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# **Western Balkans Investment Framework**

## **Infrastructure Project Facility**

### **Technical Assistance 4 (IPF 4)**

TA2012054 R0 WBF

**Preliminary Design and Feasibility Study with EIA for construction of Highway E-80 in Serbia (SEETO Route 7): from Kosovo\* (administrative crossing Merdare) to Niš via Prokuplje bypass, section Niš-Pločnik**

WB13-SER-TRA-01

**PRELIMINARY DESIGN**

**Environmental and Social Impact Assessment Study (ESIA) - Non-Technical Summary (NTS)**

July 2018

**COWI | IPF**

\*) This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.



*European Western Balkans Joint Fund (EWBJF)*

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### **Infrastructure Projects Facility**

### **Technical Assistance 4 (IPF 4)**

## **Infrastructures: Energy, Environment, Transport and Social**

TA 2012054 R0 WBF

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Environmental and Social Impact Assessment Study (ESIA)-NTS

July 2018

*The technical assistance operation is financed under the Western Balkans Investment Framework (WBIF) which is a joint initiative of the EU, International Financial institutions, bilateral donors and the governments of the Western Balkans which supports socio-economic development and EU accession across the Western Balkans through the provision of finance and technical assistance for strategic investments, particularly in infrastructure, energy efficiency and private sector development.*

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## List of Abbreviations

AADT	Annual average daily traffic
ACM	Asbestos-containing materials
BOD	Biochemical oxygen demand
CEC	Cation exchange capacity
CIE	International commission on illumination
CM	Cadastral municipalities
COD	Chemical oxygen demand
CTMP	Construction traffic Management Plan
CWMP	Construction Waste Management Plan
DALI	Digital addressable lighting interface
DTM	Digital terrain model
EBRD	European Bank for Reconstruction and Development
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EPM	Erosion potential model
ESAP	Environmental and Social Action Plan
ESIA	Environmental Social Impact Assessment
EU	European Union
Frag (A)	Fragile habitat due to functional instability and sensitivity to degradation
Frag (B)	Fragile habitat due to poor and slow reproducibility
FRY	Federal Republic of Yugoslavia
HMSS	Hydro meteorological service of Serbia
IFI	International finance institutions
ILO	International Labour Organization
INCS	Institute for Nature Conservation of Serbia
IPA	Important Plant Area
ITS	Intelligent transportation systems
IPF	Infrastructure projects facility
IUSS	International union of soil sciences
KS	Corridors of Serbia (Koridori Srbije d.o.o.)
LED	Light emitting diode
MCTI	Ministry of Construction, Transportation and Infrastructure
MEP	Ministry of Environmental Protection
NATM	New Austrian Tunneling Method
NTS	Non-Technical Summary
PD	Preliminary Design
PERS	Public Enterprise Roads of Serbia
PR	Performance Requirements
RAP	Resettlement Action Plan
REACH	Registration, evaluation, authorisation and restriction of chemicals
Ret	Rare habitat in Serbia
RPF	Resettlement Policy Framework
RS	Republic of Serbia
SEP	Stakeholder Engagement Plan
SEETO	South East Europe Transport Observatory
SIA	Social Impact Assessment Study
SP	Spatial Plan
TEM	Trans-European Motorway network
TETRA	Terrestrial trunked ratio
UPS	Uninterruptible power supply
VMS	Variable message signs
WBIF	West Balkans Investment Framework
WRB	World reference base for soil resources

