 60% irrigated land.

Furthermore, in Maskare village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.4 Section 2: Kraljevo Municipality

Table 5-201 presents land use information derived on each affected village of the Kraljevo Municipality.

Table 5-201. Land use of villages located in Kraljevo Banja Municipality

Village	Land Use
Adrani	The average size of the land is 4ha. The type of land is 60% dry agriculture, 40% irrigated land. It is used for agriculture.
Vrba	The average size of the land is 4ha. The type of land is 100% dry agriculture. It is used for agriculture
Grdica	The average size of the land is 4ha. The type of land is 100% dry agriculture. It is used for agriculture
Zaklopača	The average size of the land is 4ha. The type of land is 100% dry agriculture. It is used for agriculture
Miločaj	The average size of the land is 4ha. The type of land is 50% dry agriculture, 50% irrigated land. It is used for agriculture
Obrva	The average size of the land is 3ha. The type of land is 100% dry agriculture. It is used for agriculture.
Popovići	The average size of the land is 4ha. The type of land is 100% dry agriculture. It is used for agriculture.
Ratina	The average size of the land is 2ha. The type of land is 100% dry agriculture. It is used for agriculture.
Sirča	The average size of the land is 2ha. The type of land is 100% dry agriculture. It is used for agriculture.
Šumarice	The average size of the land is 1ha. The type of land is 100% dry agriculture. It is used for agriculture.
Stubal	The average size of the land is 2ha. The type of land is 80% dry agriculture, 20% irrigated land. It is used for agriculture.

Furthermore, in Grdica village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.5 Section 2: Vrnjačka Banja Municipality

Table 5-202 presents land use information derived on each affected village of the Vrnjačka Banja Municipality.

Table 5-202. Land use of villages located in Vrnjačka Banja Municipality

Village	Land Use
Vraneši	The average size of the land is 2.3 ha. The type of land is 41% dry agriculture, 59% irrigated land. It is used for agriculture.
Vrnjci	The land is used for agriculture. The average size of the land is 0.9 ha. The type of land is 31 % dry agriculture, 69% irrigated land. It is used for agriculture.
Novo Selo	The land is used for agriculture. The average size of land is 1.7 ha. The type of land is 65% irrigated land and 35% dry agriculture.
Podunavci	The land is used for agriculture. The average size of the land is 1.3 ha. The type of land is 75% irrigated land and 25% dry agriculture.
Ruđinci	The average size of the land is 0.8 ha. The type of land is 83% irrigated land and 17% dry agriculture.
Štulac	The average size of the land is 2.1 ha. The type of land is 57% irrigated land and 43% dry agriculture.
Grača	The land is used for agriculture. The average size of the land is 1.7 ha. The type of land is 75% irrigated land and 25% dry agriculture.

Furthermore, in Rudinci village it was observed to have the most number of households whom have size of the land less than 3 ha.

5.14.3.8.6 Section 2: Trstenik Municipality

Table 5-203 presents land use information derived on each affected village of the Trstenik Municipality.

Table 5-203. Land use of villages located in Trstenik Banja Municipality

Village	Land Use
Bogdanje	The average size of the land is 4ha. The type of land is 60% dry agriculture, 40% irrigated land. It is used for agriculture.
Velika Drenova	A few respondents said that they do not have land except a plot of land where is house. The land is used for agriculture. The average size of the land is 5.2 ha. The type of land is 42.4 % dry agriculture, 57.6% irrigated land. It is used for agriculture
Lozna	The land is used for agriculture. The average size of land is 1.2ha. The type of land is 58.3% irrigated land and 41.7% dry agriculture.
Medveđa	The land is used for agriculture. The average size of the land is 1.6ha. The type of land is 83.6% irrigated land and 16.4% dry agriculture.
Selište	The land is used for agriculture. The average size of land is 2.5ha. The type of land is 66.7% irrigated land and 33.3% dry agriculture.
Grabovac	The average size of land is 2.6ha. The type of land is 66.7% irrigated land and 33.3% dry agriculture.
Ugljarevo	The average size of land is 3.5ha. The type of land is 62.5% irrigated land and 37.5% dry agriculture.

Furthermore, in Lozna village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.7 Section 3: Čačak Municipality

Table 5-204 presents land use information derived on each affected village of the Čačak Municipality.

Table 5-204. Land use of villages located in Čačak Municipality

Village	Land Use
Baluga	The average size of the land is 1.6 ha. The type of land is 33.3 % dry agriculture, 66.7 % irrigated land, used for agriculture.
Donja Gorevnica	The majority land is used for agriculture in the village. The average size of the land is 4.3 ha. The type of land is 26.7 % dry agriculture, 73.3 % irrigated land, used for agriculture.
Katrga	The land is used for agriculture. The average size of land is 2.1 ha. The type of land is 71.4 % irrigated land and 28.6 % dry agriculture.
Mrčajevci	The land is used for agriculture. The average size of the land is 2.2 ha. The type of land is 66.7% irrigated land and 33.3 % dry agriculture.
Preljina	The land is used for agriculture. The average size of land is 2.4 ha. The type of land is 74.5% irrigated land and 25.5 % dry agriculture.
Rakova	The land is used for agriculture. The average size of land is 1.8 ha. The type of land is 61.9% irrigated land and 38.1% dry agriculture.
Sokolići	The average size of land is 3.1 ha. The type of land is 60% irrigated land and 40% dry agriculture.
Stančići	The land is used for agriculture. The average size of the land is 5.5 ha. The type of land 100% irrigated land. It is used for agriculture.
Goričani	The land is used for agriculture. The average size of land is 3.5 ha. The type of land is 77.3% irrigated land and 22.7% dry agriculture
Konjevići	The land is used for agriculture. The average size of land is 2.7 ha. The type of land is 72.7% irrigated land and 27.3% dry agriculture.

Furthermore, in Katgra village it was observed to have the greatest number of households whom have size of the land less than 3 ha.

5.14.3.8.8 Sensitive Receptors

The impact source on the land use will be the land acquitition of the Project which may cause physicial and economic displacement. Highly sensitive receptors are considered as;

- PAPs will have access problems to their land due to construction of the Project;
- PAPs that may become landless;
- PAPS whom will lose income after the loss of agricultural land;
- Agricultural workers (including seasonal agricultural workers);
- Agricultural enterprices;
- Local businesses/shops; and
- PAPs who will be resettled.

5.14.3.9 Project Information Level

Project Information Level has been asked through CLSs and HHSs. This Chapter presents the current Project information level of the local communities.

It was stated that the Project was heard by the public in all settlements. Television is the primary source of information for the public and the second source of information is stated as radio and the internet. Village heads stated that their knowledge of the Project is not sufficient, and they would like to be informed in more detail about the following issues:

- Employment Opportunities;
- The Proposed Motorway Route Alignment;
- Construction Period;
- Operation Period;
- Compensation; and
- Expropriation.

5.14.3.9.1 Project Information Level of the Community

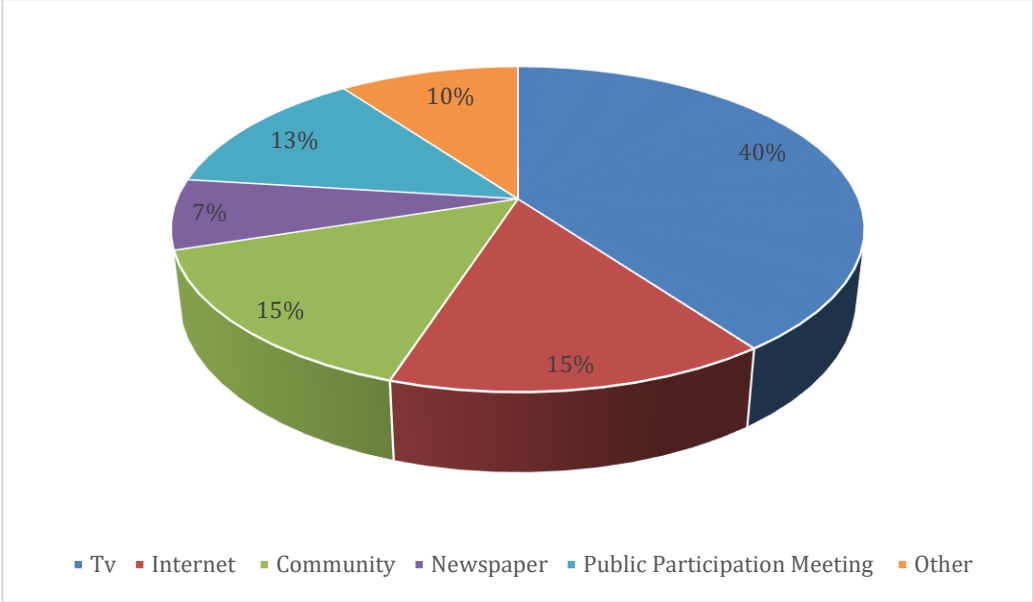
According to the outputs of the HHS, 100% of the participants are stated that heard the Project. The main information channel of the villagers is TV, radio and the community.

The other information tools are newspapers, internet and other tools. All participants agreed that the information level on the Project is insufficient, and it is recommended to use media more frequently to raise the information level of the public.

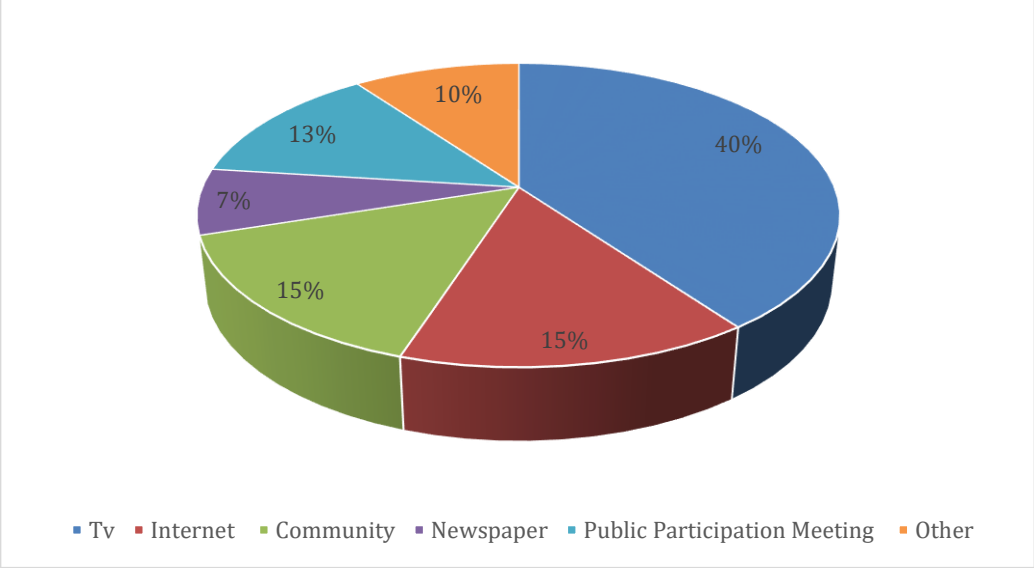
As a source of information, TV is the most widely used channel in all villages with a value ranging from 35% to 53%. It is seen that that the community members are the second source of information with a value ranging between 12% and 27%. The main information tools according to the Municipalities are given below.

SECTION-1

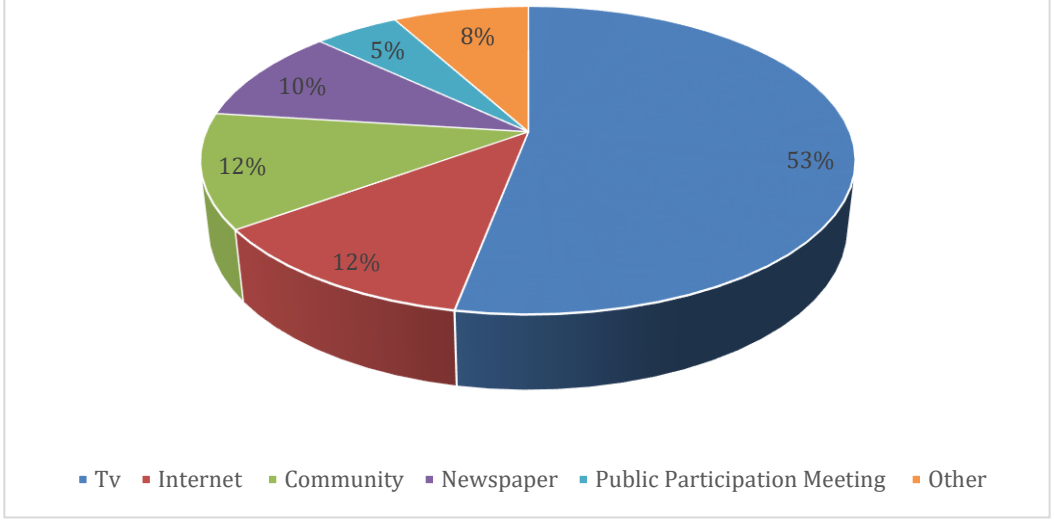
Ćićevac



Kruševac

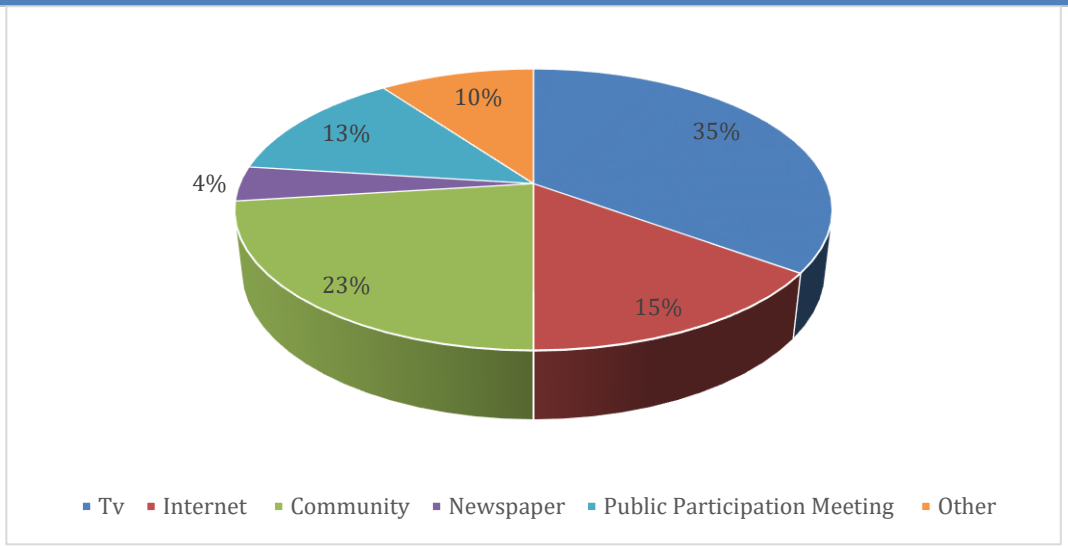


Varvarin

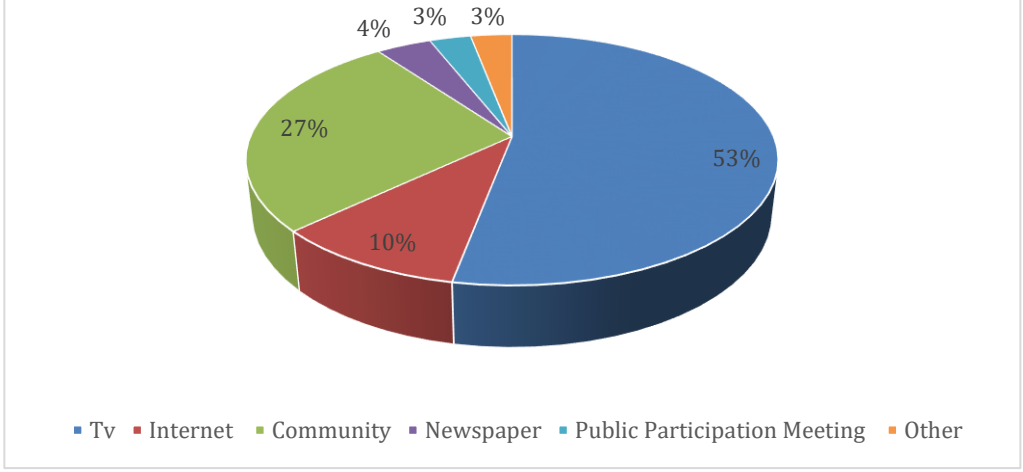


SECTION-2

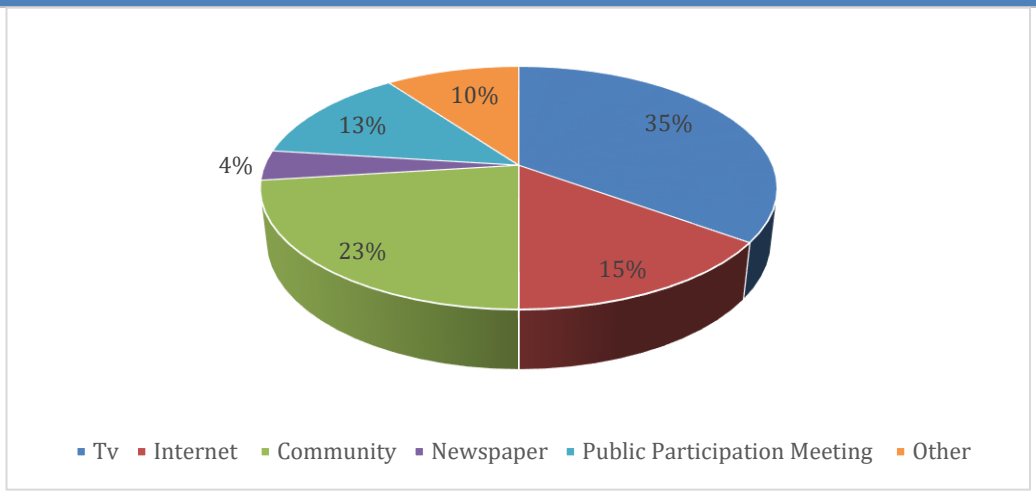
Trestenik



Vrnjačka Banja



Kraljevo



SECTION-3

Čačak

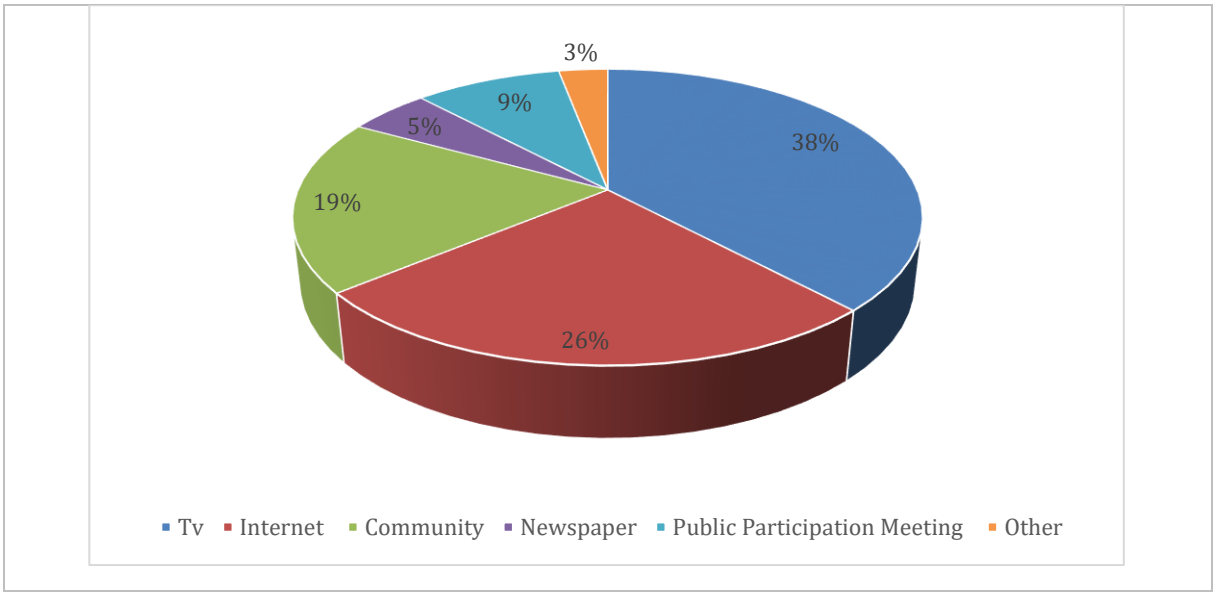


Figure 5-79. The main information tools of the Project Affected People

5.14.3.9.2 Sensitive Receptors

It has been observed that majority of the PAPs do not have indepth information about the Project activities; including; employment opportunities, the Proposed Motorway Route alignment, construction period, operation period, compensation and expropriation. Therefore, all PAPs are considered highly sensitive in terms of information disclosure.

5.14.3.10 Vulnerability

Vulnerable groups refer to people who, by virtue of; gender identity, sexual orientation, religion, ethnicity, indigenous status, age, disability, economic disadvantage or social status. They can be affected by project impacts than others and who may be limited in their ability to claim or take advantage of project benefits, education, employment, and Disability, heavy chronic disease or old age.

In the Project Area, the likelihood and cause of vulnerability for various stakeholders will be assessed during the ESIA consultation phase. Stakeholder groups that are potentially vulnerable are in the AoI was determined according to the household's: asset ownership, financial capacity, income

The financial capacity parameters and human resource parameters presented in Table 5-205

Table 5-205. Vulnerability parameters

Vulnerability Dimension	Questions in the HS Questionnaires	Vulnerability Indicators (Scores 0)
Assets	What is the size of land that your HH cultivates regularly?	Less than 3 ha
	Which vehicles does your HH own? (list of vehicles)	Less than 1 automobiles, tractors, trucks, vans or combines
Financial capacity	In the previous 12 months have you been in a situation that you're late with the payment of costs of utilities?	Yes, 2 or more times
	If your household would be in urgent need for 2000 euro (investment, cost) how would you get it?	Household savings less than 2000 euro
	HH members' sources of income	50% or less adult members having income outside agriculture
Human resources	HH members' level of education	50% or less of adult HH members has more than elementary school completed
	HH members' employment	50% or less of household members in active age has a job with income
	Disability, heavy chronic disease or old age	A person with disability or chronic disease that obstructs normal daily functioning More than 50% of HH members older than 65

After the determination of the vulnerable groups within the villages a scoring approach was applied to show the densitiy of the eack groups.

- **Ranking 0:** Represents the population percentage 25% and less within the village
- **Ranking 1:** Represents the population percentage between 26% and 50%.
- **Ranking 2:** Represents the population percentage between 51% and 75%.
- **Ranking 3:** Represents the population percentage between 76% and 100%.

After assessing the communities according to the percentage of the population in the parameters and the scores above, scores were added to understand the vulnerability level of the villages considering the different vulnerability indicators.

- a score of 0-3 indicated negligible vulnerability
- a score of 4-8 implied low vulnerability
- a score of 9-12 implied moderate vulnerability
- a score of 13-24 meant the village has a high degree of vulnerability

5.14.3.10.1 Section 1: Ćićevac Municipality

When the villages located in the Ćićevac Municipality are compared according to the different vulnerability categories, it is seen that the Stalac village has the population density. The main vulnerability indicator based on the financial indicators and mora 75% of the households in the interviewed villages cannot make saving. Almost 50% of household members of the households in the villages except Mrzenica village are unemployed. Grad Stalać is the only

village that has etnic minority. Table 5-206 shows the population of the vulnerable groups according to villages and the scores of the vulnerability according to population density.

Table 5-206. Vulnerable groups in Ćićevac Municipality

	Grad Stalać	Mrzenica	Pojate	Stalać	Total Score According to Vulnerability
Size of the land - less than 3 ha	25%	50%	45%	63%	
Score	0	1	1	2	4
Vehicles - less than 1 automobiles	75%	33%	57%	75%	
Score	2	1	2	2	7
Late with the payment (2 or more times)	13%	17%	63%	25%	
Score	0	0	2	0	2
HH saving less than 2000e	88%	83%	75%	88%	
Score	3	3	2	3	11
50% or less adult members have income source other than agriculture	38%	50%	25%	88%	
Score	1	1	0	3	5
50% or less of adult HH members has more than elementary school	63%	50%	88%	75%	
Score	2	1	3	2	8
50% or less of household members in active age has a job with income	63%	50%	88%	63%	
Score	2	1	3	2	9
More than 50% of HH members older than 65, disabled or have chronic disease	50%	17%	50%	50%	
Score	1	0	1	1	3
Ethnic Minority	1%	0%	0%	0%	0
Score	0	0	0	0	0
TOTAL Vulnerability Score of the Village	**11**	**8**	**11**	**15**	

5.14.3.10.2 Section 1: Kruševac Municipality

When the villages located in the borders of Kruševac Municipality compared, it is seen that the Citluk village has the all vulnerable categories. It is seen that the main source for the vulnerability is economy. The most populated group among all villages are the unemployed and the low educated groups. There was no ethnic minority in the villages. The number of people with chronic illnesses, people with disabilities or over 65 years of age and the number of households with having difficulty payments are quite low compared to other vulnerability categories. The percentage of vulnerable groups in Kruševac Municipality is presented in Table 5-207.

Table 5-207. Vulnerable groups in Kruševac Municipality

	Čitluk	Bela Voda	Bivolje	Jasika	Koševi	Kukljin	Makrešane	Total Score According to Vulnerability
Size of the land - less than 3 ha	35%	37%	36%	80%	70%	75%	29%	
Score	1	1	1	3	2	2	1	11
Vehicles - less than 1 automobiles	32%	46%	45%	60%	50%	88%	29%	
Score	1	1	1	2	1	3	1	10
Late with the payment (2 or more times)	15%	10%	18%	20%	0%	38%	29%	
Score	0	0	0	0	0	1	1	2
HH saving less than 2000e	60%	87%	27%	40%	60%	13%	57%	
Score	2	3	1	1	2	0	2	11
50% or less adult members have income source other than agriculture	87%	10%	45%	80%	50%	75%	57%	
Score	3	0	1	3	1	2	2	12
50% or less of adult HH members has more than elementary school	99%	96%	64%	60%	50%	50%	57%	
Score	3	3	2	1	1	1	2	13
50% or less of household members in active age has a job with income	95%	76%	36%	80%	50%	75%	14%	
Score	3	3	1	3	1	2	0	13
More than 50% of HH members older than 65, disabled or have chronic disease	30%	32%	27%	0%	10%	13%	29%	
Score	1	1	1	0	0	0	1	4
TOTAL Vulnerability Score of the Village	14	12	8	13	8	11	10	

5.14.3.10.3 Section 1: Varvarin Municipality

It is seen that the village of Maskare has the more vulnerable groups when it compared with the village of Bosnjane. The most populated vulnerable category is the people who cannot make saving in two villages. Maskare also a high population in terms of age and chronic diseases. Table 5-208 summarizes the rates for vulnerable groups.

Table 5-208. Vulnerable groups in Varvarin Municipality

	Bošnjane	Maskare	Total Score According to Vulnerability
Size of the land - less than 3 ha	38%	33%	
Score	1	1	2
Vehicles - less than 1 automobiles...	63%	83%	
Score	2	3	5
Late with the payment (2 or more times)	13%	33%	
Score	0	1	1
HH saving less than 2000e	38%	100%	
Score	1	3	4
50% or less adult members have income source other than agriculture	75%	67%	
Score	2	2	4
50% or less of adult HH members has more than elementary school	63%	33%	
Score	2	1	3
50% or less of household members in active age has a job with income	63%	67%	
Score	2	2	4
More than 50% of HH members older than 65, disabled or have chronic disease	25%	83%	
Score	0	2	2
TOTAL Vulnerability Score of the Village	10	15	

5.14.3.10.4 Section 2: Kraljevo Municipality

It has been observed that the Kraljevo Municipality has the less vulnerable population when it compared to other municipalities in the AoI. In Vrba, Grdica and Popovići villages, land per household is smaller than 3 hectares. It is seen that the livelihood sources related to agriculture in this Municipality are lower than the other Municipalities. Vrba is the most populous group among vulnerable groups in Kraljevo. Percentages of vulnerable groups belonging to each settlement are given in Table 5-209.

Table 5-209. Vulnerable groups in Kraljevo Municipality

	Adrani	Vrba	Grdica	Zaklopača	Miločaj	Obrva	Popovići	Ratina	Sirča	Šumarice	Stubal	Total Score
Size of the land - less than 3 ha	25%	83%	100%	0%	13%	25%	67%	30%	0%	25%	25%	
Score	0	3	3	0	0	0	2	1	0	0	0	9
Vehicles - less than 1	13%	33%	0%	0%	13%	25%	17%	10%	0%	50%	13%	
Score	0		0	0	0	0	0	0	0	1	0	1
Late with the payment (2 or more times)	13%	0%	0%	0%	0%	0%	17%	10%	0%	13%	0%	
Score	0	0	0	0	0	0	0	0	0	0	0	0
HH saving less than 2000e	25%	50%	0%	0%	25%	38%	67%	0%	0%	75%	38%	
Score	0	1	0	0	0	1	2	0	0	2	1	7
50% or less adult members have income source other than agriculture	50%	83%	0%	0%	13%	25%	33%	10%	0%	75%	38%	
Score	1	3	0	0	0	0	1	0	0	2	1	8
50% or less of adult HH members has more than elementary school	50%	33%	0%	0%	38%	25%	67%	20%	0%	10%	38%	
Score	1	1	0	0	1	0	2	0	0	0	2	7
50% or less of household members in active age has a job with income	50%	50%	0%	0%	38%	38%	17%	10%	0%	63%	38%	
Score	1	1	0	0	1	1	0	0	0	2	1	7
More than 50% of HH members older than 65, disabled or have chronic disease	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Score	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL Vulnerability Score of the Village	3	9	3	0	2	2	7	1	0	7	5	

5.14.3.10.5 Section 2: Vrnjačka Banja Municipality

According to the results of Household Surveys, it has been analyzed that most vulnerable groups resides in Ruđinci village within the borders of Vrnjačka Banja. The vulnerability in this Municipality based on the economy as in other settlements and is related to the limited asset ownership. A large proportion of the households interviewed in the villages of Vrnjačka Banja municipality have less than 3 hectares of land. The education rate is relatively higher than other municipalities. The number of people has no income other than agriculture was the highest in the village of Novo Selo. Table 5-210 summarizes the proportion of the vulnerable groups in Vrnjačka Banja Municipality.

Table 5-210. Vulnerable groups in Vrnjačka Banja Municipality

	Vraneši	Vrnjci	Novo Selo	Podunavci	Ruđinci	Štulac	Gračac	Total Score
Size of the land - less than 3 ha	69%	83%	74%	75%	91%	59%	63%	
Score	2	3	2	2	3	2	2	16
Vehicles - less than 1 automobiles.	27%	40%	21%	40%	54%	38%	33%	
Score	2	1	0	1	2	1	1	8
Late with the payment (2 or more times)	2%	6%	5%	0%	1%	0%	0%	
Score	0	0	0	0	0	0	0	0
HH saving less than 2000e	91%	77%	47%	69%	87%	69%	27%	
Score	3	2	1	2	3	2	1	14
50% or less adult members have income source other than agriculture	64%	11%	66%	62%	28%	33%	57%	
Score	2	0	2	2	1	1	2	10
50% or less of adult HH members has more than elementary school	20%	16%	23%	20%	29%	28%	30%	
Score	0	0	0	0	1	1	1	3
50% or less of household members in active age has a job with income	71%	33%	31%	49%	56%	36%	30%	
Score	2	1	1	1	2	1	1	9
More than 50% of HH members older than 65, disabled or have chronic disease	22%	16%	24%	13%	25%	21%	23%	
Score	0	0	0	0	0	0	0	0
TOTAL Vulnerability Score of the Village	11	7	6	8	12	8	8	

5.14.3.10.6 Section 2: Trstenik Municipality

Among the villages located in the municipality of Trestenik, it is seen that the village of Ugljarevo and Medveđa has the most populous groups in terms of vulnerability. The main vulnerability areas are land ownership and low education. Table 5-211 summarizes the proportion of the vulnerable groups in Trstenik Municipality.

Table 5-211. Vulnerable groups in Trstenik Municipality

	Bogdanje	Velika Drenova	Lozna	Medveđa	Selište	Grabovac	Ugljarevo	Total Score
Size of the land - less than 3 ha	60%	14%	100%	68%	100%	67%	80%	
Score	2	0	3	2	3	2	3	15
Vehicles - less than 1 automobiles.	53%	32%	17%	62.5%	42%	33%	37.5%	
Score	2	2	0	2	1	1	1	9
Late with the payment (2 or more times)	20%	20%	0%	0%	17%	33%	0%	
Score	0	0	0	0	0	1	0	1
HH saving less than 2000e	47%	26%	33%	71%	17%	67%	80%	
Score	1	1	1	2	0	2	3	3
50% or less adult members have income source other than agriculture	53%	23%	17%	54%	12.5%	67%	62.5%	
Score	2	0	0	2	0	2	2	8
50% or less of adult HH members has more than elementary school	60%	63%	17%	60%	62.5%	67%	80%	
Score	2	2	0	2	2	2	3	13
50% or less of household members in active age has a job with income	40%	37%	17%	60%	37.5%	67%	80%	
Score	1	1	0	2	1	2	3	3
More than 50% of HH members older than 65, disabled or have chronic disease	20%	11%	0%	24%	12.5%	33%	0%	
Score	0	0	0	0	0	1	0	1
TOTAL Vulnerability Score of the Village	10	6	3	12	7	13	15	

5.14.3.10.7 Section 3: Čačak Municipality

When the results of the household surveys were evaluated, it was seen that Preljina was the village with the highest number of vulnerable groups among the villages in Čačak Municipality. The reason for the vulnerability in this village is related to the limited assets ownership. When the whole municipality is assessed, it is seen that the majority of the villages has less than 3 hectares. Table 5-212 summarized the proportion of the vulnerable groups in Čačak Municipality.

Table 5-212. Vulnerable groups in Čačak Municipality

	Baluga	Donja Gorevnica	Katrga	Mrčajevci	Preljina	Rakova	Sokolići	Stančići	Konjevići	Goričani	Total Score
Size of the land - less than 3 ha	75%	46.7%	78.6%	62.2%	60%	71.4%	66.7%	50%	69.2%	63.6%	
Score	2	1	3	2	2	2	2	1	2	2	19
Vehicles - less than 1 automobiles...	33.3%	40%	28.6%	35.6%	54.5%	38.1%	33.3%	50%	38.5%	40.9%	
Score	1	1	1	1	2	1	1	1	1	1	11
Late with the payment (2 or more times)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Score	0	0	0	0	0	0	0	0	0	0	0
HH saving less than 2000e	33.3%	40%	85.7%	29.9%	80%	57.1%	50%	25%	76.9%	22.7%	
Score	1	1	3	1	3	2	1	0	3	0	15
50% or less adult members have income source other than agriculture	41.7%	33.3%	35.7%	42.2%	43.6%	38.1%	50%	50%	30.7%	54.5%	
Score	1	1	1	1	1	1	1	1	1	2	11
50% or less of adult HH members has more than elementary school	25%	20%	28.6%	31.1%	32.7%	28.6%	16.7%	50%	15.4%	27.3%	
Score	0	0	1	1	1	1	0	1	0	1	6
50% or less of household members in active age has a job with income	16.7%	26.7%	21.4%	26.7%	25.4%	23.8%	33.3%	0%	23.1%	18.2%	
Score	0	1	0	1	1	1	1	0	0	0	5
More than 50% of HH members older than 65, disabled or have chronic disease	25%	20%	21.4%	26.7%	25.4%	23.8%	16.7%	25%	15.4%	22.7%	
Score	0	0	0	1	1	1	0	0	0	0	3
TOTAL Vulnerability Score of the Village	5	5	9	8	11	9	6	4	7	6	

5.14.3.10.8 Sensitive Receptors

Each indentified vulnerable grops through baseline studies may experience different impacts of the Project. Therefore, all identified vulnerable groups are highly senstivie and required additional mitigation measures, in which adressed in the Chapter-6 Impact Assessment of this Report.

5.14.3.11 Human Rights Screening

Legal Approach

In terms of human rights in the Serbian Constitution, Section II of the 2006 Constitution of Serbia, comprising human and minority rights and freedoms (Arts. 18–81), is divided into three parts: I. Fundamental Principles (Arts. 18–22), II. Human Rights and Freedoms (Arts. 23–74) and III. Rights of Persons Belonging to National Minorities (Arts. 75–81). Under the Constitution, provisions on human and minority rights shall be interpreted in accordance with the valid international standards and practices of international institutions monitoring their implementation (Art. 18(3)) and the courts shall rule pursuant to the Constitution, the law and20 other general enactments when so provided for by the law, generally recognized rules of international law and ratified international treaties (Art. 142).

All major universal human rights treaties are binding on Serbia[12]. Serbia in 2010 ratified the Protocol Additional to the Geneva Conventions of 12 August 1949 and relating to the Adoption of an Additional Distinctive Emblem (Protocol III), the Convention for the Safeguarding of the Intangible Cultural Heritage and the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine.

With a view to improving the state authorities' coordination in the process of drafting periodic reports for UN Committees and the Universal Periodic Reviews, the Government of the Republic of Serbia in December 2014 enacted a decision forming a Council for the Monitoring of the Implementation of Recommendations of United Nations Human Rights Mechanisms. In compliance with its treaty obligations, the Republic of Serbia submits periodic reports on the implementation of the ratified conventions to the relevant UN committees.

The European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR) was ratified by the State Union of Serbia and Montenegro (SaM) back in 2004. Serbian nationals may file cases with the European Court of Human Rights (ECtHR). The Convention guarantees specific rights and freedoms and prohibits unfair and harmful practices (Belgrade Centre for Human Rights, 2019).

[12] The International Covenant on Civil and Political Rights and its two Protocols, the International Covenant on Economic, Social and Cultural Rights, the International Convention on the Elimination of All Forms of Racial Discrimination, the International Convention on the Elimination of Discrimination against Women and its Protocol, the Convention on the Rights of the Child and its two Protocols (on the involvement of children in armed conflict and on the sale of children, child prostitution and child pornography), the Convention on the Prevention and Punishment of the Crime of Genocide, the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment and its Protocol and the Convention on the Rights of Persons with Disabilities and its Protocol and Convention for the Protection of All Persons from Enforced Disappearance.

The Convention secures:

- the right to life (Article 2)
- freedom from torture (Article 3)
- freedom from slavery (Article 4)
- the right to liberty (Article 5)
- the right to a fair trial (Article 6)
- the right not to be punished for something that wasn't against the law at the time (Article 7)
- the right to respect for family and private life (Article 8)
- freedom of thought, conscience and religion (Article 9)
- freedom of expression (Article 10)
- freedom of assembly (Article 11)
- the right to marry and start a family (Article 12)
- the right not to be discriminated against in respect of these rights (Article 14)
- the right to protection of property (Protocol 1, Article 1)
- the right to education (Protocol 1, Article 2)
- the right to participate in free elections (Protocol 1, Article 3)
- the abolition of the death penalty (Protocol 13) (European Court of Human Rights and Council of Europe, 1994)

Serbia is a member of International Labour Organization since November, 2000. Serbia ratified 77 ILO Conventions; including Fundamental, Governance and Technical Conventions. The eight fundamental conventions ratified by Serbia are;

1. Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
2. Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
3. Forced Labour Convention, 1930 (No. 29) (and its 2014 Protocol)
4. Abolition of Forced Labour Convention, 1957 (No. 105)
5. Minimum Age Convention, 1973 (No. 138)
6. Worst Forms of Child Labour Convention, 1999 (No. 182)
7. Equal Remuneration Convention, 1951 (No. 100)
8. Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

Human Development Index

The main premise of the human development approach is that expanding peoples' freedoms is both the main aim of, and the principal means for sustainable development. Serbia's Human Development Index (HDI) value for 2018 is 0.799— which put the country in the high human development category— positioning it at 63 out of 189 countries and territories. Serbia's 2018 HDI of 0.799 is above the average of 0.750 for countries in the high human

development group and above the average of 0.779 for countries in Europe and Central Asia (UNDP).

Serbia's human development indicators and access to basic services shows that Serbia performs better on the Human Development Index than other countries with similar income levels; including with respect to school enrollment rates, life expectancy, and infant and maternal mortality rates.

Human Rights Screening

Topic	Legal Framework	Latest Conditions (2019)
Cultural Events	The Constitution of Serbia states that Serbia is a secular state and prohibits the establishment of a state religion (Art. 11), regulates the issue of individual religious freedoms and freedom of thought and explicitly guarantees the right to stand by and change one's religion or belief and the right to manifest one's religion in religious worship, observance, practice and teaching and to manifest religious beliefs in private or public (Art. 43). The freedom of manifesting one's religion or beliefs is not subject to any restrictions, which means that the freedom of thought and religious and other beliefs is absolutely protected. Furthermore, the Law on the Prohibition of Discrimination (2009) states that "All persons shall be equal and shall enjoy equal status and equal legal protection regardless of personal characteristics" (Article 4). Along with the formulation of the general prohibition of discrimination, the basis for discrimination and circle of persons who enjoy protection, the Law on the Prohibition of Discrimination is harmonized with the general documents of ILO and the EU in the area of labor and employment. Last, the Act on Churches and Religious Communities (2006), guarantees the equality of all religious communities before the law (Article 6)	There were no government restrictions on academic freedom or cultural events.
Freedom of Assembly	The Republic of Serbia is bound by international documents to protect, respect and ensure the freedom of assembly. This freedom is enshrined in the Universal Declaration of Human Rights (Art. 20), the European Convention on Human Rights (Art. 11) and the International Covenant on Civil and Political Rights (Art. 21). The freedom of peaceful assembly is also guaranteed by Article 54 of the Serbian Constitution. The Public Assembly Act (1992) guarantees the freedom of assembly to everyone and does not lay down any restrictions of this freedom on grounds of nationality (Article 1).	The constitution provides for the freedom of assembly, and the government generally respected the right.
Freedom of Association and the Right to Collective Bargaining	The Constitution of Serbia guarantees the freedom to join and form political, trade union and all other forms of associations (Art. 55). The Constitution lays down that associations shall be formed by entry in a register, in accordance with the law, and that they shall not require prior consent. With the amendments made in the Labour Law, the structure of collective bargaining and its extension of agreements to non-negotiation parties have been changed to be more in line with EU standards. Serbia has ratified all of the eight ILO core conventions; including Collective Bargaining (No. 98).	The government generally enforced the labor law with respect to freedom of association and collective bargaining, and penalties were generally sufficient to deter violations. Both public- and private-sector employees may freely exercise the right to strike, although no strikes occurred during the year of 2019.

Topic	Legal Framework	Latest Conditions (2019)
	Act on Associations (2009) defines an association as a voluntary and non-government non-profit organisation based on the freedom of association of two or more natural or legal persons established to achieve and promote a specific common or general goal or interest not prohibited by the Constitution or the law.	
Occupational Health and Safety	The Republic of Serbia has until now ratified, i.e. verified for Occupational Safety and Health a great number of the ILO Conventions as Law Norms directly implemented into National Law concerning Occupational Safety and Health, and directly executed as such. National regulations covering directly the essential aspects of Occupational Health and Safety are; • Labour Law • Law on Health and Protection • Law on Pension and Disability Insurance • Law on safety and Health at work	The Occupational Safety and Health Law of the Republic of Serbia is conceived in a way that all Requirements of the ILO as well as the EU are implemented, so it can be deemed that the majority of International Standards from this domain are integrated into this Law. Software for registering injuries at work was developed for the Ministry of Health in 2013 and training in its use was organised for occupational physicians.
Child Labour	Three main international conventions adopted by the Republic of Serbia are; the UN Convention on the Rights of the Child, and ILO Convention Nos 138 and 182 – together set the legal boundaries for child labour and provide the legal grounds for actions against it. In terms of national framework, child work and child labour are defined under the Labour Law (2017), the Law on Employment and Unemployment Insurance (2015) and the Regulation of the Government of Serbia on Hazardous Work of Children (2017), while some rights and obligations related to the earnings and property acquired through work are stipulated in the Family Law. (2015). The minimum age for employment is 15, and youths younger than 18 require written parental or guardian permission to work. The Labour Law stipulates specific working conditions for minors and limits their workweek to 35 hours, with a maximum of eight hours work per day with no overtime or night work.	The law provides penalties for parents or guardians who force a minor to engage in begging, excessive labor, or labor incompatible with his or her age.
Prohibition of Forced or Compulsory Labor	Serbia has ratified 76 ILO, International Labour Standards (Conventions), of which 62 are in force, including those on forced and child labour. Serbia is a party to the United Nations Protocol to Prevent, Supress and Punish Trafficking in Persons, especially Women and Children (2000). The Protocol covers measures that States need to adopt in order to prevent and address all forms of exploitation that are the outcome of trafficking, including the exploitation of forced labour and services (Article3).	Forced labour is prohibited. Sexual or financial exploitation of person in unfavorable position shall be deemed forced labour (Article 26 of Constitution). Following statements are given in Criminal Code (2009) of Serbia in which result with punishment with imprisonment including but not limited to: • Whoever denies or restricts freedom of movement or residence in the territory of Serbia to the citizen of Serbia,

Topic	Legal Framework	Latest Conditions (2019)
		• Whoever by use of force, threat, deceit or otherwise removes or holds another with the intent to extort money or other property gain from that person or another or to coerce that person or another to do or refrain from doing something or to endure, • Whoever by use of force or threat coerces another to do or refrain from doing something, or to endure, • Whoever deliberately fails to comply with law or other regulations, collective agreement and other general acts on labour rights and on special protection of young persons, women and disabled persons at work, or on social insurance rights and thereby deprives or restricts another's guaranteed right.
Trade Unions	According to Article 6 of Labour Law; "a trade union is understood to be an autonomous, democratic and independent organization of employees, they associate into on a voluntary basis, for the purpose of acting on behalf, representing, advancing and protecting their professional, labor, economic, social, cultural, and other individual and collective interests". Trade union recognition is regulated under the Labour Act and the Trade Union Registration Rulebook. In accordance with Article 218 of the Labour Law, a trade union shall be recognised if: (i) it is founded and is active on the grounds of principles of the freedom of trade unions and their activities; (ii) it is independent of state authorities and employers; (iii) it is financed predominantly from membership fees and its other income; (iv) it has a sufficient number of members; and (v) it is registered in accordance with the Law. Article 55 of the Constitution guarantees the freedom of association in trade unions. Trade unions may be established by registration with the competent state authority pursuant to the law and do not require prior approval. According to Article 25 of the Law on the Prohibition of Discrimination; "The Law prohibits discrimination based on political convictions of persons or group of persons, or for belonging or not belonging to a political party or trade union. It shall not be considered discrimination from paragraph 1 of this Article the	There were no records on prohibition of trade unions in the year of 2019.

Topic	Legal Framework	Latest Conditions (2019)
	restrictions related to performers of certain state functions, nor the restrictions necessary to prevent advocating and pursuing fascist, Nazi and racist activities, as prescribed by law"	
Gender Equality	Enjoyment of equal rights, regardless of gender, sex or another personal feature, is guaranteed by all international instruments ratified by Serbia. Gender equality and the development of equal opportunities policies are among the 17 principles enshrined in the Serbian Constitution. The Labor Law of the Republic of Serbia (2009) deals most concretely with the prohibition of discrimination in the area of labor and employment. It basically contains all of the classical provisions related to the prohibition of discrimination in this area, following the principles set by the International Labor Organization (primarily in Convention No. 111) and basic EU anti-discrimination acts. Furthermore, a special place in the group of anti-discriminatory laws of the Republic of Serbia belongs to the Gender Equality Act (2009). The Gender Equality Act guarantees to all employees equal wages for the equal work or work of equal value, irrespective of their gender and it prohibits any harassment including the sexual harassment and sexual blackmail. In each cycle of the professional advancement or vocational and professional training the employer is obliged to pay due attention that the provisions regarding gender representation are reflected in the structure of employees to the greatest extent possible.	Both the Labour Law and the Law on Gender Equality are explicit in requiring employers to abide by anti-discrimination practices, including their obligation to ensure equal pay for equal work for women and men. Serbia has made some progress in aligning its law with international standards and the EU acquis. The obligation to introduce gender responsive budgeting was introduced for the first time in late 2016 and is to be fulfilled by authorities at all levels by 2020 at the latest.
Right to Strike	The right to strike is guaranteed by Article 61 of the Constitution. Workers are entitled to stage strikes in accordance with the law and the collective agreement. The right to strike may be restricted only by law and in accordance with the type and nature of activity. The Law on Strikes (1996) defines a strike as an interruption of work organised by employees for the purpose of protecting their professional and economic interests regarding their labour. Employees decide freely whether they participate in a strike. A strike may also be organised as a warning strike, which may last for up to one hour. The decision to go on strike or participate in a warning strike against an employer must be made by a majority of employees or a trade union as defined by the General Trade Union Act. The decision to go on strike within a branch and business activity must be made by a competent authority within the trade union. The decision to go on general strike must be made by the highest authority in the trade union.	There were no records on prohibiting strikes in the year of 2019.
Migrant Workers	Serbia's Act on the Employment of Foreigners (2019), enables non-nationals who have been granted temporary or permanent residence in Serbia as well as individuals who have been granted refugee or temporary protection status to	While Serbia has numerous provisions dealing with the fulfilment of migrants' rights, according to the Law on Public Servants (Article 45), only Serbian

Topic	Legal Framework	Latest Conditions (2019)
	apply for work permits. All foreigners, including labour migrants, who hold a residence permit have the right to health protection, according to Article 3 of the Law on Health Protection. Health services, as well as primary and secondary education, are available free of charge.	nationals are permitted to work as civil servants in the public sector. However, foreign citizens are allowed to work in state-owned or public enterprises.
Right to Bargain	Serbia has signed ILO Convention No. 98 Concerning the Application of the Principles of the Right to Organise and to Bargain Collectively. Article 5 of the Revised European Social Charter, ratified by Serbia in 2009, enshrines the right of workers and employers to organise, which entails the right to form local, national or international organisations for the protection of their economic and social interests.	The Labor Law protects the right to bargain collectively, and this right was effectively enforced and practiced.
Right to Property	According to Article 58 of the Constitution “Peaceful tenure of a person's own property and other property rights acquired by the law shall be guaranteed. Right of property may be revoked or restricted only in public interest established by the law and with compensation which cannot be less than market value.”	The Republic of Serbia Expropriation Law (passed in 1995 and enacted on January 1, 1996, amended in March 2001, amended again on March 19, 2009, 2013 by the Constitutional Court ruling and in 2016 by the Authentic interpretation) guides expropriation and serves as a general framework for expropriation in the Republic of Serbia. The law also enshrines the principle of compensation at market value. It is intended to ensure simple, efficient process, reducing as far as possible the need for a lengthy judicial process to facilitate necessary expropriation. Under normal circumstances, the entire process of acquisition can be completed within six months. Public interest is determined in accordance with the Law on Expropriation, as a legal way of acquiring property, providing adequate compensation for expropriated property, as a result of a comprehensive legal and administrative process aiming at balancing between the necessary preservation and protection of ownership right and the public interest prevalence.

Source: (United States Department of State - Bureau of Democracy, Human Rights and Labor, 2019) (Belgrade Centre for Human Rights, 2019) (IOM, 2018) (EuroFund, 2018)

6 IMPACT ASSESSMENT

In this Chapter, construction and operation activities of the Proposed Morava Corridor Motorway Project are against the baseline conditions in order to assess the environmental and social potential impacts of the Project. With this intention, Chapter 6 provides a summary of the major, moderate and positive impacts identified during the ESIA study for the construction and operation of the Project.

The basic approach for the ESIA is adopted for conducting the environmental and social impact study for the proposed project to assess the existing baseline in the AoI (i.e., *defined as the area of 1,000 m buffer along the length of the Project, consisting of a 500 m buffer on both sides of the Project*), where the components and activities of the project having potential environmental and social impacts. Environmental and Social impact assessments are framed with the prevailing institutional and legislative setup provided in Section 4 Legal Framework.

The main approaches for the assessment covers:

1. Identification and analysis of potential positive and negative impacts, direct and indirect impacts, and short-term and long-term impacts likely to result from project implementation;
2. Identification of feasible and cost-effective mitigation measures to avoid or to minimize negative impacts, and to provide technical guidance to the engineering design for the implementation of proposed mitigations.
3. Identify potential opportunities for environmental enhancement;
4. Preparation of Environmental and Social Management and Monitoring Plan for effective implementation of environmental mitigation measures at different stages of the project.

6.1 Scoping of the Impacts

The potential environmental and social impacts of the Proposed Morava Corridor Motorway Project together with River Regulation[1] are summarized in the scoping matrix for the main Project phases (construction and operation) to identify the likely environmental and social aspects originating from them. These phases are described below:

- The Construction Phase activities, which comprises pre-construction including detailed design, construction and post-construction phases, considered in the scoping stage. In this respect, this phase covers all detailed design and construction activities as well as decommissioning of the temporary construction facilities.

[1] River Regulation Project is designed as a part of the Morava Corridor Motorway Project and general constrcution impacts are same and in paralel with the impacts caused by major constrcution works such as excavation, air qulity etc. In this respect, common impacts, impact asessment and related mtigation measures are covered under common topics. Only specific impacts caused by river regulation works are individually assessed and expressed related sections.

- The Operational Phase considers all operational activities including:
  - Operation of the motorway, which may potentially result in impacts such as the generation of noise and vibration, release of chemicals, fuels or hazardous substances, accidental spills and leakage from movement of the vehicles as well as killing of crossing animals and generation of various waste streams;
  - Potential impact of the River Regulation works on surface and subsurface water quality at West Morava Basin, and potential impacts on fresh water and terrresterial ecology of the project AoI.
  - Maintenance activities of the motorway, which may potentially result in impacts such as on the occupational health and safety for the workers that will perform regular maintenance of the motorway and public safety during the maintenance.

The potential impacts (adverse and positive) of all planned project activities have been identified and the interaction between the project activities in all these phases and the natural, physical environment and social-economic aspects are addressed using the environmental and social scoping matrixes provided in Table 6-1 and Table 6-2 below.

Table 6-1. Scoping Matrix – Potential Environmental Impacts

Project Stage	Sub Project Stage	Potential Impact Locations	Activity/Source	Water Quality		Air Quality and Climate				Noise and Vibration	Geology Soils and Cont.			Waste Management	Terrestrial and Aquatic Ecos.			Archaeological and Cultural Res.	Landscape
				Surface Water	Ground Water	NOx	SO2	Dust (PM2.5/10)	GHG Emissions		Errosion	Geohazards	Soil		Aquatic Ecosystems	Terrestrial	Protected Areas		
Pre-Construction Activities	Site preparation	Camp Sites, Borrow Pits, Quarries, Asphalt Plants, Concreate Batching Plant, Construction corridor, Access Roads, River Regulation	Top-soil stripping	X							X	X	X	X	X	X		X	X
			Top-Soil Storage	X				X		X	X		X	X	X	X			X
			Tree Cutting /Vegetation clearance							X	X		X	X		X			X
			Demolishing of Exiting Buildings/Structures	X	X			X		X			X	X					
			Geological and Geotechnical Studies							X				X				X	
			Mapping and Alignment/site selection														X	X	
			Land Take/Expropriation																
	Site Mobilization		Mobilization of Machinery and Equipment			X	X	X	X	X			X	X					
			Procurement of Materials and Equipment																
			Employment																
Construction Activities	Construction	Camp Sites, Borrow Pits, Quarries, Asphalt Plants, Concrete Batching Plants, Construction corridor, Access Roads, River Regulation	Camp Sites	X	X	X	X	X		X			X	X	X	X		X	X
			Material Storage	X	X			X		X	X		X	X	X	X		X	X
			Waste Storage/Disposal Sites	X	X								X	X	X	X			
			Water Supply	X	X										X				
			Wastewater Treatment and Disposal	X										X	X	X			
			Excavation	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
			Backfilling	X	X	X	X	X	X	X	X	X	X	X	X	X			
			Storage, Re-Use and Disposal of Excavations	X	X			X		X	X		X	X	X	X			X
			Material Spreading/Rolling/ Compaction	X		X	X	X	X	x			X	X	X				
			Asphalt-Concrete Wearing	X		X	X	X		X				X					

Project Stage	Sub Project Stage	Potential Impact Locations	Activity/Source	Water Quality		Air Quality and Climate				Noise and Vibration	Geology Soils and Cont.			Waste Management	Terrestrial and Aquatic Ecos.			Archaeological and Cultural Res.	Landscape
				Surface Water	Ground Water	NOx	SO2	Dust (PM2.5/10)	GHG Emissions		Errosion	Geohazards	Soil		Aquatic Ecosystems	Terrestrial	Protected Areas		
			Crushing and sieving					X		X				X		X			
			Machinery and Equipment	X		X	X	X	X	X			X	X	X	X			
			Asphalt Preparation	X		X	X		X	X			X	X	X				
			Concreate Batching	X				X	X	X				X	X	X			
			Transportation			X	X	X	X	X				X					
			Procurement of Materials																
			Employment																
Post Construction Activities	Demobilization	Camp Sites, Borrow Pits, Quarries, Asphalt Plants, Concreate Batching Plant, Access Roads, River Regulation	Demobilization of Equipment and Machinery			X	X		X	X			X	X					
			Re-instatement of Camp Sites and Access Roads	X				X	X	X	X		X	X	X	X			X
			Rehabilitation of Barrow Pits and Quarries	X	X			X	X	X	X		X	X					X
			Demobilization of Workers																
Operation	Motorway, Maintenance and Service Stations River Regulation		Movement of the vehicles	X		X	X	X	X	X	X		X	X	X	X			X
			Operation of Service Stations	X	X					X				X					
			Operation of Maintenance Station	X	X					X				X					
			River Regulation	X	X	-	-	-	-	-	X	X	X	-	X	X	X	-	X

Table 6-2. Scoping Matrix - Potential Social Impacts

Project Stage	Sub Project Stage	Potential Impact Locations	Activity/Source	Population	Infrastructure	Economy	Re-settlement and Land	Ecosystem Services	Labor and Working Conditions	Occupational Health and Safety	Community Health and Safety	Vulnerable People
Pre-Construction Activities	Site preparation	Camp Sites, Borrow Pits, Quarries, Asphalt Plants, Concreate Batching Plant, Construction corridor, Access Roads, River Regulation	Top-soil stripping		X		X	X		X	X	
			Top-Soil Storage							X	X	
			Tree Cutting /Vegetation clearance				X	X		X	X	X
			Demolishing of Exiting Buildings/Structures				X			X	X	X
			Geological and Geotechnical Studies		X		X			X	X	
			Mapping and Alignment/site selection				X			X		
			Land Take/Expropriation			X	X			X		
	Site Mobilization		Mobilization of Machinery and Equipment			X				X	X	
			Procurement of Materials and Equipment			X				X		
			Employment	X		X			X			X
Construction Activities	Construction	Camp Sites, Borrow Pits, Quarries, Asphalt Plants, Concreate Batching Plant, Construction corridor, Access Roads, River Regulation	Camp Sites	X	X	X				X	X	X
			Material Storage							X	X	
			Waste Storage/Disposal Sites							X	X	
			Water Supply		X					X	X	
			Wastewater Treatment and Disposal		X					X	X	
			Excavation		X					X	X	
			Backfilling		X					X	X	
			Storage, Re-Use and Disposal of Excavations				X				X	
			Material Spreading/Rolling/Compaction							X	X	
			Asphalt-Concreate Wearing									
			Crushing and sieving							X	X	
			Machinery and Equipment							X	X	
			Asphalt Preparation							X	X	
			Concreate Batching							X	X	
			Transportation		X					X	X	
			Procurement of Materials									
			Employment	X		X			X	X		X
Post	Demobilization	Camp Sites, Borrow Pits,	Demobilization of Equipment and Machinery		X					X	X	

Project Stage	Sub Project Stage	Potential Impact Locations	Activity/Source	Population	Infrastructure	Economy	Re-settlement and Land	Ecosystem Services	Labor and Working Conditions	Occupational Health and Safety	Community Health and Safety	Vulnerable People
		Quarries, Asphalt Plants, Concreate Batching Plant, Access Roads, River Regulation	Re-instatement of Camp Sites and Access Roads		X						X	
			Rehabilitation of Barrow Pits and Quarries								X	
			Demobilization of Workers						X			X
Operation	Motorway, Maintenance and Service Stations River Regulation		Movement of the vehicles								X	X
			Operation of Service Stations						X	X		X
			Operation of Maintenance Station						X	X		
			River Regulation	-	X	-	-	X	-	-	-	X

6.2 Methodology for Impact Assessment

6.2.1 Impact Types and Definitions

Impacts may occur as positive, negative, direct, indirect and cumulative. Determination of the type of impact is the important step of the assessment process. The determination of the impact type is based on geographical size, sensitivity of receptor, duration, significance and likelihood of the impact. Impact types are provided in Table 6-3.

Table 6-3. Impact Types and Definitions

Impact Type	Definition
Positive	Impacts that make positive changes over the current conditions.
Negative	Impacts that lead to new and undesirable changes over the current conditions.
Direct	Direct impacts occur through direct interaction of an activity with an environmental, social, or economic component.
Indirect	Impacts which are not a direct result of the project, often produced away from or as a result of a complex impact pathway.
Cumulative	Impacts that consist of an impact that is created as a result of the combination of the project evaluated in the current project together with other projects causing related impacts.

6.2.2 Method to Assess Environmental and Social Impacts

6.2.2.1 Determination of Impact Significance Criteria

The environmental and social impacts are dependent on the impact significance criteria (SC) of the particular impact and the Likelihood (L) of the impact occurring. Impact significance criteria (SC) is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and receptor sensitivity (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$\mathbf{SC= (E+D+M+R) \times N/4}$$

A rating scale as defined in below table represents each individual aspect in the determination of the consequence.

Table 6-4. Criteria for Determining Impact Significance

Aspect	Score	Definition
Nature (N)	**-1**	**Negative**: Impacts that are considered to represent an adverse change from the baseline condition or introduces a new undesirable factor. Impacts are described as "negative" when they; • Reduce the socio-economic welfare (i.e. living quality and result in land acquisition) • Reduce the quality of existing environment and habitat.
	+1	**Positive:** Impacts that are considered to represent an improvement on the baseline condition or introduces a new desirable factor. Impacts are described as "positive" when they; • Enhance socio-economic welfare (i.e. health, employment). • Enhance the quality of existing environment and habitat.
Extent (E) of an impact depends on the impact's type, duration and scale, as well as resistant properties of the resource / receptor	**1**	**Project Site:** (i.e. limited to the area applicable to the specific activity)
	2	**Municipality** (i.e. the area within 5 km of the site),
	3	**District** (i.e. extends between 5 and 15 km from the site
	4	**Regional:** (i.e. extends beyond 50 km from the site)
	5	**National:** *potential impacts that expected to create changes at national level.*
Duration (D) is the time period over which a receptor is affected.	**1**	I**mmediate** (<1 year)
	2	**Short term** (1-5 years),
	3	**Medium term** (6-15 years),
	4	**Long term** (the impact will cease after the operational life span of the project)
	5	**Permanent** (no mitigation measure of natural process will reduce the impact after construction).
Magnitude (M) is considered to be a function of impact extent, duration and sensitivity of receptor.	1	**Minor**: where the impact affects the social and physical environment in such a way that cultural, social and environmental functions and processes are not affected.
	2	**Low**: where the impact affects cultural, social and environmental functions and processes are slightly affected.
	3	**Moderate**: where the affected cultural, social and environmental functions are altered and processes continue in a modified way.
	4	**High**: where cultural, social or environmental functions or processes are altered to the extent that it will temporarily cease.

Aspect	Score	Definition
	5	**Very high:** where natural, cultural, social or environmental functions or processes are altered to the extent that it will permanently cease.
Receptor Sensitivity (R)[2] describes the ability of the receptor to withstand adverse impacts. It takes into consideration not only activity-impact-receptor pathways, but also social and environmental characteristics of the receptor that might make it more or less resilient to change.	1	**Low:** Local community and/or environment is fully equipped/has the tools to manage changes of life quality. • Species and/or population has high capacity to absorb or adapt to change (i.e. has capacity to move away from or adapt to the project impact), and is potentially unaffected or marginally affected • People being least vulnerable to change or disturbance (i.e. ambient conditions such as air quality are well below applicable legislation and international guidance) • Individuals who are able to quickly adapt to temporary disruption in their living conditions, livelihood status or a change in the status of public infrastructure
	3	**Medium:** Local community and/or environment is partially equipped/has the tools to manage changes of life quality. For example: • Internationally threatened species /protected area within the area impacted by the project activities outside of period of high sensitivity or during routine or reliably predictable peak presence • Species and/or population which has moderate capacity to absorb or adapt to change (i.e. has capacity to move away from or adapt to the project impact), leading to potential temporary but sustainable effect which does not substantially alter character or result in significant loss of ecological functionality • People being vulnerable to change or disturbance (i.e. ambient conditions such as air quality are below adopted standards • Negative change in livelihood status, household assets/income or living conditions. Temporary disruption to businesses resulting in a small drop in business revenue. • Increased risk to public health that can be controlled using detailed mitigation measures. • Disruption to public infrastructure that results in an inconvenience to other users

[2] Receptors may be humans, ecological and physical components of the environment. Receptor sensitivity considers how a particular receptor may be more or less susceptible to a given impact. More sensitive receptors may experience a greater degree of change, or have less ability to deal with the change, compared with less sensitive receptors that may be more resilient or adaptable.

Aspect	Score	Definition
	5	**High:** Sensitive local community and/or environment not equipped or prepared to cope with social and environmental impacts such as changes of life quality. For example: • Internationally threatened species /protected area within the area impacted by the project activities during period of high sensitivity (e.g. during breeding, spawning or nesting) and during routine or reliably predictable peak presence • Species and/or population which has little or no capacity to absorb or adapt to change (i.e. little or no capacity to move away from or adapt to the project impact), leading to potential for substantial change of character and/or loss of ecological functionality • Most vulnerable groups (i.e. ambient conditions such as air quality are at or above adopted standards • Individuals with a marginal livelihood, low socio-economic income or poor quality living conditions • Individuals who are vulnerable due to their age, disability or other reason and who may require special assistance during engagement activities • Businesses with a marginal economic existence which are not able to easily adapt to change

6.2.2.2 Determination of Impact Likelihood

Once impact significance criteria "SC" has been determined Impact Assessment "(IA)" is determined in accordance with the standard risk assessment relationship by multiplying "SC" and "L" (Likelihood is rated/scored as per Table 6-5).

Table 6-5. Likelihood Scoring

Likelihood	**1**	Improbable (the possibility of the impact materializing is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur)

6.2.2.3 Determination of the Overall Impact

The overall impact (IA) is categorized as low, medium or high. Environmental and social IA is therefore calculated as follows:

IA= SC x L

Table 6-6. Determination of the Overall Impact*****

Determination of the Overall Impact						
Significance Criteria (SC)	**5**	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	**2**	**3**	**4**	**5**
		Likelihood				

**For positive impacts, the column of the impact assessment table is marked with green colour.*

The outcome of the IA will result in a range of scores, ranging from 1 through to 25. These IA scores are then grouped into respective classes as described in Table 6-7.

Table 6-7. Description of the Overall Impact Scores

Score of the Impacts		
Value*	**Score**	**Definition**
1-8	**Low**	Impacts with a "**Low**" significance are expected to be noticeable changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the receptor. However, these impacts warrant the attention of the Project parties, and should be avoided or mitigated where practicable.
9-16	**Medium**	Impacts with a "**Moderate**" significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the receptor, although the overall function and value of the receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

Score of the Impacts		
Value*	**Score**	**Definition**
17+	**High**	Impacts with a "**High**" significance are likely to disrupt the function and value of the receptor, and may have broader systemic consequences (e.g. environment, ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

*In case the value of the overall impact is a fractional number, the value is rounded as <0.5 to round down; >0.5 to round up.

The impact IA will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/mitigated.

The impact assessment in each technical chapter will include impact summary table for each phase of the Project (an example is presented in).

Development of Mitigation Measures and Enhancement Plans

One of the aims of an ESIA consists of suggesting mitigation measures in order to limit any potential negative impacts affecting all physical, biological and socioeconomic resources as well as receptors due to Project activities. Mitigation measures are defined against each significant adverse impact by making use of avoidance, minimization, restoration and remediation as appropriate. Mitigation measures provided in each impact assessment table are also grouped under each project phase such as design, pre-construction, post construction and operation. In general, mitigations suggested for operation phase are directly related to the Project design, in this respect these mitigations are also grouped under design phase.

A hierarchy of mitigation options is considered, with avoidance at the source of the impact as a priority and compensatory measures or offsets to reduce the impact significance as a last resort. The mitigation hierarchy that is utilised in this ESIA is presented in Table 6-8 below.

Table 6-8. Hierarchy of Options for Mitigation

Options	Explanation
Avoid at Source; Reduce at Source	Avoiding or reducing at source is designing the project so that a feature causing an impact is designed out (eg, avoiding constraint areas during site selection) or altered (eg, reduced waste volume).
Abate on Site	This involves adding something to the design to abate the impact (eg, pollution controls).
Abate at Receptor	If an impact cannot be avoided, reduced or abated on-site then measures can be implemented off-site (eg, noise screening at properties).
Repair or Remedy	Some impacts involve unavoidable damage to a resource. Repair essentially involves restoration and reinstatement type measures.

The aim of the mitigation measures is to prevent or reduce the importance of negative impacts whilst optimizing the feasibility and potential benefits of the Project. Impact mitigation objectives are often established on the basis of legal standards or by referring to best practice. In the absence of any existing benchmarks, objectives specific to the project are established. Mitigation activities are supported with management plans linked to potential impacts, and they include monitoring requirements detailing what will be monitored, the method of monitoring, frequency, and measurable targets. Stepps for determination of mitigations in line with "Mitigation Hierarchy" provided below.

- Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting theworking area or changing the time of the activity). For this purpose, Constraint Maps regarding no-go areas and sensitive locations are prepared as an Annex of ESIA Report to serve as a Guiding document for the Detailed design as well as Sub-management and monitoring plans.
- Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- Compensate in Kind, Compensate Through Other Means: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Taking into account how mitigation will reduce a predicted impact, receptor sensitivity and significance of the after-mitigation impacts, residual impacts are identified. Some mitigation measures may directly address the impact on the predicted receptors, in which, the overall impact after applying the mitigation measures will result in reducing the impact on the sensitive receptors.

Where significant residual impacts or risks remain, further options for mitigation are evaluated and impacts are re-assessed until they are considered to be low and technically and financially feasible for the Project and would be deemed to be within acceptable levels.

Residual Impacts

Residual impacts will be identified by taking into account the new Nature (N'), Extent (E'), Duration (D'), Magnitude (M'), receptor sensitivity (R') and Likelihood (L') on how mitigation will reduce a predicted impact and significance of the after-mitigation.

For the purpose of this methodology the residual impact (RI) is represented by:

$$SC' = (E'+D'+M'+R') \times N'/4$$

$$RI = SC' \times L'$$

Table 6-9. Assessment of Potential Impacts (As an example)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Spillage/Leakage to Surface Water	-1 Negative	2 Municipality	2 Short Term	4 High	3 Medium	-2.75	4 High Probability	11 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probability	-5 Low
Employment Opportunities	1 Positive	3 District	2 Short-term	3 Moderate	5 High	3.25	5 Definite	16 Medium	1 Positive	4 Regional	2 Short-term	4 High	5 High	3.75	5 Definite	19 High

6.3 Water Quality

In this section, construction and operation impacts due to project activities on surface water and ground water within the Area of Influence (AoI) of the Project and measures will be taken by the Contractor and the Employer were determined.

6.3.1 Surface Water

Surface water quality and flow characteristics (level and volume) may be susceptible to contamination by the Project activities during the construction and operation phase of the Project.

The sensitive receptors were determined according to the Baseline Conditions of the surface water (See Chapter 5). Impacts that may be caused by the Project together with the mitigation measures are provided in Table 6-10 and Table 6-11.

6.3.1.1 Construction Phase

The construction activities may cause negative impacts on surface water sources throughout the construction phase in case no mitigation measures are taken.

Some of the potential sources of the impacts can be raised from;

- Construction machinery through risk of spillages or accidental releases of oil and petroleum products, discharge of motor oil and/or similar waste.
- Uncontrolled disposal of excavated materials.
- Uncontrolled drainage of sanitary waters in project facilities.

During the construction works, surface water quality is considered to be temporary affected by the construction activities including but not limited to:

- Silty/soiled water from excavations (road and river regulation), quarries, topsoil placing, machinery washing, washing of finished road surfaces to remove accumulated soil and disturbance of drains and streambeds.
- The surface water may be at risk in case of a construction site or refueling and storage depot is located near a surface water body.
- Discharge of wastewater from construction workers' accommodation sites and other construction facilities and activities poses a risk to water environment if not treated prior to discharge.

All impacts and mitigations for surface water quality in the Construction Phase of the Project is provided in Table 6-10.

Table 6-11 shows the overall rating of the impacts before and after mitigations. Potential impacts of the construction works performed in the West Morava River (i.e. river regulation, foundations for bridges etc.) are considered with high impact significance due to large impact extent and high impact magnitude. Other potential impact soruces sucha as spillage/leakage to surface water and the wastewater discharge are considered with medium significance before mitigation implementations. All mitigation measures provided in Table 6-10 are design to reduce the magnitude and minimize the likelihood of the impacts. After taking mitigation measures, the residual impacts estimated to be decreased significantly, and the impact significance of the residual impacts are classified as low.

Table 6-10. Impact and Mitigations for Surface Water Quality in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Spillage/Leakage to Surface Water • Silty/soiled water from excavations (e.g. cut and fill), exposed ground, stockpiles of soil, quarries, topsoil placing and excess material, plant and wheel washings, construction roads, washing of finished road surfaces to remove accumulated soil and disturbance of drains and streambeds (i.e. in-stream construction of culverts and channel diversions/improvement works), and landscaping e.g. of road embankments. • When construction site, a refueling and storage area are near to surface waters, a risky situation may occur for surface waters due to spillage possibility of hazardous substances. Liquid cement can be highly polluting and can increase damage in aquatic life. Since liquid cement has high alkalinity and it is corrosive. The accidental spillage of cement, fuel oils and lubricants can cause important consequences on watercourses, aquatic ecology and downstream users. • During construction, motorway repair activities such as removal of asphalt and replacement, painting etc. can impact to surface water quality since chemicals is used during these activities. The risk of water pollution is high especially close to surface water bodies in all road sectors.	Top-soil stripping Top-Soil Storage Demolishing of Exiting Buildings /Structures Material Storage Excavation Backfilling Storage, Re-Use and Disposal of Excavation Excavation for the River Regulation Asphalt concrete Wearing Machinery and Equipment Asphalt Preparation Concrete Batching	The West Morava River and its tributaries as well as water ponds and lakes located in AoI has been identified as a sensitive receptor.(for detailed information see Chapter-5)	<u>Design</u> • Storm water drainage risk assessment will be conducted in order to confirm that storm water drainage designs used for construction works are effective to mitigate impacts on land use, surface water and sensitive ecological sites therein. Out-put of this assessment including suggested mitigations will be incorporated to relevant plans such as Soil Erosion, Reinstatement and Landscape (SERL) Management Plan. <u>Construction</u> • The Project Environmental Management Plan (EMP) will include Spill Response and Prevention, Water Quality Management, Hazardous Material Management procedures that will be implemented. • Accidental spills will be avoided through good practice and restriction of refueling near watercourses. Safe fueling and gasoline handling procedures will be practiced in the construction areas. If heavy equipment cannot be moved to appropriate fueling points, an impervious surface (such as a drip-tray) will be used for refueling this equipment to prevent accidental releases to groundwater aquifers. • Re-fueling of all plant, vehicles and machinery will be carried out at minimum 50 m of any watercourse, drain or channel leading to a water course. • Hazardous materials will not be stored in excavated areas. Exposure to hazardous materials in open areas will be kept to a minimum in size and time. • All hazardous material or waste storage areas used for construction works will be connected to a

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			closed impervious sump or waste water treatment facility and/or bounded with secondary containment. Secondary containment structures will consist of berms, dikes, or walls capable of containing the larger of 110% of the largest tank or 25% of the combined tank volumes in areas where hazardous materials are handled such as fuel stores and loading areas, concrete mixing, hazardous material stores to prevent hazardous materials entering the site drainage. • Oil separator will be used for silty/soiled water from construction activities and after silty/soiled water is brought to national and international discharge criteria will be discharged to suitable receiving environment. • Scheduling of construction activities near the West Morava River during period of heavy rainfall will be considered. High sediment producing activities such as road paving will be avoided as much as possible and exposed surfaces and stored materials covered as necessary to reduce erosion of sediments to surface water. • Soil extraction or excavation areas by the river banks will be protected by appropriate fencing such as orange safety barrier fencing during the construction phase, to prevent negative impact that may be caused by driving and unloading of materials nearby. • Wastewater generated during concrete batch plant operation and cement trucks washing will be monitored for pH and temperature. Concrete wastewater can show high pH values, and high alkalinity. • Water flow in the river (or any stream) will not be fully blocked, and continuity of the flow will be maintained as much as possible,

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Sensitive areas of rivers and drains will be protected from impact from vehicles and other construction activities with appropriate fencing such as orange safety barrier fencing or other appropriate ways. • Spill Response Kits will be available on construction site. • Spill Response Kits will be held at secure, clearly signposted locations, instructions will be provided in appropriate languages and personnel will be trained in their use. • Spills will be immediately contained on site and all contaminated materials including soils will be removed from the site for suitable treatment and disposal. • All staff and subcontractors will report any spill incidents, and these will be subject to investigation and close out remedial and preventive actions.
Working in the River-Bed and River Regulation works • River regulation works during constructon phase can impact to surface water quality.	Excavation for the River Regulation	The West Morava River and its tributaries as well as water ponds and lakes located in AoI has been identified as a sensitive receptor.(for detailed information see Chapter-5)	<u>Construction</u> • The timing of the work will be constrained by the months of high-water level and Environmental requirements if the works directly related with the existing River flow. • Size of the working area in the riverbed will be reduced and limited as much as practicable. • Water flow in the river (or any stream) will not be fully blocked, and continuity of the flow will be maintained as much as possible, • Water turbidity at up-steam and down-stream of the working area will be monitored during construction activity in the riverbed. If the turbidity level exceeds the standards, level of construction works will be decreased (or stopped) at

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			corresponding location until the turbidity is decreased to regulated levels. • Re-fueling of all plant, vehicles and machinery will be carried out at minimum 50 m of any watercourse, drain or channel leading to a water course. • Storage and handling of fuels, oils and other hydrocarbons through a controlled process, involving measures to prevent soil and water contamination. Those should include fuel and oil storage on sealed surfaces and within secondary containment; • All sites near rivers will be protected by fencing and other means to prevent loss of construction materials, particularly hazardous materials. • Movement of equipment inside rivers, streams, or on their banks, will be prevented except when it is unavoidable due to the construction of a structure or in emergency situation. • Training will be provided to machine operators regarding the sensitivities and working procedures, with attention to machine and equipment inspection for leaks prior to use, safe storage and handling of fuels/oils/hydrocarbons near the watercourse and/or precautionary measures to prevent contamination of soil and watercourse • Emergency Preparedness and Response Plan (EPRP) will be followed by all staff working on or near the river.
Wastewater generation • Wastewater generation during construction activities can impact the water quality. Wastewater originated from project facilities and activities used construction works can arise a	Camp Sites Asphalt Plants Concrete Batching Plants Wastewater Treatment and Disposal	The West Morava River and its tributaries as well as water ponds and lakes located in AoI has been identified as a sensitive	<u>Pre-Construction</u> • Design of wastewater treatment facilities should sustain water discharge standards provided in Chapter 4 and Appendix – 4. • During site arrangement, the potential wastewater sources from camp/site facilities, asphalt plant,

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
risk to water environment if it is not treated before discharge.		receptor.(for detailed information see Chapter-5)	concrete batching plant, and quarries will be defined. Depending on availability on waste treatment facilities, these sources can be connected to local sewerage system, which should be ended with proper wastewater treatment facility sustains the discharge quality standards given in Chapter-4 and Appendix -4. • Wastewater treatment facilities will be established before operation of construction project facilities such as camp sites, asphalt plants and concrete batching plant. Permits and licenses for operation of these wastewater treatment facilities will be in line with national requirements. <u>Construction</u> • All wastewater discharges from all construction components must comply with the relevant legal requirements provided in Chapter 4 and appendix 4. • The treated water will be reused whenever possible.

Table 6-11. Scoring of Surface Water Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Spillage/Leakage to Surface Water	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	4 **High**	-11 **Medium**	-1 **Negative**	2 **Municipality**	2 Short Term	2 Low	3 Medium	-2.25	2 Low	-5 **Low**
Working in the River-bed and River Regulation works	-1 **Negative**	4 **Regional**	2 **Short Term**	5 **Very High**	3 **Medium**	-3,5	5 **Definite**	-18 **High**	-1 **Negative**	4 **Regional**	2 Short Term	2 Low	3 Low	-2.75	3 Definite	-8 **Low**
Wastewater discharge	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	5 **Definite**	-14 **Medium**	-1 **Negative**	2 **Municipality**	2 Short Term	2 Low	3 Medium	-2,25	1 Improbable	-2 **Low**

6.3.1.2 Operation Phase

During the operation phase of the Motorway, surface water quality may be impacted negatively in case inadequate mitigation measures be taken.

The potential operational impacts may be rised due to:

- Pollutants released from vehicles,
- Occupation of the flood plain by the Motorway,
- Alteration of flow patterns due to hydraulic structures,
- Spills due to road accident and from gas stations and service areas,
- Motorway repair activities such as removal of asphalt and replacement, painting etc. can impact to surface water quality,
- High storm water flow rates can cause flooding, erosion and habitat degradation due to increase of impermeable surface.
- Potential impact on water regime is related to the regulated sections of West Morava River.
- Potential impact of river regulation work on water quality of West Morava River.

Table 6-12 details the impact and mitigations for surface water quality in operation phase of the Motorway.

Table 6-13 shows the overall rating of the impact of before and after mitigations. Spillage/leakage to surface water, the wastewater discharge and river regulation works are considered medium since the magnitude and the likelihood of the impacts are determined as high. In addition, flooding is considered high since the magnitude and the likelihood of the impacts are determined as high. After taking mitigation measures, as shown in Table 6-13, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-12. Impact and Mitigations for Surface Water Quality in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Spillage/Leakage to Surface Water • Spills due to road accident and from operational project facilities[3] also pose a greater risk of surface water contamination during operation phase. The risk of water pollution is also high in all Motorway sections close to surface water bodies such as creeks. Accidental releases to surface water can cause significant impact when high amount of water contaminated with hazardous substances discharge into the surface water. • Motorway repair activities such as removal of asphalt and replacement, painting etc. can impact to surface water quality by the chemicals used for those activities. • During operation phase of the Motorway, surface water may be affected by routine deposits from vehicles accumulated on the Motorway surface and transported to the road drainage system (e.g. tire and brake deposits, hydrocarbons from engines, liquid exhaust emissions, etc.). The sources may be caused by the leaks from the road body itself (tar oils) and road marking materials.	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station Vehicle collisions Snow removal or de-icing applications	The West Morava River and its tributaries as well as water ponds and lakes located in AoI has been identified as a sensitive receptor.(for detailed information see Chapter-5)	<u>Design</u> • Storm Water and Drainage Risk Assessment for operation of the Project will be prepared. The scope of the assessment should confirm if storm water drainage designs are effective to mitigate impacts on land use, surface water and groundwater or sensitive ecological sites therein. • Storm water and draining mitigation measures will be implemented in the design phase, such as the use of storm water collection ponds, which enables the controlled discharge of storm water as well as protects the accidental spills caused by an accident. <u>Operation</u> • Storm water collection channels and ponds are regularly (visually) inspected for its integrity. • In case of an accidental spill, collected water in the storm water collection pond will be sampled and discharged in accordance to the standards stipulated in Chapter-4 and Appendix-4. • Spill Response Kits will be available at service and maintenance stations, will be held at secure, clearly signposted locations, instructions will be provided with the kits and personnel will be trained in their use. • Any spillages will be immediately contained on site and all contaminated materials including soils will be removed from the site for suitable treatment and disposal. • All staff and subcontractors will be required to report any incidents and these will be subject to

[3] Example: Parking areas, service areas, toll maintenance areas. For further details of the Operational Project Facilities (Please see Chapter 3.9 of the ESIA Report.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			investigation and remedial and preventive actions will be taken.
Wastewater Discharge • If wastewater discharge from service areas (petrol filling stations, restaurants, sanitary facilities etc.) is not treated appropriately in line with Serbian and international standards, local receiving streams can be negatively impacted.	Operation of Service Stations Operation of Maintenance Station	The West Morava River has been identified as a sensitive receptor.	<u>Design</u> • Depending on availability on waste treatment facilities, all wastewater from the Operational operational Project Facilities such as service stations and maintenance stations can be connected to the local/municipal sewage network, which should be ended with proper wastewater treatment facility sustains the discharge quality standards. • If wastewaters from Operational Project Facilities are collected in septic tanks, waste water will be regularly transport by a licensed contractor to a nearest licensed wastewater treatment facility, which sustains the discharge requirements.
Flooding • The Motorway was built in the flood plain of the West Morava River. Therefore, the space required for the surface water to expand during the overflow periods is no longer available and the water will be retained upstream. • In increase the impermeable surface area and the rate of surface water flow rates can caused by development of the Motorway. Thus, high storm water flow rates can cause flooding, erosion and habitat degradation. • Hydraulic structures such as bridge, culverts and diversion channels can prevent flow during flood times, thus water flow levels upstream of structure can increase above what would occur in absence of the structure.	Impermeable Surfaces Bridges, Culverts Tree Cutting /Vegetation clearance	The Sensitive receptor is determined as the whole Project area within a 500 m AoI from either side of the Motorway Alignment.	<u>Design</u> • In Design Phase of the Project, Hydrotechnical Study Report was prepared by Jaroslav Cerni to assess hydrogeological framework of the Area of Influence of the Project. Considering this assessment, the project design including river regulation has been conducted and feasible measures have been developed. • In Design Phase, sustainable road drainage and storm water management practices are part of the storm water design process for culverts and drainage stream designs will be implemented and maintained in accordance with international guidelines. • The Soil erosion, Reinstatement and Landscape Management Plan will be developed and implemented. That Plan will reflect the EHS guidelines for Environmental, Health, and Safety

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Guidelines for Toll Roads in full (as well as Serbian Regulations). <u>Construction</u> • In order to protect against flooding and eliminate more consecutive sharp bends and bank erosion, river regulation (see Chapter 3.3 for detailed information) will be carried out by the Contractor.
Change in River Flow • River diversion may affect the natural water flow due to construction of artificial structures such as new flow channels (designed as by pass channels) proposed for meandering sections, which may result in river flow change (in terms of flow speed) due to slope increase that may cause scouring especially during the high water period or heavy rains, impact on subsurface ground water flow and flood risk for down stream etc.	Channalized section of the Morava River	The West Morava River has been identified as a sensitive receptor.	<u>Design</u> • New river beds will be made curves (and not straight) with asymmetrical cross sections. • Natural materials will be used to protect and strengthen banks (turf and forest plantations) in conjunction with steel structures (gabions) rather than monolithic concrete. • The design will not include any structure blocking the continuity of the flow. <u>Operation</u> • Flow monitoring stations will be established at river diversion locations. Number and position of the flow monitoring stations will be defined during the detailed design phase in corrdination with Serbian Environmental Protection Agency and other relevant state institutions. These flow measurement locations will be part of the early warning system for flood protection.
Change in River Water Qualty • Additional sediment movement such as scouring and river-bank erosion. • Contaminant movement from new diversion channel ditch (i.e. due to scoured sediments and river bank erosion etc.)	Channalized section of the Morava River	The West Morava River has been identified as a sensitive receptor.	<u>Design</u> • The potential locations subject to scouring will be strengthened. For this purpose, as mach as natural materials i.e. gabions will be used at these locations. <u>Construction</u> • In general, no significant water quality change in the river is expected. On the other hand, protection of sediment movement at new section

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			will be minimize the risk. These protection measures are already provided in relevant sections (i.e. erosion, soil etc.) • Water quality monitoring along West Morava River will be performed to assess the performance of the mitigation measures.