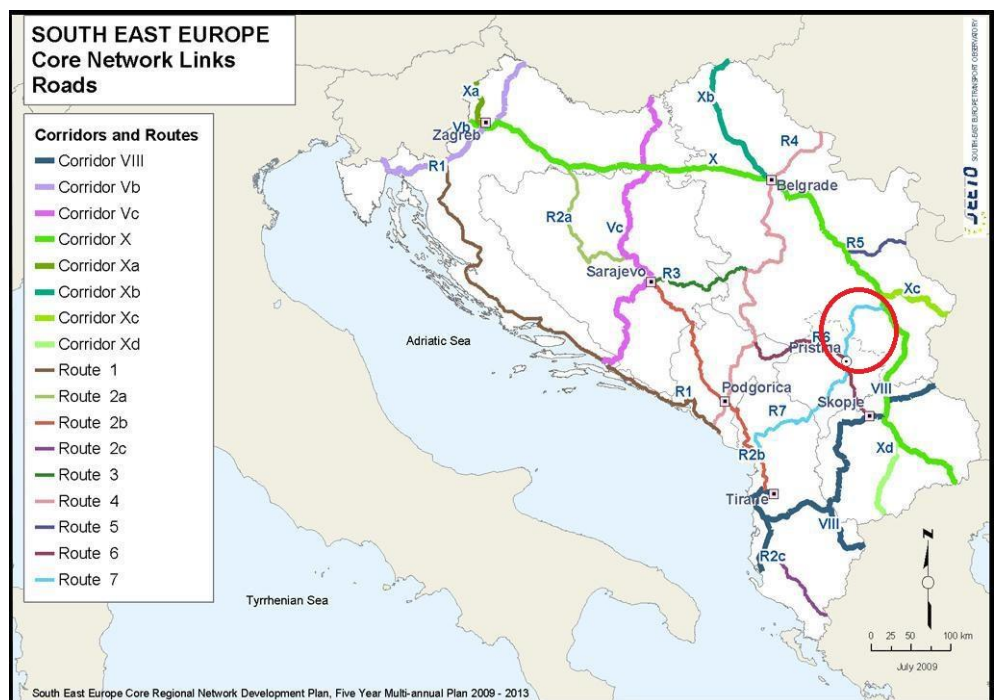


# 1 Introduction

Improving Highway E-80 (section Nis-Merdare) is without any doubt considered of great significance. This highway forms part of a wider axis (Route 7) that links Bulgaria with Adriatic Sea via Serbia, Kosovo\* and Albania.

This Route is part of the SEETO core network, a priority highway according to strategic documentation of Republic of Serbia and recently adopted by the EC as priority project. As high priority project in view of the Berlin Process it was discussed and reconfirmed in the meeting of WB6 Prime Ministers in Vienna (27-8-2015).

Figure 1 Map of SEETO Core Road Network in Western Balkans (source SEETO MAP)



The construction of a new highway between Nis and Pristina through the administrative crossing point Merdare is expected to reduce significantly travel times, increase level of service and road safety and enhance regional transport activities, both passenger and freight.

“Preliminary Design and Feasibility Study with EIA for construction of Highway E-80 in Serbia (SEETO Route 7): from Kosovo\* (administrative crossing Merdare) to Nis via Prokuplje bypass” has been reduced to a part of the highway (40km out of 77km initially approved). More specifically the assignment is undertaken for the section Nis (point 01 of PFS preferred alignment) to Plocnik (point 07 of PFS preferred alignment) in a length of approximately 40 km (out of 77 km in total).

Figure 2 Highway alignment under study-design in current T.A (nodes 01-07, red line)



## 2 Project Description and Project Alternatives

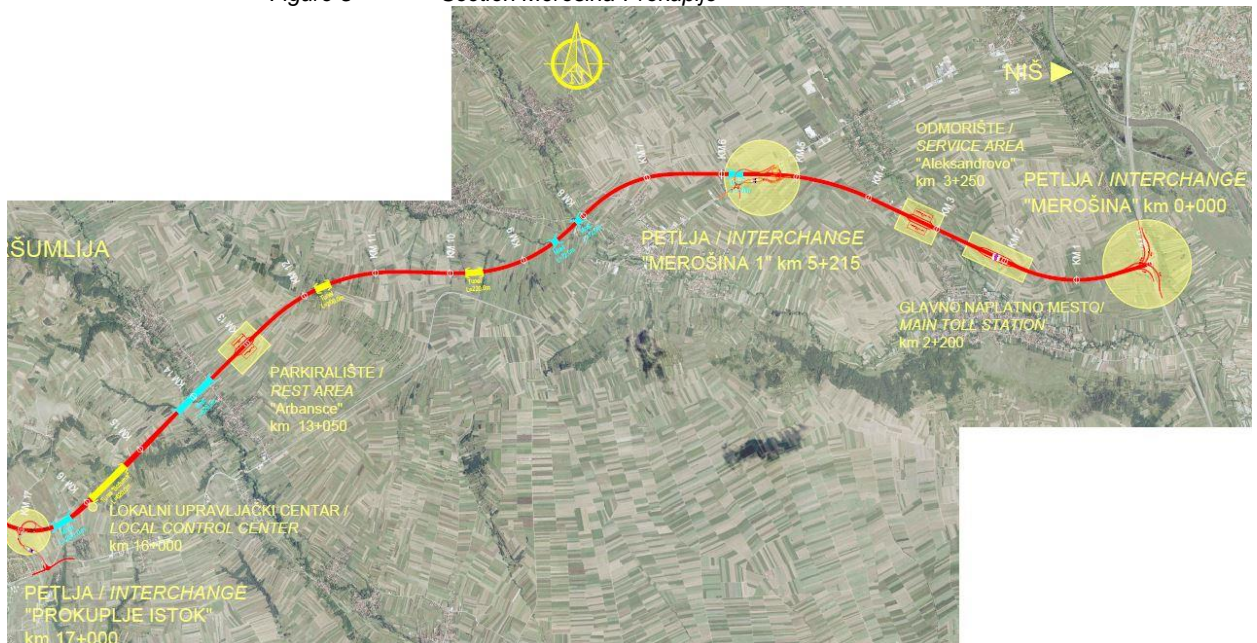
With respect of different landscape characteristics, the new highway corridor can be divided into three main sections:

- Merošina – Prokuplje (from the Interchange “Merošina” to the Interchange „Prokuplje East“)
- Prokuplje bypass (from the Interchange “Prokuplje East” to the Interchange „Prokuplje West“)
- Prokuplje – Pločnik (from the Interchange “Prokuplje West” to the end of the red route)

### Section: Merošina – Prokuplje

Figure 3

Section Merosina-Prokuplje



The starting point is the existing interchange “Merošina”, connection to Highway E-75, south of Niš. The alignment passes through the valleys of rivers and streams in plain and hilly terrain conditions. Villages are mostly located along the road and along water courses. The land is fertile arable land, usually with annual plantings and to a lesser extent orchards and vineyards.

From the existing junction “Merošina” E75/E80 up to approximately km 5+500 the designed highway alignment is using the geometry and corridor of the existing state road IB-35. On that particular section, the existing road cross section will be used as one highway lane (with rehabilitation of existing pavement and additional widening) and a second lane will be fully constructed.

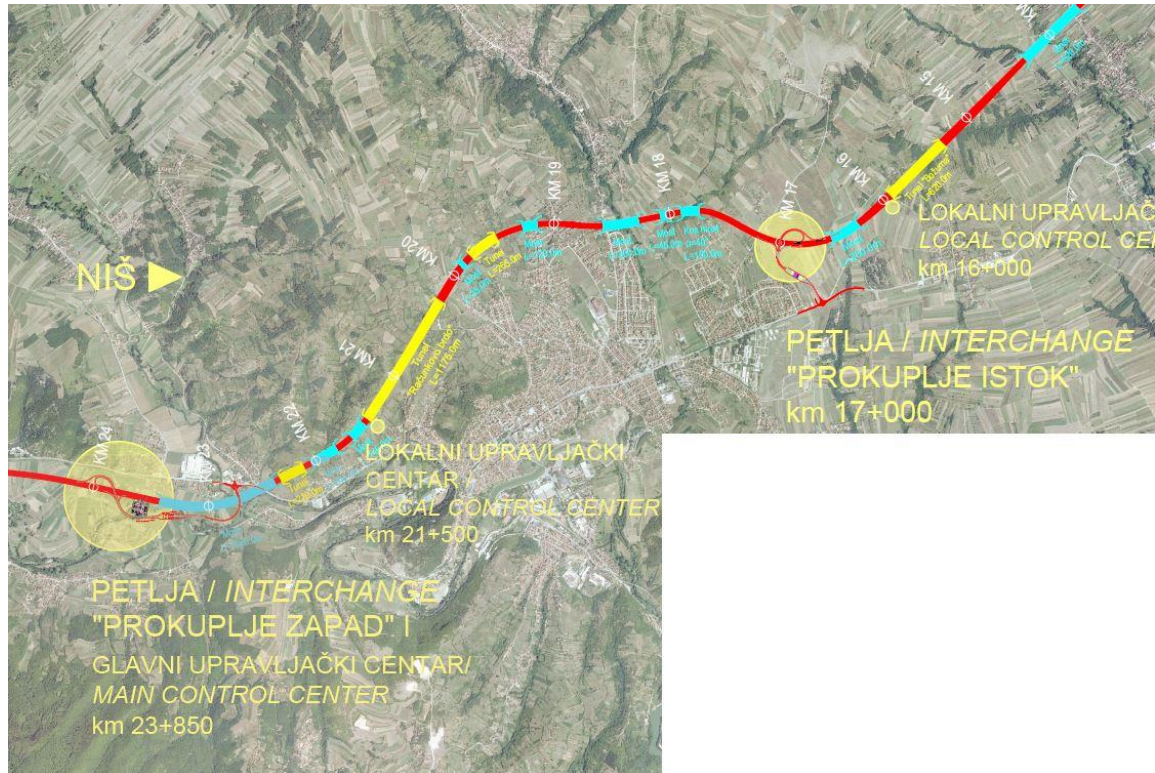
Highway route will be mostly on embankments or cuttings with bridges over existing watercourses (one 12m, two 70m long and one 130m long, marked blue), three viaducts (210, 500 and 250 m long), three underpasses, five overpasses, and



three tunnels, two shorter, 220 and 225m and one longer, 620m long (marked yellow).