Table 6-13. Scoring of Surface Water Impacts in Operation Phase

Impacts Before Mitigation									Impact After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Spillage/Leakage to Surface Water	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	4 **High**	-11 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2.25	2 **Low**	-5 **Low**
Wastewater discharge	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	5 **Definite**	-14 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2,25	1 **Improbable**	-2 **Low**
Flooding	-1 **Negative**	4 **Regional**	3 **Medium Term**	5 **Very High**	5 **High**	-4.25	4 **High**	-17 **High**	-1 **Negative**	3 **District**	2 **Short Term**	4 **High**	5 **High**	-3.75	3 **Medium**	-11 **Medium**
Change in River Flow	-1 **Negative**	3 **District**	4 **Long Term**	4 **High**	3 **Medium**	-3.25	4 **High**	-14 **Medium**	-1 **Negative**	3 **District**	4 **Long Term**	2 **Low**	3 **Medium**	-3.00	2 **Low**	-6 **Low**
Change in River Water Quality.	-1 **Negative**	3 **District**	4 **Long Term**	4 **High**	3 **Medium**	-3.25	4 **High**	-14 **Medium**	-1 **Negative**	3 **District**	4 **Long Term**	2 **Low**	3 **Medium**	-3.00	2 **Low**	-6 **Low**

6.3.2 Groundwater

6.3.2.1 Construction Phase

Large construction sites, if not properly managed and operated, may lead to significant negative impacts on groundwater quality of the AoI.

During the construction phase, the potential sources of impact can be due to:

- Aquifers can be contaminated in the event of accidental or intentional discharges of hazardous materials to the ground,
- The bedrock aquifers can be impacted by activities such as site clearance, earthworks, spillages and leakages from construction activities,
- All wastewater from construction accommodation sites and other construction facilities and activities poses a risk to water environment if not treated prior to discharge,
- Deep cuttings and excavation are necessity during construction phase. Deep cuttings may have impacts on groundwater regime.

It is important to note that, regulation activities on Morava River as mentioned in Section 6.3.1.1 will be made in order to transfer water flow to prevent flood without distrupting groundwater levels. Furter details on river regulation works within the scope of the Project is given in Chapter 3.3. of the ESIA Report.

Table 6-14 details the impact and mitigations for groundwater quality in construction phase of the Project.

Table 6-15 shows the overall rating of the impact of before and after mitigations. Leakage to Groundwater and Groundwater Contamination due to Wastewater Discharge to Water Environment are considered medium since the magnitude, the likelihood of the impacts and receptor sensitivity are determined as high. Alteration of groundwater level is considered high since the duration, magnitude, the likelihood of the impacts and receptor sensitivity are determined as high. After taking mitigation measures, as shown in Table 6-15, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-14. Impact and Mitigations for Groundwater Quality in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Leakage to Groundwater • During construction phase, particularly in shallow overburden areas, aquifers can be contaminated in the event of accidental or intentional discharges of hazardous materials to the ground.	Material Storage Waste Storage/Disposal Excavation Excavation for the River Regulation Backfilling Storage, Re-Use and Disposal of Excavations	West Morava River and its tributaries Groundwater Basin in AoI of the Project.	Pre-construction • Fuelling and storage areas will be planned and designed with containment to prevent releases to ground. Construction • Accidental spills will be avoided through good practice and restriction of refueling near watercourses. Safe fueling and gasoline handling procedures will be practiced in the construction areas. Where the construction equipment cannot be moved to fueling points, an impervious surface (such as drip-trays) will be used during refueling of construction equipment to prevent accidental leakage to groundwater. • Hazardous materials will not be stored in excavated areas. • Exposure to hazardous materials in open areas will be kept to a minimum in size and time.
Groundwater Contamination due to Wastewater Discharge to Water Environment • Wastewater generation during construction activities can impact the water quality. Wastewater originated from project facilities and activities used construction works can arise a risk to water environment if it is not treated before discharge	Camp Sites Asphalt Plants Concrete Batching Plants Wastewater Treatment and Disposal	West Morava River Groundwater Basin	Pre-construction • Design of wastewater treatment facilities should sustain water discharge standards provided in Chapter 4 and Appendix – 4. Construction • Wastewater and/or treated wastewater form treatment facilities will not be discharged or collected in any earth based dry stream course or soil pit. • Any underground septic tank either for the collection of wastewater or treated wastewater will be impervious and protected from any leakage.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Integrity of underground septic tanks will be regularly inspected and maintained.
Alteration of Groundwater Level • River regulation may impact groundwater levels. • Use of groundwater during construction works. • If borrow pits are opened deeper than maximum level of groundwater, it may create adversely impact on groundwater.	Excavation of Borrow Pits Excavation for the River Regulation	West Morava River Groundwater Basin	<u>Design</u> • The regulation activities within the scope of this Project is to protect against flooding and eliminate more consecutive sharp bends and bank eroision. • During the design phase, river regulation activities will prioritize to protect and minimize negative impacts on watercourses and stability of the riverbed. • The use of groundwater resources will be subject to approval by the local Authority. The Authority may allow the extraction wells to be drilled and used if the groundwater supply is sufficient. These approvals are based on the availability of the water source. Where the use of ground water is as water source for the construction works (including Project facilities), all permits will be secured before the use. <u>Construction</u> • Groundwater level but excessive dredging below the groundwater level will not be conducted. • Groundwater level will be regularly monitored from existing groundwater wells located near the construction site.Groundwater use shall not exceed the permitted level. • Excavation of the borrow pits can go deeper than groundwater level but excessive dredging below the groundwater level will not be conducted.

Table 6-15. Scoring of Groundwater Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Leakage to Groundwater	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **Very High**	5 **High**	-3.5	4 **High**	-14 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	5 **High**	-2.75	2 **Low**	-5.5 **Low**
Groundwater Contamination due to Wastewater Discharge to Water Environment	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **Very High**	5 **High**	-3.5	4 **High**	-14 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	5 **High**	-2.75	1 **Improbable**	-5.5 **Low**
Alteration of Groundwater Level	-1 **Negative**	2 **Municipality**	5 **Permanent**	5 **Very High**	5 **High**	-4.25	4 **High**	-17 **High**	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **High**	5 **High**	-3.5	1 **Improbable**	3.5 **Low**

6.3.2.2 Operation Phase

Potential impacts on water resources during operation/use of the Motorway are generally more limited than construction phase. Table 6-16 details the impact and mitigations for groundwater quality in operation phase of the project.

New diversion channels will be constructed at the flood plain section (alluvium deposits) of the West Morava River. Geologically, the river-bed of the West Morava River is the surficial part of the shallow aquifer. Due to this fact, the geological characteristics of the new channel same as with the existing river ditch.

Soil quality assessment in the project AoI indicates that there are elevated level of contaminants along the basin. Literarture shows that these elevated contaminant leves are caused by flood sediments either sourced by natural geogenic sources found in West Morava River Basin and/or anthropogenic sources such as mining activities located upper section of the basin. Therefore, existing surface and ground water quality in the basin already defined by these sources. Therefore, no quality cahnge is expected on groundwater. On the other hand, ground water quality monitoring shoyld also be included in parallet to the water quality monitoring along West Morava River in order to assess the performance of the mitigation measures.

Table 6-17 shows the overall rating of the impact of before and after mitigations. Accidental Spillage and Surface Runoff Contaminated Water is considered medium since the magnitude and the likelihood of the impacts are determined as high. After taking mitigation measures, as shown in Table 6-17, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-16. Impact and Mitigations for Groundwater Quality in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Accidental Spillage and Surface Runoff Contaminated Water • Runoff from the road pavement which can contain some degree of silt/dust and pollutants from atmospheric deposition, vehicle emission as well as from possible accidental road spillage incidents can impact quality of groundwater locally.	Movement of the vehicles Crashing	West Morava River and its tributaries Groundwater Basin	Operation • In the event of a major spillage accident, site assessment studies will be carried out in the spillage area and monitoring requirement will be determined accordingly. • Storm water collection channels and ponds are regularly (visually) inspected for its integrity.

Table 6-17. Scoring of Groundwater Impacts in Operation Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Accidental Spillage and Surface Runoff Contaminated Water	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	4 **High**	11 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2.25	2 **Low**	-4.5 **Low**

6.4 Air Quality and Climate

Air quality impacts are expected to occur during the construction and operation phase of the Project.

During construction phase of the Project, impacts to the air quality may result from but not limited to:

- outdoor machinery,
- road construction,
- construction vehicle and equipment,
- transportation,
- emissions caused by construction facilities (i.e. borrow pits, quarries, crushers, screen plants, asphalt plants and batch plants).

On the other hand, the operation phase of the Motorway, major air quality impacts may result from traffic generation.

As a result of environmental baseline studies, sensitive receptors were determined in Chapter 5 of the ESIA Report. Based on the baseline air quality information, the impact on the sensitive receptors was determined and these impacts, together with mitigation methods, are detailed in the Table 6-19 and Table 6-20.

6.4.1 Construction Phase

The construction activities may cause negative impacts on air quality and climate throughout the construction in case inadequate mitigation measures taken.

The Project will extend along an approximately 112 km route and there will be several emission sources on the Proposed Motorway Route. During construction phase, all activities including pre-construction land arrangement, quarry and borrow pit, crushing plants, batch plants, asphalt plants, road construction activities and construction equipment and vehicle movement such as cement mixers, trucks, backhoes, asphalt pavers etc. are sources of air emission.

Significant pollutant will be dust generated from construction activities mentioned above, and the release of engine emissions (such as NO_X, SO_X, particles, CO, VOC etc.) from construction equipment and vehicles.

Detailed emission source list including the location on the Proposed Motorway Route, emission calculations and air modelling methodology are given in Air Quality Modeling Report (see Appendix-8).

Air Modeling studies were carried out on dust parameters for construction activities. Air pollution contribution values (APCV) of PM_{10} and PM deposition, determined from the modeling studies. PM_{10} Air Pollution Contribution Values (APCV) and total pollution values which are calculated according to background monitoring. The results are shown in Table 6-21.

Table 6-18. Construction Phase APCV Determined from the Modeling Studies

Parameter	Period	Maximum APCV (µg/m³)	Limit Values(µg/m³)		
			National Limit Values	EU Limit Values	WHO Limit Values
PM 10	24 Hour	14,2	50	50	50
	1 Year	2,36	40	40	20
PM 2,5	24 Hour	1,27	-	-	25
	1 Year	0,26	-	20	10

In accordance with Table 6-18, daily and yearly APCV of PM_{10} and $PM_{2,5}$ to be originated from construction operations are comply with the national and international standards for all periods.

Table 6-19 details the impact and mitigations for the air quality and climate in the Construction Phase of the Project.

Table 6-20 shows the overall rating of the impacts before and after mitigations. Dust generation is considered medium since the magnitude and the likelihood of the impacts and receptor sensitivity are determined as high. After taking mitigation measures, as shown in Table 6-20, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-19. Impact and Mitigations for Air Quality and Climate in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Dust Generation • Use of unpaved road network during construction works are likely to cause dust. • Due to the high wind speeds occurring in the region, the potential for dust generation increases further, if there are no natural obstacles in the AoI. • Demolition of existing buildings located on the Project alignment can be a dust source. • Use of dusty construction materials. • Outward movement of more than 50 HDVs per day. • Transport, storage and disposal of excavation and residual filling materials and storage of filling and backfill materials. • Concreate batching plant operation.	Camp Sites Material Storage Excavation Backfilling Storage, Re-Use and Disposal of Excavations Material Spreading/Rolling/Compaction Asphalt Concrete Wearing Crushing Machinery and Equipment Asphalt Preparation Concrete Concreate Batching Transportation Demobilization of Equipment and Machinery Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Barrow Pits	All measurement locations[4] used to determine baseline air quality, i.e. the entire buffer area, are determined as sensitive receptors. (see Chapter-5)	<u>Construction</u> • The Project Environmental Management Plan (EMP) will include Air Quality Management procedures that will be implemented. • If there is a requirement for unpaved roads close to settlements to be used by vehicles, surface-binding agents may be used, options include salt to or gravel coat the road. • 20kph speed limit will be applied on unpaved surfaces close to settlements. • Vehicles will be kept clean, so that no dirt is carried on the vehicles into and out of the area. • Where the mitigation measures are inadequate, surface-binding agents will be used in exposed earthworks. • Localized watering/dampening and activity-specific watering/dampening will be used to reduce localized dust emissions. • Stockpiling of stripped surface material, eg. rock, sand and soil, stockpiling of unwashed materials, will be limited. Stockpiles should be kept as enclosed as possible or covered. • Stockpiles will be placed as far away from receptors as possible. • Design of stockpiles will be optimized to maintain a low profile without a sharp change in shapes.

[4] The baseline measurements were made at 42 different points for all Sections in the nearest settlements along the Proposed Motorway Route which were selected based on the proximity to the potential pollution sources of the Project such as Motorway itself and the project facilities. Since the results of the measurements for PM10, PM2.5, SO2 and NO2 do not exceed the Serbian (Degree on monitoring conditions and air quality requirements, "Off. Gazette of RS" No. 11/2010, 75/2010 and 63/2013) and WHO limit values (WHO Ambient Air Quality Guideline), all measurement locations along the entire AoI, are determined as sensitive receptors and the impact assessment will be carried out accordingly.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Wind breaks or dust protection systems (including sprinklers) should be built around the main construction activities where necessary and, if possible, near potentially dusty works to minimize the impact of nearby residential receptors. • Good practice should be applied for selection of Project vehicles that meet the latest emission standards (e.g. EURO 3 or US EPA Tier 2 emission standards) and maintained in a reasonable working order. • When not in use, vehicles should be shut down unless it is due to health and safety reasons (e.g. maintenance of the air conditioner). • Air pollution control equipment (e.g. baghouse) should be installed and operated for the asphalt plants. • During transportation on public roads, the excavated materials will be covered with nylon canvas or suitable materials with a grain size greater than 10 mm in public roads as good practice. • To reduce fugitive dust emission during vehicle operation on public roads and at construction sites, service roads and quarry/material borrow/storage sites, dust suppression methods (i.e. watering with water trucks, applying nontoxic chemicals, speed limits for mobile vehicles, using well-maintained vehicles/equipment) should be used.

Table 6-20. Scoring of Air Quality and Climate Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Dust Generation	-1 Negative	1 Project Site	4 Long Term	4 High	5 High	-3.50	5 Definite	**-18 Medium**	-1 Negative	1 Project Site	4 Long Term	3 Moderate	5 High	-3.25	2 Low Probability	-7 **Low**

6.4.2 Operation Phase

During the operation phase of the Project, air quality and climate may be impacted negatively in case inadequate mitigation measures be taken.

Section-1 of the Morava Corridor Motorway expected to start operation in year 2021.

The main pollution source during the operation phase is exhaust emissions of the vehicles along the Proposed Motorway Route. The calculations of the emissions caused by traffic along the Motorway are divided into three sections as:

1. Pojate – Kruševac
2. Kruševac (Koševi) – Adrani
3. Adrani - Mrčajevci - Preljina

According to data derived from the Roads of Serbia for the year of 2018, the value of average annual daily traffic between Pojate and Preljina ranges from 3,609 vehicles/day (section Ratina - Kraljevo (Kamidžora)) to 12,743 vehicles/day (section Mrčajevci - Preljina). The average value, which accounts for the lengths of individual sections, is 8,205 vehicles/day.

Modeling studies are carried out for NO_2, SO_2, PM_{10}, $PM_{2,5}$ and CO parameters for operation activities. APCV estimated in the measurement points and the associated limit values are presented in Table 6-21.

Table 6-21. Operation Phase APCV Determined from the Modeling Studies

Parameter	Period	Maximum APCV (µg/m³)	Limit Values(µg/m³)		
			National Limit Values	EU Limit Values	WHO Limit Values
SO_2	1 Hour	130.50	350	350	-
	24 Hour	26.33	125	125	20
	1 Year	7.40	50	50	50
NO_2	1 Hour	203.98	150	200	200
	Exceedance	1	can be exceeded 18 times	can be exceeded 18 times	-
	24 Hour	41.16	85	-	-
	1 Year	11.57	40	40	40
PM_{10}	24 Hour	1.45	50	50	50
	1 Year	0.41	40	40	20
$PM_{2,5}$	24 Hour	1.45	-	-	25
	1 Year	0.41	-	20	10
CO	Maximum Daily 8-Hour Mean	100.19	10,000	10,000	10,000
	24 Hour	20.21	5,000	-	-
	1 Year	5.68	3,000	-	-

All parameters complied by the national and international limit values[5]. Only NO_2 parameter slightly exceeds hourly EU and WHO limit value. National standards and EU standards allows to exceed hourly limit values 18 times in a year. Project exceeds hourly NO_2 limits one time. Therefore, modeling studies complies with standards. Only WHO NO_2 limit values slightly exceeded in operation phase.

Table 6-22 details the impact and mitigations for air quality and climate in operation phase of the Motorway.

Table 6-23 shows the overall rating of the impact of before and after mitigations. Impact of the gaseus emissions is considered medium since the receptor sensitivity is determined as high. The modelling study indicates that the impact of gaseus amissions during operation phase of the project is limited and not significant. No project specific mitigation measures are suggested for this impact. In general, it is envistaged that with the implementation of new technologies on mobile sources (i.e. increased engine efficiency, use of electrical cars, and implementation of low emissions standards etc.) emissions will be reduced in time. On the other hand, ambient air quality montitoring is required to assess the contribution of the project.

[5] Degree on monitoring conditions and air quality requirements, "Off. Gazette of RS" No. 11/2010, 75/2010 and 63/2013) and WHO limit values (WHO Ambient Air Quality Guideline)

Table 6-22. Impact and Mitigations for Air Quality and Climate in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Gaseous Pollutant Generation • It is predicted that there will be an increase in the number of vehicles along the Proposed Motorway Route and since the traffic uses the main arterial roads, it will affect the air quality within the wide traffic network because of increase in concentrations of gaseous pollutants.	Movement of the vehicles	All measurement locations used to determine baseline air quality, i.e. the entire AoI are determined as sensitive receptors. (see Chapter-5)	Operation • No mitigation is required. • Continuous air quality monitoring is suggested.

Table 6-23. Scoring of Air Quality and Climate Impacts in Operation Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxl**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Gaseous Pollutant Generation	-1 **Negative**	2 **Municipality**	2 **Short Term**	3 **Medium**	5 **High**	-3.00	3 **Medium**	-9 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	3 **Medium**	5 **High**	-3.00	3 **Medium**	-9 **Medium**

6.4.3 Overview of Greenhouse Gas Emissions Approach

Project activities indicate that the most relevant greenhouse gas (GHG) emitted from the project is Carbon dioxide (CO_2). As the common best practice, GHG emissions are calculated for construction and operation of the phases in accordance to the Greenhouse Gas Protocol[6]. In this respect, GHG calculations are based on three-scope process. These are;

- Scope 1 covers the direct emissions from sources used or controlled by the Contractor.
- Scope 2 emissions include indirect emissions from electric power taken from the grid; and
- Scope 3 emissions include emissions from sources that are neither owned nor directly controlled by the construction company but related to the project activities.

Available data from project plans, public sources, and previous studies have been used. Data gaps are filled with reasonable assumptions to estimate approximate level of the emissions for a given activity.

6.4.3.1 Construction Phase

Relevant activities and calculated CO_2 levels of each scope during construction are given in Table 6-24 below. The Table also includes key assumptions. The construction period is 4 years. In general, a conservative calculation method is considered on the individual assumptions regarding Greenhouse Gas Protocol. In total, the emissions over the entire construction period are about 390,259 tCO_2. With by far the greatest portion occurring under Scope 1 (381,270 t). Scope 2 and Scope 3 are being very minor in comparison. The average combined annual CO_2 emission for the construction period is 97,564 tCO_2/year

[6] The GHG Protocol is developed by World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) to establishe comprehensive global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions.

Table 6-24. Major GHG Emissions during Construction Period

Scope	Project Activity	Description	Emission (tCO_2)
Scope1	Road and River Regulation construction*		
	• Construction machinery- (including generators, project-related vehicles, etc.) • Asphalt and concrete production • transport-hauling of bulk construction materials*	- ROADEO[7] "Road Emissions Optimization: A toolkit for greenhouse gas emissions mitigation in road construction and rehabilitation" is used	381,270
Scope 2	Grid electricity use		
	• Worker Accommodation Camps (approximate 3000 workers in 3 camps)	- Consumption avg 500 kWh/person - 4 years construction period - Grid emission factor for Serbia is 1.099 tCO2/MWh[8]	6,594
Scope 3	Indirect emissions from the off-site production of material		
	• Transport of bitumen	- 300 t/day; - Travel distance 500 km (Pancheva Refinery) - Emission factor 0.280 kg/km	1,725
	• Transport of cement	- 250 t/day; - Travel distance 250 km (nearest cement producers) - Emission factor 0.280 kg/km - diesel[9]	670
Total			**390,259**

* Excavated materials from the river regulation work are planned to be used for road construction. Wit this intention, GHG emissions from the River Regulation Work is included in the total GHG emissions.

6.4.3.2 Operation Phase

Relevant activities and calculated annual CO_2 levels of each scope during operation of the motorway are given in Table 6-25. The table also includes key assumptions. The assumed operation period is taken between the years 2023 and 2045. The average combined annual CO_2 emission for all scopes is about 35,000 tCO_2/year.

It is considered that the Scope 3 emissions will occur only the additional traffic induced by the Motorway, as based the traffic information given in Chapter 3. The Motorway will also result in a certain savings of emissions such as engine improvements for new model cars as well as

[7] Microsoft Excel-based Road Emission Optimization Toolkit has been developed as part of an effort to assess the reduction of GHG emissions in the road construction industry, ESMAP, World Bank Group

[8] The Institute for Global Environmental Strategies (IGES), 2019

[9] WRI, 2019

fuel change. These savings cannot be accurately estimated at this time, and are thus not considered quantitatively in these calculations.

Table 6-25. Major Annual GHG Emissions during Operation Period

Scope	Project Activity	Description	Emission (tCO_2)
Scope1	Road maintenance		
	• Road maintenance (approximately 5 km/year)	- 5% of construction GHG	26,534
Scope 2	Grid electricity use		
	• Lightning of cross roads	- Approximately 1,000 lamps for 12 cross roads - 200 W / Lamp - 60% efficiency - Grid emission factor for Serbia is 1.099 tCO2/MWh	4,396
Scope 3	Indirect emissions from the off-site production of material		
	• Increase in traffic	- Estimated maximum daily bases traffic increase between the years 2018 to 2045 is approximately 11,000, which corresponds to 400 vehicle/day/year. - App. 90% personal cars - App. 10% light and heavy vehicles - 0.240 kg CO_2/km - gasoline - 0.280 kg CO_2/km – diesel	3,989
Total			**34,919**

6.4.3.3 Alternative Analysis

According to Principle 2 of the Equator Principles 1, an alternative analysis (to determine less GHG-intensive options) is required for projects emitting more than 100,000 t of CO_2 equivalent annually within combined Scopes 1 and 2. Per the preceding calculations, the combined Scope 1 and 2 emissions for the construction phase of this Project is about 97,000 tCO_2 per year and for the operation phase it is about 30,000 tCO_2 per year. Both annual values are below the threshold limit of 100,000 tCO_2. In this respect an alternative analysis is not considered for the Project. On the other hand, the calculated annual emissions during construction are based on draft-stage design information and the overall averages are based on 4 years construction phase. During construction of the Project, a year-by-year evaluation of emissions may exceed the 100,000 tCO_2 threshold value in the peak construction periods in particular. Therefore, a further update and breakdown of the GHG emission calculations will be warranted once further

design details and project schedule are confirmed[10]. Furthermore, following are suggested to be considered during detailed design and construction works.

- Minimization of unnecessary earthworks and minimization of travel distances. The main project target is to use excess materials at the same location for different requirement of the project. For example, stripped top-soil will be used for arrangement of the road bunkers and the use of excess materials at borrow areas for site arrangements and backfilling.
- The use of adequate construction equipment. This involves not only thick pavement layers (paving machine, compactor) but also earthworks (grader, compactor)
- The mobilization of qualified workmanship
- The proper management of material production and laying (avoiding
- unnecessary stops during laying operations)
- The selection of adequate materials (to avoid deformation and rutting under traffic load)
- Minimization fuel use and use of more efficient engines end equipment's.
- Equipment's and structures used for the road safety may have significant indirect GHG emission share. For example; construction of safety barriers is can be a major GHG emission source (upto 25%) in a road project. These emissions vary depending on the barriers'type and materials. The principle of the alternative practice is to:
    - Limit the construction of safety barriers to the strict minimum required for safety purpose by optimizing the project
    - Select, where possible, lower emitting materials (from 4 to 23% of GHG emissions due to pavement in the case of steel or concrete barriers and from 2 to 12% in the case of wood barriers)
    - There may be a significant interest in limiting the use of steel and concrete barriers where possible through adequate and safe design (safety zone cleared of obstacles, removal of aggressive spots, etc.), or to replace it by wood barriers when traffic volumes and loads are low enough. The potential impact could be upto 50% of the length of barriers, or from 2 to 12% of the emissions of pavement (depending on the selected structure). This requires anticipation in the geometric design, and efforts during the design phase
- Properly assess the traffic load which the pavement will have to bear during its life. This includes an adequate assessment of overloading, which in turn may result in stronger (thicker) pavement structures than in the absence of overloading. The

[10] Equator Principles, June 2013

expected benefit is to avoid premature failure and reconstruction, which will be ineffective in terms of GHG emissions.

- Assess the potential use of warm and cold asphalt aggregate processes. The literature shows that the total life-cycle of a pavement construction (binder, aggregate, mixing process, transport, processing) with a cold process could reduce GHG emissions from about 30-35 %.
- Assess the potential use of recycled materials. This technic can also be considered for the operation of the motorway, in particular, during maintenance of the road.
    - Cement concrete pavements can be recycled in place by breaking the existing concrete and overlaying it with a new asphalt or cement concrete surface. Alternatively, the existing concrete may be broken up, removed and crushed into aggregate sizes at the mixing plant and used as recycled concrete with additional cement.
    - Reclaimed Asphalt Pavements (RAP) can be recycled:

      In hot mixing plants at a recycling rate generally close to 10% in elevator foot, corresponding to the maximum acceptable threshold in most international specifications and standards. Nevertheless, this level in specifications is being updated by taking into account possible higher recycling rates that can possibly be reached now, depending on recent improvements in mixing plant technology:

      Up to 25% into the mixer,

      Up to 35% into dryer recycling ring,

      Up to 50% in case of two drums in parallel, this is the most advanced technology for hot asphalt recycling, nevertheless available only for very few plants at the present time.

      In hot surface recycling/thermo-regeneration, this technology is usable only for wearing courses on a maximum thickness of 40 mm;

      Cold in mixing plant or on-site by adding as binder either bitumen emulsion (or foam bitumen), or cement or a mix of bituminous emulsion and cement. This technology is very attractive in terms of mitigation of GHG emissions as it permits a recycling rate up to 100% of in-site existing materials, which is significantly higher than recycling technology in hot mixing plants. Nevertheless, the elastic modulus and structural efficiency of these materials remain relatively weak and cause an increase in the thickness of the corresponding layer by about 30% when compared to traditional hot asphalt materials. Also in-site cold recycling requires a sufficient homogeneity of

existing pavement structures, which is not the case for most job sites, causing quality defects.

- Design of the Motorway embankments and drainage system needs to be suitable for the potentially more intense (though less frequent) rainfalls;
- Measures should be reviewed periodically by the Project Operator as part of the environmental management system to promote water conservation at the Service Areas (eg recycling/re-use of any car-wash waters, rainfall recovery/re- use for onsite irrigation).

6.4.3.4 Monitoring & Reporting Requirements

According to Annex A of the Equator Principles, project developers/ borrowers must quantify Scope 1 and 2 GHG emissions in accordance with internationally recognized methods and goods practices. These Scope 1 and 2 emission levels must then be publicly reported annually if they exceed 100,000 tCO_2 equivalent annually during the operational phase of the project. Whilst not obligatory, borrowers are encouraged to voluntarily report their emissions if exceeding 25,000 tCO_2 equivalent annually. In the case of this Project, per the above calculations and assumptions, the Scope 1 and 2 emissions during operations are estimated to be about 30,000 tCO_2 that is above the threshold. In this respect, a public reporting is suggested for the operation of the Motorway.

In order to contribute to enforcement of EU Acquis in a climate change field and fulfilment of obligations under the UNFCCC, the Government of Serbia has launched an EU twinning project “Establishment of a mechanism for implementation of the Monitoring and Reporting of GHG Emissions (MMR)”. The main goal of the project is the establishment and maintaining of a system and processes for collection and storage of and report on climate change related data and information.

6.4.3.5 Climate Change Adaptation

The Republic of Serbia has been part of the United Nations Framework Convention on Climate Change (UNFCCC) since 2001 and the Kyoto Protocol since 2008 as a developing country (non-Annex I country). The Republic of Serbia defines the Climate Change (CC) as a global challenge that requires a rapid and decisive response from every country. It is anticipated that the consequences of climate change could have material, financial impacts as well as human loss in The Republic of Serbia. In this respect, The Republic of Serbia has developed “The National Climate Change Strategy” (NCCS) in 2019 in order to establish a strategic framework for climate action and including adaptation options addressing the climate risks. NCCS is also an indicator that RS is moving forward in the fulfilment of both its international commitments

and national objectives. The Paris Agreement11 is the major basis of the NCCS. Prior to the Paris Conference, Serbia submitted its Intended National Determined Contribution (INDC) with the pledge to reduce greenhouse gas emissions of 9.8% by 2030 compared to 1990 levels (Ref 1).

The Second National Communication (SNC) and the draft National Adaptation Plan (NAP) of Serbia indicate that the average temperature increase between the period 1960-2012 is about 0.3°C per decade. Furthermore, developed climate scenario models anticipate future temperature increase estimates varies in the range from 3.8 to 4.6°C (depending on climate scenarios) (Ref 2). In parallel to temperature increase, a significant decrease in precipitation amount compared to the reference period (1961-1990) during the most of seasons (except in spring) is projected for the period of 2071-2100 over the majority of the country. This decrease is projected up to 30% in the summer season across almost the whole territory of the Republic of Serbia. Moreover, the impacts of climate change may, among other, jeopardize infrastructure, agriculture productivity, water availability and public health. Vulnerability and Adaptation options for the purpose of the Strategy were identified also based on the Second National Communication (SNC) and the draft National Adaptation Plan (NAP). These documents underline three most vulnerable sectors:

1. Agriculture – food production:
2. Forestry – bioenergy:
3. Hydrology and Water Resources – hydro-electric production:

As given in the Draft Low Carbon Development Strategy Action Plan (LCDSAP) dated December 2019, total GHG emissions in 2015 estimated as to 61.233 kt CO2eq, which represents 2,3% decrease of emissions compared to the year 2010 and 24,9% compared to 1990.

Energy is the major GHG emitting sector in the country with a share of 80,6% in overall emissions, of which, the sub-sector Energy Industries that contains public electricity and heat production, transport, refineries and manufacturing of fuels. In the country there is a decreasing trend for GHG emissions since 1990 (21,4%) due to lower production in general. Structural changes in the sector are other cause of the decrease. Compared to 2010, emissions have been decreased by 5% in 2015.

[11] The Paris Agreement, adopted under the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 and entered into force on 4 November 2016. It sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C. Previously, the European Union (EU) adopted the 2030 Climate and Energy Framework; its targets entail a GHG reduction of 40% by 2030 compared to 1990 levels.

GHG emissions in sub sectors/categories of the energy sector in 2015 were:

- In Transport sector the GHG emissions are 31,4% higher than in 1990 and 11,1% below the 2010.
- GHG emissions from Manufacturing Industries and Construction are 46,2% lower than 1990 values and 19,3% lower than 2010. This decrease is the consequence of the decrease in manufacturing industry and, to some extent, to the increase in the biomass consumption (137% higher than 2010).
- GHG emissions in the “Other sectors”, (commercial, residential and other institutional buildings and fuel combustion in agricultural stationary equipment) are 61,5% lower than 1990 values and 22% lower than 2010.
- Fugitive GHG emissions i) from mining and post-mining activities, ii) oil and gas production, and processing (the main source of CH4 emissions in the Energy sector) are 34,3% lower than in 1990 values and 4,7% higher than in 2010.

Four mitigation scenarios are developed under the LCDSAP in order to develop the strategy as well as to identify the indicators for the achievement of the climate vision. The models used for all scenarios are also covers the EU targets regarding 2020, 2030 and 2050 in addition to the respective policies and measures, besides national requirements. The base year used for expression of the GHG emission reduction is 2010.

Those scenarios are:

- Scenario 1: Baseline scenario regarding current trend plus implementation of the EU-Emission Trading Scheme.
- Scenario 2: Implementation of all EU acquis in whole is transposed and implemented,
- Achieving 33% GHG emissions compared to 1990; With the use of Renewable Energy Sources (RES) by 2030 and implementation of Enhanced Energy Efficiency (EEE), as the Republic of Serbian contribution to the EU target (Contribute to 1,50C goal).
- Scenario 3: The Republic of Serbia individually achieves the EU 2030 targets (meaning -40% GHG emissions compared to 1990; with the use of RES by 2030 and increased level of EEE.)
- M4 scenario: Serbia achieves 80% GHG cuts in 2050 compared to 1990 levels (aligned with the European Commission communication on climate neutrality).

Action Plan annexed to the LCDSAP covers two mitigation items (Item 11 and Item 14), which are directly related to the Project. According to these items

- (Item 11) New vehicles are becoming more efficient based on CO2 standards that are in effect in EU, of which Serbia benefits indirectly. The EU has adopted Regulation

443/2009 defining targets for CO2 emissions of 130 gCO2/km in 2015 and 95 gCO_2/km in 2021. In 2019, the EU targets for 2030 have been agreed, emissions have to decrease by 37.5 % by 2030 compared to 2021 levels for cars and by 30 % for vans. The EU, for the first time in 2019, agreed also on the reduction target for trucks and buses, for which the average emissions of new vehicles in 2030 will have to be 30 % lower than in 2019. Based on these targets, vehicles in Serbia will become more efficient even if Serbia is not part of the EU, since the same vehicles are sold in Serbia as in EU. Serbia needs to align its legislation to the EU legislation no later than by 2021.

For the improvement of efficiency of vehicles, it is important that Serbia controls the import of used cars and their use, especially for very old vehicles. There is a risk that, due to upcoming electrification, even more old vehicles from the EU will be imported to Serbia, limiting the effects of the legislation on new vehicles. That is why the legislation on yearly taxation has to change in the way that it will stimulate buying vehicles that are more efficient and emits less CO_2 per km. The Law on taxes on the use, possession and carrying goods (Official Gazette of the Republic of Serbia no. 26/01, 80/02, 43/04, 132/04, 112/05, 114/06, 118/07, 114/08 and 31/09) defines yearly tax for vehicles that is dependent on the volume of the engine and age of the vehicle. Discount for older cars needs to be gradually removed, since they have much greater negative impact on the environment than new cars. To support low CO_2 emissions vehicles, CO_2 emissions should be included in the calculation of level of the yearly registration tax, with lower taxes for lower emitting cars. For a faster penetration of electric vehicles, subsidies would need to be offered, at least in the early stage of market development. Furthermore, the Public Procurement Directive, aligned with the Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles, recognizes that public procurement can be a powerful market mover for the introduction of new technologies, including of clean and high energy efficient vehicles. This is not because it can have direct large impact on emissions reduction, but because of its large demonstration effect. Serbia will have to invest in charging infrastructure for electric vehicles and also for other alternative fuels (natural gas). This will, partially, have to be supported by the Government (through energy efficiency fund).

- (Item14) Freight transport is necessary for economic growth and normally witnessing higher growth rates than GDP. As such, in a context where Serbia's GDP will continue to grow and freight more than the GDP, it is important to find modalities to limit from this source, without necessarily limiting freight and growth. Serbia lies on X. and XI. Corridors experiencing high freight flows also from abroad. These will heavily increase when Serbia joins the EU, as has also been experienced by other countries joining EU, due to free trade and movement of goods.

  Therefore, in order to support promotion of sustainable freight transport it is important to implement modulation of yearly infrastructure charges for HDVs according to CO_2

emission performance standards and implement road charging for freight vehicles based on EURO emission standard.

Furthermore, the updates of Strategy of railway, road, inland waterway, air and intermodal transport development of Republic of Serbia 2008-2015 has to be prepared to assess different aspects of transport development and Serbia's needs and possibilities to define optimal infrastructure development path for the future in order to ease the future pressure on road infrastructure.

With the implementation of these mitigations, it is aiming to save total of 908 ktCO2 eq per annum by the year of 2030.

6.4.3.6 Assessment of GHG Contribution

The GHG estimates demonstrates that GHG contribution of the project during construction is about 97 ktCO2 per year, which is approximately 0,2 % of the estimated total emissions of the Republic of Serbia for the year 2015. By considering the four year construction period, the GHG contribution of the construction works will be limited and will not cause a major change for the national targets. Furthermore, the Project itself is the one of the target project to help to increase the energy efficiency objective of the action plan, in particular during the operation phase of the project. The impact of the GHG emissions are considered minor and negligible.

6.5 Noise and Vibration

Noise levels around the AoI will increase during the construction temporarily and operation phase of the Project. The difference between the baseline noise levels and the noise levels during Project implementation will determine the impact and its significance. Table 6-32 and Table 6-39 detail the impact and mitigations for the noise and vibration in the Construction Phase and Operation Phase of the Project.

Modelling study was performed to determine noise and vibration level both for construction and operation phase of the Project. Receiver (R) coordinate information used in Acoustic Report of the modelling study is given in Table 6-26.

Table 6-26. Receiver Information

Receivers	Comments	Extent	Sensitivity	Importance	Distance to road axis (m)	Road Points (Km)	Coordinate, X	Coordinate, Y
1	Residential buildings	Site	Medium	Medium	380	0	21,44011567	43,75122803
2	Commercial	Single	Low	Low	110	0-1	21,44186074	43,74192927
3	Residential buildings	Site	Medium	Medium	520	3-4	21,42976922	43,72001481
4	Residential buildings	Site	Medium	Medium	130	8	21,41243567	43,6852153
5	Residential buildings	Site	Medium	Medium	375	9-10	21,40308767	43,67331834
6	Residential buildings	Site	Medium	Medium	470	10-11	21,38126393	43,67474381
7	Residential buildings	Site	Medium	Medium	500	13	21,37153381	43,65392251
8	Residential buildings	Site	Medium	Medium	710	17	21,36115823	43,62354901
9	Residential buildings	Site	Medium	Medium	100	17-18	21,36572827	43,61681742
10	Residential buildings	Site	Medium	Medium	390	23	21,29667742	43,61026439
11	Residential buildings	Site	Medium	Medium	55	25-26	21,27045309	43,59580577
12	Residential buildings	Site	Medium	Medium	175	28	21,24241451	43,58600911
13	Residential buildings	Site	Medium	Medium	300	30-31	21,22182492	43,60224038
14	Residential buildings	Site	Medium	Medium	720	32-33	21,19832145	43,61388088
15	Residential buildings	Site	Medium	Medium	350	36-37	21,14714958	43,61300376
16	Residential buildings	Site	Medium	Medium	540	38-39	21,13068071	43,61912856
17	Residential buildings	Site	Medium	Medium	25	43-44	21,07279784	43,62641037
18	Residential buildings	Site	Medium	Medium	40	45	21,05515895	43,62606008
19	Residential buildings	Site	Medium	Medium	150	46-47	21,03972995	43,63077563
20	Residential buildings	Site	Medium	Medium	190	48	21,02440913	43,63307597
21	Residential buildings	Site	Medium	Medium	20	50-51	20,9972607	43,6248578
22	Residential buildings	Site	Medium	Medium	300	50-51	20,99784337	43,62190447
23	Residential buildings	Site	Medium	Medium	40	51-52	20,98103379	43,6306549
24	Residential buildings	Site	Medium	Medium	40	52-53	20,97078178	43,63135506
25	Residential buildings	Site	Medium	Medium	10	54	20,95400673	43,6349962

Receivers	Comments	Extent	Sensitivity	Importance	Distance to road axis (m)	Road Points (Km)	Coordinate, X	Coordinate, Y
26	Residential buildings	Site	Medium	Medium	25	56-57	20,92724325	43,64372526
27	Residential buildings	Site	Medium	Medium	30	58	20,91133288	43,65390663
28	Residential buildings	Site	Medium	Medium	60	60	20,89165185	43,66116494
29	Residential buildings	Site	Medium	Medium	190	61-62	20,8750816	43,66141816
30	Residential buildings	Site	Medium	Medium	20	63	20,85612756	43,66265644
31	Residential buildings	Site	Medium	Medium	85	66	20,83094431	43,67790181
32	Residential buildings	Site	Medium	Medium	100	68-69	20,80320696	43,68858119
33	Residential buildings	Single	Medium	Medium	140	70	20,7871039	43,69833968
34	Residential buildings	Site	Medium	Medium	120	72	20,76654634	43,70637611
35	Residential buildings	Site	Medium	Medium	120	74	20,75229284	43,72259825
36	Residential buildings	Single	Medium	Medium	60	74-75	20,74979203	43,72686968
37	Hotel	Single	Medium	Low	180	75-76	20,73880279	43,72996946
38	Residential buildings	Site	Medium	Medium	350	76	20,73626687	43,73629339
39	Residential buildings	Site	Medium	Medium	230	77-78	20,72019148	43,74036096
40	Residential buildings	Site	Medium	Medium	900	79	20,68411075	43,74585837
41	Residential buildings	Site	Medium	Medium	90	80-81	20,70126681	43,75002828
42	Residential buildings	Site	Medium	Medium	140	80	20,6630601	43,75450502
43	Residential buildings	Site	Medium	Medium	750	80-81	20,66982602	43,76199799
44	Residential buildings	Site	Medium	Medium	650	81	20,64882123	43,7636101
45	Residential buildings	Single	Medium	Medium	390	82	20,65682249	43,7722241
46	Residential buildings	Single	Medium	Medium	320	84	20,63052744	43,78278467
47	Residential buildings	Site	Medium	Medium	40	87	20,59837392	43,79070763
48	Residential buildings	Site	Medium	Medium	380	89	20,57821617	43,80272715
49	Residential buildings	Single	Medium	Medium	580	90-91	20,56479579	43,81390457
50	Residential buildings	Single	Medium	Medium	130	95	20,5148306	43,83451111
51	Residential buildings	Site	Medium	Medium	50	98	20,49456125	43,853061

Receivers	Comments	Extent	Sensitivity	Importance	Distance to road axis (m)	Road Points (Km)	Coordinate, X	Coordinate, Y
52	Residential buildings	Single	Medium	Medium	260	103-104	20,43653608	43,87762186
53	Residential buildings	Site	Medium	Medium	75	106	20,41582447	43,88774603
54	Residential buildings	Single	Medium	Medium	40	106-107	20,41233937	43,89400372
55	Residential buildings	Single	Medium	Medium	70	107-108	20,41012081	43,90054694
56	Residential buildings	Site	Medium	Medium	70	107-108	20,40763814	43,90855635
57	Residential buildings	Site	Medium	Medium	160	108-109	20,40261895	43,90983574
58	Residential buildings	Site	Medium	Medium	140	108-109	20,40507555	43,91201844
59	Residential buildings	Single	Medium	Medium	80	109-110	20,39605276	43,91628384
60	Residential buildings	Site	Medium	Medium	710	106-107	20,40427300	43,89262900
61	Residential buildings	Site	Medium	Medium	211	83	43,76726800	20,63514500
62	Residential buildings	Site	Medium	Medium	487	73	43,71067200	20,75822600
63	Residential buildings	Site	Medium	Medium	600	66-67	43,6862280	20,8289360
64	Residential buildings	Site	Medium	Medium	60	60	43,6732750	20,9010080
65	Residential buildings	Site	Medium	Medium	62	53-54	43,6335660	20,9580860
66	Residential buildings	Site	Medium	Medium	30	54-55	43,6431610	20,9485080
67	Residential buildings	Site	Medium	Medium	90	53	43,6315780	20,9638150
68	Residential buildings	Site	Medium	Medium	107	48-49	43,6242360	21,0150470
69	Residential buildings	Single	Medium	Medium	327	42	43,6260830	21,0905230
70	Residential buildings	Site	Medium	Medium	34	25-26	43,6024630	21,2652670
71	Residential buildings	Site	Medium	Medium	461	18	43,6118130	21,3623020

6.5.1 Construction Phase

Although the construction noise is temporary, the noise levels will increase significantly during the construction phase of the Project compared to the baseline condition.

Potential source of noise and vibration impacts may be caused by but not limited to:

- noise and vibrations emitted by machinery, equipment and vehicles used during construction,
- demolition,
- production of gravel and concrete,
- construction works (i.e. earthworks, bridge construction, on-site and off-site transport of materials, etc.)

Therefore, emission of noise and vibrations will affect sensitive receptors (for details of the sensitive receptors see Chapter 5 of the ESIA Report).

Noise Modelling Study was performed to determine noise and vibration level for construction phase of the Project.

Construction Noise

To perform noise modelling study, the quantities of construction machines and equipment that will be required for construction activities were taken into consideration as sources of noise emissions. All of the construction sub-stages were assumed to be held at the same time in a specific construction corridor around main motorway axis and they are defined as area sources. Besides, quarries, concrete plants and asphalt plants were also integrated to the noise model as separate area sources. All noise sources for the construction are defined as area noise sources and machine and equipment are considered as distributed noise sources over defined areas.

Phases of the construction are earthworks, structural works, paving and finishing works. In the worst-case scenario, all the phases of the construction takes place at the time but in different locations.

Construction machine and equipment list and their sound power levels are detailed in acoustic report which gives also methodology of impact assessment. (See Appendix-9).

Table 6-29 below summarizes the details of the noise impact assessment for construction phase.

Table 6-27. Sound Power Level of Construction Phase

Sound Power Level for Each Phase							
	Lw (dBA)	Earthworks		Concrete Works		Finishing	
Machine/Equipment	Lw For Each Equipment	Quantity	Total Lw (dBA)	Quantity	Total Lw (dBA)	Quantity	Total Lw (dBA)
Excavator	104.5	40	120.6	10	114.5	10	114.5
Grader	104.5	10	114.5	-	0	-	0
Truck	103.5	600	131.3	250	127.5	50	120.5
Roller	101.5	2	104.5	2	104.5	15	113.3
Pumps	97.5	10	107.5	30	112.3	10	107.5
Man Lift	101.5	5	108.5	5	108.5	5	108.5
Vacuum Street Sweeper	93.5	4	99.5	1	93.5	1	93.5
Front End Loader	99.5	50	116.5	20	112.6	10	109.5
Mixer	100.5	10	110.5	30	115.3	10	110.5
Paver	105.5	-	0	-	0	12	116.3
Rock Drill	101.5	6	109.3	-	0	-	0
Compressor (air)	99.5	10	109.5	10	109.5	5	106.5
Generator	102.5	60	120.3	50	119.5	30	117.3
Pickup Truck	74.5	45	91.1	40	90.6	80	93.6
Compactor (ground)	96.5	64	114.6	-	0	-	0
Crane	100.6	5	107.6	30	115.3	10	110.6
Hydra Break Ram	103.5	10	113.5	5	110.5	-	0
Total		132.4 dBA		128.9 dBA		124.7 dBA	

Table 6-28. Sound Power Level of Plants

Sound Power Level for Each Phase							
	Lw (dBA)	Asphalt Plant		Batch Plant		Barrow Pit/Quarry	
Machine / Equipment	Lw For Each Equipment	Quantity	Total Lw (dBA)	Quantity	Total Lw (dBA)	Quantity	Total Lw (dBA)
Slurry Plant	101.5	2	104.5	-	0	-	0
Truck	103.5	40	119.6	-	0	-	0
Generator	102.5	1	102.5	1	102.5	1	102.5
Rock Drill	101.5	-	0	-	0	1	101.5
Grader	104.5	-	0	2	107.6	1	104.5
Dump Truck	103.5	-	0	25	117.5	25	117.5
Mixer	100.5	-	0	40	116.5	-	0
Pumps	97.5	-	0	2	100.5	-	0
Concrete Batch Plant	98.3	-	0	-	0	-	0
Front End Loader	99.5	1	99.5	1	99.5	1	99.5
Total		119,8 dBA		120,5 dBA		118 dBA	
Lw'' (sound power level per area) (dBA/m^2)		70 dBA/m^2		75 dBA/m^2		60 dBA/m^2	

Table 6-29. Assessment Ldn for Construction Phase

Location	Distance (m)	Source Leq	Limit Value	Limit Exceedance	Magnitude Of Impact			Responsivity			Impact Significance
		Ld (dBA)	Ld (dBA)		Scale Of Impact	Extent	Impact Mag	Importance	Sensitivity	Responsivity	
R1	380	50,9	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R2	110	62,8	55	7,8	Medium	Single	N	Low	Low	Low	Negligible
R3	520	51,7	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R4	130	62,3	55	7,3	Medium	Site	M	Medium	Medium	Medium	Moderate
R5	375	56,4	55	1,4	Negative	Site	N	Medium	Medium	Medium	Negligible
R6	470	53,7	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R7	500	54,8	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R8	710	52,9	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R9	100	63,5	55	8,5	Medium	Site	M	Medium	Medium	Medium	Moderate
R10	390	57,2	55	2,2	Negative	Site	N	Medium	Medium	Medium	Negligible
R11	55	71,5	55	16,5	Large	Site	L	Medium	Medium	Medium	Major
R12	175	59,9	55	4,9	Small	Site	S	Medium	Medium	Medium	Minor
R13	300	57,0	55	2,0	Negative	Site	N	Medium	Medium	Medium	Negligible
R14	720	41,1	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R15	430	56,2	55	1,2	Negative	Site	N	Medium	Medium	Medium	Negligible
R16	370	52,3	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R17	330	57,9	55	2,9	Negative	Site	N	Medium	Medium	Medium	Negligible
R18	680	54,9	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R19	570	53,0	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R20	740	53,5	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R21	20	72,4	55	17,4	Large	Site	L	Medium	Medium	Medium	Major
R22	300	56,8	55	1,8	Negative	Site	N	Medium	Medium	Medium	Negligible
R23	40	70,9	55	15,9	Large	Site	L	Medium	Medium	Medium	Major
R24	40	69,7	55	14,7	Large	Site	L	Medium	Medium	Medium	Major

Location	Distance (m)	Source Leq	Limit Value	Limit Exceedance	Magnitude Of Impact			Responsivity			Impact Significance
		Ld (dBA)	Ld (dBA)		Scale Of Impact	Extent	Impact Mag	Importance	Sensitivity	Responsivity	
R25	10	71,4	55	16,4	Large	Site	L	Medium	Medium	Medium	Major
R26	25	72,7	55	17,7	Large	Site	L	Medium	Medium	Medium	Major
R27	30	71,6	55	16,6	Large	Site	L	Medium	Medium	Medium	Major
R28	60	73,1	55	18,1	Large	Site	L	Medium	Medium	Medium	Major
R29	190	59,9	55	4,9	Small	Site	S	Medium	Medium	Medium	Minor
R30	56	73,1	55	18,1	Large	Site	L	Medium	Medium	Medium	Major
R31	285	66,1	55	11,1	Large	Site	L	Medium	Medium	Medium	Major
R32	35	65,2	55	10,2	Lage	Site	L	Medium	Medium	Medium	Major
R33	140	61,6	55	6,6	Medium	Single	N	Medium	Medium	Medium	Negligible
R34	120	62,2	55	7,2	Medium	Site	M	Medium	Medium	Medium	Moderate
R35	120	63,7	55	8,7	Medium	Site	M	Medium	Medium	Medium	Moderate
R36	60	72,3	55	17,3	Large	Single	S	Medium	Medium	Medium	Minor
R37	180	60,6	55	5,6	Medium	Single	N	Low	Medium	Low	Negligible
R38	350	57,4	55	2,4	Negative	Site	N	Medium	Medium	Medium	Negligible
R39	230	59,0	55	4,0	Small	Site	S	Medium	Medium	Medium	Minor
R40	900	56,4	55	1,4	Negative	Site	N	Medium	Medium	Medium	Negligible
R41	90	65,9	55	10,9	Large	Site	L	Medium	Medium	Medium	Major
R42	140	61,9	55	6,9	Medium	Site	M	Medium	Medium	Medium	Moderate
R43	750	51,8	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R44	650	52,6	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R45	390	55,2	55	0,2	No Impact	Single	No Impact	Medium	Medium	Medium	No Impact
R46	320	56,7	55	1,7	Negative	Single	N	Medium	Medium	Medium	Negligible
R47	40	71,3	55	16,3	Large	Site	L	Medium	Medium	Medium	Major
R48	380	55,9	55	0,9	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R49	580	52,6	55	0,0	No Impact	Single	No Impact	Medium	Medium	Medium	No Impact

Location	Distance (m)	Source Leq	Limit Value	Limit Exceedance	Magnitude Of Impact			Responsivity			Impact Significance
		Ld (dBA)	Ld (dBA)		Scale Of Impact	Extent	Impact Mag	Importance	Sensitivity	Responsivity	
R50	130	62,6	55	7,6	Medium	Single	N	Medium	Medium	Medium	Negligible
R51	50	72,7	55	17,7	Large	Site	L	Medium	Medium	Medium	Major
R52	260	66,0	55	11,0	Large	Single	S	Medium	Medium	Medium	Minor
R53	75	70,5	55	15,5	Large	Site	L	Medium	Medium	Medium	Major
R54	40	72,1	55	17,1	Large	Single	S	Medium	Medium	Medium	Minor
R55	70	68,4	55	13,4	Large	Single	S	Medium	Medium	Medium	Minor
R56	70	61,6	55	6,6	Medium	Site	M	Medium	Medium	Medium	Moderate
R57	160	61,5	55	6,5	Medium	Site	M	Medium	Medium	Medium	Moderate
R58	140	62,3	55	7,3	Medium	Site	M	Medium	Medium	Medium	Moderate
R59	80	66,9	55	11,9	Large	Single	S	Medium	Medium	Medium	Minor
R60	710	51,8	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R61	211	56,2	55	1,2	Negative	Site	N	Medium	Medium	Medium	Negligible
R62	487	57,5	55	2,5	Negative	Site	N	Medium	Medium	Medium	Negligible
R63	550	53,2	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R64	60	47,6	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R65	62	59,5	55	4,5	Small	Site	S	Medium	Medium	Medium	Minor
R66	30	56,0	55	1,0	Negative	Site	N	Medium	Medium	Medium	Negligible
R67	90	60,1	55	5,1	Medium	Site	M	Medium	Medium	Medium	Moderate
R68	280	57,8	55	2,8	Negative	Site	N	Medium	Medium	Medium	Negligible
R69	160	63,4	55	8,4	Medium	Single	N	Medium	Medium	Medium	Negligible
R70	34	54,5	55	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R71	461	62,2	55	7,2	Medium	Site	M	Medium	Medium	Medium	Moderate

Since construction activities will end in a specific time period (4 years), no residual noise impacts are expected from construction activities.

Construction Vibration

Vibration during the construction phase is mainly from two main sources:

- blasting activities held in quarries and
- construction vibration due to machine and equipment that is used in main motorway construction.

Vibration from blasting activity was calculated for two scenarios for every facility where blasting activity is held. One scenario assumes that blasting is happening at the closest point to the residential areas in the boundary polygon of facility. Second scenario as assumes that blasting is happening at the mean distance inside the boundary polygon of facility. This strategy was developed because the area of the facilities that includes blasting activities is very large and it cannot be precisely known where the specific blasting point is.

With given blasting design it is estimated that the closest safe distance for blasting activities is 185 meters, which is calculated by using the Divine Equation. The values used in the calculation are given in Table 6-30 and the figure for blasting calculations is given below**.** Any blasting activity will be dangerous and has impact closer than this distance to the receiving bodies.

All of the receiving bodies are counted as Category III according to the US Federal Transit Administration document that is non-engineered timber and masonry buildings. (John A. Volpe National Transportation Systems Center, 2018)

Table 6-30. Blasting Calculations at Quarry Areas

Facility Information				Receptor Minimum Distance			Receptor Average Distance			Assessment Min Distance	Assessment Ave. Distance	Limits
Facility	Explosive amount in single hole (kg)	Receptor Distance Min (m)	Receptor Distance Average (m)	Vibration PPV (mm/s)						FTA Limits	FTA Limits	FTA Categories 3
Makresane Quarry	50	500	750	2.0	0.4	1.0	1.1	0.2	0.5	Suitable	Suitable	5.08
Citluk Quarry	50	40	300	116.1	23.2	58.1	4.6	0.9	2.3	Impact	Suitable	5.08
Vrnjci Quarry 1	50	20	250	352.0	70.4	176.0	6.2	1.2	3.1	Impact	Suitable	5.08
Vrnjci Quarry 2	50	580	800	1.6	0.3	0.8	1.0	0.2	0.5	Suitable	Suitable	5.08
Sumarice Quarry	50	10	300	1066.9	213.4	533.5	4.6	0.9	2.3	Impact	Suitable	5.08

For main Proposed Motorway Route construction vibration calculations, it was identified that the process that produces most vibration is “Surface Filling”. Calculations were held according to the information and reference vibration levels gathered from FTA document. Reference vibration levels for specific equipment for “Surface Filling” activities are given in following Table 6-31.

Table 6-31. Reference Vibration Levels for Machine and Equipment

Surface Filling	Reference Vibration (inch/sec) @25 feet
Finisher	0,089
Double Metal Banded	0,21
24 tons Adjustable Tıre Pressure Cylınder	0,21
Double Steel Banded Cylınder (3 TONS)	0,21
CAT 955 Loader	0,089
Asphalt Sweeper	0,076
Compactor	0,21
Street Sweeper	0,89

Critical distance was calculated as 35 meters for main motorway construction vibration calculations. As can be seen from Figure 6-1, any Proposed Motorway Route construction activity closer than 35 meters to the receiving bodies will have impact and will be dangerous. Again, for main Proposed Motorway Route construction vibration calculations buildings are counted as Category III according to FTA document.

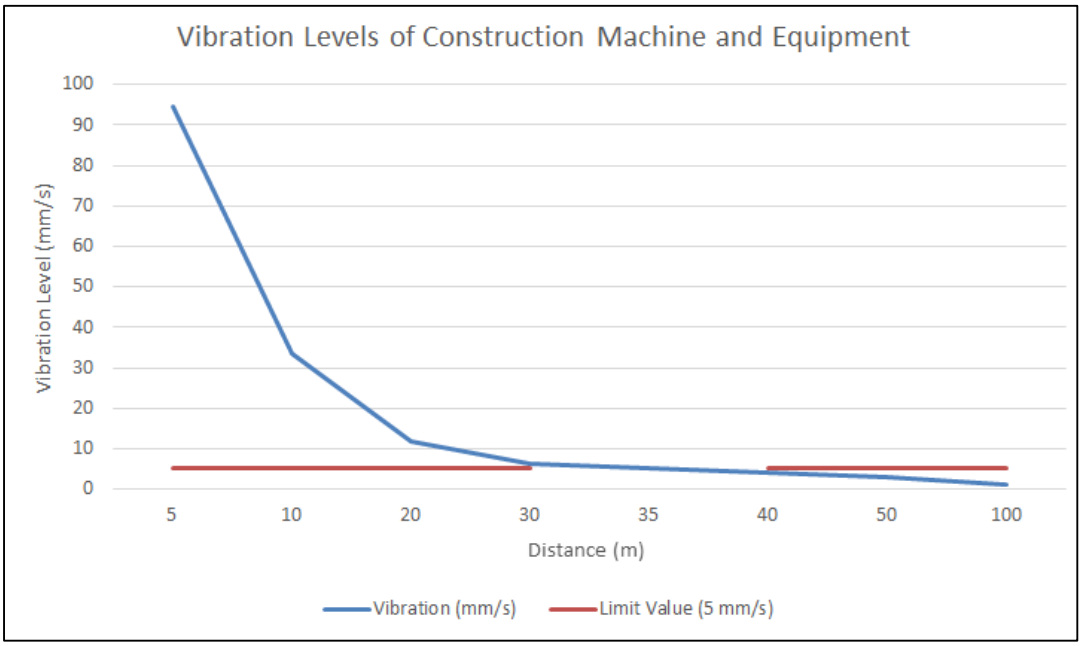


Figure 6-1. Vibration Critical Distance for Main Motorway Construction Activities

As shown in Table 6-33, the overall rating of vibration is considered medium since the magnitude and the likelihood of the impacts are determined as high due to blasting activities within the scope of Project. After taking mitigation measures, the likelihood and the magnitude of the impact expected to decrease to the levels stipulated by the national regulations.

Table 6-32. Impact and Mitigations for Noise and Vibration in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Noise Pollution • The noise impact will be temporarily and expected to affect the settlements within the AoI of the Project. • In construction of bridges and viaducts, noise arising from general construction works is considered in road construction site evaluations. Bored piles is used, which has lower noise level than driven piles. • Noise pollution due to vehicle operation.	Camp Sites Material Storage Excavation Backfilling Storage, Re-Use and Disposal of Excavations Excavation for River Regulation Material Spreading/Rolling/Compaction Asphalt concrete Wearing Crushing Machinery and Equipment Asphalt Preparation Concreate Batching Transportation Demobilization of Equipment and Machinery Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Barrow Pits	All Settlements within the AoI (see Chapter 5)	<u>Pre-construction</u> • Project Environmental Management Plan (EMP) will include Noise and Vibration and Management Plan that will be define the sensitive receptor locations, monitoring program and specific mitigation measures to be implemented. • Traffic Management Plan (EMP) and construction Method Statements will include any agreed noise and vibration mitigation measures. • Planning of transport routes including temporary access roads, haul roads and construction work sites should be determined to avoid populated areas and away from sensitive receptors and villages as much as possible. • The Project should consider the construction of a newly allocated access road instead of using the existing road network. • As Project construction progresses, buildings that may be potentially affected will be identified prior to construction, including assessing whether buildings are sensitive to night-time disturbance. <u>Construction</u> • Motorway alignment will be used for the transport of construction materials and equipment wherever possible. • Internal haul routes will be well designed and maintained and steep gradients should be avoided where possible. • Empty vehicles will not have loose chains or other noise “generating parts on the loading platform. • During off-loading, materials will dropped from an appropriate height to avoid noise disturbance to the surrounding receptors or to minimize noise from the site in general. • All construction equipment and vehicles will be regularly checked and maintained. This should particularly include the regular inspection of diesel powered equipment and, if necessary, replacement of intake and exhaust silencers. Any change in the

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance. • Position of all auxiliary plant (e.g. generators, compressors) should be determined to cause minimal noise disturbance. • In case of noise exceedance, silencers or acoustic enclosures on machines as well as portable sound barriers around stationary equipment, should be installed where applicable. • 20kph speed limit will be applied on unpaved roads to reduce noise and vibration, limit fugitive dust generation, reduce emission and reduce the risk of accidents (vehicles, pedestrians, cyclist, and fauna). • Speed exceedances will be notified to the site administration and handled according to H&S Management Plan. • Additional driver training, temporary speed restrictions, improved driving monitoring, etc., will be provided as necessary or required. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Noise mitigation measures specifically related to equipment and vehicle traffic through sensitive receptors should be directed at: - Minimizing individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program. - Maintain road surface regularly. - Avoid unnecessary idling times. - Minimizing the need for trucks/equipment to reverse movement. This will reduce the frequency of reverse warnings will occur. Alternatives to the traditional reverse 'beeper' alarm such as a 'self-adjusting' or 'smart' alarm could be considered. These alarms include a mechanism to detect the local noise level and automatically adjust the output of the alarm is so that

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			it is 5 to 10 dB above the noise level near the moving equipment. - Where possible, noisy activities such as, decommissioning and maintenance, should be limited to day-time hours. • Noise levels will not exceed WHO Environmental Noise Limits, national limits or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site. • Noise level limits for construction activities are stated in the national EIA. If limits are exceeded, then appropriate mitigation measures will be implemented in accordance with the Serbian regulations. These may include: - Night-time operation and transport should be minimized as much as possible, near to villages or where a transport road passes. - Distance between construction site and sensitive receptors (e.g. hospitals, nursing homes, schools) should be mazimised. If this is not possible, then temporary noise barriers (eg. portable sound walls, soil berm) should be installed between the construction site and sensitive receptors. - Construction equipment used in intermittent periods will be shut down at intervals between works. - Working hours for some construction equipment or operations with greater noise and vibration impact will be limited to core daytime hours or routes where the area is less susceptible to noise. • Sensitive receptors (e.g. hospitals, nursing homes, schools) will be provided with advanced notification of noisy works and project specific additional mitigation measures. • Special acoustic insulation and related mitigation measures will be evaluated on a case-by-case basis.
Vibration	Excavation Backfilling Asphalt Concrete Wearing	All Settlements within the AoI (see Chapter 5)	Pre-construction

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
• Potential damage to buildings caused by construction vibration • Potential vibration caused during the work in quarries	Crushing Machinery and Equipment Transportation Demobilization of Equipment and Machinery		• Buildings near vibration sources (e.g. blasting, pile-driving and operating heavy earth-moving equipment) will be identified prior to construction. • Buildings and occupants with susceptibility detection will be evaluated for vibration, and if vibration estimates or measurements show potential for building damage, alternative construction methods will be developed to prevent damage. • Vibration standards according to Serbian regulations (Law on Environmental Noise / 2010) will be implemented through the Noise and Vibration Management Plan. Documentation will be prepared for each of the identified buildings. • Quarry Management Plan will be developed, and should include noise and vibration mitigation measures such as placement of rock structures as a noise barrier between the quarry area and potentially affected villages. • Material procured from quarries and suppliers that are not directly owned by the Project Owner or the Contractor will be evaluated to assess the operations of this facility to verify compliance with its permitted activities and relevant operating conditions. <u>Construction</u> • Monitoring of vibration in initiation of relevant activities will be performed to ensure that national legal requirements and international standards are met. • Additional measures will be taken to reduce vibration effects if standards are exceeded, and, if necessary, to change operating methods to use equipment that generates lower vibration levels. • Mitigation measures will be taken into account to prevent negative impacts caused by vibration in quarries, and this will be documented in the Quarry Management Plan. • During blasting operations, when hydraulic drills are used for drilling of boreholes, the number of the boreholes will be decided according to the blasting plan in order to reduce to a minimum any need for secondary blasting of rock.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• During blasting operations at quarry sites and during earthworks, monitoring/inspection will be carried out to ensure compliance with legal requirements and blasting permit requirements.

Table 6-33. Scoring of Ambient Noise and Vibration Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Noise Pollution	-1 **Negative**	1 **Project Site**	2 **Short Term**	4 **High**	3 **Medium**	-2.50	5 **Definite**	-13 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	2 **Low**	3 **Medium**	-2	2 **Low**	-4 **Low**
Vibration	-1 **Negative**	1 **Project Site**	2 **Short Term**	5 **Very High**	3 **Medium**	-2.75	5 **Definite**	-14 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	3 **Moderate**	3 **Medium**	-2.25	3 **Medium**	-7 **Low**

6.5.2 Operation Phase

Modelling study was performed to determine noise and vibration level for operation phase of the Project.

Operation Noise

Noise sources during operation phase of the Motorway is mainly due to road traffic which will be cumulated throughout the road axis. This perspective was incorporated during the noise modeling study and magnitude of the impact as well as impact significance can be found in Table 6-34.

Since surrounding terrain alignment information around road axis is not finalized at this stage of the Project, it is difficult to determine exact mitigation measures that will suit to prevent operational noise impacts. Therefore, following measures may be incorporated after the finalization of road axis in order to prevent noise related impacts during the operation phase as:

Noise barriers: Noise barriers are engineered structures that lower the noise exposure at determined receiver locations. However, it is not reasonable to build noise barriers at every situation. Rather than reducing the noise exposure, physical characteristics of noise barriers are also needed to be considered such as; static and wind loads. Optimized height of the noise barriers should not be exceeding 4 meters in order to maintain effectiveness of sound reduction and practicality of construction. For maintaining effectiveness of the barrier structures following aspects should be considered;

- Distance between receiver locations and barrier structures
- Terrain levels of the road axis and receiver locations
- Height of the receiver location and road axis
- Social acceptance of barrier structures (because of wall like structure of the noise barriers some residents living just behind those structures may refuse noise barriers to be built)

Noise Berms: Noise berms are more efficient than noise barriers in many cases in terms of applicability. However, for application of berms available space, terrain levels and availability of the berm material are limiting aspects.

Vegetation: Vegetation is an option for noise reduction and social acceptance. Even though vegetation has no proved sufficient effect for noise reduction surely it has affirmative psychological effects on residents.

Stone Mastic Asphalt Surface (SMA) Application (approximately 4dBA noise reduction): SMA have modified surface textures which bring about reductions in noise and could reduce the noise generated by the tire/pavement interaction.

Applicability and effectiveness of noise barriers and noise berm structures and vegetation applications strongly depend on the terrain structure between noise source and receiver. Because of explained situation noise barrier structures are assumed to be suitable for every major impacted case and designed accordingly.

Noise reduction gained by barrier structures also strongly depends on the terrain levels. Since the Project's terrain data is not finalized, it is not possible to determine amount of reduction will be gained by barrier structure, thus; a standard noise reduction is assumed as 10 dB for every barrier structure.

Table 6-34. Assessment Ldn, for Operation

Location of the Receivers (R)	Distance (m)	Source Leq		Limit Value		Limit Exceedance	Magnitude Of Impact			Responsivity			Impact Significance
		Ld (dBA)	Ln (dBA)	Ld (dBA)	Ln (dBA)		Scale Of Impact	Extent	Impact Mag	Importance	Sensitivity	Responsivity	
R1	380	45,9	42,1	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R2	110	57,6	52,3	55	45	7,3	M	Single	N	Low	Low	Low	Negligible
R3	520	45,8	42,8	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R4	130	56,8	52	55	45	7,0	M	Site	M	Medium	Medium	Medium	Moderate
R5	375	50,1	46,6	55	45	1,6	N	Site	N	Medium	Medium	Medium	Negligible
R6	470	48,3	45,1	55	45	0,1	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R7	500	49,2	45,1	55	45	0,1	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R8	710	45,5	41,2	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R9	100	58	52,6	55	45	7,6	M	Site	M	Medium	Medium	Medium	Moderate
R10	390	50,1	45	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R11	55	62,5	56,7	55	45	11,7	L	Site	L	Medium	Medium	Medium	Major
R12	175	55,9	51,5	55	45	6,5	M	Site	M	Medium	Medium	Medium	Moderate
R13	300	53,3	48,5	55	45	3,5	S	Site	S	Medium	Medium	Medium	Minor
R14	720	45,3	41,8	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R15	430	49,9	46,8	55	45	1,8	N	Site	N	Medium	Medium	Medium	Negligible
R16	370	49,4	46,4	55	45	1,4	N	Site	N	Medium	Medium	Medium	Negligible
R17	330	51,6	47,7	55	45	2,7	N	Site	N	Medium	Medium	Medium	Negligible
R18	680	45,9	42,3	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R19	570	45,9	43	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R20	740	45,4	42,3	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R21	20	73,2	67,4	55	45	22,4	L	Site	L	Medium	Medium	Medium	Major
R22	300	52,9	47,9	55	45	2,9	N	Site	N	Medium	Medium	Medium	Negligible
R23	40	68,5	62,8	55	45	17,8	L	Site	L	Medium	Medium	Medium	Major
R24	40	59,7	54,7	55	45	9,7	M	Site	M	Medium	Medium	Medium	Moderate
R25	10	78,2	72,4	55	45	27,4	L	Site	L	Medium	Medium	Medium	Major
R26	25	67,6	61,8	55	45	16,8	L	Site	L	Medium	Medium	Medium	Major
R27	30	66,9	61,1	55	45	16,1	L	Site	L	Medium	Medium	Medium	Major
R28	60	65,5	59,7	55	45	14,7	L	Site	L	Medium	Medium	Medium	Major
R29	190	55,9	51	55	45	6,0	M	Site	M	Medium	Medium	Medium	Moderate
R30	56	63,6	58	55	45	13,0	L	Site	L	Medium	Medium	Medium	Major
R31	285	53,1	48,6	55	45	3,6	S	Site	S	Medium	Medium	Medium	Minor
R32	35	68,2	62,4	55	45	17,4	L	Site	L	Medium	Medium	Medium	Major
R33	140	54,8	51,1	55	45	6,1	M	Single	N	Medium	Medium	Medium	Negligible
R34	120	54,1	50,4	55	45	5,4	M	Site	M	Medium	Medium	Medium	Moderate
R35	120	60,7	55,4	55	45	10,4	L	Site	L	Medium	Medium	Medium	Major
R36	60	63	57,5	55	45	12,5	L	Single	S	Medium	Medium	Medium	Minor
R37	180	53,6	50,2	55	45	5,2	M	Single	N	Low	Medium	Low	Negligible
R38	350	52	47,5	55	45	2,5	N	Site	N	Medium	Medium	Medium	Negligible
R39	230	55,4	50,3	55	45	5,3	M	Site	M	Medium	Medium	Medium	Moderate
R40	900	43,8	40,3	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R41	90	60	55,1	55	45	10,1	L	Site	L	Medium	Medium	Medium	Major

Location of the Receivers (R)	Distance (m)	Source Leq		Limit Value		Limit Exceedance	Magnitude Of Impact			Responsivity			Impact Significance
		Ld (dBA)	Ln (dBA)	Ld (dBA)	Ln (dBA)		Scale Of Impact	Extent	Impact Mag	Importance	Sensitivity	Responsivity	
R42	140	57,1	52,5	55	45	7,5	M	Site	M	Medium	Medium	Medium	Moderate
R43	750	45,6	41,9	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R44	650	46,3	43	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R45	390	51,2	46,6	55	45	1,6	N	Single	N	Medium	Medium	Medium	Negligible
R46	320	51,5	48,4	55	45	3,4	S	Single	N	Medium	Medium	Medium	Negligible
R47	40	68,1	62,4	55	45	17,4	L	Site	L	Medium	Medium	Medium	Major
R48	380	50,6	47,2	55	45	2,2	N	Site	N	Medium	Medium	Medium	Negligible
R49	580	46,5	43,5	55	45	0,0	No Impact	Single	No Impact	Medium	Medium	Medium	No Impact
R50	130	57	52,4	55	45	7,4	M	Single	N	Medium	Medium	Medium	Negligible
R51	50	64,7	58,9	55	45	13,9	L	Site	L	Medium	Medium	Medium	Major
R52	260	53	49,3	55	45	4,3	S	Single	N	Medium	Medium	Medium	Negligible
R53	75	62	56,5	55	45	11,5	L	Site	L	Medium	Medium	Medium	Major
R54	40	65,5	59,7	55	45	14,7	L	Single	S	Medium	Medium	Medium	Minor
R55	70	60,4	55,2	55	45	10,2	L	Single	S	Medium	Medium	Medium	Minor
R56	70	56,2	52,1	55	45	7,1	M	Site	M	Medium	Medium	Medium	Moderate
R57	160	56,7	52,2	55	45	7,2	M	Site	M	Medium	Medium	Medium	Moderate
R58	140	59,2	53,9	55	45	8,9	M	Site	M	Medium	Medium	Medium	Moderate
R59	80	60,6	55,4	55	45	10,4	L	Single	S	Medium	Medium	Medium	Minor
R60	710	45,5	42	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R61	211	40,8	37,9	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R62	487	53,2	48	55	45	3,0	S	Site	S	Medium	Medium	Medium	Minor
R63	550	48,8	45,2	55	45	0,2	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R64	60	37,2	32,8	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R65	62	54,2	50,8	55	45	5,8	M	Site	M	Medium	Medium	Medium	Moderate
R66	30	46,8	41,2	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R67	90	52,7	49,2	55	45	4,2	S	Site	S	Medium	Medium	Medium	Minor
R68	280	52,9	49	55	45	4,0	S	Site	S	Medium	Medium	Medium	Minor
R69	160	58,1	52,9	55	45	7,9	M	Single	N	Medium	Medium	Medium	Negligible
R70	34	44,8	39,2	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact
R71	461	45,8	42,1	55	45	0,0	No Impact	Site	No Impact	Medium	Medium	Medium	No Impact

The location of the receivers where have “Major” noise impact significance recommended to implement noise barriers. Detailed information on the recommended noise barriers including their locations and size is given in Table 6-35.

Table 6-35. Geometrical Information about Recommended Noise Barriers

Barrier No	Barrier KM	Barrier Side	Relevant Receivers	Length (m)	Height (m)
1	25-26	LHS	11	1381	3
2	50-51	RHS	21	845	3
3	51-52	RHS	23	796	3
4	54	RHS	25	285	3
5	53-55	LHS	25-65	1055	3
6	55-59	LHS	26-27	4101	3
7	58-59	RHS	27	926	3
8	59-61	LHS	28	1557	3
9	63	LHS	30	724	3
10	68-69	RHS	32	1080	3
11	74	LHS	35	796	3
12	80	LHS	41	1221	3
13	86-88	RHS	47	2077	3
14	96-98	RHS	51	2029	3
15	104-107	RHS	53	2426	3
*LHS=Left Hand Side *RHS=Right Hand Side					

After implementing the recommended noise barriers according to Table 6-35, the final impact significance are given in the Table 6-36.

Table 6-36. Final Impact Significance after Mitigation of the Noise Receivers that had “Major” Impact

Location of the Receiver (R)	Distance (m)	Final Impact Significance Before Mitigation	Final Impact Significance After Mitigation
R11	55	Major	Negligible
R21	20	Major	Major
R23	40	Major	Moderate
R25	10	Major	Major
R26	25	Major	Moderate
R27	30	Major	Moderate
R28	60	Major	Minor
R30	56	Major	Minor
R32	35	Major	Moderate
R35	120	Major	No Impact
R41	90	Major	No Impact
R47	40	Major	Moderate
R51	50	Major	Minor
R53	75	Major	Negligible

Three “Major” affected receivers after implementation of recommended noise barriers (see Table 6-37, additional measures such as;

- to implementate noise berms which are more efficient than noise barriers in many cases in terms of applicability;
- to implementate Vegetation and SMA Surface Application to reduce potential residual impacts;
- to rehabilitate receptors by insulating to reduce recoptor sensitivity
- to pay compensation to receivers in cases where insulation is not possible

are recommended.

For the “Moderate” affected receivers after implementation of recommended noise barriers, additional mitigation measures such as noise berms, vegetation and SMA Surface Application are recommended to be implemented.

For receiver locations where the final impact significance is moderate, noise monitoring processes[12] is recommended. This monitoring process should either be periodic or continuous.

> For continuous monitoring systems; implementation of steady online noise monitoring devices is recommended.
>
> For periodic noise monitoring systems; the frequency of the monitoring is recommended to be twice or three times annually.

In addition to noise monitoring processes, grievances regarding the noise will be recorded in the Grievance Mechanism and necessary mitigation measures will be adopted, as appropriate.

During noise monitoring studies both for periodic and continuous rules defined about environmental noise monitoring studies in ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise is recommended to be adopted.

[12] The noise monitoring was conducted in line with ISO 1996-2: Acoustics – Description and measurement of environmental noise. During noise monitoring process both for periodic and continuous; the rules defined about environmental noise monitoring studies in ISO 1996-2 international standard recommended to be followed.

Operation Vibration

Ground-borne vibrations due to irregularities on the road, especially generated by heavy vehicles on the flowing traffic, may have an impact on receivers close to the main road axis.

An empirical equation developed by R. Watts and V.V. Krylov used to predict the PPV in mm/s at a building foundations due to heavy vehicles passing over a road surface defects

$$PPV_{max} = 0.028 \times a \times \frac{v}{48} \times t \times p \times \left(\frac{r}{6}\right)^{x}$$

Where;

a : maximum height or depth of the road surface defect in mm,
v : maximum expected speed of heavy vehicle in km/h
p : the wheel index, which is over 0.75 for heavy vehicles when one wheel crosses a damaged spot, or 1 in other cases
t: the coefficient of soil supporting a roadway structure
r : the distance between the measuring point and the moving vehicle
x: power coefficient

Table 6-37. Ground Scaling Factors and Power Coefficients for Different Soils (Watts and Krylov, 2000)

Ground Type	Ground Scaling Factor (G)	Power Coefficient for Attenuation (X)
Alluvium	4.40	-0.79
Peat	2.39	-1.19
London clay	1.93	-1.06
Sand/gravel	0.58	-0.74
Boulder clay	0.27	-0.93
Chalk rock	0.06	-1.08

Source: G.R. Watts, V.V. Krylov. Ground-borne vibration generated by vehicles crossing road humps and speed control cushions. Applied Acoustics 59 (2000) 221-236

Calculations conducted for a heavy vehicle having 80 km/h and 50 mm of maximum road defect, and two wheels crosses the damaged spot. Since softer ground types are not suitable for construction of founded structures, both London clay and sand/gravel arrangements considered in the calculations. Results of the calculations based on these parameters, are presented in the Figure below:

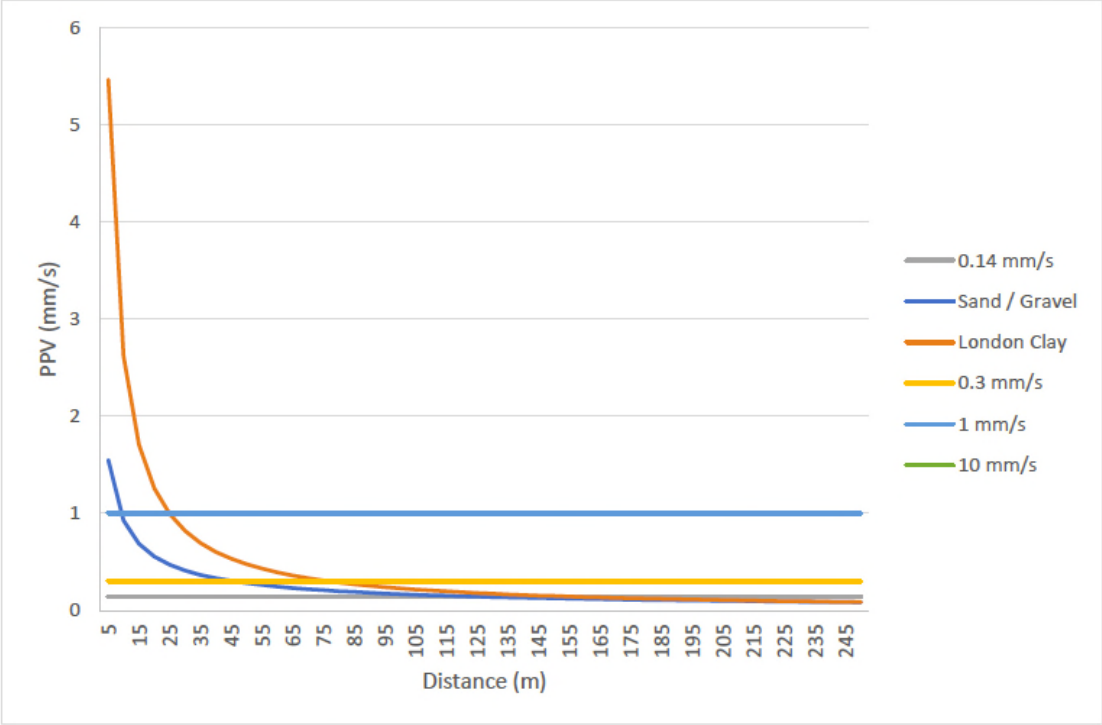


Figure 6-2. Operational Vibration - PPV vs Distance

In case of London clay ground type, traffic-induced ground borne vibration is expected to become imperceptible at 80 meters from the Motorway which is below 0.3 mm/s as indicated in BS 5228-2. Vibration levels over 1 mm/s are expected to occur in the areas closer than 25 m to the Motorway.

In the areas with sand/gravel vibration levels exceeding 1 mm/s at a distance of 10 m to the road and it is expected to decrease to 0.3 mm/s at 45 m from the Motorway. The vibration calculation results provided in the Table 6-38 indicates that vibration impact during operation will be negligible or insignificant.

Table 6-38. Impact Assessment for Operational Vibration

Location of the Receiver (R)	Distance (m)	PPV (mm/s)		Impact Significance	
		Sand/Gravel	London Clay	Sand/Gravel	London Clay
R1	380	0.06	0.06	No Impact	No Impact
R2	110	0.16	0.21	Negligible	Negligible
R3	520	0.05	0.04	No Impact	No Impact
R4	130	0.14	0.17	No Impact	Negligible
R5	375	0.06	0.06	No Impact	No Impact
R6	470	0.05	0.04	No Impact	No Impact
R7	500	0.05	0.04	No Impact	No Impact
R8	710	0.04	0.03	No Impact	No Impact
R9	100	0.17	0.23	Negligible	Negligible

Location of the Receiver (R)	Distance (m)	PPV (mm/s)		Impact Significance	
		Sand/Gravel	London Clay	Sand/Gravel	London Clay
R10	390	0.06	0.05	No Impact	No Impact
R11	55	0.26	0.43	Negligible	Small
R12	175	0.11	0.13	No Impact	No Impact
R13	300	0.07	0.07	No Impact	No Impact
R14	720	0.04	0.03	No Impact	No Impact
R15	430	0.06	0.05	No Impact	No Impact
R16	370	0.06	0.05	No Impact	No Impact
R17	330	0.07	0.06	No Impact	No Impact
R18	680	0.04	0.02	No Impact	No Impact
R19	570	0.05	0.03	No Impact	No Impact
R20	740	0.04	0.02	No Impact	No Impact
R21	20	0.56	1.26	Small	Medium
R22	300	0.07	0.07	No Impact	No Impact
R23	40	0.33	0.60	Small	Small
R24	40	0.33	0.60	Small	Small
R25	10	0.93	2.62	Small	Medium
R26	25	0.47	0.99	Small	Small
R27	30	0.41	0.82	Small	Small
R28	60	0.25	0.39	Negligible	Small
R29	190	0.10	0.12	No Impact	No Impact
R30	56	0.26	0.42	Negligible	Small
R31	285	0.08	0.07	No Impact	No Impact
R32	35	0.37	0.70	Small	Small
R33	140	0.13	0.16	No Impact	Negligible
R34	120	0.15	0.19	Negligible	Negligible
R35	120	0.15	0.19	Negligible	Negligible
R36	60	0.25	0.39	Negligible	Small
R37	180	0.11	0.12	No Impact	No Impact
R38	350	0.07	0.06	No Impact	No Impact
R39	230	0.09	0.09	No Impact	No Impact
R40	900	0.03	0.02	No Impact	No Impact
R41	90	0.18	0.26	Negligible	Negligible
R42	140	0.13	0.16	No Impact	Negligible
R43	750	0.04	0.03	No Impact	No Impact
R44	650	0.04	0.03	No Impact	No Impact
R45	390	0.06	0.05	No Impact	No Impact
R46	320	0.07	0.07	No Impact	No Impact
R47	40	0.33	0.60	Small	Small
R48	380	0.06	0.06	No Impact	No Impact
R49	110	0.16	0.21	Negligible	Negligible
R50	520	0.05	0.04	No Impact	No Impact
R51	130	0.14	0.17	No Impact	Negligible

Location of the Receiver (R)	Distance (m)	PPV (mm/s)		Impact Significance	
		Sand/Gravel	London Clay	Sand/Gravel	London Clay
R52	375	0.06	0.06	No Impact	No Impact
R53	470	0.05	0.04	No Impact	No Impact
R54	500	0.05	0.04	No Impact	No Impact
R55	710	0.04	0.03	No Impact	No Impact
R56	100	0.17	0.23	Negligible	Negligible
R57	390	0.06	0.05	No Impact	No Impact
R58	55	0.26	0.43	Negligible	Small
R59	175	0.11	0.13	No Impact	No Impact
R60	300	0.07	0.07	No Impact	No Impact
R61	720	0.04	0.03	No Impact	No Impact
R62	430	0.06	0.05	No Impact	No Impact
R63	370	0.06	0.05	No Impact	No Impact
R64	330	0.07	0.06	No Impact	No Impact
R65	680	0.04	0.02	No Impact	No Impact
R66	570	0.05	0.03	No Impact	No Impact
R67	740	0.04	0.02	No Impact	No Impact
R68	20	0.56	1.26	Small	Medium
R69	300	0.07	0.07	No Impact	No Impact
R70	40	0.33	0.60	Small	Small
R71	40	0.33	0.60	Small	Small

Table 6-40 shows the overall rating of the impacts before and after mitigations. Noise pollution is considered high since the magnitude, the receptor sensitivity and the likelihood of the impacts are determined as high. Implementation of noise barriers for noise pollution, along with other proposed mitigation measures, the overall impact after mitigation measures as shown in Table 6-40 is expected to reduce the sensitivity of the receptor as well as the extend of the impact's magnitude According to the modeling study, it is seen that there will be no vibration impact during the the operation phase of the Project. For the noise polution, modelling study show that 14 of 71 receptors determined have major impact before the mitigation measures and almost 3 percent of the receptors (i.e. 2 of 71 receptors) is remained as major after the mitigation measures is taken. However, for these two receptors that have major impact after mitigation, the mitigation measures to be taken was determined and will be implemented. As a result, the magnitude and likelihood of the impact are decreased to medium with the mitigation measures thus, the residual impact is medium.