### Section: Prokuplje Bypass

Figure 4 Section Prokuplje Bypass

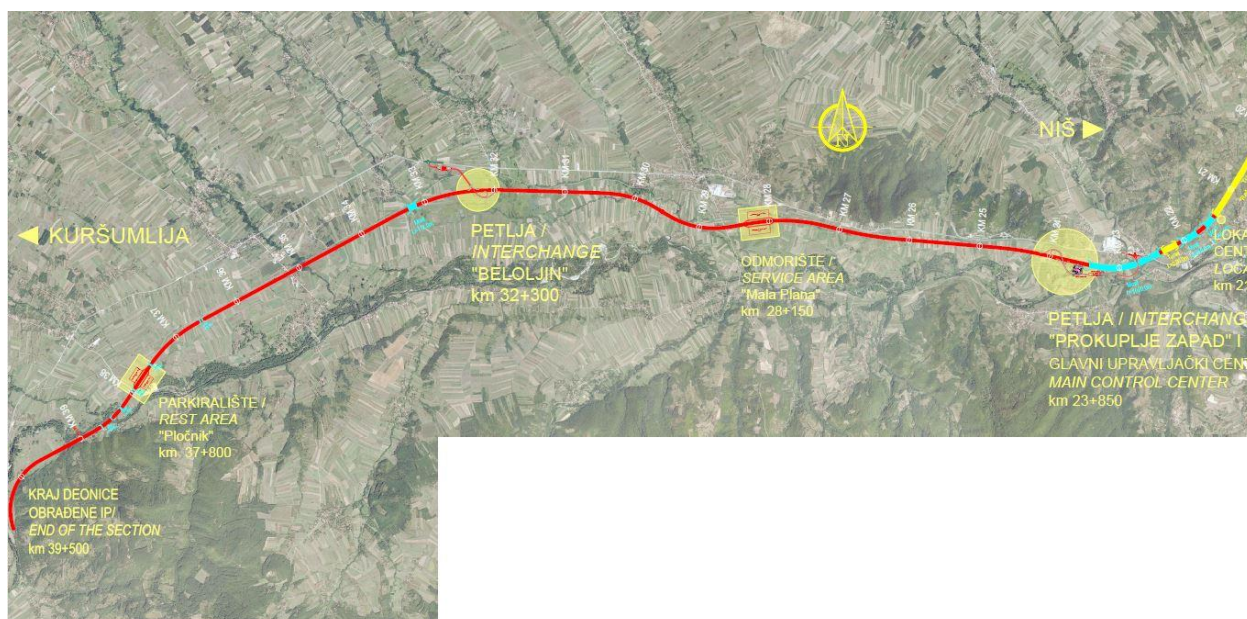


The Prokuplje Bypass is placed on the north side of Prokuplje on a terrain that is characterized as hilly to mountainous with settlements along the roads that pass through the valley between the hills.

Slopes of the terrain is very steep and hard to pass. The route of the highway is placed on high embankments, which turns deep cuts to the structures, bridges and tunnels. There are two bridges, one 130m and other 315m long. There are two underpasses and four viaducts, respectively 140m, 150m, 250m and 975m long (marked blue). There is one overpass and three tunnels, two of which up to 300m and one over 1100m (marked yellow). The northern part of the Prokuplje bypass is located in favorable terrain conditions with scattered settlements.

## Section: Prokuplje – Pločnik

Figure 5 Section Prokuplje-Pločnik



This area extends along the Toplica River valley. The first part of the valley up to Beloljin is much wider and provides opportunities for alternative routes within a flattened area. The slopes of the surrounding hills are not so steep and not too complicated to build a highway route. There is one overpass and seven underpasses on the route, three bridges 35m long, three bridges 15m long, one bridge of 50m and one of 140m (marked blue).

## 2.1 Junctions and Toll-stations

Connections of a new highway with existing and planned road network will be realized through junctions/interchanges.

Location, concepts and functional level of designed interchanges are shown in the following table.

Table 1 Location, concepts and functional level of designed interchanges

Interchange	Interchange station	Connection road	Interchange type	Functional level	Pay sites	Type
Merošina	0+000	E-75 (motorway)	„triangle“	A	16	Main toll
Merošina 1	5+215	IB-35 (state road)	„trumpet“	C	7	Side toll
Prokuplje (east)	17+000	IB-35 (state road)	„trumpet“	C	7	Side toll
Prokuplje (west)	23+848	IB-35 (state road)	„trumpet“	C	7	Side toll
Beloljin	32+278	IB-35 (state road)	„trumpet“	C	7	Side toll

## 2.2 Drainage concept

Drainage design propose such a solution that all storm water from pavement surface are efficiently collected and taken for the treatment and continue to the

recipient. Rainwater from cut and fill slopes are collected with trenches and concrete channels along the right of way fence.