Table 6-39. Impact and Mitigations for Noise and Vibration in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Noise Pollution • Increasing noise level due to road traffic on the Motorway	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station	All Settlements within the AoI (see Chapter 5)	<u>Design</u> • Stone Mastic Asphalt (SMA) surfacing that cause's low noise will be used by the Contractor for the Motorway. • Natural topography will be used for noise protection. • Additional noise barriers will be considered for the sensitive receptors, as necessary. • The landscape screening will be done either by lowering the Motorway or adding soil embankment • The noise barriers adjacent to the motorway will be used. • The building insulations will be improved (for example, sound insulation of windows and walls), where necessary. • In cases where insulation is not possible, compensation will be considered. <u>Operation</u> • Maintenance of the road surface will be done. • Speed limits will be applied.

Table 6-40. Scoring of Ambient Noise and Vibration Impacts in Operation Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Noise Pollution	-1 **Negative**	1 **Project Site**	5 **Permanent**	4 **High**	5 **High**	-3.50	5 **Definite**	-18 **High**	-1 **Negative**	1 **Project Site**	4 **Long Term**	2 **Low**	5 **High**	-3.00	3 **Medium**	-9 **Medium**

6.6 Geology and Soil

Impacts on soil and geology will be a concern mainly during the construction phase of the Project as the construction activities include direct and/or extensive physical interaction with the environmental components.

On the other hand, risk of soil contamination due to accidents and geotechnical and seismic risks would be of the primary concern for the operation phase.

Assessment of the impacts for geology and soil in construction and operation phases is provided in Subsection 6.6.1 and Subsection 6.6.2.

As a result of environmental baseline studies, sensitive receptors were determined in Chapter 5 of this Report. Table 6-41 and Table 6-43 detail the impact and mitigations for geology and soil in the Construction and Operation Phases.

6.6.1 Construction Phase

The Project will be constructed along a long route of approximately 112 km and significant volumes of the earthworks will be conducted in the scope of the Project, relevant measures required to be taken into a consideration, in order to avoid significant impacts on the soil environment.

The potential impacts of the land preparation and construction activities on the soil environment are summarized as;

- disturbance such as loss of fertile top layer,
- mixing of soil layers and types,
- soil compaction etc. due to top soil stripping, cut and fill operations,
- construction of road structures and extraction of construction materials at the quarry sites;
- soil erosion and soil contamination due to unexpected leakages or spills.

In addition, geotechnical risks along the Proposed Motorway Route will be identified to ensure safety and stability.

In case of not implementing the mitigation measures, top soil itself or its vegetative properties along the Motorway route may be lost due to erosion or mixing with coarse or contaminated soils. Thus, top soil management measures will be applied in the scope of the Project

Table 6-41 details the impact and mitigations for geology and soil in the Construction Phase of the Project.

Table 6-42 shows the overall rating of the impacts before and after mitigations. Erosion, land degradation and soil loss and soil pollution caused by construction activities are considered medium since the magnitude and the receptor sensitivity of the impacts are determined as high. For potential earthquake related impact, the design of the project to took consideration of national requirement while conducting seismic design and risk assessment of the Project. In addition, construction specific emergency preparedness and response plan will be adopted throughout the construction phase. For erosion related impact, the design of the Project took measures to reduce of the sensitivity of the receptors. Considering, measures taken for both erosion and earthquake related impacts as shown in Table 6-41, the sensitivity of the receptors will reduce to medium.

Table 6-41. Impact and Mitigations for Geology and Soil in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Earthquake[13] • Earthquake may occur either during the construction or the operation of the Project. The Project site is located on the 2nd degree seismic zone.	Faults Bounding on blocks	(See Subsection 5.8.8 in Chapter 5)	Design and Pre-construction • The Project will comply with the relevant Serbian regulatory requirements related to seismic design and risk assessment.(14) • Emergency Preparedness and Response Plan (EPRP) will be implemented.
Erosion • Several areas of potential soil erosion were identified as part of the preliminary geotechnical assessment investigation. There are areas along the Project which have a natural erosion risk due to their subsurface characteristics, areas at risk from excavation works and soil movement such as steep slopes at cut and fill sections.	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Excavation Backfilling Storage, Re-Use and Disposal of Excavations	(See Subsection 5.8.8 in Chapter 5)	Design • The Soil Erosion, Reinstatement and Landscape Management Plan will be developed and implemented. The Plan will adopt measures stated in the IFC EHS Guidelines: Construction and Decommissioning (2007) as: o Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical, o Contouring and minimizing length and steepness of slopes o Mulching to stabilize exposed areas o Re-vegetating areas promptly o Designing channels and ditches for post-construction flows o Lining steep channel and slopes (e.g. use jute matting). Also, structure of the Plan will comply with the IFC EHS Guidelines: Toll Roads (2007).

[13] The Project will not create any seismic activity As a result, it is not expected any earthquake caused by the Project. In this section, the impact of the earthquake on the Project area and mitigations is evaluated.
[14] Depending on the ground conditions and the seismic characteristics of the region, design and design verification will be carried out according to Eurocode 8: Design of structures for earthquake resistance.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Soil Pollution caused by Construction Activities • Soil pollution and degradation during construction phase can be caused by improper handling of oil and its derivatives that are used for machinery. Pollution can also be caused by vehicles and machinery washing outside planned locations, inadequately regulated construction sites, and other activities that are not carried out under recommendations of technical measures of protection during construction works. • During the construction phase, a risky situation can occur for soil quality due to possibility spillage of hazardous substances. The accidental spillage of cement, fuel oils and lubricants may cause important consequences on soil quality. • Soil quality assessment in the project AoI indicates that there are elevated level of contaminants along the basin (see Chapter 5). Literarture shows that these elevated contaminant leves are caused by flood sediments either sourced by natural geogenic sources found in West Morava River Basin and/or anthropogenic sources such as mining activities located upper section of the basin. Storage of the excavated material (surface soil) may cause spread of contaminants.	Top-Soil Storage Camp Sites Material Storage Waste Storage/Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Material Spreading/Rolling/Compaction Machinery and Equipment Asphalt Preparation	• All soil temporary storage and disposal sites; these areas are not defined yet. Before construction, site specific baseline studies are required for all defined temporary storage areas and permanent disposal sites. • Nearby settlements which are under the dust impact. • Morava river and its tributaries in relation to storage and disposal areas • Camp sites.	<u>Construction</u> • Spill Response and Prevention Procedure will be prepared and implemented. • Construction equipment, machines and vehicles will be parked on arranged locations. • Parking surfaces (soil, gravel, and rock) will be protected from pollution from oil, oil derivate, naphtha and naphtha derivate. In case of pollution, measures will be taken in accordance with the Law on Soil Protection ("Official Gazette of RS" no. 112/15) • Washing of equipment, machinery and vehicles will be prohibited within construction area. • Concrete mixer washout areas will be designated and any other washing of concrete mixer and uncontrolled removal of the remaining parts of concrete mass on any surface outside road area will be prohibited. • Excavated material will be re-used to the extent possible. • Excess materials will be used during site arrangement and resinstaement activities. • Before storage of excess excavated materials, soil samples form excess material and proposed storage site will be sampled in order to understand the suittability of the proposed area fort he storage. • Hazardous materials will not be stored in excavated areas.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Exposure to hazardous materials in open areas will be kept to a minimum in size and time
Land Degradation and Soil Loss • Large amounts of construction material will be transported during the construction phase. New borrow pits will be opened. These activities can cause land degradation or permanent soil loss.	Excavation Top-Soil Storage	Project Area	<u>Design and Pre-construction</u> • All borrow pits and unsuitable soil waste areas will be designed in accordance with the mitigation measures within the national EIA and any permit conditions (outside the alignment expropriation boundaries). • Soil, Erosion, Rehabilitation and Landscape Management Plan will be prepared for all borrow pits and unsuitable soil waste areas used during construction works. <u>Construction</u> • Borrow pits and unsuitable soil waste areas will be executed according to design specifications, method statements and reinstatement plans.

Table 6-42. Scoring of Geology and Soil Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Earthquake	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	5 **High**	-3.25	1 **Improbable**	-3.25 **Low**	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	3 **Medium**	-2.75	1 **Improbable**	-2.75 **Low**
Erosion	-1 **Negative**	2 **Municipality**	1 **Immediate**	3 **Moderate**	5 **High**	-2.75	4 **High**	-11 **Medium**	-1 **Negative**	2 **Municipality**	1 **Immediate**	2 **Moderate**	3 **Medium**	-2	4 **High**	8 **Low**
Soil Pollution Caused by Construction Activities	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	5 **High**	-3.25	3 **Medium**	-10 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	5 **High**	-2.75	1 **Improbable**	-3 **Low**
Land Degradation and Soil Loss	-1 **Negative**	2 **Municipality**	2 **Short Term**	3 **Moderate**	5 **High**	-3	5 **Definite**	-15 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	1 **Minor**	5 **High**	-2.5	1 **Improbable**	-3 **Low**

6.6.2 Operation Phase

During the operation phase, soil contamination risks may be caused by the improper handling of the hazardous materials to be used in the road maintenance activities and leakage/spill of fuels, chemicals, etc. during the unexpected accidents. In that case, the associated impacts would be similar to the impacts described for the construction phase and a similar mitigation strategy would be adopted for the mitigation of potential impacts.

Last, seismic risks would be of concern for the entire operational life of the Motorway thus further evaluation on the potential risks and mitigation approaches is provided below.

Table 6-43 details the impact and mitigations for geology and soil in the Operation Phase of the Project.

Table 6-44 shows the overall rating of the impacts before and after mitigations. Earthquake impact is considered as low since the likelihood and duration are determined low. On the other hand, road and accidental spillage is considered as medium since the magnitude and likelihood are determined as high. For potential earthquake related impact, the design of the project to took consideration of national requirement while conducting seismic design and risk assessment of the Project. In addition, construction specific emergency preparedness and response plan will be adopted throughout the operation phase. Considering, measures earthquake related impacts as shown in Table 6-43, the sensitivity of the receptor will reduce to medium.

Table 6-43. Impact and Mitigations for Geology and Soil in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Earthquake • Earthquake may occur either during the construction or the operation of the Project. The Project site is located on the 2nd degree seismic zone.	Faults Bounding on blocks	(See Subsection 5.8.8 in Chapter 5)	Design • The Project will comply with the relevant Serbian regulatory requirements[15] related to seismic design and risk assessment. • Emergency Preparedness and Response Plan will be implemented for the operation phase.
Runoff from the Road and Accidental Spillage • Runoff from the road pavement which can contain some degree of silt/dust and pollutants from atmospheric deposition, vehicle emission as well as from possible accidental road spillage incidents can impact quality of groundwater locally.	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station Crashing	Project Area	Design • The Storm Water Drainage Risk Assessment will be conducted in order to confirm that storm water drainage designs are effective to mitigate impacts on soil quality therein. Measures will be taken, such as the use of sand layers, which should be used as filters in leakage pits, to prevent the penetration of harmful substances into deeper soil layer. • Emergency Preparedness and Response Plan (EPRP) will be developed.

[15] Depending on the ground conditions and the seismic characteristics of the region, design and design verification will be carried out according to Eurocode 8: Design of structures for earthquake resistance.

Table 6-44. Scoring of Geology and Soil Impacts in Operation Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Earthquake	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	5 **High**	-3.25	1 **Improbable**	-3.25 **Low**	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	3 **Medium**	-2.75	1 **Improbable**	-2.75 **Low**
Runoff from the Road and Accidental Spillage	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	4 **High**	-11 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2.25	2 **Low**	-5 **Low**

6.7 Resources and Waste

This section discusses resource efficiency for the Project and all waste impact that may occur during construction and operation phases of the Project. Following subsections determine magnitude of waste related impacts to the environment and how to manage, reduce or prevent them with recommended mitigation measures.

Resource

For the construction of the Project and all related infrastructure, significant quantities of various typical construction materials will be needed; these will include concrete, prefabricated segments (e.g. beams for bridges), steel, aggregates, and asphalt. In addition, large volumes of soil/topsoil will need to be excavated for motorway and river regulation works and as much as re-used as filling material as well as site arrangement and reinstatement.

Arrangements for sourcing and transport of the materials and equipment are under the responsibility of the Contractor. The supply of these materials will involve supply from local, national or international sources and use of transport by road or rail.

As explained in Section 3, at preliminary design phase of the project, a total of 56 borrow area and quarry have been identified along the project route. In addition to these borrow areas, excavated materials from river diversion channels will be used for the motorway construction. The construction material requirements have not been finalized since geotechnical investigations for the final design are still ongoing and the suitability of cut-fill requirements for the project have not been finalized. Due to this reason, a range for the material requirement could not be assessed. However, a preliminary estimate Amount of aggregate required for the construction is estimated as 8.156,400 m3 in total. The amount include reserves of alluvial gravel, aggregate of carbonate origin (limestone), used for the construction of the upper supporting layers of pavement structure and concrete. As the Contractors estimate the quarries and borrow areas together with the excavated material sourced from river diversion project is sufficient for construction works. On the other hand, depending on the results of detailed geotechnical study, there will be some changes about the size and location of proposed material source. In case a requirement, constraint maps prepared as a result of ESIA study will be used for the new site determination in order to avoid and minimize any potential impact on sensitive locations. Additionally, the contractor will conduct Environmental Site Assessment as a Due Diligence study for new proposed sites in line with the policies and mitigations identified in the ESIA. In this respect, EHS considerations that will need to be taken into account in the selection of appropriate quarry sites and access routes will be based on IFC General EHS Guidelines (IFC, 2007) as well as guidelines for IFC EHS Guidelines for Construction Materials Extraction (IFC, 2007). These guidelines will take into account the noise, air quality, proximity to sensitive receptors, community HS, vibration issues (blasting), habitat and biodiversity among other considerations for the selection and use of these quarries.

An audit procedure will be developed to assess the existing quarries with respect to the IFC and Serbian regulatory requirements.

The approximate earthwork volumes are: 20 million m^3 of cut volume and 17 million m^3 of fill volume. Based on the above estimates there will be a net surplus of material across the Project of approximately 3 million m^3. As stated above, most of the material will be useful for construction of other parts of the Project (embankments, road base materials, backfilling for reinstatement of borrow areas etc.) and the aim will be to achieve a balance of cut and fill material as far as possible. It should be noted that geotechnical assessment is being conducted for the final design stage and a more accurate number will be established. The soil quality will be tested in areas where potential sources of contamination may be expected to ensure proper usage as material for the cut and fill requirements (see Chapter 5 Geology and Soils).

Water is another major requirement in the project. The estimated amount of water use for labor camps is 25,000 tons in total of 2 camps as monthly average. If the number of camps is to be 3 then this estimate will yield as 38,000 tons per month. For batch plants, water consumption is estimated as approximately 10,000 tons per month. Regarding the consumptions of resources in asphalt plants, it is estimated to consume 3,500 tons of water as monthly average. Potential water consumptions for the construction of project are provided in Table 6-45. Water will mainly be supplied from existing sources and the water wells.

Table 6-45. Amount of Water Use during Construction

Description	Water Use (ton/month)
Labour camps	25,000
Batch plants	10,000
Asphalth plants	3,500
Concrete Production	8,500
Total	**47,000**

Some of the other materials used for the project

- 7,500 tons of cement per month is expected to be used in the concrete batching plant. Cement for concrete production will be supplied from the cement producer facilities nearby the project site (around 250 km distance). Approximately 25 dump trucks per day will be used for raw material transportation to batch plants.
- Average daily production of the asphalt is estimated as 3,000 tons. Bitumen will be used in the asphalt production and it will be supplied from Pančevo Refinery. The distance between the project site and refinery is about 500 km.

Waste

Following waste materials are expected to be generated during the construction and operation phases of the Project.

Excavation Materials: Excavation materials will result from the construction activities of the Project. Numerous cuttings to be built along the Proposed Motorway Route are planned. In addition, river regulation works to prevent flooding will result in excavation materials. The amount of excavation material caused by the river regulation is 9 647 756 m^3. Wherever possible, materials excavated from excavation sites will be reused as fillers on the construction site or for reinstatement purposes. This will maximize the rate of use of materials on-site and reduce the need for off-site disposal. On the other hand, unsuitable soil from excavations are not expected to be generated in large quantities during the construction of the Project.

If there is excess unsuitable excavation material, proper storage and evacuation of the material will be carried out in order to not carry the pollution to another location considering the high heavy metal values found in the soil during the baseline studies. When it needs to be moved to another location, it should be proved that it will not create pollution in that area by conducting soil and field analyses.

Domestic Waste: It is foreseen that there will be approximately 2000 construction phase workers in the two worker accommodation sites. The Contractor stated that the domestic waste to be produced at all sites will be collected and stored in containers placed at suitable points and the recyclable waste will be collected separately. These wastes will be collected periodically by licensed companies and sent to the nearest waste disposal facility.

Worldwide, waste generated per person per day averages 0.74 kilogram (The World Bank, n.d.). Thus,

$$0.74\ {}^{kg}/_{person.day} \times 2000\ people = 1{,}480\ {}^{kg}/_{day}$$

Thus, it is estimated that a total of 740 kg of domestic waste will be produced per camp per day.

In summary, it is foreseen that the importance of the impact of domestic wastes to be produced during construction phase will be small as the generated wastes will be collected at certain intervals.

During the operation phase of the Project, it is foreseen that the domestic wastes will be limited to the small volumes related to the maintenance works and the maintenance of the landscape areas.

In summary, no significant impact is anticipated given that appropriate waste treatment, storage and disposal procedures will be adopted and detailed information on waste disposal sites to be potentially used within the scope of the Project provided in Chapter 3.6 (Third Party

Utilities) of the ESIA Report. Before the construction phase, waste disposal sites will be visited and appropriate disposal sites will be added to the waste management plan.

Waste Oil: During the construction phase, waste oil originating from the maintenance of construction machinery, equipment and vehicles will be generated. Maintenance activities such as oil change of construction machinery and equipment will be carried out at various locations along the Proposed Motorway Route. Therefore, drip trays will be used to avoid soil pollution.

The waste oil produced required to be collected in safe sealed containers. It will be stored in an area with a concrete surface and in a suitable secondary container to prevent spills and leaks from reaching the soil and groundwater. Containers will be appropriately labelled. These labels will also indicate the amount of waste stored and the time of storage. If containers are damaged, waste will be transferred to other containers with the same characteristics.

It is recommended that the waste oil containers are kept in bounded areas; such that there will be a permeable wall around the oil storage areas to contain any spillage. Ideally, its volume required to contain 110% of the oil stored there.

The transportation of wastes required to be carried out by persons and institutions licensed for this work and by means of the vehicles appropriate to the characteristics of the waste transported. These hazardous wastes will be sent to an arranged licensed facility. All health and safety precautions related to personnel responsible for activities such as transportation and temporary waste storage at the facility will be taken.

Other typical construction wastes will be stored temporarily onsite in appropriate containers and then transferred to and disposed of (or treated) via licensed waste facilities located in vicinity of the Project. The waste facilities used during construction will be selected by the EPC contractor. The wastes that will be generated during the construction process include:

Recyclable wastes: waste metals, plastics, cables, glass, paper (packaging material, clean air filters, clean containers, drums bins, crushed stone).

- Wastewater from construction camps and construction operations
- Non-hazardous waste from construction camps and construction operations (scrap metal, slightly contaminated discarded material)
- Hazardous waste (chemicals, additives, paints) generated from use of hazardous materials for road construction
- Machinery operation and maintenance related wastes (machinery parts replacement, used filters, etc)
- Waste generated from concrete batch plant and asphalt plant and painting operations (wastewater, sludge, waste bitumen, spent paint)
- Medical waste
- Waste batteries and accumulators.

The quantities of materials used and wastes generated during the Project operation phase will primarily relate to the operation of the service and maintenance areas and the toll plazas, as well as to the maintenance of the road corridor. Solid waste generation during operation and maintenance activities may include road resurfacing waste (e.g. removal of the old road surface material); during operation and maintenance activities may include road resurfacing waste (e.g. removal of the old road surface material); road litter, illegally dumped waste, or general solid waste from rest areas; animal carcasses; vegetation waste from right-of-way maintenance; and sediment and sludge from stormwater drainage system maintenance (including sediment traps and oil/water separation systems). Paint waste may also be generated from road and bridge maintenance (e.g. due to removal of old paint from road stripping and bridges prior to re-painting).The oil to be used for maintenance activities must not contain PCBs (polychlorinated biphenyl) or other carcinogenic chemicals. All wastes should be collected and disposed of properly by the arranged licensed company.

6.7.1 Construction Phase

During the construction phase, a significant amount of rock and soil material will be formed from the earthworks. In the design phase, the disposal sites of excess material and the methods of disposal (area, compaction, slope stability, drainage, etc.) will be identified. Areas for disposal of inert materials (construction and demolition waste) will be determined in consultation with the related local authorities.

During the construction phase, the Waste Management Plan will be carried in accordance with the IFC EHS Guidelines for Construction Materials Extraction (2007) and the recommendations of the IFC General EHS Guidelines (2007).

Table 6-46 shows the overall rating of the impacts before and after mitigations. Destruction of habitats and plants during earthworks and resource extraction, disposal of excavated waste

soil and hazardous waste generated during construction activities are considered medium since the magnitude and the likelihood of the impacts are determined as high. After taking mitigation measures, as shown in Table 6-47, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-46. Impact and Mitigations for Waste Generation in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
• Destruction of habitats and plants during earthworks and resource extraction	Top-soil stripping Tree Cutting /Vegetation clearance Demolishing of Exiting Buildings/Structures Camp Sites Waste Storage/Disposal Excavation Crushing Asphalt Preparation Concrete Batching	Existing waste disposal sites, settlements near to the camp areas and storage areas are determined as sensitive receptors.	<u>Design and Pre-construction</u> • Quarry Management Plan will be developed and implemented during the construction phase. • Soil Erosion, Reinstatement and Landscape (SERL) Management Plan will be prepared in accordance with Serbian law, IFC EHS Guidelines and international environmental management systems. • Emergency Preparedness and Response Plan (EPRP) will be developed and implemented. • Hazardous Material Management Plan will be developed and implemented. <u>Construction</u> • Quarries will be operated and monitored to comply with national and international standards (IFC EHS Guidelines for Construction Materials Extraction (2007) • Where possible, existing (fully licensed) quarries should be used instead of opening new quarries. • Existing quarries will be assessed to ensure that the permits are valid and that operations are appropriate and in accordance with national and international standards. • If a new quarry is opened outside the expropriation boundaries, all required permits will be obtained
• Disposal of excavated waste soil	Top-soil stripping Tree Cutting /Vegetation clearance Demolishing of Exiting Buildings/Structures Camp Sites Waste Storage/Disposal	Existing waste disposal sites, settlements near to the camp areas and storage areas are determined as sensitive receptors.	<u>Pre-construction</u> • Waste Management Plan and Soil Erosion, Reinstatement and Landscape (SERL) Management Plan will include best management practices for excavated waste soils.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
	Excavation Crushing Asphalt Preparation Concrete Batching		Construction • Excavated soils will be reused as much as possible and, where applicable, alternative uses of surplus residues will be investigated.
• Hazardous waste generated during construction activities	Demolishing of Exiting Buildings/Structures Camp Sites Waste Storage/Disposal Excavation Crushing Asphalt Preparation Concrete Batching	Existing hazardous waste disposal sites Settlements near to project construction sites including all project facilities and activities Natural habitats	Pre-construction • Hazardous Material Management Plan will be prepared and implemented. Construction • Hazardous waste generated during construction will not be discharged in surface water. (Law on Waste Management ("Official Gazette of RS", no. 36/09 and 88/10). • All hazardous waste should be properly collected, marked and disposed at approved location in accordance with the procedure prescribed within the Law on waste management (“Official Gazette of RS”, 36/09, 88/10, 14/16). It is strictly forbidden to dispose any type of hazardous waste on locations where surplus earth material will be disposed. • Hazardous waste will be managed and disposed in accordance with Law on Waste Management and the Directive 91/689/EEC on hazardous waste. • Hazardous waste will be collected and disposed by a licensed waste contractor.
Resource Efficiency* • Excess amount of resource usage may cause negative impact.	All Pre-Construction and Construction Works		Construction • When the project is a potentially significant consumer of water, in addition to applying the resource efficiency requirements of this Performance Standard, the Contractor shall adopt measures that avoid or reduce water usage so that the project’s water consumption does not have significant adverse impacts on others. These measures include, but are not limited to,

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			➢ the use of additional technically feasible water conservation measures within the construction activities, ➢ the use of alternative water supplies, water consumption offsets to reduce total demand for water resources to within the available supply • The Contractor will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release according to the mitigation measures given in the Report. This applies to the release of pollutants to air, water, and land due to routine, non-routine, and accidental circumstances with the potential for local, regional, and transboundary impacts. • Where waste generation cannot be avoided, the Contractor will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. Where waste cannot be recovered or reused, the Contractor will treat, destroy, or dispose of it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material. If the generated waste is considered hazardous, the client will adopt GIIP alternatives for its environmentally sound disposal while adhering to the limitations applicable to its transboundary movement.

*In addition to the mitigitions outlined in this section, detailed measures are specified in each environmental section; water quality, air quality and climate, noise and vibration, and geology and soil. In addition, both the Construction Contractor and the Project Owner will detail their implementation plans within the scope of the quality system they will implement within the project. Impacts on resources are also addressed as part of social impact assessment.

Table 6-47. Scoring of Waste Generation Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Destruction of habitats and plants during earthworks and resource extraction	-1 **Negative**	1 **Project Site**	2 **Short Term**	4 **High**	3 **Medium**	-2.5	4 **High**	-10 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	2 **Low**	3 **Medium**	-2	1 **Improbable**	-2 **Low**
Disposal of excavated waste soil	-1 **Negative**	1 **Project Site**	2 **Short Term**	4 **High**	3 **Medium**	-2.5	4 **High**	-10 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	2 **Low**	3 **Medium**	-2	2 **Low**	-4 **Low**
Hazardous waste generated during construction activities	-1 **Negative**	1 **Project Site**	2 **Short Term**	5 **Very High**	3 **Medium**	-2.75	4 **High**	-11 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	2 **Low**	3 **Medium**	-2	**1** **Improbable**	-2 **Low**
Resource Efficiency	-1 Negative	1 **Project Site**	2 **Short Term**	4 **High**	5 **High**	-3	4 High	-12 **Medium**	-1 Negative	1 **Project Site**	2 **Short Term**	2 **Low**	5 **High**	-2.5	**2** **Low**	-5 **Low**

6.7.2 Operation Phase

The waste to be generated during the operation phase will be sourced from food, paper and packaging waste from the passengers who will use the parking lots along the Motorway. A sufficient number of waste bins and containers will be placed in the parking lots and disposal of waste will be cooperated with arranged by the local authorities.

Also, during the maintenance activities of the Motorway and operational vehicles/equipment, hazardous waste may impact the environment.

Table 6-48 details the impact and mitigations for waste in operation phase of the Motorway.

Table 6-49 shows the overall rating of the impact of before and after mitigations. Generation of waste is considered high since the duration, magnitude and the likelihood of the impacts are determined as high. After taking mitigation measures, as shown in Table 6-49, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-48. Impact and Mitigations for Waste Generation in Operation Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
• Generation of Waste	Operation of Maintenance Station	Existing waste disposal sites and retail stations are determined as sensitive receptors.	<u>Design</u> • Waste Management Plan will be prepared and implemented • Hazardous Material Management Plan will be prepared and implemented. <u>Operation</u> • To minimize the risk of road paving maintenance work, follow the IFC EHS Toll Road Guidelines (2007). • Mitigation measures will take into account the requirements of Serbian regulations and IFC General EHS Guidelines. o An appropriate training should be provided to all personnel in operational project facilities and at toll booths to show where different types of waste will be placed. o Solid waste will be collected regularly and disposed of properly at an appropriate disposal site. o Waste containers will be capable of handling the solid wastes in an appropriate and safe manner and will not be affected by weather conditions. o Waste containers required to have labels identifying the type of waste. Proper labelling will prevent mixing of hazardous waste and non-hazardous solid waste. o Reuse/recycling methods will be considered to minimize the generation of solid waste. o Certified/licensed facilities will be used for the final disposal of solid wastes which cannot be reused/recycled. o Signs and other posting will be used to inform drivers not to throw litter. Litter or illegally disposed waste along the Motorway required to be collected and disposed of properly. o Recycling and trash containers will be provided in parking lots and rest areas to minimize litters on the Motorway. o Sediments and sludge from storm drainage systems required to be managed and disposed appropriately. o Old road surface materials can be managed by re-using in paving or stockpiling materials may be stored for roadbed or other uses.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• All hazardous waste should be properly collected, marked and disposed at approved location in accordance with the procedure prescribed within the Law on waste management (“Official Gazette of RS”, 36/09, 88/10, 14/16). It is strictly forbidden to dispose any type of hazardous waste on locations where surplus earth material will be disposed.

Table 6-49. Scoring of Waste Management Impacts in Construction Phase

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Generation of Waste	-1 **Negative**	2 **Municipality**	4 **Long Term**	2 **Low**	3 **Medium**	-2.75	5 **Definite**	11 **Medium**	-1 **Negative**	2 **Municipality**	4 **Long Term**	2 **Low**	3 **Medium**	-2.75	2 **Low Probability**	-6 **Low**

6.8 Terrestrial and Freshwater Ecology

The construction and operation of the Project will involve a wide range of activities that have the potential to affect ecology. Impacts of project activities can be further divided into the target group of biological elements as terrestrial and aquatic. Important impacts of motorway construction and operation activities on biological environment are mainly habitat fragmentations. Habitat fragmentation can be described as the splitting of natural habitats and ecosystems into smaller, more isolated patches. The process of fragmentation is connected to many different factors, of which the direct loss and isolation of natural habitat are the most important.

The ecological effects of transportation include disturbance in terms of noise, visual nuisance from artificial structures and machinery activities and pollution, which act to reduce the suitability of adjacent areas for wildlife. The infrastructure itself contributes significantly towards habitat fragmentation by creating barriers to animal movement. This may result in the isolation and loss of sensitive species. The steady increase in the number of animal casualties associated with roads and to a lesser extent with drowned animals in waterways provides a further indication of the fragmentation effect. Fauna mortality, in particular, has helped raise the public perception of the problem, due to the inherent link to traffic safety. Finally, devaluation of the landscape and nature for human recreation can make an important negative economic factor.

During the planning, construction or upgrading of transportation infrastructure, all possible efforts must be made to maintain or restore ecological structures and connect habitats and populations. Particular attention will be paid to rivers, streams, riparian forests, wooded corridors, networks of hedges and dikes etc., which provide ecological corridors for growth, expansion of range and/or migration of wildlife populations and can often be the last refuge for many species in an intensively man-used landscape.

Best practice assigns that project planning and design will aim to avoid ecological damage, especially to protected or sensitive habitats and/or species. The avoidance of fragmentation will be considered before resorting to mitigation measures.

The general principles that will be considered to avoid against the habitat fragmentation are:

- The fragmentation of natural habitats by transportation infrastructure is a problem, which can only be solved through acceptance of the issue at a policy level. Only an interdisciplinary approach involving planners, economists, engineers, ecologists and landscape architects etc., can provide the necessary tools for successfully addressing fragmentation. Public involvement is also essential to ensure the success of the chosen solutions.

- Habitat connectivity is a vital property of landscapes and is especially important for sustaining animal movement across the landscape. The preservation of habitat connectivity should be a strategic goal in the environmental policy of the transport sector.
- Avoiding and mitigation will be applied from the start of the planning process.

The relevant construction and operational activities of the Project likely to give rise to impacts on receptors are summarized in Table 6-50, along with the likely pathway of the impacts.

Table 6-50. Potential Impacts of the Project on Biological Environment

Phase of the Project Activities	Activity	Potential Impact
Construction	Vegetation clearance	Damage or loss of habitats Loss of important plant species Direct incidental killing of fauna Loss of habitat for faunal species Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Invasive species
	Camp sites, borrow areas, batch and asphalt plants and quarries	Damage or loss of habitat Increase in noise, visual and vibration which may cause disturbance or displacement of fauna
	Construction of culverts, bridges and viaducts	Damage or loss of habitat Increase in noise, and vibration and disturbance on fauna Disruption of ecological connectivity Loss of ecosystem services
	Presence of site preparation and construction vehicles	Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Damage or loss of flora and /or fauna
Operation	Operational traffic	Increase in noise, visual and vibration which may cause disturbance or displacement of fauna Damage and/or loss of fauna Barrier effects

Protected Areas

According to the EIAs prepared for the Morava Motorway Project, based on the decision of the Institute for Nature Protection of Serbia, It was determined that the area foreseen for the Motorway, is not located in "protected areas for which protection procedure has been carried out or initiated", "Ecological Network of the Republic of Serbia ", and "recorded natural assets".

Internationally Recognized Areas

IFC PS6 states that internationally and/or nationally recognized areas of high biodiversity value are likely qualified as critical habitat. These include Key Biodiversity Areas (KBAs), Important Bird Areas (IBAs) and Important Plant Areas (IPAs). Therefore, all of the KBAs within and in the vicinity of the Project Area are considered to be of high sensitivity.

Nationally Recognized Areas

IFC PS6 states that internationally and/or nationally recognized areas of high biodiversity value are likely qualify as critical habitat. These include nationally protected areas. Therefore, all of the protected areas within and in the vicinity of the Project area are considered to be of high sensitivity.

There is no nationally or internationally protected area within the AoI. Only one nationally recognized nature reserve area located is outside the AoI (Section-2, KP 30). The "Osredak" Special Nature Reserve protected area is situated 530 m distance to the Proposed Motorway centerline. The Project does not pose any direct impact (land take, construction of any access roads, borrow area etc.) to the site. The results of the assessment on physical impacts (i.e. air quality, noise, soil and water quality) given in this chapter indicate that indirect impacts of the Project to the site are also insignificant or negligible. All the assessment on noise and air impacts have been estimated with numerical models. As an example, estimated noise level at the Osredak Special Nature Reserve is 40 dB, which indicates that no noise impact on the area is expected due to its distance to project facilities. The site is also included in the constraint maps as no-go area.

River diversion project will cause a significant change in the river flow. In order to reduce the impact of flow in the new riverbed due to river regulation, natural material (such as rocks) will be used for the protection of scouring and river bank erosion. Continuity of the flow will be maintained in the new channel and the flow of the river will not be impacted. Therefore, no adverse impacts on Gornje Pomoravlje KBA.

Habitats

Nine different 3rd level EUNIS habitat types were identified in the Proposed Motorway Route. Natural habitats are usually not continuous but intermittent. The Project area covers mostly invasive plant species habitats and agricultural lands (see Table 6-51). Sensitive habitats are also provided in the "Constraint Map" given in Appendix-5.

Table 6-51. Habitat Sensitivity and Habitat Loss due to Project

Habitat Code		Habitat Type	Rationale	Sensitivity	Total Area (buffer)		Damage or Loss of Habitats due to Permanent Structures (Motorway and River Regulation Footprint)		Damage or Loss of Habitats due to Temporary Structures (Project Facilities)	
					ha	%	ha	%	ha	%
Natural	C2.3	Permanent non-tidal, smooth-flowing watercourses	These habitat are described as a priority Habitat according to the EU Habitats Directive (92/43/EEC) and Law On Nature Protection ("Official Gazette of RS", no. 36/2009, 88/2010 and 91/2010 – corr.and 14/2016)	Medium	685.95	3.7	65.3	5,7	1,3	0,1
	E2.1	Permanent mesotrophic pastures and aftermath-grazed meadows		Medium	188.42	1.0	12.8	1,1	7.9	0,6
	G1.1	Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix		Medium	2710.59	14.7	208.1	18,3	130.8	10,0
	G1.7	Thermophilous deciduous woodland		Medium	2211.62	12.0	70.7	6,2	240.3	18,4
	J5.3*	Highly artificial non-saline standing waters		Medium	19.94	0.1	0	0,0	0.13	0,01
Total Natural Habitats					*5816,52*	*31,5*	*356.8*	*31,4*	*380.6*	*38.9*
Modified	I1.1	Intensive unmixed crops	Habitat that support species of Low sensitivity	Low	11312.1	61.4	749.2	66,0	920	70,4
	J1.2	Residential buildings of city and town centres		Low	863.65	4.7	8.2	0,7	1.5	0,1
	J2.3	Rural industrial and commercial sites still in active use		Low	142.92	0.8	1.5	0,1	0	0,0
	J3.2	Active opencast mineral extraction sites,		Low	74.43	0.4	2.0	0,2	1.1	0,1

Habitat Code		Habitat Type	Rationale	Sensitivity	Total Area (buffer)		Damage or Loss of Habitats due to Permanent Structures (Motorway and River Regulation Footprint)		Damage or Loss of Habitats due to Temporary Structures (Project Facilities)	
					ha	%	ha	%	ha	%
		including quarries								
	J4.2	Road Networks		Low	130.83	0.7	25,7	2,3	1.7	0,1
	J5.3	Highly artificial non-saline standing waters		Low	96,68	0.5	2.3	0,2	1.9	0,2
Total Modified Habitats					*12620,6*	*68,5*	*779.1*	*74.9*	*926.3*	*61.1*
Total					**18437,1**	**100.0**	**1135.9**	**100.0**	**1306.8**	**100.0**

**areas which naturalized in time*

Table 6-52. Detailed Habitat Loss due to Each Project Component

Project Component	Total Area of the Component (ha)	% Area of the Component	Habitat	Total Area of the Habitat within the Component (ha)	% Area of the Habitat within the Component
Motorway	829,38	33,76	C2.3	7,57	0,91
			E2.1	10,79	1,30
			G1.1	70,79	8,54
			G1.7	66,80	8,05
			I1.1	634,97	76,56
			J1.2	8,15	0,98
			J2.3	1,52	0,18
			J3.2	1,24	0,15
			J4.2	25,45	3,07
			J5.3	2,10	0,25
River Regulation	316,25	12,87	C2.3	57,69	18,24
			E2.1	1,96	0,62
			G1.1	137,29	43,41
			G1.7	3,94	1,25
			I1.1	114,18	36,10
			J3.2	0,78	0,25
			J4.2	0,23	0,07
			J5.3	0,17	0,05
Batch Plant	37,48	1,53	G1.1	1,91	5,10
			G1.7	1,68	4,48
			I1.1	33,83	90,26

Project Component	Total Area of the Component (ha)	% Area of the Component	Habitat	Total Area of the Habitat within the Component (ha)	% Area of the Habitat within the Component
			J5.3	0,06	0,16
Precast Yard	13,58	0,55	G1.1	0,28	2,06
			G1.7	0,46	3,39
			I1.1	12,84	94,55
Beam Plant	25,81	1,05	I1.1	25,80	100,00
Borrow Area	956,14	38,92	C2.3	0.00	0,00
			E2.1	6,16	0,64
			G1.1	125,34	13,11
			G1.7	45,19	4,73
			I1.1	776,04	81,16
			J3.2	0,77	0,08
			J4.2	0,60	0,06
			J5.3	2.00	0,21
SW Plant	8,55	0,35	G1.7	0,11	1,29
			I1.1	8,45	98,83
Quarry	201,76	8,21	C2.3	1,33	0,66
			E2.1	1,80	0,89
			G1.1	1,65	0,82
			G1.7	189,26	93,80
			I1.1	5,04	2,50
			J1.2	1,24	0,61
			J3.2	0,32	0,16
			J4.2	1,12	0,56
Asphalt Plant	11,3	0,46	G1.1	0,06	0,53
			G1.7	0,28	2,48
			I1.1	10,67	94,42
			J1.2	0,27	2,39
Subbase Plant	6,39	0,26	G1.7	0,11	1,72
			I1.1	6,28	98,28
Camp Area	42,7	1,74	G1.1	1,61	3,77
			G1.7	0,04	0,09
			I1.1	41,06	96,16
Crusher	7,07	0,29	G1.7	3,15*	100,00
Total	2456,41	100,00			

*The remaining area of the Curshers are located in the Quarry sites

It can be observed that the most affected habitat (permanently occupied by the motorway and river regulation – habitat lost) is agricultural lands (66%), described with a low sensitivity. Thermophilous deciduous woodland (6.2%) and Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix (18.3%). The affection to the rest of the habitats will be much lower, with a percentage of habitat loss below 9.5% in all the cases. Regarding temporary occupancies of habitats, they are mostly limited to agricultural lands (70.4%), Thermophilous deciduous woodland (18.4%) and Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix (10%). The rest of the habitats represent a percentage below 1.2%.

Threatened Flora and Fauna Species

Flora

There are no species endemic and protected by international conventions in the Project area.

According to the National legislation, there is one plant species listed as strictly protected (Ann-I) *Nuphar lutea*. Only, *Arctium lappa, Hypericum perforatum, Iris pseudoacorus, Acinos hungaricus, Lamium album, Althea officinalis, Crataegus monogyna, Rosa canina, Galium odoratum* and *Viola odorata* species listed as protected species (Ann-II) were identified. These species are assessed as medium sensitivity.

Invertebrates

According to the National legislation, there are 2 species *Papilio machaon* and *Pieris brassicae* listed as strictly protected (Ann-I). The species potentially found in the Project AoI don't have important concentrations in terms of the species listed in National Protection lists. These species identified in the studies have high global populations and widely distributed species in the country and in Europe. According to this situation, these species are assessed as high sensitivity.

Zerynhia cerisy is evaluated as NT (Near Threatened) according to IUCN Red List is assessed as medium sensitivity. Rest of the invertebrate species are low sensitivity.

Amphibian –Reptilian

According to the National legislation, there are 8 Amphibian species and 7 Reptile species listed as s strictly protected (Ann-I) and 1 Amphibian species listed as protected species (Ann-II). The species potentially found in the Project AoI don't have important concentrations in terms of the species listed in National Protection lists. These species identified in the studies have high global populations and widely distributed species in the country and in Europe. According to this situation, species listed in Ann-I are assessed as high sensitivity and species listed in Ann-II are assessed as medium sensitivity.

Emys orbicularis, Testudo hermanni and *Darevskia praticola* are evaluated as NT (Near Threatened) according to IUCN Red List and assessed as medium sensitivity.

Triturus macedonicus, Anguis fragilis, Lacerta viridis, Podarcis muralis and Vipera ammodytes are assessed as low sensitivity due to their global and national status.

Birds

According to the National legislation, 75 of the bird species are listed as strictly protected (Ann-I). And 19 species are listed as protected species (Ann-II).The species potentially found in the Project AoI don't have important concentrations in terms of the species listed in National Protection lists. These species identified in the studies have high global populations and widely distributed species in the country and in Europe. There were no bird species and/or habitats in flocks and/or colonies observed in the study area. According to this situation, species listed in Ann-I are assessed as high sensitivity and species listed in Ann-II are assessed as medium sensitivity.

Aquila heliaca, Streptopelia turtur are evaluated as VU (Vulnerable) and *Milvus milvus*, *Falco vespertinus* are evaluated as NT according to the IUCN Red List. These species are assessed as medium sensitivity. Rest of the species not belonging to the National legislation and evaluated lower than NT according to the IUCN are assessed as low sensitivity.

Mammals

According to the National legislation, 33 of the mammal species are listed as strictly protected (Ann-I). And 1 species is listed as protected species (Ann-II). The species potentially found in the project AoI don't have important concentrations in terms of the species listed in National Protection lists. These species identified in the studies have high global populations and widely distributed species in the country and in Europe. According to this situation, species listed in Ann-I are assessed as high sensitivity and species listed in Ann-II are assessed as medium sensitivity.

Rhinolophus Euryale, Myotis bechsteinii and *Lutra lutra* are evaluated as NT (Near Threatened) and *Myotis capaccinii* is evaluated as VU (Vulnerable) according to IUCN Red List and assessed as medium sensitivity. Rest of the species do not belong to the National legislation and evaluated lower than NT-VU according to the IUCN are assessed as low sensitivity.

Aquatic Environment

According to the National legislation, 4 of the fish species and 2 of the macrobenthic species listed as strictly protected (Ann-I). 9 fish species and one macrobenthic species listed as protected species (Ann-II). The species potentially found in the Project AoI don't have

important concentrations in terms of the species listed in National Protection lists. These species identified in the studies have high global populations and widely distributed species in the riverine system of the country and Europe. According to this situation, species listed in Ann-I are assessed as high sensitivity and species listed in Ann-II are assessed as medium sensitivity.

Cyprinus carpio is evaluated as VU (Vulnerable) according to IUCN Red List and assessed as medium sensitivity. Within the macrobenthic organisms, *Hirudo medicinalis* is classified as 'Near Threatened Species-NT',*Astacus astacus* classified as 'Vulnerable-VU' and *Unio crassus* classified as 'Endangered-EN' according to IUCN Red List. In this context, *Hirudo medicinalis* and *Astacus astacus* assessed as medium and *Unio crassus* assessed as high sensitivity. Rest of the aquatic species not belonging to the National legislation and evaluated lower than NT-VU according to the IUCN are assessed as low sensitivity.

Critical Habitat Assessment

Conservation of biodiversity requires protection of habitats for survival of species as well as sustenance of ecosystems. As stated by IFC PS 6, habitats constitute "a terrestrial, freshwater or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment" (IFC, 2012). To meet IFC PS 6 requirements, clients would have different obligations for different kinds of habitats. This enables to provide a better understanding of specific species and habitat requirements and establish meaningful management units to define a mitigation strategy. In order for IFC PS6 requirements to be met, clients have different responsibilities regarding different habitat types.

The first step in assessment of habitat features is to differentiate between modified, natural and critical habitats, each of which require different conservation efforts and compensatory measures. Modified habitats, in the most general sense, are those that have been subject to some form of alteration, often resulting in agricultural land. Despite the fact that some modified habitats might lose all of their natural characteristics, it is still required to minimize further impacts. Natural habitats are composed of plant and/or animal species that are mostly of native origin, where human activity has not been significant enough to modify ecological functions and species composition within. In line with IFC PS 6, in areas of natural habitat project activities will not significantly convert or degrade the habitat unless the following conditions are met (IFC, 2012):

- There are no technically and financially feasible alternatives;
- The overall benefits of the project outweigh the costs, including those to the environment and biodiversity; and
- Any conversion or degradation is appropriately mitigated.

In areas of natural habitat, mitigation measures are required to be designed to achieve no net loss of biodiversity. Critical habitats are areas of high biodiversity value that may include at least one or more of the five values specified in IFC PS 6. Critical habitat criteria are as follows and should form the basis of any critical habitat assessment (IFC, 2019 GN53):

I. Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
II. Criterion 2: Endemic and/or restricted-range species;
III. Criterion 3: Migratory and/or congregatory species;
IV. Criterion 4: Highly threatened and/or unique ecosystems; and
V. Criterion 5: Key evolutionary processes.

Numerical thresholds have been defined for the first four critical habitat criteria. The thresholds are indicative and serve as a guideline for decision-making only (IFC, 2019 GN56).

I. Criterion 1: Critically Endangered and Endangered Species

Species threatened with global extinction and listed as CR and EN on the IUCN Red List of Threatened Species shall be considered as part of Criterion 1. Critically Endangered species face an extremely high risk of extinction in the wild. Endangered species face a very high risk of extinction in the wild.

Criterion 1 of species that are listed nationally/regionally as CR or EN in countries that adhere to IUCN guidance shall be determined on a project-by-project basis in consultation with competent professionals.

Thresholds for Criterion 1 are the followings:

a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species).

b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a).

c) As appropriate, areas containing ***important concentrations*** of a nationally or regionally listed EN or CR species.

According to the findings obtained from surveys in these habitats, no Terrestrial and Aquatic flora-fauna species classified as CR were observed. Only Unio crassus classified as EN in global scale according to IUCN. Although, European population of Unio crassus classifed as VU. Unio crassus was not detected in the field study and was included in the lists based on the literature. Species classified as VU status have been identified during the studies, but the habitats don't have globally important concentrations in these habitats. All of the species

identified in these studies have high global populations and all species are widely distributed species.

As it is given in the baseline chapter of the ESIA Report, the literature together with the baseline study indicates that neither species potentially found in the project AoI nor the habitats don't have important concentrations in terms of the species listed in National Protection lists. The assessment shows that the area is heavily under the anthropogenic influences (mainly agriculture and populated settlements along Morava River and the existing road).

II. Criterion 2: Endemic and Restricted-range Species

- For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO[16] less than 50,000 square kilometers (km^2).
- For marine systems, restricted-range species are provisionally being considered as those with an EOO of less than 100,000 km^2.
- For coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers), restricted range is defined as having a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

The threshold for Criterion 2 is the following:

a) Areas that regularly hold ≥10% of the global population size AND ≥10 reproductive units of a species

According to the findings obtained from surveys in these habitats, no Terrestrial and Aquatic flora-fauna species classified as Endemic and Restricted-Range Species were observed. All of the species identified in the studies have high global populations and all species are widely distributed species.

There are no Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas for restricted-range species.

For the above reasons, no Critical habitat is expected to be present within the AoI according to Criterion 2.

III. Criterion 3: Migratory and Congregatory Species

[16] IFC Guidance Note GN74 For purposes of this Guidance Note, the term endemic is defined as restricted-range. Restricted range refers to a limited extent of occurrence (EOO).

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).

Congregatory species are defined as species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.

Thresholds for Criterion 3 are the followings:

a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.
b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

During the studies, it was observed that there are areas used for breeding and wintering purposes. However, the species in these areas do not form large colonies.

There are no Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas for congregatory species.

There are no Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.

For the above reasons, no Critical habitat is expected to be present within the AoI according to Criterion 3.

IV. Criterion 4: Highly Threatened or Unique Ecosystems

The IUCN is developing a Red List of Ecosystems, following an approach similar to the Red List for Threatened Species. "The client should use the Red List of Ecosystems where formal IUCN assessments have been performed. Where formal IUCN assessments have not been performed, the client may use assessments using systematic methods at the national/ regional level, carried out by governmental bodies, recognized academic institutions and/or other relevant qualified organizations (including internationally recognized NGOs). GN80".

The thresholds for Criterion 4 are the followings:

a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.
b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.

None of the habitats identified within the AoI are considered to be "Highly Threatened and/or Unique Ecosystems" i.e.:

(i) at risk of significantly decreasing in area or quality;

(ii) with a small spatial extent; and/or

(iii) containing unique assemblages of species including assemblages or concentrations of biome-restricted species.

The Terrestrial and Aquatic habitats identified are not considered as threatened according to the "IUCN Red List of Ecosystems" and "European Red List of Habitats". These habitats are very common in Europe.

For the above reasons, no Critical habitat is expected to be present within the AoI according to Criterion 4.

V. Criterion 5: Key Evolutionary Processes

The structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties. In some cases, spatial features that are unique or idiosyncratic of the landscape have been associated with genetically unique populations or subpopulations of plant and animal species. Physical or spatial features have been described as surrogates or spatial catalysts for evolutionary and ecological processes, and such features are often associated with species diversification. Maintaining these key evolutionary processes inherent in a landscape as well as the resulting species (or subpopulations of species) has become a major focus of biodiversity conservation in recent decades, particularly the conservation of genetic diversity. By conserving species diversity within a landscape, the processes that drive speciation, as well as the genetic diversity within species, ensures the evolutionary flexibility in a system, which is especially important in a rapidly changing climate.

There is no any isolation, spatial heterogeneity and wealth of environmental gradients in the AoI. It also has not been subject to much higher levels of habitat loss and fragmentation. AoI does not support key evolutionary processes.

For the above reasons, no Critical habitat is expected to be present within the AoI according to Criterion 5.

The habitats identified in the field study are very common in Europe. Invasive species are generally found in natural habitats in the Project site. A large part of the Project site consists of agricultural areas.

Surroundings of the Project site show similar habitat and ecosystem characteristics to those that had been identified at the project site before the onset of construction activities. Therefore, vicinity of the Project site bears suitable alternative habitats for fauna species with high

ecological carrying capacity. Outside the Project site, there are animal species from each large terrestrial vertebrate class, with prey-predator relationships representing the food pyramid.

In the official letter issued by the Institute for Nature Protection of Serbia[17] for the local EIAs "Location Condition" (03 no.019-1532/2 19.06.2019) includes the following statements for the area where the activity will take place;

There are no "protected areas on the Motorway Section for which protection procedure has been carried out or initiated", "ecologically significant areas and ecological corridors of international importance of the ecological network of the Republic of Serbia determined by the Decree on Ecological Network (Official Gazette of RS, No.102/2010)".

It is also the habitat of several species of strictly protected and protected species of fish, amphibians, reptiles, birds and mammals. No endemic or relict species were found. *The animal and plant species that inhabit this area are relatively widespread in the territory of Serbia, so the area does not represent a vital part of the habitat for their survival or overall conservation status.*

Furthermore, according to the findings obtained from studies in these habitats, no flora and fauna species classified as dangerous and / or threatened (CR) were observed. Species under protection according to national and international conservation criteria are available. However, all of the species identified in the field have high global populations and all species are widely distributed ones.

Critical habitat assessment carried out in the Area of Influence defined in the report presented in Appendix-11.

Supplemental Biodiversity Assessment ("SBA") including Critical habitat assessment (CHA), Updated biodiversity impact assessment, Offset strategy and Biodiversity Management Plan following IFC Performance Standard 6 is currently underway to more fully understand the national and global significance of the habitats and species which may be affected, which will enable targeted mitigation to be put in place where required. SBA will be presented in addition to ESIA.

[17] In the process of elaboration of the Fifth National Report on implementation of the Convention on Biological Diversity, the Institute for Nature Conservation of Serbia have given their contribution by delivering information and data.

6.8.1 Construction Phase

The Impact Assessment on Terrestrial and Freshwater Ecology during the Construction Phase

Table 6-53 details the impact and mitigations for the Terrestrial and Freshwater Ecology in the Construction Phase of the Project.

Table 6-54 shows the overall rating of the impacts before and after mitigations. All of the potential impacts may cause medium receptor sensitivity with various duration. Therefore, the overall impacts prior to mitigation measures are medium. After taking mitigation measures, as shown in Table 6-54, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-53. Impact on Terrestrial and Freshwater Ecology (Construction Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Impact assessment for "Protected Areas" was not performed due to protected areas will not be affected in any way since they are located outside the Morava Corridor Motorway Project AoI.			
Damage or loss of terrestrial habitats due to permanent structures • Construction activities can directly cause damage and loss of habitats: Vegetation clearance and motorway	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Camp Sites Material Storage Waste Storage/Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Machinery and Equipment	Terrestrial Habitats	<u>Design</u> • Afforestation activities to be performed in line with No net loss principle, i.e preparation of Biodiversity Management Plan and SERL Management Plan. • Gallery vegetation will be created along West Morava's new riverbed, as it existed before the regulation, to restore the natural habitat condition. This gallery will also be retention for possible high waters. • After the river regulation, 17 m of revegetated area with native species will be created on both sides of the new river bed. <u>Pre-Construction</u> • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. <u>Construction</u> • Project construction sites and access roads will be separated from sensitive areas with appropriate fencing and signage. • Appropriate fencing such as orange safety barrier fencing will be installed to protect sensitive habitats. (Sensitive habitats are provided in the Constraint Map given in Appendix-5) • In sensitive habitat areas, pedestrian, equipment and vehicle access will be limited to the designated access to construction sites. Parking and driving off the designated access roads will not be allowed.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Waste generated from construction work and activities will be stored at designated areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Construction waste generated due to project activities will first be stored at designated storage areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Licensed/approved facilities for solid and liquid waste disposal will be used and a duty of care and chain of custody for all waste leaving the site will be followed. • Riparian vegetation along the West Morava River will be restored.
Damage or loss of terrestrial habitats due to temporary structures • Construction activities can directly cause damage and loss of habitats: Vegetation clearance, Soil and rock excavations and Borrow pits, quarries, camp sites and other facilities.	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Camp Sites Material Storage Waste Storage/Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Machinery and Equipment Demobilization of Equipment and Machinery	Terrestrial Habitats	<u>Design and pre-construction</u> • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. • SERL Plans will be developed for all Project Facilities – camps, site facilities, borrow pits, quarries, batching plant, and asphalt plants. • SERL plans for borrow pits will include habitat designs that allow artificial wetlands to be reformed. During the baseline field studies, existing borrow pits which had already been opened in the region in the past, had over time developed into wetland habitats. This measure will encourage development of new habitats, especially aquatic plants and bird species. <u>Construction</u> • Project construction sites and access roads will be separated from sensitive areas with appropriate

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
	Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles		fencing and signage. • Appropriate fencing such as orange safety barrier fencing will be installed to protect sensitive habitats. (Sensitive habitats are provided in the Constraint Map given in Appendix-5) • In sensitive habitat areas, pedestrian, equipment and vehicle access will be limited to the designated access to construction sites. Parking and driving off the designated access roads will not be allowed. • Waste generated from construction work and activities will be stored at designated areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Licensed/approved facilities for solid and liquid waste disposal must be used and a duty of care and chain of custody for all waste leaving the site will be followed. • Project Facilities will be dismantled upon completion of the construction phase. • Areas where the facilities are located will be reinstated according to SERL Plans.
Habitat fragmentation • Linear infrastructures, such as highways, contribute significantly towards the habitat fragmentation. Building of a closed highway will cause fragmentation and separation of habitats.	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Excavation Movement of the vehicles	Terrestrial Habitats	<u>Construction</u> • Fauna crossing points (i.e. culverts) will be designed and installed along the motorway. Culverts for animals are primarily constructed as safe crossing points for mammals. Target species are usually mammals. Small fauna species may readily use these culverts as well. As a minimum when using culverts a ledge will be incorporated where species such as otters and reptiles can cross alongside the river even at times of high flow. It can also be used on bridges to be built on the West Morava River to prevent barrier effect.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Vegetated area will be left between the bridge abutment and the riverbank. (Sensitive habitats are provided in the Constraint Map given in Appendix-5)
Loss of sensitive plant species • Flora species will be directly affected from the road construction through construction activities. *National Legislation Ann-I* *Nuphar lutea* *National Legislation Ann-II* *Arctium lappa,* *Hypericum perforatum,* *Iris pseudoacorus,* *Acinos hungaricus,* *Lamium album,* *Althea officinalis,* *Crataegus monogyna,* *Rosa canina,* *Galium odoratum* *Viola odorata*	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Camp Sites Material Storage Waste Storage/Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Machinery and Equipment Demobilization of Equipment and Machinery Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles	Terrestrial Habitats	Pre-Construction • Seeds of nationally protected flora will be collected from the construction area to be used in the post-construction landscaping phase (Location of the species are provided in the Constraint Map given in Appendix-5) • Where practical, collected seeds of the limited range distributed flora will be delivered to the Plant Gene Bank in Belgrade, for conversation purposes. • Where practical, *Iris pseudoacorus* (KP 60+700) will be relocated to nearby or similar habitats by a suitably qualified person such as botanist. Construction • Measures to reduce dust and air quality will be taken as mentioned in Sections 6.4 • Dust suppression will be used at working sites (i.e. truck roads, storage areas etc.) in the proximity or near to the areas, where the *Nuphar lutea* species is located, and dust will be prevented. In addition, specie specific signs (to inform workers and local people) will be prepared for the areas where this species is located, and necessary measures will be taken to prevent this area from being affected by construction works.
Loss of sensitive fauna species • Construction activities can result in accidental loss of fauna, due in most of the cases to the presence and activity of the machinery	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance	Terrestrial Habitats	Pre-Construction • Where possible, gradual vegetation clearance will be planned to enable fauna to move to other areas.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
<u>Invertebrates</u> *Zerynhia cerisy* <u>Amphibian –Reptilian</u> *Emys orbicularis,* *Testudo hermanni* *Darevskia praticola* <u>Birds</u> *Aquila heliaca,* *Streptopelia turtur* *Milvus milvus,* *Falco vespertinus* <u>Mammals</u> *Rhinolophus Euryale* *Myotis bechsteinii* *Lutra lutra* *Myotis capaccinii* *and Nationally Protected species** **Lists of species protected by the National legislation given in the baseline report will be taken into consideration during the construction activities.*	Land Take/Expropriation Mobilization of Machinery and Equipment Camp Sites Material Storage Waste Storage/Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Machinery and Equipment Demobilization of Equipment and Machinery Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles		• Pre-construction surveys for target fauna will be undertaken within high sensitive areas by a competent ecologist to assess their presence in the construction site. • Before any construction works in the West Morava River or at the river banks the locations will be controlled for potential presence of otters (burrows, trail, feces, and pubs). Additionally, the borders of the construction area will be identified, and the construction area will be prevented for the entrance of individuals (otters) during construction works. • Protection strategy for sensitive fauna will be developed and implemented in coordination with National Protection Institute. If during the construction activities, any sensitive fauna species is observed, the works will be suspended in the specific location immediately, and the National Protection Institute will be informed without delay. • In the areas where bridge structures are proposed, observation for *Lutra lutra* will be made by a competent biologist. If the Holts of *Lutra lutra* are observed in the field, biologist will verify that it is not used by the species. • Before any construction works in the breeding and wintering habitats, the size of these habitats will be controlled. • Vegetation clearance will be avoided, whenever feasible, during the breeding and wintering periods. • Construction activities will be planned to minimize disturbance during the breeding bird period (1 April to 30 June). During baselines field survey areas were identified with suitable habitats for breeding: Quarry at KP 25 and Borrow Pit at KP 67.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Construction activities will be planned to minimize disturbance during the wintering bird period (1 December to 1 February). During baselines field survey areas were identified as wintering area: Borrow Pit at KP 60 and West Morava River corresponding to KP 95. • If construction has started before these dates, work can be continued in both breeding and wintering areas. <u>Construction</u> • Speed of construction vehicles will be limited, in order to limit emission of dust in non-paved access roads and avoid the risk of accidents with fauna. • Sensitive habitats will be protected by the use of appropriate fencing such as orange safety barrier fencing. Protective measures will be implemented especially in locations of active construction works to also avoid the entry fauna and avoiding accidents.
Increase in noise, visual nuisance and vibration which may cause disturbance or displacement of fauna • Construction activities can directly and indirectly cause disturbance to species of fauna, due in most of the cases to the presence and activity of the machinery.	Mobilization of Machinery and Equipment Camp Sites Material Storage Excavation Backfilling Storage, Re-Use and Disposal of Excavations Crushing Machinery and Equipment Asphalt Preparation Concrete Batching	Terrestrial Habitats	<u>Construction</u> • Measures to reduce noise will be taken as mentioned in Sections 6.5 • Noise, waste and spills created during the construction activities will be managed under an Environmental Management Plan, to limit the disturbance to fauna. • Environmental Awareness training will be provided to all personnel to increase awareness about the impact of disturbance, waste and spills on habitats and fauna.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
	Demobilization of Equipment and Machinery Movement of the vehicles		
Introduction of Alien invasive species • The clearing of new areas may provide opportunities for Alien invasive species introduction.	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Excavation Machinery and Equipment Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles	Terrestrial Habitats	<u>Construction</u> • Intrusion of any invasive flora species into the project area and its surroundings will be prevented. For this purpose, especially vehicles used for vegetation clearance and/or plant transfer will be washed/cleaned prior to use. • Project employees will not be allowed to bring any live animals or plants into the construction site to avoid the risk of pest/invasive species establishing in the Project area. • Planting of alien species will be prohibited within the Project Facilities or any areas within the AoI, including landscaping of revegetated areas. • Where practical, alien species will be seasonally monitored to record their populations in the construction area and to prevent them from spreading throughout the AoI. Additionally, prompt revegetation (i.e. sowing of native herbaceous species and/or planting native shrubs/trees) on bare soil with natural or semi-natural vegetation will reduce the spread of alien species. • Revegetation (i.e., the sowing of native herbaceous species on top-soils and/or the planting of native shrubs/trees) will be undertaken as soon as possible after clearance and construction.
Damage to Freshwater Ecosystem There are a number of activities during the construction activities that can result in damage to the freshwater ecosystems:	Waste Storage/Disposal Water Supply Wastewater Treatment and Disposal	Aquatic Habitats	<u>Pre-Construction</u> • Temporary culverts proposed for river and stream crossings as mitigation measure to protect sensitive aquatic habitats (see Water Environment

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
• Soil and rock excavations, with an associated change of the water quality. • Borrow pits and quarries, with an associated change of the water quality. • Construction of culverts, bridges and viaducts, with an associated change of the water quality. • Smoothing of beds of stream flows and the activities of flood areas. • Increase of the turbidity as a result of conducting construction activities within the water feature. • Accidental spill of fuel or hazardous wastes affecting a water feature: river, lake, creek, etc. • Dilution of the spill in the water feature will affect to the whole freshwater ecosystem, through direct exposure to the chemical compounds present in the spilled product, or by ingest of exposed organisms. • Increase of the turbidity as a result of conducting construction activities within the water feature. • During the construction phase of the bridges that will be constructed increasing of sediment and/or turbidity in the waterbed due to bridge construction. Excessive sediment formation in rivers can cause fish deaths by blocking their gills.	Excavation Storage, Re-Use and Disposal of Excavations		Terrestrial section 6 of the ESIA) will be designed to allow fish crossing during both high and low flows (i.e. bottomless culverts). • The natural structure of the riparian vegetation which forms the spawning and sheltering area for many aquatic organisms will be preserved where possible. • Vegetation clearance works will be planned and executed to avoid damage to the riparian vegetation, whenever possible. • Any intervention in particular during river regulation works in long distance or that can significantly disturb the river habitat (riverbed and side slope) will be prevented during the breeding season of fish species (30th April to 15th June). <u>Construction</u> • The permanent non-tidal, smooth-flowing watercourses habitat (EUNIS Code C2.3) within the proposed Motorway route is sensitive and highly susceptible to damage. For this reason, the construction activities will be executed without damage to the habitats which outside the proposed Motorway route. (Locations of the habitats are provided in Biodiversity Baseline Report - EUNIS Habitat Map given in Appendix-7). • To avoid any increase of the turbidity levels, excavated materials will not be deposited or stored in or near freshwater features. Detailed mitigations about spillage are given in Sub-section 6.3.1 Construction within the Riverbed • Measures to avoid spills will be taken as mentioned in Sub-section 6.3.1. Spillage/Leakage to Surface Water. • If any emergency, construction or river crossing works in or near West Morava River and its

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			tributaries must be carried out during the breeding season, a Method Statement will be developed detailing protection measures such as sediment traps/booms, temporary diversions, etc. and monitoring process. • Monitoring will be done during construction by specialist subcontractor/biologist.
Freshwater Habitat loss / change due to river regulation • Habitat change due to river regulation • Construction and excavation works in mainstream, floodplain and coastal areas of river regulation construction area • During the construction of the river regulation construction activities can cause fish deaths • Small amount of water will continue to be supplied on the old riverbed. However fish species will be stranded in the old river bed due to decreasing of water level after the alteration of river bed. • Spawning and sheltering behavior of fish species will be directly affected by river regulation construction activities. • Change in river flow rate	Excavation Backfilling Machinery and Equipment	Aquatic Habitats	<u>Design and Pre-Construction</u> • The new riverbed should be designed with the ground material that characterizes the riverbeds in the region as much as possible (rocks, gravels). There should be sufficient areas on the riverbanks where aquatic plants can hold, and as a result, plant development can be achieved. This will create suitable spawning and sheltering areas for fish species. • The barriers at the upstream end of the abandoned river channel will not allow fish migration, but as the compensation measure, the abandoned meanders will be left open on the downstream side. Fish migration is possible through the new river channel of the West Morava River. • In order to reduce the impact of flow in the new riverbed due to river regulation, natural material (such as rocks) will be used for the protection of scouring and river bank erosion. Continuity of the flow will be maintained in the new channel and the flow of the river will not be impacted. • Stream mouths will be arranged to allow fish passage in places where existing streams will be connected to the new riverbed. • Afforestation activities will be performed on the river regulation works in line with the 'no net loss principle', i.e., preparation of Biodiversity Management Plan and SERL Management Plan.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Construction • During river regulation or diversion works, fish species stranded in the natural small ponds (puddle) will be transported to the riverbed by a competent biologist. • Fish transportation will be made in specialized vehicles with tanks and oxygen, if necessary, other vehicles will be adapted for this purpose and equipped with a container for transporting fish.
Loss of important aquatic species • Construction activities can result in accidental loss of aquatic species, due in most of the cases to the presence and activity of the machinery *Nationally Protected species Ann-I* *Carassius carassius** *Tinca tinca* *Cobitis elongata* *Zingel zingel* *Unio carassus* *Astacus astacus* *Nationally Protected species Ann-II* *Abramis brama* *Barbus balcanius* *Chondrostoma nasus* *Cyprinus carpio (VU)* *Squalius cephalus* *Esox lucius* *Perca fluviatilis* *Sander lucioperca*	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Land Take/Expropriation Mobilization of Machinery and Equipment Camp Sites Material Storage Waste Storage/Disposal Water Supply Wastewater Treatment and Disposal Excavation Backfilling Storage, Re-Use and Disposal of Excavations Crushing Machinery and Equipment Asphalt Preparation Concrete Batching	Aquatic Habitats	Pre-construction and Construction • Construction work (bridge structures, drainage, temporary crossings and temporary works for structures) on and near the West Morava River and its tributaries between 30th April to 15th June will be planned and executed with care to avoid or minimize impact to fish species caused by human or equipment activities. • A Method Statement for Work on or Near Watercourse will be prepared detailing the measures such as sediment traps/booms, temporary diversions, etc. • If construction work (river regulation, bridge structures, drainage, temporary crossings, and temporary works for structures) has commence before the start of breeding season, work can continue in line with the measures detailed in the Method Statement.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Silurus glanis *Hirundo medicinalis*	Demobilization of Equipment and Machinery Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles		

Table 6-54. Impacts Scoring on Terrestrial and Freshwater Ecology (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impact**
Damage or loss of terrestrial habitats due to permanent structures	-1 Negative	2 Municipality	5 Permanent	5 Very High	3 Medium	-3.75	5 Definite	-19 High	-1 Negative	2 Municipality	5 Permanent	2 Low	3 Medium	-3.00	2 Low Probablity	-6 Low
Damage or loss of terrestrial habitats due to temporary structures	-1 Negative	2 Municipality	4 Long Term	4 High	3 Medium	-3.25	5 Definite	-16 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	2.25	2 Low Probablity	-5 Low
Habitat fragmentation	-1 Negative	2 Municipality	5 Permanent	5 Very High	3 Medium	-3.75	5 Definite	-19 Hİgh	-1 Negative	2 Municipality	5 Permanent	3 Medium	3 Medium	-3.25	2 Low Probablity	-7 Low
Loss of important plant species	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	5 Definite	-11 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-1.75	2 Low Probablity	-3.5 Low
Loss of important fauna species	-1 Negative	2 Municipality	2 Short Term	2 Low	5 High	-2.2.75	5 Definite	-14 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	5 High	-2.75	2 Low Probablity	-6 Low
Increase in noise, visual and vibration which may cause disturbance or displacement of fauna	-1 Negative	2 Municipality	2 Short Term	3 Medium	3 Medium	-2.5	5 Definite	-13 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probablity	-5 Low
Introduction of Alien invasive species	-1 Negative	2 Municipality	3 Medium Term	3 Medium	3 Medium	-2.75	5 Definite	-14 Medium	-1 Negative	2 Municipality	3 Medium Term	2 Low	3 Medium	-2.50	2 Low Probablity	-5 Low
Damage to Freshwater Ecosystem	-1 Negative	3 District	5 Permanent	4 High	3 Medium	-3.75	5 Definite	-19 High	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probablity	-5 Low
Freshwater Habitat loss / change due to river regulation	-1 Negative	2 Municipality	5 Permanent	5 Very High	3 Medium	-3.75	5 Definite	-19 High	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probablity	-5 Low
Loss of important aquatic species	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.5	5 Definite	-13 Medium	-1 Negative	2 Municipality	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probablity	-5 Low

6.8.2 Operation Phase

The Impact Assessment on Terrestrial and Freshwater Ecology during the Construction Phase

Table 6-55 details the impact and mitigations for the Terrestrial and Freshwater Ecology in the Operation Phase of the Project.

Table 6-56 shows the overall rating of the impacts before and after mitigations. All of the potential impacts may cause medium receptor sensitivity with permanent duration. Therefore, the overall impacts prior to mitigation measures are medium. After taking mitigation measures, as shown in Table 6-56, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-55. Impacts on Terrestrial and Freshwater Ecology (Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Impact assessment for "Protected Areas" was not performed due to protected areas will not be affected in any way since they are located outside the Morava Corridor Motorway Project AoI.			
Accidental loss of fauna • The presence of a motorway can result in the loss of some fauna, as a result of accidents when crossing the motorway, getting run over by the vehicles. This can affect to all the different groups of fauna.	Movement of the vehicles	Terrestrial Habitats	<u>Design</u> • Hard fences are erected to prevent the access of animals onto roads. They are mostly constructed to reduce accidents due to collisions between large mammals and cars, but also to reduce the number of smaller animals killed on the roads. The disadvantage of hard fences is that they increase the barrier effect. In most cases, hard fences must therefore be combined with wildlife passages. In these cases, they fulfill an important role in guiding animals to the crossing points. • Hard fences will always be built on both sides of a road. The ends of the hard fences are danger points: animals may go around the end of the hard fence and get trapped on the road. Hard fences will therefore end at structures like bridges. • Warning signs aim at influencing the behavior of drivers in order to reduce the number and severity of collisions between large mammals and cars. • Road lights often attract insects and as a consequence bats or nocturnal birds which hunt them. This results in high mortality for the insects as well as for their predators. To prevent collisions of insects the use of sodium lights is recommended. <u>Operation</u> • Standard traffic signals will be placed in areas where collisions often occur. They also exist for amphibians, water birds and other animals.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Barrier effect in fauna • The linear infrastructures, such as motorways projects, contribute significantly towards the habitat fragmentation by creating barriers to fauna animal movement and the isolation of their populations. • The barrier effect created by such linear infrastructures can affect the dispersion and movement capacity of the fauna. This affects indirectly to their capacity for searching food, shelter or other individuals of their same species during the breeding season. These factors are linked with the species populations dynamic and can influence in the survival of threaten species.	Motorway	Terrestrial Habitats	<u>Design</u> • Culverts for animals are primarily constructed as safe crossing points for mammals. Target species are usually mammals. Small fauna species may readily use these culverts as well. As a minimum when using culverts a ledge will be incorporated where species such as otters and reptiles can cross alongside the river even at times of high flow. • It can also be used on bridges to be built on the West Morava River to prevent barrier effect. Vegetated area will be left between the bridge abutment and the riverbank. • There are 65 culvert and 40 bridges along the motorway. Box Culverts with dimensions of at least 1.5 m x 2 m and Pipe culverts with diameters to be between 60 and 140cm will be placed in natural habitats where the species most likely to be crossing to reduce habitat fragmentation. <u>Operation</u> • Regular maintenance and cleaning will be done to prevent flood-carrying materials from blocking the culvert inlets

Table 6-56. Impacts Scoring on Terrestrial and Freshwater Ecology (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impact**
Accidental loss of fauna	-1 Negative	2 Municipality	5 Permanent	4 High	5 High	-4	5 High Probability	20 High	-1 Negative	1 Project Site	5 Permanent	2 Low	5 High	-3.25	2 Low	-7 Low
Barrier effect in fauna	-1 Negative	2 Municipality	5 Permanent	4 High	5 High	-4	5 High Probability	20 High	-1 Negative	1 Project Site	5 Permanent	2 Low	5 High	-3.25	2 Low	-7 Low

6.9 Archaeological and Cultural Resources

According to Spatial Plan, National EIAs and the interviews with focus groups, it was determined that there are intangible cultural heritage such as two sacred trees and an old building in the Municipality of Maskare, archaeological sites and immovable cultural assets in the Project and the route of the motorway and area of the river regulation was determined in line with these information.Thus, the Motorway route and area of the river regulation works will not coincide with any archaeological area and immovable cultural assets and will not impact these areas. During construction phase of the Project, a Chance Finds Procedure will be prepared and it will be implemented for the all Project sections. The Procedure will include measures; in case of a chance find occurs during the excavation works. In exizisting situtaiton, to access of these sacred trees are through existing unpaved village roads. During the operation phase of the Project, the access to the sacred tree located in Bela Voda village will be provided with under passes. On the other hand, the sacred tree located in Donja Gorevnica Village will use the existing path as there will be no limits to access.These trees are located respectively.

Table 6-57 details the impact and mitigations for the archaeological and cultural resources in the Construction Phase of the Project and there will be no impact during the Operation Phase of the Motorway.

Table 6-58 shows the overall rating of the impacts before and after mitigations. Dust generation is considered medium since the magnitude, the likelihood of the impacts and receptor sensitivity are determined as high. After taking mitigation measures, as shown in Table 6-58, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-57. Impact and Mitigations for Archaeological Cultural Resources and in Construction Phase of the Project

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Chance of Destruction of Archaeological and Cultural Resources • Registered archaeological area and immovable cultural assets • Intangible cultural heritage • Unexpected find of cultural heritage during the pre-construction and construction phase	Construction works	The Archaeological areas and Heritage buildings that overlap the AoI of the Project. (See Chapter 5)	<u>Design and pre-construction</u> • During the route selection process, existing cultural heritage sites and intangible values were taken into a consideration. • Chance Find Procedure will be developed and implemented by the Employer. <u>Construction</u> • The Project Owner / Employer will provide all the conditions and enable smooth and constant monitoring of works during the entire duration of the earthworks, by the archaeological supervision. • The Contractor will follow the national requirements with respect to “chance finds” which may emerge during construction. • During the construction work, if archaeological or historical sites and objects are discovered the Contractor shall mark and secure new identified sites (with a protective railing or other means of protection) to avoid damage in the course of road construction and immediately notify the relevant Institute for the Protection of Cultural Monuments.

Table 6-58. Scoring of Impact on Archaeological and Cultural Resources

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Overall Rating (IA)=SCxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (SC)**	**Likelihood (L)**	**Residual Impact**
Chance Destruction of Archaeological and Cultural Resources	-1 **Negative**	1 **Project Site**	2 **Short Term**	5 **Very High**	5 **High**	-3.25	4 **High**	-13 **Medium**	-1 **Negative**	1 **Project Site**	2 **Short Term**	2 **Low**	5 **High**	-2.5	1 **Low**	-3 **Low**

6.10 Visual Landscape and Land Use

The Motorway components such as bridge, overpasses, underpasses, culverts, interchanges toll plazas and other project components will be a source of change in the existing visual environment. Construction of the Motorway and its components will result in the changes in the existing land use. Accordingly, landscape character of these areas will change permanently. The width of the expropriation corridor changes depending on the scale of excavation and fill requirements and siting of the road structures such as interchanges, service areas, etc. Therefore, landscape in the mentioned area will be affected. In addition, quarries and camp sites will have potential impacts on landscape.

In the visual analysis, first of all the settlements that will be constantly affected by the project were evaluated. All of the sensitivity of the settlements is assessed as medium. In addition to the settlements, recreational areas such as trekking routes, rafting and boat tours and other recreational areas (picnic areas etc.) were also evaluated. In this context, 13 recreational activity areas were taken into consideration. Sensitivity of the recreational areas is assessed as high sensitivity. The recreational areas evaluated are given in Table 6-59 and Figure 6-3

Table 6-59. Recreational Areas

Trekking Route	Rafting and-Boat Tour	Other Recreational Areas
Trekking Route-1 (Mrzenica Monastary) in Mrzenica	Rafting-Boat Tour-1 in Ćićevac	Recreational Area-1 in Makreasane
Trekking Route-2 (St. Mark's Church) in Kukljin	Rafting-Boat Tour-2 in Trstenik	Recreational Area-2 in Adrani
Trekking Route-3 in Bogdanje	Rafting-Boat Tour-3 in Vrnjci	
Trekking Route-4 in Grabovac		
Trekking Route-5 in Stulac		
Trekking Route-6 (Stubal Monastary) in Stubal		
Trekking Route-7 in Sirca		
Trekking Route-8 in Sirca		

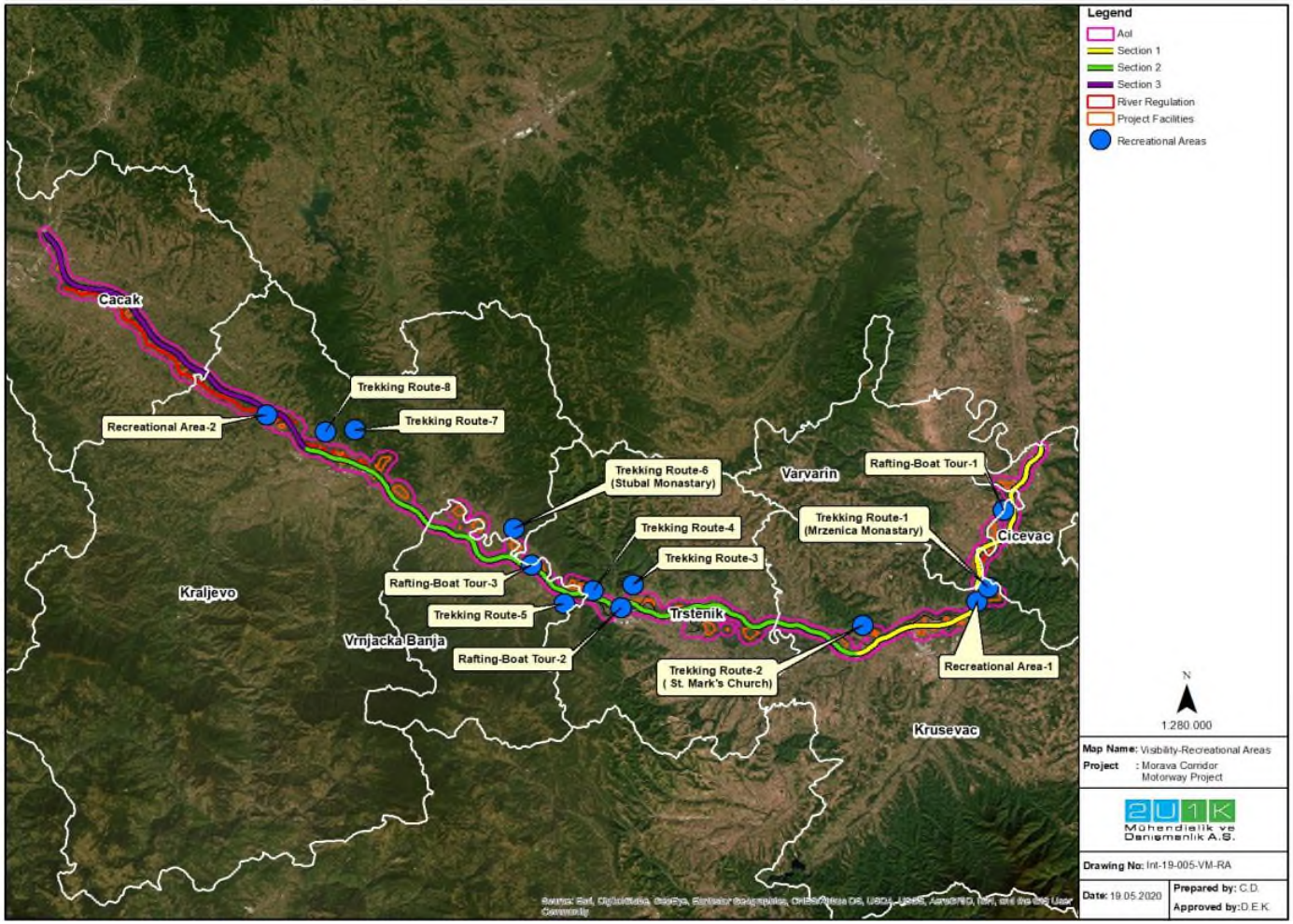


Figure 6-3. Recreational Areas

Visual analysis was carried out by considering the barrier effect of the existing vegetation in the area with topographical features at all potential points of view. All potential points of view were selected as observer points. Due to the flat terrain behavior of the project area and habitats characteristics of the region, the visibility of the road and river regulation project is limited.

As a result of the analysis, it was concluded that the project components are only visible from Recreation Area-1 in Makresane, Recreation Area-2 in Adrani and Trekking Route-5 in Stulac. The project is not visible from other areas.

6.10.1 Construction Phase

The Impact Assessment on Visual Landscape Ecology during the Construction Phase

Table 6-60 details the impact and mitigations for the Visual Landscape in the Construction Phase of the Project.