Such a concept implies that drainage of rainwater, from pavement surface will be carried out to the gutters at the edge of the pavement. At certain distances along the gutters manholes with drain covers will be installed. Atmospheric water goes into a closed pipe system, and from there to the separators for the treatment of storm water. After passing through the separator for oil products, purified water is drained by pipeline to the recipient, where the water is discharged.

Closed drainage pipe system collects water from the bridges and the tunnels along the route. There are bridge drains with drain covers on the bridges, which are connected to the outlet piping. The tunnels have drainage systems and fire hydrant network in case of fire fighting.

## 2.3 Tunnels

On highway Niš – Merdare, section Niš – Pločnik (km0+000 to km39+500) construction of a total of 6 tunnels is planned.

Table 2 Review of tunnels per section

Tunnel	Beginning of tunnel	End of tunnel	Length
Debelo brdo	9+570.00	9+790.00	220 m
Lalinac	11+625.00	11+850.00	225 m
Božurna	15+300.00	15+920.00	620 m
Vršnik	19+550.00	19+750.00	200 m
Računkovo brdo	20+250.00	21+425.00	1175 m
Plehane kuće	22+120.00	22+340.00	220 m

## 2.4 Road side facilities

The maintenance and control base is located near junction “Prokuplje (West)”, km 23+600.

Table 3 Location of facilities for users' needs

Station	Type of facility	Type	Name
3+250	Service area	Both sides	“ALEKSANDROVO”
13+100	Rest area	Both sides	“ARBANASCE”
28+150	Service area	Both sides	“MALA PLANA”
37+800	Rest area	Both sides	“PLOČNIK”

## 2.5 Road Safety Audit

RSA Workshop took place in Belgrade, PERS premises, from 28-30. November 2017. RSA was performed through:

TA to Connectivity in the Western Balkans



Sub-Project Code: CONNECTA-TRA-CRM-REG-01

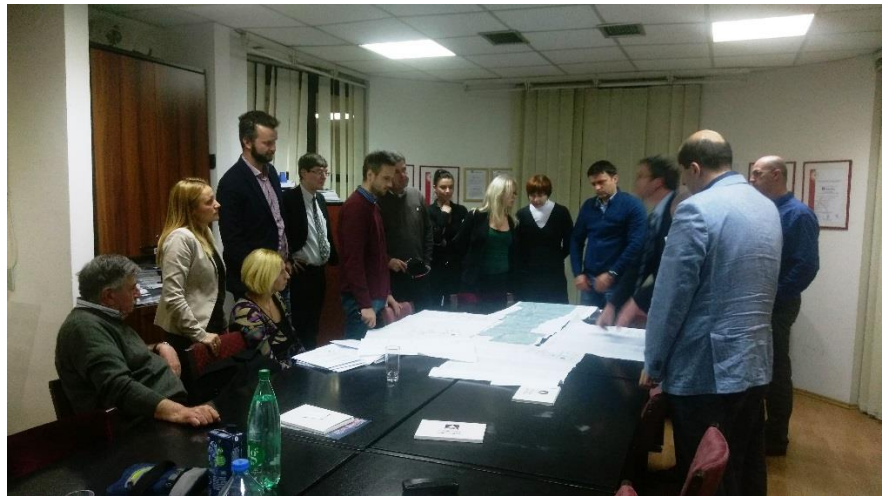
Area: Connectivity Transport Reform Measures

*Preparation of Road Safety Inspection and Audit Plans for core/comprehensive road network in Western Balkans (WB6) and Pilots*

Stage One Road Safety Audit, E80 Niš-Pločnik, Serbia

On Day 1 Design team presented the project background and also technical, environmental and social part of the design. After the presentation RSA team and Consultant discuss further about some aspects of the highway alignment and other part of the design.

Figure 6 RSA Workshop and discussion



On Day 2, RSA team performed a Site visit, together with Consultant, in order to become more familiar with the existing state road (which is close to proposed highway) and also to see proposed places for major highway objects (interchanges, tunnels, bridges etc.).

Figure 7 Site visit and design review “in situ”



On Day 3, RSA team, together with Beneficiary, performed a meeting and agreed further steps in audit.

The Consultant received comments from RSA team, in a form of report which was prepared on 20 December 2017. After reviewing this report the design was improved taking into consideration the RSA recommendations. Then a report was prepared describing what is implemented and some of the design solutions were also further explained. That Report was sent to PERS and to the Ministry on 13 February 2018.

## 2.6 Project Alternatives

Preliminary assessment of suitability has been made for all variants from the General Design taking into account environmental and social criteria.

Alternative solutions were obtained by a combination of options:

- Location of the loop on the E-75 highway, options - Merošina-N or Doljevac-D
- Variant of the Prokuplje bypass, options - north-south, south-b
- Variant of route Prokuplje-Pločnik, options - north-1, medium-2, south-3

Figure 8 Variants of the highway route processed in the General Design



All examined variants (18 of them, formed as all possible combinations of sections) were estimated approximately similar from the ecological point of view. The selection of the preferred options was based on their Economic, Environmental, and Social evaluation. The selected alignment minimizes expropriation needs and present a relatively low cost.

### Lalinačke slatine solutions

Bearing in mind that one part of the alignment goes through Lalinačke slatine area, the Consultant received the opinion from the Institute for nature Conservation No. 020-1429/2 08.10.2016 regarding the fact that the highway route intersects the periphery of IPA "Lalinačke slatine". After site visit, the Institute concluded that the plant species on the concerned section have a wide distribution in Serbia, and that planned activities will have no impact on the conservation status of characteristic plant species. On the periphery of IPA site, uncultivated habitats are dominant with very small fragments of steppes. Both of proposed technical solutions (deep cut, which is financially favorable, or tunnel 225m long, which would have to do "cut



and cover” method, due to the thin overlay) are feasible regarding protection of natural values. Based on all of this data, the Consultant adopted the option of a “cut and cover” tunnel in a total length of 225m.

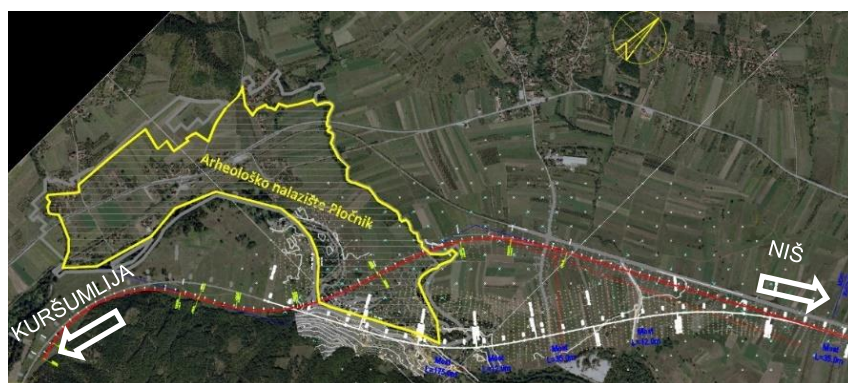
Figure 9 Highway alignment in relation to IPA area (marked red)



### Archaeological site Pločnik realignment solutions

The Consultant decided to do a small realignment to fully avoid any potential collision with the archaeological site and protected area of Pločnik.

Figure 10 Realignment according to the Pločnik site protected zone.



Bridge over Toplica River is extended because of the small hydro power plant which is in near area, and its derivation channel with inflow in Toplica River bed. The bridge will cross over both Toplica and derivation channel river bed.



## 3 Summary of Environmental & Social Legal and policy Framework

### 3.1 National Environmental Legal and Policy Framework

Serbia has largely transposed the EU regulatory requirements related to **environmental impact assessment** into national legislation, including the EIA Directive (Directive 92/11/EC, as amended).

The Law on the Environmental Impact Assessment ("O.G. of the RS ", No. 135/04 and 36/09) regulates the process of Environmental Impact Assessment, the content of the Environmental Impact Assessment Study, the participation of interested authorities and organizations and of the public, cross-border notification for projects that can have significant impacts on the environment of another state, and supervision, and other issues of importance for environmental impact assessment.

An EIA is required during the Preliminary design stage of a project. The opinion on the need for an EIA is initiated by a formal screening study in order to identify the categorization of the project. But in cases where the project categorization is obviously high due to its nature and scale and the clear requirement under international standards and national legislation the screening may be omitted.

The fulfilment of environmental impact assessment requirements is a prerequisite for the construction permit. The national EIA procedure comprises the phases of screening, scoping, impact assessment and public consultation.

**Nature conservation** is primarily regulated by the: Law on Nature Conservation (Off. Gazette of RS. No. 36/2009, 88/2010 and 91/2010) which is harmonized with the EU Habitats Directive and the Birds Directive. Specific aspects of nature conservation are regulated by various by-laws. The Decree on Ecological Network (Off. Gazette of RS, No. 102/2010) identifies ecological network areas in Serbia and sets the management, financing, monitoring and protection requirements.