Table 6-61 shows the overall rating of the impacts before and after mitigations. All of the potential impacts on settlements may cause medium receptor sensitivity with very high magnitude. Therefore, the overall impacts prior to mitigation measures are medium. At the same time, the potential impacts on the three recreational areas mentioned above may cause high receptor sensitivity with very high magnitude. Therefore, the overall impact prior to mitigation measures is high on recreational areas while the other overall impacts are medium. After taking mitigation measures, as shown in Table 6-61, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-60. Impact on Visual Landscape (Construction Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Change of landscape due to changes in land use • Land use and topographic structure and vegetative pattern are factors affecting the proposed Motorway width. It was considered that impacts on landscape would be basically the physical impacts of the project in terms of land-take and change of the landscape due to the changes in the land use. It will be also added that the Proposed Motorway Route mostly passes through agricultural lands (no unique landscape value).	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Camp Sites Material Storage Storage, Re-Use and Disposal of Excavations Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Construction</u> • Construction footprint areas including Project Facilities will be as minimal as practicable. • Visual barriers will be installed if area is subjected to high visual impacts where practical. Planting native species will be used as visual barrier. In areas with short construction period, adult trees should be translocated for establishing the visual barriers. Areas where visual impact will occur are provided in the Visibility Map given in Appendix-5 • Construction sites will be kept tidy and workers will have necessary knowledge/training about the issue.
Visibility of new structures from Settlements • Visual impacts may occur in a wide area when topography allows. The activities and structures can be observed from further distances.	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Camp Sites Material Storage Storage, Re-Use and Disposal of Excavations Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	
Visibility of new structures from Recreational Areas • Visual impacts may occur in a wide area when topography allows. The activities and	Top-soil stripping Top-Soil Storage Tree Cutting /Vegetation clearance Camp Sites	Recreation Area-1 Recreation Area-2 Trekking Route-5	

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
structures can be observed from recreational areas.	Material Storage Storage, Re-Use and Disposal of Excavations Re-instatement of Camp Sites and Access Roads Rehabilitation of Borrow Pits Movement of the vehicles		

Table 6-61. Impacts Scoring on Impact on Visual Landscape (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impact**
Change of landscape due to changes in land use	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **Very High**	3 **Medium**	-3	5 **Definite**	-15 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2.25	2 **Low Probability**	-5 **Low**
Visibility of new structures from Settlements	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **Very High**	3 **Medium**	-3	5 **Definite**	-15 **Medium**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	3 **Medium**	-2.25	2 **Low Probability**	-5 **Low**
Visibility of new structures from Recreational Areas	-1 **Negative**	2 **Municipality**	2 **Short Term**	5 **Very High**	5 **High**	-3.50	5 **Definite**	-18 **High**	-1 **Negative**	2 **Municipality**	2 **Short Term**	2 **Low**	5 **High**	-2.75	2 **Low Probability**	-6 **Low**

6.10.2 Operation Phase

The Impact Assessment on Visual Landscape Ecology during the Operation Phase

Table 6-62 details the impact and mitigations for the Visual Landscape in the Operation Phase of the Project.

Table 6-63 shows the overall rating of the impacts before and after mitigations. All of the potential impacts on settlements may cause medium receptor sensitivity with permanent duration and very high magnitude. At the same time, the potential impacts on the three recreational areas mentioned above may cause high receptor sensitivity with permanent duration and very high magnitude. Therefore, the overall impacts prior to mitigation measures are high. After taking mitigation measures, as shown in Table 6-63, the residual impacts decrease significantly, and the residual impacts are classified as low.

Table 6-62. Impacts on Impact on Visual Landscape (Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Change of landscape due to changes in land use • Land use and topographic structure and vegetative pattern are factors affecting the corridor width. It was considered that impacts on landscape would be basically the physical impacts of the Motorway in terms of land-take and change of the landscape due to the changes in the land use. It will be also added that the Proposed Motorway Route mostly passes through agricultural lands (no unique landscape value).	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Design</u> • Planting will be implemented to restore or compensate for lost habitats. • Planting mixes will be selected using native species and planting will be set out to establish new and enhance existing native habitats. The use of native species throughout the area is important in order that the Motorway planting will, over time, become almost indistinguishable from the vegetation naturally occurring in the surrounding area. • Planting will be implemented to reconnect hedgerows or areas of planting formerly severed as a result of the construction works in order to maintain wildlife corridors and reinstate local landscape character • Landscape design will be coherent with regional landscape identity to the extent possible • Planting treatments will be designed to visually screen road structures and earthworks from nearby housings and settlements • Planting treatments will be interrupted to open up key views and vistas which reinforce local identity and minimize driver monotony <u>Operation</u> • In the places where the motorway is monotony, it is necessary to refresh it by planting decorative species that don't require maintenance. Preventing monotony will also have a positive impact on traffic safety. • Arranging community trees and shrubs along the motorway for re-giving natural-looking area. In addition, these areas will be grassed for erosion control. In this way, maintenance needs of the areas can be kept to a minimum.
Visibility of new structures from Settlements • Visual impacts may occur in a wide area when topography allows. The activities and structures can be observed from further distances.	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	
Visibility of new structures from Recreational Areas • Visual impacts may occur in a wide area when topography allows. The activities and structures can be observed from recreational areas.	Movement of the vehicles Operation of Service Stations Operation of Maintenance Station	Recreation Area-1 Recreation Area-2 Trekking Route-5	

Table 6-63. Impacts Scoring on Impact on Visual Landscape (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impact**
Change of landscape due to changes in land use	-1 **Negative**	2 **Municipality**	5 **Permanent**	5 **Very High**	3 **Medium**	-3.75	5 **Definite**	-18.75 **High**	-1 **Negative**	2 **Municipality**	5 **Permanent**	2 **Low**	3 **Medium**	-3	2 **Low Probability**	-6 **Low**
Visibility of new structures from Settlements	-1 **Negative**	2 **Municipality**	5 **Permanent**	5 **Very High**	3 **Medium**	-3.75	5 **Definite**	-15 **Medium**	1 **Positive**	2 **Municipality**	5 **Permanent**	2 **Low**	3 **Medium**	-3	2 **Low Probability**	-6 **Low**
Visibility of new structures from Recreational Areas	-1 **Negative**	2 **Municipality**	5 **Permanent**	5 **Very High**	5 **High**	-4.25	5 **Definite**	-21 **High**	-1 **Negative**	2 **Municipality**	5 **Permanent**	2 **Low**	5 **High**	-3.5	2 **Low Probability**	-7 **Low**

6.11 Social Impact Assessment

The Motorway projects have both negative and positive impacts from a socio-economic standpoint. Land acquisition and loss of income generation due to land acquisition can be characterized as negative impacts; while short and long term employment opportunities, increase in local development due to accessibility and transportation benefits can be described as positive impacts.

This section of the impact assessment assesses the direct and indirect potential socio-economic impacts of the Project. In order to explain the cause of the expected impacts of the Project for socio-economic stand point of view, each subsections either refers and repeats the data derived from the baseline studies (Chapter 5 of the ESIA Report) to emphasize on the existing conditions of the AoI. In that aspect, given the baseline conditions will explain the reason behind expected impacts for each different topics discussed in below.

Major social issues subject to assessment are:

- Population
- Infrastructure
- Economy
- Resettlement and Land Acquisition
- Ecosystem Services
- Labour and Working Conditions
- Occupational Health and Safety
- Community Health and Safety and,
- Vulnerable People.[18]

[18] Human Rights is scoped out in this Section of the ESIA Report.

6.11.1 Population

6.11.1.1 Construction Phase

The main impact source for the population influx during the construction phase is expected to be the immigration of the construction workers and the people seeking for the job opportunities. In addition to the direct employment opportunities during the construction phase, the Project is expected to create a wide range of project-related economic opportunities that will increase the number of the local population.

The construction phase of the Project is expected to be four years and the peak period of the Project is expected to be 2022. During the peak period, the number of the direct construction workers will be approximately 3,800.

According to the Guidance document of the World Bank “Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx”; the influx of workers and followers can lead to adverse social and environmental impacts on local communities, especially if the communities are rural, remote or small (World Bank, 2016).

The direct impact zone of the population influx will be the settlements located in the close vicinity to workers accommodation sites. The workers accommodation for Section-1 will be established in the borders of the Kruševac Municipality. The worker accommodation site is located in the borders of the industrial zone and located at a distance of 1.7 km to the residential areas. Figure 6-4 below is showing the location of the accommodation for Section-1.

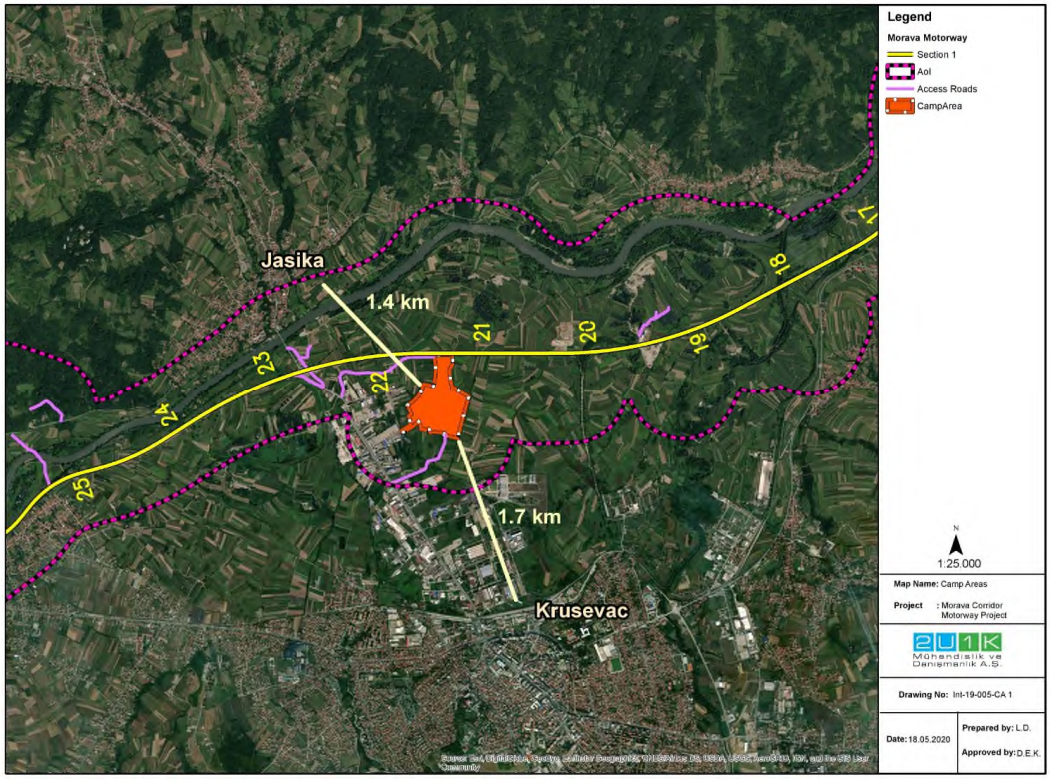


Figure 6-4. Workers Accommodation Location for Section-1

The workers accommodation camp for Section-2 is planned to be established within the borders of the Trstenik Municipality. The closest settlements to the accommodation are Vrnjci Village which is located at a distance of 200mm and Trstenik which has residential areas approximately 500 m to the camp. Figure 6-5 represents the location of the workers camp for Section-2.

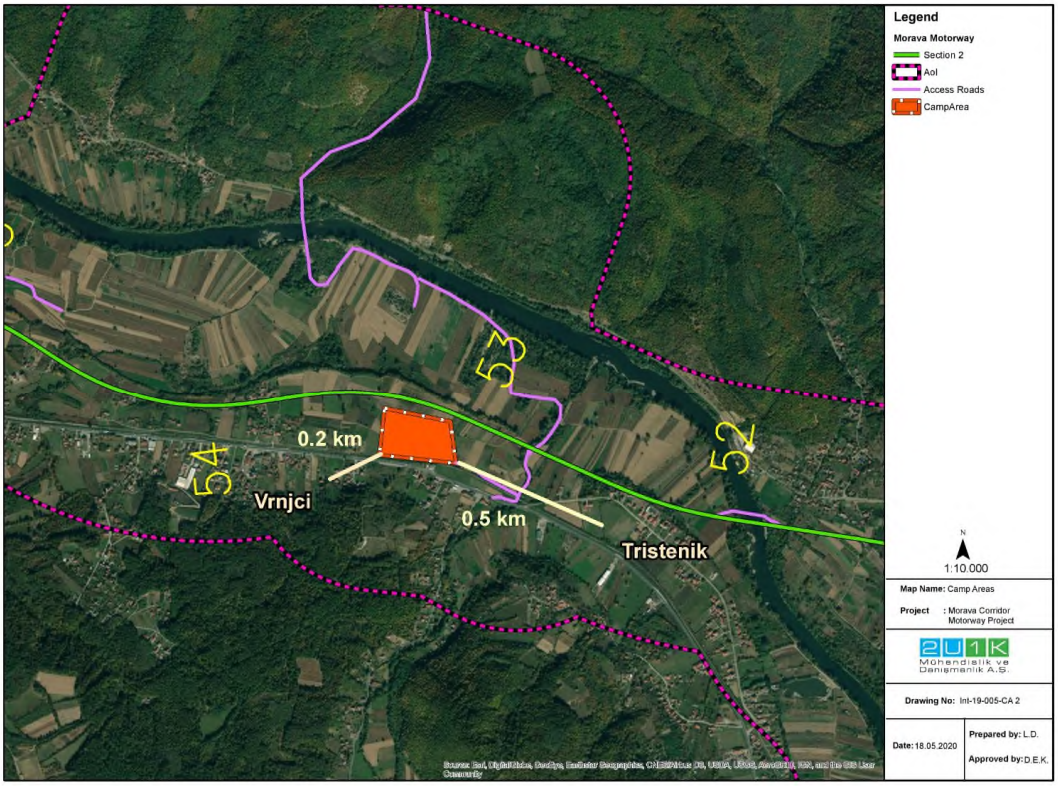


Figure 6-5. Workers Accommodation Location for Section-2

The location for the workers accommodation for Section-3 is within the borders of the Adrani Village in Kraljevo Municipality. The residential areas to the workers accommodation are at a distance of approximately 50 m.

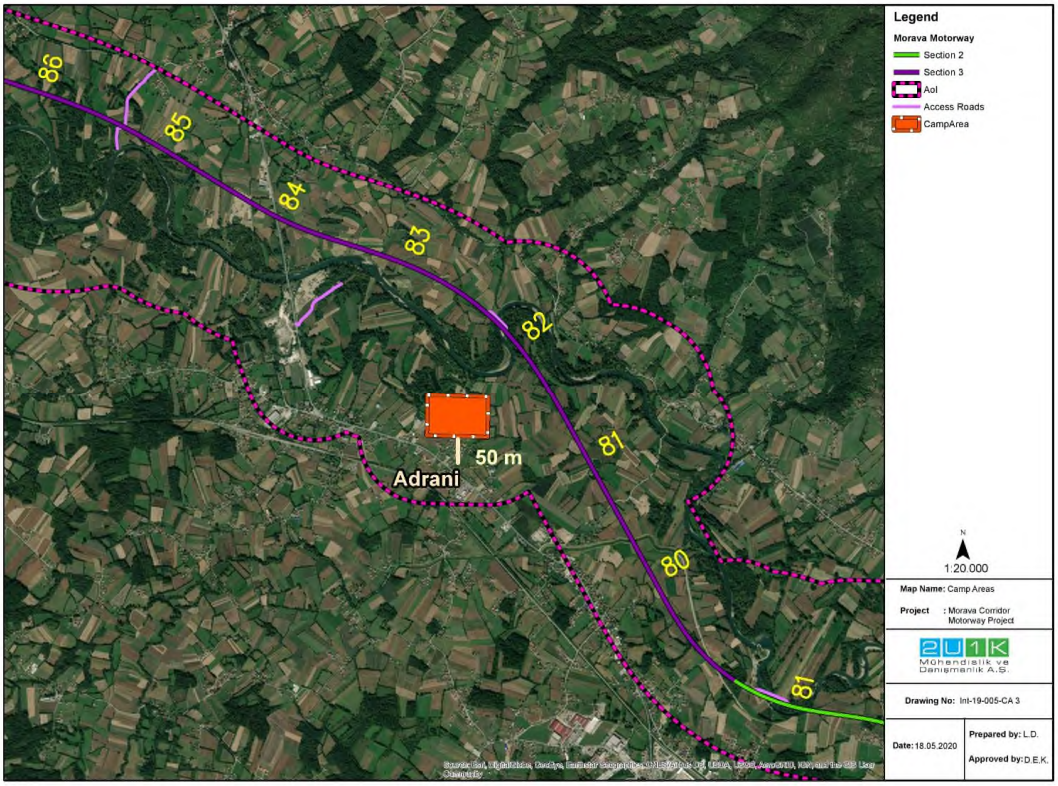


Figure 6-6. Workers Accommodation Location for Section-3

Populations of settlements that are planned to be established for the workers accommodation vary between 1,300 and 2,300 people. During the peak period, an average of 2,000 people is expected to stay in accommodation camps which doubles the population of the nearby settlements. In this respect, all settlements close to accommodations considered as sensitive receptor. Jasika is considered to be more sensitive considering to its rural characteristics. However, Adrani is located at the closest point to the workers accommodation in Section-3 (i.e., 50 m) which makes Adrani the most sensitive receptor to the population influx impact caused by the migration of the workers.

The Impact Assessment on Population during the Construction Phase

The Table 6-64 presents the potential population related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-65 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-64, Table 6-65 then assess the residual impacts of the Project.

When assessing the potential construction impacts of the Project, all of the population related impacts observed to be negative, municipal and short term. The overall rating of influx of

additional population, increase burden on competition of for public services and inflation of the price of goods and services are assessed as medium, considering the receptor sensitivity and likelihood of the impacts. After implementation of proposed mitigation measures, the likelihood of the impacts are observed to increase in which caused all of the impacts' residual impacts as low.

Table 6-64. Impacts on Population (Construction Phase)

Impact Description	Impact Source	Sensitive Receptor (s)	Mitigation /Enhancement Measures
Increased risk of illicit behavior and crime: The influx of workers and service providers into communities may increase the rate of crimes and/or a perception of insecurity by the local community.	**Construction phase labor force**	Jasika Vrnjci Adrani	Pre-construction and Construction • Workers will be paid adequately to prevent theft potential. • Workers will be paid into bank accounts. • Priority will be given to the local labor where possible and practical. • Worker accommodation facilities will include leisure areas to reduce the interaction of the workers with the local communities. • Code of Conduct will be developed in compliance with the Serbian legislation. Hard copies will be provided in English and the native languages of the workforce. • All workers (including international workers) will be trained in their native languages about the Code of Conduct and dismissal policy in particular in criminal cases.
Risk of social conflict: Conflicts may arise between the local communities and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources.	**Construction phase labor force**	Jasika Vrnjci Adrani	Pre-construction and Construction • Code of Conduct will be developed in compliance with the Serbian legislation. Hard copies will be provided in English and the native languages of the workforce. • All workers (including international workers) will be trained in their native languages about the Code of Conduct. • All workers (including international workers) will receive Project Orientation and Cultural Awareness training that covers sensitive issues on the local communities. • Before mobilizing the workers to the camp accommodation, the Camp Manager and the local CLOs will inform the local communities about the international workers.

Impact Description	Impact Source	Sensitive Receptor (s)	Mitigation /Enhancement Measures
Influx of additional population ("followers"): job seekers in the region can migrate to the Project area to get benefit from the job opportunities of the Project.	**Construction phase labor force**	Jasika Vrnjci Adrani	Pre-construction and Construction • Recruitment Plan will be prepared and implemented to prevent spontaneous influx of job seekers. • Employment capacity and the qualifications required for the construction will be disclosed to the public to prevent unrealistic expectations. • Cooperation will be developed with the local municipalities and local employment agencies.
Impacts on community dynamics: In case the accommodation areas lack to provide social facilities and services to the Project workers, additional pressure may occur to the local community services as the Project workers seek for services, in which may affect the dynamics of the existing local community of the Project area.	**Construction phase labor force**	Jasika Vrnjci Adrani	Pre-construction • Mitigation measures will aim to prevent burden on the communal services and AoI. • Worker accommodation will be established to reduce pressure on the facilities of the local communities. Workers accommodations will be established in compliance with the Guidance by IFC and EBRD Workers' Accommodation: Processes and Standards to reduce pressure on the facilities of the local communities. . The guidance includes but not limited to: 1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi- purpose halls to providing designated areas for radio, TV, cinema. 2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, and educational facilities. 3. Workers are provided with dedicated places for religious observance if the context warrants. 4. Workers have access to public phones at affordable/ public prices (that is, not inflated). 5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated ((IFC, EBRD, 2009)

Impact Description	Impact Source	Sensitive Receptor (s)	Mitigation /Enhancement Measures
Increased burden on and competition for public service provision: The presence of construction workers and service providers (and in some cases family members of either or both) may generate additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services. This is particularly the case when the influx of workers is not accommodated by additional or separate supply systems.	**Construction phase labor force**	The sewage system is a sensitive receptor in all settlements. In Grocani, Bosnjane, Bivoje and Vrba the existing electricity system is not adequate for the villagers.	Pre-construction • Wastewater treatment system and septic system will establish in the Project Facilities as a good practice. • When required, coordination with local municipality and electricity companies will be carried out to ensure the need assessment for the electricity and water supply by the Contractor for the construction and domestic usage does not cause the capacity to decrease. • Project Owner will assist the Contractor with the cooperation with the local authorities about the water and electricity consumption. • Since the majority of the neighboring villages do not have a sewage system the Camp Management Plan (CMP) may establish capacity building measures within the location of camp accommodation areas to prevent any residual impacts.
Gender Based Discrimination	**Construction phase labor force**	Jasika Vrnjci Adrani	Pre-construction • Information tools and hiring women CLOs to access women in the AoI is recommended. During the Women Focus Group Discussion (FGDs), it has been raised by the participants that the women members of the community cannot participate in the decision-making process and they do not have equal roles in the community. • Code of Conduct will be developed in compliance with the Serbian legislation. Gender equality, positive discrimination and the sexual harassment issues and approach on gender sensitivity should be included. • All workers (including international workers) will be trained in their native languages about the Code of Conduct. • All workers (including international workers) will receive Project Orientation and Cultural Awareness training that covers sensitive social issues on the local communities. Construction • Grievance mechanism will record any gender based complaints and necessary measures will be taken accordingly.

Impact Description	Impact Source	Sensitive Receptor (s)	Mitigation /Enhancement Measures
Local inflation of prices: Increased Project spending on wages, procurement of local goods and services will have the potential to cause localized inflation.	**Construction phase labor force**	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Construction • Market rates for procurement of goods, services, land and labour should be paid in order to avoid directly causing an increase in the price of local goods, services, land and labour.

Table 6-65. Impacts Scoring on Population (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Increase risk of illicit behavior or crime	-1	2 Municipal	2 Short term	2 Low	5 High	2.75	2 Low	**-6 Low**	-1	2 Municipal	2 Short term	2 Low	5 High	2.75	1 Improbable	**-3 Low**
Risk of social conflict	-1	2 Municipal	2 Short term	2 Low	3 Medium	2.25	2 Low	**-5 Low**	-1	2 Municipal	2 Short term	2 Low	3 Medium	2.25	1 Improbable	**-2 Low**
Influx of additional population	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	3 Medium	**-9 Medium**	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	2 Low	**-6 Low**
Impacts on community dynamics	-1	2 Municipal	2 Short term	2 Low	3 Medium	2.25	2 Low	**-5 Low**	-1	2 Municipal	2 Short term	2 Low	3 Medium	2.25	1 Improbable	**-2 Low**
Increase burden on competition for public service	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	3 Medium	**-9 Medium**	-1	1 Project Site	2 Short term	3 Moderate	5 High	2.75	2 Low	**-6 Low**
Gender based violence	-1	2 Municipal	2 Short term	2 Low	1 Low	1.75	2 Low	**-4 Low**	-1	2 Municipal	2 Short term	2 Low	1 Low	1.75	1 Improbable	**-2 Low**
Local inflation	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	3 Medium	**-9 Medium**	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	2 Low	**-6 Low**

6.11.1.2 Operation Phase

During the operation phase of the Project, the main source of the population change is expected to be the outmigration of the people who lost their all agricultural lands and where the overpasses locate in the highly populated residential areas. The Project may also lead population increase due to mobility of the people as a result of the better transportation structure and urbanization.

Population decrease

The implementation of the Project may cause out-migration for new job opportunities due to the fact that people who will lose their entire agricultural lands as a result of land acquisition and access to the livelihood sources may leave the region. The magnitude of this impact will be determined during the Resettlement Action Plan (RAP) preparation process.

Comment on the Spatial Plan:

Vrnjci: *"…the planned overpass directly threatens the life of the inhabited population in these plots of the settlement Vrnjci, Vrnjačka Banja, where there is high population density and where there will be no conditions for further living, because you will certainly agree that life below the overpass is not possible."*

Answer to Comment and Mitigation Measure:

"…the possibility of displacement of the planned graded junction in Vrnjačka Banja will be examined."

Population increase

The Project is expected to connect more than 500,000 people by linking more than 20,000 small and medium-sized enterprises through the Corridor X and XI, which run to Austria and Greece by way through Slovenia, Croatia, and Macedonia; and to Italy and Romania via Montenegro. The mobility is expected to create long term population increase in the AoI. The establishment of the Motorway will lead urbanization and in parallel with the urbanization process; the business sectors will be developed in the area and employment opportunities of the new sectors will increase the population figures.

Comment on the Spatial Plan:

Čačak: *"…From the airport "Morava" at Lađevci, the Highway should be entered directly. Mrčajevci, as a place with large number of inhabitants, and the villages gravitating towards this place, as an important tourist destination and the area with great economic potential, should have a connection with the Highway.*

It would be of great significance that the old road Čačak-Kraljevo, i.e. a large number of villages on the right bank of the West Morava in the area from Čačak to Kraljevo, have connection with this Highway. This would be a great opportunity for economic development of this very large region."

Answer to Comment and Mitigation Measure:

"*The airport "Morava" currently does not have a direct access to the Highway, other than via the Adrani loop. In the future, as already specified in the Spatial Plan, when preparing technical and planning documentation for the future Highway link Batočina-Kragujevac-Knić-connection with E-761, the position of loop which will*

provide more optimum connection of the airport with the Highway E 761 will be defined. This link connecting with the Highway should be solved by way of the Spatial Plan of the local self-government.

In the textual part of the Plan, the need for accommodating the specified emergency services will be defined, what will be also spatially located during preparation of the urban-technical documentation."

The Impact Assessment on Population during the Operation Phase

The Table 6-66 presents the potential population related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-67 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-66, Table 6-67 then assess the residual impacts of the Project.

When assessing the potential operation impacts of the Project, increase and decrease in population is expected. The population decrease as a result of PAPs whom become landless and may decide to out-migrate is a negative impact at Municipal level. On the other hand, the operational activities may attract people from other regions to migrate to the Project Area in parallel with economic development and urbanization at District level. The receptor sensitivity is high based on the observations made on the social field studies in terms of population decrease, therefore, the impact is considered as medium. With the implementation of the proposed mitigation measures, especially implementation the Resettlement Action Plan, the likelihood of occurrences of negative impacts will be reduced to low.

Table 6-66. Impacts on Population (Operation Phase)

Impact Description	Impact Source	Mitigation /Enhancement Measures
Population Decrease	**Loss of Livelihoods**	Design • The livelihood sources of the PAPs will be taken into consideration during the approval of the Spatial Planning process which frames the borders of the Project establishments. • Overpasses and underpasses will be designed considering the agricultural activities. • Detailed "Resettlement Action Plan" will be prepared to determine the PAPs and develop practical mechanism to prevent the outmigration. • Replacement of the lost assets within the acquired land with similar assets at the same or better standard to ensure continuity of current livelihoods will be achieved through provision of materials, seedlings, labor, and additional financial and legal assistance. Pre-construction • Priority for the employment opportunities of the Project will be given to people whom lost their livelihoods. • Skill development training will be provided to local labor force. • Cooperation will be established with the local governmental bodies including job agencies and agricultural institutions to develop effective community development programs and strategies.
Population Increase	**Increased mobility due to developed transportation and urbanization**	Design • Enable the construction of commercial buildings in new locations as a planned reserved space. Operation • Strengthening competition among business entities through the development of local institutions necessary for the faster development and structural adjustment. • Identifying and implementing a new industrial development policy as a combination of targeted policy with justified, direct state interventions and horizontal measures without special protection sectors with care for key inputs, labor, capital, infrastructure services, research and development. • Encouraging the development of information and communication technologies, information technology infrastructure, electronic networks, databases and sources of data and statistics as a basis for speeding up growth in general and the new service sector in particular. • Give preference to local processing of agricultural products, agroindustry and other "clean" branches of economy that will take advantage of the location advantages derived from proximity to the market, for multipurpose border - crossing centers. • Development of a rational and functional structure of the settlement network. • Identifying settlements that can most effectively serve as service, manufacturing and commercial centers of the surrounding area.

Table 6-67. Impacts Scoring on Population (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Population decrease	-1 Negative	2 Municipal	4 Long term	3 Moderate	5 High	3.5	3 Medium	**-11 Medium**	-1 Negative	2 Municipal	4 Long term	3 Moderate	5 High	3.5	2 Low	**-7 Low**
Population increase	+1 Positive	3 District	4 Long term	4 High	3 Medium	3.5	4 High	**14 Medium**	+1 Positive	3 District	4 Long term	4 High	3 Medium	3.5	5 Very High	**18 High**

6.11.2 Infrastructure

6.11.2.1 Construction Phase

Health Services

Influx of the Project workers may increase demand on local health services. Among the 48 affected settlements within the Social AoI, 29 of them do not have a primary health care centers within the borders of their villages. In general a typical primary health care centers includes; preventive health care for all population categories, urgent care, general medicine, health care for women and children, health visitor service, laboratory and other diagnostics, prevention and treatment in dental care, employee health care, i.e. occupational medicine and physical medicine and rehabilitation.

Considering the insufficient of health services of more than half of the affected settlements of the Social AoI, the influx may impose pressure to the existing health services. The capacity of existing health facilities may not be able to absorb major disruption any potential demand for care and attendance to acute conditions of the influx workers (in case of curative or emergency cases).

According to the World Health Organization, fewer than 2.3 doctors per 1,000 inhabitants would be insufficient to achieve coverage of primary healthcare needs of the settlement. In that regards, Ćićevac, Varvarin and Trstenik Municipalities have insufficient healthcare coverage within their borders. Further details on the density of the doctors in each affected municipality is presented in Table 6-68.

Table 6-68. Density of the doctors in each affected municipality

Municipality	Number of Doctors	Number of Doctors per 1,000 inhabitants
Ćićevac	12	1,4
Kruševac	348	2,9
Varvarin	18	1,1
Kraljevo	343	2,9
Vrnjačka Banja	81	3,1
Trstenik	50	1,3
Čačak	279	2,5

Source: Institute of Public Health of Serbia, 2018

There are 10 villages affected by the Project in the Čačak Municipality in which 8 of them do not have health facilities within its borders. Among those 8 villages, the distance of the closest health facilities is stated to be approximately 5 km away.

Furthermore, there are two affected villages within the borders of Varvarin Municipality which neither of the settlements have health centers within its borders. The closest health facilities from the affected villages of Varvarin Municipality is approximately 7 km away.

Therefore, in the scope of health services, considering inadequate health services Varvarin and Trstenik Municipalities, settlements in those settlements may be imposed to more diverse impacts on health services compared to other municipalities.

Table 6-69 presents all the affected villages within the borders of Social AoI without health services and type of the closest Project units (Proposed Motorway Route and construction associate facilities) to these settlements.

Table 6-69. Affected villages within the borders of Social AoI without health services

Municipality	Villages that don't have Primary Health Care	Closest Project Facility
Ćićevac	Grad Stalac	Borrow & Batch
	Mrzenica	Borrow & River Regulation
Kruševac	Bele Vode	Motorway
	Kosevi	Borrow
	Maksresane	Batch
Varvarin	Bosnjane	Borrow
	Maskare	Borrow
Kraljevo	Adrani	Borrow & Camp & River Regulation
	Grdica	Borrow & River Regulation
	Obrva	Borrow
	Popovici	River Regulation
	Sirca	River Regulation & Borrow
	Sumarice	Borrow
Vrnjačka Banja	Stulac	Borrow & Asphalt
	Vrnjci	Borrow & Batch
	Rudinci	Camp & Asphalt & Borrow
Trstenik	Bogdanje	Borrow
	Lozna	Quarry
	Seliste	Motorway
	Grabovac	Motorway
	Ugljarevo	Borrow
Čačak	Baluga	Motorway
	Katrga	Motorway
	Preljina	Batch
	Rakova	Motorway
	Sokolici	Motorway
	Stancici	Batch & Borrow
	Konjevići	Motorway
	Goričani	Borrow & River Regulation

Infrastructure

The establishment of three worker accommodation camps with worker accommodation (with an average of approximately 2,000 workers) and other project construction facilities and activities may lead to temporary increased pressure and potential cuts of utility supply such as electricity, water supply, and waste management, in particular for settlements located closer to the project facilities and activities. Disruption to utilities could result in impacts to livelihood or quality of life and if unmanaged could result in health impacts.

According to Community Level and Household Surveys, electricity cut offs occur rarely in all affected villages. Almost all of the affected villages throughout the Project sections observed to have insufficient sewage system and the domestic waste are being disposed through wild dumping. This subject is also covered in the Spatial Plan of the Project and according to Plan, priority will be given to complete sanitation of the settlements in the Social AoI. The reconstruction and extension of the sewage network and the construction of a sewage treatment plant are planned to be constructed in accordance with the requirements, needs and economic development of the Social AoI. In this regard, to mitigate negative impacts and increase existing sewage capacity of the settlements, the following objectives were claimed in the Spatial Plan;

- organized solution of the sewerage system,
- planned construction of sewerage networks sewage treatment plants for sewage and process wastewater; and,
- establishment of a system for quality and quantity control of discharged wastewater.

The Spatial Plan of the Project also made assessments on each affected municipality and addressed key infrastructure insufficiencies, in which may provide further information on the existing infrastructure conditions and cover any gaps from the outcomes of the social field study. The Table 6-70 below presents the summary of the outcomes made according to the Plan.

Table 6-70. Infrastructure shortages According to Spatial Plan

Municipality	Infrastructure Shortages
Ćićevac Varvarin	• Uncontrolled and improper disposal of domestic waste
Kruševac	• Wastewater is directly discharged into the Waste Morava without treatment. • Sewage in rural areas are insufficient. • Septic tanks are either discharged into nearest ditches or water courses. • Disposal of solid waste from villages are disorganized.
Kraljevo	• Inadequate treatment of municipal waste and wastewater
Vrnjačka Banja	• Lack of landfill, recycling and wastewater treatment systems
Trstenik	• In central settlements, transportation and disposal of waste is sufficient. On the other hand, in the villages waste is disposed in landfills.
Čačak	• Large number of wild landfills.

Source: Spatial Plan, November 2019

Traffic & Accessibility

The potential impacts on the local road network as a result of the construction activities (i.e. transportation workers, material and equipment, waste disposal, etc.) are disruption to traffic and transportation due to road crossings and damage to local roads from heavy traffic movement to and from project facilities and activities. Disruption to road infrastructure and reduced access due to road cuttings may result negative impacts on the livelihood or quality of live if not managed properly. Considering the importance of the road network to ensure mobility between settlements along the Social AoI and access to municipality centers, services (i.e. education, health, etc.) as well as access to agricultural fields, all PAPs are considered as highly sensitive.

The Project has a risk of reducing access to agricultural fields in case of appropriate road underpasses are not designed. During the stakeholder consultations of the Spatial Plan on August 2019, PAPs raised the potential of reduced access to agricultural fields after the implementation of the Project. The common concern is that the number of underpasses may not be located close enough to the affected fields and this may cause increased transportation costs to the farmers who would have spent more money and time for access. Furthermore, some of the local businesses were concerned that during the construction of the Project, their businesses may not be accessible to the customers. These concerns were addressed by the committee of the Spatial Plan as access roads will be provided to the businesses to continue their activity. In Sirca village of Kraljevo Municipality, the residents were concerned to accessibility of pedestrians, and this was addressed through the design of the Proposed Motorway Route by considering the construction of a road bridge over the regulated river bed of the West Morava River, as well as the construction of an overpass or underpass below the highway for the pedestrians of the Sirca village.

The Impact Assessment on Infrastructure during the Construction Phase

The Table 6-71 presents the potential infrastructure related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-72 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-71, Table 6-72 then assess the residual impacts of the Project.

The impacts regarding the infrastructure during the construction phase is observed to be negative and in Municipal extent. All of the potential impacts may cause high receptor sensitivity due to insufficient infrastructure services in the region, therefore, the overall impacts prior to mitigation measures are medium. The extent of the Project's impact is expected to be in Municipal level without any mitigation measures. With the implementation of proposed mitigation measures given below, the extent of the infrastructure related impacts are expected to be reduced from Municipal to Project Site with the compliance of international good practices.

Table 6-71. Impacts on Infrastructure (Construction Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Pressure on the local healthcare infrastructure as a result of incoming construction workforce	Labour Influx Lack of health services 29 villages	Čačak Municipality Varvarin Municipality Trstenik Municipality	Pre-construction • Emergency Preparedness and Response Plan (19) (EPRP) will be developed that considers the role of communities and community infrastructure as appropriate in responding to emergency events. • Health Services assessment will be conducted of available health services Local and District levels and will assess the situation of settlements and in the vicinity of the construction sites, camp and other Project Facilities to ensure no reduction in services available to local settlements occurs. • Preventive health basic measures will be carried out regarding COVID 19 Pandemic and WHO recommendations will be implemented • Camp accommodation and site facilities should include first aid and emergency response for safety, fire and environmental hazards and incidents. • Camp accommodation will include first aid and medical facility for its international workers which is expected to mitigate potential burden on the existing local health infrastructures, and in accordance with the Occupational Health and Safety Law enforced in 2005 (Official Gazette No: 101). • Infrastructure and Utilities Management Plan (IUMP) will be developed before setting up the camps. The Plan will assess the infrastructure potential of the surrounding area (i.e., water supply, wastewater and sanitation services, electricity supply, potable water supply, and solid waste management). If the camps are established in a location with no sufficient capacity, services and utilities the Contractor will establish its own utility services when required, e.g. Power generators.

[19] An Emergency Preparedness and Response Plan will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines (IFC, 2007)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Construction • A Grievance Mechanism will be developed to record, avoid and address incidents caused by the construction activities (e.g. Electricity and water cutoffs, traffic blockages, disruption of local roads where patients are travelling to hospitals daily).
Negative impacts on local infrastructure: The establishment of a construction camp with worker accommodation and additional facilities may lead to temporary increased pressure and potential cuts of utility supply such as electricity, water supply, and waste management.	Influx	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Design and Pre-construction • Emergency Preparedness and Response Plan20 (EPRP) will be developed that considers the capacity of communities and current situation of the community infrastructure to respond to emergency events efficiently. • Infrastructure and Utilities Management Plan (IUMP) will be developed. • Camp Management Plan (CMP) will be developed that considers infrastructure and utility needs for construction sites, accommodation, workshops and warehouses. • During the preparation of all plans, engagement with local authorities and utilities companies will be undertaken to ensure continuity of supply to communities. Construction • The Project will implement a Grievance Mechanism and address infrastructure related grievances in line with the Stakeholder Engagement Plan (SEP) of the Project. • Training construction workers regarding to good practices on resource efficiency.
Potential Impacts on Local Network: The potential impacts on the local road network as a result of the construction activities (i.e. transportation workers, material and equipment, waste disposal, etc.) are disruption to traffic and transportation due to road crossings	Construction activities	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality	Design and Pre-construction • Traffic Management Plan (TMP), Infrastructure and Utilities Management Plan (IUMP) and Emergency Preparedness and Response Plan (EPRP) will be developed and implemented. • Temporary loss of, or access to, infrastructure or services should be avoided by - providing alternative routes and roads, as necessary

[20] An Emergency Preparedness and Response Plan will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines (IFC, 2007)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
and damage to local roads from heavy traffic movement to and from project facilities and activities. Disruption to road infrastructure and reduced access due to road cuttings may result negative impacts on the livelihood or quality of life if not managed properly.		Kraljevo Municipality Čačak Municipality	- inform local communities of program and sequence of works. • In case of using local roads for transportation, repair works will be made in collaboration with the local authorities. <u>Construction</u> • Engagement will be made with local authorities on the issue of traffic movement during construction phase.

Table 6-72. Impacts Scoring on Infrastructure (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Pressure on the local infrastructure during construction activities	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	3 Medium	**-9 Medium**	-1	1 Project Site	2 Short term	2 Low	5 High	2.5	2 Low	**-5 Low**
Pressure on the local infrastructure due to project facilities	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	3 Medium	**-9 Medium**	-1	1 Project Site	2 Short term	2 Low	5 High	2.5	2 Low	**-5 Low**
Impacts on local road network	-1	2 Municipal	2 Short term	4 High	5 High	3.25	3 Medium	**-10 Medium**	-1	2 Municipal	2 Short term	3 Moderate	5 High	3	2 Low	**-6 Low**

6.11.2.2 Operation Phase

The emerging market`s economic growth is positively impacted by the implementation of quality infrastructure projects. Transport infrastructure, in particular, is linked with improvements in an emerging market`s economy through reduced transportation costs and increased accessibility. These two factors not only impact directly on productivity and growth but also indirectly impact by enabling higher levels of private investment.

The Project aims to improve the quality of life and create the conditions for demographic renewal and encourage people to return in Project region. The Project is expected to contribute improve transportation within the region and also improve transit and intermediary links between pan-European infrastructure corridors as well.

The Project will indirectly lead to an increase in economic activities such as tourism, infrastructure services, agricultural and industry, real estate investments and employment levels. The Project will provide the local residents with better accessibility to social, health and educational services in larger towns in Serbia. Also, the locals that use the public transport would likely experience decrease in travel time due to reduced traffic in the Project region.

On the other hand, the potential for unplanned and uncontrolled economic and population growth could lead to issues surrounding sanitation, and service delivery. In terms of impacts on infrastructure, the increased population due to economic growth of the region may lead to a surge in demand for water, power, sewerage and waste facilities, health and education facilities, and telecommunications. As mentioned in Chapters 5.14.3.7 and 6.10.2.1, almost all of the affected villages observed to have insufficient sewage system and the domestic waste are being disposed through uncontrolled dumping. According to the Spatial Plan, reconstruction and extension of the sewage network and the construction of a sewage treatment plant are planned to be constructed to prevent any negative impacts during the operation phase of the Project.

The Spatial Plan introduces various developments in infrastructure to mitigate negative impacts and improve the livelihood of the local residents within the Project region.

According to Spatial Plan, the existing power supply will be sufficient for the operation phase of the Project. The Social AoI is equipped with a power grid and substations with nominal voltage of 220 and 110 kV and distribution network and substations with 35 and 10 kV.

The Impact Assessment on Infrastructure during the Operation Phase

The Table 6-73 presents the potential infrastructure related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-74 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project.

Considering the Project will adopt and apply the given mitigation measures in Table 6-73, Table 6-74 then assess the residual impacts of the Project.

Pressure on local infrastructure during operation phase may occur in Municipal level without any improvement on the existing Municipal infrastructure. According to mitigation measures, the likelihood of the potential impact is expected to be low.

Table 6-73. Impacts on Infrastructure (Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Pressure on the local healthcare infrastructure as a result of in migration	Job opportunities Expand in local market	Varvarin Municipality Trstenik Municipality	Operation • Considering inadequate health services Varvarin and Trstenik Municipalities, settlements in those settlements may be imposed to more diverse impacts on health services compared to other municipalities, therefore, it is recommended that incorporation with the Project Employer and local authorities should be made in case the in-migration resulted insufficiency in health services to take any possible action.
Pressure on sewage system Lack of waste management	In-migration Expand in local business and services	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Construction • Project Employer is recommended to be cooperate with responsible authorities in case necessary improvements will be required for local infrastructure. Operation • Project Employer to be in close coordination with the related local authorities to curtail inconvenience to the residents of the Project area.

Table 6-74. Impacts Scoring on Infrastructure (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Pressure on the local infrastructure during operation activities	-1	2 Municipal	4 Long term	4 High	5 High	3.75	3 Medium	**-11** **Medium**	-1	2 Municipal	4 Long term	3 Moderate	5 High	3.5	2 Low	**-7** **Low**

6.11.3 Economy

In this Section, the potential economic (national and local) and employment (direct and indirect) impacts associated with the construction and operation of the Project are assessed.

IFC's Good Practice Note on Non-discrimination and Equal Opportunity states that "*good practice companies operating in emerging markets often set specific targets for creating local employment opportunities, building local capacity through training, and advancing country nationals to replace expatriates in management positions*". IFC further explains that large projects can have ripple effects on the economy, creating jobs and business opportunities, increasing competitiveness, and generating tax revenues for national and local governments.

6.11.3.1 Construction Phase

High number of unemployment in the Social AoI

In all affected municipalities, unemployment is stated to be a significant issue. Especially considering the fact that increased number of out-migration of young generation occurred over the recent years due to lack of job opportunities. The Republic of Serbia considers individuals aged between 15 and 64 as a working age and according to national statistics unemployment rate of Social AoI ranges from 11% to 35%. Table 6-75 presents the employment profile of the Project affected municipalities.

Table 6-75. Unemployment Ratios of the Municipalities

Municipality	Working Age Population (2018)	Unemployed (2018)	Unemployment Rate	Number of Affected Settlements
Ćićevac	2,702	802	29.5 %	4
Kruševac	39,897	11,861	29.7 %	7
Varvarin	5,067	974	19.2 %	2
Kraljevo	38,889	10,459	26.9 %	11
Vrnjačka Banja	8,609	3,005	34.9%	7
Trstenik	12,500	4,326	34.6 %	7
Čačak	64,127	7,229	11.8 %	10

All of the Social AoI is considered as highly sensitive in terms of economic impacts. Among the affected municipalities, Trstenik municipality is observed to be most affected from the lack of employment opportunities in the AoI. On the other hand, considering the unemployment rate (34.9 %) and number of villages (seven) affected by the Project related activities, especially during the expropriation process, Trstenik municipality is one of the highly sensitive receptors when assessing the local economy. Also, considering the unemployment rate (26.9%) and number of affected villages (11), it can be stated that Kraljevo municipality is moderately sensitive in terms of economic impacts of the Project.

During the baseline assessment, a team of social experts conducted Focus Group Discussions (FGD) with the local women in Čačak, Varvarin, Kruševac, Vrnjačka Banja and Kraljevo municipalities to understand role of the local women and gender specific conditions of the Social AoI. Target groups interviewed were farmers, unemployed women, older women, general population, Roma women and young women. It was observed that there is no gender inequality for job opportunities in the region and majority of the local women are contributing in the household income through agricultural activities. However, both local men and women are suffering from lack of job opportunities. Considering the former experiences on private and public sectors, local women were willing to be part of the Project whether through direct or indirect job opportunities.

Direct and In-Direct Job Opportunities

The Project will provide temporary employment opportunity for the duration of construction phase (expected to be 4 years, at this stage). This includes individuals employed by the Project as well as contractors and subcontractors for the pre-construction and construction activities. The average number of the construction workers will be 3,100 and the peak number of the project workers will be approximately 3,800. Majority of the unskilled workforce are expected to be hired locally within the Social AoI, with the majority of skilled construction workers expected to be recruited internationally. Considering the income increase on local employees, it is expected to have increase in general spending on goods and services, which may lead to additional job creations in the region.

During the consultations through Household Surveys conducted by 2U1K, occupational skills of the PAPs were identified to provide general outlook of the availability of the types of labour force and Table 6-76 presents the details of the outcomes of the Surveys.

Table 6-76. Available skills of the PAPs

Municipality	Ćićevac	Kruševac	Varvarin	Kraljevo	Vrnjačka Banja	Trstenik	Čačak	Total
Technically educated person	162	280	5	342	455	1372	126	2742
Driver	60	245	25	290	920	390	312	2242
Construction worker	100	383	60	275	905	355	162	2240
Heavy machinery operator	10	58	5	67	88	40	50	318
Security personnel	10	65	7	41	55	27	60	265
Electricity technician	162	102	7	42	149	26	68	556

Indirect Employment opportunities also include jobs supplying the goods and services required to support the construction process including; asphalt from local refinery, machinery fuels from local market, cement, iron, construction vehicles and machinery, food, laundry, security and transport services and other services to support accommodation camps (considered as indirect employment). The procurement of goods and services for the Project is expected to contribute to the economy to the extent that these services are purchased municipal, district or national level.

The procurement of goods and services from the local business is likely to have a positive impact on economic growth and result in employment opportunities during the 4-year construction phase by creating new businesses and jobs. Also, it is assumed that an increase in demand of goods and services will lead to increase in supply. This is likely to create the pull factors which are needed to restore the attractiveness of the local communities and keep young people in the villages and even encourage in-migration. During the interviews with the local NGO's (conducted on 26.09.2019), Association of Serbian Businesswomen stated that, at least two companies from Čačak who participated in the construction of the Corridor X and Milos Great Highway benefitted from improving the skills and qualifications of their workforce.

From the outcomes of the baseline] assessment, majority of the PAPs may not be qualified for the skilled positions required by the Contractor, however, PAPs will benefit from the employment opportunities through unskilled positions. On the other hand, the Project will result in long-term capacity enhancement for the local workforce during the construction phase. Especially, long-term benefits from on the job and formal training opportunities for individual workers. This will also apply for local companies who would provide services in terms of capacity enhancement. The companies who will provide services would also reputational benefits from working on a major national Project.

Negative Impacts on the Local Economy Due to Expropriation

The Project is expected to cause economic displacement on land users, business owners and farmers within the borders of AoI due to expropriation. Negative impacts on people, households and communities may result from economic displacement as a result of loss of assets or access to them, loss of employment or other aspects of livelihood, welfare and/or amenity, due to direct changes in land use on which the Motorway and its ancillary facilities will be constructed.

Based on the Household and Community Level Surveys, the PAPs are predominantly involved in agricultural activities as their main source of income. Also, livestock activities are common for household purposes. The Project will require temporary and permanent land acquisitions that will lead to physical and economic displacement of PAPs. There will be loss of agricultural land, forest land, business land and private land as a result of the Project. PAPs that will go through expropriation on agricultural lands may experience loss of main or partial source of their household income. This may occur especially in the cases where remaining parcels of

the agricultural land after expropriation is not suitable for cultivation. On the other hand, some of the farmers may experience loss of their best quality arable land due to expropriation, which may cause reduced production and consequent loss of income. These types of concerns were expressed by locals during the disclosure of the Spatial Plan (August 2019), and according to the minutes of meeting, farmers who had concerns regarding losing best quality arable lands were offered an exception to exclude arable lands during the land acquisition as much as possible.

The Impact Assessment on Economy during the Construction Phase

The Table 6-77 presents the potential economy related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-78 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-77, Table 6-78 then assess the residual impacts of the Project.

During the construction phase of the Project, both direct and indirect economic opportunities at municipal is expected to occur. The magnitude of the potential impacts will be increased to high with the implementation of proposed enhancement measures from municipal to district level, especially the implementation of the Local Procurement Plan will lead equal competition opportunity.

Table 6-77. Impacts on Economy (Construction Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Employment Opportunities: Local unemployment is a significant issue in the Social AoI. In that regards, the Project will require temporary direct workers for the duration of the construction phase. The labour requirement for the construction of the Project will be primarily sourced from local labour force and complemented by international workers.	Employment or Recruitment: The average number of the construction workers will be 3,100 and the peak number of the Project workers will be approximately 3,800 for the construction phase.	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-construction • Recruitment procedures will be developed and aim to: - provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled, and skilled workforce - give priority to vulnerable persons (especially those who will be economically disabled) - give priority to Social AoI as much as possible, for the scope of good practice. • The Contractor and the Employer will outline and require a fair and transparent, gender neutral recruitment process for all job openings. The Contractor should seek to employ Project PAPs on each Sector of the Project route. • The Contractor should encourage Subcontractors to employ local personnel. Construction • Capacity enhancement benefits will be increased through training programs for contractors and subcontractors on related policies, as well as phased capacity building and targeted training programs for national and local suppliers agreed with local government and industry organizations to benefit local capacity enhancement.
Procurement Opportunities: Employment opportunities include jobs supplying the goods and services needed to support the construction process, including construction vehicles and machinery, food, laundry, security and transport services and other	Construction activities Services for the Project Facilities	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality	Pre-construction • Project should seek to maximize the benefits for local communities in terms of both direct and indirect employment opportunities and purchasing of local good and services. • Procurement Plan will be developed and implemented. Project should adopt measures within its purchasing policy to provide opportunity for local

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
services to support accommodation camps. In addition, the increased income of the direct and indirect employees will lead to an increase in general spending on goods and services as well as potentially related job creations.		Čačak Municipality	scale businesses to tender for procurement of subcontracted good and services (e.g. advertising locally).
The Project will result in long-term capacity enhancement for the local workforce during the construction phase. This includes long-term benefits from on-the-job and formal training opportunities for individual workers, and the possibility for capacity enhancements for local and national companies. These companies would also reap reputational benefits from working on a national major Project.	Construction activities Services for the Project Facilities	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Construction</u> • Increase capacity enhancement benefits through training programs for contractors and subcontractors on related policies, as well as phased capacity building and targeted training programs for national and local suppliers agreed with local government and industry organizations to benefit local capacity enhacement.
Impact on Agriculture: Agriculture is one of the main income sources of the Project region, implementation of Project may lead farmers landless or move on to different sectors.	Expropriation for the Project	PAPs who engaged in agriculture and livestock	<u>Pre-construction</u> • During land expropriation and acquisition process, cooperation between the Project Owner and Project Operator (Corridors of Serbia, Ministry of Construction, Transport and Infrastructure (MCTI) and Roads of Serbia) should consider the following measures; - support for the development of cooperatives and farmers associations should be provided - ensure the implementation of education programs for farmers; implementation of local agricultural incentive programs, - provide seminars to direct for farmers to promote and modern approaches to farming. - Implementation of RLRF and RAP.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Construction The Project Owner/Employer will encourage and interact with Ministry of Agriculture to include the PAPs within their training programs (eg. reskilling, opportunity, diversity).

Table 6-78. Impacts Scoring on Economy (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Employment Opportunities	1 Positive	3 District	2 Short-term	3 Moderate	5 High	3.25	5 Definite	16 **Medium**	1 Positive	4 Regional	2 Short-term	4 High	5 High	3.75	5 Definite	19 High
Local Procurement Opportunities	1 Positive	3 District	2 Short-term	3 Moderate	5 High	3.25	5 Definite	16 **Medium**	1 Positive	4 Regional	2 Short-term	4 High	5 High	3.75	5 Definite	19 High

6.11.3.2 Operation Phase

Benefit to the National Economy

The Project connects Preljina near Čačak with Pojate on the A1 Motorway (the North-South motorway in central Serbia) through Kruševac, where it will provide a linkage for the residents (more than 500,000 people) and 21,000 companies. This will include better accessibility for businesses in the Project region to expand their geographical markets and resources to other areas and countries.

The majority of the National Highways in Serbia are under tolling[21]. Therefore, the primary national benefit will be derived from the toll collection for the Motorway. Furthermore, the Project will significantly shorten the travel time and the Social AoI will benefit from the improved carriageway with higher quality transport movement and safer infrastructure. In general, this will improve the facilitation of goods transport costs and commune of financial resources within the country.

On the other hand, the locals whom travel frequently for any occasion could still use village roads to acess their business, farm or any other local location since the Project do not bind the locals to only use the Motorway.

Benefits to the Local Economy

The Project is expected to attract more investors in the Project region. The increased investment will bring in more employment opportunities to the local people, including diversification of economic activities. This is quite significant considering the fact that majority of the expropriated land are agricultural lands, and PAPs whom may be affected economically can shift and continue to attribute their income through newly introduced economic fields.

In order to develop local economy throughout the operation phase of the Project, the Spatial Plan indicates that there will be two maintenance facilities within the Motorway alignment in which it is expected to employ local community within its departments. Also, the Project will establish amenities including; parking lots, rest areas, motels, gas station (including grocery, cafes and restaurant) which are expected to increase benefits to the local economy. Therefore, after the establishment of the Project, roadside businesses may enhance and facilitate trade along the Project corridor.

Based on the economic indicators of previous motorway projects, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of

[21] There are charges for the passage of several motorways leading across the Serbia, the current state in 2019 is 645 km of highway tolls with 47 toll gates. On toll roads are subject to the obligation to pay tolls for all motor vehicles using these roads, including motorcycles, quads and tricycles.

the Motorway in general. The following operational activities are expected to be required which will result in direct employment opportunities within the Social AoI:

- Traffic and safety operation:
  - Route patrolling;
  - Operation and maintenance of traffic and safety; and,
  - Emergency operations.
- Tolling operation:
  - Cash collection and money management in toll lanes; and,
  - Operation and maintenance of toll office, including user data management (vehicle classification, license plate number, toll plaza lane entry / exit corrections, Illegal Passes etc.).

The Project will be subject to regular maintenance, including summer and winter maintenances, in which will provide procurement opportunities of local and national contractors. Some of the procurement activities related to maintenance expected to be required listed as following:

- Routine maintenance, cleaning and limited repair of the motorway, interchanges and connecting roads including the related structures and infrastructures;
- Watering, trimming and mowing of non-decorative green areas;
- Winter maintenance with preventive and corrective activities;
- Operation and routine maintenance, cleaning and repair of the toll related structures, infrastructures, building, facilities, ancillaries;
- Maintenance of equipment; and,
- Routine inspections for all motorway assets.

Indirect job opportunities are expected to further stimulate employment opportunities and increase the livelihood of PAPs. Other induced impacts are considered to be mostly in the service sector such as tire repair services, on the road assistance and auto mechanics.

According to the Spatial Plan, the Proposed Logistic Centers are expected to be constructed in Čačak and Kraljevo municipalities by the Government of Serbia after the operation phase of the Project. These centers can employ between 500 and 10,000 employees, which may provide significant benefit for the locals who seek employment. The Spatial Plan also states that, industrial zones are planned to be constructed along the Motorway corridor located in Kraljevo, Kruševac, Čačak, Trstenik, Varvarin and Ćićevac municipalities. The details of the

planned industrial zones are currently being arranged, no further details are provided in the Spatial Plan.

The Impact Assessment on Economy during the Operation Phase

The Table 6-79 presents the potential economy related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-80 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-79, Table 6-80 then assess the residual impacts of the Project. The only negative impact caused by the Project operation phase is expected to be decrease in agricultural sector in the Region. With the implementation of proposed mitigation measures, the likelihood of this impact may decrease from medium to low, in which the overall impact is assessed as low. On the other hand, direct and indirect job opportunities and increase in economic development of Region could be improved with the proposed enhancement measures.

Table 6-79. Impacts on Economy (Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Direct and In-direct Employment Opportunities: Employment for the operation and maintenance activities of the motorway, bridge and tolls will be required, resulting in long-term employment opportunities for the municipal, district and national workforce. Local contractors and subcontractors as well as national and local companies will have the opportunity to be involved in maintenance and repair works as well as services to be provided in amenities. It is assumed that operation and maintenance work will require a mix of skilled and semiskilled labor, which may be employed from the municipal or district workforce.	Operation and maintenance activities of the motorway, bridge and tolls as well as amenities services	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Operation Recruitment policy and procedures of the Employer should aim to provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled, and skilled workforce, and giving priority to vulnerable persons (especially those who will be economically disabled). Priority will be given to Social AoI. • Training for PAPS to increase their employability should target identified PAPs within the scope of intervention of the RAP. • The training for PAPs whom seek employment should be provided to obtain jobs with the Project to the extent possible, with in the scope of intervention of the RAP • The Operator should require and develop policies for a fair and transparent, gender neutral recruitment process for all job openings. The Project Owner should seek to employ PAPs on each Sector of the Project route. • As a good practice, Subcontractors should be encouraged to employ local personnel within the scope of their recruitment policy and procedures.
Increase in Economic Development in the Region: The operational stage of the Project is expected to improve connectivity for the transport of goods, services and people between the provinces of the region leading to a better economic growth potential of the Social AoI. This would include improved trade and access to tourism points as well as better accessibility for businesses in the region to expand their geographical markets and resources.	Increase in demand of goods, supplies and services	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Operation • The operation phase of the Project will seek to promote local employment (including job training for the operational activities) and purchase local goods and services to the extent possible.

Table 6-80. Impacts Scoring on Economy (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Direct and In-direct Employment Opportunities	+1 Positive	3 Municipal	4 Long - term	1 Minor	2 Low	2.5	2 Low	**5 Low**	+1 Positive	4 Regional	4 Long - term	2 Low	2 Low	3	4 High	**12 Medium**
Increase in Economic Development in the Region	+1 Positive	5 National	4 Long - term	3 Moderate	4 High	4	4 High	**16 Medium**	+1 Positive	5 National	4 Long - term	3 Moderate	4 High	4	5 Definite	**20 High**

6.11.4 Resettlement and Land Acquisition

This section discusses potential impacts on the land use and the PAPs whose land will be expropriated. Detailed information on the Project Owner's commitments for the PAPs and physical, economic displacement and livelihood impacts caused by Project implementation in all Project phases can be found in Resettlement and Livelihood Restoration Framework (RLRF) prepared as a part of ESIA Disclosure Package.

Also, Resettlement Action Plan (RAP) is currently being prepared by an independent consultant company in order to:

- mitigate adverse social and economic impacts of expropriation and temporary or permanent losses by providing compensation for losses of property on the basis of replacement costs and ensure implementation of the activities of displacement with appropriate data disclosure, consultations and participation of the PAPs,
- re-establish or even improve sources of income and living standards of resettled persons to the level before Project impact.

The Project Employer will prepare and make available to all PAPs and interested stakeholders the summary document of the RAP, after final RAP has been adopted, in addition of appropriate full RAP disclosure.

6.11.4.1 Construction and Operation Phase

The Project includes approximately 112 km long Motorway from Pojate to Preljina and with 40 bridges, 20 overpasses and 10 interchanges and regulation of the West Morava River (with total length of 32 km of regulation works). The proposed regulation designs are to protect against flooding and eliminate more consecutive sharp bends and bank erosion.

The Project will lead to impacts associated with land use and land base livelihoods including physical and economic displacement.

The existing land use of the Social AoI will be affected by the construction of the Project and its components as well as by the project facilities and activities. There will be loss of business, municipality, governmental and individual land as a result of the Project. The land types and person who will have compensation rights were provided in the RLRF of the Project.

The Project execution will require permanent acquisition of land by using expropriation. The Project is expected to cause economic displacement and physical resettlement, however, at this stage, the magnitude of displacement is not completely known. Identification of the landowners for Section 1 and Section is completed. At this stage, the Preliminary Design of Section-2 is currently in progress in parallel to the national EIA process; therefore the exact amount of expropriated land is currently unknown.

The CoS will be responsible for the expropriation activities for all Sections of the Project. Responsible Institutions and their roles on land acquisition and expropriation for the Project is provided in Table 6-81.

Table 6-81. Responsible Institutions on Land Acquisition & Expropriation

Section	Expropriation	Construction Employer	Operator
Section 1	CoS	CoS	CoS
Section 2	CoS	CoS	CoS
Section 3	CoS	CoS	RoS
Responsibilities	Land cadastral maps Expropriation administration Payment	Supervision of design and construction (through and third party Consultant) Ownership of RAP Monitoring	Operation and maintenance of motorway

According to the data obtained from CoS and the Contractor, arable land (non-irrigated arable land) and heterogeneous agricultural areas (with complex cultivation patterns) cover the largest area along the AoI, which covers 500 m on each side of the motorway along the Project route.

Table 6-82. Land Use Areas in AoI

Land Type	Area (ha)	%
Arable land	10,453.63	61.2
Mineral extraction sites	74.12	0.4
Residential buildings of villages and urban peripheries	814.82	4.8
Rural industrial and commercial sites still in active use	142.47	0.8
Road networks	129.41	0.8
Broad-leaved forest	4,564.51	26.7
Grassland	177.36	1.0
Artificial Ponds	110.37	0.6
Water courses	618.64	3.6
Total	**17,085.33**	**100**

Source: Community Level Surveys, 2019

The Project will avoid the acquisition of lands or land use rights that result in any physical or economic displacement where possible. If the land acquisition and displacement is unavoidable, the Project will apply the mitigation measures as agreed in the Resettlement and Livelihood Restoration Framework of the Project to minimize the impacts resulted by displacement. The impacts resulting from the economic and physical displacements are summarized in the Table 6-83.

Table 6-83. Potential Impacts Caused by the Economic and Physical Displacements

Project Impacts in Preconstruction Phase Under the Responsibility of CoS	Project Impacts in Construction Phase Under the Responsibility of Contractor *(if the cause solely owned by the contractor)*
• Economic Displacement of Agricultural Land PAP's livelihoods • Economic Displacement of Construction Land • Economic Displacement of Unviable Land • Loss of Annual Crops • Loss of Plants and Trees • Loss of Wood mass • Loss of Forest • Loss of Buildings Used for Livestock • Loss of Immovable Assess • Negative impacts on agricultural workers • Loss of business structures • Loss of structures used for living premises (no physical resettlement is needed but used for leased as a source of income) • Physical displacement of buildings • Displacement of structures used for agricultural and livestock activities • Physical displacement of unviable buildings • Physical displacement of state- owned buildings • Physical displacement of public utility and community health resources • Impact caused by temporary occupancy • Impacts on vulnerable groups • Additional land requirement due to alignment change • Access to the Natural sources • Access to ecosystem services (river, forest, hunting areas) • Access to agricultural lands • Access to ecosystem services (river, forest, hunting areas) • Impact on local businessescultural heritage • Changes in community dynamics and social network	• Impacts on local businesses • Unplanned Damages to agricultural lands during Construction • Unplanned Damages to Crops, trees During Construction • Loss of livelihoods due to noise and dust • Loss of livelihoods due to access to the agricultural lands during the construction • Unauthorized entry to private lands

The key land acquisition activities including the identification of the required land, identification of PAPs, land valuation, negotiation with landowners and the identification of the affected people and compensation, land valuation, preparation of the land acquisition files, and announcement of the Project layout through newspapers have been carried out for Section-1, by CoS. This process will be supplemented if needed in the course of the RAP definition/implementation.

The potential major impacts may be experienced by the locals who may have to expropriate all or most of their land and other property and move to the other locations. Moderate impacts may be experienced by the locals who may lose smaller portions of their land and assets and who may not need to physically relocate. Losses may not only be limited to property owners

with legally recognized property rights, but some impacts could possibly be experienced by people without ownership rights, such as tenants and informal or itinerant land users.

During operation phase, the most likely potential impact would be damage to crops near the Motorway corridor from maintenance activities or vehicular access.

Below present the land acquisition requirements for the Motorway construction and the project facilities according to each Section in order to understand Section specific impacted areas and types of lands for the Proposed Motorway Route and construction facilities in terms of land acquisition.

To understand the scope of the impact and the justification of the proposed mitigation measures, following subsections provide required permanent and temporary lands for the Project and its facilties for each Section, respectively. In order to do so, maps for respective expropriation area for the Proposed Motorway Route followed by the maps preparead for the locations of the project facilties of each Section shown in below.

Section 1

For the construction of the Motorway in Section-1, 267 ha area is required permanently including land required for camp sites.

The expropriation zone of the motorway alignment passes through 17 Cadastral Municipalities[22] within the borders of the three Municipalities including; Kruševac, Ćićevac and Varvarin. The private lands constitute 83% of the affected lands including the 1% of the business. Public land constitutes 17% of overall impacted land; of which Government lands consist 14% of the affected lands and Municipal land 3%.

[22] Cadastral municipality is a subclass of administrative territorial entity and records property ownership in a cadastre, which is a register describing property ownership by boundary lines of the real estate. The land record in Serbia is kept by cadastral municipalities.

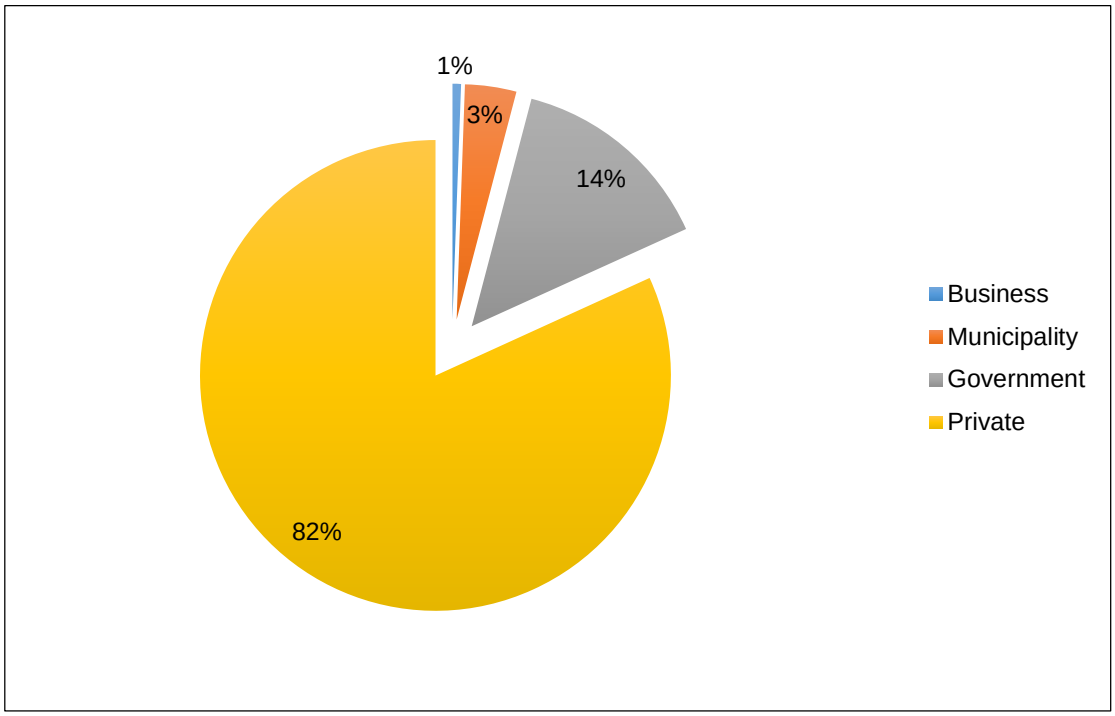


Figure 6-7. Land Types According to the Ownership Status

The list of PAPs within Section-1 is provided by CoS. Land acquisition data for private parcels includes size of land impacted per parcel. Based on received information, 38% of PAPs have lost more than 80% of their parcel. Almost a quarter of PAPs have lost less than 10% of their parcel.

Project Facilities will also require land acquisition. The Facilities for Section-1 consists of beam plant, borrow area, precast yard, quarry, subbase plant SW plant, asphalt plant, and the camp area. Total land required for the project facilities is approximately 600 ha. The Figure 6-8 presents expropriation route, river regulation and location of the Project facilities for Section 1.

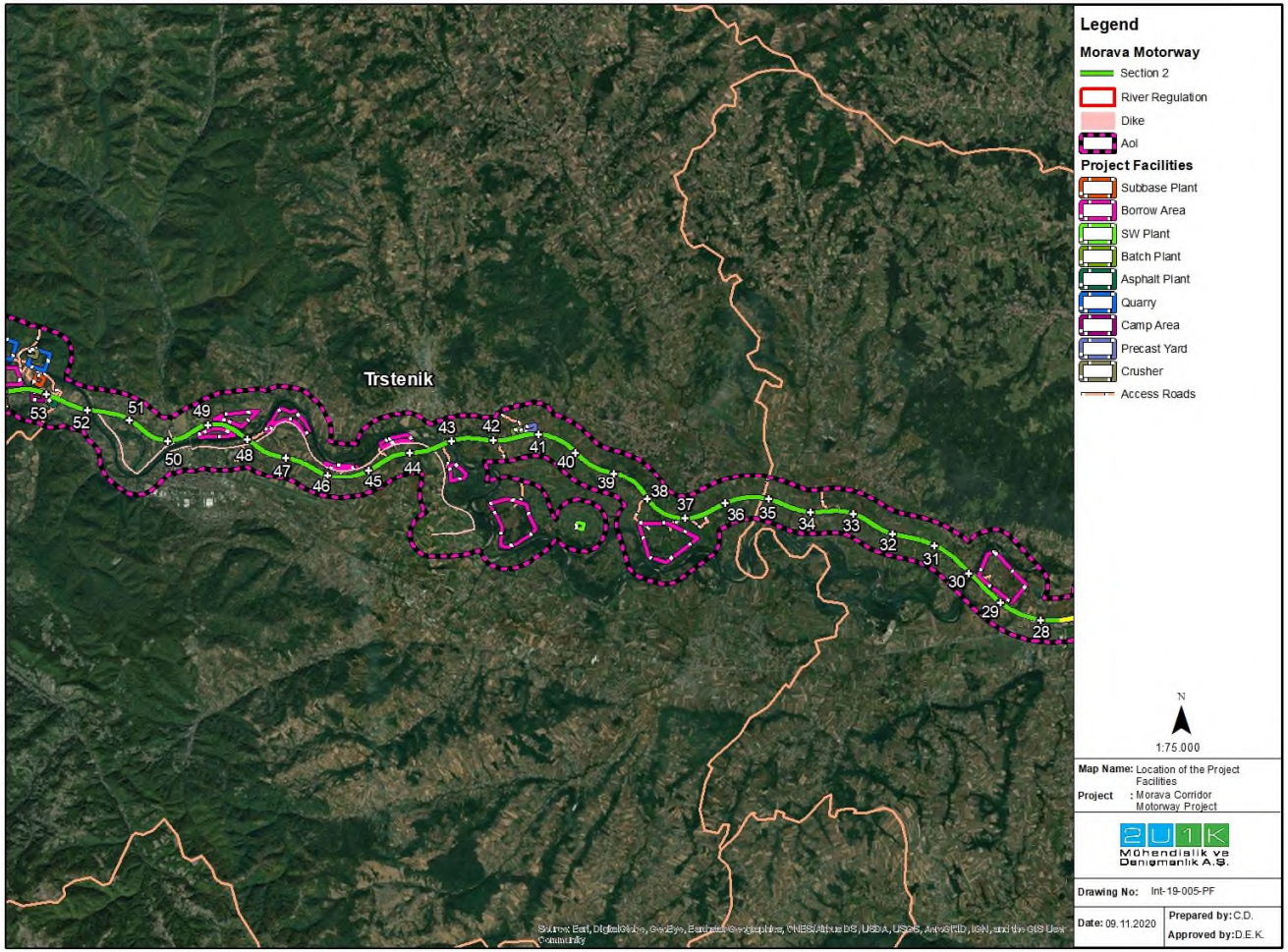


Figure 6-8. Expropriation Route and Location of the Project Facilities for Section

Section 2

For the construction of the Motorway in Section-2, at this stage of the Project, it is estimated that 530 ha is required permanently. Furthermore, land required area for the temporary usage (access roads, storage areas) will be determined in the further stages of the Project Design.

The expropriation zone of the motorway alignment passes through the Kraljevo, Vrnjačka Banja, Trstenik Municipalities. This Section includes 42 Cadastral Municipalities. The project facilities for the Section-2 will consist asphalt plant, batch plant, beam plant, borrow area, precast yard, quarry, subbase plant SW plant and the camp area. Total land required for the facilities is estimated at approximately 750 ha (maximum) at this stage of the Project.

The Figure 6-9 and Figure 6-10 presents expropriation route, river regulation and location of the Project facilities for Section-2.

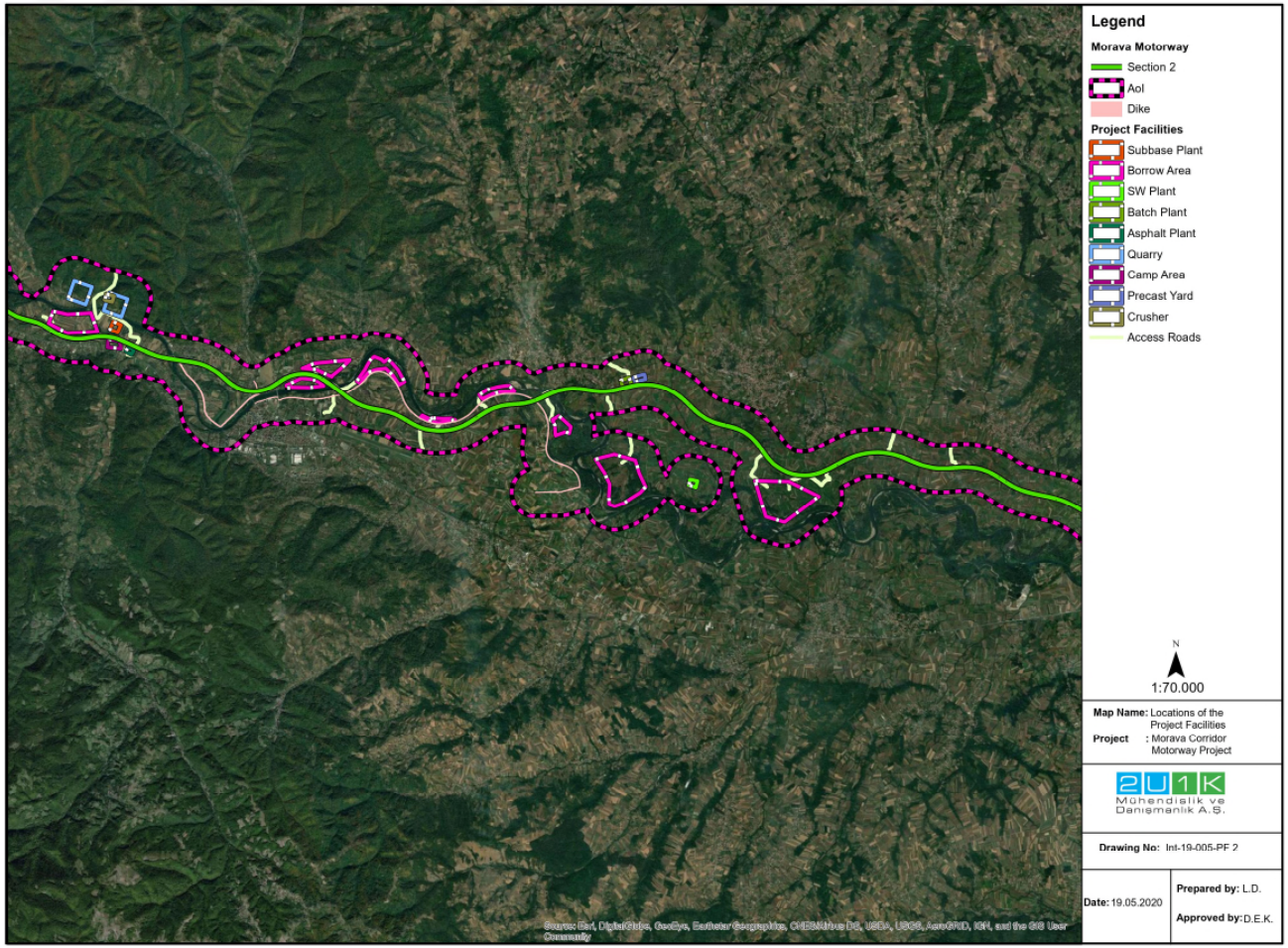


Figure 6-9. Expropriation Route and Location of the Project Facilities for Section 2

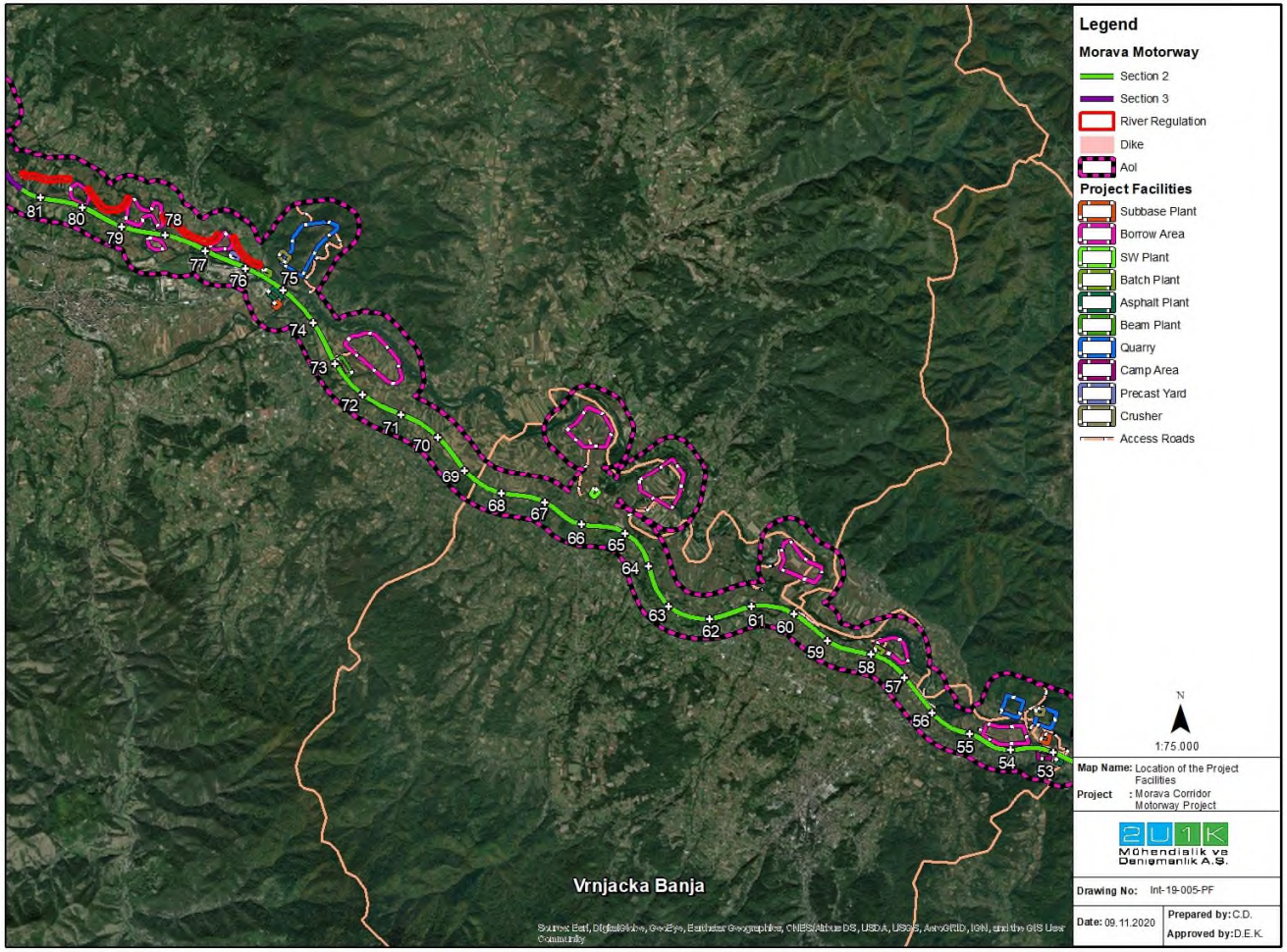


Figure 6-10. Expropriation Route and Location of the Project Facilities for Section 2-a

Section 3

For the construction of the Motorway in Section-3, at this stage of the Project, it is estimated that 320 ha is required permanently. Furthermore, land required area for the temporary usage (access roads, storage areas) will be determined in the further stages of the Project Design.

The expropriation zone of the motorway alignment it passes through the Čačak Municipality. This Section includes 17 Cadastral Municipalities.

The project facilities and activities for Section-3 will consist batch plant, beam plant, borrow area, precast yard, SW plant and the camp area. Total land required for the facilities is estimated at approximately 200 ha at this stage of the Project.

The Project will also require some temporary land take for construction access roads, construction laydown areas and camps, temporary storage of excavated materials/soil, cut trees etc.

In addition to land acquisition, the Project may cause severance impacts from dividing the land parcels. During the disclosure of the draft Spatial Plan (August and November 2019), the landowners and land users expressed the importance of accessibility to their agriculture lands. Hence, the Commission for Conducting the Public Insight of the Spatial Plan stated that the Project will take necessary measures such as interchanges, overpasses, bridges and underpasses in order to retain the accessibility of the land owners and users to these areas in order to minimize any adverse impact on the livelihood resources.

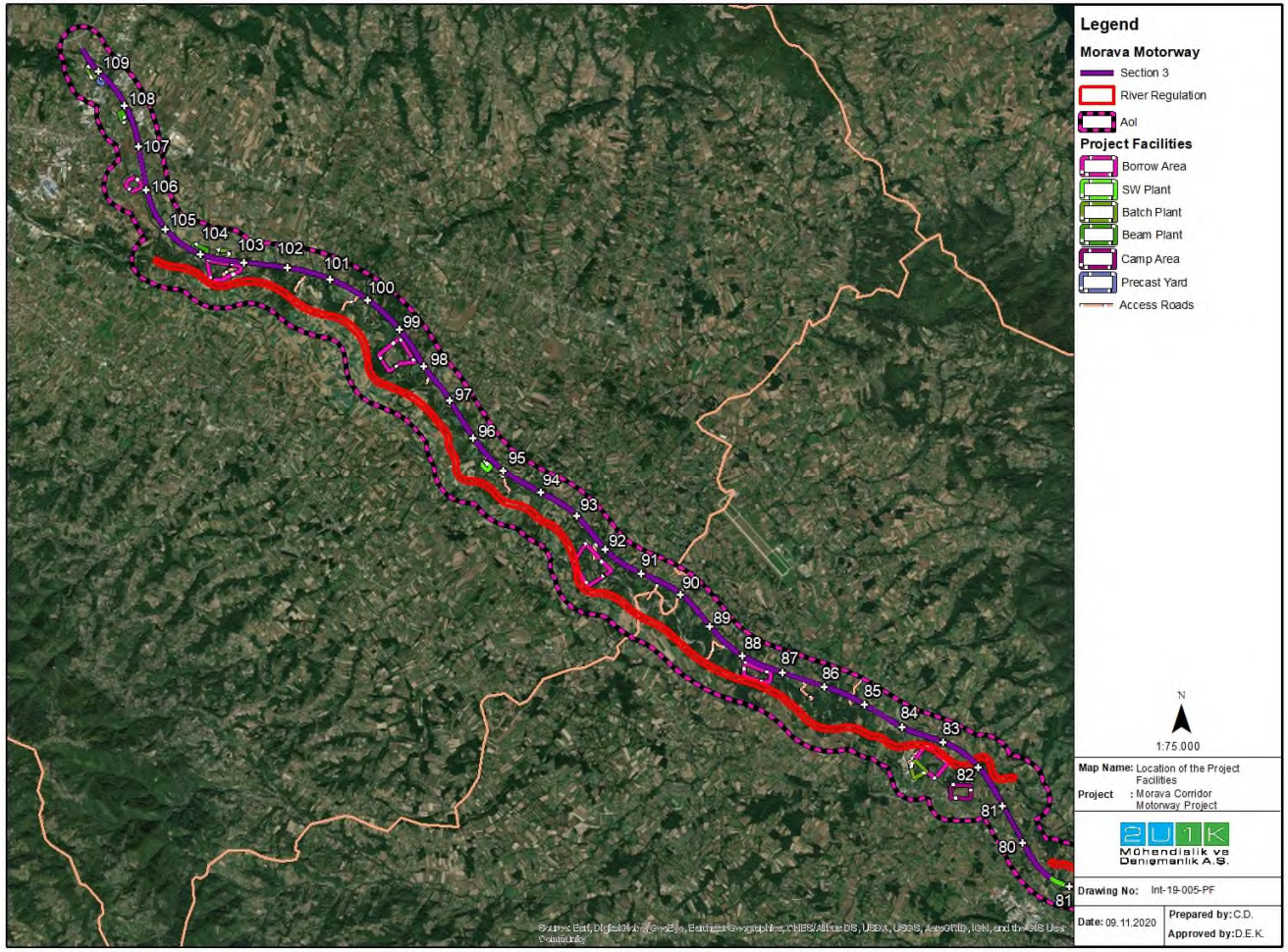


Figure 6-11. Expropriation Route and Location of the Project Facilities for Section 3

The Impact Assessment on Resettlement and Land Acquisition during the Construction and Operation Phase

The Table 6-84 presents the potential resettlement and land acquisition related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction and operation. In that regards, Table 6-85 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-84, Table 6-85 then assess the residual impacts of the Project.

All impacts caused by the resettlement and land acquisition have negative nature, however, duration of the impacts may change according to temporary and permanent requirement of the land. The magnitude of the impacts for permanent land requirement and resettlement are assessed as high and the magnitude of the temporary land requirement and possible damage assessed as low. The likelihood of all impacts are definite, excluding the unplanned damages, before the implementation of the proposed mitigation measures. The sensitive receptors for land acquisition and resettlement impacts are those who will lose their land, structure, business and income sources. Prior to the mitigation measures, the sensitivity of the receptors mainly considered as high. The implementation of mitigation measures (i.e. compensation and other type of assistances provided by the Project Employer), the sensitivity of the receptors who will lose lands is expected to reduced as shown in Table 6-85.