#### **Public consultation and information disclosure framework**

Serbian legislation guarantees to its citizens the right to information, i.e. that everyone shall have the right to be informed accurately, fully and timely about issues of public importance. These provisions are included in the Constitution of the Republic of Serbia: (Official Gazette of the RS, No. 98/2006), as well as in the Law on Free Access to Information of Public Importance (Official Gazette of the RS, No. 120/04, 54/07, 104/09, 36/2010).

The Law on Planning and Construction (Off. Gazette of RS, No. 72/2009, 81/2009, 64/2010, 24/2011, 121/2012, 42/2013, 50/2013, 98/2013, 132/2014 and 145/2014)

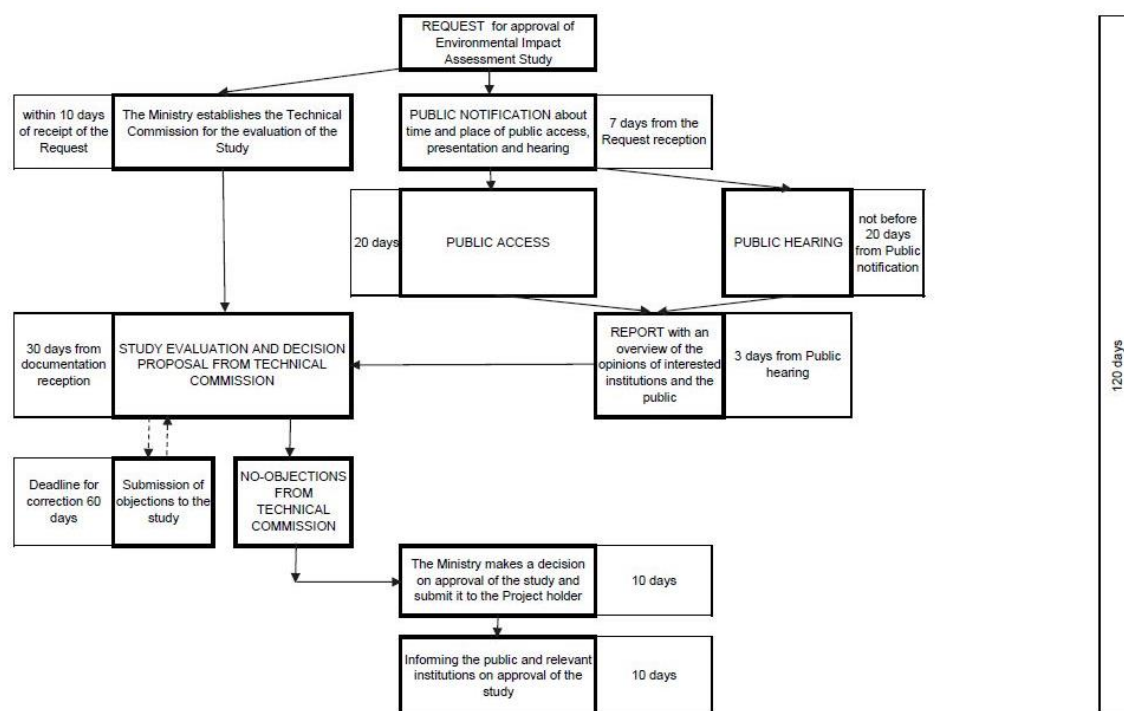
regulates the development and adoption of spatial and urban plans in Serbia, which are all subject to a public disclosure and consultation process.

Serbia ratified the Aarhus Convention in 2009. Provisions of the Aarhus Convention were incorporated into the environmental regulation, including the Law on Environmental Impact Assessment and the Law on Strategic Environmental Impact Assessment.

It should be noted that the first publication and public consultation activities start from the Scoping phase of the project. During the Scoping phase of the EIA, the publication of the announcement of the Application for a decision on the scope and content of the EIA Study, in the local newspaper, takes place and the Application with all enclosed documents are available to the public for 15 days. The authorities, organisations and the public concerned may submit their opinions on the application with regards to the application within 15 days from the date of announcement.

Thereafter the competent authority makes a decision on the scope and content of the EIA Study, taking into account the opinions of the authorities, organisations and the public concerned.

Figure 11 Procedure from EIA submission to approval



## Stakeholder Engagement

There is no single standing Law or Act guiding Stakeholder engagement during preparation of an ESIA for what is recognized under EBRD and EIB categoriation as a Category A Project. Nowtwithstanding, the idea of stakeholder engagement is deeply embedded in the legal system from the Constitution, to various Laws to the UN Economic Commission for Europe (UNECE) Aarhus Convention to which Serbia is a

signatory of since 2009. More elaborate details on stakeholder engagement are to be found in the SEP adopted for this Project.