Table 6-84. Impacts on Resettlement and Land Acquisition (Construction and Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Loss of private and public lands due to expropriation The Project execution will require permanent acquisition of land by using expropriation. There will be loss of agricultural, forest, municipal, village and private land as a result of the Project. The existing land use of the Social AoI will be affected by the construction of the Project and its components as well as by the project facilities.	Loss of private and public lands due to expropriation	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Design</u> • Effects of physical and economic displacement will be minimized • People affected by the Project will be compensated in accordance with the Principles set in the in the RLRF. • As a minimum, Resettlement Action Plans (RAPs) will be prepared. It will detail the impacts of the Project on land ownership, land use, property and livelihoods. The RAPs will set out the measures needed to address adequately physical and economic displacements due to the Project. • A detailed socio-economic assessment will be undertaken for the RAP to identify impacts on PAPs, including land acquisition impacts and restriction to land use. • A census will be carried out to determine persons to be displaced by the Project, persons that are eligible for compensation and assistance, inventory of affected land and property. <u>Pre-construction</u> • Assistance will be provided to vulnerable persons who are not able to relocate and resettle on their own. • Additional targeted assistance (e.g., credit facilities, training, or job opportunities) will be provided and opportunities to improve or at least restore their income-earning capacity, production levels, and standards of living to Economically Displaced Persons whose livelihoods or income levels are adversely affected <u>Construction</u> • The amount of land occupied during the construction will be minimized. • Construction workers will be trained to stay within the border of the construction areas and expropriation corridor and avoid trespass on private land.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• For exceptional cases when the privately-owned land has to be used but the expropriation or court processes have not been finalized yet, no work will be started until bilateral agreements are settled and official consent letters are taken from the legal owners. • If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case basis and where necessary, corrective actions will be planned and implemented. • In case of any direct damage on private property as a result of the activities of the Project contractors or subcontractors, the Contractor will ensure that relevant corrective measures (e.g. repair, maintenance, rebuilding, restoration, etc.) are implemented.
Impacts on agricultural land: Agricultural lands will be affected during the land acquisition/ expropriation process	Expropriation	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Pre-construction</u> • Users of land will be timely informed when construction is planned to begin and how lost crops and damages will be compensated. • When displacement cannot be avoided, displaced persons will be provided with appropriate compensation for loss of assets per Expropriation Law (Official Gazette RS, No. 53/95 dated December 28, 1995, including changes of 23/01 dated April 6, 2001, 20/09 dated March 19, 2009 and 55/13 dated June 25, 2013) considering the provisions of the Spatial Law. • All users of land whose crops are lost or affected by any other damage during the construction will be compensated at a full replacement value, in accordance with Serbian legislation and IFC requirements. • If compensation alone is not sufficient to restore livelihoods, implementation of livelihood restoration in accordance with IFC requirements. • Grievance mechanism will be established

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			Construction • Impacts to agricultural and pasture lands will be minimized as far as possible by keeping the Project construction footprint as narrow as possible, and efficiently restoring any damaged areas
Impacts on business land: Business lands will be affected during the land acquisition/ expropriation process.	Expropriation	Owner of the business lands its employees in the following municipalities: Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-construction • Business losses will be compensated at a full replacement value, in accordance with Serbian Legislation and the IFC requirements. • If compensation alone is not sufficient to restore livelihoods, implementation of livelihood restoration in accordance with IFC requirements. • Grievance Mechanism will be implemented in line with the SEP.
Temporary land allocation: Temporary land and property impacts (for borrow pits, excess material disposal sites, storage, access roads and worker camps) impacts will affect the landowners during the construction phase of the Project	Construction activities	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Construction • All of the disturbed sites will be rehabilitated as appropriate and agreed upon, following the completion of construction works.
Fragmentation of certain land plots: The Project implementation will cause the fragmentation of certain land plots.	Expropriation	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Deisgn and Pre-construction • Underpasses will be designed to ensure access of local people to agricultural lands, with sufficient dimensions for the passage of harvesters, vehicles, etc. where required. • Temporary access roads will be constructed in parallel to the Motorway route near agricultural areas/zones to provide access to agricultural lands, where practical.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Damage to crops during the construction and operation phase phase	Maintenance activities	Agricultural lands neighboring the Motorway within the Social AoI	Pre-constructon • Any loss of or damage to crops caused by Project activities will be compensated. Construction and Operation • The Project will minimize damage to crops by minimizing the area of disturbance caused by vehicle movement and other construction activities. • If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case and where necessary, corrective actions will be planned and implemented.
Physical and economic displacement of PAPs: The Project will cause temporary and permanent land acquisitions that will lead to physical and economic displacement of PAPs. There will be loss of agricultural land, forest land, business land and private land as a result of the Project. PAPs that will go through expropriation on agricultural lands may experience loss of main or partial source of their household income.	Physical and economic displacement of PAPs	PAPs who experience expropriation within the borders of Social AoI	Pre-construction and Construction • Employment Plan will be prepared. Local employment and PAPs who will lose income (agriculture and seasonal agriculture activities) or jobs due to Project related activities should be encouraged by establishing fair, transparent and equal opportunities for employment.

Table 6-85. Impacts Scoring on Resettlement and Land Acquisition (Construction and Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Loss of private and public lands due to expropriation	-1	1 Project Site	5 Permanent	5 Very High	5 High	4	5 Definite	**-20 High**	-1	1 Project Site	5 Permanent	4 High	3 Moderate	3.25	5 Definite	**-16 Medium**
Loss of business lands	-1	1 Project Site	5 Permanent	5 Very High	5 High	4	5 Definite	**-20 High**	-1	1 Project Site	5 Permanent	4 High	3 Moderate	3.25	5 Definite	**-16 Medium**
Temporary land and property impacts	-1	1 Project Site	1 Immediate	2 Low	5 High	2.25	5 Definite	-11 Medium	-1	1 Project Site	1 Immediate	1 Minor	3 Medium	1.5	5 Definite	**-8 Low**
Fragmentation of agricultural land plots.	-1	1 Project Site	5 Permanent	5 Very High	5 High	4	5 Definite	**-20 High**	-1	1 Project Site	5 Permanent	4 High	3 Moderate	3.25	5 Definite	**-16 Medium**
Loss of economic forestland function	-1	1 Project Site	5 Permanent	2 Low	5 High	3.25	5 Definite	**- 16 Medium**	-1	1 Project Site	5 Permanent	1 Minor	5 High	3	5 Definite	**-15 Medium**
Damage to crops during the operation phase	-1	1 Project Site	4 Long term	2 Low	3 Medium	3.33	2 Low	**-7 Low**	-1	1 Project Site	4 Long term	1 Minor	3 Medium	2.25	2 Low	**-5 Low**
Physical and economic displacement of PAPs.	-1	1 Project Site	5 Permanent	5 Very High	5 High	4	5 Definite	**-20 High**	-1	1 Project Site	5 Permanent	4 High	3 Medium	3.25	5 Definite	**-16 Medium**

6.11.5 Ecosystem Services

Ecosystem services are the benefits that people, including businesses, derive from ecosystems. According to IFC Performance Standard 6, the ecosystem services are organized into four types:

(i) provisioning services, which are the products people obtain from ecosystems;

(ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes;

(iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and

(iv) supporting services, which are the natural processes that maintain the other services (IFC, 2012).

This Chapter of the Impact Assessment covers the existing ecosystem services including types of usage along the AoI, respectively.

6.11.5.1 Construction Phase

This section of the Impact Assessment derived from the social field study conducted on 2019, and Spatial Plan of the Project (2019). The questionnaires prepared for the social field studies included specific topic for ecosystem services to:

- Identify drivers of ecosystem change likely to be associated with the project
- Identify potentially impacted ecosystems and ecosystem services and potentially affected beneficiaries
- Assess project impact on ecosystem services
- Assess current supply of priority ecosystem services and their contribution to beneficiaries well being

Impact on Forest Lands:

The Project alignment will pass through forestlands in each of the Municipalities within the AoI. The most affected Municipalities are located in Section-2 including Trstenik and Vrnjačka Banja Municipalities. The forestlands in the AoI are mainly used for wood, plant and mushroom collection and hunting purposes. All of the forest related activities are mainly used for household consumption according to the results of social field study.

Although the Project activities require forest utilization, no significance impact is foreseen on this ecosystem service, since most of the plants used are in the peridomiciliary spaces, and have spaces for use or complementary sources of supply for their use.

The areas required for the establishment of the Project and the purpose of the forest usage of the local communities are given in the Table 6-86.

Table 6-86. Required Forest Lands and the Forest Usage within the Municipalities

Name of the Municipality	Required land for the establishment of the Project (ha)	Details of the forest usage
Ćićevac	18.14	• Wood collection for heating purposes. • Plant collection (%5 of the AoI) for household purposes. • Hunting (Hunting Association "Hajduk Veljko" manages hunting in Mojsinjske mountains, and hunting area covers 11,203 ha.) • Wood collection, herb collection nor hunting is not made to generate income according to the result of field studies. All activities within the forest is for household consumption.
Kruševac	24.19	• Wood collection for heating purposes. • Mushroom collection for household consumption (Bela Voda village) • Timber collection for income generation (70% of the locals in Jasika Village collect timber to generate income) • Plant collection for household consumption (Kukjin and Jasika villages) • Hunting (Hunting Association of Kruševac manages the hunting and the area covers 52,464 ha)
Varvarin	8.73	• Wood collection for heating purposes. • Plant collection (%5 of the AoI) for household purposes. • Hunting (Juhor Hunting Association, manages the activity and the area covers 21,500 ha)
Trstenik	51.20	• Wood collection for heating purposes. o Wood consumed during the winter season in all affected villages is approximately 14.8 m^3 • Mushroom collection in Velika Drenova, Grabovac, Lozna, Ugljarevo and Medveđa villages for household consumption. • Hunting (Hunting Association "Radoslav Brkic Boza", based in Trstenik, manages the hunting and the area covers 41,287 ha) • None of the villages within the AoI collects herbs from the forest for income generation
Vrnjačka Banja	48.22	• Wood collection for heating purposes o Wood consumed during the winter season in all affected villages is approximately 16.25 m^3 • Mushroom collection in Vraneši, Vrnjci, Podunavci, Štulac and Novo Selo villages for household consumption • Hunting (Hunting Association "Vrnjačka Banja", manages the hunting ground "Vrnjacka River" with a total area of 10,445 ha) • None of the villages within the AoI collects herbs from the forest for income generation
Kraljevo	58.11	• Wood collection for household purposes. o Commercially timber production for income generation was detected in household located in Miločaj village within the AoI. • Plant collection for household consumption is rare, furthermore, plant collection is not income based. • Hunting (Kraljevo Association manages the hunting and the hunting area covers 50,000 ha)

Name of the Municipality	Required land for the establishment of the Project (ha)	Details of the forest usage
Čačak	11.39	• Wood collection for heating purposes. o Wood consumed during the winter season in all affected villages is approximately 13.4 m^3 • In Mrčajevci and Preljina villages, the locals collect mushrooms from the forest for household purposes. • Hunting is very rare in the affected villages of Čačak Municipality, only few residents go haunting to catch pheasant, rabbit and wild boar. • None of the villages within the AoI collects herbs from the forest for income generation

Source: Spatial Plan, 2019 and Social Field Surveys 2019

Impact on Beekeepers

During the site visit conducted by 2U1K in August 2019, it was observed that the Quarry area proposed by the Contractor is located in the close proximity to apicultural activity area. However, beekeeping activities are carried out various locations in the forest area, and the locations of all beekeepers could not be determined during ESIA studies. Beehives are also located in the close proximity to Motorway route in Mrzenica and Makrasane shown in Figure 6-12 and Figure 6-13.

Source: 2U1K, August 2019

Figure 6-12. Beehives in Mrzenica

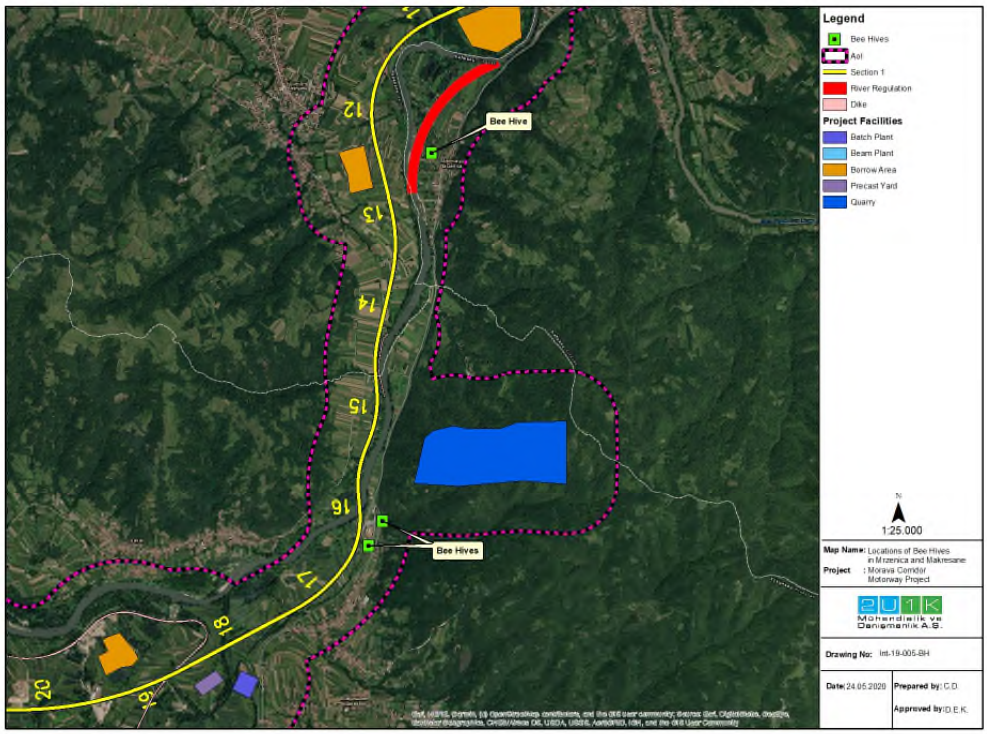


Figure 6-13. Beehives in Mrzenica and Makrasene

According to the information received from the Association of Professional Beekeepers, beehives located in the close proximity Morava River will be affected by the excavation and blasting activities of the Project including dust, noise and vibration. The beekeeper Association of Kruševac recommended that the construction activities should be conducted as much as practical distance from the beehives (in May, June, July they can fly 2 km) by considering the seasonal changes.

The quality of the flowers may be reduced as a result of the CO_2 and dust emissions and this may reduce honey production and quality.

Impact on Tourism

Within the borders of the AoI, municipality of Vrnjačka Banja is observed to have the most available touristic activities among other affected municipalities. Below presents details on the tourism activities and available hospitality services within the affected municipalities.

Table 6-87. Tourism activities within the AoI

Name of the Municipality	Available Touristic Activities and Areas
Vrnjačka Banja	• According to social surveys, there are no touristic facilities (i.e .hotel, hostel, camp site) among the affected villages • The main tourism source in the Municipality is thermal water. Special Mercury Hospital and HTP Fontana are the main touristic facilities. • Another tourism source is Goč mountain in terms of hiking trails, two hunting grounds, ski slopes with cable car, lake Selište, ponds. • Other tourist attraction in Vrnjačka Banja is the area with a recreational-tourist zone along the West Morava. This zone is mainly being used for hunting and fishing.
Kraljevo	• According to social surveys, Adrani village stated to have touristic facilities (i.e.hotel, hostel, camp site) among the affected villages.
Čačak	• According to social surveys, Mrčajevci and Preljina villages were stated to have touristic facilities (i.e. hotel, hostel, camp site) among the affected villages. • Ovčar-Kablar Gorge is a karst limestone canyon that is a touristic source of the Municipality.
Ćićevac	• According to social surveys, Grad Stalac village was stated to have touristic facilities (i.e. hotel, hostel, camp site) among the affected villages.
Kruševac	• According to social surveys, Citluk and Bivolje villages were stated to have touristic facilities (i.e. hotel, hostel, camp site) among the affected villages.
Trstenik	• According to social surveys, there are no touristic facilities (i.e. .hotel, hostel, camp site) among the affected villages.
Varvarin	• According to social surveys, there are no touristic facilities (i.e. .hotel, hostel, camp site) among the affected villages.

Source: Social Field Study (2019)

During the discussions with the head of villages, although there may be lack of touristic activities nor facilities among the AoI, it was stated that most of the affected settlement may have potential to become a touristic location. This matter is also covered in the Spatial Plan (November 2019) of the Project indicating the importance of Project to increase the tourism potential of the affected settlements through easier accessibility of the settlements.

Impact on River Usage

The Morava River is used by the villagers for various purposes including fishing, irrigation and transportation. The main impact on the river use is expected to be from the regulation of the river. River regulation activities will not create additional worker accommodation sites within the scope of Project activities. Also, existing roads will be used within the scope of regulation works. Based on the Hydrotechnical Study Corrıdor of the Highway E-761, Section Pojate-Prelina conducted by Jaroslav Cerni (2016), Table 6-88 presents the areas of the river regulation along with the closest settlements according to Project sections, respectively.

Table 6-88. Areas of the River Regulation

Section Number	Settlement	Distance Between the River Regulation and the Village Center (km)
1	Grad Stalac	1,339
	Maskare	1,597
	Mrzenica	0,247
	Bosnjane	1,308
2	Sirca	0,527
3	Grdica	0,966
	Adrani	2,504
	Popovici	0,649
	Milocaj	0,883
	Obrva	1,409
	Goricani	1,643
	Katrga	2,072
	Mrcajevci	3,744
	Donja Gorevnica	2,484
	Stancici	1,336

As can be seen from the Table above, Section 3 is expected experience more river regulation impacts among the Project sections. According to Household and Community Level surveys, none of the locals among the Section 3 derives household income from the Morava River. Popovici village, being the closest settlement to the river regulation activities in Section 3 stated to use Morava River for fishing on household consumption. None of the affected settlements use the river for transportation purposes. From this aspect, regulation impacts on river usage could be managed sufficiently with proper mitigation measures.

During the social field studies, the head of each affected villages was asked the purpose of Morava River usage, which can be found below. Although fishing activities are common in majority of the affected settlements within the AoI, the locals do not generate income from fishing. On the other hand, Čačak Municipality is observed to be the only affected municipality that use the River for transportation purposes.

Table 6-89. Purpose of River Usage

Section	Municipality	Purpose of the River Usage	Name of the villages
Section 1	Ćićevac	Irrigation	Grad Stalac, Mrzenica, Poijate, Stalack
		Transportation	None
		Fishing (household consumption)	Grad Stalac, Mrzenica, Poijate, Stalack
		Recreation	Grad Stalac, Mrzenica, Poijate, Stalack
	Kraljevo	Irrigation	Adrani, Vrba, Grdica, Zaklopaca, Milocaj, Obrva, Popovici, Ratina, Sirca, Sumarce, Stubal
		Transportation	None
		Fishing (household consumption)	Adrani, Vrba, Grdica, Zaklopaca, Milocaj, Obrva, Popovici, Ratina, Sirca, Sumarce, Stubal
		Recreation	None
	Varvarin	Irrigation	Bosnjane and Maskare
		Transportation	None
		Fishing (household consumption)	Bosnjane and Maskare
		Recreation	Bosnjane and Maskare
Section 2	Kruševac	Irrigation	Bivolje, Bela Voda, Citlluk, Kosevi, Makrešane
		Transportation	Kukljin,
		Fishing (household consumption)	Makrešane, Jasika
		Recreation	Kosevi
	Vrnjačka Banja	Irrigation	Vraneši, Podunavci, Ruđinci and Gračac
		Transportation	None
		Fishing (household consumption)	Vraneši, Podunavci, Ruđinci, Vrnji, Novo Selo, Stulac and Gračac
		Recreation	None
	Trstenik	Irrigation	Bogdanje, Medveđa, of Velika Drenova and Lozna
		Transportation	None
		Fishing (household consumption)	Velika Drenova and Lozna
		Recreation	Velika Drenova and Lozna

Section	Municipality	Purpose of the River Usage	Name of the villages
Section 3	Čačak	Irrigation	Baluga, Dona Gorevnica, Katrga, Mrčajevci, Stančići, Konjevići and Goričani
		Transportation	None
		Fishing (household consumption)	Baluga, Dona Gorevnica, Katrga, Mrčajevci, Stančići, Konjevići and Goričani, Popovici
		Recreation	None

Spring and Well Water:

As can be seen from the Section 5 of the ESIA Report, majority of the affected settlements either use spring and/or well water for household consumption and irrigation purposes. The design phase of the Project took consideration and avoided to interact with spring and well water sources. It is important to note that, regulation activities on Morava River will be made in order to transfer water flow to prevent flood without distrupting groundwater levels and springwater. As stated in Chapter 6.3.2, groundwater level will be regularly monitored from existing groundwater wells located near the construction site.

The overall construction of the Project is not expected to cause negative impact on both resources. Furter details on river regulation works within the scope of the Project is given in Chapter 3.3. of the ESIA Report.

Cultural and Intangible Values:

During the social field study, specific questionnaires were dedicated to determine and understand the existing tangible/intangible cultural heritages among the AoI. Besides acknowledging, Archaeological and cultural resources (See Chapter 6.9 for details), it is important to identify cultural and spiritual values specific to the AoI. Potential contacts between the local population and non-local workforces unfamiliar with the traditional conventions and customary modes of behavior may also negatively impact on traditional intangible culture of the AoI.

As mentioned in the Section 6.9 of this Impact Assessment, there are various types of registered cultural heritages among the AoI.

According to the Spatial Plan of the Project (November, 2019) and the information derived during the social field study, there are two sacred trees that and old building located within the borders of AoI. Thus, the Motorway route and area of the river regulation works will not coincide with any archaeological area and immovable cultural assets and will not impact these areas. During construction phase of the Project, a Chance Finds Procedure will be prepared and it will be implemented for the all Project sections. The Procedure will include measures; in case of a chance find occurs during the excavation works.

As stated, there are two sacred trees within the borders of AoI; located in Bela Voda villige and Donja Gorevnica village respectively. As stated in the Spatial Plan of the Project, these trees were left outside of the selected route of the Motorway. In addition, according to the design of the Project, none of the Project construction facilities will be neighboring these trees.

The locals access to of these sacred trees are through existing unpaved village roads. During the operation phase of the Project, the access to the sacred tree located in Bela Voda village will be through under pass.

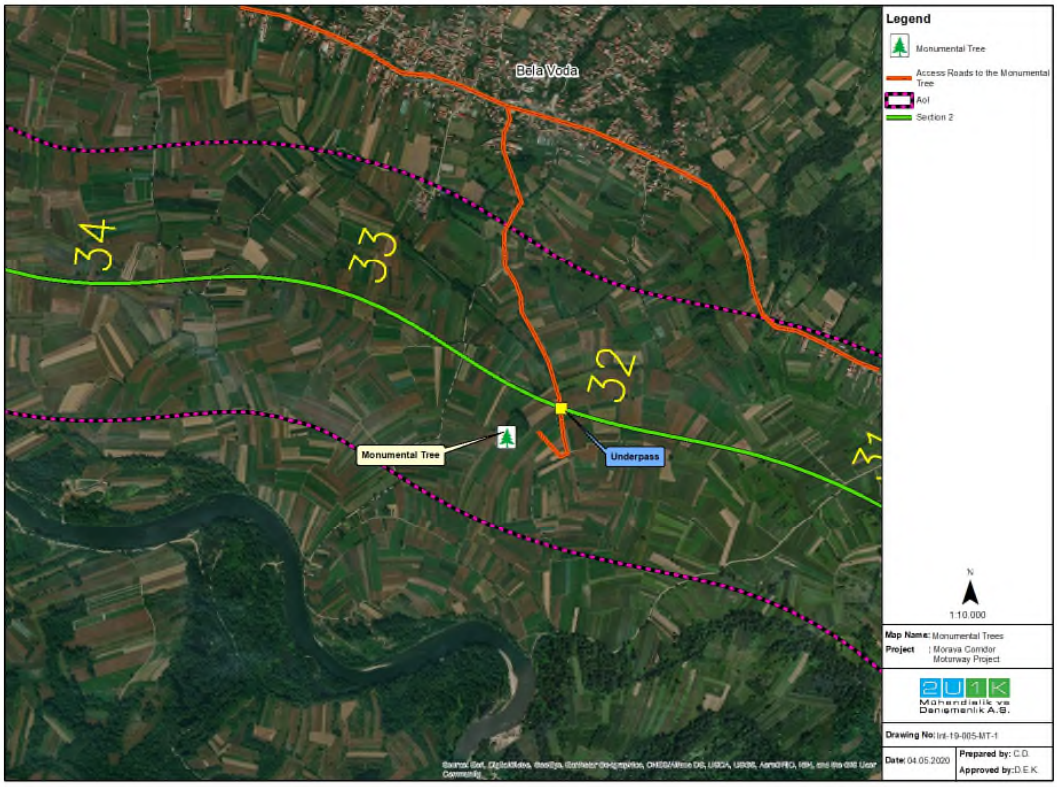


Figure 6-14. Monument Tree Located in Bela Voda Village

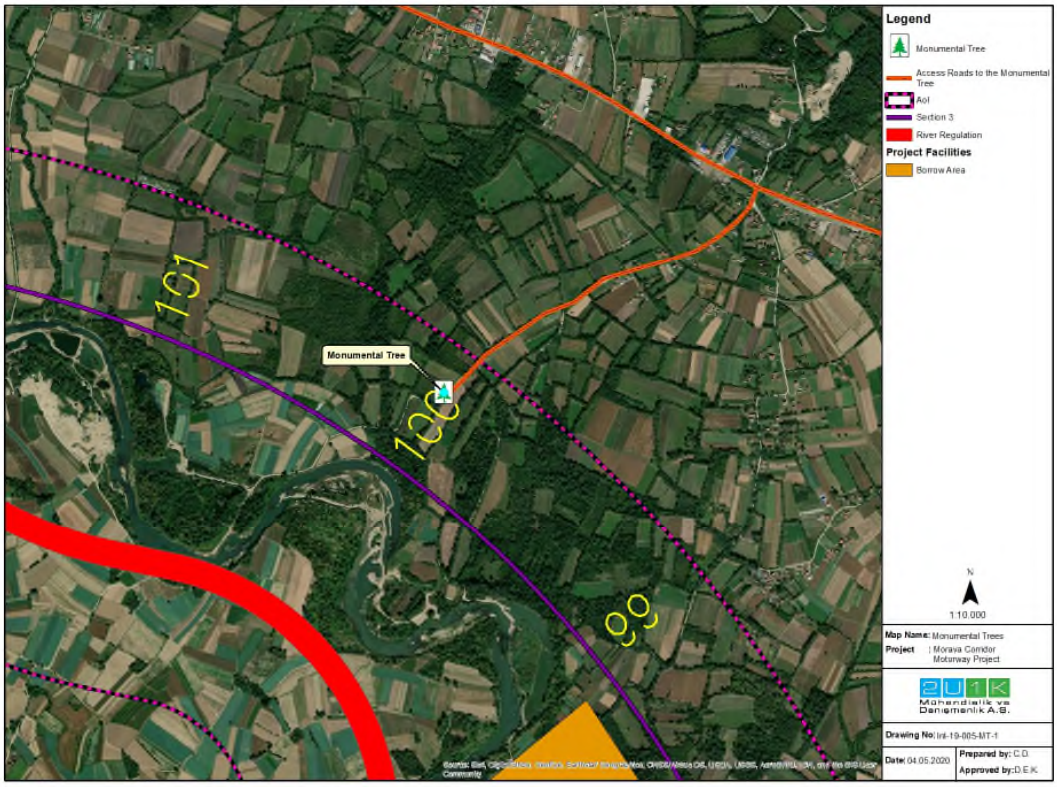


Figure 6-15. Monument Tree Located in Donja Gorevnica

On the other hand, the sacred tree located in Donja Gorevnica Village will use the existing path as there will be no limits to access.

In case of unexpected tangible/intangible cultural heritage determined during the pre-construction / construction activities; the Contractor will not remove any nonreplicable cultural heritage, unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and
- Any removal of cultural heritage is conducted using the best available technique. (IFC PS 8 Guidance Note,2012).

Last, it is important to note that, there is no Indigenous People residing among the AoI. Details on existing archaeological and cultural resources, along with the proposed mitigation measures are addressed in Chapter 6.9 of this ESIA Report.

The Impact Assessment on Ecosystem Services during the Construction Phase

Table 6-90 presents the potential ecosystem services related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-91 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-90, Table 6-91 then assess the residual impacts of the Project.

The impacts on ecosystem services have negative nature. Access to the forest lands and impacts apiculture activities have Municipal extent, however, impact on river usage, leisure activities and tourism have district extent. The likelihood of the negative impacts on apiculture are assessed as medium considering the possible changes on the location of the borrow pits and quarries. With the implementation of mitigation measures, the likelihood of the negative impacts decrease as can be seen in Table 6-91.

Table 6-90. Impacts on Ecosystem Services (Construction Phase)

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Access to Forest Lands	Deforestation	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-Construction • Local authorities and the villagers will be informed before the construction activities within the forest land to not create any limitation on firewood collection, herbs collection and hunting Construction • Hunting and collection of wild animals will be strictly prohibited within the Project area. • Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such has wood fuel, mushrooms, building materials or other useable resources. • For households who obtain income from timbering activities commercially, compensate for unavoidable loss through in-kind restoration or other type of compensation methods applicable to the IFI requirements. • Piles of woody vegetation cleared for construction activities are to be made available to communities to access it for use as wood fuel or other purposes.
Impact on Apiculture	Quarries Borrow pits Construction activities	Kruševac Municipality	Pre-Construction • Exact location of the beehives will be determined during the RAP preparation and if required, logistic assistance should be provided the move the beehives. • Seasonal requirements for apiculture will be considered during the planning of construction works. The Beekeepers Association of Kruševac recommended that the construction activities should be conducted as much as practical distance from the beehives (in May, June, July they can fly 2 km). • In case of grievances, beehives will be moved away from the Motorway Route with the assistance of CoS. Construction • Monitoring will be held within the scope of the RAP to analyze the livelihood impacts of the beekeepers.

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Impact on River Usage	Excavation activities River regulation	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Kraljevo Municipality Čačak Municipality	Design • In forming the new river bed and banks, preserve as much as possible, their original and authentic look and purpose. In the case of cutting riverbed, it is necessary to ensure some culverts for the smooth flow of water and the movement/migration of aquatic organisms, including fish. Construction • The communication tools developed within the scope of the SEP will be implemented to inform the PAPs and the local authorities on the river regulation. • Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Avoidance of any spill affecting to the freshwater ecosystems. • Construction activities will be carried out carefully and impacts caused by human activities will be minimized especially between 30th April to 15th June in order not to harm the species that is exist in the West Morava River.
Impact on Leisure Activities and Tourism	Construction activities	Vrnjačka Banja Municipality Kraljevo Municipality Čačak Municipality	Construction • Addition to SEP, suitably qualitied technical staff and environmental management procedures will be developed and implemented. • Planting native species will be used as visual barrier. In areas with short construction period, adult trees can be translocated for establishing the visual barriers to prevent the impacts on the tourism activities.

Table 6-91. Impacts Scoring on Ecosystem Services (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Access to Forest Lands	-1 Negative	2 Municipal	1 Immediate	3 Moderate	5 High	2.75	5 Definite	**-14 Negative Medium**	-1 Negative	2 Municipal	1 Immediate	3 Moderate	5 High	2.75	3 Medium	**-8 Negative Low**
Impact on Apiculture	-1 Negative	2 Municipal	1 Immediate	2 Low	5 High	2.5	3 Medium	**-8 Negative Low**	-1 Negative	1 Project Site	1 Immediate	2 Low	5 High	2.25	2 Low	**-5 Negative Low**
Impact on River Usage	-1 Negative	3 District	1 Immediate	4 High	3 Medium	2.75	5 Definite	**-14 Negative Medium**	-1 Negative	3 District	1 Immediate	4 High	3 Medium	2.75	4 High	**- 11 Negative Medium**
Impact on Leisure Activities and Tourism	-1 Negative	3 District	1 Immediate	3 Moderate	5 High	3	5 Definite	**-15 Negative Medium**	-1 Negative	2 Municipal	1 Immediate	2 Low	5 High	2.5	4 High	**- 10 Negative Medium**

6.11.5.2 Operation Phase

During the operation period of the Project, access to the ecosystem services will be limited, including forest areas, irrigation from the Morava River and the permanent withdrawal of forest lands by the Project will result in loss of its economic function as well as socioeconomic value for local communities including ecosystem services use.

The Impact Assessment on Ecosystem Services during the Operation Phase

The Table 6-92 presents the potential ecosystem services related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-93 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-92, Table 6-93 then assess the residual impacts of the Project.

During the operation phase, the main impact is expected to be access to the ecosystem services. With the provision of the required access to the service areas and the implementation of the mitigation measures, the likelihood of the impact is expected to be reduced to low.

Table 6-92. Impacts on Ecosystem Services (Operation Phase)

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Access to Ecosystem Services	Access limitation during operation phase		Design • Access to the ecosystem services will be ensured by providing required overpasses and underpasses. • An ecological bridge will be constructed at suitable point. • In case any damage to Irrigation system, damaged channels will be re-constructed. • In case of grievances, beehives will be moved away from the Motorway Route with the assistance of CoS. • Detailed “Resettlement Action Plan” will be prepared to determine the PAPs whom will be affected by the impacts on the livelihoods as a result of access to ecosystem services.

Table 6-93. Impacts Scoring on Ecosystem Services (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Access to Ecosystem services	**-1**	**3 District**	**4 Long Term**	**4 High**	**5 High**	4	**3 Medium**	**-12 Negative Medium**	**-1**	**3 District**	**4 Long Term**	**4 High**	**5 High**	4	**32 Low**	**-8 Negative Low**

6.11.6 Labour and Working Conditions

The impact assessment of labour and working conditions is considered together for both the construction and operation phase, as similar consequences can arise as well as same mitigation measures will be applied for both phases of the Project.

The Contractor envisages a 60 hour working week within the conditions provided by the national labour legislation which in addition will provide:

- Redistribution of working hours supporting the construction schedule needs, while complying with the labour law, and the options set within.
- Addional payment for extra working hours in accordance with national labour law
- Provision of accommodation in accordance with national standards
- Health and wellbeing program for all employees
- Occupational health and safety program for all employees
- Prevention program that identifies opportunities to reduce exposure to occupational health and safety risks
- Training program for all employees, with focus on high risk activities
- Work organization at site in order to make easier and more efficient for employee to complete their tasks
- Grievance procedure for employees to compliance with the requirements of good practices required by the International Finance Institutions.

6.11.6.1 Construction and Operation Phase

The Project will result in temporary employment for the duration of construction phase (expected to be 4 years, at this stage). The average number of the Project workers will be 3,100 and the peak number will be approximately 3,800. To the extent possible, the unskilled workforce are expected to be hired from the local of AoI. On the other hand, majority of the skilled construction workers are expected to be sourced from the Contractor, and these will be primarily temporary international workers. This recruitment process has been implemented by the Contractor on previous infrastructure projects. The Contractor will be responsible for human resources for the construction phase.

For operation phase of the Project, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway, in which will be the responsibility of Roads of Serbia for the operation phase.

Throughout the construction and operation phases, the Project will comply with national labor, social security and occupational health and safety laws as well as the principles and standards of ILO convention. The national principles embodied in the ILO convention are:

- The abolition of child labor,
- The elimination of forced labor,
- The elimination of discrimination,
- Collective bargaining.

The detailed information of the Legal Framework of the Project is presented in Chapter 4 of this ESIA Report. However, in order to understand the applicability of the mitigation measures, additional information of the labour related national requirements are also specified in this section below.

Child labour: The Constitution (Official Gazette of the RS. No. 98/2006) and Labour Law (Official Gazette of the Republic of Serbia no. 24/05, 61/05, 54/09) guarantee special protection to the family and the child and prohibit the employment of children under 15 and for hazardous work under 18. These provisions are in line with international standards.

Forced labour: The Constitution prohibits slavery, keeping persons in conditions tantamount to slavery and all forms of trafficking in persons. The Law on the Protection Program for Participants in Criminal Proceedings (Official Gazette of the RS. No. 85/05) regulates the protection of and assistance to victims of human trafficking.

Occupational Health and Safety: The Constitution guarantees the right to occupational safety and health and the right to protection at work, as well as special protection at work for women, young persons and persons with disabilities. The Occupational Safety and Health Act was significantly amended in 2015 to be aligned with EU standards Health and Safety.

Trade Unions: The Constitution guarantees the freedom of association in trade unions. The freedom to associate in trade unions is the only trade union-related right guaranteed by human rights protection instruments ratified by Serbia. This freedom entails the right to establish a trade union and join it of one's own free will, the right to establish associations, national and international alliances of trade unions and the right of trade unions to act independently, without interference from the state.

Collective Bargaining: The Labour Law requires collective bargaining agreements for any company with more than 10 employees. To be recognized as a collective bargaining agent, a union must comprise 15 percent of the workforce. The collective agreements may apply on the general, sectorial or at company level.

Working Conditions: The Constitution protects the right to fair and favorable working conditions and equal access to work. Working conditions are primarily regulated by the Labour Law and the Employment and Unemployment Insurance Act (adopted on 13.05.2019). The employment

of foreign citizens in Serbia is regulated by the Law on Employment of Foreigners. Representatives (Official Gazette of RS", no. 31/2019) of the public and private sectors, consulted in 2013 and 2015, reported that the Labour Law did not sufficiently allow flexible forms of employment.

- Workplace harassment: The Act on the Prevention of Harassment at Work (Official Gazette of the Republic of Serbia", No. 36/2010) obliges employers to inform workers in writing of the provisions of the law and to ensure, among others, that work is organised in a manner precluding harassment and that it protects workers from harassment. The Act applies also to sexual harassment and provides employees with the opportunity to obtain faster and more efficient protection than the one provided by the Labour Law.
- Wages: The constitution guarantees the right of workers to fair remuneration for work. According to the Labour Law, employment contracts violating the principle of an appropriate wage shall be deemed null and void. The overtime rate is at least 26 percent higher than the wage base, as is work in shifts or at night, in the event the employment contract does not specify remuneration for such work. This is in line with international standards.
- Working hours: The Constitution guarantees the right to limited working hours, daily and weekly rest and paid annual vacations. The Construction Contract between the Government of the Republic of Serbia BEJV; and the Special Law (Law on Establishing Public Interest and Special Procedures for the Implementation of the Project for Construction of the Infrastructure Corridor of E-761 Highway, Section Pojate-Preljina) envisage 60 hours of average working hours in a week.
- Social security: The Constitution guarantees the rights of workers and their families to social protection and insurance, the right to compensation in case of temporary inability to work and to temporary unemployment allowances and the right to pension insurance. The social security system covers nine benefits: old age, invalidity, survivors, sickness, maternity, employment injury, unemployment, medical care and family benefits. The unemployed are entitled to allowances paid out for a maximum of 12 months, ranging from 80 to 160 percent of the minimum wage.

The Impact Assessment on Labour and Working Conditions during the Construction and Operation Phase

Table 6-94 presents the potential labour and working conditions related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction and operation. In that regards, Table 6-95 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-94, Table 6-95 then assess the residual impacts of the Project.

The possibility of the inadequate management of the labour (ie. labour discrimination, inadequate payroll process, etc.) may create negative impacts on the direct and indirect labour force. The extent of impact is expected to municipal, considering the requirement of skilled and unskilled labour. Considering the best labour practices of the Contractor, the likelihood of the impact is expected to be low without mitigation measures. The likelihood of the negative impacts will be reduce from low to improbable with the proposed mitigation measures.

Table 6-94. Impacts on Labour and Working Conditions (Construction and Operation)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Labour Risks and Impacts Related to Women Employment and Non-Discrimination and Equal Opportunity	High number of unemployment women in the Social AoI	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-construction / Construction / Operation • The Contractor and Operator will apply equal opportunities to women in all of their branches. • Further measures will be put in place to encourage female participation in indirect workforce, such as providing specific training where required, enabling flexibility and job-sharing opportunities for women with children to participate.
Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced)	High level of unemployment in the Social AoI	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-construction / Construction / Operation • The Contractor and Operator will not employ nor permit any subcontractor to use child labour, and in accordance with Serbian legislation, any person under the age of 18 may not be assigned to any hazardous work within the Project. • The Contractor and Operator will prohibit the use of forced labour by ensuring full compliance with national legislation and the provisions of relevant conventions and other international standards
Working conditions and terms of employment for international and national workers.	High number of local and international workers Accommodation of approximately 2,000 workers in camps	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-construction / Construction / Operation • Workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Information will include, but not be limited to: - entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity or holiday) - able to join trade unions of their choice and have the right to collective bargaining - contracts will be verbally explained in their native languages to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed. • Cultural Awareness Training will be provided an on-boarding requirement to all non-local workers, and in particularly foreign workers.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Worker Grievance Mechanism will be developed and will: - be open to all the staff and their contractors, - be publicly advertised by the Project in the workforce, - be easily accessible by workers - be free of retribution - allow anonymous complaints to be raised and addressed. • All Project parties will require all contractors to sign an anti-corruption and responsible procurement policy. • For all contractor contracts, the Project will make explicit reference to the need to abide by IFC standards and ILO conventions in relation to labor and welfare standards, freedom of association and reference must be made to child and forced labor. Emphasis will also be placed on anti-discrimination measures. Where young people below the age of 18 years are employed, it will be made clear that they will not be employed in hazardous work and their work will be subject to an appropriate risk assessment. <u>Pre-construction</u> • Camp Management Plan will be developed and comply with 'Workers' accommodation: processes and standards, a guidance note by IFC and the EBRD' (2009) • Design of the accommodation camp will include measures for managing the camp to ensure adherence to international standard for providing a safe environment that is clean, and adequate sanitary. Measures will include: - waste management - provision of potable water, - provisions of minimum amount of space for each worker - laundry facilities - cooking facilities (separate area for the foreign personnel, if necessary) - provision of first aid and medical facilities - provision of heating and ventilation.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Camp Management Project will include a Code of Conduct for construction workers <u>Construction</u> • During the construction phase, the Contractor's HSE plans and procedures include requirements for induction and training on expected behaviors and on disciplinary procedures (including dismissal procedures for unacceptable conduct). • In case of a collective dismissal required, Retrenchment Plan will be developed by the Contractor to mitigate adverse effects of job losses on the workers concerned. Retrenchment of workers is likely to be required across the lifespan of the Project, particularly during the transition from construction to operation. Retrenchment of workers will be undertaken in line with national law and international best practices, and will include providing skills to enable individuals to secure alternative employment. o The effectiveness of all retrenchment should be monitored including the timely close out of retrenchment-related grievances <u>Operation</u> • Human Resources Policy will be developed and implemented. Under the policy, the project proponent shall provide all employees with information regarding their rights under national labour law, including their rights related to wages and benefits. The policy covers working conditions, right to organize, non-discrimination, grievance mechanisms, child labour, and forced labour.
For operation phase of the Project, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway.	Risk of not continuing good labour practices	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	<u>Operation</u> • The workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Information will include, but not be limited to, entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity or holiday). All workers will be able to join trade unions of their choice and have the right to collective bargaining. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• The Project will put in place a worker grievance mechanism. The grievance mechanism will be open to all the staff and their contractors. The grievance mechanism will be publicly advertised by the Project in the workforce. It will be easily accessible by workers, free of retribution and will allow anonymous complaints to be raised and addressed. • The Operator will establish human resources policy for all operational employees with information regarding their rights under national labour law, including their rights related to wages and benefits. The policy will cover working conditions, right to organize, non-discrimination, grievance mechanisms, child labour, and forced labour. • All contractor contracts, the Project will make explicit reference to the need to abide by Serbian Labour Law (Official Gazette No. 75/ last amended on 2014). IFC standards and ILO conventions in relation to labor and welfare standards, freedom of association and reference must be made to child and forced labor. Emphasis will also be placed on anti-discrimination measures. Where young people below the age of 18 years are employed, it will be made clear that they will not be employed in hazardous work and their work will be subject to an appropriate risk assessment.

Table 6-95. Impacts Scoring on Labour and Working Conditions (Construction and Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Risks and Impacts Related to Women Employment and Non-Discrimination and Equal Opportunity	-1	4 Regional	4 Long term	3 Moderate	3 Medium	-3.5	2 Low	**-7 Low**	-1	4 Regional	4 Long term	3 Moderate	3 Medium	-3.50	1 Improbable	**-3 Low**
Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced)	-1	4 Regional	4 Long term	3 Moderate	3 Medium	-3.5	2 Low	**-7 Low**	-1	4 Regional	4 Long term	3 Moderate	3 Medium	-3.50	1 Improbable	**-3 Low**
Working conditions and terms of employment for international and national workers.	-1	4 Regional	2 Short term	3 Moderate	3 Medium	-3	2 Low	**-6 Low**	-1	4 Regional	2 Short term	3 Moderate	3 Medium	-3	1 Improbable	**-3 Low**
For operation phase of the Project, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway.	-1	4 Regional	4 Long term	2 Low	1 Low	-2.75	2 Low	**-6 Low**	**-1**	**4** Regional	**4 Long term**	**2 Low**	**1 Low**	-2.75	**1 Improbable**	**-3 Low**

6.11.7 Occupational Health and Safety

6.11.7.1 Construction Phase

The Project is expected to create more than 3,800 direct employment opportunities during the peak of the construction period. Construction activities will involve the operation of heavy equipment and trucks, working at height, construction traffic, use of electric devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction, occupational health and safety is a key risk with the potential for accidents that may result in personal injuries and fatalities, as well as lost job-hours.

The construction of motorway projects may carry several key health and safety risks to the construction workers including;

- Work at heights,
- Slips and falls,
- Moving machinery,
- Struck by objects,
- Dust,
- Confined spaces and excavations,
- Epidemic diseases,
- Biological hazards (poisonous snakes).

In addition to general construction working the risks for this Project are working near water, driving, transportation of personnel, materials & equipment, manual handling & off loading, crane/lifting activities, hot work/welding, communicable diseases (leptospyrosis), public interface and dust (silica), in which will be detailed in the Construction Risk Register of the Project by the Contractor.

The Contractor's Environmental, Safety, and Health (ES&H) Core Processes (CPs) are the foundation for all project ES&H programs/plans and/or processes that will be implemented on the Project to ensure all activities are executed in an appropriate manner in accordance with regulatory and project specific requirements. They have been developed to address the different subjects that fall within the ES&H responsibilities and are built into the Morava Corridor Motorway Project policies, plans and procedures.

The categories of core ES&H work processes include general safe work procedures, ES&H training and competency, hazardous work/permit procedures, health and hygiene procedures, emergency planning/evacuation procedures and environmental assurance/compliance procedures.

Considering the potential risks, some of the construction activities may be classified as high risk with a significant potential for incident if no appropriate mitigation management systems are not adopted.

It is important to ensure that the Contractor and its subcontractors will employ workers that are suitably trained, and have the appropriate equipment to undertake their tasks in a safe manner. All workers associated with the Project, and in particular the site management, will be required to be familiar with the appropriate safety measures, starting with undertaking appropriate hazard and risk assessment for all activities. This should be followed by appropriate training, that personnel undertaking hazardous tasks are certified to do so and implementation of specific international requirements for working at height and working in enclosed spaces.

A particularly sensitive group of workers may be associated with the workforce sourced from the local communities who may not have previous experience of working on large-scale construction projects.

Last, in response to the COVID-19 outbreak, Serbia has adopted new legal measures that affect employers. Businesses are now required to support working remotely where possible and to take additional measures to safeguard the health of employees, among other new requirements. Namely, the Serbian Government has adopted a Decree on the organization of operation of employers during the state of emergency (Official Gazette of the R, No. 31/2020) ("Decree"), which entered into force on 16 March 2020. This Decree defines the special manner and organization of work of Serbian employers during the current state of emergency.

The Impact Assessment on Occupational Health and Safety during the Construction Phase

The Table 6-96 presents the potential occupational health and safety related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-97 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-96, Table 6-97 then assess the residual impacts of the Project.

The impacts to the Occupational Health and Safety are likely to be direct negative. The impacts related to OHS is short term and extent is limited with the Project sites. Although, the duration and the extent of the impact leads the magnitude of the impact low, considering the worst case scenario (fatalities), the magnitude is assessed as high. With the implementation of the mitigation measures, and experiences of the Contractor from previous infrastructure projects, the overall impacts likelihood will be minimized to low.

Table 6-96. Impacts on Occupational Health and Safety (Construction phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Health and Safety Risks due to General Occupational Health and Safety Hazards	Inadequate training Inadequate OHS management Insufficient resources of OHS Inadequate supervision of workforce	Project Construction Workers for the Project and its facilities	Pre-construction and Construction • The Contractor will establish Occupational Health and Safety (OH&S) Management Plan with special focus on (but not limited to): movement of vehicles and traffic management, working at heights, working in confined spaces, working with hazardous materials, management of electrical hazards, prevention of unintended ground movements and collapse. OH&S Management Plan will acknowledge and reference to IFC EHS Guidelines for Toll Roads (2007) and IFC General EHS Guidelines (2007). • Contractual conditions will ensure that all sub-contractors to follow the OH&S Management Plan. • Organization of the work schedule will include specific risks e.g. flood. • Communication skills across the workforce will be multi lingual. • Enforcement, self-verification & consequence management will be implemented. • Appropriate number of EH&S officers per workforce group (e.g. risk based) will be employed to implement the EH&S program, including risks assessment, training, supervision of high risks tasks, subcontractor induction. • Site-specific factors which may contribute to excavation slope instability will be controlled. • During blasting operations, work areas will be evacuated, and blast mats or other means of deflection will be used to minimize fly rock or ejection of demolition debris. • Good cooperation with the local medical services will be ensured. • An OHS system will be established for the reporting and recording of occupational accidents and dangerous occurrences/incidents. • Personal Protective Equipment will be selected based on the specific hazards and risks of the task to be performed and properly maintained to keep them effective and operational throughout their use. • Individuals shall only carry out tasks for which they are competent and authorized to do so. Individuals shall only operate and use plant or equipment for which they are trained and authorized. Copies of all operator certificates will be retained. Emergency contact numbers will be made available at the work sites. This will include the fire and rescue service and the environmental inspection. • Emergency contact numbers will be made available at the work sites. This will include the fire and rescue service and the environmental inspection.
Health and Safety Risks due to Physical and Chemical Hazards	Accident and Injuries Inadequate training Inadequate OHS management Inadequate supervision of workforce	Project Construction Workers for the Project and its facilities	Pre-construction / Construction • The area around which elevated work is taking place will be barricaded to prevent unauthorized access and working under personnel on elevated structures will be avoided • Hoisting and lifting equipment will be rated and properly maintained, and operators trained in their use. • Elevated working platforms will be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings), equipment movement protocols (e.g. movement only when the lift is in a retracted position), repair by qualified individuals, and installation of locks to avoid unauthorized use by untrained individuals. • Ladders will be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions. • When working at height, proper fall protection measures will be implemented. Fixtures will be installed on bridge components. Safety harnesses with proper thickness and of suitable materials ensuring sufficient strength will be used. Rope safety harnesses will be replaced before signs of ageing or fraying of fibers become evident. • When operating power tools at height, workers will use a second (backup) safety strap. • Personnel exposed to high levels of noise will be required to use personal hearing protection devices/equipment. Where required for specific works, work rotation programs will be implemented to reduce cumulative exposure. • Weather forecasts will be monitored for outdoor work to provide advance warning of extreme weather and schedule the work accordingly. Protective clothing will be used where required

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Properly maintained construction machinery, equipment and vehicles will be used to minimize air emissions. • Engine idling time will be reduced in construction sites. • Direct diesel exhaust will be properly removed to minimize exposure of the operators. • Indoor working areas where vehicles or engines are operated will be ventilated or the exhaust gases will be properly diverted. • Lead-containing paint will be avoided, and appropriate respiratory protection will be used when cutting galvanized steel. • At work sites where dust levels are excessive, dusks will be used by relevant personnel.
Health and Safety Risks due to Emergencies and epidemic diseases	Inadequate training Inadequate OHS management Insufficient accident preventive measures	Project Construction Workers for the Project and its facilities	<u>Design</u> • Emergency Preparedness and Response Plan (EPRP) will be prepared and cover specific project risks such as spill containment and clean-up, flood, working over water, fire, rescue from height. The EPRP should include: - Risk assessment, - Location of medical rescue, fire-fighting resources and spill response equipment will be available along the route. - Procedure for staff and subcontractors to report any incidents and the investigation, remediation and preventive actions taken, - Emergency response information and training - Emergency Communication Procedure included in the Stakeholder Engagement Plan (SEP) and the Emergency Preparedness and Response Plan (EPRP) including with local communities and authorities • Sub-Contractors will develop and prepare site-specific EPRPs in line with the Contractor overarching plan. • Relevant emergency preparedness and response measures will be taken during emergency situations arising at the construction/work sites and Camp Sites. • The Pandemic Preparedness Plan will be implemented based on the prevailing situation with respect to Covid-19. The Pandemic Preparedness Plan will take into a consideration to Decree on the organization of operation of employers during the state of emergency (Official Gazette of the R, No. 31/2020) following measures have been adopted by the Government as: • During the state of emergency, the employer must enable employees to perform work remotely (i.e. outside of the employer's business premises (teleworking and work from home)), at all workplaces where such work can be organized in line with the general enactment (i.e. the employment rulebook or collective bargaining agreement of the employer, whichever is applicable) and the employment contract. • If the general enactment and the employment contract do not provide for the possibility for remote work, the employer may issue a decision allowing for work outside of the business premises, if organizational conditions allow so. Such a decision must contain the duration of working hours and the manner of supervision of the work of employees. The employer is obligated to keep records of employees who work outside of the business premises. • If the nature of the activity of the employer does not allow for organization of work in the manner provided above, such an employer must adjust its operations to the conditions of the state of emergency as follows: • − arrange shift work, if possible and without requiring additional resources, so that as few persons (employees and all other engaged persons) as possible work simultaneously at one premises. • − enable that all business meetings are held via electronic or other appropriate means (video link, video call, etc.); • − postpone business trips in Serbia and abroad, in accordance with the authority's ban / temporary restriction of entry and movement. • In order to ensure the protection and health of employees, engaged personnel and clients, employers must provide all general, special and extraordinary measures related to the hygienic

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			safety of facilities and persons in accordance with the Law on Protection of Citizens from Contagious Diseases. • For employees and engaged personnel who are in direct contact with clients or share a workspace with multiple persons, it is necessary to provide sufficient quantities of protective equipment in accordance with special regulations.
Health and Safety Risks due to Construction Traffic	Construction Traffic	Project Construction Workers for the Project and its facilities	<u>Design</u> • Traffic Management Plan (TMP) will be prepared. <u>Pre-construction / Construction</u> • Safe work zone will be established to separate workers on foot from the traffic; • For the construction works to be conducted at location where traffic exists, safe work zones will be established by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.); • Weather forecasts will be monitored to provide advance warning of extreme weather to drivers and schedule the work accordingly. • Traffic control supervisors will be assigned with competence in traffic control principles and who will assume overall responsibility for the safety of the work zone setup. • Temporary traffic control devices, such as signage, warning devices, paddles, and concrete barriers in a consistent manner throughout the work zone to provide passing motorists with advanced warning of upcoming work zones; • Traffic control workers will be trained in topics such as traffic flow, work zone setup and proper placement of channelizing devices; and • All workers will wear high-visibility safety apparel.
Health and Safety Risks on Accommodation	Poor Accommodation Conditions	Project Construction Workers for the Project and its facilities	<u>Pre-Construction / Construction</u> • Worker accommodation will be designed and maintained to meet the standards defined in IFC and EBRD guidance on accommodation. The standards of the rooms or dormitory facilities should be designed to allow workers to rest properly and to maintain good standards of hygiene. This includes cafeteria, medical room, shower and toilets, wastewater treatment plants/septic tanks, water supply facilities (i.e. water well) • Worker accommodation conditions will be maintained to ensure a good standard of personal hygiene and hygiene in canteens need to be ensured to prevent contamination and the spread of diseases which result from inadequate sanitary facilities and may affect the community health and safety as well. • Medical facilities (first-aid facilities, additional medical facilities) will be maintained to ensure good standards of workers' health and to provide adequate responses in case of health emergency situations. • Basic leisure, social and telecommunication facilities will be provided for workers to rest and also to socialize during their free time. These requirements at the camp accommodation facilities should be optimized to minimize potential impacts on the workers' welfare and risk of work-related accidents and maximize the overall productivity. • Worker Grievance Mechanism will be established that will provide means for all Project personnel to lodge their complaints. • Only concrete plants will be located at Camp Sites; asphalt and medical plants will be sited close to the quarries to the extent feasible.
Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced Labour Risks)			<u>Pre-Construction / Construction</u> The Contractor will not employ nor permit any subcontractor to use child labour, The Contractor will prohibit the use of forced labour by ensuring full compliance with national legislation and the provisions of relevant conventions and other international standards. These measures will be reflected in the Project's Employment Policy Document.

Table 6-97. Impacts Scoring on Occupation Health and Safety (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Health and Safety Risks due to General Occupational Health and Safety Hazards	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**
Health and Safety Risks due to Physical and Chemical Hazards	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**
Health and Safety Risks due to Emergencies and Epidemic Diseases	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**
Health and Safety Risks due to Construction Traffic	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**
Health and Safety Risks on Accommodation	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**
Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced Labour Risks)	-1	1 Project Site	2 Short Term	5 Very High	5 Very High	3.25	3 Medium	**-10 Medium**	**-1**	**1 Project Site**	**2 Short Term**	**3 Moderate**	**5 Very High**	2.75	**2 Low**	**-6 Low**

6.11.7.2 Operation Phase

For the operation phase, there will be direct and indirect workers for the Project. Direct employees will be approximately between 20 and 50 and hired for traffic and safety operations and tolling operation departments of the Project. Indirect workers will be hired for maintenance of Motorway, infrastructures and equipment's throughout the operation phase of the Project.

The maintenance of motorway projects may carry several key health and safety risks to the workers including;

- Inadequate selection of worker for specific assignment
- Inadequate OHS Management

General occupation and health pre-cautions should be applied to all operation workers and for maintenance workers, specific mitigation measures should be implemented whether direct or indirectly hired.

The Impact Assessment on Occupational Health and Safety during the Operation Phase

The Table 6-98 presents the potential occupational health and safety related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-99 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-98, Table 6-99 then assess the residual impacts of the Project.

The impacts to the Occupational Health and Safety are likely to be direct negative. The lack of experience in Motorway maintenance may lead to complacency which increases the risks, on the other hand, considering the OHS management and trainings will be according to the mitigation measured stated below. The OHS related impacts are expected to be low.

Table 6-98. Impacts on Occupational Health and Safety (Operation Phase)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
Health and Safety Risks due to General Occupational Health and Safety Hazards	Inadequate OHS Management Inadequate selection of worker for specific assignment Emergency cases	Motorway Route Administrative Offices of the Motorway Toll collection locations Maintenance locations	Operation • Occupational Health and Safety Management Plan specific to operational activities will be prepared and OH&S Management Plan will acknowledge and reference to IFC EHS Guidelines for Toll Roads (2007) and IFC General EHS Guidelines (2007). • A system will be established for the reporting and recording of occupational accidents and dangerous occurrences/incidents. • Tollbooths will be equipped with proper ventilation and air filtration systems. • PPEs will be selected based on the specific hazards and risks of the task to be performed and properly maintained to keep them effective and operational throughout their use. • Individuals shall only carry out tasks for which they are competent and authorized to do so. Individuals shall only operate and use plant or equipment for which they are trained and authorized. Copies of all operator certificates will be retained. • Emergency contact numbers will be made available at the assigned areas. This will include the fire and rescue service and the environmental inspection.
Health and Safety Risks due to Physical and Chemical Hazards	Maintenance activities	Motorway Route Administrative Offices of the Motorway Toll collection locations Maintenance locations	Operation • Pavers with exhaust ventilation systems will be used and proper maintenance of such systems will be ensured to maintain worker exposure to crystalline silica (millers and grinders) and asphalt fumes (pavers) below applicable occupational exposure levels. • Correct asphalt product will be used for each specific application and application at the correct temperature will be ensured to reduce the fuming of bitumen during normal handling.

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Tollbooths will be equipped with proper ventilation systems; • Protective clothing will be used when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel, or other solvents. • Appropriate respiratory protection will be used when removing paints.
Health and Safety Risks due to Emergencies	Emergency cases	Motorway Route Administrative Offices of the Motorway Toll collection locations	<u>Design</u> • An Emergency Preparedness and Response Plan, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Motorway's operation, should be prepared and implemented by trained personnel in order to avoid significant risks.
Health and Safety Risks due to Motorway maintenance	Insufficient Trainings Inadequate OHS Management	Motorway Route Administrative Offices of the Motorway Toll collection locations	<u>Operation</u> • Workers will only work in live lane(s) once advance signs are in place to warn road users of their presence. Where possible, operatives should face the oncoming traffic, or work with a lookout. • Works vehicles will support operatives and minimise the need to cross the carriageway. They should be positioned to prevent funneling of drivers toward the work area or into the path of oncoming traffic. • Incidents where vehicles have struck or displaced traffic management equipment or entered the works area should be recorded. This will allow the traffic management design to be reviewed and altered, if appropriate, to maintain the safety of drivers and workers. • Reflective signs and equipment need to be kept clean to maintain clear visibility. Replacing dirty or damaged equipment rather than cleaning or repairing it in situ will reduce time at the roadside. • Night workers (i.e. those regularly working between 11 pm and 6 am unless specified elsewhere in a written agreement)

Impact Description	Impact Source	Location of Sensitive Receptor	Mitigation /Enhancement Measures
			• Lone working should be assessed to determine if one person can do the tasks safely and if particular precautions are needed.

Table 6-99. Impacts Scoring on Occupation Health and Safety (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Health and Safety Risks due to General Occupational Health and Safety Hazards	-1	3 District	4 Long Term	3 Moderate	5 Very High	3.75	3 Medium	**-11 Medium**	-1	3 District	4 Long Term	5 Very High	5 Very High	3.75	2 Low	**-8 Low**
Health and Safety Risks due to Physical and Chemical Hazards	-1	3 District	4 Long Term	3 Moderate	5 Very High	3.75	3 Medium	**-11 Medium**	-1	3 District	4 Long Term	5 Very High	5 Very High	3.75	2 Low	**-8 Low**
Health and Safety Risks due to Emergencies	-1	3 District	4 Long Term	3 Moderate	5 Very High	3.75	3 Medium	**-11 Medium**	-1	3 District	4 Long Term	5 Very High	5 Very High	3.75	2 Low	**-8 Low**
Health and Safety Risks due to Motorway maintenance	-1	3 District	4 Long Term	3 Moderate	5 Very High	3.75	3 Medium	**-11 Medium**	-1	3 District	4 Long Term	5 Very High	5 Very High	3.75	2 Low	**-8 Low**

6.11.8 Community Health and Safety

6.11.8.1 Construction Phase

Traffic

The main impact source of the traffic on the community health and safety is expected to be the vehicle increase due to construction works including excavation and hauling of excess excavated material outside the construction platform, as well as installation works at the road and railway crossings. During the construction phase of the Project, the Contractor estimated 1,136 vehicles will be required, as shown in Table 6-100.

Table 6-100. Number of Vehicles proposed during Construction Phase

Moving Vehicles	Number of Vehicle
Sedan Car	7
SUV 4*4	34
Passenger Bus	23
Worker Bus	36
Pick Up 163	163
Bitumen Distributor Truck	1
Repair Truck	7
Lube Truck	8
Tire Truck	6
Fuel Truck	16
Potable Water Truck	4
Water Truck	23
Heavy Truck Tractor	1
Transit Mixer 6X4	41
Concrete Pump Truck	6
Dump Truck 8X4	24
Dump Truck 6X4	688
Truck with Snow Plow	1
High bed Trailer	28
Lowbed	10
Farm Tractor Trailer	9
TOTAL	1,136

Source: Equipment List of BEJV

Communicable disease

The construction of each Section of the Project will require approximately 3,800 workers and during the peak period, infectious diseases and Sexually Transmitted Diseases (STD) may occur in the communities due to potential worker in-migration to the area.

According to the community-level survey, infectious diseases were reported only in Kraljevo and Varvarin. Among the total diseases, infection-related diseases have a scale of 2% and 15%. In the villages interviewed, no STD was specified.

Other source of the communicable diseases may be the inadequate management of household waste. During the social field survey conducted from August to September 2019, it is observed that the main village problems are directly related with the inadequate waste management and the sewage system. The majority of houses are using septic tanks.

Last, considering the prevailing situation with respect to Covid-19, Serbia has designated COVID-19 hospitals and quarantine locations across the country. All community hospitals and medical care centers through Serbia have opened COVID-19 clinics. The Clinics accepts patients with COVID-19 symptoms through a dedicated entrance separate from that used by other patients. If the test results are negative, the patient is released. If the tests results are positive, the patient will remain at the Clinic.

Construction related environmental impacts:

During implementation of the planned activities, dust, noise, mud on roads and landslides/unstable slopes impacts are expected to occur from the demolition and clearance of objects that are located along the intended route. Earthworks (including terrain cleaning, excavation, leveling), transport and disposal of excavated material and movement of mechanization and transport vehicles will cause increase in the traffic load in the AoI.

Construction noise is explained in detail in Section 6.5 of this ESIA Report. With the application of the mitigation measures regarding the construction noise, the significance of negative impacts are expected to reduce to 4% in other words, the overall impact of construction noise is expected to be low. From the social quality aspect of view, no additional measures are needed considered the given scenarios in Chapter 6.5.

The construction activities may cause negative impacts on surface water sources throughout the construction phase in case no mitigation measures are taken. The most significant impact on water regime is related to reconstruction of the sections of West Morava River. River diversion may affect the natural water flow due to construction of artificial structures and barriers, which may result in siltation of riverbed, flow during the high water period or heavy rains, etc. Chapter 6.3 of this ESIA Report explains the potential impacts on surface water including measures to minimize the negative impacts.

Last, for air quality related impacts, Chapter 6.4 of this Report addresses the Project's impacts on air quality and climate in detail.

Security around the Project site:

During the construction phase of the Project, security will be needed on the site. According to the results of the social field survey, there are total of 265 people who obtained a certification for private security living in the villages located in the Aoi. Security personnels who are part of the community and who are familiar with local customs may serve as a positive and visible point of contact between the company and the community.

According to the National legal requirements, the parties involved in the Project will follow the Law on Private Security (published in the Official Gazette of the Republic of Serbia No. 87/18 from 13 November 2018 which will come into force on 21 November 2018) to ensure security within the Project site.

The Impact Assessment on Community Health and Safety during the Construction Phase

The Table 6-101 presents the potential community health and safety related impacts and the proposed mitigation measures to prevent stated impacts due to Project construction. In that regards, Table 6-102 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-101, Table 6-102 then assess the residual impacts of the Project.

The impacts to the Community Health and Safety are likely to be direct negative. The impacts related to is Community Health and Safety short term and extent is Municipal. Although, the duration and the extent of the impact leads the magnitude of the impact low, considering the worst case scenario (fatalities), and the sensitivity of the local communities the magnitude is assessed as moderate to high. With the implementation of the mitigation measures, and experiences of the CoS from previous infrastructure projects, the overall impacts likelihood will be reduced.

Table 6-101. Impacts on Community Health and Safety (Construction Phase)

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Disturbance to environmental health, quality of life and wellbeing during construction phase	Construction activities	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Design • Project Environmental Management Plan (EMP) will include Noise and Vibration and Management Plan that will be define the sensitive receptor locations, monitoring program and specific mitigation measures to be implemented. • The Project Environmental Management Plan (EMP) will include Air Quality Management procedures that will be implemented. • Planning of transport routes including temporary access roads, haul roads and construction work sites should be determined to avoid populated areas and away from sensitive receptors and villages as much as possible. • As Project construction progresses, buildings that may be potentially affected will be identified prior to construction, including assessing whether buildings are sensitive to night-time disturbance. • Traffic Management Plan of the Project will include measures on accessibility for local community. <u>Pre- Construction</u> • OH&S Management Plan will include awareness of community health and safety issues. OH&S Management Plan will include the Pandemic Preparedness Plan within its scope with respect to Covid – 19 and/or any other diseases present in the region. • Construction work schedule will be distributed to the affected settlements in a timely manner to inform any road closures and construction related cautions. • Air and noise monitoring will be undertaken in accordance with local regulations. Establish in advance a relationship with municipal environmental department. <u>Construction</u> • Operational area in borrow pits, access roads, work sites, construction camp sites, batch and asphalt plants etc. will be regularly monitored for air quality parameters such as PM10, PM2.5, SO2, NOx, HC, CO etc. (For Air Quality related measures; See Chapter 6.2.1 of the ESIA Report). • Construction work schedule will be distributed to the affected settlements in a timely manner to inform any road closures and construction related cautions. • Washing system will be implemented to prevent mud on roads.

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
			• Dust suppression mitigation measures such water sprinkling will be implemented in sensitive locations. • Operational areas in in borrow areas, access roads, work sites, construction camp sites, batch and asphalt plants etc. will be regularly monitored for noise levels representing all hours of a typical work shift. • In case of noise exceedance, silencers or acoustic enclosures on machines as well as portable sound barriers around stationary equipment, should be installed where applicable. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Sensitive receptors (e.g. hospitals, nursing homes, schools) will be provided with advanced notification of noisy works and project specific additional mitigation measures. • Special acoustic insulation and related mitigation measures will be evaluated on a case-by-case basis. • 20kph speed limit will be applied on unpaved surfaces close to settlements. • Wind breaks or dust protection systems (including sprinklers) should be built around the main construction activities where necessary and, if possible, near potentially dusty works to minimize the impact of nearby residential receptors. • Air pollution control equipment (e.g. baghouse) should be installed and operated for the asphalt plants. • During transportation on public roads, the excavated materials will be covered with nylon canvas or suitable materials with a grain size greater than 10 mm in public roads as good practice. • To reduce fugitive dust emission during vehicle operation on public roads and at construction sites, service roads and quarry/material borrow/storage sites, dust suppression methods (i.e. watering with water trucks, applying nontoxic chemicals, speed limits for mobile vehicles, using well-maintained vehicles/equipment) should be used.

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
			• In case of a Grievance, additional measurements will be implemented, and the results will be shared with the complainant. If the results of the measurements will not fit with the commitments given in the relevant environmental Chapters of the report, additional mitigation measures will be implemented.
Increased risk of communicable diseases and burden on local health services:	Workers' Accommodation	Kruševac Municipality Vrnjci Village Adrani Village	Pre- Construction & Construction • All workers will be informed on the Tetanus and Sexually Transmitted Diseases (STDs) including HIV during the orientation period and condoms will be provided to international workers. If required, vaccinating workers against Tetanus will be applied. • First aid facility including health and wellbeing facility will be established within the Camp accommodation. • All workers will be informed about the closest Public healthcare facilities. • If an increase in cases of disease or use of public health facilities is observed awareness raising training will be coordinated with the local health authorities.
Increased traffic and rise in accidents Potential to result in injuries or fatalities to drivers and passengers in non-project related vehicles or pedestrians.	Construction vehicles	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Pre-Construction • Traffic Management Plan (TMP) will be developed and implemented include good practice and specific mitigations for sensitive areas. • Traffic Management Plan (TMP) will be shared with the local authorities for their approval. • Local authorities will be informed regarding the date, time and route of the transportation activity. • Traffic signals and signs will be set up and will be clear and visible • Traffic flagmen will be appointed where necessary. • Temporary traffic control methods will be applied at intersections and connections that hold higher risk for accidents. • All drivers will obey the national speed limits and the drivers will be trained on the all Serbian traffic rules. • Contractor to ensure construction area provides measures and signage for safe pedestrian crossing. Crossing locations should take into account community preferences, including those related to convenience or personal safety. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the Project except at designated crossing points.

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
			Construction • Supervision and escort for heavy machinery (which requires escort and permit in line with Serbian Legislation) will be provided. • Supervision for vehicles carrying construction materials and equipment that pass over public or private roads and railway crossings will be provided. • Project related traffic will be regulated during certain dates and times where local community will require to commute (to/from schools, commercial areas etc.) or take on any agricultural activity (animal grazing or other farming activities etc.). • Temporary access to private property or appropriate accessing alternatives will be determined in consultation with the land owners or users. • Local authorities and community will be provided with detailed information on closure of roads during the road and railway crossings. • Methods for every road crossing will be determined and agreed upon with authorities prior to taking any action. All methods and construction techniques proposed by the Contractor will aim to minimize possible disruptions caused by road crossings. • Contractor will ensure that road safety training will be provided to employees. • The schools nearby the Project site will be informed about the peak movements of the vehicles and vehicle traffic will be minimized during hours when children are traveling to and from school. • Heavy machinery and vehicles utilized in transportation activities (including transportation of personnel) will be used by qualified and licensed drivers. • All drivers will know and comply with all traffic signs, are will be made aware of hotspots of intense traffic that are expected along the route and are trained properly for on and off-road conditions. • Managing and monitoring of working and resting hours drivers will be undertaken according to Serbian Legislation. • Monitoring security arrangements for loads, vehicles and drivers will be undertaken according to Serbian Legislation. • All project work sites, associated facilities, temporary roads, and traffic management works will be will be signposted in line Serbian Legislation and as required by the Traffic Management Plan (TMP).

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
			• Night drive/transportation will be limited as much as possible to reduce the risk of accidents and obtaining necessary permits shall night transportation be required. • Compensating damages caused by an accident due to project activities will be undertaken according to national legislative requirements and the Grievance Mechanism defined in the Stakeholder Engagement Plan (SEP) of the Project. • A Grievance Mechanism Procedure will be set up for communities and individuals to formally communicate their concerns, complaints and grievances and facilitate resolutions that are mutually acceptable by the parties. • The routes of the roads that will be used and the peak hours of the usage of the roads will be shared with village heads and management of the schools. • The CLOs of the contractors will provide awareness trainings to schools if there is a school located on the route of the roads that will be used. • Installation of barriers (e.g. fencing,) to deter pedestrian access to the Project construction area except at designated crossing points
Security around the Project site	Armed and non-armed security forces	Kruševac Municipality Vrnjci Village Adrani Village	Construction • Engagement activities prior to construction will ensure that local stakeholders are informed of the risks and consequences of entering the site; • Security personnel will patrol the site area to prevent any unauthorized access onto the site. They will also ensure that protocols for entering the construction site are enforced; • A management plan for security personnel will be developed and implemented by the Contractors, outlining expectations around security, • Conflict Management Training will be provided to armed security personnel, • The Grievance Mechanism for the Project will capture all grievances raised in relation to security and safety issues. These will be addressed promptly, and actions will be taken.

Table 6-102. Impacts Scoring on Community Health and Safety (Construction Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Traffic Density	-1 Negative	2 Municipal	2 Short-term	4 High	5 High	3.25	5 Definite	**- 16 Medium**	-1 Negative	2 Municipal	2 Short-term	3 Moderate	5 High	4	3 Medium	**- 12 Medium**
Communicable Diseases	-1 Negative	2 Municipal	2 Short-term	3 Moderate	3 Medium	2.5	2 Low	**- 5 Low**	-1 Negative	2 Municipal	2 Short-term	3 Moderate	3 Medium	2.5	1 Improbable	**- 3 Low**
Construction related environmental impacts	-1 Negative	2 Municipal	2 Short-term	4 High	5 High	3.25	4 High	**- 13 Medium**	-1 Negative	1 Project Site	2 Short-term	3 Moderate	5 High	2.75	3 Medium	**- 8 Low**
Security around the Project Site	-1 Negative	1 Project Site	2 Short-term	3 Moderate	3 Medium	3	2 Low	**-6 Low**	-1 Negative	1 Project Site	2 Short-term	3 Moderate	3 Medium	3	1 Improbable	**- 3 Low**
Earthquake	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	5 **High**	-3.25	1 **Improbable**	**-3 Low**	-1 **Negative**	4 **Regional**	1 **Immediate**	3 **Moderate**	3 **Medium**	-2.75	1 **Improbable**	**-3 Low**
Erosion	-1 **Negative**	2 **Municipality**	1 **Immediate**	3 **Moderate**	5 **High**	-2.75	4 **High**	**-11 Medium**	-1 **Negative**	2 **Municipality**	1 **Immediate**	2 **Moderate**	3 **Medium**	-2	4 **High**	**8 Low**
Spillage/Leakage to Surface Water	-1 **Negative**	2 **Municipality**	2 **Short Term**	4 **High**	3 **Medium**	-2.75	4 High	**11 Medium**	-1 **Negative**	2 **Municipality**	2 Short Term	2 Low	3 Medium	-2.25	2 Low Probability	**-5 Low**

6.11.8.2 Operation Phase

Accessibility:

To mitigate potential impacts regarding to accessibility, the Motorway includes bridges, overpasses and underpasses in each section of the Project. Information about the bridges, overpasses and interchanges along the Proposed Motorway Route are presented in Table 6-103.

Table 6-103. Number of Bridges, Overpasses and Interchanges along the Sections of the Motorway

	Section-1	Section-2	Section-3
Bridge	10	15	15
Overpass	8	8	4
Underpass	1	5	9
Culvert	19	31	15
Interchange	4	5	2

Flood Risk:

During the disclosure period of the Spatial Plan from July to August 2019, 22 of 48 villages within the AoI expressed their concerns about the possible flood risk during the operation period. These villages are considered as sensitive receptors.

Noise:

Noise sources during operation stage of the project is mainly road traffic will be cumulated throughout the road axis. The speed of the light vehicles is taken as 130 km/h whereas the speed is taken as 80 km/h for heavy vehicles. The noise impact is assessed in the relevant environmental Chapter of the report in details. In the below boxes, the comments of the residents on the Spatial Plan are provided to show the sensitivity of the community on the noise impact during the construction.

Level crossing:

The risk during operation is the level crossing and the Project is passing through the two railways in km point 1 and km point 75.

Transport of dangerous goods:

The Dangerous goods are those that may jeopardize people's health, cause contamination of the environment or impose material damage, or that have dangerous properties for people's health and environment, which are as such specified by laws, other regulations and international contracts, which, on the basis of their nature or properties and condition, and related to transport, may be dangerous for safety or have proven toxic, corrosive, flammable,

explosive or radioactive effects. Dangerous goods also include raw materials of which dangerous goods are produced as well as waste if possess the properties of dangerous goods. Law on Transport of Dangerous Goods ("Official Gazette RS", No 88/2010) regulates the transport of the dangerous goods.

The Impact Assessment on Community Health and Safety during the Operation Phase

The Table 6-104 presents the potential community health and safety related impacts and the proposed mitigation measures to prevent stated impacts due to Project operation. In that regards, Table 6-105 provides quantitative assessment of the impacts through identifying; nature, extent, duration, magnitude, significance and likelihood of each potential impacts of the Project. Considering the Project will adopt and apply the given mitigation measures in Table 6-104, Table 6-105 then assess the residual impacts of the Project.

Project impacts on the community health and safety has negative nature. It has been observed that the flood risk during the operation phase has the highest magnitude and sensitivity level as a result, the overall rating of the impact is assessed as high. With the proposed mitigation measures, the impacts regarding the flood and operational noise could be managed and the receptor sensitivity will be reduced.

Table 6-104. Impacts on Community Health and Safety (Operation Phase)

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Level crossings safety	Railway crossings	Two railway crossings	Operation • The set of precautionary measures will be implemented, including road operational safety procedures. • Regular inspection and maintenance of the Motorway will be carried out. • Safety management program will be implemented. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the Motorway except at designated crossing points; Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian or bikeways.
Noise during operation	Operational Traffic	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Design • Stone Mastic Asphalt (SMA) surfacing that cause's low noise will be used by the Contractor for the Motorway. • Natural topography will be used for noise protection. • Additional noise barriers will be considered for the sensitive receptors, as necessary. • The landscape screening will be done either by lowering the Motorway or adding soil embankment • The noise barriers adjacent to the motorway will be used. Operation • Noise level measuring during operation will be performed at annual intervals and in case of complaints by the local population. • Noise barriers will be used in the sensitive locations such as schools, hospitals and residential areas to reduce the sound as required.
Flood risk during operation	River regulation	Grad Stalac Mrzenica Stalać Bela Voda Adrani Vrba Grdica Miločaj Popovići Sirča Stubal Bogdanje Lozna Grabovac Medveđa Ugljarevo Novo Selo Podunavci Ruđinci Donja Gorevnica Katrga Goričani	Operation • The culverts will be maintained and monitored whether they perform as designed to the both sides of the Motorway. • Perform the most necessary regulation works to stabilize and bank erosion. • Drainage channels and ponds will be built to discharge the surface water. • Flood Management and Flood Escape systems and escape roads to be constructed. • Flood control contingency plans need to be formulated for the study area.
Transport of dangerous goods	Movement of vehicles with chemical and dangerous materials	Ćićevac Municipality Varvarin Municipality Kruševac Municipality Vrnjačka Banja Municipality Trstenik Municipality Kraljevo Municipality Čačak Municipality	Operation • The proper screening acceptance procedure will be implemented with development of the Emergency Preparedness and Response Plan (including Spillage Response Plan). • Speed limit will be implemented for the hazardous material carriage.

Table 6-105. Impacts Scoring on Community Health and Safety (Operation Phase)

Impacts Before Mitigation									Impacts After Mitigation							
Impacts	**Nature**	**Extent**	**Duration**	**Magnitude**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Overall Rating (IA)=CxL**	**Nature**	**Extent'**	**Duration'**	**Magnitude'**	**Receptor Sensitivity**	**Significance Criteria (C)**	**Likelihood (L)**	**Residual Impacts**
Level crossings safety	-1 Negative	1 Project Site	4 Long-term	2 Low	5 High	3	2 Low	**-6 Low**	-1 Negative	1 Project Site	4 Long-term	2 Low	5 High	3	1 Improbable	**-3 Low**
Noise during operation	-1 Negative	1 Project Site	4 Long-term	3 Moderate	5 High	3.25	5 Definite	**-16.25 Medium**	-1 Negative	1 Project Site	4 Long-term	3 Moderate	3 Medium	2.75	3 Medium	**-8.25 Low**
Flood risk during operation	-1 Negative	3 District	4 Long-term	5 Very high	5 High	4.25	4 High	**- 17 High**	-1 Negative	3 District	4 Long-term	4 High	3 Medium	3.5	4 High	**-14 Medium**
Transport of dangerous goods	-1 Negative	2 Municipal	4 Long-term	3 Moderate	5 High	3.5	2 Low	**-7 Low**	-1 Negative	2 Municipal	4 Long-term	3 Moderate	5 High	3.5	1 Improbable	**-3.5 Low**

6.11.9 Vulnerable People

Vulnerable groups refers to Persons who, by virtue of; gender identity, sexual orientation, religion, ethnicity, indigenous status, age, disability, economic disadvantage or social status. They can be affected by project impacts differently than others and may be limited in their ability to claim or take advantage of project benefits. Therefore, CoS (with assistance of relevant Municipalities, when needed), shall apply provisions for assisting disadvantaged or vulnerable individuals that may be more adversely affected by displacement than others and who may be limited in their ability to claim or take advantage of livelihood assistance and related development benefits.

6.11.9.1 Construction and Operation Phase

The sources of main impacts on the vulnerable people in the area are identified as traffic intensity, infectious disease and employment opportunities and land acquisition which were explained in the above sections in detail.

The following vulnerable groups were identified:

Vulnerable Category	Support Methodology
Elderly (aged over 65)	• Travel assistance • Assistance on acknowledging and signing official documents • Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to access compensation payments • Assistance to clear and store materials from their land.
PAPs with size of a land less than 3 ha	• Assistance to find alternative land • Temporary livelihood assistance when required, • Job assistance • Replanting assistance
Disabled	• Travel assistance • Assistance to obtain personal documents • Assistance to access compensation payments • Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to clear and store materials from their land.
Low income[23]	• Priority for job opportunity during the construction phase of the Project • Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to access compensation payments • Travel assistance

[23] According to Statistical Office of Republic of Serbia **poverty threshold** amounts to 15 600 dinars a month on an average for a single person household. For a household with two adults and one child aged below 14, the threshold is 28 080 dinars per a month, while for a four-member household with two adults and two children aged below 14, it amounts to 32 760 dinars.

Vulnerable Category	Support Methodology
Informal structures	• Moving allowances
Women headed households	• equal employment opportunities for women;
Single parents households	• Where physical relocation is necessary, provide temporary housing • Temporary livelihood assistance when required, • Priority for job opportunity • Job assistance
Homeless	• Temporary livelihood assistance when required, • Priority for job opportunity • Job assistance
Seasonal Workers	• Temporary livelihood assistance • Priority for job opportunity • Job assistance

The above-mentioned impacts on vulnerable groups which will possibly arise during the construction phase are expected to be temporary.

The Project will use the Grievance Mechanism for communities and individuals to formally communicate their concerns, complaints and grievances and facilitate resolutions that are mutually acceptable by the parties; the routes of the roads that will be used and the peak hours of the usage of the roads will be shared with village heads and management of the schools. The CoS and the Contractor Department in charge of Community Relations (CR) will be responsible to implement this SEP during pre-construction and construction phases of the Project.

Table 6-106. Impacts on Vulnerable Groups (Construction and Operation Phase)

Impact Description	Impact Source	Sensitive Receptor	Mitigation /Enhancement Measures
Impact on the Vulnerable Groups	Employment opportunities Traffic density Project information Land acquisition Infectious diseases	Vulnerable Groups	<u>Pre-Construction</u> • Travel assistance will be provided to elderly and disabled people during land acquisition when required. • Assistance will be provided to elderly and low educated groups on acknowledging and signing official documents during land acquisition. • During land acquisition Legal assistance will be provided when requested to all groups. • Assistance will be provided to access compensation payments to disabled and elderly groups during land acquisition. • Where physical relocation is necessary, temporary housing will be provided to low income groups, women household heads and elderly groups during land acquisition. <u>Construction</u> • Traffic management plan will be implemented. • Face to face meetings will be held to inform the elderly people on the construction and operation activities. • Priority will be provided for the job opportunity during the construction phase of the Project to landless and low-income groups. • Equal employment opportunities will be provided to women; • Code of conduct will be implemented. • Skill development programs will be implemented.

7 CUMULATIVE AND TRANSBOUNDARY IMPACTS

7.1 Introduction

This Chapter focuses on Cumulative Impact Assessment (CIA), where the planned and foreseeable future developments within or near by the Project AoI are investigated and assessed to determine whether any of these planned projects will cause additional unanticipated environmental and social impacts. The CIA also defines applicable mitigation measures in order to prevent or minimize the related risks of potential cumulative impacts in line with the mitigation measures defined in the ESIA report.

7.2 Guidance

IFC Performance Standard 1, Assessment and Management of Environmental and Social Risks and Impacts, recognizes that in some instances, private sector developers need to consider cumulative effects in their identification and management of environmental and social impacts and risks. Therefore, IFC requires that when a private sector project sponsor faces cumulative environmental and social impacts, it should have mechanisms for identifying the magnitude and significance of its contribution to those impacts and risks, and should include appropriate mitigation measures as an integral component of the Project's Environmental and Social Management System (ESMS).

Performance Standard 1, in paragraph 8, defines the area of influence to encompass "cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned, or reasonably defined developments at the time the risks and impact identification process is conducted." Performance Standard 1, in footnote 16, limits the cumulative impacts to be addressed to "those impacts generally recognized as important on the basis of scientific concerns and/or concerns from "Affected Communities" and provides examples such as "incremental contribution of gaseous emissions to an airshed; reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed; interference with migratory routes or wildlife movement; or more traffic congestion and accidents due to increases in vehicular traffic on community roadways."

IFC also defines cumulative impact assessment in its Good Practice Handbook as: "the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Ecosystem Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible."

IFC further defines VECs as "environmental and social attributes that are considered to be important in assessing risks"; and that they may be:

- physical features, habitats, wildlife populations,
- ecosystem services,
- natural processes,
- social conditions, or
- cultural aspects.

While VECs may be directly or indirectly affected by a specific development, they often are also affected by the cumulative effects of several developments. VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways.

The key task with this CIA is to describe how the potential impacts of a proposed development might combine, cumulatively, with the potential impacts of the other human activities.

7.3 Assessment Methodology

Assessment of cumulative impacts consider the effects of other past, present and planned projects with similar impacts on the project area of influence. The key point in determining the need for cumulative impact assessment is to identify one or more impact topics which are affected by different developments.

Cumulative effects can occur as interactions; between actions and the environment, and between components of the environment. These “pathways” between a source and an effect are often the focus of an assessment of indirect or cumulative impacts. The magnitude of the combined effects along a pathway can be equal to the sum of the individual effects (additive effect) or can be an increased effect (synergistic effect).

The objective of the assessment of cumulative impacts and impact interactions is to identify and focus on the significant impacts, and to ensure that these impacts are taken into consideration in the decision-making process. In order to make the assessment effective, at first these main impacts should be understood. They can be generally defined as follows.

Cumulative Impacts: These impacts are incremental effects of past, present or future activities together with the proposed project.

Indirect Impacts (Secondary Impacts): These impacts are not directly caused by project. Indirect impacts occur in complex pathways or away from the project.

Impact Interactions: These impacts (e.g. reaction of emissions of proposed project and an existing plant) are the results of reactions between impacts of proposed project or other actions.

The approach to this CIA has been undertaken in line with the IFC Good Practice Handbook, *Cumulative Impact Assessment and Management Guidance for the Private Sector in*

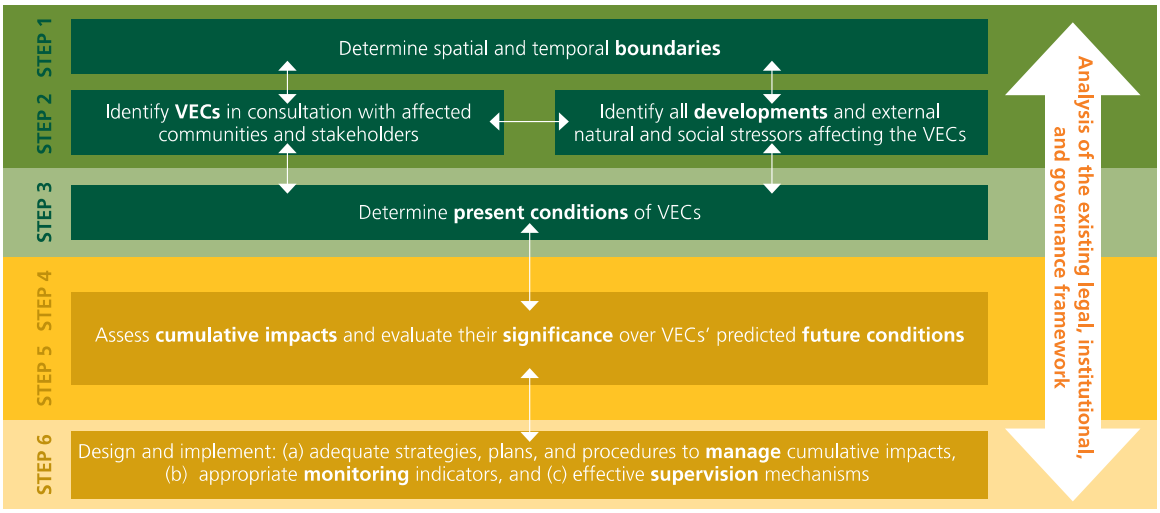
Emerging Markets. Considering the limited availability of existing data and uncertainties regarding anticipated developments, in this respect, a Rapid Cumulative Impact Assessment (RCIA) is considered to be appropriate for the Project. RCIA can be considered when the challenges are due to:

- Lack of baseline data related to the other project developments;
- Uncertainties associated with anticipated developments; and
- Limited and emergent, strategic regional, sectoral, or integrated resource planning schemes.

In line with IFC PS 1 guidance notes (GN41) the assessment should be;

- "commensurate with the incremental contribution, source, extent, and severity of cumulative impacts anticipated",
- when the assessment attempts to focus only on the potentially significant cumulative impacts,
- where the Project's contribution to the cumulative impact is considered to be significant.

The CIA methodology follows the steps indicated in Figure 7-1:



(Source: IFC Good Practice Handbook: Cumulative Impact Assessment and Management)

Figure 7-1. Steps of RCIA

The RCIA given in this section is mainly based on the baseline information gathered through the ESIA process. As it is given in Chapter 5, baseline information includes primary data collection, review of existing EIAs, review of relevant existing scientific sources as well as review of spatial plan. In addition to baseline studies, the following information has been considered;

- Outcomes of the impact assessment process are used for the determination of key potential cumulative impacts;

- Data gathered during social baseline studies and outcomes of interviews including inputs from public and statutory stakeholders are considered;
- Information on potential other projects available through publicly available sources.

7.4 STEP 1 – Determination of Spatial and Temporal Boundaries

Spatial Boundaries

The relevant spatial boundaries for this RCIA are essentially the same as the specific AoI in Chapter 5, where it varies between 35 m to 500 m (as the distance from the centreline of the Motorway alignment, locations regarding river regulation works as well as other project facilities such as borrow pits, quarries, camp sites, concrete batching plants, asphalt plants etc.) depending on the baseline feature.

Temporal Boundaries

In general, the temporal boundary of the RCIA covers the entire Project life-cycle, from construction through long-term operations. On the other hand, the RCIA process is limited with the prediction of the future activities and developments such as the planning/implementation of other relevant projects in the region. Therefore, for the purpose of this RCIA, consideration is given to the pre-construction, design and construction phase and for operation phase is only considered to the extent feasible for discussion and assessment of cumulative impacts with the other projects.

7.5 STEP 2 – Identification of VECs and Screening of Other Projects in Region

Identification of VECs

In the ESIA process, VECs in the AoI, which are subject to potential impacts from the Project and other relevant projects in a cumulative manner, are already defined in Chapter 6. At first, the results of the impact assessments are reviewed to identify VECs that are impacted by the Project. Then the common VECs are defined by considering other projects that may significant contribution in terms of cumulative impacts. These significant impacts are considered to represent the contribution of other development's (see Table 7-2) of industrial zones in the region to cumulative impacts.

The VECs to be considered within the RCIA are provided in Table 7-1.

Table 7-1. The VECs in the Project Area

VECs	Impacts from the Project	Area of Influence
Biodiversity	Land taken from forest areas, tree cutting, top soil removal, emissions, noise, etc. Habitat fragmentation and barrier impact. Opening new quarries along the West Morava River Plain	Footprint of the Project including associated facilities and close environments.
Surface and Ground Water (The West Morava River and its tributaries)	Flow alteration and water quality change due to River regulation Storm water discharge from motorway and associated facilities. Accidental spills and leaks from construction sites. Accidental spills and leaks during operation phase	Footprint of the Project area, The West Morava River and its tributaries
Noise and vibration	Disturbance and nuisance due to noise from construction sites and Road Traffic on the Motorway.	Close settlement (less than 250 m)
Air Quality	Change of air quality due to emissions from construction works during construction and traffic during operation.	Close settlement (less than 250 m)
Land Use	Effects on livelihood from livestock activities due to resettlement and economical displacement.	Footprint of the Project including associated facilities
Community safety	Increased traffic due to transportation and site access during construction.	Project AoI
Waste Management	Disposal of excavated wastes soil Disposal of solid wastes and hazardous wastes generated during construction works.	Provinces in the AoI
Local Economy	Resettlement and decrease in the livelihood Increase in income level	Provinces in the AoI

Identifying other relevant projects in the region

The Spatial Plan and the Hydrotechnical Report are considered as the two main sources for identifying the projects and developments planned for the region. As stated previously, the data obtained from social baseline studies were also considered in the RCIA.

Accordingly, the possible projects planned in the region are listed in Table 7-2. However, no timing has been given for these projects and it is assumed that the projects would be realized within the first five years. In addition to these projects, dam projects planned along the Western Morava River were also evaluated. There is also no technical detail for these projects.

Table 7-2. Potential Projects in the Region

Project	Description
Establishment of the Logistic Centers	• The Logistic Centersare expected to be constructed in Čačak and Kraljevo municipalities after the operation phase of the Project and according to the Spatial Plan. These centers can employ between 500 and 10,000 employees in which may provide significant benefit for the locals who seek employment.
Establishment of Industrial Zones	• According to the Spatial Plan, Industrial Zones are planned to be constructed in Kraljevo, Kruševac, Čačak, Trstenik, Varvarin and Ćićevac municipalities. The details of the planned Industrial Zones are currently being arranged and no further details provided in the Plan.
Reconstruction and rehabilitation of exiting Railway Systems	• Reconstruction, modernization and construction of the existing Belgrade - Mladenovac railway with European interoperability standards, • Revitalization and modernization (ultimately complete electrification) of the existing single-track railway lines Lapovo - Kraljevo - Lesak - Kosovo Polje - General Jankovic, • Revitalization and modernization of the existing single-track Stalać - Kraljevo railway, • Stations will be either improve or construct businesses and services.
Run-of the River Dam Projects along the West Morava River	• Five cascade Run-of the River Dam Projects are planned over the river section (see Figure 7-2).

Figure 7-2 represents the potential projects in the Region, which are given in the table above.

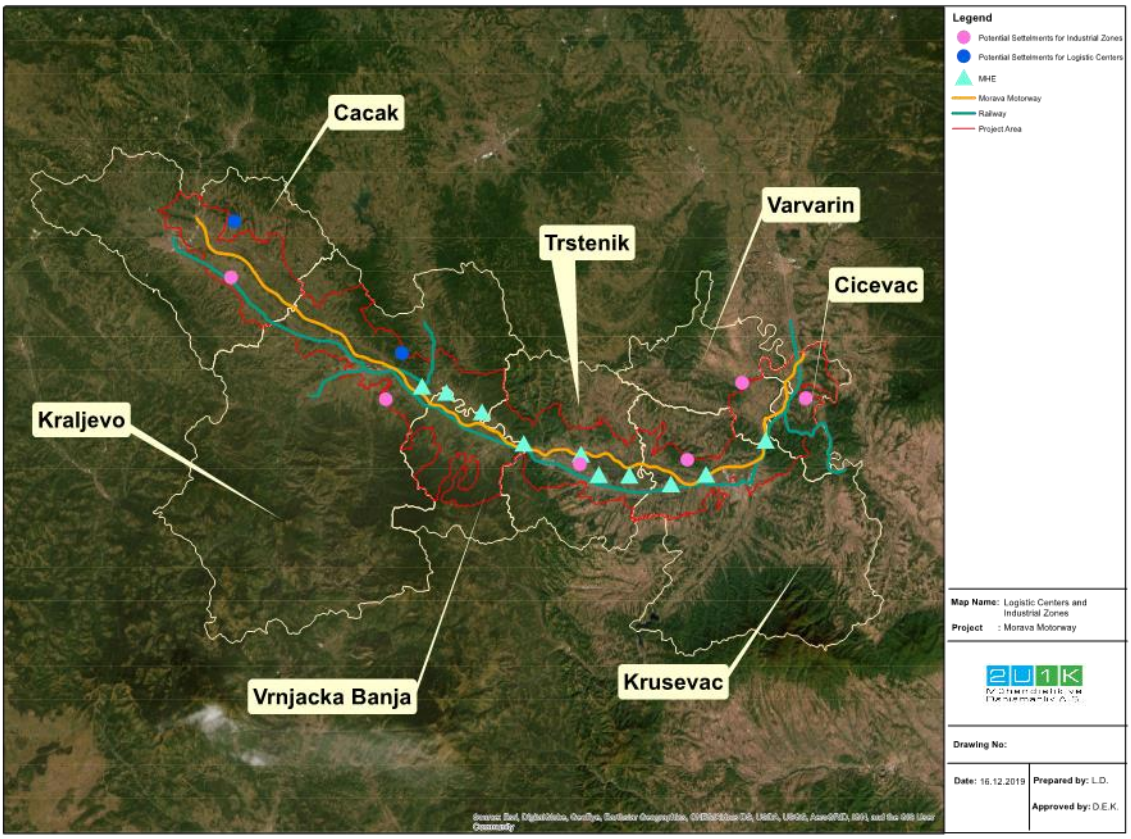


Figure 7-2. Potential Projects in the Region

7.6 STEP 3 – Determine Existing Conditions of the VECs

Existing conditions of the VECs, which are summarized in Table 7-1, are described in the respective baseline sections in Chapter 5 of the ESIA report. With this intention, current understanding of baseline conditions has been used to identify and assess the potential cumulative impacts presented in Step 4, Step 5 and Step 6 given below.

7.7 STEP 4, STEP 5 and STEP 6 – Assesment of Cumulative Impacts and Identification of Mitigation Measures

A qualitative assessment of potential cumulative impacts on the identified VECs, by considering each of project identified in Step 2, was undertaken and is provided in the Table 7-3.

Table 7-3. Cumulative Impact Assessment and Mitigation Measures

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
Not known. It is assumed that establishment of lLogistic cCentres will start during construction of the Project	Operation periods are same with the proposed Project.	Land Use	Footprints of the projects in the AoI.	Construction	Change in area characteristics at the occupied lands for the Project.	Negative Additive	The Project (together with river diversions) has main impact on agricultural lands. The assessment on land use indicates that physical land use change due to the project is limited with its footprints. Therefore, no major cumulative impact is expected. On the other hand, exact locations and size of the Logistic Centers are not known. Site selection of the Logistic Centers are important to decrease the impact on agricultural fields.
			AoI	Operation	Change in land use characteristics depending on local economic development.	Negative Synergic	Implementation of the project, Logistic Centers together with new Industrial Zones (given in item 2 of the Table) have a great potential in terms of local economic development. In this respect, there will be more stress on agricultural lands. Consequently, proposed revisions of the strategic plans, regarding new developments, should cover and assess these synergic impacts. In this respect, the ESIA Report will be available for planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Construction, Transportation and Infrastructure within the stakeholder engagement process.
		Biodiversity	Footprints of the projects in the AoI.	Construction	Loss of natural habitats	Negative Additive	Overall potential impact of the Project on natural habitats are assessed as limited with project footprint. The target of the mitigations provided for the project is as much as to restore disturbed habitats during the reinstatement of temporary used areas according to the habitat characteristics of the project AoI. Habitats along the old river-bed sections, which are subject to river diversions, will be protected.

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							Additionally, new river bed at river diversion sections will be constructed with natural materials and river banks along river regulation sections will be planted with native species in order to support existing riparian habitats. Therefore, no major cumulative impact is expected. On the other hand, exact locations and size of the Logistic Centers are not known. Site selection of the Logistic Centers are important to decrease the impact on biodiversity. The outcome of the ESIA study should be considered during the site selection process of the Logistic Centers. In this respect, the ESIA Report will be available for planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Construction, Transportation and Infrastructure within the stakeholder engagement process.
			AoI	Operation	Fauna casualties	Negative Additive	The Project is directly connected to the logistic centers, so that operation of the Logistic Centers will increase the truck traffic, which increase the risk of fauna causalities. Design of proposed Motorway Project includes under passes for movement of terrestrial fauna. ESIA studies concluded that no major impact is expected on the terrestrial fauna species. Therefore, no cumulative impact is expected. On the other hand, an informative program about fauna species of the project AoI can be considered for the truck drivers serving for the proposed logistic centres.
		Surface and Ground Water	The West Morava River	Construction	Wastewater discharges from construction camps and from other associated facilities.	Negative Additive	All wastewater discharged from project facilities of the project will be treated in accordance to the existing national regulation as well as IFC Guidelines. Therefore, no major impact is expected

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
					Sand and Silt discharge from construction areas.		due to proposed project.
				Operation	Storm water discharges from open surfaces.	Negative Additive	All the storm water collected from proposed Project, will be rested in settlement ponds before discharge to the Western Morava River (or its any tributaries). Therefore, no major cumulative impact is expected.
		Noise and Vibration	Near Settlements	Construction	Increase in ambient noise level due to construction activities.	Negative Additive	Exact locations of the Logistic Centers are not known. Therefore, there is no information regarding their impact on sensitive receptors identified in this ESIA. No major impact is expected from the Project construction works. On the other hand, cumulative noise impact may exceed the guideline limits where the construction locations of the Logistic Centers and proposed motorway project get closer. In this respect, during the noise monitoring of the construction works of the project, potential construction areas, which may cause cumulative noise impact, will be identified and noticed in the noise monitoring reports.
			Near Settlements	Operation	Increase in ambient noise due to traffic.	Negative Additive	As stated in Chapter 6, there are critical locations along the Project route, where the noise guideline limits might be exceeded during operation of the Project. Besides, exact locations of the Logistic Centers are not known. Therefore, there is no information about overlapping areas in terms of these sensitive locations. Therefore, the assessment results in the ESIA report should be considered during the site selection process of the Logistic Centers as well as local EIA process. In this respect, the ESIA Report will be available for related authorities, and out-come of the ESIA will be shared with relevant stakeholders (i.e. Ministry

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							of Environmental Protection) within the stakeholder engagement process.
		Air Quality	AoI	Construction	Increase in ambient PM levels.	Negative Additive	Exact locations of the Logistic Centers are not known. Therefore, there is no information regarding their impact on sensitive receptors identified in this ESIA. In general, no major impact is expected from the Project construction works. On the other hand, cumulative impact in terms of PM levels may exceed the guideline limits where the construction locations of the Logistic Centers and proposed motorway project get closer. In this respect, during the PM monitoring of the construction works of the project, potential construction areas, which may cause cumulative air quality impact, will be identified and noticed in the PM monitoring reports.
			AoI.	Operation	In crease in ambient pollutant levels of SO_2, NOx and PM levels.	Negative Additive	No major impact is expected from the Project. Logistic Centers are not major emission sources. Therefore, no major cumulative impact is expected.
		Community Health and Safety	AoI	Construction	Increase in the number of traffic accidents.	Negative Additive	It is assumed that the level of construction works will not cause a major increase in existing level of traffic in the Region. On the other hand, overlapping areas (i.e. use of main road E761 and common access roads located in AoI), cumulative impacts on traffic may become significant. In this respect, construction contractor should maintain continuous coordination with local authorities that responsible coordination of the traffic on main transport roads as well as access roads. The Traffic Management Plan should regularly be updated to include potential projects in the AoI that may cause cumulative impacts.

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
			AoI	Operation	Increase in the number of traffic accidents.	Negative Synergic	Exact locations of the Logistic Centers and capacities are not known. On the other hand, it is a fact that establishment of the Logistic Centers will increase the traffic level in the motorway. In general, the traffic level is included in the feasibility of the project, and traffic level on the motorway as well as performance of the proposed mitigations will be continuously monitored by related state authorities.
		Local Economy	Footprints of the projects	Construction	Resettlement and decrease in the livelihood	Negative Synergic	Resettlement and loss in livelihood are the major negative impact of the proposed Project. In this respect, any land acquisition process for the :Logistic Centers may cause additional impact on the local people, in case overlapping of the Logistic Centers and the Project. In this respect, any potential land acquisition process performed for Logistic Centers are required to be followed by CoS (having information from related designated authority such as municipalities) to understand any additional potential impact on the affected person covered in the Resettlement Action Plan. The additional impact (if exist) should be included in the monitoring reports. In this respect, the ESIA Report will be available for planning authorities, and out-come of the ESIA will be shared with relevant stakeholders (i.e. Ministry of Construction, Transportation and Infrastructure within the stakeholder engagement process.
			Province in the AoI	Operation	Increase in income level	Positive Synergic	The Spatial Plan states that establishment of the Logistic Centers will to lead new employment opportunities up to 10,000 workers. These new job opportunities and transportation revenues as well as increase in the secondary services such as temporal accommodation of vehicle drivers and

1. Establishment of Logistic Centers							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							maintenance services etc. can lead important contribution to local economy. Proposed Motorway will establish a direct connection of these Logistic Centers to national and international markets. In this respect, establishment of the projects will lead potential positive impacts for the local economy.

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
Not known. It is assumed that construction of Industrial Zones will start during construction of the proposed project	Operation periods are same with the proposed project.	Land Use	Footprints of the projects in the AoI.	Construction	Change in area characteristics at the occupied lands for the project.	Negative Additive	The Project has main impact on agricultural lands. The assessment on land use indicates that physical land use change due to project is limited with its footprints. Therefore, no major cumulative impact is expected. On the other hand, exact locations and size of Industrial Zones are not known. Site selection of the Industrial Zones are important to decrease the impact on agricultural fields. In this respect, the ESIA Report will be available for planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Construction, Transportation and Infrastructure within the stakeholder engagement process.
			AoI	Operation	Change in land use characteristics depending on local economic development.	Negative Synergic	Implementation of the Project and Industrial Zones together with new Logistic Centers (given in item 1) have great potential in terms of local economic development. In this respect, there will be more stress on agricultural fields. Consequently, proposed revisions of the strategic plans, regarding new developments, should cover and assess these synergic impacts.

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
		Biodiversity	Footprints of the projects in the AoI.	Construction	Loss of natural habitats	Negative Additive	Overall potential impact of the Project on natural habitats are assessed as limited with project footprint. The target of the mitigations provided for the project is as much as to restore disturbed habitats during the reinstatement of temporary used areas according to the habitat characteristics of the project AoI. Habitats along the old river-bed sections, which are subject to river diversions, will be protected. Additionally, new river bed at river diversion sections will be constructed with natural materials and river banks along river regulation sections will be planted with native species in order to support existing riparian habitats. Therefore, no major cumulative impact is expected. On the other hand, same as the Logistic Centres exact locations and size of the Industrial Zones are not known. Site selection of the Industrial Zones are important to decrease the impact on biodiversity. The outcome of the ESIA study should be considered during the site selection process of the Industrial Zones. In this respect, the ESIA Report will be available for planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Construction, Transportation and Infrastructure within the stakeholder engagement process.
			AoI	Operation	Fauna casualties	Negative Additive	The project is directly connected to planned Industrial Zones, so that operation of the Industrial Zones will increase the local traffic, which increase the risk of fauna causalities. Design of proposed motorway project includes under passes for

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							movement of terrestrial fauna. ESIA studies concluded that no major impact is expected on the terrestrial fauna species. Therefore, no cumulative impact is expected. On the other hand, an informative program about fauna species of the project AoI can be considered for the truck drivers serving for the proposed Industrial Zones.
		Surface and Ground Water	The West Morava River	Construction	Wastewater discharges from construction camps and from other associated facilities. Sand and Silt discharge from construction areas.	Negative Additive	All wastewater discharged from project facilities of the Project will be treated in accordance to the existing national regulation as well as IFC Guidelines. Therefore, no major cumulative impact is expected due to proposed project.
			The West Morava River	Operation	Storm water discharges from open surfaces.	Negative Additive	All the storm water collected form proposed Morava Motorway Project, will be rested in settlement ponds before discharge to the Western Morava River (or its any tributaries). Therefore, no major cumulative impact is expected.
		Noise and Vibration	Near Settlements	Construction	Increase in ambient noise level due to construction activities.	Negative Additive	Exact locations of the Industrial Zones are not known. Therefore, there is no information regarding their impact on sensitive receptors identified in this ESIA. In general, no major impact is expected from construction works of the Project. On the other hand, cumulative noise impact may exceed the guideline limits, where the Project alignment passes close to construction locations of the Industrial Zones (or any construction works in the Industrial Zones such as construction new industrial unit) . In this respect, during the noise monitoring of the construction works of the Project, potential construction areas of Industrial Zones, which may cause cumulative noise impact, will be identified

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							and noticed in the noise monitoring reports.
			Near Settlements	Operation	Increase in ambient noise due to traffic.	Negative Additive	As stated in Chapter 6 of the ESIA Report, there are critical locations along the Project route, where the noise guideline limits might be exceeded during operation of the project. Besides, exact locations of the Industrial Zones are not known. Therefore, there is no information about overlapping areas in terms of these sensitive locations. Therefore, the assessment results in the ESIA report suggested to be considered during the site selection process of the Industrial Zone (or any construction works in the Industrial Zones such as construction new industrial unit) as well as local EIA process.
		Air Quality	AoI	Construction	Increase in ambient PM levels.	Negative Additive	Exact locations of the Industrial Zones are not known. Therefore, there is no information regarding their impact on sensitive receptors identified in this ESIA. In general, no major impact is expected from proposed Project construction works. On the other hand, cumulative impact in terms of PM levels may exceed the guideline limits where the construction locations of the Industrial Zones and project get closer. In this respect, during the PM monitoring of the construction works of the Project, potential construction areas, which may cause cumulative air quality impact, will be identified and noticed in the PM monitoring reports.
			AoI.	Operation	Decrease in the ambient air quality, in particular NOx levels.	Negative Additive	Air emissions form the Industrial Zones will have potential negative impact on ambient air quality in the AoI. As stated in Chapter 6 of the ESIA Report, there are potential critical locations in terms of ambient NOx levels caused by the Project. At these locations, estimated NOx levels are close or slightly

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							above regulated levels. As the nature of the Project, the NOx emissions from the vehicles cannot be controlled by the projects, and it is directly related to national policies. It is assumed that NOx emission levels will be decreased in time with respect to new technological improvements on transport vehicles as well as new national policies developed in line with EU accession. On the other hand, impact of the motorway in terms of air quality should always be regarded in future EIA Processes performed for new developments in the Region, in particular for the projects which have a potential impact on air quality. In this respect, the ESIA Report will be available for relevant authorities, and out-come of the ESIA will be shared with relevant stakeholders (i.e. Ministry of Environmental Protection within the stakeholder engagement process.
		Community Health and Safety	AoI	Construction	Increase in the number of traffic accidents.	Negative Additive	It is assumed that level of the construction works associated with the Industrial Zones will not cause a major increase in existing level of traffic in the region. On the other hand, cumulative impacts on traffic may become significant at overlapping areas, which is under the impact of the Project (i.e. access roads to the project site and associated facilities), In this respect, construction contractor should maintain continuous coordination with local authorities that responsible for coordination of the traffic on main transport roads as well as access roads. The Traffic management plan regularly updated to include potential projects in the AoI that may cause cumulative impacts.
			AoI	Operation	Increase in the number of traffic accidents.	Negative Synergic	Exact locations of the Industrial Zones and size of the zones are not known. On the other hand, it is a

2. Establishment of Industrial Zones							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							fact that establishment of the Industrial Zones will increase the traffic level on the motorway. In general, the traffic level is included in the feasibility of the project, and traffic level on the motorway as well as performance of the proposed mitigations will be continuously monitored by related state authorities.
		Local Economy	Footprints of the projects	Construction	Resettlement and decrease in the livelihood	Negative Synergic	Resettlement and loss in livelihood are the major negative impact of the Proposed Morava Motorway Project. In this respect, any land acquisition process for the Industrial Zones may cause additional impact on the local people, in case overlapping of the Industrial Zones and proposed Morava Motorway Project. In this respect, any potential land acquisition process performed for the zones are required to be followed by CoS (having information from related designated authority such as municipalities) to understand any additional potential impact on the effected person covered in the Resettlement Action Plan. The additional impact (if exist) should be included in the monitoring reports.
			Province in the AoI	Operation	Increase in income level	Positive Synergic	The strategic plan states that establishment of the Industrial Zones will lead new employment opportunities. These new job opportunities will have an important economic impact in the region. The Project will establish a direct connection of these projects to national and international markets. In this respect establishment of the projects will lead potential positive impacts for the local economy.

3. Reconstruction and rehabilitation of exiting Railway systems							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
Not known. It is assumed that reconstruction and rehabilitation will start during construction of the proposed project	Operation periods are same with the proposed project.	Land Use	Footprints of the projects in the AoI.	Construction	Change in area characteristics at the occupied lands for the project.	Negative Additive	Project has main impact on agricultural lands. The assessment on land use indicates that physical land use change due to the project is limited with its footprints. Therefore, no major cumulative impact is expected.
			AoI	Operation	Impact is not expected	Negative Additive	NA
		Biodiversity	Footprints of the projects in the AoI.	Construction	Loss of natural habitats	Negative Additive	Potential impact of the Project on natural habitats is limited with its footprint. Therefore, no major cumulative impact is expected. Same level of impact is expected from implementation of the Railway Rehabilitation and Reconstruction Project. Therefore, no major cumulative impact is expected.
			AoI	Operation	Fauna casualties Barrier effect	Negative Additive	Barrier effect of the Project is minimized with inclusion of the under passes for movement of terrestrial fauna. ESIA studies concluded that no major impact is expected on the terrestrial fauna species. Therefore, no major cumulative impact is expected.
		Surface and Ground Water	The West Morava River	Construction	Wastewater discharges from construction camps and from other associated facilities. Sand and Silt discharge from construction areas.	Negative Additive	All wastewater discharged from the project facilities will be treated in accordance to the existing national regulation as well as IFC Guidelines. Therefore, no major cumulative impact is expected.
				Operation	Storm water discharges from open surfaces.	Negative Additive	All the storm water collected form the Project will be rested in settlement ponds before it is discharged to the West Morava River (or its any tributaries). Therefore, no major cumulative impact is expected.

3. Reconstruction and rehabilitation of exiting Railway systems							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
		Noise and Vibration	Near Settlements	Construction	Increase in ambient noise level due to construction activities.	Negative Additive	No major impact is expected from the Project construction works. On the other hand, cumulative noise impact may exceed the guideline limits where the Project alignment passes close to the construction locations of the Railway Rehabilitation and Reconstruction Project. In this respect, during the noise monitoring of the construction works of the proposed motorway, potential construction areas, which may cause cumulative noise impact, will be identified and noticed in the noise monitoring reports.
			Near Settlements	Operation	Impact is not expected	NA	Noise level caused by the use of existing railway were measured and included in the baseline noise measurements. No major changes in terms of noise caused by train operation is expected after the Railway Rehabilitation and Reconstruction Project.
		Air Quality	AoI	Construction	Increase in ambient PM levels.	Negative Additive	No major impact is expected from the Project construction works. On the other hand, cumulative impact in terms of PM levels may exceed the guideline limits where the Project alignment passes close to the construction locations of the Railway Rehabilitation and Reconstruction Project. In this respect, during the PM monitoring of the construction works of the project, potential construction areas, which may cause cumulative air quality impact, will be identified and noticed in the PM monitoring reports.
			AoI.	Operation	Impact is not expected	Negative Additive	NA.

3. Reconstruction and rehabilitation of exiting Railway systems							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
		Community Health and Safety	AoI	Construction	Increase in the number of traffic accidents.	Negative Additive	Construction works of the Project will not cause a major increase in existing level of traffic in the region. On the other hand, at overlapping areas (i.e. use of main road E761 and common access roads located in AoI), cumulative impacts on traffic may become significant. In this respect, construction contractor should maintain continuous coordination with local authorities that responsible coordination of the traffic on main transport roads as well as access roads. The traffic management plan regularly updated to include potential projects in the AoI that may cause cumulative impacts.
			AoI	Operation	Impact is not expected	Negative Additive	NA
		Local Economy	Footprints of the projects	Construction	Resettlement and decrease in the livelihood	Negative Synergic	Resettlement and loss in livelihood are the major negative impact of the Project. In this respect, any land acquisition process for the railway projects may cause additional impact on the local people at overlapping areas with the Railway Rehabilitation and Reconstruction Project. Due to that reason, any potential land acquisition process performed for the Railway Rehabilitation and Reconstruction Project are required to be followed by CoS (having information from related designated authority such as railway authority) to understand any additional potential impact on the effected person covered in the Resettlement Action Plan. The additional impact (if exist) should be included in the monitoring reports.

3. Reconstruction and rehabilitation of exiting Railway systems							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
			Province in the AoI	Operation	Increase in income level	Positive Synergic	Railway project and motorway projects are two critical infrastructures for development of the regional and national economies. Therefore, establishment of the projects will have important positive impact on local economy.

4. Run-of the River Dam Projects along Morava River							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
Not known. It is assumed that construction will start during construction of the proposed project	Operation periods are same with the proposed project.	Land Use	Footprints of the projects in the AoI.	Construction	Change in area characteristics at the occupied lands for the project.	Negative Additive	The Project has main impact on agricultural lands. The assessment on land use indicates that physical land use change due to the project is limited with its footprints. There is no detailed technical information regarding the area requirement as well as the maps showing the coverage areas of the Run of the River Projects. By considering the general project characteristics of the Run of the River Projects, the land requirements for the projects are considered to be limited with weir ponds and power structures. In general, no major cumulative impact is expected. However, as it is stated above there is no detailed information on these hydropower projects. Additionally, material requirement for these projects are another important impact source of the Run of the River Projects. Due to that reason, National EIA process of the Run of the River Projects require to consider land use impact of the proposed Project. Therefore, the ESIA Report will be available for

4. Run-of the River Dam Projects along Morava River							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Environment Protection, within the stakeholder engagement process.
			AoI	Operation	Impact is not expected	Negative Additive	NA
		Biodiversity	Footprints of the projects in the AoI.	Construction	Loss of natural habitats	Negative Additive	Overall potential impact of the Project on natural habitats are assessed as limited with project footprint. The target of the mitigations provided for the project is as much as to restore disturbed habitats during the reinstatement of temporary used areas according to the habitat characteristics of the project AoI. Habitats along the old river-bed sections, which are subject to river diversions, will be protected. Additionally, new river bed at river diversion sections will be constructed with natural materials and river banks along river regulation sections will be planted with native species in order to support existing riparian habitats. Exact locations and detailed information on Run of the River Projects are not known. Therefore, an estimation on habitat loss due to Run of the River Projects is not possible. Besides, by considering the number of the Run of the River Projects and coverage are of the Project together with the Run of the River Projects, habitat loss can be significant in the Project AoI. Therefore, the site selection, design and local EIA Process of these projects should consider the outcome of the ESIA study. In this respect, the ESIA Report will be

4. Run-of the River Dam Projects along Morava River							
Constructio n Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							available for planning authorities, and out-come of the ESIA will be shared with relevant stake holders (i.e. Ministry of Environmental Protection within the stakeholder engagement process.)
			AoI	Operation	Impact is not expected	Negative Additive	Alteration of the river flow and barrier effect of the weirs are the major operational impact of the Run of the River Projects. Flow alteration and barrier effect of Run of the River projects mainly have significant impact on migratory aquatic species. As it in explained in Chapter 3, the diversion channels designed for River Regulation sections, does not include any structure (i.e. energy breaking weirs etc.), which is hindering the hydraulic conductivity of the West Morava River in order to sustain movement of the migratory aquatic species. Additionally, the water flow speed at new regulated sections will be more or less same with natural flows of the river system by arranging the areal size of the new channel at design phase. Due to that reason, no major flow change is expected at regulated sections due to flow alteration. In this respect, operational impacts of the river regulation and Run of the River Regulation Projects will not be common. Therefore, no cumulative impact is expected during operation phase. On the other hand, the design of Run of the River Projects should be made in accordance to the River Regulation design. For this purpose, River Regulation design and outcome of the ESIA Studies will be available for planning authorities, and out-come of the

4. Run-of the River Dam Projects along Morava River							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							ESIA will be shared with relevant stake holders (i.e. Ministry of Environmental Protection within the stakeholder engagement process.)
		Surface and Ground Water	The West Morava River	Construction	Wastewater discharges from construction camps and from other associated facilities. Sand and Silt discharge from construction areas.	Negative Additive	All wastewater discharged from the Project facilities will be treated in accordance to the existing national regulation as well as IFC Guidelines. Therefore, no major impact is expected due to the Project. In this respect, no major cumulative impact is expected.
				Operation	Storm water discharges from open surfaces.	Negative Additive	All the storm water collected from the proposed the Project, will be rested in settlement ponds before it is discharged to the West Morava River (or its tributaries). Therefore, no major cumulative impact is expected.
		Noise and Vibration	Near Settlements	Construction	Increase in ambient noise level due to construction activities.	Negative Additive	No major impact is expected from the Project construction works. On the other hand, cumulative noise impact may exceed the guideline limits where the construction locations of dams and the project get closer. In this respect, during the noise monitoring of the construction works of the project, potential construction areas, which may cause cumulative noise impact, will be identified and noticed in the noise monitoring reports.
			Near Settlements	Operation	Impact is not expected.	Negative Additive	NA
		Air Quality	AoI	Construction	Increase in ambient PM levels.	Negative Additive	No major impact is expected from the Project construction works. On the other hand, cumulative impact in terms of PM levels may exceed the guideline limits where the Project alignment passes close to the construction locations of the dams including material

4. Run-of the River Dam Projects along Morava River							
Construction Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							sources. In this respect, during the PM monitoring of the construction works of the Project, potential construction areas, which may cause cumulative air quality impact, will be identified and highlighted in the PM monitoring reports.
			AoI.	Operation	Impact is not expected.	Negative Additive	NA
		Community Health and Safety	AoI	Construction	Increase in the number of traffic accidents.	Negative Additive	It is assumed that level of the construction works of the Project will not cause a major increase in existing level of traffic in the region. On the other hand, at overlapping areas (i.e. use of main road E761 and common access roads located in AoI), cumulative impacts on traffic may become significant. In this respect, construction contractor should maintain continuous coordination with local authorities that responsible coordination of the traffic on main transport roads as well as access roads. A traffic management plan regularly updated to include potential projects in the AoI that may cause cumulative impacts.
			AoI	Operation	Impact is not expected	Negative Additive	NA
		Local Economy	Footprints of the projects	Construction	Resettlement and decrease in the livelihood	Negative Synergic	Resettlement and loss in livelihood are the major negative impact of the Project. In this respect, any land acquisition process for the dam projects may cause additional impact on the local people at overlapping areas. In this respect, any potential land acquisition process performed for the dam projects is required to be followed by CoS (having information from

4. Run-of the River Dam Projects along Morava River							
Constructio n Period	**Operation Period**	**Common VEC**	**Spatial Dimension**	**Temporal Dimension**	**Potential Impact**	**Impact Type**	**Assessment and Mitigations**
							related designated authority such as railway authority) to understand any additional potential impact on the effected person covered in the Resettlement Action Plan. The additional impact (if exist) should be included in the monitoring reports.
			Province in the AoI	Operation	Impact is not expected	Positive Additive	NA

7.8 Conclusion

This RCIA identified the relevant and potential major development projects in the region, and applied a systematic methodology to assessment of cumulative impacts (both spatial and temporal) in relation to the Project (together with river regulation works) construction and operation activities.

The RCIA found that major development projects in the region such as establishment of Industrial Zones and Logistic Centers have both potential negative and positive cumulative impacts. Positive impacts, which are anticipated in relation to economic development in the Project AoI, align with the main objective of the Project. On the other hand, economic development also leads to a shift in the structure of production, with a move from agricultural to manufacturing and services in addition to population growth. These structural changes put additional stress on land use as well as ecological habitats. Future Spatial Plan(s) or EIAs prepared for new developments covering the Project AoI need to consider the outcomes of the ESIA, and the potential cumulative impacts on existing land use including natural habitats are required to be evaluated. The extent of this impact will rely on coordinated planning between transportation and land use planning agencies. In this respect, the ESIA Report and out-come of the ESIA will be shared with relevant stakeholders such as Ministry of Construction, Transportation and Infrastructure and Ministry of Environmental Protection etc. within the stakeholder engagement process.

The assessment shows that expected level of the cumulative impacts related to air emissions, noise, traffic, waste water discharges are same as the Project impacts given in Chapter 6, and in general minor. Therefore, no specific recommendations are made for monitoring or measurements of potential impacts in the field due to fact that mitigations suggested in the assessment overlaps with mitigations stipulated in the ESMMP given in Chapter 8.

7.9 Transboundary Impacts

Due to the distances between planned Project activities and the land territories of Bosnia-Herzegovina, Macedonia and Kosovo (i.e. greater than 50 km), predicted impacts do not have the potential to cross territorial land borders and have a transboundary environmental impact. This includes potential transboundary air quality impacts as associated with the transportation of resources to and from the Project during the Construction and Operation Phase of the Project. In Chapter 6, impact on Terrestrial Ecology also considers and concludes that there will not be transboundary impacts upon migratory birds given that the Project will not have significant adverse direct or indirect impacts upon migratory bird species during planned activities.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

This plan presents the Environmental and Social Management and Monitoring Plan (ESMMP) for the proposed Morava Motorway Project, and will be implemented as part of the proposed Project's Environmental and Social Management System (ESMS). The ESMS will be implemented through an integrated framework of the projects overall management systems defined and framed in the ESIA as well as in the ESMMP. The ESMS will address organizational structure, responsibilities, practices and resources necessary for managing the project, including specific environmental and social commitments during the construction and operational phases of the proposed Motorway. The framework of the ESMS is provided in the Appendix-12.

This ESMMP sets out a formal system by which the Project can manage and monitor commitments during the construction and operational phases of the proposed Motorway.

8.1 Objective and Scope

The ESIA process has identified the key environmental, social and health issues, impacts and risks associated with the Project requiring the implementation of mitigation measures. this; these include;

- all the Project commitments (including relevant national regulations and legal requirements and lenders requirements),
- mitigation measures that have been identified from the impact assessment, and
- other best practice measures designed to avoid, minimize or reduce negative impacts and enhance positive impacts.

The purpose of this ESMMP is to establish how the mitigation commitments made through the ESIA process will be implemented, monitored and sustained. The content of the ESMMP is essential to bridge the findings of the ESIA with the implementation of the mitigation measures and to provide an early framework of management and monitoring that will ensure the implementation of these ESIA commitments.

The ESMMP also provides information and instructions on how environmental, social, and health commitments of the Project will be managed from design, pre-construction through the construction and operation phases. The ESMMP is a living document which:

- Incorporates the environment and social mitigation measures identified as a result of the ESIA process into a comprehensive framework to facilitate and ensure appropriate management throughout the Project life cycle.

- Provides a framework to incorporate commitments into the Project plans and procedures for construction and operation activities.
- Presents the division of responsibilities for achieving the ESMMP requirements including the provision of training.
- Provides a framework for the implementation of specific management plans by the Contractor and Operator that will meet the requirements of the national legislation as well as IFC/WB Group Performance Standards.
- Provides the monitoring/verification and reporting program (including corrective actions).

8.2 Roles and Responsibilities

The key parties and their primary roles and responsibilities in implementing the ESMMP are given in Table 8-1.

Table 8-1. Roles and Responsibilities

Name of the Authority	Responsibilities
Borrower – Ministry of Finance/ Ministry of Construction Transport and Infrastructure	Ensure allocation of sufficient resources for the implementation of bi-annual monitoring of the ESMMP, in line with Lender requirements.
Project Owner (Construction)- Corridors of Serbia	Overall responsibility of the Project with respect to applicable national and international standards. Ensure the allocation of sufficient resources for the implementation of their commitments within the ESMMP. Ensure stakeholder engagement and grievances related to land acquisition and expropriation activities are managed in line with the agreed Project SEP, RLRF and RAPs. Review the Contractors site specific implementation plans to ensure that they meet the requirements of and support the implementation of this ESMMP. Periodic review of the ESMMP effectiveness in line with the provisions of this plan. Participate in ESMMP Implementation Group. Reporting of significant incidents in line with Lender requirements.
Construction Contractor - BEJV	Overall responsibility for construction execution of the Project with respect to applicable national and international standards Ensure the allocation of sufficient resources (personnel, materials and equipment) are consistent with achieving the objectives and requirements for the implementation of their commitments within the ESMMP. Assign clear responsibilities and expectations with respect to implementing the Contractor's responsibilities and commitments within the ESMMP. Ensure the allocation of appropriately qualified personnel for the implementation of their commitments with the ESMMP. Employ Community Relations Officer to manage, review and monitor a social program to meet Project requirements, including commitment within the ESMMP. Employ Environmental Officer to manage, review and monitor the environmental program to meet Project requirements, including commitment within the ESMMP. Employ Health and Safety Officer to manage, review and monitor the occupational health and safety program to meet Project requirements, including commitment within the ESMMP.

Name of the Authority	Responsibilities
	Prepare site specific implementation plans that meet the requirements of and support the implementation of this ESMMP. Promote and implement the ESMMP by incorporating the appropriate provisions into Project policies, plans and procedures. Ensure stakeholder engagement and grievances related to construction activities are executed in line with the Contractor responsibilities and commitments in the agreed Project SEP, RLRF and RAPs Identify environmental and social risks as part of its planning processes and through implementation of appropriate mitigation measures and communicating these to its workforce. Establish self-verification of its own compliance by maintaining a system to manage environment and social aspects and impacts in line with ESIA requirements. Perform environmental and social monitoring activities prescribed within the national EIA Study and ESIA. Establish an ES&H program of internal reporting that includes incident reporting and investigation, system to record observations, non-conformance and actions that includes ESMMP performance indicators. Provide training to Project and subcontractor staff in their responsibilities with respect to compliance with the ES&H program. Report environmental and social performance to Project Owner and Lenders in line with agreed KPIs on periodical basis in a commonly agreed format. Ensure stakeholder engagement and grievances related to construction activities are managed in line with the agreed Project SEP. Develop awareness campaign on the Project SEP and Grievance Mechanism and address accordingly any grievances received that are related to construction activities. Prepare Human Resources policies and procedures that meet the requirements of national legislation and IFC/WB performance standards. Participate in ESMMP Implementation Group.
Project Operator – Roads of Serbia	Ensure the allocation of sufficient resources for the implementation of their commitments within the ESMMP. Ensure stakeholder engagement and grievances related to operation activities are managed in line with the agreed Project SEP, RLRF and RAPs Periodic review of the ESMMP effectiveness in line with the provisions of this plan. Participate in ESMMP Implementation Committee.

8.3 Documentation and Reporting

Documentation is an important element linked to the implementation of the ESMMP. The construction Contractor will establish a documentation and record keeping system in keeping with their Environment and Social Management System (ESMS), and will include the commitments within the ESMMP. Responsibilities will be assigned to relevant personnel for ensuring that the ESMMP documentation system is maintained, document controlled and distributed to the identified personnel. The following plans, procedures, and reports will be included in the Contractor's management systems:

- Occupational Health and Safety Management Plans
- Environmental Management Plans
- Sustainability and Social Management Plans
- Legal Compliance Register

- Method Statements and Work Instructions
- Incident Reporting
- Emergency preparedness and response procedures
- Training records
- Auditing and Monitoring reports;
- Complaints Register and issues attended/closed.

The Contractor will provide timely submissions of reports with the agreed level of detail.

In addition to the commercial contract requirements the Contractor's Construction Log and Construction Diary will include other observations that support the implementation of the ESMMP, such as community relations grievances.

8.3.1 External Reporting

All external reporting will be managed by the Project Owner/Employer within their obligations to the Serbian government entities under the national legislation and to the Lenders.

8.3.2 Internal Reporting

Internal reporting with regards to the Contractor's commitments within the ESMMP will be managed jointly by the Community Relations Officer, Environmental Officer and Occupational Health and Safety Officer. The Project will share, as appropriate, inspection and audit findings with their suggested measures regularly with the Project management, the ESMMP Implementation Committee and employees. To maintain an open communication between the employees and management on occupational health, safety, environmental and social issues the following tools will be used:

- Team Briefings,
- On-site work group meetings,
- Work Specific Instructions.

8.4 ESMMP Review

The ESMMP will be periodically reviewed to address changes in the responsible parties' organization, process or regulatory requirements.

Following any reviews, the Contractor will coordinate through the ESMMP Implementation Group to make any necessary amendments in the ESMMP, with, the updates communicated to all responsible parties and employees on the Project.

8.5 Training

The Project will implement a training and awareness program covering ESMMP expectations and commitments of the Project. As a minimum, this should be implemented as an induction

for all employees and sub-contractors engaged during pre-construction, design, construction and operation phases, with further training to be implemented depending on the level of responsibility for implementing the ESMMP.

The training program will cover the following aspects:

- Purpose of ESMMP in relation to the Project activities,
- Requirements of the management and monitoring plans,
- Understanding of the sensitive environmental and social receptors within and surrounding the Project areas, and
- Aware of the potential risks from the Project activities.

The Project will ensure that all personnel responsible for the implementation of this ESMMP are competent on the basis of education, training and experience. All Project personnel will be provided with environmental and social training appropriate to their scope of activity and level of responsibility.

8.6 Monitoring

A monitoring, review and auditing program will be implemented during construction to monitor implementation of the ESMMP requirements and environment and social commitments. The Project Owner/Employer will be responsible for ensuring that the Contractor and its sub-contractors are complying with the applicable national regulations as well as lenders requirements.

In line with the commercial contract, the Contractor will develop its own monitoring plan in conjunction with the Project Supervision Consultant (PSC) and relevant Project documents (EIA Studies, Preconditions of relevant authorities and ESIA). Responsibilities and cost of implementation of monitoring activities should be harmonized with EIA Studies requirements.

8.7 Legal Framework

This section presents a summary of national legislations and international standards, guidelines and requirements that are relevant to the Project and its activities. Detailed information on the mentioned legislations and international requirements can be found in Chapter 4 and Appendix 4 of the ESIA Report.

Table 8-2 presents the summary of national laws and regulations to reduce the potential and social impacts that may arise from the construction and operation activities of the Project.

Table 8-2. National Environmental and Social Legal and Policy Framework

National Environmental Legal and Policy Framework	
Environmental Impact Assessment	
Law on Environmental Impact Assessment	Official Gazette of the RS ", No. 135/04 and 36/09

Law on Strategic Environmental Impact Assessment	Official Gazette of RS, No.135/2004
Law on Planning and Construction	Official Gazette of RS, No. 47/03, 34/06
Law on Environmental Protection	Official Gazette of RS, No. 66/91, 83,92, 67/93, 48/94, 53/95, 135/04
Water	
Law on Water	Official Gazette of RS", No. 95/2018
Air	
Law on Air Protection	Official Gazette of RS, No 78/09
Law on Integrated Environmental Pollution Prevention and Control	Official Gazette of RS, No. 13/04
Soil	
Law on Soil Protection	Official Gazette of RS, No. 112/15
Noise	
Law on Environmental Noise	Official Gazette of RS, No. 88/10
Waste	
Law on Waste Management	Official Gazette of RS, No. 36/09 and 88/10
Geology and Seismicity	
Law on Mining and Geological Explorations	Official Gazette of RS, No. 88/2011
Nature Conservation	
Law on Nature Conservation	Official Gazette of RS, No. 9/10
Law on Forest	Official Gazette of RS, No. 30/10, 93/12, 89/15
National Social Legal and Policy Framework	
Assets	
The Law on Foundations of Property Law Relations	Official Gazette of RS, No. 6/80, 36/90
Law on Planning and Construction	Official Gazette of RS, No. 72/09
Law on Non-Contentious Proceedings	Official Gazette of RS, No. 25/82 and 48/88 Official Gazette of the RS No 46/95, 18/05, 85/12, 45/13, 55/14, 6/15 and 106/15
Law on State Surveying and Cadastre of Immovable Property	Official Gazette of the RS, No 72/09, amended on 18/10, 65/13 and 15/15
Law on Public Property	Official Gazette of RS, No. 95/18
Law on Contract and Property Rights	Official Gazette of RS, No. 9113/17
Expropriation	
Expropriation Law	"Official Gazette RS", No. 53/95
Labour and Working Conditions	
Labour Law	Official Gazette of RS, No. 75/2014
Occupational Health and Safety Law	Official Gazette of RS, No: 101/05
Law on Gender Equality	Official Gazette of RS, No. 104/09
Law on the Prohibition of Discrimination	Official Gazette of RS, No. 22/09
Law on Preventing Discrimination against Persons with Disabilities	Official Gazette of RS, No. 33/06 and 13/16
Law on Retirement and Disability Insurance	Official Gazette of RS, No. 34/03, 64/04
Law on Prevention of Harassment at Work	Official Gazette of RS, No.36/10
Law on Employment of Foreigners	Official Gazette of RS, No. 128/14
Stakeholder Engagement	
Law on Free Access to Information of Public Importance	Official Gazette", No. 120/04
Law on the Protector of Citizens	Official Gazette of RS" No. 54/07

Lender guidelines to be adopted by the Project is presented in Table 8-3.

Table 8-3. International Finance Institutions' Requirements

International Finance Institutions' Requirements	
UK Export Finance (UKEF)	Impact Assessments and Environmental and Social Management Plans produced by the project sponsor against host country laws and the relevant international standards, typically the International Financial Corporation (IFC) Performance Standards (PSs). UKEF, also adopted the Equator Principles. Similarly, Equator Principles refers to IFC Performance Standards on Environmental and Social Sustainability and the World Bank Group Environmental, Health and Safety Guidelines for the project type (Toll Roads), which is of concern for financial support.
Multilateral Investment Guarantee Agency (MIGA)	There are 8 Performance Standards (PS) established for the client to meet throughout the life of an investment supported by MIGA as: PS 1: Assessment and Management of Environmental and Social Risks and Impacts PS 2: Labor and Working Conditions PS 3: Resource Efficiency and Pollution Prevention PS 4: Community Health, Safety and Security PS 5: Land Acquisition and Involuntary Resettlement PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources PS 7: Indigenous Peoples PS 8: Cultural Heritage
IFC Requirements	IFC requires the Project Parties to carry out an environmental and social assessment of Project-related impacts according to the PSs as; PS 1: Assessment and Management of Environmental and Social Risks and Impacts PS 2: Labour and Working Conditions PS 3: Resource Efficiency and Pollution Prevention PS 4: Community, Health Safety and Security PS 5: Land Acquisition and Involuntary Resettlement PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources PS 7: Indigenous Peoples PS 8: Cultural Heritage;
Equator Principles	The Principles comprise a set of ten broad principles that are underpinned by the environmental and social policies, standards and guidance of the IFC as follows; Principle 1: Review and Categorization; Principle 2: Environmental and Social Assessment; Principle 3: Applicable Environmental and Social Standards; Principle 4: Environmental and Social Management System and Action Plan; Principle 5: Stakeholder Engagement; Principle 6: Grievance Mechanism; Principle 7: Independent Review; Principle 8: Covenants Principle 9: Independent Monitoring and Reporting; and Principle 10: Reporting and Transparency

8.8 SUPPORTING ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

Various management plans and procedures will be developed by the Contractor and will be implemented throughout the construction phase of the Project. The main subject and its purpose is presented below:

Environment, Health and Safety (EH&S) Management Plan: The purpose of this Plan is to provide a system and program that enables the ES&H policies, plans and procedures to be achieved by successfully performing the Project works in compliance with the Project requirements and the legal requirements of Serbia and IFI requirements. The Contractor's Project specific ES&H Management Plan will be developed to meet the requirements of ISO 45001 and ISO 14001, for which both Bechtel Corporation and ENKA İnşaat ve Sanayi A.Ş. have achieved certification.

The key elements of this Plan will include:

- ES&H Policy
- ES&H Responsibilities
- Worksite Rules and Security
- Sub-contractor management
- Incident Management
- Emergency Preparedness and Response
- Training
- Health and Wellbeing (including community health and safety)
- Incentive and Disciplinary
- Continuous improvement

Construction Environmental Management Plan (EMP): This Plan will outline how the Project will implement the requirements of the international Environmental Standard BS EN ISO 14001:2015, to which both joint venture companies are certified. This Plan will be implemented during the construction phase of the Project, and will include the additional policies, plans and procedures, such as:

- Environmental Policy
- Incident Management
- Noise and Vibration
- Water Quality Management
- Waste Management
- Soil Management
- Spill Response and Pollution Prevention, including specific procedures
- Emergency Preparedness and Response
- Chance-find Procedure
- Hazardous Materials Management
- Environmental Awareness Training
- Site Closure Plan

Emergency Preparedness and Response Plan (ERRP): This Plan outlines the roles and responsibilities involved in the planning and execution of emergency situations, identifies resources, training, and response procedures for any emergency situation during the construction phase.

Biodiversity Management Plan: This Plan outlines the mitigation measures, commitments and responsibilities, monitoring, auditing and implementation schedule in relation to Biodiversity during the construction phase.

Security Management Plan: This Plan outlines the roles and responsibilities involved in the planning and execution of security services, identifies resources, training, and response procedures for any emergency security situation during the construction phase. This Plan also includes community interface.

Infrastructure and Utility Management Plan (IUMP): This Plan includes processes to minimize risks and outlines appropriate response to failures and ensures operational reliability and effectiveness of all utility systems.

Traffic Management Plan (TMP): This Plan includes procedures and standards to minimize risks related to traffic management on public roads, private roads and temporary access roads during the construction phase.

Quarry Management Plan: This Plan includes guidance for selection, management and rehabilitation of quarries and borrow pits in compliance with the ESMMP and national requirements.

Soil, Erosion, Reinstatement and Landscape Management Plan (SERL): This Plan will describe the framework and approach that will be applied by the Project Owner and its Contractors to manage soil, erosion, sediment control and reinstatement during construction.

Stakeholder Engagement Plan (SEP): This Plan will be developed accordance with the approved SEP developed within the ESIA process, and aligned with international best practice. The Plan will provide sufficient opportunity for stakeholders to express their opinions or concerns via Grievance Mechanism and ensure that these concerns are addressed in the Project decision-making processes during all stages of the Project lifecycle.

Workers Grievance Mechanism: The Worker Grievance Mechanism will include policy and procedures to deal with the complaints and feedback received from the Project workforce. The structured Workers Grievance Mechanism will ensure that the grievances associated with the Project are addressed through a transparent and impartial process. From the early stages of the Project lifecycle, the grievance procedure has been and will continue to be disclosed to the workforce through individual or group meetings, printed materials, notice boards. Within the scope of the Workers Grievance Mechanism will be included for the construction phase of the Project by the Contractor for the complaints from the Contractor employees (including both direct and indirect employees, local workers and migrant workers through contractors).

Resettlement Action Plan (RAP): The purpose of this Plan is to specify all resettlement the procedures that will be followed and the actions that will be taken to mitigate adverse effects,

compensate losses, prevent impact on the livelihoods and provide development benefits to persons and communities affected by the Project. The document is developed for and implemented by the Project Owner.

Camp Management Plan (CMP): This Plan will outline the standard requirements of camp management process including worker accommodation and temporary site facilities for the Project. The main purpose of this Procedure is to delineate the general requirements applicable for the administration and maintenance of temporary camp facilities.

HR Policy and Labour Relations Plan: The aim of this document will be to establish an active human resource management to meet with the quality and quantity requirements of the Contractor and their Subcontractors to ensure good working conditions including recruitment strategy, fair and equitable pay, benefits and opportunities as determined by their qualifications, position and work performance for its staff and the staff of subcontractors. This document will provide a framework for recruitment, training, motivation and promotion processes.

During the operation phase, the Project Operator will establish their Environmental and Social Management System in order to implement the measures within the ESMMP.

8.9 Environmental and Social Management and Monitoring

Monitoring will be conducted for the Project activities to confirm effectiveness of management and mitigation measures within the ESMMP to ensure compliance with Project standards (national legislation and IFC/WB performance standards).

Periodical monitoring will be conducted during the life of the Project to confirm the effectiveness of the management plans. A reporting mechanism for the monitoring results is essential and will ensure the review of the Project seniors and lenders. The ESMMP Audit Reports shall cover the status of ES&H -related aspects such as permits, status of compliance with obligations arising from licenses or permits, non-compliance with regulatory environmental standards with root cause analysis, corrective measures, as well as conformance with the ESMMP. The audits must address the performance of both the Project Owner and the Contractor or its Subcontractors.

A management and monitoring plan has been prepared for the construction (pre-construction, design, and construction) and operation phases of the Project in Table 8-4 and Table 8-5.

8.9.1 Environmental and Social Management

Table 8-4. Environmental and Social Management and Monitoring Plan (Construction Phase)

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
Surface Water								
1.	**Spillage/Leakage to Surface Water**	PS 1 PS 3	Design • Storm water drainage risk assessment will be conducted in order to confirm that storm water drainage designs used for construction works are effective to mitigate impacts on land use, surface water and sensitive ecological sites therein. Out-put of this assessment including suggested mitigations will be incorporated to relevant plans such as Soil Erosion, Reinstatement and Landscape (SERL) Management Plan. Construction • The Project Environmental Management Plan (EMP) will include Spill Response and Prevention, Water Quality Management, Hazardous Material Management procedures that will be implemented. • Accidental spills will be avoided through good practice and restriction of refueling near watercourses. Safe fueling and gasoline handling procedures will be practiced in the construction areas. If heavy equipment cannot be moved to appropriate fueling points, an impervious surface (such as a drip-tray) will be used for refueling this equipment to prevent accidental releases to groundwater aquifers. • Re-fueling of all plant, vehicles and machinery will be carried out at minimum 50 m of any watercourse, drain or channel leading to a water	Contractor	West Morava River and its tributaries Existing natural ponds	EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management WMP EPRP SERL Management Plan Site Closure Plan	Visual inspection and observation Incident/accident reports Site inspection reports Water quality measurements	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			course. • Hazardous materials will not be stored in excavated areas. Exposure to hazardous materials in open areas will be kept to a minimum in size and time. • All hazardous material or waste storage areas used for construction works will be connected to a closed impervious sump or waste water treatment facility and/or bounded with secondary containment. Secondary containment structures will consist of berms, dikes, or walls capable of containing the larger of 110% of the largest tank or 25% of the combined tank volumes in areas where hazardous materials are handled such as fuel stores and loading areas, concrete mixing, hazardous material stores to prevent hazardous materials entering the site drainage. • Oil separator will be used for silty/soiled water from construction activities and after silty/soiled water is brought to national and international discharge criteria will be discharged to suitable receiving environment. • Scheduling of construction activities near the West Morava River during period of heavy rainfall will be considered. High sediment producing activities such as road paving will be avoided as much as possible and exposed surfaces and stored materials covered as necessary to reduce erosion of sediments to surface water. • Soil extraction or excavation areas by the river banks will be protected by appropriate fencing such as orange safety barrier fencing during the construction phase, to prevent negative impact that may be caused by driving and unloading of					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			materials nearby. • Wastewater generated during concrete batch plant operation and cement trucks washing will be monitored for pH and temperature. Concrete wastewater can show high pH values, and high alkalinity. • Water flow in the river (or any stream) will not be fully blocked, and continuity of the flow will be maintained as much as possible, • Sensitive areas of rivers and drains will be protected from impact from vehicles and other construction activities with appropriate fencing such as orange safety barrier fencing or other appropriate ways. • Spill Response Kits will be available on construction site. • Spill Response Kits will be held at secure, clearly signposted locations, instructions will be provided in appropriate languages and personnel will be trained in their use. • Spills will be immediately contained on site and all contaminated materials including soils will be removed from the site for suitable treatment and disposal. • All staff and subcontractors will report any spill incidents, and these will be subject to investigation and close out remedial and preventive actions.					
2.	**Working in the River-Bed and River Regulation works**	PS 1 PS 3 PS 6	<u>Construction</u> • The timing of the work will be constrained by the months of high-water level and Environmental requirements if the works directly related with the existing River flow.	Contractor	West Morava River and its tributaries	Construction Method Statements EPRP Pre-mobilization	Visual Inspections and observations Water quality measurements Warnings/penaltie	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Size of the working area in the riverbed will be reduced and limited as much as practicable. • Water flow in the river (or any stream) will not be fully blocked, and continuity of the flow will be maintained as much as possible, • Water turbidity at up-steam and down-stream of the working area will be monitored during construction activity in the riverbed. If the turbidity level exceeds the standards, level of construction works will be decreased (or stopped) at corresponding location until the turbidity is decreased to regulated levels. • Re-fueling of all plant, vehicles and machinery will be carried out at minimum 50 m of any watercourse, drain or channel leading to a water course. • Storage and handling of fuels, oils and other hydrocarbons through a controlled process, involving measures to prevent soil and water contamination. Those should include fuel and oil storage on sealed surfaces and within secondary containment; • All sites near rivers will be protected by fencing and other means to prevent loss of construction materials, particularly hazardous materials. • Movement of equipment inside rivers, streams, or on their banks, will be prevented except when it is unavoidable due to the construction of a structure or in emergency situation. • Training will be provided to machine operators regarding the sensitivities and working procedures, with attention to machine and equipment inspection for leaks prior to use, safe storage and handling of fuels/oils/hydrocarbons near the watercourse and/or precautionary			checklist EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management SERL Management Plan	s given by public authorities Complaint records	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			measures to prevent contamination of soil and watercourse • Emergency Preparedness and Response Plan (EPRP) will be followed by all staff working on or near the river.					
3.	**Wastewater generation**	PS 1 PS 3	<u>Pre-Construction</u> • Design of wastewater treatment facilities should sustain water discharge standards provided in Chapter 4 and Appendix – 4. • During site arrangement, the potential wastewater sources from camp/site facilities, asphalt plant, concrete batching plant, and quarries will be defined. Depending on availability on waste treatment facilities, these sources can be connected to local sewerage system, which should be ended with proper wastewater treatment facility sustains the discharge quality standards given in Chapter-4 and Appendix -4. • Wastewater treatment facilities will be established before operation of construction project facilities such as camp sites, asphalt plants and concrete batching plant. Permits and licenses for operation of these wastewater treatment facilities will be in line with national requirements. <u>Construction</u> • All wastewater discharges from all construction components must comply with the relevant legal requirements provided in Chapter 4 and Appendix 4. • The treated water will be reused whenever possible.	Contractor	West Morava River and its tributaries	Camp Management Plan EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management WMP	Monitoring results of wastewater treatment facilities Water quality measurements. Warnings/penalties given by public authorities Complaint records.	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
Groundwater								
4.	**Leakage to Groundwater**	PS 1 PS 3	Pre-construction • Fuelling and storage areas will be planned and designed with containment to prevent releases to ground. Construction • Accidental spills will be avoided through good practice and restriction of refueling near watercourses. Safe fueling and gasoline handling procedures will be practiced in the construction areas. Where the construction equipment cannot be moved to fueling points, an impervious surface (such as drip-trays) will be used during refueling of construction equipment to prevent accidental leakage to groundwater. • Hazardous materials will not be stored in excavated areas. • Exposure to hazardous materials in open areas will be kept to a minimum in size and time.	Contractor	Shallow Aquifer (1m - 6 m) of the West Morava River	EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management, Site Closure WMP EPRP SERL Management Plan	Incident/accident reports Visual Inspection and observation Groundwater quality measurements.	Construction
5.	**Groundwater Contamination due to Wastewater Discharge to Water Environment**	PS 1	Pre-construction • Design of wastewater treatment facilities should sustain water discharge standards provided in Chapter 4 and Appendix – 4. Construction • Wastewater and/or treated wastewater form treatment facilities will not be discharged or collected in any earth based dry stream course or soil pit. • Any underground septic tank either for the collection of wastewater or treated wastewater will be impervious and protected from any leakage.	Contractor	Shallow Aquifer (1m - 6 m) of the West Morava River	CMP EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management	Visual Inspection and observation Groundwater quality measurements. Warnings/penalties given by public authorities Complaint records	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Integrity of underground septic tanks will be regularly inspected and maintained.					
6.	**Alteration of Groundwater Level**		<u>Design</u> • The regulation activities within the scope of this Project is to protect against flooding and eliminate more consecutive sharp bends and bank eroision. • During the design phase, river regulation activities will prioritize to protect and minimize negative impacts on watercourses and stability of the riverbed. • The use of groundwater resources will be subject to approval by the local Authority. The Authority may allow the extraction wells to be drilled and used if the groundwater supply is sufficient. These approvals are based on the availability of the water source. Where the use of ground water is as water source for the construction works (including Project facilities), all permits will be secured before the use. <u>Construction</u> • Groundwater level but excessive dredging below the groundwater level will not be conducted. • Groundwater level will be regularly monitored from existing groundwater wells located near the construction site.Groundwater use shall not exceed the permitted level. • Excavation of the borrow pits can go deeper than groundwater level but excessive dredging below the groundwater level will not be conducted.	Project Owner Contractor	West Morava River aquifer	CMP EMP - Water Quality Management, Spill Response and Prevention, Hazardous Material Management	Groundwater level monitoring results of Project Facilities and existing wells close to the borrow pit areas	Pre-construction baseline and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
Air Quality and Climate								
7.	**Dust Generation**	PS 1 PS 3	Construction • The Project Environmental Management Plan (EMP) will include Air Quality Management procedures that will be implemented. • If there is a requirement for unpaved roads close to settlements to be used by vehicles, surface-binding agents may be used, options include salt to or gravel coat the road. • 20kph speed limit will be applied on unpaved surfaces close to settlements. • Vehicles will be kept clean, so that no dirt is carried on the vehicles into and out of the area. • Where the mitigation measures are inadequate, surface-binding agents will be used in exposed earthworks. • Localized watering/dampening and activity-specific watering/dampening will be used to reduce localized dust emissions. • Stockpiling of stripped surface material, eg. rock, sand and soil, stockpiling of unwashed materials, will be limited. Stockpiles should be kept as enclosed as possible or covered. • Stockpiles will be placed as far away from receptors as possible. • Design of stockpiles will be optimized to maintain a low profile without a sharp change in shapes. • Wind breaks or dust protection systems (including sprinklers) should be built around the main construction activities where necessary and, if possible, near potentially dusty works to minimize the impact of nearby residential	Contractor	Nearest settlements to construction sites Natural habitats along the construction sites	EMP - Air Quality Management TMP	Air quality monitoring results Maintenance records of vehicles and equipment. Warnings/penalties given by public authorities Complaint records.	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			receptors. • Good practice should be applied for selection of Project vehicles that meet the latest emission standards (e.g. EURO 3 or US EPA Tier 2 emission standards) and maintained in a reasonable working order. • When not in use, vehicles should be shut down unless it is due to health and safety reasons (e.g. maintenance of the air conditioner). • Air pollution control equipment (e.g. baghouse) should be installed and operated for the asphalt plants. • During transportation on public roads, the excavated materials will be covered with nylon canvas or suitable materials with a grain size greater than 10 mm in public roads as good practice. • To reduce fugitive dust emission during vehicle operation on public roads and at construction sites, service roads and quarry/material borrow/storage sites, dust suppression methods (i.e. watering with water trucks, applying nontoxic chemicals, speed limits for mobile vehicles, using well-maintained vehicles/equipment) should be used.					
Noise and Vibration								
8.	**Noise Pollution**	PS 1 PS 3	<u>Pre-construction</u> • Project Environmental Management Plan (EMP) will include Noise and Vibration and Management Plan that will be define the sensitive receptor locations, monitoring program and specific mitigation measures to be implemented.	Contractor	Nearest settlements to construction sites Natural habitats along the	EMP - Noise and Vibration Management Quarry Management Plan TMP	Noise monitoring results Warnings/penalties given by public authorities Complaint records	Pre-construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Traffic Management Plan (EMP) and construction Method Statements will include any agreed noise and vibration mitigation measures. • Planning of transport routes including temporary access roads, haul roads and construction work sites should be determined to avoid populated areas and away from sensitive receptors and villages as much as possible. • The Project should consider the construction of a newly allocated access road instead of using the existing road network. • As Project construction progresses, buildings that may be potentially affected will be identified prior to construction, including assessing whether buildings are sensitive to night-time disturbance. <u>Construction</u> • Motorway alignment will be used for the transport of construction materials and equipment wherever possible. • Internal haul routes will be well designed and maintained and steep gradients should be avoided where possible. • Empty vehicles will not have loose chains or other noise “generating parts on the loading platform. • During off-loading, materials will dropped from an appropriate height to avoid noise disturbance to the surrounding receptors or to minimize noise from the site in general. • All construction equipment and vehicles will be regularly checked and maintained. This should particularly include the regular inspection of diesel powered equipment and, if necessary,		construction sites	SEP	Maintenance records of vehicles	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance. • Position of all auxiliary plant (e.g. generators, compressors) should be determined to cause minimal noise disturbance. • In case of noise exceedance, silencers or acoustic enclosures on machines as well as portable sound barriers around stationary equipment, should be installed where applicable. • 20kph speed limit will be applied on unpaved roads to reduce noise and vibration, limit fugitive dust generation, reduce emission and reduce the risk of accidents (vehicles, pedestrians, cyclist, and fauna). • Speed exceedances will be notified to the site administration and handled according to H&S Management Plan. • Additional driver training, temporary speed restrictions, improved driving monitoring, etc., will be provided as necessary or required. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Noise mitigation measures specifically related to equipment and vehicle traffic through sensitive receptors should be directed at: ➢ Minimizing individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			an equipment maintenance program. ➢ Maintain road surface regularly. ➢ Avoid unnecessary idling times. ➢ Minimizing the need for trucks/equipment to reverse movement. This will reduce the frequency of reverse warnings will occur. Alternatives to the traditional reverse 'beeper' alarm such as a 'self-adjusting' or 'smart' alarm could be considered. These alarms include a mechanism to detect the local noise level and automatically adjust the output of the alarm is so that it is 5 to 10 dB above the noise level near the moving equipment. ➢ Where possible, noisy activities such as, decommissioning and maintenance, should be limited to day-time hours. • Noise levels will not exceed WHO Environmental Noise Limits, national limits or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site. • Noise level limits for construction activities are stated in the national EIA. If limits are exceeded, then appropriate mitigation measures will be implemented in accordance with the Serbian regulations. These may include: ➢ Night-time operation and transport should be minimized as much as possible, near to villages or where a transport road passes. ➢ Distance between construction site and sensitive receptors (e.g. hospitals, nursing homes, schools) should be mazimised. If this is not possible, then temporary noise barriers (eg. portable sound walls, soil berm) should be installed between the construction site and sensitive receptors.					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			➢ Construction equipment used in intermittent periods will be shut down at intervals between works. ➢ Working hours for some construction equipment or operations with greater noise and vibration impact will be limited to core daytime hours or routes where the area is less susceptible to noise. • Sensitive receptors (e.g. hospitals, nursing homes, schools) will be provided with advanced notification of noisy works and project specific additional mitigation measures. • Special acoustic insulation and related mitigation measures will be evaluated on a case-by-case basis.					
9.	**Vibration**	PS 1 PS 7	<u>Pre-construction</u> • Buildings near vibration sources (e.g. blasting, pile-driving and operating heavy earth-moving equipment) will be identified prior to construction. • Buildings and occupants with susceptibility detection will be evaluated for vibration, and if vibration estimates or measurements show potential for building damage, alternative construction methods will be developed to prevent damage. • Vibration standards according to Serbian regulations (Law on Environmental Noise / 2010) will be implemented through the Noise and Vibration Management Plan. Documentation will be prepared for each of the identified buildings. • Quarry Management Plan will be developed, and should include noise and vibration mitigation measures such as placement of rock structures as a noise barrier between the quarry area and	Contractor	Nearest settlements to construction sites, Project Facilities and quarries Natural habitats along the construction sites, Project Facilities and quarries	EMP - Noise and Vibration Management Quarry Management Plan	Vibration measurements Quality Inspection Records Warnings/penalties given by public authorities Complaint records	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			potentially affected villages. • Material procured from quarries and suppliers that are not directly owned by the Project Owner or the Contractor will be evaluated to assess the operations of this facility to verify compliance with its permitted activities and relevant operating conditions. <u>Construction</u> • Monitoring of vibration in initiation of relevant activities will be performed to ensure that national legal requirements and international standards are met. • Additional measures will be taken to reduce vibration effects if standards are exceeded, and, if necessary, to change operating methods to use equipment that generates lower vibration levels. • Mitigation measures will be taken into account to prevent negative impacts caused by vibration in quarries, and this will be documented in the Quarry Management Plan. • During blasting operations, when hydraulic drills are used for drilling of boreholes, the number of the boreholes will be decided according to the blasting plan in order to reduce to a minimum any need for secondary blasting of rock. • During blasting operations at quarry sites and during earthworks, monitoring/inspection will be carried out to ensure compliance with legal requirements and blasting permit requirements.					
Geology and Soil								

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
10.	**Earthquake**[1]	PS 1 PS 4	Design and Pre-construction • The Project will comply with the relevant Serbian regulatory requirements related to seismic design and risk assessment.(2) • Emergency Preparedness and Response Plan (EPRP) will be implemented.	Contractor	Construction sites and Project Facilities	EPRP	Incident Reports Emergency Training Documents Emergency Drill Records	Pre-Construction and Construction
11.	**Erosion**	PS 1 PS 4	Design The Soil Erosion, Reinstatement and Landscape Management Plan will be developed and implemented. The Plan will adopt measures stated in the IFC EHS Guidelines: Construction and Decommissioning (2007) as: ○ Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical, ○ Contouring and minimizing length and steepness of slopes ○ Mulching to stabilize exposed areas ○ Re-vegetating areas promptly ○ Designing channels and ditches for post-construction flows ○ Lining steep channel and slopes (e.g. use jute matting). Also, structure of the Plan will comply with the IFC EHS Guidelines: Toll Roads (2007).	Contractor	Construction site including all Project Facilities West Morava River and its tributaries	IFC EHS Guidelines: Construction and Decommissioning (2007) and Toll Roads (2007) EMP - Site Closure SERL Management Plan	Visual inspections Incident Reports	Pre-Construction and Construction
12.	**Soil Pollution caused by Construction**	PS 1 PS 3	Construction • Spill Response and Prevention Procedure will be	Contractor	Construction site and	EMP - Water Quality	Visual Inspections	Pre-Construction and

[1] The Project will not create any seismic activity As a result, it is not expected any earthquake caused by the Project. In this section, the impact of the earthquake on the Project area and mitigations is evaluated.
[2] Depending on the ground conditions and the seismic characteristics of the region, design and design verification will be carried out according to Eurocode 8: Design of structures for earthquake resistance.

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
	Activities		prepared and implemented. • Construction equipment, machines and vehicles will be parked on arranged locations. • Parking surfaces (soil, gravel, and rock) will be protected from pollution from oil, oil derivate, naphtha and naphtha derivate. In case of pollution, measures will be taken in accordance with the Law on Soil Protection ("Official Gazette of RS" no. 112/15) • Washing of equipment, machinery and vehicles will be prohibited within construction area. • Concrete mixer washout areas will be designated and any other washing of concrete mixer and uncontrolled removal of the remaining parts of concrete mass on any surface outside road area will be prohibited. • Excavated material will be re-used to the extent possible. • Excess materials will be used during site arrangement and resinstaement activities. • Before storage of excess excavated materials, soil samples form excess material and proposed storage site will be sampled in order to understand the suittability of the proposed area fort he storage. • Hazardous materials will not be stored in excavated areas. • Exposure to hazardous materials in open areas will be kept to a minimum in size and time.		Project Facilities	Management, Spill Response and Prevention, Hazardous Material Management, Waste Management, Site Closure Plan ERPR SERL Management Plan	Soil quality analysis Warnings/penalties given by public authorities Complaint records	Construction
13.	**Land Degradation and Soil Loss**	PS 1	<u>Design and Pre-construction</u> • All borrow pits and unsuitable soil waste areas will be designed in accordance with the	Contractor	Construction site and Project	SERL Management Plan	Visual Inspections Site inspection	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			mitigation measures within the national EIA and any permit conditions (outside the alignment expropriation boundaries). • Soil, Erosion, Rehabilitation and Landscape Management Plan will be prepared for all borrow pits and unsuitable soil waste areas used during construction works. <u>Construction</u> • Borrow pits and unsuitable soil waste areas will be executed according to design specifications, method statements and reinstatement plans.		Facilities	EMP - Site Closure	reports	
Resource and Waste								
14.	**Destruction of habitats and plants during earthworks and resource extraction**	PS 3 PS 6	<u>Design and Pre-construction</u> • Quarry Management Plan will be developed and implemented during the construction phase. • Soil Erosion, Reinstatement and Landscape (SERL) Management Plan will be prepared in accordance with Serbian law, IFC EHS Guidelines and international environmental management systems. • Emergency Preparedness and Response Plan (EPRP) will be developed and implemented. • Hazardous Material Management Plan will be developed and implemented. <u>Construction</u> • Quarries will be operated and monitored to comply with national and international standards (IFC EHS Guidelines for Construction Materials Extraction (2007) • Where possible, existing (fully licensed) quarries should be used instead of opening new quarries. • Existing quarries will be assessed to ensure that	Contractor	Construction site and Project Facilities	SERL Management Plan Quarry Management Plan EPRP	Visual inspection to ensure the effectiveness of the mitigation measures Waste disposal records Records of the contractual agreements .	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			the permits are valid and that operations are appropriate and in accordance with national and international standards. • If a new quarry is opened outside the expropriation boundaries, all required permits will be obtained.					
15.	**Disposal of excavated waste soil**	PS 1 PS 3	Pre-construction • WMP and Soil Erosion, Reinstatement and Landscape (SERL) Management Plan will include best management practices for excavated waste soils. Construction • Excavated soils will be reused as much as possible and, where applicable, alternative uses of surplus residues will be investigated.	Contractor	Construction site and Project Facilities	EMP - Waste Management SERL Management Plan	Visual inspection Records of the third-party agreement for disposal of the excavated soil	Pre-Construction and Construction
16.	**Hazardous waste generated during construction activities**	PS 1 PS 3	Pre-construction Hazardous Material Management Plan will be prepared and implemented. Construction Hazardous waste generated during construction will not be discharged in surface water. (Law on Waste Management ("Official Gazette of RS", no. 36/09 and 88/10). All hazardous waste should be properly collected, marked and disposed at approved location in accordance with the procedure prescribed within the Law on waste management ("Official Gazette of RS", 36/09, 88/10, 14/16). It is strictly forbidden to dispose any type of hazardous waste on locations where surplus earth material will be disposed. Hazardous waste will be managed and disposed in accordance with Law on Waste Management and the Directive 91/689/EEC on hazardous waste.	Contractor	Construction site and Project Facilities	EMP - Hazardous Material Management, Waste Management	Records of the third-party agreement for disposal of the hazardous waste	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Hazardous waste will be collected and disposed by a licensed waste contractor.					
17.	**Resource Efficiency***		<u>Construction</u> • When the project is a potentially significant consumer of water, in addition to applying the resource efficiency requirements of this Performance Standard, the Contractor shall adopt measures that avoid or reduce water usage so that the project's water consumption does not have significant adverse impacts on others. These measures include, but are not limited to, ➢ the use of additional technically feasible water conservation measures within the construction activities, ➢ the use of alternative water supplies, water consumption offsets to reduce total demand for water resources to within the available supply • The Contractor will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release according to the mitigation measures given in the Report. This applies to the release of pollutants to air, water, and land due to routine, non-routine, and accidental circumstances with the potential for local, regional, and transboundary impacts. • Where waste generation cannot be avoided, the Contractor will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. Where waste cannot be recovered or reused, the Contractor will treat, destroy, or dispose of it in an environmentally sound manner that includes	Contractor	Construction site and project construction facilities	EMP - Waste Management Construction Management Plan	Sustainability Report	Pre-Construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			the appropriate control of emissions and residues resulting from the handling and processing of the waste material. If the generated waste is considered hazardous, the client will adopt GIIP alternatives for its environmentally sound disposal while adhering to the limitations applicable to its transboundary movement.					
Terrestrial and Freshwater Ecology								
18.	**Damage or loss of terrestrial habitats due to permanent structures**	PS6	<u>Design</u> • Afforestation activities will be performed in line with the 'no net loss principle', i.e., preparation of Biodiversity Management Plan and SERL Management Plan. • Gallery vegetation will be created along West Morava's new riverbed, as it existed before the regulation, to restore the natural habitat condition. This gallery will also be retention for possible high waters. • After the river regulation, 17 m of revegetated area with native species will be created on both sides of the new river bed. <u>Pre-Construction</u> • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. <u>Construction</u> • Project construction sites and access roads will be separated from sensitive areas with appropriate fencing and signage. • Appropriate fencing such as orange safety	Project Owner Contractor	Construction site Project Facilities	Biodiversity Management Plan SERL Management Plan	Visual Inspections Site inspection reports. Achievement of the targets/measures provided in Biodiversity Management Plan.	Pre-construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			barrier fencing will be installed to protect sensitive habitats. (Sensitive habitats are provided in the Constraint Map given in Appendix-5) • In sensitive habitat areas, pedestrian, equipment and vehicle access will be limited to the designated access to construction sites. Parking and driving off the designated access roads will not be allowed. • Waste generated from construction work and activities will be stored at designated areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Construction waste generated due to project activities will first be stored at designated storage areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Licensed/approved facilities for solid and liquid waste disposal will be used and a duty of care and chain of custody for all waste leaving the site will be followed. • Riparian vegetation along the West Morava River will be restored.					
19.	**Damage or loss of terrestrial habitats due to temporary structures**	PS6	<u>Design and pre-construction</u> • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. • SERL Plans will be developed for all Project Facilities – camps, site facilities, borrow pits, quarries, batching plant, and asphalt plants. • SERL plans for borrow pits will include habitat designs that allow artificial wetlands to be reformed. During the baseline field studies,	Project Owner Contractor	Construction site and Project Facilities	Biodiversity Management Plan SERL Management Plan	Visual Inspections Site inspection reports. Achievement of the targets/measures provided in Biodiversity Management	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			existing borrow pits which had already been opened in the region in the past, had over time developed into wetland habitats. This measure will encourage development of new habitats, especially aquatic plants and bird species. Construction • Project construction sites and access roads will be separated from sensitive areas with appropriate fencing and signage. • Appropriate fencing such as orange safety barrier fencing will be installed to protect sensitive habitats. (Sensitive habitats are provided in the Constraint Map given in Appendix-5) • In sensitive habitat areas, pedestrian, equipment and vehicle access will be limited to the designated access to construction sites. Parking and driving off the designated access roads will not be allowed. • Waste generated from construction work and activities will be stored at designated areas and then disposed. Solid waste will not be allowed to be left at natural habitats. • Licensed/approved facilities for solid and liquid waste disposal must be used and a duty of care and chain of custody for all waste leaving the site will be followed. • Project Facilities will be dismantled upon completion of the construction phase. • Areas where the facilities are located will be reinstated according to SERL Plans.				Plan.	
20.	**Habitat fragmentation**	PS6	Design and Construction • Fauna crossing points (i.e., culverts) will be designed and installed along the motorway, in	Contractor	Construction site and Project	National EIAs Biodiversity Management Plan	The crossing success of the fauna species.	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			accordance with the national EIAs and ESIA baseline studies. Culverts for animals are primarily constructed as safe crossing points for mammals. Target species are usually mammals. Small fauna species may readily use these culverts as well. As a minimum when using culverts a ledge will be incorporated where species such as otters and reptiles can cross alongside the river even at times of high flow. It can also be used on bridges to be built on the West Morava River to prevent barrier effect. Vegetated area will be left between the bridge abutment and the riverbank. (Sensitive habitats are provided in the Constraint Map given in Appendix-5)		Facilities		Reported number of incidents/accidents.	
21.	**Loss of sensitive plant species**	PS6	Pre-Construction • Seeds of nationally protected flora will be collected from the construction area to be used in the post-construction landscaping phase (Location of the species are provided in the Constraint Map given in Appendix-5) • Where practical, collected seeds of the limited range distributed flora will be delivered to the Plant Gene Bank in Belgrade, for conversation purposes. • Where practical, Iris pseudoacorus (KP 60+700) will be relocated to nearby or similar habitats by a suitably qualified person such as botanist. Construction • Measures to reduce dust and air quality will be taken as mentioned in Sections 6.4 • Dust suppression will be used at working sites (i.e. truck roads, storage areas etc.) in the proximity or near to the areas, where the Nuphar lutea species is located, and dust will be	Project Owner Contractor	Location of the species are provided in the Constraint Map given in Appendix-5	Biodiversity Management Plan	The germination success of the planted seeds.	Pre-construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			prevented. In addition, specie specific signs (to inform workers and local people) will be prepared for the areas where this species is located, and necessary measures will be taken to prevent this area from being affected by construction works.					
22.	**Loss of sensitive fauna species**	PS6	<u>Pre-Construction</u> • Where possible, gradual vegetation clearance will be planned to enable fauna to move to other areas. • Pre-construction surveys for target fauna will be undertaken within high sensitive areas by a competent ecologist to assess their presence in the construction site. • Before any construction works in the West Morava River or at the river banks the locations will be controlled for potential presence of otters (burrows, trail, feces, and pubs). Additionally, the borders of the construction area will be identified, and the construction area will be prevented for the entrance of individuals (otters) during construction works. • Protection strategy for sensitive fauna will be developed and implemented in coordination with National Protection Institute. If during the construction activities, any sensitive fauna species is observed, the works will be suspended in the specific location immediately, and the National Protection Institute will be informed without delay. • In the areas where bridge structures are proposed, observation for Lutra lutra will be made by a competent biologist. If the Holts of Lutra lutra are observed in the field, biologist will verify that it is not used by the species. • Before any construction works in the breeding	Project Owner Contractor	Location of the target species are provided in the Constraint Map given in Appendix-5	Biodiversity Management Plan	Achievement of the targets/measures provided in Biodiversity Management Plan.	Pre-construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			and wintering habitats, the size of these habitats will be controlled. • Vegetation clearance will be avoided, whenever feasible, during fauna breeding and wintering periods. • Construction activities will be planned to minimize disturbance during the breeding bird period (1 April to 30 June). During baselines field survey areas were identified with suitable habitats for breeding: Quarry at KP 25 and Borrow Pit at KP 67. • Construction activities will be planned to minimize disturbance during the wintering bird period (1 December to 1 February). During baselines field survey areas were identified as wintering area: Borrow Pit at KP 60 and West Morava River corresponding to KP 95. • If construction has started before these dates, work can be continued in both breeding and wintering areas. <u>Construction</u> • Speed of construction vehicles will be limited, in order to limit emission of dust in non-paved access roads and avoid the risk of accidents with fauna. • Sensitive habitats will be protected by the use of appropriate fencing such as orange safety barrier fencing. Protective measures will be implemented especially in locations of active construction works to also avoid the entry fauna and avoiding accidents.					
23.	**Increase in noise, visual and vibration which**	PS6	<u>Construction</u> • Measures to reduce noise will be taken as mentioned in Sections 6.5	Contractor	Construction site located in Sensitive	EMP – Waste Management, Environmental	Site inspection reports.	Pre-construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
	may cause disturbance or displacement of fauna		• Noise, waste and spills created during the construction activities will be managed under an Environmental Management Plan, to limit the disturbance to fauna. • Environmental Awareness training will be provided to all personnel to increase awareness about the impact of disturbance, waste and spills on habitats and fauna.		Habitats provided in the Constraint Map given in Appendix-5	Awareness Training Biodiversity Management Plan	Achievement of the targets/measures provided in Biodiversity Management Plan. Noise measurement results.	
24.	**Introduction of Alien invasive species**	PS6	<u>Construction</u> • Intrusion of any invasive flora species into the project area and its surroundings will be prevented. For this purpose, especially vehicles used for vegetation clearance and/or plant transfer will be washed/cleaned prior to use. • Project employees will not be allowed to bring any live animals or plants into the construction site to avoid the risk of pest/invasive species establishing in the Project area. • Planting of alien species will be prohibited within the Project Facilities or any areas within the AoI, including landscaping of revegetated areas. • Where practical, alien species will be seasonally monitored to record their populations in the construction area and to prevent them from spreading throughout the AoI. Additionally, prompt revegetation (i.e. sowing of native herbaceous species and/or planting native shrubs/trees) on bare soil with natural or semi-natural vegetation will reduce the spread of alien species. • Revegetation (i.e., the sowing of native herbaceous species on top-soils and/or the	Contractor	Construction site and Project Facilities	EMP – Site Closure Biodiversity Management Plan SERL Management Plan	Visual Inspection Achievement of the targets/measures provided in Biodiversity Management Plan.	Construction Post-construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			planting of native shrubs/trees) will be undertaken as soon as possible after clearance and construction.					
25.	**Damage to Freshwater Ecosystem**	PS6	Pre-Construction • Temporary culverts proposed for river and stream crossings as mitigation measure to protect sensitive aquatic habitats (see Water Environment Terrestrial section 6 of the ESIA) will be designed to allow fish crossing both high and low flows (i.e. bottomless culverts). • The natural structure of the riparian vegetation which forms the spawning and sheltering area for many aquatic organisms will be preserved where possible. • Vegetation clearance works will be planned and executed to avoid damage to the riparian vegetation, whenever possible. • Any intervention in particular during river regulation works in long distance or that can significantly disturb the river habitat (riverbed and side slope) will be prevented during the breeding season of fish species (30th April to 15th June). Construction • The permanent non-tidal, smooth-flowing watercourses habitat (EUNIS Code C2.3) within the proposed Motorway route is sensitive and highly susceptible to damage. For this reason, the construction activities will be executed without damage to the habitats which outside the proposed Motorway route. (Locations of the habitats are provided in Biodiversity Baseline Report - EUNIS Habitat Map given in Appendix-7). • To avoid any increase of the turbidity levels,	Project Owner Contractor	West Morava River and its tributaries Natural ponds in the AoI.	EMP – Water Quality Management, Waste Management, Site Closure Biodiversity Management Plan SERL Management Plan	Site inspection reports. Achievement of the targets/measures provided in Biodiversity Management Plan. Water quality measurement results.	Pre-construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			excavated materials will not be deposited or stored in or near freshwater features. Detailed mitigations about spillage are given in Sub-section 6.3.1 Construction within the Riverbed • Measures to avoid spills will be taken as mentioned in Sub-section 6.3.1. Spillage/Leakage to Surface Water. • If any emergency, construction or river crossing works in or near West Morava River and its tributaries must be carried out during the breeding season, a Method Statement will be developed detailing protection measures such as sediment traps/booms, temporary diversions, etc. and monitoring process. • Monitoring will be done during construction by specialist subcontractor/biologist.					
26.	**Freshwater Habitat loss / change due to river regulation**	PS6	<u>Design and Pre-Construction</u> • The new riverbed should be designed with the ground material that characterizes the riverbeds in the region as much as possible (rocks, gravels). There should be sufficient areas on the riverbanks where aquatic plants can hold, and as a result, plant development can be achieved. This will create suitable spawning and sheltering areas for fish species. • The barriers at the upstream end of the abandoned river channel will not allow fish migration, but as the compensation measure, the abandoned meanders will be left open on the downstream side. Fish migration is possible through the new river channel of the West Morava River. • In order to reduce the impact of flow rate in the new riverbed due to river regulation natural material (such as rocks) will be used for the	Project Owner and external experts to conduct the specialist services, field surveys. Contractor	West Morava River and its tributaries Natural ponds in the AoI	EMP – Water Quality Management, Waste Management, Site Closure Biodiversity Management Plan SERL Management Plan	Site inspection reports. Achievement of the targets/measures provided in Biodiversity Management Plan. Water quality measurement results.	Pre-construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			protection of scouring and river bank erosion. Continuity of the flow will be maintained in the new channel and the flow of the river will not be impacted. • Stream mouths will be arranged to allow fish passage in places where existing streams will be connected to the new riverbed.• • Afforestation activities will be performed on the river regulation works in line with the 'no net loss principle', i.e., preparation of Biodiversity Management Plan and SERL Management Plan. <u>Construction</u> • During river regulation or diversion works, fish species stranded in the natural small ponds (puddle) will be transported to the riverbed by a competent biologist. • Fish transportation will be made in specialized vehicles with tanks and oxygen, if necessary, other vehicles will be adapted for this purpose and equipped with a container for transporting fish.					
27.	**Loss of sensitive aquatic species**	PS6	<u>Pre-construction and Construction</u> • Construction work (bridge structures, drainage, temporary crossings and temporary works for structures) on and near the West Morava River and its tributaries between 30th April to 15th June will be planned and executed with care to avoid or minimize impact to fish species caused by human or equipment activities. • A Method Statement for Work on or Near Watercourse will be prepared detailing the measures such as sediment traps/booms, temporary diversions, etc. • If construction work (river regulation, bridge	Project Owner Contractor	West Morava River and its tributaries Natural ponds in the AoI	Biodiversity Management Plan	Site inspection reports. Achievement of the targets/measures provided in Biodiversity Management Plan.	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			structures, drainage, temporary crossings, and temporary works for structures) has commence before the start of breeding season, work can continue in line with the measures detailed in the Method Statement.					
Archaeological and Cultural Resources								
28.	**Chance of Destruction of Archaeological and Cultural Resources**	PS 8	<u>Design and pre-construction</u> • During the route selection process, existing cultural heritage sites and intangible values were taken into a consideration. • Chance Find Procedure will be developed and implemented by the Employer. <u>Construction</u> • The Project Owner / Employer will provide all the conditions and enable smooth and constant monitoring of works during the entire duration of the earthworks, by the archaeological supervision. • The Contractor will follow the national requirements with respect to “chance finds” which may emerge during construction. • During the construction work, if archaeological or historical sites and objects are discovered the Contractor shall mark and secure new identified sites (with a protective railing or other means of protection) to avoid damage in the course of road construction and immediately notify the relevant Institute for the Protection of Cultural Monuments.	Project Owner and external experts to conduct the field surveys. Contractor	The Archaeological areas and Heritage buildings that overlap the buffer zone of the Project (see Appendix 5.3)	Chance Find Procedure	Visual check Site inspection reports	Pre-Construction and Construction
Visual and Landscape and Land Use								
29.	**Change of landscape due to**		<u>Pre-construction and Construction</u>	Project Owner	All Municipalities	EMP –Site Closure	Visual inspections	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
	changes in land use		• Construction footprint areas including Project Facilities will be as minimal as practicable. • Visual barriers will be installed if area is subjected to high visual impacts where practical. Planting native species will be used as visual barrier. In areas with short construction period, adult trees should be translocated for establishing the visual barriers. Areas where visual impact will occur are provided in the Visibility Map given in Appendix-5 • Construction sites will be kept tidy and workers will have necessary knowledge/training about the issue.	Contractor	in the social AoI	SERL Management Plan	Grievance Records	
30.	**Visibility of new structures from Settlements**							
31.	**Visibility of new structures from Recreational Areas**							
SOCIAL								
Population								
32.	**Increased risk of illicit behavior and crime**	PS-1	<u>Pre-construction and Construction</u> • Workers will be paid adequately to prevent theft potential. • Workers will be paid into bank accounts. • Priority will be given to the local labor where possible and practical. • Worker accommodation facilities will include leisure areas to reduce the interaction of the workers with the local communities. • Code of Conduct will be developed in compliance with the Serbian legislation. Hard copies will be provided in English and the native languages of the workforce. • All workers (including expats) will be trained in their native languages about the Code of Conduct and dismissal policy in particular in criminal cases.	Contractor	Jasika Vrnjci Adrani	Grievance Mechanism Cultural Awareness Training Recruitment Plan	Grievance Records Percentage of local employment compared to the overall workforce. Cultural Awareness Training records Skill development training content for local labour	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
33.	**Risk of social conflict**	PS-1	Pre-construction and Construction • Code of Conduct will be developed in compliance with the Serbian legislation. Hard copies will be provided in English and the native languages of the workforce. • All workers (including expats) will be trained in their native languages about the Code of Conduct. • All workers (including expats) will receive Project Orientation and Cultural Awareness training that covers sensitive issues on the local communities. • Before mobilizing the workers to the camp accommodation, the Camp Manager and the local CLOs will inform the local communities about the expat workers.	Contractor	Jasika Vrnjci Adrani	Code of Conduct Project Orientation and Cultural Awareness SEP	Training records on the Code of Conduct, Project Orientation and Cultural Awareness Consultation records and proof of interactions of local CLOs with communities in the vicinity of the camp accommodation.	Construction
34.	**Influx of additional population**	PS-1	Pre-construction and Construction • Recruitment Plan will be prepared and implemented to prevent spontaneous influx of job seekers. • Employment capacity and the qualifications required for the construction will be disclosed to the public to prevent unrealistic expectations. • Cooperation will be developed with the local municipalities and local employment agencies.	Contractor	Jasika Vrnjci Adrani	Recruitment Plan	Number of the local employees Announcement of employment opportunities. CV pool. Recruitment tools.	Construction
35.	**Impacts on community dynamics**	PS-1	Pre-construction • Mitigation measures will aim to prevent burden on the communal services and AoI. • Worker accommodation will be established to reduce pressure on the facilities of the local communities. • Worker accommodation will be in compliance with the Guidance by IFC and EBRD Workers'	Contractor	Jasika Vrnjci Adrani	CMP	Monitoring of Camp Management Plan. Visual inspections Camp Inspection reports	Pre-construction and Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			Accommodation: Processes and Standards. • Camp Management Plan will be developed and include (but not limited to) IFC and EBRD Guidance (IFC, EBRD, 2009) for worker accommodation, such as: ➢ Basic collective social/rest spaces such as multi- purpose halls, designated areas for radio, TV, cinema. ➢ Recreational facilities such as exercise equipment, library, swimming pool, tennis courts, table tennis, and educational facilities. ➢ Dedicated places for religious observance. ➢ Access to public phones at affordable/ public prices (that is, not inflated). ➢ Internet facilities , particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated					
36.	**Increased burden on and competition for public service provision**	PS-1	<u>Pre-construction</u> • Wastewater treatment system and septic system will establish in the Project Facilities as a good practice. • When required, coordination with local municipality and electricity companies will be carried out to ensure the need assessment for the electricity and water supply by the Contractor for the construction and domestic usage does not cause the capacity to decrease. • Project Owner will assist the Contractor with the cooperation with the local authorities about the water and electricity consumption. • Since the majority of the neighboring villages do not have a sewage system the Camp Management Plan (CMP) may establish capacity building measures within the location of camp	Project Owner/Employer Contractor	Jasika Vrnjci Adrani	Grievance Mechanism	Grievances related with pressure on the public services and infrastructure.	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			accommodation areas to prevent any residual impacts.					
37.	**Gender Based Violence**	PS-1	Pre-construction • Information tools and hiring women CLOs to access women in the AoI is recommended. During the Women Focus Group Discussion (FGDs), it has been raised by the participants that the women members of the community cannot participate in the decision-making process and they do not have equal roles in the community. • Code of Conduct will be developed in compliance with the Serbian legislation. Gender equality, positive discrimination and the sexual harassment issues and approach on gender sensitivity should be included. • All workers (including expats) will be trained in their native languages about the Code of Conduct. • All workers (including expats) will receive Project Orientation and Cultural Awareness training that covers sensitive social issues on the local communities. Construction • Grievance Mechanism will be developed and gender based complaints and necessary measures will be taken accordingly.	Contractor	Jasika Vrnjci Adrani	Grievance Mechanism SEP Code of Conduct Recruitment Plan	Recruitment of women CLO. Training Records on Code of Conduct. Grievance records.	Construction
38.	**Local inflation of prices:**	PS-1	Construction • Market rates for procurement of goods, services, land and labour should be paid in order to avoid directly causing an increase in the price of local goods, services, land and labour.	Contractor, Subcontractors and supply chain	Jasika Vrnjci Adrani	Grievance Mechanism	Grievance Records Annual reports of the governmental bodies.	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
Infrastructure								
39.	**Pressure on the local healthcare infrastructure as a result of incoming construction workforce**	PS 1 PS 4	Pre-construction • Emergency Preparedness and Response Plan (3) (EPRP) will be developed that considers the role of communities and community infrastructure as appropriate in responding to emergency events. • Health Services assessment will be conducted of available health services Local and District levels and will assess the situation of settlements and in the vicinity of the construction sites, camp and other Project Facilities to ensure no reduction in services available to local settlements occurs. • Preventive health basic measures will be carried out regarding COVID 19 Pandemic and WHO recommendations will be implemented • Camp accommodation and site facilities should include first aid and emergency response for safety, fire and environmental hazards and incidents. • Camp accommodation will include first aid and medical facility for its expat employees which is expected to mitigate potential burden on the existing local health infrastructures, and in accordance with the Occupational Health and Safety Law enforced in 2005 (Official Gazette No: 101). • Infrastructure and Utilities Management Plan (IUMP) will be developed before setting up the camps. The Plan will assess the infrastructure potential of the surrounding area (i.e., water supply, wastewater and sanitation services,	Contractor, Subcontractors and supply chain	All Municipalities in the social AoI	IUMP EPRP CMP Grievance Mechanism	Statistics on workforce using accommodation facilities. Grievance records.	Construction

[3] An Emergency Preparedness and Response Plan will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines (IFC, 2007)

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			electricity supply, potable water supply, and solid waste management). If the camps are established in a location with no sufficient capacity, services and utilities the Contractor will establish its own utility services when required, e.g. Power generators. <u>Construction</u> • A Grievance Mechanism will be developed to record, avoid and address incidents caused by the construction activities (e.g. Electricity and water cutoffs, traffic blockages, disruption of local roads where patients are travelling to hospitals daily).					
40.	**Impacts on local infrastructure**	PS 1 PS 4	<u>Design and Pre-construction</u> • Emergency Preparedness and Response Plan4 (EPRP) will be developed that considers the capacity of communities and current situation of the community infrastructure to respond to emergency events efficiently. • Infrastructure and Utilities Management Plan (IUMP) will be developed. • Camp Management Plan (CMP) will be developed that considers infrastructure and utility needs for construction sites, accommodation, workshops and warehouses. • During the preparation of all plans, engagement with local authorities and utilities companies will be undertaken to ensure continuity of supply to communities. <u>Construction</u> • The Project will implement a Grievance	Contractor	All Municipalities in the social AoI	IUMP EPRP SEP CMP Grievance Mechanism	Incident/accident records regarding local infrastructure Community engagement records Grievance records	

[4] An Emergency Preparedness and Response Plan will be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines (IFC, 2007)

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			Mechanism and address infrastructure related grievances in line with the Stakeholder Engagement Plan (SEP) of the Project. • Training construction workers regarding to good practices on resource efficiency.					
41.	**Impacts on the local road network**	PS 1 PS 4	<u>Design and Pre-construction</u> • Traffic Management Plan (TMP), Infrastructure and Utilities Management Plan (IUMP) and Emergency Preparedness and Response Plan (EPRP) will be developed and implemented. • Temporary loss of, or access to, infrastructure or services should be avoided by ➢ providing alternative routes and roads, as necessary ➢ inform local communities of program and sequence of works. • In case of using local roads for transportation, repair works will be made in collaboration with the local authorities. <u>Construction</u> • Engagement will be made with local authorities on the issue of traffic movement during construction phase.	Contractor	All Municipalities in the social AoI	TPM IUMP EPRP Grievance Mechanism	Visual inspections approved TMPs Incident Reports number and type of traffic incidents/accidents Training Records – records Vehicle Inspection records and driver logs Grievance records	Construction
Economy								
42.	**Employment**	PS 2	<u>Pre-construction</u> • Recruitment procedures will be developed and aim to: ➢ provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled, and skilled workforce ➢ give priority to vulnerable persons (especially	Project Owner Contractor	All Municipalities in the social AoI	Human Resource Policy Workers Grievance Mechanism	Statistics on workforce from the social AoI Project-specific Human Resources Policy and relevant	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			those who will be economically disabled) ➢ give priority to Social AoI as much as possible, for the scope of good practice. • The Contractor and the Employer will outline and require a fair and transparent, gender neutral recruitment process for all job openings. The Contractor should seek to employ Project PAPs on each Sector of the Project route. • The Contractor should encourage Subcontractors to employ local personnel. <u>Construction</u> • Capacity enhancement benefits will be increased through training programs for contractors and subcontractors on related policies, as well as phased capacity building and targeted training programs for national and local suppliers agreed with local government and industry organizations to benefit local capacity enhancement.				procedures Grievances records	
43.			<u>Pre-construction</u> • Project should seek to maximize the benefits for local communities in terms of both direct and indirect employment opportunities and purchasing of local good and services. • Procurement Plan will be developed and implemented. Project should adopt measures within its purchasing policy to provide opportunity for local scale businesses to tender for procurement of subcontracted good and services (e.g. advertising locally).	Contractor	All Municipalities in the social AoI	Local Procurement Plan	Procurement Plan local business content and records Grievances records	Construction
44.	**Impact on Agriculture**		<u>Pre-construction</u> • During land expropriation and acquisition process, cooperation between the Project Owner and Project Operator (Corridors of Serbia,	Project Owner Project Operator	All Locations where land acquisition is occurring	RAP	The indicators that will be provided within the scope of RAP	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			Ministry of Construction, Transport and Infrastructure (MCTI) and Roads of Serbia) should consider the following measures; ➢ support for the development of cooperatives and farmers associations should be provided ➢ ensure the implementation of education programs for farmers; implementation of local agricultural incentive programs, ➢ provide seminars to direct for farmers to promote and modern approaches to farming. ➢ Implementation of RLRF and RAP. <u>Construction</u> • The Project Owner/Employer will encourage and interact with Ministry of Agriculture to include the PAPs within their training programs (eg. reskilling, opportunity, diversity).				Grievances records	
Land Acquisition and Resettlement								
45.	**Permanent acquisition of lands**	PS 5	<u>Design</u> • Effects of physical and economic displacement will be minimized • People affected by the Project will be compensated in accordance with the Principles set in the in the RLRF. • As a minimum, Resettlement Action Plans (RAPs) will be prepared. It will detail the impacts of the Project on land ownership, land use, property and livelihoods. The RAPs will set out the measures needed to address adequately physical and economic displacements due to the Project.	Project Owner Contractor	All affected people from the land acquisition and resettlement	RAP SEP Grievance Mechanism	Documentation associated with implementation of RAP Documentation associated with implementation of Livelihood Restoration Plan Grievances records	Pre-Construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• A detailed socio-economic assessment will be undertaken for the RAP to identify impacts on PAPs, including land acquisition impacts and restriction to land use. • A census will be carried out to determine persons to be displaced by the Project, persons that are eligible for compensation and assistance, inventory of affected land and property. <u>Pre-construction</u> • Assistance will be provided to vulnerable persons who are not able to relocate and resettle on their own. • Additional targeted assistance (e.g., credit facilities, training, or job opportunities) will be provided and opportunities to improve or at least restore their income-earning capacity, production levels, and standards of living to Economically Displaced Persons whose livelihoods or income levels are adversely affected <u>Construction</u> • The amount of land occupied during the construction will be minimized. • Construction workers will be trained to stay within the border of the construction areas and expropriation corridor and avoid trespass on private land. • For exceptional cases when the privately-owned land has to be used but the expropriation or court processes have not been finalized yet, no work will be started until bilateral agreements are settled and official consent letters are taken from the legal owners. • If complaints related with unauthorized use of					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case basis and where necessary, corrective actions will be planned and implemented. • In case of any direct damage on private property as a result of the activities of the Project contractors or subcontractors, the Contractor will ensure that relevant corrective measures (e.g. repair, maintenance, rebuilding, restoration, etc.) are implemented.					
46.	**Impacts on Agricultural lands**		<u>Pre-construction</u> • Users of land will be timely informed when construction is planned to begin and how lost crops and damages will be compensated. • When displacement cannot be avoided, displaced persons will be provided with appropriate compensation for loss of assets per Expropriation Law (Official Gazette RS, No. 53/95 dated December 28, 1995, including changes of 23/01 dated April 6, 2001, 20/09 dated March 19, 2009 and 55/13 dated June 25, 2013) considering the provisions of the Spatial Law. • All users of land whose crops are lost or affected by any other damage during the construction will be compensated at a full replacement value, in accordance with Serbian legislation and IFC requirements. • If compensation alone is not sufficient to restore livelihoods, implementation of livelihood restoration in accordance with IFC requirements. • Grievance mechanism will be established	Project Owner/ Employer Contractor	All affected people from the land acquisition	RAP SEP Grievance Mechanism	Documentation associated with implementation of RAP Documentation associated with implementation of Livelihood Restoration Plan Grievances records	Pre-Construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			Construction • Impacts to agricultural and pasture lands will be minimized as far as possible by keeping the Project construction footprint as narrow as possible, and efficiently restoring any damaged areas					
47.	**Impacts on Business lands**		Pre-construction • Business losses will be compensated at a full replacement value, in accordance with Serbian Legislation and the IFC requirements. • If compensation alone is not sufficient to restore livelihoods, implementation of livelihood restoration in accordance with IFC requirements. • Grievance Mechanism will be implemented in line with the SEP.	Project Owner Contractor	All affacted businessess	RAP SEP Grievance Mechanism	Documentation associated with implementation of RAP Documentation associated with implementation of Livelihood Restoration Plan Grievances records	Pre-Cpnstruction Construction
48.	**Temporary land allocation**		Construction • All disturbed private land will be rehabilitated as appropriate and agreed upon, following the completion of construction works.	Contractor	All locations where temporary land allocation is occuring	EMP –Site Closure RAP SEP Grievance Mechanism	Protocols with land owners Grievances records	Pre-Construction Constrcution
49.	**Fragmentation of certain land plots**		Design and Pre-construction • Underpasses will be designed to ensure access of local people to agricultural lands, with sufficient dimensions for the passage of harvesters, vehicles, etc. where required. • Temporary access roads will be constructed in parallel to the Motorway route near agricultural areas/zones to provide access to agricultural	Project Owner/ Employer Contractor	All municipalities in social AoI	RAP SEP Grievance Mechanism	Documentation associated with implementation of RAP Documentation associated with implementation of	Pre-Construction Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			lands, where practical.				Livelihood Restoration Plan Grievances records	
50.	**Damage to crops during construction**		Pre-construction • Any loss of or damage to crops caused by Project activities will be compensated. Construction • The Project will minimize damage to crops by minimizing the area of disturbance caused by vehicle movement and other construction activities. • If complaints related with unauthorized use of privately-owned lands, damages on adjacent lands, etc. are received through Project's Grievance Mechanism, evaluation/inquiry will be conducted on a case-by-case and where necessary, corrective actions will be planned and implemented.	Project Owner Contractor	All locations where damage may occur	RAP SEP Grievance Mechanism	Protocols with land owners Grievances records	Pre-Construction Construction
51.	**Physical and economic displacement of PAPs**		Pre-construction and Construction • Employment Plan will be prepared. Local employment and PAPs who will lose income (agriculture and seasonal agriculture activities) or jobs due to Project related activities should be encouraged by establishing fair, transparent and equal opportunities for employment.	Project Owner/ Employer	All affected people from the land acquisition and resettlement	RAP SEP Grievance Mechanism	Employment records Grievances records	Pre-Construction Construction
Ecosystem Services								
52.	**Access to Forest Lands**	PS 5 PS 6	Pre-Construction • Local authorities and the villagers will be informed before the construction activities within the forest land to not create any limitation on	Project Owner Contractor	All municipalities in the AoI	Grievance Mechanism RAP	Visual inspections and records of information tools & consultation	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			firewood collection, herbs collection and hunting. Construction • Hunting and collection of wild animals will be strictly prohibited within the Project area. • Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such has wood fuel, mushrooms, building materials or other useable resources. • For households who obtain income from timbering activities commercially, compensate for unavoidable loss through in-kind restoration or other type of compensation methods applicable to the IFI requirements. • Piles of woody vegetation cleared for construction activities are to be made available to communities to access it for use as wood fuel or other purposes.			SEP	Environmental measurement records Traffic incident/accident reports Training records on traffic management Biodiversity monitoring records Visual inspections and records of vegetation clearing Grievances records related to restrictions on designated hunting areas	
53.	**Impact on Apiculture**	PS 5 PS 6	Pre-Construction • Exact location of the beehives will be determined during the RAP preparation and if required, logistic assistance should be provided the move the beehives. • Seasonal requirements for apiculture will be considered during the planning of construction works. The Beekeepers Association of Kruševac recommended that the construction activities should be conducted as much as practical distance from the beehives (in May, June, July they can fly 2 km). • In case of grievances, beehives will be moved	Project Owner	Kruševac	Grievance Mechanism RAP SEP	Statistics on beekeepers and activities Environmental measurement records - dust & noise Resettlement action records (if required) Grievance records	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			away from the Motorway Route with the assistance of CoS. Construction • Monitoring will be held within the scope of the RAP to analyze the livelihood impacts of the beekeepers				related with beekeeping activities.	
54.	**Impact on River Usage**	PS 5 PS 6	Design • In forming the new river bed and banks, preserve as much as possible, their original and authentic look and purpose. In the case of cutting riverbed, it is necessary to ensure some culverts for the smooth flow of water and the movement/migration of aquatic organisms, including fish. Construction • The communication tools developed within the scope of the SEP will be implemented to inform the PAPs and the local authorities on the river regulation. • Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Avoidance of any spill affecting to the freshwater ecosystems. Construction activities will be carried out carefully and impacts caused by human activities will be minimized especially between 30th April to 15th June in order not to harm the species that is exist in the West Morava River.	Project Owner Contractor	All municipalities in the AoI	Grievance Mechanism RAP SEP	Consultation records Grievance records related to river usage	Construction
55.	**Impact on Leisure Activities and Tourism**	PS 5 PS 6	Construction • Addition to SEP, suitably qualitied technical staff and environmental management procedures will be developed and implemented.	Project Owner Contractor	Vrnjačka Banja Municipality Kraljevo Municipality Čačak	Grievance Mechanism RAP	Grievance Records Tourism statistics	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Planting native species will be used as visual barrier. In areas with short construction period, adult trees may be translocated for establishing the visual barriers to prevent the impacts on the tourism activities.		Municipality	SEP	Stakeholder engagement records (owners/operators of touristic facilities)	
Labour and Working Conditions								
56.	**Labour Risks and Impacts Related to Women Employment and Non-Discrimination and Equal Opportunity**	PS 2	Pre-construction / Construction / Operation • The Contractor and Operator will apply equal opportunities to women in all of their branches. • Further measures will be put in place to encourage female participation in indirect workforce, such as providing specific training where required, enabling flexibility and job-sharing opportunities for women with children to participate.	Contractor Project Operator	Construction area and Project Facilities	Worker Grievance Mechanism Human Resource Policy	Workforce statistics Grievance records Workforce statistics	Construction
57.	**Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced)**	PS 2	Pre-construction / Construction / Operation • The Contractor and Operator will not employ nor permit any subcontractor to use child labour, and in accordance with Serbian legislation, any person under the age of 18 may not be assigned to any hazardous work within the Project. • The Contractor and Operator will prohibit the use of forced labour by ensuring full compliance with national legislation and the provisions of relevant conventions and other international standards	Contractor Project Operator	Construction area and Project Facilities	Worker Grievance Mechanism Human Resource Policy	Workforce statistics	Construction
58.	**Worker Conditions and term of employment**	PS 2	Pre-construction / Construction / Operation • Workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Information will include, but not be limited to: • entitlement to wages, hours of work, overtime arrangements and overtime compensation, and	Contractor Project Operator	Construction area and Project Facilities	Worker Grievance Mechanism Human Resource Policy	Work contracts in line with Serbian Law and the IFC PS2. Labor Audit Report(s)	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			any benefits (such as leave for illness, maternity / paternity or holiday) • able to join trade unions of their choice and have the right to collective bargaining • contracts will be verbally explained in their native languages to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed. • Cultural Awareness Training will be provided an on-boarding requirement to all non-local workers, and in particularly foreign workers. • Worker Grievance Mechanism will be developed and will: • be open to all the staff and their contractors, • be publicly advertised by the Project in the workforce, • be easily accessible by workers • be free of retribution • allow anonymous complaints to be raised and addressed. • All Project parties will require all contractors to sign an anti-corruption and responsible procurement policy. • For all contractor contracts, the Project will make explicit reference to the need to abide by IFC standards and ILO conventions in relation to labor and welfare standards, freedom of association and reference must be made to child and forced labor. Emphasis will also be placed on anti-discrimination measures. Where young people below the age of 18 years are employed, it will be made clear that they will not be employed in hazardous work and their work will				Training Records	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			be subject to an appropriate risk assessment. <u>Pre-construction</u> • Camp Management Plan will be developed and comply with 'Workers' accommodation: processes and standards, a guidance note by IFC and the EBRD' (2009) • Design of the accommodation camp will include measures for managing the camp to ensure adherence to international standard for providing a safe environment that is clean, and adequate sanitary. Measures will include: • waste management • provision of potable water, • provisions of minimum amount of space for each worker • laundry facilities • cooking facilities (separate area for the foreign personnel, if necessary) • provision of first aid and medical facilities • provision of heating and ventilation. • Camp Management Project will include a Code of Conduct for construction workers, <u>Construction</u> • During the construction phase, the Contractor's HSE plans and procedures include requirements for induction and training on expected behaviors and on disciplinary procedures (including dismissal procedures for unacceptable conduct). • During the construction phase, the Contractor's HSE plans and procedures include requirements for induction and training on expected behaviors and on disciplinary procedures (including					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			dismissal procedures for unacceptable conduct). • In case of a collective dismissal required, Retrenchment Plan will be developed by the Contractor to mitigate adverse effects of job losses on the workers concerned. Retrenchment of workers is likely to be required across the lifespan of the Project, particularly during the transition from construction to operation. Retrenchment of workers will be undertaken in line with national law and international best practices, and will include providing skills to enable individuals to secure alternative employment. ➢ The effectiveness of all retrenchment should be monitored including the timely close out of retrenchment-related grievances <u>Operation</u> • Human Resources Policy will be developed and implemented. Under the policy, the project proponent shall provide all employees with information regarding their rights under national labour law, including their rights related to wages and benefits. The policy covers working conditions, right to organize, non-discrimination, grievance mechanisms, child labour, and forced labour.					
Occupational Health and Safety								
59.	**Health and Safety Risks due to General Occupational Health and Safety Hazards**	PS 2	<u>Pre-construction and Construction</u> • The Contractor will establish Occupational Health and Safety (OH&S) Management Plan with special focus on (but not limited to): movement of vehicles and traffic management, working at heights, working in confined spaces, working with hazardous materials, management	Contractor	Construction area and Project Facilities	Grievance Mechanism Human Resource Policy OHS Management Plan	OHS Performance Reports including accident/incidents, corrective actions, trends, risks, Subcontractor & supply chain performance	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			of electrical hazards, prevention of unintended ground movements and collapse. OH&S Management Plan will acknowledge and reference to IFC EHS Guidelines for Toll Roads (2007) and IFC General EHS Guidelines (2007). • Contractual conditions will ensure that all sub-contractors to follow the OH&S Management Plan. • Organization of the work schedule will include specific risks e.g. flood. • Communication skills across the workforce will be multi lingual. • Enforcement, self-verification & consequence management will be implemented. • Appropriate number of EH&S officers per workforce group (e.g. risk based) will be employed to implement the EH&S program, including risks assessment, training, supervision of high risks tasks, subcontractor induction. • Site-specific factors which may contribute to excavation slope instability will be controlled. • During blasting operations, work areas will be evacuated, and blast mats or other means of deflection will be used to minimize fly rock or ejection of demolition debris. • Good cooperation with the local medical services will be ensured. • An OHS system will be established for the reporting and recording of occupational accidents and dangerous occurrences/incidents. • Personal Protective Equipment will be selected based on the specific hazards and risks of the task to be performed and properly maintained to keep them effective and operational throughout				Training Records	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			their use. • Individuals shall only carry out tasks for which they are competent and authorized to do so. Individuals shall only operate and use plant or equipment for which they are trained and authorized. Copies of all operator certificates will be retained. • Emergency contact numbers will be made available at the work sites. This will include the fire and rescue service and the environmental inspection.					
60.	**Health and Safety Risks due to Physical and Chemical Hazards**	PS 2	<u>Pre-construction / Construction</u> • The area around which elevated work is taking place will be barricaded to prevent unauthorized access and working under personnel on elevated structures will be avoided • Hoisting and lifting equipment will be rated and properly maintained, and operators trained in their use. • Elevated working platforms will be maintained and operated according to established safety procedures including use of fall protection measures (e.g. railings), equipment movement protocols (e.g. movement only when the lift is in a retracted position), repair by qualified individuals, and installation of locks to avoid unauthorized use by untrained individuals. • Ladders will be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions. • When working at height, proper fall protection measures will be implemented. Fixtures will be installed on bridge components. Safety	Contractor	Construction area and Project Facilities	Grievance Mechanism Human Resource Policy OHS Management Plan	OHS Performance Reports including accident/incidents, corrective actions, trends, risks, Subcontractor & supply chain performance Training Records	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			harnesses with proper thickness and of suitable materials ensuring sufficient strength will be used. Rope safety harnesses will be replaced before signs of ageing or fraying of fibers become evident. • When operating power tools at height, workers will use a second (backup) safety strap. • Personnel exposed to high levels of noise will be required to use personal hearing protection devices/equipment. Where required for specific works, work rotation programs will be implemented to reduce cumulative exposure. • Weather forecasts will be monitored for outdoor work to provide advance warning of extreme weather and schedule the work accordingly. Protective clothing will be used where required • Properly maintained construction machinery, equipment and vehicles will be used to minimize air emissions. • Engine idling time will be reduced in construction sites. • Direct diesel exhaust will be properly removed to minimize exposure of the operators. • Indoor working areas where vehicles or engines are operated will be ventilated or the exhaust gases will be properly diverted. • Lead-containing paint will be avoided, and appropriate respiratory protection will be used when cutting galvanized steel. • At work sites where dust levels are excessive, dust masks will be used by relevant personnel.					
61.	**Health and Safety Risks due to Emergencies**	PS 2	<u>Design</u> • Emergency Preparedness and Response Plan	Contractor and	Construction area and Project	Grievance Mechanism	OHS Performance Reports including accident/incidents,	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			(EPRP) will be prepared and cover specific project risks such as spill containment and clean-up, flood, working over water, fire, rescue from height. The EPRP should include: ➢ Risk assessment, ➢ Location of medical rescue, fire-fighting resources and spill response equipment will be available along the route. ➢ Procedure for staff and subcontractors to report any incidents and the investigation, remediation and preventive actions taken, ➢ Emergency response information and training ➢ Emergency Communication Procedure included in the Stakeholder Engagement Plan (SEP) and the Emergency Preparedness and Response Plan (EPRP) including with local communities and authorities • Sub-Contractors will develop and prepare site-specific EPRPs in line with the Contractor overarching plan. • Relevant emergency preparedness and response measures will be taken during emergency situations arising at the construction/work sites and Camp Sites. • The Pandemic Preparedness Plan will be implemented based on the prevailing situation with respect to Covid-19. The Pandemic Preparedness Plan will take into a consideration to Decree on the organization of operation of employers during the state of emergency (Official Gazette of the R, No. 31/2020) following measures have been adopted by the Government as: • During the state of emergency, the employer must enable employees to perform work	Subcontractors	Facilities	Human Resource Policy OHS Management Plan EPRP	corrective actions, trends, risks, Subcontractor & supply chain performance Training Records	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			remotely (i.e. outside of the employer's business premises (teleworking and work from home)), at all workplaces where such work can be organized in line with the general enactment (i.e. the employment rulebook or collective bargaining agreement of the employer, whichever is applicable) and the employment contract. • If the general enactment and the employment contract do not provide for the possibility for remote work, the employer may issue a decision allowing for work outside of the business premises, if organizational conditions allow so. Such a decision must contain the duration of working hours and the manner of supervision of the work of employees. The employer is obligated to keep records of employees who work outside of the business premises. • If the nature of the activity of the employer does not allow for organization of work in the manner provided above, such an employer must adjust its operations to the conditions of the state of emergency as follows: ➢ arrange shift work, if possible and without requiring additional resources, so that as few persons (employees and all other engaged persons) as possible work simultaneously at one premises. ➢ enable that all business meetings are held via electronic or other appropriate means (video link, video call, etc.); ➢ postpone business trips in Serbia and abroad, in accordance with the authority's ban / temporary restriction of entry and movement. • In order to ensure the protection and health of employees, engaged personnel and clients, employers must provide all general, special and					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			extraordinary measures related to the hygienic safety of facilities and persons in accordance with the Law on Protection of Citizens from Contagious Diseases. • For employees and engaged personnel who are in direct contact with clients or share a workspace with multiple persons, it is necessary to provide sufficient quantities of protective equipment in accordance with special regulations.					
62.	**Health and Safety Risks due to Construction Traffic**	PS 2	<u>Design</u> • Traffic Management Plan (TMP) will be prepared. <u>Pre-construction / Construction</u> • Safe work zone will be established to separate workers on foot from the traffic; • For the construction works to be conducted at location where traffic exists, safe work zones will be established by taking relevant measures (closure of roads, diversion of traffic, use of protective barriers, cones, warning lights, etc.). • Weather forecasts will be monitored to provide advance warning of extreme weather to drivers and schedule the work accordingly. • Traffic control supervisors will be assigned with competence in traffic control principles and who will assume overall responsibility for the safety of the work zone setup. • Temporary traffic control devices, such as signage, warning devices, paddles, and concrete barriers will be set up where required in a consistent manner throughout the work zone to provide passing motorists with advanced warning of upcoming work zones;	Contractor	Construction area and Project Facilities	Grievance Mechanism Human Resource Policy TMP	OHS Performance Reports including accident/incidents, corrective actions, trends, risks, Subcontractor & supply chain performance Training Records	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Traffic control workers will be trained in topics such as traffic flow, work zone setup, and proper placement of channelizing devices; and • All workers will wear high-visibility safety apparel.					
63.	**Health and Safety Risks on Accommodation**	PS 2	<u>Pre-Construction / Construction</u> • Worker accommodation will be designed and maintained to meet the standards defined in IFC and EBRD guidance on accommodation. The standards of the rooms or dormitory facilities should be designed to allow workers to rest properly and to maintain good standards of hygiene. This includes cafeteria, medical room, shower and toilets, wastewater treatment plants/septic tanks, water supply facilities (i.e. water well) • Worker accommodation conditions will be maintained to ensure a good standard of personal hygiene and hygiene in canteens need to be ensured to prevent contamination and the spread of diseases which result from inadequate sanitary facilities and may affect the community health and safety as well. • Medical facilities (first-aid facilities, additional medical facilities) will be maintained to ensure good standards of workers' health and to provide adequate responses in case of health emergency situations. • Basic leisure, social and telecommunication facilities will be provided for workers to rest and also to socialize during their free time. These requirements at the camp accommodation facilities should be optimized to minimize potential impacts on the workers' welfare and risk of work-related accidents and maximize the overall productivity.	Contractor	Camp Sites	Grievance Mechanism Human Resource Policy OHS Management Plan	OH&S Induction personnel working on site Task specific training (Project employees, subcontractors & suppliers)	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• Worker Grievance Mechanism will be established that will provide means for all Project personnel to lodge their complaints. • Only concrete plants will be located at the Camp Sites; asphalt and mechanical plants will be sited close to the quarries to the extent feasible.					
64.	**Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced Labour Risks)**	PS 2	Pre-Construction / Construction • The Contractor will not employ nor permit any subcontractor to use child labour, • The Contractor will prohibit the use of forced labour by ensuring full compliance with national legislation and the provisions of relevant conventions and other international standards. These measures will be reflected in the Project's Employment Policy Document.	Contractor	Construction area and Project Facilities	Grievance Mechanism Human Resource Policy OHS Management Plan	OH&S Induction personnel working on site Number of grievances Worker Contracts	Construction
Community Health and Safety								
65.	**Disturbance to environmental health, quality of life and wellbeing during construction phase**	PS 4	Design • Project Environmental Management Plan (EMP) will include Noise and Vibration and Management Plan that will be define the sensitive receptor locations, monitoring program and specific mitigation measures to be implemented. • The Project Environmental Management Plan (EMP) will include Air Quality Management procedures that will be implemented. • Planning of transport routes including temporary access roads, haul roads and construction work sites should be determined to avoid populated areas and away from sensitive receptors and villages as much as possible. • As Project construction progresses, buildings that may be potentially affected will be identified	Contractor	All villages in the AoI	OHS Management Plan SEP Grievance Mechanism	Grievance records Consultation records Environmental measurements - air quality, noise	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			prior to construction, including assessing whether buildings are sensitive to night-time disturbance. • Traffic Management Plan of the Project will include measures on accessibility for local community. <u>Pre-construction</u> • OH&S Management Plan will include awareness of community health and safety issues. OH&S Management Plan will include the Pandemic Preparedness Plan within its scope with respect to Covid – 19 and/or any other diseases present in the region. • Construction work schedule will be distributed to the affected settlements in a timely manner to inform any road closures and construction related cautions. • Air and noise monitoring will be undertaken in accordance with local regulations. Establish in advance a relationship with municipal environmental department. <u>Construction</u> • Operational area in borrow pits, access roads, work sites, construction camp sites, batch and asphalt plants etc. will be regularly monitored for air quality parameters such as PM10, PM2.5, SO2, NOx, HC, CO etc. (For Air Quality related measures; See Chapter 6.2.1 of the ESIA Report). • Construction work schedule will be distributed to the affected settlements in a timely manner to inform any road closures and construction related cautions. • Washing system will be implemented to prevent					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			mud on roads. • Dust suppression mitigation measures such water sprinkling will be implemented in sensitive locations. • Operational areas in in borrow areas, access roads, work sites, construction camp sites, batch and asphalt plants etc. will be regularly monitored for noise levels representing all hours of a typical work shift. • In case of noise exceedance, silencers or acoustic enclosures on machines as well as portable sound barriers around stationary equipment, should be installed where applicable. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Movement of construction traffic through sensitive receptor community areas will be prevented or limited, wherever possible. If this cannot be avoided, additional measures defined in the Traffic Management Plan (TMP) such as slower driving rules, physical speed restrictions) will be applied. • Sensitive receptors (e.g. hospitals, nursing homes, schools) will be provided with advanced notification of noisy works and project specific additional mitigation measures. • Special acoustic insulation and related mitigation measures will be evaluated on a case-by-case basis. • 20kph speed limit will be applied on unpaved					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			surfaces close to settlements. • Wind breaks or dust protection systems (including sprinklers) should be built around the main construction activities where necessary and, if possible, near potentially dusty works to minimize the impact of nearby residential receptors. • Air pollution control equipment (e.g. baghouse) should be installed and operated for the asphalt plants. • During transportation on public roads, the excavated materials will be covered with nylon canvas or suitable materials with a grain size greater than 10 mm in public roads as good practice. • To reduce fugitive dust emission during vehicle operation on public roads and at construction sites, service roads and quarry/material borrow/storage sites, dust suppression methods (i.e. watering with water trucks, applying nontoxic chemicals, speed limits for mobile vehicles, using well-maintained vehicles/equipment) should be used. • In case of a Grievance, additional measurements will be implemented, and the results will be shared with the complainant. If the results of the measurements will not fit with the commitments given in the relevant environmental Chapters of the report, additional mitigation measures will be implemented.					
66.	**Increased risk of communicable diseases and burden on local health services:**	PS 4	<u>Pre- Construction & Construction</u> • All workers will be informed on the Tetanus and Sexually Transmitted Diseases (STDs) including HIV during the orientation period and condoms will be provided to expats. If required,	Contractor	All villages in the AoI	OHS Management Plan SEP	SEP engagement records Health trends	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			vaccinating workers against Tetanus will be applied. • First aid facility including health and wellbeing facility will be established within the Camp accommodation. • All workers will be informed about the closest Public healthcare facilities. • If an increase in cases of disease or use of public health facilities is observed awareness raising training will be coordinated with the local health authorities.			Grievance Mechanism	Training Records on health topics, community awareness, code of conduct	
67.	**Increased traffic and rise in accidents**	PS 4	<u>Pre-Construction</u> • Traffic Management Plan (TMP) will be developed and implemented include good practice and specific mitigations for sensitive areas. • Traffic Management Plan (TMP) will be shared with the local authorities for their approval. • Local authorities will be informed regarding the date, time and route of the transportation activity. • Traffic signals and signs will be set up and will be clear and visible • Traffic flagmen will be appointed where necessary. • Temporary traffic control methods will be applied at intersections and connections that hold higher risk for accidents. • All drivers will obey the national speed limits and the drivers will be trained on the all Serbian traffic rules. • Contractor to ensure construction area provides measures and signage for safe pedestrian crossing. Crossing locations should take into	Contractor	All villages in the AoI	OHS Management Plan TMP SEP Grievance Mechanism	Grievance Records Traffic Accident Records Training Records on drivers TMP approved by local authorities Visual inspections of the traffic control devices Training Records of the road safety awareness trainings within community & schools, Visual inspections	Construction

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			account community preferences, including those related to convenience or personal safety. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the Project except at designated crossing points. <u>Construction</u> • Supervision and escort for heavy machinery (which requires escort and permit in line with Serbian Legislation) will be provided. • Supervision for vehicles carrying construction materials and equipment that pass over public or private roads and railway crossings will be provided. • Project related traffic will be regulated during certain dates and times where local community will require to commute (to/from schools, commercial areas etc.) or take on any agricultural activity (animal grazing or other farming activities etc.). • Temporary access to private property or appropriate accessing alternatives will be determined in consultation with the land owners or users. • Local authorities and community will be provided with detailed information on closure of roads during the road and railway crossings. • Methods for every road crossing will be determined and agreed upon with authorities prior to taking any action. All methods and construction techniques proposed by the Contractor will aim to minimize possible disruptions caused by road crossings. • Contractor will ensure that road safety training will be provided to employees.				of the warning signs during road and railway crossings.	

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• The schools nearby the Project site will be informed about the peak movements of the vehicles and vehicle traffic will be minimized during hours when children are traveling to and from school. • Heavy machinery and vehicles utilized in transportation activities (including transportation of personnel) will be used by qualified and licensed drivers. • All drivers will know and comply with all traffic signs, are will be made aware of hotspots of intense traffic that are expected along the route and are trained properly for on and off-road conditions. • Managing and monitoring of working and resting hours drivers will be undertaken according to Serbian Legislation. • Monitoring security arrangements for loads, vehicles and drivers will be undertaken according to Serbian Legislation. • All project work sites, Project Facilities, temporary roads, and traffic management works will be will be signposted in line Serbian Legislation and as required by the Traffic Management Plan TMP). • Night drive/transportation will be limited as much as possible to reduce the risk of accidents and obtaining necessary permits shall night transportation be required. • Compensating damages caused by an accident due to project activities will be undertaken according to national legislative requirements and the Grievance Mechanism defined in the Stakeholder Engagement Plan (SEP) of the Project.					

Ref No.	Subject	IFC PS	Mitigation measures	Responsible Party	Location	Related Plans	Monitoring Tool	Monitoring Period
			• A Grievance Mechanism Procedure will be set up for communities and individuals to formally communicate their concerns, complaints and grievances and facilitate resolutions that are mutually acceptable by the parties. • The routes of the roads that will be used and the peak hours of the usage of the roads will be shared with village heads and management of the schools. • The CLOs of the contractors will provide awareness trainings to schools if there is a school located on the route of the roads that will be used. • Installation of barriers (e.g. fencing,) to deter pedestrian access to the Project construction area except at designated crossing points					
68.	**Security around the Project site**	PS 4	<u>Construction</u> • Engagement activities prior to construction will ensure that local stakeholders are informed of the risks and consequences of entering the site; • Security personnel will patrol the site area to prevent any unauthorized access onto the site. They will also ensure that protocols for entering the construction site are enforced; • A management plan for security personnel will be developed and implemented by the Contractors, outlining expectations around security, • Conflict Management Training will be provided to armed security personnel, • The Grievance Mechanism for the Project will capture all grievances raised in relation to security and safety issues. These will be addressed promptly, and actions will be taken.	Contractor	All villages in the AoI	OHS Management Plan Security Management Plan SEP Grievance Mechanism EPRP	Training Records – community consultations Training Records - security personnel Incident Records - security incidents.	Construction

Table 8-5. Environmental and Social Management and Monitoring Plan (Operation Phase)

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
Surface Water								
1.	**Spillage/Leakage to Surface Water**	PS 1 PS 3	Design • Storm Water and Drainage Risk Assessment for operation of the Project will be prepared. The scope of the assessment should confirm if storm water drainage designs are effective to mitigate impacts on land use, surface water and groundwater or sensitive ecological sites therein. • Storm water and draining mitigation measures will be implemented in the design phase, such as the use of storm water collection ponds, which enables the controlled discharge of storm water as well as protects the accidental spills caused by an accident. Operation • Storm water collection channels and ponds are regularly (visually) inspected for its integrity. • In case of an accidental spill, collected water in the storm water collection pond will be sampled and discharged in accordance to the standards stipulated in Chapter-4 and Appendix-4. • Spill Response Kits will be available at service and maintenance stations, will be held at secure, clearly signposted locations, instructions will be provided with the kits and personnel will be trained in their use. • Any spillages will be immediately contained on site and all contaminated materials including soils will be removed from the site for suitable treatment and disposal.	Operator	Morava Motorway and Operational Project Facilities	Storm Water and Drainage Risk Assessment Spill Response Plan EPRP	Natural stream flow and slowing of flow due to sediment load Visual inspections to compare before and after river regulation Water turbidity and suspended solids, dissolved oxygen, oil and grease	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• All staff and subcontractors will be required to report any incidents and these will be subject to investigation and remedial and preventive actions will be taken.					
2.	**Wastewater discharge**	PS 3	<u>Design</u> • Depending on availability on waste treatment facilities, all wastewater from the Operational Project Facilities such as service stations and maintenance stations can be connected to the local/municipal sewage network, which should be ended with proper wastewater treatment facility sustains the discharge quality standards. • If wastewaters from Operational Project Facilities are collected in septic tanks, waste water will be regularly transport by a licensed contractor to a nearest licensed wastewater treatment facility, which sustains the discharge requirements.	Project Owner Operator and its contractor	Operational Project Facilities	Water Quality Management Plan	Domestic wastewater treatment plants (IFC EHS General Guideline): • BOD • COD • TSS • pH • Total nitrogen • Total phosphorus	Operation
3.	**Flooding**	PS 1	<u>Design</u> • In Design Phase of the Project, Hydrotechnical Study Report was prepared by Jaroslav Cerni to assess hydrogeological framework of the Area of Influence of the Project. Considering this assessment, the project design including river regulation has been conducted and feasible measures have been developed. • In Design Phase, sustainable road drainage and storm water management practices are part of the storm water design process for culverts and drainage stream designs will be implemented and maintained in accordance with international guidelines. • The Soil erosion, Reinstatement and Landscape Management Plan will be developed and implemented. That Plan will reflect the EHS	Operator	West Morava River and its tributaries Morava Motorway and Operational Project Facilities	Hydrotechnical Study Report SERL Management Plan EPRP	Visual observation	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			guidelines for Environmental, Health, and Safety Guidelines for Toll Roads in full (as well as Serbian Regulations). Construction • In order to protect against flooding and eliminate more consecutive sharp bends and bank erosion, river regulation (see Chapter 3.3 for detailed information) will be carried out by the Contractor.					
4.	**Change in River Flow**		Design • New river beds will be made curves (and not straight) with asymmetrical cross sections. • Natural materials will be used to protect and strengthen banks (turf and forest plantations) in conjunction with steel structures (gabions) rather than monolithic concrete. • The design will not include any structure blocking the continuity of the flow.. Operation • Flow monitoring stations will be established at river diversion locations. Number and position of the flow monitoring stations will be defined during the detailed design phase in coordination with Serbian Environmental Protection Agency and other relevant state institutions. These flow measurement locations will be part of the early warning system for flood protection.	Operator	Flow monitoring stations in river regulation locations defined during the detailed design phase in coordination with Serbian Environmental Protection Agency and other relevant state institutions.	Water Quality Management Plan	Water Quality Monitoring Report	Operation
5.	**Change in River Water Quality**		Design • The potential locations subject to scouring will be strengthened. For this purpose, as much as natural materials i.e. gabions will be used at these locations.	Operator	Flow monitoring stations in river regulation locations defined during the detailed design phase in coordination with	Water Quality Management Plan	Water Quality Monitoring Report	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			Construction • In general, no significant water quality change in the river is expected. On the other hand, protection of sediment movement at new section will be minimize the risk. These protection measures are already provided in relevant sections (i.e. erosion, soil etc.) • Water quality monitoring along West Morava River will be performed to assess the performance of the mitigation measures.		Serbian Environmental Protection Agency and other relevant state institutions.			
Groundwater								
6.	**Accidental Spillage and Surface Runoff Contaminated Water**	PS 1 PS 3	Operation • In the event of a major spillage accident, site assessment studies will be carried out in the spillage area and monitoring requirement will be determined accordingly. • Storm water collection channels and ponds are regularly (visually) inspected for its integrity.	Operator	West Morava River and its tributaries	Water Quality Management Plan Spill Response Plan EPRP	Incident/accident records - spill accidents and heavy rainfall events	Operation
Air Quality and Climate								
7.	**Gaseous Pollutant Generation**	PS 1	Operation • No mitigation is required. • Continuous air quality monitoring is suggested.	Operator	Morava Motorway and Operational Project Facilities	Air Quality Management Plan	Exhaust emissions (NO_x, SO_2, CO)	Operation
Noise and Vibration								
8.	**Noise Pollution**	PS 1 PS 7	Design • Stone Mastic Asphalt (SMA) surfacing that cause's low noise will be used by the Contractor for the Motorway.	Operator	Morava Motorway and Operational Project Facilities	Noise Management Plan	Environmental monitoring - noise levels Grievance records	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• Natural topography will be used for noise protection. • Additional noise barriers will be considered for the sensitive receptors, as necessary. • The landscape screening will be done either by lowering the Motorway or adding soil embankment • The noise barriers adjacent to the motorway will be used. • The building insulations will be improved (for example, sound insulation of windows and walls), where necessary. • In cases where insulation is not possible, compensation will be considered. <u>Operation</u> • Maintenance of the road surface will be done. • Speed limits will be applied.				(complaints related with noise)	
Geology and Soil								
9.	**Earthquake**	PS 1 PS 4	<u>Design</u> • The Project will comply with the relevant Serbian regulatory requirements related to seismic design and risk assessment. • Emergency Preparedness and Response Plan (EPRP) will be implemented for the operation phase.	Operator	Morava Motorway and Operational Project Facilities	EPRP	Records of emergency drills	Operation
10.	**Runoff from the Road and Accidental Spillage**	PS 1	<u>Design</u> • Storm Water and Drainage Risk Assessment will be conducted in order to confirm that storm water drainage designs are effective to mitigate impacts on soil quality therein. Measures will be taken, such as the use of sand layers, which should be used as filters in leakage pits, to prevent the	Operator	West Morava River and its tributaries Morava Motorway and Operational Project Facilities	Storm Water and Drainage Risk Assessment Spill Response Plan	Incident / accident records	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			penetration of harmful substances into deeper soil layer. • Emergency Preparedness and Response Plan (EPRP) will be developed.			EPRP		
Waste Management								
11.	**Generation of Waste**	PS 1 PS 3 PS 6	<u>Design</u> • Waste Management Plan will be prepared and implemented • Hazardous Material Management Plan will be prepared and implemented. <u>Operation</u> • To minimize the risk of road paving maintenance work, follow the IFC EHS Toll Road Guidelines (2007). • Mitigation measures will take into account the requirements of Serbian regulations and IFC General EHS Guidelines. ➢ An appropriate training should be provided to all personnel in operational project facilities and at toll booths to show where different types of waste will be placed. ➢ Solid waste will be collected regularly and disposed of properly at an appropriate disposal site. ➢ Waste containers will be capable of handling the solid wastes in an appropriate and safe manner and will not be affected by weather conditions. ➢ Waste containers required to have labels identifying the type of waste. Proper labelling will prevent mixing of hazardous waste and non-hazardous solid waste. ➢ Reuse/recycling methods will be considered to	Operator and its contractor	Morava Motorway and Operational Project Facilities	Hazardous Material Management Plan Waste Management Plan	Visual inspections Waste Audits including disposal records	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			minimize the generation of solid waste. ➢ Certified/licensed facilities will be used for the final disposal of solid wastes which cannot be reused/recycled. ➢ Signs and other posting will be used to inform drivers not to throw litter. Litter or illegally disposed waste along the Motorway required to be collected and disposed of properly. ➢ Recycling and trash containers will be provided in parking lots and rest areas to minimize litters on the Motorway. ➢ Sediments and sludge from storm drainage systems required to be managed and disposed appropriately. ➢ Old road surface materials can be managed by re-using in paving or stockpiling materials may be stored for roadbed or other uses. • All hazardous waste should be properly collected, marked and disposed at approved location in accordance with the procedure prescribed within the Law on waste management ("Official Gazette of RS", 36/09, 88/10, 14/16). It is strictly forbidden to dispose any type of hazardous waste on locations where surplus earth material will be disposed.					
Terrestrial and Freshwater Ecology								
12.	**Accidental loss of fauna**	PS6	<u>Design</u> • Hard fences are erected to prevent the access of animals onto roads. They are mostly constructed to reduce accidents due to collisions between large mammals and cars, but also to reduce the number of smaller animals killed on the roads. The disadvantage of hard fences is that they increase the barrier effect. In most cases, hard fences must	Operator	Morava Motorway	Biodiversity Management Plan	Visual observations, Photographic records Inspection records	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			therefore be combined with wildlife passages. In these cases, they fulfill an important role in guiding animals to the crossing points. • Hard fences will always be built on both sides of a road. The ends of the hard fences are danger points: animals may go around the end of the hard fence and get trapped on the road. Hard fences will therefore end at structures like bridges. • Warning signs aim at influencing the behavior of drivers in order to reduce the number and severity of collisions between large mammals and cars. • Road lights often attract insects and as a consequence bats or nocturnal birds which hunt them. This results in high mortality for the insects as well as for their predators. To prevent collisions of insects the use of sodium lights is recommended. <u>Operation</u> • Standard traffic signals will be placed in areas where collisions often occur. They also exist for amphibians, water birds and other animals.					
13.	**Barrier effect in fauna**	PS6	<u>Design</u> • Culverts for animals are primarily constructed as safe crossing points for mammals. Target species are usually mammals. Smal fauna species may readily use these culverts as well. As a minimum when using culverts a ledge will be incorporated where species such as otters and herptiles can cross alongside the river even at times of high flow. • It can also be used on bridges to be built on the West Morava River to prevent barrier effect. Vegetated area will be left between the bridge abutment and the riverbank.	Operator	Morava Motorway	Biodiversity Management Plan	Visual observations, Photographic records Inspection records The crossing success of the fauna species	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• There are 65 culvert and 40 bridges along the motorway. Box Culverts with dimensions of at least 1.5 m x 2 m and Pipe culverts with diameters to be between 60 and 140cm will be placed in natural habitats where the species most likely to be crossing to reduce habitat fragmentation. Operation • Regular maintenance and cleaning will be done to prevent flood-carrying materials from blocking the culvert inlets					
Visual and Landscape and Land Use								
14.	**Change of landscape due to changes in land use**		Design • Planting will be implemented to restore or compensate for lost habitats. • Planting mixes will be selected using native species and planting will be set out to establish new and enhance existing native habitats. The use of native species throughout the area is important in order that the Motorway planting will, over time, become almost indistinguishable from the vegetation naturally occurring in the surrounding area. • Planting will be implemented to reconnect hedgerows or areas of planting formerly severed as a result of the construction works in order to maintain wildlife corridors and reinstate local landscape character • Landscape design will be coherent with regional landscape identity to the extent possible • Planting treatments will be designed to visually screen road structures and earthworks from nearby housings and settlements • Planting treatments will be interrupted to open up	Operator	All municipalities in the AoI	SERL Management Plan	Visual observations, photographic records and inspection records	Operation
15.	**Visibility of new structures**			Operator	All municipalities in the AoI	SERL Management Plan	Visual observations, photographic records and inspection records	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			key views and vistas which reinforce local identity and minimize driver monotony Operation • In the places where the motorway is monotony, it is necessary to refresh it by planting decorative species that don't require maintenance. Preventing monotony will also have a positive impact on traffic safety. • Arranging community trees and shrubs along the motorway for re-giving natural-looking area. In addition, these areas will be grassed for erosion control. In this way, maintenance needs of the areas can be kept to a minimum.					
SOCIAL								
Population								
16.	**Population Decrease**	PS 1	Design • The livelihood sources of the PAPs will be taken into consideration during the approval of the Spatial Planning process which frames the borders of the Project establishments, • Overpasses and underpasses will be designed considering the agricultural activities, • Detailed "Resettlement Action Plan" will be prepared to determine the PAPs and develop practical mechanism to prevent the outmigration. • Replacement of the lost assets within the acquired land with similar assets at the same or better standard to ensure continuity of current livelihoods will be achieved through provision of materials, seedlings, labor, and additional financial and legal assistance. Pre-construction	Operator	All villages in the AoI	SEP Grievance Mechanism	Population Statistics of the Local Authority	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• Priority for the employment opportunities of the Project will be given to people whom lost their livelihoods. • Skill development training will be provided to local labor force. • Cooperation will be established with the local governmental bodies including job agencies and agricultural institutions to develop effective community development programs and strategies.					
17.	**Population Increase**	PS 1	<u>Design</u> • Enable the construction of commercial buildings in new locations as a planned reserved space; <u>Operation</u> • Strengthening competition among business entities through the development of local institutions necessary for the faster development and structural adjustment; • Identifying and implementing a new industrial development policy as a combination of targeted policy with justified, direct state interventions and horizontal measures without special protection sectors with care for key inputs, labor, capital, infrastructure services, research and development; • Encouraging the development of information and communication technologies, information technology infrastructure, electronic networks, databases and sources of data and statistics as a basis for speeding up growth in general and the new service sector in particular. • Give preference to local processing of agricultural products, agroindustry and other "clean" branches of economy that will take advantage of the location advantages derived from proximity to the market, for multipurpose border - crossing centers.	Operator	All villages in the AoI	SEP Grievance Mechanism	Population Statistics of the Local Authority	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• Development of a rational and functional structure of the settlement network; • Identifying settlements that can most effectively serve as service, manufacturing and commercial centers of the surrounding area:					
Infrastructure								
18.	**Pressure on the local healthcare infrastructure as a result of in migration**	PS 1 PS 4	Operation • Considering inadequate health services Varvarin and Trstenik Municipalities, settlements in those settlements may be imposed to more diverse impacts on health services compared to other municipalities, therefore, it is recommended that incorporation with the Project Employer and local authorities should be made in case the in-migration resulted insufficiency in health services to take any possible action.	Operator	All villages in the AoI	SEP IUMP Grievance Mechanism	Statistics Grievance records (regarding accommodation)	Operation
19.	**Pressure on sewage system Lack of waste management**	PS 1 PS 4	Construction • Project Employer is recommended to be cooperate with responsible authorities in case necessary improvements will be required for local infrastructure. Operation • Project Employer to be in close coordination with the related local authorities to curtail inconvenience to the residents of the Project area.	Operator	All villages in the AoI	SEP Waste Management Plan Grievance Mechanism	Statistics Grievance records (regarding accommodation)	Operation
Economy								
20.	**Direct and In-direct Employment Opportunities**	PS 1 PS 2	Operation • Recruitment policy and procedures of the Employer should aim to provide opportunities for	Operator	All municipalities in the AoI	Statistics SEP	Statistics on workforce (inc. breakdown of	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			employment of local workforce to the extent possible considering unskilled, semi-skilled, and skilled workforce, and giving priority to vulnerable persons (especially those who will be economically disabled). Priority will be given to Social AoI. • Training for PAPS to increase their employability should target identified PAPs within the scope of intervention of the RAP. • Training for PAPs whom seek employment should be provided to obtain jobs with the Project to the extent possible, within the scope of intervention of the RAP • The Operator should require and develop policies for a fair and transparent, gender neutral recruitment process for all job openings. The Project Owner should seek to employ PAPs on each Sector of the Project route. • As a good practice, Subcontractors should be encouraged to employ local personnel within the scope of their recruitment policy and procedures.			Grievance Mechanism Human Resource Policy	direct and contracted workers, ratio of people hired from the local) Labour Audit Repots Written Project-specific Human Resources Policy and relevant procedures Grievances records (recruitment) Number of female staff recruited Worker Grievance Procedure	
21.	**Increase in Economic Development in the Region**	PS 1	<u>Operation</u> • The operation phase of the Project will seek to promote local employment (including job training for the operational activities) and purchase local goods and services to the extent possible.	Operator	All municipalities in the AoI	Statistics SEP Grievance Mechanism	Procurement records Number of local employees Number of local services acquired Grievance Records	Operation
Ecosystem Services								

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
22.	**Access to Ecosystem Services**		Design • Access to the ecosystem services will be ensured by providing required overpasses and underpasses. • An ecological bridge will be constructed at suitable point. • In case any damage to Irrigation system, damaged channels will be re-constructed. • In case of grievances, beehives will be moved away from the Motorway Route with the assistance of CoS. • Detailed "Resettlement Action Plan" will be prepared to determine the PAPs whom will be affected by the impacts on the livelihoods as a result of access to ecosystem services.	Operator	All affected municipalities	RAP Grievance Mechanism SEP	Grievance Mechanism	Operation
Labour and Working Conditions								
23.	**Local Employment**	PS 2	Operation • The workers will have contracts which clearly state the terms and conditions of their employment and their legal rights. Information will include, but not be limited to, entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity / paternity or holiday). All workers will be able to join trade unions of their choice and have the right to collective bargaining. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights prior to any employment contract to be signed. • The Project will put in place a worker grievance mechanism. The grievance mechanism will be open to all the staff and their contractors. The	Operator	Tool Stations	Human Resource Policy Workers Grievance Mechanism	Worker Contracts Training Records Grievance Records Labour Audit Repots	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			grievance mechanism will be publicly advertised by the Project in the workforce. It will be easily accessible by workers, free of retribution and will allow anonymous complaints to be raised and addressed. • The Operator will establish human resources policy for all operational employees with information regarding their rights under national labour law, including their rights related to wages and benefits. The policy will cover working conditions, right to organize, non-discrimination, grievance mechanisms, child labour, and forced labour. • All contractor contracts, the Project will make explicit reference to the need to abide by Serbian Labour Law (Official Gazette No. 75/ last amended on 2014). IFC standards and ILO conventions in relation to labor and welfare standards, freedom of association and reference must be made to child and forced labor. Emphasis will also be placed on anti-discrimination measures. Where young people below the age of 18 years are employed, it will be made clear that they will not be employed in hazardous work and their work will be subject to an appropriate risk assessment.					
Occupational Health and Safety								
24.	**Health and Safety Risks due to General Occupational Health and Safety Hazards**	PS 4	Operation • Occupational Health and Safety Management Plan specific to operational activities will be prepared and OH&S Management Plan will acknowledge and reference to IFC EHS Guidelines for Toll Roads (2007) and IFC General EHS Guidelines (2007). • A system will be established for the reporting and	Operator	Morava Motorway and Operational Project Facilities	OHS Management Plan	Training Records including inductions, code of conduct, cultural awareness, environmental awareness, toolbox talks.	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			recording of occupational accidents and dangerous occurrences/incidents. • Personal Protective Equipment will be selected based on the specific hazards and risks of the task to be performed and properly maintained to keep them effective and operational throughout their use. • Individuals shall only carry out tasks for which they are competent and authorized to do so. Individuals shall only operate and use plant or equipment for which they are trained and authorized. Copies of all operator certificates will be retained. • Emergency contact numbers will be made available at the assigned areas. This will include the fire and rescue service and the environmental inspection.				Stop Work Incident Records Quality Audits including subcontractors	
25.	**Health and Safety Risks due to Physical and Chemical Hazards**	PS 4	<u>Operation</u> • Pavers with exhaust ventilation systems will be used and proper maintenance of such systems will be ensured to maintain worker exposure to crystalline silica (millers and grinders) and asphalt fumes (pavers) below applicable occupational exposure levels. • Correct asphalt product will be used for each specific application and application at the correct temperature will be ensured to reduce the fuming of bitumen during normal handling. • Tollbooths will be equipped with proper ventilation systems; • Protective clothing will be used when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel, or other solvents. • Appropriate respiratory protection will be used when removing paints.	Operator	Morava Motorway and Operational Project Facilities	OHS Management Plan		Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
26.	**Health and Safety Risks due to Emergencies**	PS 4	Design • An Emergency Preparedness and Response Plan, covering the emergency situations (involving vehicles and pedestrians) that may occur during the Motorway's operation, should be prepared and implemented by trained personnel in order to avoid significant risks.	Operator	Morava Motorway and Operational Project Facilities	OHS Management Plan EPRP		Operation
27.	**Health and Safety Risks due to Motorway maintenance**	PS 4	Operation • Workers will only work in live lane(s) once advance signs are in place to warn road users of their presence. Where possible, operatives should face the oncoming traffic, or work with a lookout. • Works vehicles will support operatives and minimise the need to cross the carriageway. They should be positioned to prevent funneling of drivers toward the work area or into the path of oncoming traffic. • Incidents where vehicles have struck or displaced traffic management equipment or entered the works area should be recorded. This will allow the traffic management design to be reviewed and altered, if appropriate, to maintain the safety of drivers and workers. • Reflective signs and equipment will be kept clean to maintain clear visibility. Replacing dirty or damaged equipment rather than cleaning or repairing it in situ will reduce time at the roadside. • Night workers (i.e. those regularly working between 11 pm and 6 am) unless specified elsewhere in a written agreement. • Lone working should be assessed to determine if one person can do the tasks safely and if particular precautions are needed	Operator	Morava Motorway and Operational Project Facilities	OHS Management Plan		Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
Community Health and Safety								
28.	**Level crossings safety**	PS-4	Operation • The set of precautionary measures will be implemented, including road operational safety procedures. • Regular inspection and maintenance of the Motorway will be carried out. • Safety management program will be implemented. • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the Motorway except at designated crossing points; • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian or bikeways.	Project Owner	Morava Motorway and Operational Project Facilities	Grievance Mechanism OHS Management Plan TPM	Grievance Records Incident Records Training Records	Operation
29.	**Noise during operation**	PS-4	Design • Stone Mastic Asphalt (SMA) surfacing that cause's low noise will be used by the Contractor for the Motorway. • Natural topography will be used for noise protection. • Additional noise barriers will be considered for the sensitive receptors, as necessary. • The landscape screening will be done either by lowering the Motorway or adding soil embankment • The noise barriers adjacent to the motorway will be used. Operation • Noise level measuring during operation will be performed at annual intervals and in case of complaints by the local population.	Operator	Morava Motorway and Operational Project Facilities	Grievance Mechanism OHS Management Plan TMP Method Statements	Consultation records Grievance records related to noise complaints	Operation

Ref No.	Subject	Requirements	Mitigation measures	Responsible Party	Location	Related Plan	Monitoring Indicator	Monitoring period
			• Noise barriers will be used in the sensitive locations such as schools, hospitals and residential areas to reduce the sound as required					
30.	**Flood risk during operation**	PS-4	Operation • The culverts will be maintained and monitored whether they perform as designed to the both sides of the Motorway. • Perform the most necessary regulation works to stabilize and bank erosion. • Drainage channels and ponds will be built to discharge the surface water. • Flood management and flood escape systems and escape roads to be constructed. • Flood control contingency plans need to be formulated for the study area.	Local Authorities (Municipalities	All municipalities in the AoI	Grievance Mechanism OHS Management Plan TMP EPRP	Grievance Records Incident Records	Operation
31.	**Transport of dangerous goods**	PS-4	Operation • The proper screening acceptance procedure will be implemented with development of the Emergency Preparedness and Response Plan (EPRP) including spillage response. • Speed limit will be implemented for the hazardous material carriage.	Project Owner	Morava Motorway and Operational Project Facilities	Grievance Mechanism OHS Management Plan TMP EPRP	Relevant certificates	Operation

8.9.2 Environmental and Social Monitoring

Construction

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
Air Quality					

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
1.	A Method Statement will be prepared for air quality monitoring during the pre-construction and construction phase. The Method Statement will make provision for: • Periodic visual inspections of activities resulting in impact to air quality. Visual inspections will reflect the ethos of 'see it, own it', in terms of identifying and addressing significant air quality impacts. Where significant impacts are observed, these will be recorded and closed out. • Regular inspections during the site preparation phase to review air and dust issues and dust suppression techniques altered as required. • If significant dust complaints are received, passive monitoring of dust deposition upwind and downwind of key construction areas will be undertaken. Monitoring will be undertaken using an internationally recognised technique.	Nearest settlements to construction sites Natural habitats along the construction sites	During construction. Monitoring data reviewed monthly	• Dust monitoring results compliant to performance criteria. • Recommendations and corrective actions taken when dust generation or combustion sources are noted. • Complaints arising from air quality emissions managed through the Grievance Mechanism.	Contractor
Greenhouse Gas Emissions					
2.	The ESIA undertaken for the proposed Motorway suggests that on the basis of the amount of diesel required during the construction phase that GHG emissions during the construction phase would surpass the IFC PS3 threshold of 25,000 tCO_2e per year. Given this exceedance the Project will quantify and monitor direct GHG emissions from the Project in accordance with internationally recognized methodologies and in accordance with the requirements included in Annex A of the IFC PS3.	Not Applicable	During construction. Annual report	• Quantification of Project GHG emissions during the construction phase. • Monitoring results which can be used to evaluate project performance.	Contractor
Noise and Vibration					
3.	A Method Statement will be prepared for noise monitoring during the pre-construction and construction phase. The Method Statement will make provision for: • Monthly noise measurements with portable noise meter at the nearest noise sensitive receptor locations to key Project activities (viz. Construction Camp and Plant; quarries and borrow pit sites; and active work sites). • Inspection of vehicle/machinery/equipment maintenance	Nearest settlements to construction sites Natural habitats along the construction sites	Regular noise level checks will be carried out on a monthly basis during construction and when significant noise	• Noise monitoring results compliant to performance criteria. • Noise monitoring records. • Recommendations and corrective actions taken when high audible incidents are noted. • Complaints arising from excessive noise	Contractor and Project Owner

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	records. • Noise monitoring at nearest noise sensitive receptors if significant complaints received.		complaints are received.	managed through the Grievance Mechanism.	
4.	**Piling works** A Method Statement will be prepared for piling and earthworks activities. The Method Statement will make provision for monitoring of vibration during piling works and vibratory compaction. Monitoring programme will: • ensure work is in compliance with Serbia's vibration limits at the nearest structure/building. • focus on identifying the effectiveness of the adopted vibration reductions measures. • recommend control measures. Monitoring of ground vibration will be performed using an instrument such as seismograph (or equivalent), which detects and records movement. In the event that the vibration criteria are exceeded in proximity to the closest buildings, other control methods will be considered to reduce vibration levels as far as is practicable.	Nearest settlements to construction sites Natural habitats along the construction sites	During construction. If piling or vibratory compaction activities will occur near sensitive structures or if significant complaints are received during these construction activities.	• Vibration monitoring results compliant to performance criteria. • Recommendations and corrective actions taken when vibration incidents are noted. • Complaints arising from excessive vibrations and managed through the Grievance Mechanism.	Contractor and Project Owner
5.	**Blasting works** A Method Statement will be prepared for blasting activities. The Method Statement will make provision for monitoring of adherence to blasting schedule and the number of complaints.	Nearest settlements to blasting area Natural habitats near to blasting area	During construction If blasting activities will occur near sensitive structures or if significant complaints are received during these construction activities.	• Complaints pertaining to blasting and managed through the Grievance Mechanism.	Contractor and Project Owner
Water					

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
6.	Groundwater levels in private and community wells located within 1 km of Project water abstraction boreholes will be monitored on a quarterly basis.	West Morava River aquifer	Pre-construction to obtain a seasonal baseline for capturing multi-seasonal data and1-yr post construction Quarterly	• Water levels in private / community wells not affected.	Project Owner
7.	**Ground water and surface water quality.** Ground water - in private and community wells located within 1 km of proposed water abstraction boreholes, Construction Camps, and any areas where hazardous substances will be handled, e.g.: refueling stations, vehicle workshops. Surface water - in rivers, streams and dams located within 1 km downstream of Project activities including Construction Camps and any areas where hazardous substances will be handled, e.g.: refueling stations, vehicle workshops. Surface and groundwater samples will be collected at least quarterly, twice during the wet season and twice during the dry season, in areas where Project activities are taking place and for one year thereafter. Samples will be analyzed for a suite of analyses suitable to identify potential contaminants from project activities, e.g.: total petroleum hydrocarbons, dissolved metals, cations and anions (Ca, Mg, K, Fl, Cl, SO4), pH, total dissolved solids (TDS) and total suspended solids (TSS), and other compounds of potential concern based on chemicals compounds used during the project (e.g.: lubricants, degreasers).	West Morava River and its tributaries Existing natural ponds within project AoI West Morava River aquifer	Pre-construction to obtain a seasonal baseline for capturing multi-seasonal data and1-yr post construction During construction Quarterly	• Water quality results compliant to performance criteria.	Project Owner
8.	**Waste water discharge** Monitoring of discharge from wastewater treatment plants located on construction site and Camp Accommodation to comply with applicable Serbian legislation and international good practice.	West Morava River and its tributaries Wastewater Treatment	During construction and operation of camp accommodation	• Water quality in private / community wells and in nearby rivers not affected.	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		Facility discharge locations	Monthly		
Biodiversity					
9.	**Damage or loss of terrestrial habitats** Detail mapping of natural habitat could be made through remote sensing of satellite imagery prior to the start of construction within each section, and ground-truthing to confirm the status of the habitat at a scale of 1:5000 or 1:1000 (including the actual route, drainage features, access roads, borrow pits and quarries, construction camps and any other construction components that lead to loss of vegetation). Habitats should be classified as either natural or modified based on the requirements of the PS6. A specialized ecologist should define the present ecological condition of habitats, describe the presence of species of conservation concern, the impacts, and transformation at the time of the survey. GIS tools should be used to calculate the loss of natural habitat from an overlay of the actual construction footprint over the extent of natural habitat.	Natural habitats in AoI	Prior to the start of construction and during the construction using Appendix 5 – Constraints Maps from ESIA	• Biodiversity Management Plan defining the methodology to be used based on PS6. • Report for each section of the motorway presenting accurate maps and estimates of natural habitat loss.	Project Owner
10.	**Habitat fragmentation** Monitoring of fauna killed on the roads used by Contractor vehicles during construction. Records should include date, species, location, gender, approximate age and freshness of the carcass.	Natural habitats in AoI	As and when incidents are encountered from the start of construction through to the start of the operational phase. Quarterly	• The crossing success of the fauna species. • No encounters with fauna deaths.	Contractor
11.	**Loss of sensitive plant species** Monitoring of relocated and seeded plants that are moved and collected from sites to be cleared. Records should include species identification, date of uprooting, date of transplanting, date of	*National Legislation Ann-I* *Nuphar lutea* *National*	Monitoring post planting Quarterly	• Success of transplanting and germination of the plants	Project Owner

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	collecting, date of seeding and equipment used. Visual inspection of success rate of establishment.	*Legislation Ann-II* *Arctium lappa,* *Hypericum perforatum,* *Iris pseudoacorus,* *Acinos hungaricus,* *Lamium album,* *Althea officinalis,* *Crataegus monogyna,* *Rosa canina,* *Galium odoratum* *Viola odorata*			
12.	**Loss of sensitive fauna species** Monitoring of fauna loss due to death within the construction site buffer zone during construction. Records should include date, species, location, gender, approximate age and freshness of the carcass.	Invertebrates *Zerynhia cerisy* Amphibian and Reptilian *Emys orbicularis,* *Testudo hermanni* *Darevskia praticola* Birds *Aquila heliaca,* *Streptopelia turtur* *Milvus milvus,* *Falco vespertinus* Mammals	As and when incidents are encountered from the start of construction through to the start of the operational phase. Quarterly	• No encounters with fauna deaths.	Project Owner

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		Rhinolophus Euryale *Myotis bechsteinii* *Lutra lutra* *Myotis capaccinii* and Nationally Protected species*			
13.	**Introduction of Alien invasive species** Monitoring of introduced alien invasive species in the construction site during construction. Records should include alien invasive species identification, density, height, stages of reproduction (germination, flowering, fruiting, and seed production), dates since disturbance, effectiveness of control measures.	Natural habitats in AoI	During construction Seasonal basis	• No encounters with alien invasive species	Contractor
14.	**Damage to Freshwater Ecosystem-Freshwater Habitat loss / change due to river regulation** In order to address the seasonal baseline for capturing multi-seasonal data, aquatic biomonitoring (eg. counting the fish species) will be conducted in all aquatic habitats supporting flowing water that are crossed by the proposed Motorway. Emphasis will be placed on the West Morava River and its tributaries. Preconstruction Aquatic Ecology baselines (from ESIA) will be used to establish baseline and compared against data during construction. Post construction Aquatic Ecology data will be compared against data from the preconstruction baselines.	West Morava River and its tributaries Natural ponds in the AoI	Multi-seasonal prior to construction and for 12 months post construction. Bi-annual (1 breeding and 1 non breeding season)	• No major change against baseline data.	Project Owner
15.	**Loss of sensitive aquatic species** Visual monitoring of aquatic species deaths during construction. Records should include date, species, location, and freshness of the carcass.	*Nationally Protected species Ann-I* *Carassius carassius** *Tinca tinca*	As and when required from the start of construction through to the start of the	• No incident with fish deaths. • Compliance with mitigation measures construction in Method Statements	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		Cobitis elongata *Zingel zingel* *Unio carassus* *Astacus astacus* *Nationally Protected species Ann-II* *Abramis brama* *Barbus balcanius* *Chondrostoma nasus* *Cyprinus carpio (VU)* *Squalius cephalus* *Esox lucius* *Perca fluviatilis* *Sander lucioperca* *Silurus glanis* *Hirundo medicinalis*	operational phase.		
Visual Landscape					
16.	**Change of landscape due to changes in land use** Monitoring the visibility of landscape changes	Sensitive receptors are given in Appendix-5 Visibility Map	During construction Quarterly	• Before and after photographic documentation at sensitive receptors • Complaints in visual quality in immediate settlements affected. • Grievance arising from visual managed through the Grievance Mechanism	Project Owner
17.	**Visibility of new structures from Settlements**	Sensitive receptors are	During	• Before and after photographic	Project

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	Monitoring the visibility of new structures in particular Project Facilities e.g. quarries, borrow pits, asphalt plants, to be built by the Project	given in Appendix-5 Visibility Map	construction Quarterly	documentation at sensitive receptors • Visual quality in immediate settlements not affected. • Grievance arising from visual managed through the Grievance Mechanism	Owner
18.	**Visibility of new structures from Recreational Areas** Monitoring the visibility of new structures in particular Project Facilities e.g. quarries, borrow pits, asphalt plants, to be built by the Project	Sensitive receptors are given in Appendix-5 Visibility Map	During construction Quarterly	• Before and after photographic documentation at sensitive receptors • Visual quality in recreational areas not affected. • Grievance arising from visual managed through the Grievance Mechanism	Project Owner
Waste					
19.	Duty of Care of contractors will be audited to ensure that facilities and waste disposal/treatment/recycling / reclamation processes are suitable and in line with national Serbian and international good practice standards.	Construction site and Project Facilities	During construction Bi-annually	• Waste contractor facilities and process fully licensed and in line with national and international standards • Waste contractor performance is in line with national and international standards.	Contractor
20.	Housekeeping checks will be conducted to ensure waste is being transferred to and stored correctly at the Construction Camps and that no littering is occurring at active work sites.	Workers who accommodate in camp sites	During construction Visual inspections on an regular basis	• Well-maintained and clean active work areas that are free of litter and other wastes.	Contractor
21.	Regular Inspections of waste disposal areas at active work areas and waste storage facilities at the Construction Camp will be undertaken to ensure compliance with this ESMMP, Environmental License conditions and relevant legislation.	Construction site and Project Construction Facilities	During construction Visual inspections on an regular basis		Contractor
22.	Grievance Mechanism to include complaints regarding waste management.	PAPs	During construction	• Up to date complaints register.	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
			Visual inspections on an regular basis		
Spills					
23.	Spill Response Kit inspection checklist to include missing response equipment, personal protection equipment, fire extinguishers or documentation (licenses, permit), number to replaced, location.	West Morava River and its tributaries Existing natural ponds Shallow Aquifer (1m - 6 m) of the West Morava River	During construction Monthly	• No missing response equipment, personal protection equipment or documentation.	Contractor
24.	Spill pollution prevention measures inspection checklist to identify condition and preventative maintenance required, as well as what preventative maintenance was performed.	West Morava River and its tributaries Existing natural ponds Shallow Aquifer (1m - 6 m) of the West Morava River	During construction Monthly	• Well implemented preventative maintenance programme.	Contractor
25.	Bi-annual spill response drill to provide information regarding required revisions to training or the ESMMP.	Across all construction site and associate facilities	During construction Bi-annual	• Undertaking bi-annual spill response drills.	Contractor
26.	All spills will be reported and investigated. Effectiveness of corrective and prevention action will be audited.	West Morava River and its tributaries Existing natural ponds Shallow Aquifer	During construction	• Spill log maintained and up to date with corrective actions closed out. • Incident reporting classification in line with Environmental Management Plan.	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		(1m - 6 m) of the West Morava River			
Social Monitoring					
Population					
27.	To reduce the risk of illicit behavior and crime, training will be provided to all workers including expatriates workers. Including Orientation, Code of Conduct and Cultural Awareness Trainings, Grievance Mechanism.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Records community Grievance Mechanism related to illicit behavior of the workers • Number of local workers. • Number of Cultural Awareness Trainings for the ex-pat and foreign workers. • Number of skill development trainings to local labour force.	Contractor
28.	To reduce the risk of social conflict training will be provided to all workers including expatriates workers. Including Orientation, Code of Conduct and Cultural Awareness Trainings, Grievance Mechanism. Community Liaison Officer will provide engagement with the nearby communities.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Training records on the Code of Conduct. • Training records on the Orientation • Engagement records and proof of introduce of local CLOs to the nearby communities to the campsites.	Contractor
29.	To minimize the Influx of additional population (“followers”) equal recruitment opportunity will be provided to local population.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Number of the local employees. • Announcement of employment opportunities. • CV pool. • Recruitment tools.	Contractor
30.	To prevent the potential negative impacts on the dynamics between the workers and the local community, the worker accommodation areas will include social facilities and services for the Project workers.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Inspection records of all camp accommodation facilities in compliance with Guidance by IFC and EBRD Workers’ Accommodation: Processes and Standards. Inspection to include: - leisure, social telecommunications facilities.	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
				- medical facilities - standards for nutrition and food safety - laundry facilities Canteen, cooking and laundry facilities - toilet facilities Rooms/dormitories facilities - water heating, air conditioning, ventilation and light - wastewater and solid waste - showers/bathrooms and other sanitary facilities	
31.	To minimize the burden on and competition for public services (eg. electricity, water, etc) worker accommodation facilities will include additional or separate supply systems.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Grievances records related with the pressure on the public services and infrastructure.	Contractor
32.	To prevent the gender-based discrimination Code of Conduct training be provided to workers and women Community Liaison Officer will be hired where possible.	villages - Jasila, Vrnjci, Adrani	During construction Quarterly	• Recruitment of women CLO. • Records of training on Code of Conduct. • Grievance records.	Contractor
33.	Local inflation and the prices will be monitored.	villages - Jasila, Vrnjci, Adrani	During construction Annually	• Grievance Records. • Annual reports of the governmental bodies. • Market price analysis	Contractor
Infrastructure					
34.	Pressure on the local healthcare infrastructure as a result of incoming construction workforce will be monitored as part of the various management plans including Grievance Mechanism and the statistics of the workforce using the accommodation and medical facilities .	Municipalities Čačak, Varvarin, Trstenik	In case of a complaint Quarterly	• Statistics on workforce using on-site accommodation medical facilities. • Grievance records.	Contractor
35.	Traffic management plan (TMP) will be used to monitor; - The potential impacts on the local road network as a result of the construction activities (i.e. transportation workers, material and equipment, waste disposal, etc.)	Municipalities Varvarin, Kruševac, Vrnjačka Banja,	During construction Complaints or damage to local	• Visual inspections to ensure the effectiveness of the mitigation measures in TMP	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	- road crossings and damage to local roads from heavy traffic movement - disruption to road infrastructure and reduced access due to road cuttings	Trstenik, Kraljevo, Čačak	roads	• TMP in place and implemented • Reported number of incidents/accidents • Driver training records and driver logs in place • Grievance Mechanism	
36.	Pressure on waste management system including the pressure on the sewage system will be monitored through WMPand Grievance Mechanism.	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	Complaints	• Number of grievances raised in relation to accommodation • Permits in place	Contractor
Economy					
37.	Employment of the local people and direct and indirect job opportunities will be monitored through the Grievance Mechanism, HR policy and the workforce statistics.	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Workforce statistics including: - breakdown of direct and contracted worker - percentage of the skilled, semi-skilled and unskilled - number of female staff recruited - workforce hired from within the social AoI - grievances raised in relation to recruitment • Written Project-specific Human Resources • Policy and relevant procedures in place • Grievance Procedure in place and implemented grievance forms available at construction camps site and other works sites • Grievance records register and close-out forms	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
38.	Local procurement will be monitored through the procurement plan and the Grievance Mechanism.	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Number / type of business identified and contracted • Procurement Plan in place • Procurement Plan monitoring records • Grievances raised and means of reporting	Contractor
39.	Livelihoods based on agricultural sector will be monitored through the SEP, community development programs and Grievance Mechanism.		During construction Annually	• Grievance Records • Engagement Records with the stakeholders	Contractor
Land Acquisition and Resettlement - Input and Output Monitoring					
40.	Overall spending on land acquisition	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction (by Employer) Quarterly	• Cash compensation, • Compensation of fisheries, • Costs of providing assistance, by type of assistance • Consultation and engagement cost • Costs of evaluators and surveyor • Costs of legal fees • Costs of taxes and registration fees • Costs of consultancy input • Costs of vehicles, computers, and so on • Other costs (and type).	Project Owner
41.	Number of employees and consultants involved to the land acquisition and resettlement process	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction (by Employer) Quarterly	• Members of the land acquisition team • Members of other departments and Sections • Social workers • Skill trainers • Land acquisition consultants.	Project Owner

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
42.	Number of landowners and land users	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• Initial data will be received through the cadastral records, • Updates will be made continuously as the implementation team • Identifies all owners/users/fisheries of all land plots (for example, through the management of grievances).	Project Owner
43.	Number of private and governmental lands	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Data will be received through cadastral records	Project Owner
44.	Number of land plots for compensation agreements signed	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• The percentage should be calculated from the total number of affected land plots/houses/businesses, as identified by the census/survey.	Project Owner
45.	Number (and percentage) of land plots / businesses for which compensation agreements were refused/are still pending	Agricultural lands neighbouring the Motorway within the Social AoI	During construction Quarterly	• If possible, a breakdown of reasons why compensation agreements have been declined (or have still not been accepted) should be provided (land/ businesses).	Project Owner
46.	Number (and percentage) of owners/users who refused to sign compensation agreements/ are still deliberating	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• If possible, a breakdown of reasons why compensation agreements have been declined (or have still not been accepted) should be provided (land/ businesses).	Project Owner
47.	Number (and percentage) of compensation agreements executed	PAPs who	During	• The percentage should be calculated	Project

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	(compensation paid)	experience expropriation within the borders of Social AoI	construction Monthly	from the number of compensation agreements signed.	Owner
48.	Number of users or owners whom displaced physically	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• Number of replacement properties given and houses provided; • Number of PAPs affected by exercising its right of ownership on buildings and land; • Number of PAPs received compensation in time and full amound; • Changes in the household conditions (i.e. the size of the house) • Records of transitional allowances and rental allowances	Project Owner
49.	Number and type of grievances, including legal actions arising from expropriation	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• Number of submitted cases • Number of resolved cases • Time needed for their resolution.	Project Owner
50.	Number of vulnerable persons/households assisted by the implementation team by type of assistance and by category (owners/users)	PAPs who experience expropriation within the borders of Social AoI	During construction Quarterly	• Assistance to prepare ownership documents (monetary assistance, provision of information, legal aid, and so on) • Other assistance (and type)	Project Owner
51.	Number of people whom were able to restore their livelihoods	PAPs who experience expropriation within the borders of Social	During construction Quarterly	• Number and % of person with improved household income; • Number and % of persons with improved housing conditions;	Project Owner

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		AoI		• Number and % of persons with increased monthly expenditure level; • Number and % of persons with improved asset ownership; • Number and % of persons still living below poverty line (applying the same criteria as was used to determine vulnerability).	
Access to Ecosystem Services					
52.	Grievance Mechanism, visual inspections, traffic management plan, dust noise and air measurements, will be used to monitor, - Access to Forest Lands - Impact on Apiculture - Impact on River Usage - Impact on Leisure Activities and Tourism	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Visual inspections and records of information tools and records of consultations, • Grievances related with the access to the ecosystem services, • Grievances related with dust, air and vibration, • Environmental measurement records, • Visual inspections of the vegetation clearing • Number of beekeepers (enterprises or individuals) • Number of beehives, • Dust and noise measurement records, • Annual honey production level, • Grievance records related with beekeeping activities. • Grievances related with restrictions on the designated hunting areas.	Project Owner
Labour and Working Conditions					

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
53.	HR policy, workers Grievance Mechanism will be used to minimize the labour risks and impacts and to monitor: - women employment and non-discrimination and equal opportunity - labour risks and impacts related to subcontractor and supply chain management (including child and forced) - working conditions and terms of employment for expat and national workers. - employment of the local workforce	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Percentage of workforce who are women or from other vulnerable groups • Number of workers (direct employees and subcontractors) trained on the worker grievance mechanism • Number of grievances from workers or job seekers related to discrimination, abuse of labour rights, sexual harassment. • Grievance Records • Average number of hours worked per week • Average number of days worked without a rest day • Average number of overtime hours worked per week • 100% of contracts including clauses on labour and working conditions in line with Serbian Law and the IFC PS2. • Labor Audit Report(s) verifying worker/contractor accommodation conditions provided in line with the requirements described in the "IFC/EBRD Guidance Note on Workers' • Accommodation: Processes and Standards" • Records of trainings • Percentage of workforce who receive training/ induction on • HR policies, plans and procedures • Number of workers (direct employees and subcontractors) trained on the worker	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
				grievance mechanism • Grievance Records	
Occupational Health and Safety					
53	Occupational Health and Safety (OH&S) Management Plan will be implemented to monitor and reduce risk exposure of the workforce. The OH&S Management Plan will include a variety of plans and procedures depending on the activities being undertaken and associated risks, such as: - Physical and chemical hazards - Emergencies - Construction traffic - Accommodation - Subcontractor and Supply Chain Management (including child and forced labour risks) Staff will also receive training on this and incidents and accidents recorded and investigated. Implementation of the OH&S Management Plan will be monitored to ensure that it is being implemented appropriately and that risks are being managed. This will include regular (daily) site walkovers to observe behaviors and more detailed weekly checks of performance. Accident and incident data will be reviewed monthly to spot trends where further health and safety measures or training may need to be implemented. H&S Management Plan will include community health and safety risks and will monitor: - Level crossings safety - Noise during operation - Flood risk during operation Transport of dangerous goods	All Project workers, Sub-contractors and supply chain	During construction Quarterly	• Percentage of workers (direct employees, subcontractors and suppliers) that have received OHS induction prior to working on site • Number of workers (direct employees, subcontractors and suppliers) that have received task specific training • Percentage of workers attending toolbox talks. • Number of stop work notices issued by activity • Number and type of non-compliances observed during daily and weekly site inspections • Number of Lost Time Injuries (LTI) involving workers on site • Number of minor incidents and injuries • Number of incidents investigated, corrective actions identified and closed out/ not closed out within the required timeframe • Percentage of suppliers and subcontractors hired where • Assessment has identified issues associated with forced labour, child labour or significant safety violations • Number of grievances • Worker Contracts Performance Indicators for community health	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
				and safety: • Grievance Records • Accident Records • Training records on the safety management program • Consultation records • Grievance related with the noise measurement • Grievance Records • Incident Records • Relevant certificates	
Community Health and Safety					
54.	Disturbance to community health and safety during the construction phase (eg. air, noise, environmental health, quality of life and wellbeing) will be monitored through the Grievance Mechanism.	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja Trstenik Kraljevo Čačak	During construction Quarterly	• Grievance records about the environmental issues, • Consultation records, • Records of Air quality measurements, • Records of Noise measurements, • Grievance records on air and noise,	Contractor
55.	SEP, health screening of workers and community health and safety trainings topics will be used to monitor increased risk of communicable diseases and burden on local health services.	Municipalities Kruševac Villages Vrnjci Adrani	During construction Quarterly	• SEP Register, • Health screening summary records • Training materials and records on health induction and refresher training, including public health partnership information	Contractor
56.	Traffic Management Plan, Grievance Mechanism, and the results of the awareness trainings will be used to monitor increased traffic and rise in accidents.	Municipalities Ćićevac Varvarin Kruševac Vrnjačka Banja	During construction Quarterly	• Grievance Records, • Traffic Accident Records • Training Records for drivers	Contractor

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		Trstenik Kraljevo Čačak		• Protocols signed with the local authorities if any • Visual inspections of the traffic signs • Records of the road safety awareness trainings to the nearby schools • Visual inspections of the warning signs during road and railway crossings	
57.	Security Management Plan will include monitoring of the private security services around the Project sites and the local community hot spots.	Municipalities Kruševac Villages Vrnjci Adrani	During construction Quarterly	• Records of the consultations • Records of the trainings given the security personnel • Records of the security incidents	Contractor

Operation

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
Biodiversity					
58.	**Accidental loss of fauna** Monitoring of fences along the proposed Motorway for breaches by wildlife, holes, tunneling beneath, breakages, faulty energizers or any other malfunctions to maintain the fence in an animal proof-state. Monitoring of fauna road kills along proposed Motorway during operations. Parameters measured include date, species, location, gender, approximate age and freshness of the carcass.	Amphibian and Reptilian *Emys orbicularis, Testudo hermanni Darevskia praticola* Mammals *Lutra lutra,* and Nationally Protected species *However, other non-sensitive amphibian, reptile and mammal species may also be affected.	As and when road kills are encountered from the start of operations and maintained for the life of the proposed Motorway.	• No encounters with fauna deaths.	Operator
59.	**Barrier effect in fauna** Monitoring of culverts along the proposed Motorway for blocking by materials or any other malfunctions to maintain the culvert in an animal proof-state.	Amphibian and Reptilian *Emys orbicularis, Testudo hermanni Darevskia praticola* Mammals *Lutra lutra,* and Nationally	Annually throughout the Operation	• The crossing success of the fauna species. • No encounters with fauna deaths.	Operator

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
		Protected species *However, other non-sensitive amphibian, reptile and mammal species may also be affected.			
Visual Landscape					
60.	**Change of landscape due to changes in land use** Monitoring the visibility of landscape changes	Sensitive receptors are given in Appendix-5 Visibility Map	Annual monitoring studies throughout operation	• Visual quality in immediate settlements not affected. • Grievance arising from visual managed through the grievance procedure	Project Owner
Ecosystem Services					
61.	• Access to Ecosystem Services due to lack of under and overpasses will be monitored through the GRM	All Municipalities in the AoI	Bi-Annually during the operation	• Grievance Mechanism	Project Owner
Occupational Health and Safety					
62.	Occupational Health and Safety Management Plan will be implemented to monitor and reduce risk exposure of the workforce. The OH&S Management Plan will include a variety of plans and procedures depending on the activities being undertaken and associated risks, such as: - Physical and chemical hazards - Emergencies - Construction traffic - Accommodation - Subcontractor and Supply Chain Management (Including Child and Forced Labour Risks) Staff will receive training on incidents and accidents recorded and investigated.	All Project workers, Sub-contractors and supply chain	Quarterly during the operation	• Percentage of workers (direct employees, subcontractors and suppliers) that have received OH&S induction prior to working on site • Number of workers (direct employees, subcontractors and suppliers) that have received task specific training • Percentage of workers attending toolbox talks. • Number of stop work notices issued by activity • Number and type of non-	Operator

Ref No.	Monitoring Measure	Sensitive Receptor	Timing and Frequency	Performance Indicator	
	Implementation of the OH&S Management Plan will be monitored to ensure that it is being implemented appropriately and that risks are being managed. This will include regular (daily) site walkovers to observe behaviors and more detailed weekly checks of performance. Accident and incident data will be reviewed monthly to spot trends where further health and safety measures or training may need to be implemented.			compliances observed during daily and weekly site inspections • Number of Lost Time Injuries (LTI) involving workers on site • Number of minor incidents and injuries • Number of incidents investigated, corrective actions identified and closed out/ not closed out within the required timeframe • Percentage of suppliers and subcontractors hired where • Assessment has identified issues associated with forced labour, child labour or significant safety violations	
63.	OH&S Management Plan will include community health and safety risks and will monitor: - Level crossings safety - Noise during operation - Flood risk during operation - Transport of dangerous goods	PAPs	Quarterly during the operation	• Grievance Records • Accident Records • Training records on the safety management program • Consultation records • Grievance related with the noise measurement • Grievance Records • Incident Records • Relevant certificates	Operator

8.10 Key Performance Indicators

Table 8-6 below summarizes the Key Performance Indicators (KPIs) and associated targets that may be used to assess the progress and effectiveness of proposed mitigation strategies during construction phase. The agreed KPIs will be developed jointly with the Project Owner and Contractor and Project Operator.

Table 8-6. Key Performance Indicators

KPI	Target
Air Quality	
Air Quality incidents	Minimization and continued improvement in the number of the reported air quality related incidents.
Non-Compliance with air quality standards	Zero complaints per year
Community complaints	Minimization and continued improvement in the number of air quality related community complaints.
Noise	
Noise and Vibration incidents	Minimize and continued improvement in number of reported noise and vibration related incidents.
Non-Compliance with Project standards	Zero NCRs per year
Number of noise-related community grievances	Zero grievances per year
Water	
Spill incident	Minimization and continued improvement in the number of the reported water quality related incidents.
Non-Compliance with Project standards	Zero NCRs per year
Number of Noise-related community grievances	Zero grievances per year
Soil	
Spill incident	Minimization and continued improvement in the number of the reported soil quality related incidents.
Non-Compliance with Project standards	Zero NCRs per year
Number of noise-related community grievances	Zero grievances per year
Traffic	
Number of non-compliances against the mitigation controls identified in Traffic Management Plan	Decreasing number/ continuous improvement in number of reported non-compliances
Number of drivers found to be exceeding speed limits or driving unsafely	Zero exceedance per year
Number of road traffic accidents involving: Accidental injuries and deaths, Spillages (such as cargo or fuel), Wildlife-vehicle collisions.	Zero accidents per year
Number of traffic-related grievances	Zero grievances per year
Health, Safety and Environment	
% of workforce attending STARRT	>90
% of scheduled HSE Inspection	>90
% of attendance at HSE meetings	>90
% of closing of NCRs	100
Reporting safe observations	100%
Reporting unsafe observations	100%
Reporting near misses	100%
% of Toolbox attending	>90
% of Risk Assessment compliance	>90

% of Legal Requirements compliance	>90
Results of scheduled audits	>85
HSE training carried out to training matrix > 90% of all training to matrix	>90
% of attendance at scheduled trainings	>90
Engagement in HSE program by individual managers and supervisors	>90
Engagement in HSE program by Subcontractor's	>90
Labor and Working Conditions	
Number of worker grievances not closed out within the target timeframe	Zero worker grievances not closed out on time
Community Health and Safety	
Number of communicable and non-communicable diseases and injuries.	No significant increase in communicable and non-communicable disease and injury rates per 1,000 residents per annum.
Number of community health safety & security complaints from local communities as recorded in the grievance management system.	Decreasing number/ continuous improvement in number of complaints .
Number of reported community health & safety incidents	Zero incidents per year
Number of reported noise incidents	Zero incidents per year

9 STAKEHOLDER ENGAGEMENT

9.1 Objectives of Stakeholder Engagement

Stakeholder engagement is a two-way process of communication between the Project parties and its stakeholders. The Stakeholder Engagement Plan (SEP) presented in Appendix-3 has been developed with the aim of explaining how the Project will communicate, engage and interact with the stakeholders that may be directly or indirectly affected by and / or interested in the Project. The SEP summarizes engagement activities undertaken to date and includes details of the approach and mechanisms proposed for future engagement with stakeholders. It also includes the general principles and main steps of a grievance management system of the mechanism for stakeholders to raise any concerns related to the Project.

In accordance with international best practice, the objectives of the Stakeholder Engagement are to:

- build and maintain a constructive relationship with and among the stakeholders, in particular project-affected communities;
- promote improved environmental and social performance through effective engagement with the stakeholders;
- promote and provide effective means for adequate engagement with project-affected communities throughout the project cycle on issues that could potentially affect them so that their concerns are addressed accordingly and to ensure that meaningful environmental and social information is timely disclosed to them and to other stakeholders;
- ensure that all stakeholders have ways to access project information and raise issues;
- ensure that project-affected people (PAPs) have accessible and effective means to raise issues and grievances, and the Contractor responds to and manages such issues and grievances appropriately.

9.2 Roles and Responsibilities

Corridors of Serbia and the Ministry of Construction, Transport and Infrastructure, on behalf of the Government of Serbia, is the Employer of the Project.

The SEP describes CoS and the Contractor's approach in engaging with stakeholders that will be maintained throughout the Project lifecycle. SEP is a strategy for the provision of timely information on the Project's commitment to Stakeholder EngagementThe CoS and the Contractor Department in charge of Community Relations (CR) will be responsible to implement this SEP during pre-construction and construction phases of the Project. During the operation phase, the CoS will have the main responsibility to implement and update the document.

In terms of land acquisition process, mainly for the implementation of the grievance mechanism, the CoS will be the main responsible party with the assistance of CRSD, in the cases where needed. Detailed responsibility for individual activities within the scope of Stakeholder Engagement listed in Table 9-1 below.

Table 9-1. Roles and Responsibilities

Name of the Authority	Responsibilities
Ministry for Construction, Transport and Infrastructure	The role of Ministry will be during the permitting phase and to some extent during public disclosure of the Project. The activities regarding Project documentation and permits, a certain role of this Ministry will be dissemination of the information regarding the project. Public disclosure and media coverage will be to some extent responsibility of this Ministry.
CoS	The day-to-day implementation of the SEP, grievance management for the land acquisition and resettlement will be the responsibility of the CoS. The CoS will closely liaison with other relevant institutions, governmental bodies, local governments, and affected communities and individual as well as with other stakeholders to engage with them and ensure full disclosure of information and documents as defined by this SEP. Prior to construction, the public and local community will be informed, through the websites of the CoS and those of the respective Municipality's Administration website, about the information and Grievance officer. The day-to-day implementation of the SEP will be the responsibility of the Land acquisition and resettlement department of the CoS.
Contractor	Stakeholder engagement and grievances management related to construction activities will be managed by the Contractor. Prior to construction, the public and local community will be informed by construction contractor at local level. Prepare HR Policy and Workers GRM and comply with their requirements
Ministry for Environmental Protection	The role of the Ministry is; protection and improvement of the environmental system; application of scientific and technological research results and investigation in the environment; implementation of the Convention of public participation, access to information and right on legal protection in the environmental field; determination of environmental conditions in spatial planning and construction of objects.
Municipalities	Local municipalities govern the expropriation process (Department of property affairs)

9.3 Stakeholder Identification and Analysis

A stakeholder is defined as an individual or group that may be directly or indirectly affected by the Project, and/or that may have an interest in or influence over the Project. Stakeholders are those who have an interest in a particular decision, either as individuals or representatives of a group including people who influence a decision or can influence it as well as those affected by it. Stakeholders include Project affected people and other stakeholders including; non-governmental organizations, governments, shareholders and employees as well as non-affected community members.

Stakeholders have been identified based on proximity to Project features, and the degree of impact and interest in the Project.

Project-affected parties include those likely to be affected by the project because of actual impacts or potential risks to their physical environment, health, security, cultural practices, well-being, or livelihoods. These stakeholders may include individuals or groups, including local communities

Other Stakeholders refer to individuals, groups, or organizations with an interest in the project, which may be because of the project location, its characteristics, its impacts, or matters related to public interest. For example, these parties may include regulators, government officials, the private sector, the scientific community, academics, unions, women's organizations, other civil society organizations, and cultural groups.

Table 9-2 below presents identified stakeholders based the on-desktop study[1] and the consultations[2] during the ESIA studies. Disclosure and recommended routine of communication for the future stakeholder engagement activities; during the ESIA are also presented.

[1] Studies on the Environmental Impact Assessment Project of the E-761 Motorway Project border of Republika Srpska - Pozega - Preljina - Pojate, section Pojate - Kruševac (Kosevi) from km 0-229.75 to km 27 + 600.00 (Traffic Institute CIP, 2018) EIA of Preliminary Design of Motorway E - 761 Pojate – Preljina, Section: Adrani – Mrcajevci (Institute for Roads J.S.C.,2011) Hydro technical Study Corridor of the Motorway E-761, Section Pojate-Preljina Field Study Outcomes (March 18 – 22, 2019)

[2] Consultation tools used for the past stakeholder engagement process presented in Chapter 5 in detail

Table 9-2. List of Stakeholders

Stakeholder Groups	Interested / Affected Party	Communication Tool
Government		
Ministry of Environmental Protection Ministry of Construction, Transport and Infrastructure Ministry of Agriculture, Forestry and Water Management Ministry of Internal Affairs Ministry of Mining and Energy Ministry of Labour and Social Policy Republic Institute for the Protection of Cultural Monuments Corridors of Serbia Roads of Serbia Jaroslav Černi (river regulation purposes)	Interested	Meetings; Conferences; Reports; Correspondence
Technical		
Project Designers EIA Consultants ESIA Consultants	Interested	Meetings; Conferences; Reports Correspondence
Administration		
Kraljevo Municipality Kruševac Municipality Čačak Municipality Vrnjačka Banja Municipality Trstenik Municipality Ćićevac Municipality Varvarin Municipality Cadastral Municipalities (in all affected municipalities)	Interested Affected	Meetings; Conferences; Reports; Correspondence
Local Communities		
All affected 48 local settlements within the Area of Influence of the Project. Local Businesses Formal and Informal Land Users	Affected	Consultation; Public hearings; Meeting; Corporate website Shares; Written Project brochure/poster/non-technical summaries Grievance mechanism Corporate social responsibility
Vulnerable groups; • Elderly • Disabled • Low income • Untitled houses • Women headed households • Homeless • Seasonal Workers • Size of the land - less than 3 ha (%)	Affected	Assistance to access Grievance mechanism Assistance to access Project information tools (report, meetings) Additional technical assistance (travel, legal) when necessary, Assistance to obtain updated information on the preconstruction and construction activities.
Media		
Local and National Media	Interested	Press releases; Press conference Interview; Newsletters; Reports
Non Governmental Organizations		
See Annex-6 of SEP Report for the detailed NGO List.	Interested	Press releases; Press conference Interview;

Stakeholder Groups	Interested / Affected Party	Communication Tool
		Newsletters; Reports
Project Employees		
Direct Employees Indirect Employees Temporary Employees Trade Unions	Affected	Collective bargaining; Code of Conduct; Public reception; Corporate website; Corporate portal; Electronic network; Letters / responses to requests; Poll / survey; Training Mailing Worker Grievance Mechanism

9.3.1 Vulnerable Groups

Vulnerable groups refer to Persons who, by virtue of; gender identity, sexual orientation, religion, ethnicity, indigenous status, age, disability, economic disadvantage or social status. Vulnerable groups are more susceptible to be marginalized by the society. They can be affected by project impacts differently than others and may be limited in their ability to claim or take advantage of project benefits. Therefore, Employer and the Contractor (with assistance of relevant Municipalities, when needed), shall apply provisions for assisting disadvantaged or vulnerable individuals that may be more adversely affected by displacement than others and who may be limited in their ability to claim or take advantage of livelihood assistance and related development benefits.

The sources of main impacts on the vulnerable people in the area are identified, but not limited to, as traffic intensity, infectious disease and employment opportunities and land acquisition. The following vulnerable groups were identified at this stage of the Project.

Table 9-3. Potential Vulnerable Groups

Vulnerable Category	Support Methodology
Elderly (aged over 65)	• Travel assistance • Assistance on acknowledging and signing official documents • Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to access compensation payments • Assistance to clear and store materials from their land.
PAPs with size of a land less than 3 ha	• Assistance to find alternative land • Temporary livelihood assistance when required, • Job assistance • Replanting assistance
Disabled	• Travel assistance • Assistance to obtain personal documents • Assistance to access compensation payments

Vulnerable Category	Support Methodology
	• Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to clear and store materials from their land.
Low income[3]	• Priority for job opportunity during the construction phase of the Project • Access to legal resources with an assistance in case of a need (i.e. transportation) • Assistance to access compensation payments • Travel assistance
Informal structures	• Moving allowances
Women headed households	• equal employment opportunities for women;
Single parents' households	• Where physical relocation is necessary, provide temporary housing • Temporary livelihood assistance when required, • Priority for job opportunity • Job assistance
Homeless	• Temporary livelihood assistance when required, • Priority for job opportunity • Job assistance
Seasonal Workers	• Temporary livelihood assistance • Priority for job opportunity • Job assistance

To ensure that all Project affected stakeholders will have an opportunity to receive Project information, raise concerns or make written or oral comments, special provisions will be taken to consider vulnerable groups in a meaningful way, including but not limited to:

- Provision of transport to disclosure and public participation meetings (e.g. for elderly, physically disabled people or other people who wish to access the locations where public meetings are held).

- Allowing participants to either make comments formally during the meeting or informally on a one-to-one basis after a meeting.

- The option that the participants who are not able to read or write have the opportunity to listen to presentations and provide their concerns verbally to minute takers during or after the meeting.

[3] According to Statistical Office of Republic of Serbia **poverty threshold** amounts to 15 600 dinars a month on an average for a single person household. For a household with two adults and one child aged below 14, the threshold is 28 080 dinars per a month, while for a four-member household with two adults and two children aged below 14, it amounts to 32 760 dinars.

9.4 Previous and Planned Stakeholder Engagement Activities

This section outlines the previous stakeholder engagement activities undertaken during scoping and the main impact assessment as well as planned ESIA disclosure activities and activities during project implementation[4].

Table 9-4. Past Stakeholder Engagement Activities within the Scope of ESIA Studies

<table>
<tr><th>Activity</th><th>Details</th><th>Date</th><th>Responsible Party</th></tr>
<tr><td>Gap Assessment Studies for ESIA</td><td>For the initial stakeholder analysis, 2U1K conducted Key Informant Interviews (KII) carried out in order to:
• understand the Justification of the Project;
• obtain updated information on the EIAs prepared for the different phases of the Project; and
• understand the possible environmental and social impacts and the approach to mitigations of the impacts.
It should be noted that, these interviews were carried out in an unofficial way and the scope of the meetings were limited since the ESIA process did not start officially.
Following authorities were interviewed within the scope of Gap Assessment as:
• Institute for Nature Protection of Serbia.
• CIP
• Highway Institutie
• Roads of Serbia
• Jaroslav Černi (The outputs of the KII consultations are presented in Annex-2).</td><td>March 2019</td><td>The Contractor
2U1K</td></tr>
<tr><td>ESIA Consultation Phase</td><td>Table below presents the number of surveys and interviews conducted respectively and following sub-sections provide details of the surveys conducted.
<table>
<tr><th>Type of Survey/ Interview</th><th>Number of Surveys/Interviews/ Meetings</th></tr>
<tr><td>Household Surveys</td><td>1563</td></tr>
<tr><td>Community Level Surveys</td><td>48</td></tr>
<tr><td>Key Informant Interviews (KIIs) during the Gap Assessment</td><td>6</td></tr>
<tr><td>KIIs with Non-Governmental Organizations</td><td>9</td></tr>
<tr><td>KIIs with Affected Municipalities</td><td>7</td></tr>
<tr><td>Focus Group Discussions</td><td>7</td></tr>
<tr><td>Business Surveys</td><td>110</td></tr>
<tr><td>Consultation for Resettlement and Livelihood Restoration Framework</td><td>7</td></tr>
</table></td><td>August 2019 – October 2019</td><td>2U1K</td></tr>
</table>

[4] Stakeholder engagement activities in accordance with Serbian Law can be found in the SEP.

Activity	Details	Date	Responsible Party
	The qualitative and quantitative tools that were used during the ESIA consultation phase in order to gather data for baseline purposes are as follows: Community Level Surveys (CLS): Community level surveys were performed with the village representatives and 46 CLS were conducted in total. Household Surveys (HHS): There is a total of 48 settlements within the buffer zone of 1000 meters. In period from26.08.2019-26.09.2019 1563 household surveys conducted according to the sample size determined in compliance with the population of the settlements. (The main impacts expected by the participants according to the settlements is presented in Annex-3.) Focus Group Discussions (FGD): Another method used for qualitative primary data collection is planned to be focus group discussions (FGDs) with different social/stakeholder groups: men, women, farmers, entrepreneurs, youth, elderly, etc. (See Annex 5 for details of the FGDs) NGO meetings: In period from 10.09.2019 till 18.10.2019, 10 NGO FGDs were held by the local social team with the supervision of 2U1K. Following NGOs were interviewed: • NGO Treehouse • Kruševac's Educational Center • Eurokontakt • Bee organization • White Tree Organization • NGO EKO IBAR • NGO Morava Fishing Association, former president of the municipality • Information level about the Project is inadequate. • West Morava Water Sports Association and Ecology Society • Women Entrepreneur Association The summary of NGO meetings is presented in Annex-4. Key Informant Interviews (KII): Key informant interviews (KIIs) were held with relevant local leaders and topic experts like health care professionals, education professionals, local government officers and other individuals able to provide specific information. Key Informant Interviews are realized in 7 Municipalities. Total of 110 companies were interviewed within the scope of Business surveys for the Project as:		

<table>
<tr><th>Activity</th><th>Details</th><th>Date</th><th>Responsible Party</th></tr>
<tr><td></td><td>
<table>
<tr><th>Municipality</th><th>Number of Surveys</th></tr>
<tr><td>Ćićevac</td><td>12</td></tr>
<tr><td>Varvarin</td><td>11</td></tr>
<tr><td>Kruševac</td><td>19</td></tr>
<tr><td>Vrnjačka Banja</td><td>13</td></tr>
<tr><td>Trstenik</td><td>8</td></tr>
<tr><td>Kraljevo</td><td>18</td></tr>
<tr><td>Čačak</td><td>29</td></tr>
<tr><td>TOTAL</td><td>110</td></tr>
</table>

Through the mentioned surveys following topics were discussed :
• Population and Demography of the AoI
• Economic conditions of the AoI
• Existing ecosystem services of the AoI
• Health, environment and security conditions of the AoI
• Infrastructure and Services of the AoI
• Vulnerability assessment
• Existing tangible and intangible resources located within the AoI
• Project Information level of the interviewees
• Suggestions for the Project development
Social baseline conditions of the AoI derived from the desktop and field studies can be found in Chapter 5 of the ESIA Report. Social impact Assessment including suggestions made by the interviewees can be found in Chapter 6 of the ESIA Report for respective topics listed above.</td><td></td><td></td></tr>
<tr><td>Disclosure of the Resettlement and Livelihood Restoration Framework (RLRF)</td><td>On January 22, 2020, both English and Serbian versions of the RLRF were disclosed on the official web site of the Corridors of Serbia (CoS) from the links provided below:
Serbian version:
http://koridorisrbije.rs/site/content/media/img/files/Morava%20RLRF%20Rev_%2010%20(14_01_2020)_Serbian(1).pdf
English version:
http://koridorisrbije.rs/site/content/media/img/files/RLRF_Rev_10%20(14_01_2020)%20CC.pdf.pdf
In the third quarter of February 2020, public participation meetings for disclosure were conducted to share the scope of the Framework</td><td>Third quarter of February 2020</td><td>2U1K
CoS</td></tr>
</table>

<table>
<tr><th>Activity</th><th>Details</th><th>Date</th><th>Responsible Party</th></tr>
<tr><td></td><td>For the announcement of the disclosure meeting, several invitation channels were used including the TV announcements, municipal announcements, radio and social media

Various informative materials were prepared to be used during the disclosure meetings including the presentation, brochure, maps (showing the motorway route, expropriation zone and the associated facilities) and comment forms

Distribution of the participants according to the municipalities given in below.
<table>
<tr><th>Municipality</th><th>Number of Participants</th></tr>
<tr><td>Kruševac</td><td>9</td></tr>
<tr><td>Ćićevac</td><td>8</td></tr>
<tr><td>Trestenik</td><td>30</td></tr>
<tr><td>Vrnjačka Banja</td><td>26</td></tr>
<tr><td>Kraljevo</td><td>37</td></tr>
<tr><td>Čačak</td><td>21</td></tr>
<tr><td>Total</td><td>131</td></tr>
</table></td><td></td><td></td></tr>
<tr><td>ESIA Disclosure</td><td>2U1K experts conducted a field study on August 2020 to assess whether open air Public Participation Meeting (PPM) could be arranged with local authorities and venues considering mandatory restrictions and social distancing measures associated with Covid-19. With the assessment of venues in August, all the arrangements and official permits were completed to conduct open air Public Participation Meetings in each affected villages, respectively. With the approval of local authorities, Contractor, Employer and Project Lenders; 2U1K was able to arrange and organize outdoor Public Participation Meetings located on each affected municipalities between the dates of September 23-30. The arranged venues were feasible to invite affected villages' leaders/ representatives and interested NGOs.

All the villages arranged to have Project Leaflets prior to PPMs and banners posted at the office of the village heads. It is important to note that the number of leaflets calculated for each affected villages according to ESIA baseline data to cover all vulnerable households in minimum. In other words, availability of leaflets for all vulnerable households was the key approach to reach out to them one by one and provide information on Project documents and how to contact to Project Parties. Also, website of the Employer announced the meetings in local language. The announcement of PPMs as well as the soft copy of the Non-Technical Summary of the ESIA Report can be accessed from: http://koridorisrbije.rs/sr/n-a-5f6206db6de3c

Also, 17 NGOs and organizations were invited to participate in the open air venues. NGOs whom participated during the ESIA studies are also included in the invitation circle. The invitation made in Serbian language and included following information;
Purpose of the Meeting
Brief Project Information
PPM Schedule for Each Affected Municipality
Covid-19 Precautions
Access to Project Documentation
Contact Information.</td><td>September 2020</td><td>2U1K
BEJV
CoS</td></tr>
</table>

Activity	Details	Date	Responsible Party
	Each meetings presented through a local facilitator whom was capable of translate from Serbian to English to obtain additional information from the 2U1K experts when necessary. In addition, meetings included hard copies of Project leaflets available for stakeholders to obtain. Also Project banners were posted entrances of the meeting venue. The presentation contained the following topics; • Purpose of the Meeting, • Covid – 19 briefing and precautions, • Introduction of the Project, • Explaining the Project parties, • Benefits of the Project, • Project sections and sectors, • Roles and responsibilities, • Land acquisition and resettlement, • Project construction schedule, • Project elements, • River regulation, • Introduction to environmental and social area of influence, • Environmental and social baseline studies conducted for the ESIA, • Key environmental and social impacts expected for construction and operation phase of the Project, • Environmental and Social Management and Monitoring Plan, • Conclusion, • Informed consultation and participation, • Grievance mechanism, • Access to Project documents and contact information. As can be seen in the images below the Route map was prepared for each affected municipality and hard copy (in A1 size) and presented at the end of the PPM for the interested stakeholders to show; • Route of the motorway, • Associated facilities, • River regulation, • Expropriation zone, • Location of the bridges, interchanges and underpasses, • EUNIS Habitat, • Location of the villages.		

<table>
<tr><th>Activity</th><th>Details</th><th>Date</th><th>Responsible Party</th></tr>
<tr><td></td><td>Summary of each PPMs presented in the following Table, for details of the PPM arrangements, tools provided and all recorded suggestions / feedbacks received from the participants can be found in Annex 11 of this Report.
<table>
<tr><th>Municipality</th><th>Meeting Date</th><th>Summary of the Meeting</th></tr>
<tr><td>Ćićevac</td><td>September 23,2020</td><td>The meeting was conducted in the backyard of the Economical Trade School of Ćićevac at 5:00 P.M. In total there were 9 local participants, Deputy Mayor of Ćićevac Municipality, representatives from Ćićevac Municipality, local media representatives, experts from Corridors of Serbia, BEJV representatives and experts whom will conduct Resettlement Action Plan.
At the end of the presentation, the attendees wanted to look at the route map in detail with the assistance of 2U1K experts, route of the Motorway, location of bridges, underpasses and overpasses and Project facilities were shown to locals.
 
An attendee stated that borrow pit is close to the Morova river and some small lakes formed in pits emptied as a result of similar material extraction for some other projects in the region previously. As a response, 2U1K experts acknowledged this comment, pre-cautions, and mitigation measures were explained regarding to this concern (rehabilitation or reinstatement works were discussed with the locals). Also, continuing supplementary biodiversity studies were also mentioned to the attendee and result of the studies will give opinions to Project designed for rehabilitation and reinstatement options.</td></tr>
</table></td><td></td><td></td></tr>
</table>

Activity	Details			Date	Responsible Party
	Varvarin	September 24,2020	The PPM was conducted at the Plaza Hotel in Varvarin Municipality. In total there were 10 local participants, including Deputy President Assembly of Varvarin, officials from Varvarin Municipality, local TV (RTK TV), local business owners, experts from Corridors of Serbia, BEJV representatives and experts whom will conduct Resettlement Action Plan. Deputy President Assembly of Varvarin was provided with hard copy of Non-Technical Summary of ESIA and leaflets for further distribution. Local news reporters interviewed Günal Özenirler with the help of translation by Lola Milojevic to introduce the Project, location of Project facilities and purpose of the PPM. At the end of the presentation, an attendee stated that there is an old church located in Maskare village and wondered whether the stated church will be impacted due to Project. 2U1K experts explained the archeological studies conducted within the scope of ESIA and concluded that no tangible or intangible values will be impacted due to Project. Also, Chance Find Procedure was explained to the attendee.  Another attendee stated ongoing issues with flood in the Region and wondered how the Project will place a role in this matter. 2U1K explained the purpose of the river regulation for the Project as well as other flood protection measures considered within the scope of the Project. The representative from CoS also contributed to the explanation river regulation design.		

Activity	Details			Date	Responsible Party
	Kruševac	September 25,2020	The PPM was conducted at the Nicolo Hotel located in Kruševac Municipality. The local participants were offered for bottled drinks, hygienic supplies and Project leaflets. In total there were 9 local participants, Counselor Member of the Kruševac, Secretary of the Local office in Kuklin, local TV (Jefimija TV), locals whom are affected by the expropriation, representor from CoS, BEJV representatives and experts whom will conduct Resettlement Action Plan. The Counselor Member was provided with hard copy of Non-Technical Summary of the ESIA and leaflets for further distribution. Local news reporter interviewed Günal Özenirler with the help of translation by Lola Milojevic to introduce the Project, location of Project facilities and purpose of the PPM. At the end of the presentation, an attendee asked whether it is safe to continue agricultural production nearby the Motorway. 2U1K environmental expert (Günal Özenirler) explained the environmental studies conducted for the both construction and operation phases to assess the short term, long term and residual impacts of the Project. Considering the studies conducted in regard to air and noise impacts, the results of measurement and modelling studies show that agricultural fields neighboring the Motorway will not have a residual impacts after the implementation of mitigation measures stated in the ESIA. 		

Activity	Details			Date	Responsible Party
			Another attendee asked what type of impacts are expected in neighboring locations by the quarry located in Makresani village. 2U1K environmental expert (Günal Özenirler) explained that the area of influence of the Project includes not only the route of the Motorway, Project facilities and areas for the river regulation also included. In that regards, environmental baseline studies for air quality, noise and vibration were also covered for the potential quarry locations in the ESIA study. To minimize impacts, the area of the quarry was decided reduced in order to mitigate impacts to the locals, sensitive receptors, settlements and beehives. It was also noted by the 2U1K that, this Project will be financed by the International Finance Institutions and according to their standards, the rehabilitation of selected quarries is committed within the scope of Project. Management and monitoring of the Project facilities are also covered in the Environmental and Social Monitoring and Management Plan of the ESIA. In case the locals have further comments / suggestions in regard to this matter, communication channels of the Project were reminded to the locals as given in the PowerPoint presentation.		
	Trstenik	September 26, 2020	The PPM was conducted at the Public Venue in front of the local library in Trstenik Municipality. The local participants were offered for bottled drinks, hygienic supplies and Project leaflets. In total, there were 27 participants, Mayor of the Trstenik Municipality, Vice President of Trstenik Municipality, local TV (Trstenik TV), locals whom wanted further information on the expropriation, representors from CoS and BEJV. The Mayor was provided with hard copy of Non-Technical Summary of the ESIA and PR official from the Trstenik was provided with additional leaflets for further distribution. Local news reporter interviewed Günal Özenirler with the help of translation by Dragan Kovacevic to introduce the Project, location of Project facilities and purpose of the PPM.		

Activity	Details			Date	Responsible Party
			 At the end of the presentation, the locals were pleased to be discussed further details with the representor from CoS, Nina Valcic, in regard to future expropriation procedures planned within the scope of the Project. Nina Valcic started her speech with the brief information of the Expropriation Law and procedures adopted within the national framework. Also, she explained the Project will also follow International Finance Institutions requirements to bridge any gaps by the national legislation. Availability of Cadastral Maps were also discussed by Nina Valcic and the availability of these maps can be found in CoS website as well as in all affected Municipalities. The evaluation procedure for the expropriated lands, structures and agricultural products were briefly introduced by Nina Valcic. The upcoming social field study for the Resettlement Action Plan was introduced and the procedures were briefly discussed as well, the further announcements in regard to RAP studies will also be made by the Trstenik Municipality officials.		
	Vrnjačka Banja	September 28,2020	The PPM was conducted at the amphitheater located in Vrnjačka BanjaMunicipality. The local participants were offered for bottled drinks, hygienic supplies and Project leaflets. In total, there were 33 participants including the Mayor of Vrnjačka Banja, local TV (VRT TV), locals whom wanted further information on the expropriation, representors from CoS and BEJV. The Mayor was provided with hard copy of Non-Technical Summary of the ESIA. Local news reporter interviewed Günal Özenirler with the help		

Activity	Details	Date	Responsible Party
	of translation by Dragan Kovacevic to introduce the Project, location of Project facilities and purpose of the PPM.  At the end of the presentation, an attendee requested further information on who to contact regarding the construction activities.2U1K representative, Günal Özenirler, explained that the Contractor will implement Construction Management Plan. Within the scope of this Plan, affected settlements for upcoming construction works will be notified prior to construction activities in detail. Also, Mr. Özenirler stated that the engagement with stakeholder will be continuous process throughout the phases of the Project. Stakeholder Engagement Plan (SEP) prepared for this Project was briefly introduced and explained locals how to access to the Report. Another attendee stated that after the expropriation, his settlement will be separated in two and additional access may be needed for locals in terms of health and school services. 2U1K representative, Günal Özenirler, explained the planned bridges and underpasses to be constructed within the Project and showed the locations of these structures through the map at the end of PPM directly to the attendee. Field studies in the scope of RAP will discuss this issue with the locals in further details, and these types of issues will be covered in RAP. In case they have further questions or suggestions in regard to this matter, grievance mechanism was reminded to the attendee again.		

Activity	Details			Date	Responsible Party
	Kraljevo	September 29,2020	The PPM was conducted at the entrance of Bataljan Elementary School. The school administration provided electricity, chairs and desks for 2U1K. Both entrance of the venue arranged to include masks and hygienic supplies for the attendees. In total, there were 29 participants including; officials from local environmental NGO, local TV (RVT Kraljevo), locals who wanted further information on the expropriation and ecological conditions of the Morava River, representors from CoS and BEJV. Although the Municipality officials were previously contacted officially through letter, e-mail and phone call, Municipality representors were not present in the meeting. Local news reporter interviewed Günal Özenirler with the help of translation by Dragan Kovacevic to introduce the Project, location of Project facilities and purpose of the PPM. At the end of the presentation, a local asked the purpose behind the river regulation and how this with affect the natural habitat in the Morava River. Similar to the comment, an attendee from a local NGO asked how river regulation activities will be monitored. 2U1K representative, Günal Özenirler, explained the purpose of the river regulation, especially in terms of flood prevention. For ecological conditions, the intensive ecological baseline survey within the scope of ESIA study was explained and background disciplines of the national and international experts who conducted the baseline studies were briefly introduced. Mitigation measures considered within the scope of river regulation (including technical details) also explained by Mr. Özenirler and for attendees whom may want further information can access to the NTS whether in hard copy or electronic version (see Appendix-13 for soft copy of NTS). Additional ecological studies that are currently been ongoing was also introduced and the banner posted regarding the details of the ongoing studies were shown to the attendees, the results of the studies stated to be disclosed to all interested stakeholders. The purpose of Environmental and Social Management Plan as introduced in the PowerPoint presentation was expanded to explain what type monitoring activities are suggested in terms of surface water, ground water, flora, fauna and soil. Last, 2U1K representatives also explained that during the construction activities continuous engagement will be made with interested and affected stakeholders and reference to Stakeholder Engagement Plan (SEP) was made and how the locals can access to Serbian version SEP was also explained.		

Activity	Details			Date	Responsible Party
			 Another attendee requested further information on the studies conducted for soil quality. 2U1K representative, Günal Özenirler, explained the studies conducted within the scope of baseline studies and measures considered after the assessment of potential impacts. Günal Özenirler also noted that selection of borrow pits were made with the consideration of environment, social and cultural aspects.		
	Čačak	September 30,2020	The PPM as conducted at the public hall located in municipality center. In total, there were 33 participants including; officials from Čačak Municipality, local TV (Galaksija TV), locals who wanted further information on the community health and safety, expropriation and river regulation of the Morava River, representors from CoS and BEJV. The hard copy of Non-Technical Summary of the ESIA Report was provided to the Public Relations department of the Čačak Municipality as well as locals who requested to 2U1K experts. Local news reporter interviewed Günal Özenirler with the help of translation by Dragan Kovacevic to introduce the Project, location of Project facilities and purpose of the PPM. At the end of the presentation, an attendee asked about the impacts of the river regulation in terms of ground and surface water. The results of the environmental impact assessment in terms of ground and surface water explained by 2U1K expert, Günal Özenirler. Especially as the locals seemed to be concerned for the		

Activity	Details	Date	Responsible Party
	groundwater; Mr. Özenirler pointed out that no negative impact is foreseen for the groundwater. Mr. Özenirler stated that the levels in groundwater will be monitored through the monitoring wells and mitigation measures are already prepared in case there is a change for groundwater levels in the region. Also, Mr. Özenirler pointed out the Technical Review of the River Regulation study that is currently being ongoing with the attendees. The purpose of the river regulation, especially from the aspect of flood prevention was also explained to the locals by Mr. Özenirler. River regulation impacts in terms of ecosystem was discussed and in-depth studies conducted within the ESIA were introduced to the locals. At this stage, summary of the existing study ecological studies was stated to be accessed from the Non-Technical Summary of the ESIA. Mr. Özenirler also pointed out the ongoing critical habitat assessment and biodiversity studies for the Project. Last, Mr. Özenirler explained the stakeholder engagement activities will be ongoing throughout the project phases, and construction activities will be notified to the locals in an appropriate timeframe before the work starts. 		

Activity	Details			Date	Responsible Party
			Another attendee complained regarding the lack of information provided to locals who are affected by the expropriation. 2U1K expert Yasemin Celikel stated that this Project will obey not only national legislations also requirements of International Finance Institutions. Therefore, transparency and ongoing stakeholder engagement is the key approach to move forwards with the Project. For expropriation related matters the locals were also suggested to look over the disclosed Resettlement and Livelihood Restoration Framework of the Project. Also, the locals were informed that there is an ongoing Resettlement Action Plan study that the locals can be reached by the experts to convey their issue in detail. Experts from CoS made a speech stating these issues will be taken into a consideration for further assessment and requested attendees with similar complaints to address this issue through official mechanisms to be recorded and monitored. Also, grievance mechanism was mentioned again to all attendees and details communication options repeated by Mr. Özenirler.		

9.4.1 Summary of the Social Field Studies for the ESIA Report

The social study area was decided by considering the impacts sourced from transportation route, workers accommodation, noise during construction and operation phases, labour influx, land use, changes on dust and air quality. As stated previously, there are 7 municipalities and 48 settlements within the envisaged the Project and construction facilities.

The objective of primary data collection is to gather recent data, to triangulate it with secondary data and to gather first-hand information from potentially impacted communities.

Table below presents the number of surveys and interviews conducted respectively and following sub-sections provide details of the surveys conducted.

Table 9-5. Surveys and Interviews Conducted by 2U1K

Type of Survey/ Interview	Number of Surveys/Interviews/ Meetings
Household Surveys	1563
Community Level Surveys	48
Key Informant Interviews (KIIs) during the Gap Assessment	6
KIIs with Non-Governmental Organizations	9
KIIs with Affected Municipalities	7
Focus Group Discussions	7
Business Surveys	110

Following subsections will address brief summary of the outcomes of the social field study in respective topics. Details of the social field study as well as other topics that were covered can be found in ESIA Chapter 5, furthermore, Chapter 6 of the ESIA Report presents the impact assessment derived from the outcomes of the baseline conditions of the Area of Influence.

Further details on surveys can also be found in SEP Report: Annex 2 (Key Outputs of KIIs during Gap Assessment Study), Annex 3 (Summary of CLSs and HHSs), Annex 4 (List of NGOs interviewed) and Annex 5 (Summary of Focus Group Discussions).

9.4.1.1 Population of the Area of Influence

Ćićevac Municipality: According to the outputs of the Community Level Surveys, total of 3,576 people live in four villages. In all settlements interviewed, it was stated that the population decreases due to economic reasons.

Kruševac Municipality: Unlike the other municipalities where Community Level Surveys were conducted, it was observed that in some settlements of Kruševac Municipality, population increase was observed directly related to job opportunities.

Varvarin Municipality: According to Community Level Surveys results, Bošnjane village is experiencing the population increase as a result of economic opportunities and the population of the Maskere village decreases due to lack of employment opportunities.

Kraljevo Municipality: When the municipalities in the impact area are analyzed, it was observed that Kraljevo is the most affected Municipality in terms of number of the villages in the AoI of the Project. There are 11 villages located in the 1 km AoI of the Project with the total population of 14,249. The economic reasons stated to be the main cause of both population growth and the population decrease.

Vrnjačka Banja Municipality: 15,115 people live in the affected villages located in 1 km zone of Vrnjačka Banja Municipality. This Municipality is more heterogeneous in terms of ethnic composition when compared to the other Municipalities. There are 7% of Roma in Gracac and 1-3% of Bulgarians and Hungarians in the other villages.

Trstenik Municipality: The average household size of the villages varies between 2.5 and 4. In all villages, there is a decrease in the population due to economic reasons.

Čačak Municipality: According to the results of Community Level Surveys, majority of the affected villages population figures have been decreasing due to economic reasons.

9.4.1.2 Economy of the Area of Influence

Based on the Household and Community Level Surveys, the PAPs are predominantly involved in agricultural activities as their main source of income. Also, livestock activities are common for household purposes.

In all affected municipalities, unemployment was stated to be a significant issue. Especially considering the fact that increased number of out-migration of young generation occurred over the recent years due to lack of job opportunities.

Among the affected municipalities, Trstenik municipality is observed to be most affected from the lack of employment opportunities in the AoI. On the other hand, considering the unemployment rate (34.9 %) and number of villages (seven) affected by the Project related activities, especially during the expropriation process, Trstenik municipality is one of the highly sensitive receptors when assessing the local economy. Also, considering the unemployment rate (26.9%) and number of affected villages (11), it can be stated that Kraljevo municipality is moderately sensitive in terms of economic impacts of the Project.

9.4.1.3 Ecosystem Services of the Area of Influence

The Project alignment will pass through forestlands in each of the Municipalities within the AoI. The most affected Municipalities are located in Section-2 including Trstenik and Vrnjačka Banja Municipalities. The forestlands in the AoI are mainly used for wood, plant and mushroom collection and hunting purposes. All of the forest related activities are mainly used for household consumption according to the results of social field study.

During the site visit conducted by 2U1K in August 2019, it was observed that the Quarry area proposed by the Contractor is located in the close proximity to apicultural activity area.

However, beekeeping activities are carried out various locations in the forest area, and the locations of all beekeepers could not be determined during ESIA studies. According to the information received from the Association of Professional Beekeepers, beehives located in the close proximity Morava River will be affected by the excavation and blasting activities of the Project including dust, noise and vibration. The beekeeper Association of Kruševac recommended that the construction activities should be conducted as much as practical distance from the beehives (in May, June, July they can fly 2 km) by considering the seasonal changes.

During the discussions with the head of villages, although there may be lack of touristic activities nor facilities among the AoI, it was stated that most of the affected settlement may have potential to become a touristic location. This matter is also covered in the Spatial Plan (November 2019) of the Project indicating the importance of Project to increase the tourism potential of the affected settlements through easier accessibility of the settlements.

During the social field studies, the head of each affected villages was asked the purpose of Morava River usage, although fishing activities are common in majority of the affected settlements within the AoI, the locals do not generate income from fishing. On the other hand, Čačak Municipality is observed to be the only affected municipality that use the River for transportation purposes.

9.4.1.4 Cultural and Intangible Values of the Area of Influence

During the social field study, specific questionnaires were dedicated to determine and understand the existing tangible/intangible cultural heritages among the AoI.

According to Spatial Plan, National EIAs and the interviews with focus groups and head of villages, it was determined that there are intangible cultural heritage such as two sacred trees and an old building in the Municipality of Maskare, archaeological sites and immovable cultural assets in the Project and the route of the motorway and area of the river regulation was determined in line with these information. Thus, the Motorway route and area of the river regulation works will not coincide with any archaeological area and immovable cultural assets and will not impact these areas.

As stated in the Spatial Plan of the Project, these trees were left outside of the selected route of the Motorway. In addition, according to the design of the Project, none of the Project construction facilities will be neighboring these trees. The locals access to of these sacred trees are through existing unpaved village roads.

9.4.1.5 Project Information Level of the Area of Influence

Project Information Level has been asked through Community Level Surveys and Household Surveys. It was stated that the Project was heard by the public in all settlements. Television is the primary source of information for the public and the second source of information was stated as radio and the internet. Village heads stated that their knowledge of the Project is not sufficient, and they would like to be informed in more detail about the following issues:

- Employment Opportunities;
- The Proposed Motorway Route Alignment;
- Construction Period;
- Operation Period;
- Compensation; and
- Expropriation.

9.4.1.6 Vulnerability Assessment of the Area of Influence

Ćićevac Municipality: When the villages located in the Ćićevac Municipality were compared according to the different vulnerability categories, it is seen that the Stalac village has the population density. The main vulnerability indicator based on the financial indicators and mora 75% of the households in the interviewed villages cannot make saving. Almost 50% of household members of the households in the villages except Mrzenica village are unemployed. Grad Stalać is the only village that has etnic minority.

Kruševac Municipality: When the villages located in the borders of Kruševac Municipality compared, it is seen that the Citluk village has the all vulnerable categories. It was seen that the main source for the vulnerability is economy. The most populated group among all villages are the unemployed and the low educated groups. There was no ethnic minority in the villages. The number of people with chronic illnesses, people with disabilities or over 65 years of age and the number of households with having difficulty payments are quite low compared to other vulnerability categories.

Varvarin Municipality: It was observed that the village of Maskare has the more vulnerable groups when it compared with the village of Bosnjane. The most populated vulnerable category is the people who cannot make saving in two villages. Maskare also a high population in terms of age and chronic diseases.

Kraljevo Municipality: It has been observed that the Kraljevo Municipality has the less vulnerable population when it compared to other municipalities in the AoI. In Vrba, Grdica and Popovići villages, land per household is smaller than 3 hectares. It was seen that the livelihood sources related to agriculture in this Municipality are lower than the other Municipalities. Vrba is the most populous group among vulnerable groups in Kraljevo.

Vrnjačka Banja Municipality: According to the results of Household Surveys, it has been analyzed that most vulnerable groups resides in Ruđinci village within the borders of Vrnjačka Banja. The vulnerability in this Municipality based on the economy as in other settlements and is related to the limited asset ownership. A large proportion of the households interviewed in the villages of Vrnjačka Banja municipality have less than 3 hectares of land. The education rate is relatively higher than other municipalities. The number of people has no income other than agriculture was the highest in the village of Novo Selo.

Trstenik Municipality: Among the villages located in the municipality of Trestenik, it was observed that the village of Ugljarevo and Medveđa has the most populous groups in terms of vulnerability. The main vulnerability areas are land ownership and low education.

Čačak Municipality: When the results of the household surveys were evaluated, it was seen that Preljina was the village with the highest number of vulnerable groups among the villages in Čačak Municipality. The reason for the vulnerability in this village is related to the limited assets ownership. When the whole municipality is assessed, it is seen that the majority of the villages has less than 3 hectares.

9.5 Stakeholder Engagement Program

The Stakeholder Engagement Program, through an Informed Consultation and Participation (ICP) process, includes set of actions with targeted audience and responsibilities in order to ensure the maximum engagement level for all relevant stakeholders.

The ICP process presented in this chapter covers 3 phases of the Project cycle. The Project cycle comprises the following;

- Pre-construction Phase
- Construction Phase
- Operation Phase.

The Employer of the Project, as part of the stakeholder engagement, will disclose following information and documentation regarding the Project as:

- Stakeholder Engagement Plan (SEP),
- Project description and updates regarding the implementation progress of the Project,
- Information on community health and safety risks and impacts (including any expected road access restrictions and construction works) and proposed mitigation measures;
- Resettlement and Livelihood Restoration Framework (RLRF),
- Resettlement Action Plans (RAPs),
- Summary of conclusions from the consultative meetings and public discussions held,
- The Grievance Redress Mechanism, its objectives, and the information request form.

The information packages will be available in Serbian (as well as in English) immediately upon the commencement of the Project. Information packages will be accessible through websites of the affected municipalities and CoS. Printed copies of SEP, RLRF, RAPs and RLRF will be available in all affected municipalities and Project offices. The Contractor will also disclose ESIA, SEP and Grievance Redress Mechanism to its own website.

It is important to note that, these documents and information will remain in the public domain for the entire duration of the Project.

9.6 Pre-Construction Phase

During pre-construction phase, the information package will be updated as needed and disclosed. It is important to notify local stakeholders, in a meaningful and timely manner, of any activities that might impact them.

The ESIA and EIA information disclosure package will be disclosed in pre-construction phase. The disclosure and consultation activities will be designed along the following objectives:

- Consultation events and opportunities will be widely and proactively publicized (two weeks prior to any meeting),
- The ESIA Summary will be accessible prior to any event to ensure that people are informed of the assessment content and conclusions in advance of the meeting,
- The location and timing of any meeting will be designed to maximize accessibility to affected stakeholders,
- Accessibility to the meeting venues (i.e. transportation services) will be provided for each affected settlement,
- Information presented will be clear and non-technical, and will be presented in the local language understood by those in the communities,
- Facilitation will be provided to ensure that stakeholders are able to raise their concerns,
- Issues raised will be answered at the meeting or actively followed up.

ESIA disclosure and stakeholder engagement require effective processes, systems and tools. These become even more important in ensuring effective engagement during the Covid-19 pandemic. Under this special circumstance, the Project endeavored to reduce large human gathering during ESIA disclosure, especially when consulting with communities. 2U1K experts conducted a field study on August 2020 to assess whether open air Public Participation Meeting (PPM) could be arranged with local authorities and venues. With the assessment of venues in August, all the arrangements and official permits were completed to conduct open air Public Participation Meetings in each affected villages, respectively.

With the approval of local authorities, Contractor, Employer and Project Lenders; 2U1K was able to arrange and organize outdoor Public Participation Meetings located on each affected municipalities between the dates of September 23-30. Details of the PPMs can be found in Annex – 11 of the SEP Report.

Stakeholder engagement activities that will be held during the pre-construction phase is presented in Table 9-6.

Table 9-6. Pre-Construction Phase Stakeholder Engagement Activities

No	Action	Target stakeholders	Responsibility	Consultation Tool
1	Inform stakeholders on the activities related to design process river regulation works and present salient features of design, alignment and route and regulation alternatives if any.	Project Affected People Vulnerable Groups Interested Stakeholders	CoS	Public Participation Meeting Announcement on the Project website Announcement on the Municipalities website, Mass media (local newspapers, TV channels, radio, social media) Assistance to vulnerable groups will be provided when needed.
2	Public Participation Meetings in Compliance with the national EIA Process	All Stakeholders	Ministry of Environmental Protection	Media announcement Official invitation Letters to governmental bodies Presentation, Project Brochures, Records of the opinions and the concerns of the stakeholders,
3	Dis Disclosure of ESIA and the Management Plans, and SEP. conducted in September 2020. During the disclosure process, affected communities will be informed on outcomes of the ESIA studies. This would include significant Project related impacts that were assessed during the ESIA studies as follows: - River regulation works - Impacts on ecosystem services - Impacts on ecology and habitat loss - Impacts related to land acquisition and resettlement - Impacts on environment (including; construction and operation noise, air quality, resource efficiency and waste management).	All Stakeholders	The Contractor CoS	Public Participation Meeting Announcement on the Project website Announcement on the Municipalities website, Mass media (local newspapers, TV channels, radio, social media). Hard copies on the Project site and the Municipalities in the AoI.

No	Action	Target stakeholders	Responsibility	Consultation Tool
4	Introduce Stakeholder Engagement Plan and Project Grievance Mechanism	All Stakeholders	The Contractor CoS	Presentation on the grievance mechanism and the stakeholder engagement tools, Distribution of the Contact details of the Public Relations Officers, Records of the grievances
5	Informed Consultations on land acquisition and compensations during the finalization of Resettlement and Livelihood Restoration Plan used to develop specific Resettlement Action Plan	Landowners and land users Informal landowners and land users Owners of assets, structures, buildings and businesses that will be affected by the Project	CoS	Public notice and official correspondence by concerned authorities and organization Noticeboards and website of the affected local municipalities Individual compensation agreements and the Grievance Records[5]
6	Implementation of stakeholder engagement and information disclosure activities for PAPs	PAPs that will be directly/indirectly affected by the land acquisition and resettlement activities Vulnerable groups	CoS	Announcement on the Project website Announcement on the Municipalities website, Mass media (local newspapers, TV channels, radio, social media). Hard copies on the Project site and the Municipalities in the AoI
7	Engage with stakeholders during preparation of site specific RAPs and implementation of individual measures as prescribed in the RAP	All Stakeholders	CoS	Social Survey of all affected households with individual visits to each affected household Disclosure of draft RAP Dissemination of Cut-Off date via public announcements

[5] A specific grievance mechanism will be established for the affected people from the land acquisition and this mechanism will be introduced to the PAPs as part of the Resettlement Policy Framework.

9.7 Construction Phase

The aim of the construction phase stakeholder engagement is to minimize the community health and safety impacts of the Project, management of the potential contractors, management of the grievance mechanism and minimization of the construction related impacts. The Contractor will implement Community Relations Plan to establish a process for communicating and engaging with stakeholders, construction related comments and suggestions. Feedbacks received regarding the construction activities (i.e. design suggestions, accessibility issues, etc.) will be managed through the process determined through Community Relations Plan.

Stakeholder engagement activities that will be held during the construction phase is presented in Table 9-7 below.

Table 9-7. Construction Phase Stakeholder Engagement Activities

No	Action	Target stakeholders	Responsibility	Consultation Tool
1	Notice on Construction Activities: - Notification of any transport disruptions. - Notification of construction activities, closure of roads, available under/over passes, pedestrian accessibility, etc. - Notification of schools nearby the Project site will be informed about the peak movements of the vehicle. - Notification of stakeholders on river regulation works and potential limitations on river related activities. - Notification on construction noise for sensitive receptors (nearby settlements, hospitals, schools, nursing homes etc.)	All affected settlement Vulnerable Groups Local Authorities Local Businesses	CSRD and EHS Teams of the Contractor	Direct phone calls to head of villages, sensitive receptors (e.g. hospitals, nursing homes, schools), Village visits Banners posted in public amenity buildings, construction sites and municipal buildings Grievance Mechanism Information boxes located at the construction sites

No	Action	Target stakeholders	Responsibility	Consultation Tool
2	Information Disclosure on: Purpose and nature of the construction activities Early notification of Construction start date, scheduling and duration Potential impacts and health and safety measures/ mechanisms	All affected settlements and Interested parties Local communities Local government Local business	Public Relations Team of the Contractor CoS	Regular site visits, Annual Environmental and Social Monitoring Reports Official meetings with the governmental bodies Grievance Mechanism Banners posted in public amenity buildings, construction sites and municipal buildings
3	Feedback and grievance mechanism • Training on Grievance Procedure • Grievance Resolution Process (including in response to security, construction or contractor issues) • Provide training on the Contractor's policies (employees and contractors) on respectful and appropriate behaviors with communities	All affected settlements, Interested parties and Project Workers	CSRD and EHS Teams of the Contractor	Direct phone calls, emails, and face-to-face meetings, village visits.
4	Recruitment and Procurement Employment Employment of Local Workers Occupational Health and Safety • Recruitment of employees • Training of staff • Procurement of supplies and services • Design of Capacity development program for local people through targeted training programs internally and with key external training partners	All affected settlements	CSRD and Contract/procurement teams of the Contractor Human Resource Team of the Contractor	Website announcement Village meetings Training of Non-Serbian workers on the cultural codes of Serbia Information meeting about safety precautions of the construction of the Motorway Safety meetings about the barrow pits
5	Develop, implement and keep informed local communities on: • Community health and safety plan • Local procurement plan • Traffic management plan • Emergency response plan	All affected settlement	CSRD and EHS Teams of the Contractor	Contractor's website, official correspondence, mass media, local noticeboards and premises of municipalities.
6	Disclose information on project Environmental and Social construction performance	PAPs Interested Stakeholders	Contractor	Contractor's website

9.8 Operation Phase

The aim of the operation phase stakeholder engagement is to introduce the public possible operational impacts and information about the transition of the responsibilities from the Contractor to Road Management Authority of Serbia and increase the capacity of the Roads of Serbia to ensure the implementation of SEP. Stakeholder engagement activities that will be held during the operation phase is presented in Table 9-8 below.

Table 9-8. Operation Phase Stakeholder Engagement Activities

No	Action	Target stakeholders	Responsibility	Consultation Tool
1	Assign and provide training on the implementation of the SEP and Grievance Mechanism for the operation phase of the Project.	Staff of Roads of Serbia	Road Management Authority	Training Records
2	Disseminate information about transition of responsibilities and liabilities from the Contractor to Roads of Serbia	Affected communities, Project affected persons Public.	The Contractor and Employer and Road Management Authority	Grievance mechanism. Contractors grievance / liaison officer
3	Keep stakeholders informed on any operation -related activities that might affect them including but not limited to: - road closures and diversions - operational noise - traffic jams, etc.	Affected communities, Project affected persons Public.	Road Management Authority	Consultation Records
4	Update and implement SEP and Community Health and Safety Plan and Traffic Management Plan considering the operational phase impact of the Project.	Affected communities, Project affected persons Public.	Road Management Authority	Updated documents
5	Develop and publish Annual Environmental and Social Report (brief summary of the Annual Environmental and Social Monitoring Report (AESMR)	Affected communities, Project affected persons, Public.	Road Management Authority	Annual Environmental and Social Monitoring Reports SEP
6	Disseminate information on: - road safety - road conditions - tolling stations and tolling cost	Affected communities, Project affected persons, Public.	Road Management Authority	Mass media Road managements authority website Grievance Mechanism

9.9 External Communications

The external communication includes exchange of information both within the entire Project parties themselves and all related stakeholders. It is significant for all parties involved to take ownership of entire stakeholder relations and manage them effectively.

External communication is the very first step in creating the appropriate the Project image. It contains related Project information from inventive reports, printed publications, presentations, or web pages. The main goal of external communication is to inform the stakeholders an important message about the work and quality of the Project. External communication activities play a very important role in every phase of the Project cycle. To engage with stakeholder groups that impacted parties: governmental institutions, local communities, associations, organizations, academia, media, and NGO´s. A good working relationships will be established with all of stakeholders and actively elicit their input through public consultations, focus groups, face-to-face meetings. It is essential to be proactive, accessible, and responsive about project impacts and work collaboratively with the stakeholders on projects of mutual interest.

The Grievance Mechanism will provide complaint management and their responses which is intended specifically on affected stakeholders. The external communications will cover specifications of the SEP and the Grievance Mechanism. All related Project representatives from CoS and the Contractor will communicate with the stakeholders on a regular basis. For implementation and maintenance of the external communication; each request and/or feedback will be recorded and be followed and responded to by the Community Relations and Sustainability Department. The team will track related external communications to facilitate a local discourse with identified stakeholders and affected communities.

The external communication information, aligned to the Project's progress reports, will list the activities will carry out in over the Project phases, and will include key performance indicators (KPI) for the Contractor and the Employer to enable measurement of performance against set targets.

According IFC, External Communications have several benefits:

- Increases program transparency
- Reduces the spread of misinformation
- Serves as a two-way channel for feedback from stakeholders
- Builds interest and buy-in from civil society and government
- Strengthens corporate image among the public and industry peers
- Improves risk management
- Strengthens brand value / reputation
- Increases appeal to financial investors

All engagements will be documented both in writing and photographically, with minutes taken in standardized format and attendance recorded. Minutes will be shared with and approved by participants.

9.10 Grievance Mechanism

The purpose of Grievance Management is foremost to provide access to a problem-solving procedure applicable throughout the Project lifecycle.

A structured Grievance Management system will be established to ensure that grievances associated with the Project are addressed through a transparent and impartial process. Stakeholders will be able to share their opinions and grievances via a range of options such as letters, e-mail, grievance boxes and face to face meetings during all phases of the Project.

9.10.1 Public Grievance Mechanism

Public Grievance will be managed in six main steps as follows.

1. **Receipt of Grievances:** Complaints may be sent via letters, e-mails, phone calls, in person, through municipalities.
2. **Acknowledgement and Record Keeping:** All incoming grievances will be reflected on a daily basis through a Grievance Log. The Grievance Log will also be used to track the status of a grievance, analyses the frequency of complaints arising, typical sources and causes of complaints, as well as to identify prevailing topics and any recurrent trends.
3. **Investigation:** Through the investigation; underlying causes of the grievances will be assessed and possible response/and solution including the corrective measures will be established.
4. **Response to Complaint:** Once the investigations are complete and the proposed resolution determined, the Project will then provide an official response to complainants and the grievance will be formally closed.
5. **Discussion of Resolution**: If a complainant is not satisfied with the proposed resolution, further negotiations can take place until the matter of the complaint is resolved and the case is closed. If negotiations between the Project parties and the complainant do not achieve a satisfactory result leading to the closure of the complaint, then the grievance is escalated to higher levels to be defined in the course of the Project's procedures setting.
6. **Resource to Legal System:** The parties may take the dispute to court at any point during the process. Resorting to the Project's amicable grievance resolution does not prevent the complainant to resort to Justice at any stage in the process.

9.10.2 Worker Grievance Mechanism

A Worker Grievance Mechanism will be established by the Project prior to construction within the scope of the HR Management Plan to manage the complaints from all Project employees. This mechanism will be structured with an intention of it being an effective approach for early identification, assessment and resolution of grievances throughout the Project's phases. During the construction phase, the Contractor will be responsible to implement the mechanism then it will be transferred to the CoS for the operations phase.

10 CONCLUSION

This ESIA has been conducted to evaluate the impacts associated with the proposed Morova Motorway Project of 112 km length, passing through the seven Municipalities including Čačak, Kraljevo, Vrnjačka Banja, Trstenik, Kruševac and Ćićevac in Serbia. The impact assessment has been conducted in compliance with IFC Performance Standards, international best practice, relevant national legislative requirements, international conventions and the Contractor's corporate requirements.

10.1 Impacts Summary

Following a gap assessment for the scoping phase, this ESIA Report focuses on interactions among the pre-construction including design phase, construction, post-construction and operation Project activities and various sensitive receptors that may experience impacts during the Project lifecycle.

As a result of the ESIA, the Project impacts are mostly medium and residual impact and these impacts will decrease to low level mostly after the implementation of the proposed mitigation measures given in Chapter 6 of the ESIA Report. Table 10-1 presents the outcomes of the detailed assessment of identified impacts as a result of various phases of the proposed Project and summaries the impacts.

Table 10-1. ESIA Impact Assessment Summary

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
ENVIRONMENTAL IMPACT ASSESSMENT				
Water Quality				
Spillage/Leakage to Surface Water	Construction	Negative	Medium	Low
Working in the River-bed and River Regulation works	Construction	Negative	High	Low
Wastewater discharge	Construction	Negative	Medium	Low
Spillage/Leakage to Surface Water	Operation	Negative	Medium	Low
Wastewater discharge	Operation	Negative	Medium	Low
Flooding	Operation	Negative	High	Medium
Change in River Flow	Operation	Negative	Medium	Low
Change in River Water Quality.	Operation	Negative	Medium	Low
Groundwater				
Leakage to Groundwater	Construction	Negative	Medium	Low

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Groundwater Contamination due to Wastewater Discharge to Water Environment	Construction	Negative	Medium	Low
Alteration of Groundwater Level	Construction	Negative	High	Low
Accidental Spillage and Surface Runoff Contaminated Water	Operation	Negative	Medium	Low
Air Quality and Climate				
Dust Generation	Construction	Negative	Medium	Low
Gaseous Pollutant Generation	Operation	Negative	Medium	Medium
Noise and Vibration				
Noise Pollution	Construction	Negative	Medium	Low
Vibration	Construction	Negative	Medium	Low
Noise pollution	Operation	Negative	High	Low
Geology and Soil				
Earthquake	Construction	Negative	Low	Low
Erosion	Construction	Negative	Medium	Low
Soil Pollution caused by Construction Activities	Construction	Negative	Medium	Low
Land Degradation and Soil Loss	Construction	Negative	Medium	Low
Earthquake	Operation	Negative	Low	Low
Runoff from the Road and Accidental Spillage	Operation	Negative	Medium	Low
Resource and Waste				
Destruction of habitats and plants during earthworks and resource extraction	Construction	Negative	Medium	Low
Disposal of excavated waste soil	Construction	Negative	Medium	Low
Hazardous waste generated during construction activities	Construction	Negative	Medium	Low
Resource Efficiency	Construction	Negative	Medium	Low
Generation of Waste	Operation	Negative	Medium	Low
Terrestrial and Freshwater Ecology				
Damage or loss of terrestrial habitats on permanent structures	Construction	Negative	High	Low

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Damage or loss of terrestrial habitats on temporary structures	Construction	Negative	Medium	Low
Habitat fragmentation	Construction	Negative	High	Low
Loss of important plant species	Construction	Negative	Medium	Low
Loss of important fauna species	Construction	Negative	Medium	Low
Increase in noise, visual and vibration which may cause disturbance or displacement of fauna	Construction	Negative	Medium	Low
Introduction of Alien invasive species	Construction	Negative	Medium	Low
Damage to Freshwater Ecosystem	Construction	Negative	High	Low
Freshwater Habitat loss / change due to river regulation	Construction	Negative	High	Low
Loss of important aquatic species	Construction	Negative	Medium	Low
Accidental loss of fauna	Operation	Negative	High	Low
Barrier effect in fauna	Operation	Negative	High	Low
Archaeological and Cultural Resources				
Chance Destruction of Archaeological and Cultural Resources	Construction	Negative	Medium	Low
Visual Landscape and Land Use				
Change of landscape due to changes in land use	Construction	Negative	Medium	Low
Visibility of new structures	Construction	Negative	Medium	Low
Visibility of new structures from Recreational Areas	Construction	Negative	Medium	Low
Change of landscape due to changes in land use	Operation	Negative	High	Low
Visibility of new structures	Operation	Negative	Medium	Low
Visibility of new structures from Recreational Areas			High	
SOCIAL IMPACT ASSESSMENT				
Population				

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Increase risk of illicit behavior or crime	Construction	Negative	Low	Low
Risk of social conflict	Construction	Negative	Low	Low
Influx of additional population	Construction	Negative	Medium	Low
Impacts on community dynamics	Construction	Negative	Low	Low
Increase burden on competition for public service	Construction	Negative	Medium	Low
Gender based violence	Construction	Negative	Low	Low
Local inflation	Construction	Negative	Medium	Low
Population decrease	Operation	Negative	Medium	Low
Population increase	Operation	Positive	Medium	High
Infrastructure				
Pressure on the local infrastructure during construction activities	Construction	Negative	Medium	Low
Pressure on the local infrastructure due to associated facilities	Construction	Negative	Medium	Low
Impacts on local road network	Construction	Negative	Medium	Low
Pressure on the local infrastructure during operation activities	Operation	Negative	Medium	Low
Economy				
Employment Opportunities	Construction	Positive	Medium	High
Local Procurement Opportunities	Construction	Positive	Medium	High
Direct and In-direct Employment Opportunities	Operation	Positive	Low	Medium
Increase in Economic Development in the Region	Operation	Positive	Medium	High
Decrease in agricultural sector in the Region	Operation	Negative	Medium	Low
Resettlement and Land Acquisition				
Loss of private and public lands due to expropriation	Pre-Construction	Negative	High	Medium
Loss of business lands	Pre-Construction	Negative	High	Medium
Temporary land and property impacts	Pre-Construction	Negative	Medium	Low

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Fragmentation of agricultural land plots.	Pre-Construction	Negative	High	Medium
Loss of economic forestland function	Pre-Construction	Negative	Medium	Medium
Damage to crops during the operation phase	Pre-Construction	Negative	Low	Low
Physical and economic displacement of PAPs.	Pre-Construction	Negative	High	Medium
Ecosystem Services				
Access to Forest Lands	Construction	Negative	Medium	Low
Impact on Apiculture	Construction	Negative	Low	Low
Impact on River Usage	Construction	Negative	Medium	Medium
Impact on Leisure Activities and Tourism	Construction	Negative	Medium	Medium
Access to Ecosystem Services	Operation	Negative	Medium	Low
Labor and Working Conditions				
Risks and Impacts Related to Women Employment and Non-Discrimination and Equal Opportunity	Both phases	Negative	Low	Low
Labour Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced)	Both phases	Negative	Low	Low
Working conditions and terms of employment for expat and national workers.	Both phases	Negative	Low	Low
For operation phase of the Project, it is expected that between 20 and 50 permanent local employees will be hired for the tolling station and toll collection of the Motorway.	Both phases	Negative	Low	Low
Occupational Health and Safety				
Health and Safety Risks due to General Occupational Health and Safety Hazards	Construction	Negative	Medium	Low

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Health and Safety Risks due to Physical and Chemical Hazards	Construction	Negative	Medium	Low
Health and Safety Risks due to Emergencies and Epidemic Diseases	Construction	Negative	Medium	Low
Health and Safety Risks due to Construction Traffic	Construction	Negative	Medium	Low
Health and Safety Risks on Accommodation	Construction	Negative	Medium	Low
Labor Risks and Impacts Related to Subcontractor and Supply Chain Management (Including Child and Forced Labour Risks)	Construction	Negative	Medium	Low
Health and Safety Risks due to General Occupational Health and Safety Hazards	Operation	Negative	Medium	Low
Health and Safety Risks due to Physical and Chemical Hazards	Operation	Negative	Medium	Low
Health and Safety Risks due to Emergencies	Operation	Negative	Medium	Low
Health and Safety Risks due to Motorway maintenance	Operation	Negative	Medium	Low
Community Health and Safety				
Traffic Density	Construction	Negative	Medium	Medium
Communicable Diseases	Construction	Negative	Low	Low
Construction related environmental impacts	Construction	Negative	Medium	Low
Security around the Project Site	Construction	Negative	Low	Low
Earthquake	Construction	Negative	Low	Low
Erosion	Construction	Negative	Low	Low
Spillage/Leakage to Surface Water	Construction	Negative	Low	Low
Level crossings safety	Operation	Negative	Low	Low
Noise during operation	Operation	Negative	Medium	Low
Flood risk during operation	Operation	Negative	High	Medium

Impact Description	Phase	Impact Nature	Overall Impact	Residual Impact
Transport of dangerous goods	Operation	Negative	Low	Low

Impact Classification	
	Low: where this impact is unlikely to be a significant risk
	Medium: where the impact could have a medium level social risk
	High: where the impact could have a significant social risk
	Positive: where the impact has an improvement

The impacts considered as high are; working in the river-bed and river regulation works, flood risk during construction and operation phases, alteration of groundwater level, noise pollution in operation phase, damage or loss of terrestrial habitats (conducting critical habitat assessment in line with IFC PS6) due to permanent structures, habitat fragmentation, damage to freshwater ecosystem, freshwater habitat loss / change due to river regulation, accidental loss of fauna, barrier effect in fauna, change of landscape due to changes in land use in operation phase, visibility of new structures from recreational area, loss of private lands, fragmentation of agricultural land plots, physical and economic displacement of PAPs and traffic.

In addition, socially positive impacts are also evaluated. These impacts are mainly based on development in the local economy and employment opportunities during the construction and operation phase of the Project, which will result in direct and indirect job opportunities and procurement opportunities in the Project region.

Mitigation measures corresponding the key environmental, social and health issues, impacts and risks associated with the Project are also identified in the ESIA Report. The necessary actions required to manage these issues, impacts and risks are presented in this Environmental and Social Management and Monitoring Plan (ESMMP); these include;

- all the Project commitments (including national legislative and lenders requirements),
- mitigation measures that have been identified from the impact assessment, and
- other best practice measures designed to avoid, minimise or reduce negative impacts and enhance positive impacts.

The ESMMP also provides information and instructions on how environmental, social, and health commitments of the Project will be managed from pre-construction through the construction and operation phases. The ESMMP is a living document which:

- Incorporates the environment and social mitigation measures identified as a result of the ESIA process into a comprehensive framework to facilitate and ensure appropriate management throughout the Project cycle;

- Provides a framework to incorporate commitments into the Project plans and procedures for construction and operation activities.
- Presents responsibilities for meeting ESMMP requirements including the provision of training;
- Provides a framework for the implementation of specific management plans by the Contractor and.
- Provides the monitoring/verification and reporting program (including corrective actions).

In addition to the ESMMP, other key supporting management plans, including RLRF and SEP, have been prepared as stand-alone project plans.

10.2 Additional Complementary Environmental and Social Studies

The Contractor is responsible for the design for construction, and construction of the motorway and the river regulation. Any design changes required as a result of the ESIA studies will be incorporated into the Project as part of a Change Management Procedure to be prepared and implemented by the Contractor according to their Environmental and Social Management Systems. While detailed design works are being carried out, it should be kept in mind that there are additional complementary environmental and social studies (see Table below) being conducted and there might be more in the pre-construction phase.

Table 10-2. Complementary Environmental and Social Studies

Tasks	Remarks
Task 1: River Regulation LTA Assessment	On-going
Task 2: PS6 Supplemental Biodiversity Assessment	Completed
Task 3: Additional Biodiversity Baseline Data Collection	On-going
Task 4: Social Impact Assessment Gaps	Completed
Task 5: Supplementary Lenders Information Pack (SLIP)	On-going

The outcomes of these studies which are being conducted in order to complement the ESIA Report will be disclosed also as part of the ESIA Lenders disclosure (in particular, as a Supplementary Lenders Information Package).