### **Legal Framework for Land Acquisition**

The Law on Expropriation (passed in 1995 and enacted on January 1, 1996, amended in March 2001, amended again on March 19, 2009, and 2013 by the Constitutional Court ruling) enables government institutions to acquire property for projects that are deemed to be of public interest, while protecting the interests of all persons with legal title, whose assets are to be expropriated. The Law on expropriation does not use the term "involuntary resettlement", but instead uses the term "expropriation" and is based on the Governments eminent domain power. The law also enshrines the principle of fair compensation according to "market value" of the property instead of the "replacement value" used in IFI's resettlement policies.

These are key provisions of the Law of Expropriation:

- Immovable assets (by Law generally defined as land, buildings and other construction structures) can be expropriated only after declaring public interest by law, or decision of the Government of RS. Public interest can be declared if construction of facility is intended for public utility infrastructure,
- Owners partially expropriated of immovable property are entitled to request expropriation of the entire property and the corresponding compensation, in case if expropriation deteriorates their economic situation and/or makes the remaining part unviable,
- As a general rule, compensation for expropriated property is offered and paid in cash, with the exception of expropriation of agricultural land for the construction of linear infrastructure facilities (roads, highways), suitable agricultural land of the same type and quality, or the corresponding value in the area and its surrounding area will be offered as replacement land,
- The Beneficiary of Expropriation will not be allowed to take possession of the Expropriated property prior to the decision on compensation becoming legally binding, or before the date of conclusion of an agreement on compensation for expropriated property, unless the Law provides otherwise. In exceptional cases the Ministry of Finance, at the request of the BoE can allow possession of site to be taken prior to the above stated cases but only upon justification for urgency has been proven.
- After passing the decision of Expropriation, the BoE will submit a written offer within 15 day after the decision has become legally binding. If the offer is not accepted by the owner the case is transferred to the judicial proceeding for the Court to determine the compensation. Such cases are urgent by virtue of the Law.

The legal framework guiding land acquisition& resettlement is broadly compatible with the EBRD and EIB Social standards and requirements. The key difference is seen in the request for a Project specific Grievance Mechanism in addition and parallel to the existing redress mechanism made available under the national law, the equal eligibility of entitlement of formal and informal title holders to any title, the need to develop an RPF, RAP and socioeconomic survey and assessment of affected population at the level of individual households.

## 3.2 Environmental Impact Assessment and IFIs framework

Implementation of the Project will follow the framework laws and regulations of the Republic of Serbia as well as applicable EBRD & EIB policies and standards. In accordance with EBRD's Environmental & Social Policy (2014) and the EIB Social Principles and Standards the Project has been screened as a Category A project.

The **EIB Statement on Environmental and Social Principles and Standards**, sets the policy context for the protection of the environment and human well-being. This framework promotes the EU approach to environmental and social issues, and is in line with international best practice. Such procedures, principles and standards are translated into the routine practices of the EIB in the Environmental and Social Practices Handbook ([http://www.eib.org/attachments/strategies/environmental\\_and\\_social\\_practices\\_handbook\\_en.pdf](http://www.eib.org/attachments/strategies/environmental_and_social_practices_handbook_en.pdf)), which is subject to regular review and revision.

**The Environmental and Social Policy of the EBRD** (<https://www.ebrd.com/what-we-do/strategies-and-policies/approval-of-new-governance-policies.html#a1>), as approved by the Board of Directors at its Meeting on 7th May 2014, outlines how the Bank will address the environmental and social impacts of its projects by:

- defining the respective roles and responsibilities of both EBRD and its clients in designing, implementing and operating projects in line with this Policy and the Performance Requirements
- setting a strategic goal to promote projects with high environmental and social benefits
- mainstreaming environmental and social sustainability considerations into all its activities

### Stakeholder Engagement

Both EIB and EBRD are committed to promoting environmentally sound and sustainable development in accordance with their Environmental and Social Standards (2014) and Environmental and Social Policy (May 2014) and the Performance Requirement (PR) 10: Information Disclosure and Stakeholder Engagement respectively.

Public consultation and stakeholder engagement is considered as an interactive and an on-going process, from the onset of the project and at the earliest stage of the environmental and social impact assessment process, and to be continued throughout the entire life. Special attention should be paid to the identification of vulnerable stakeholders whose life and well-being is directly affected by the Company's activities. Furthermore, it is required that the project developer establishes and maintain an effective grievance mechanism, ensuring that any stakeholder complaints and concerns are received, handled and resolved effectively, in a prompt and timely manner.

A Stakeholder Engagement Plan has been prepared to identify key Project stakeholders and define relevant procedures and plans for engagement prior to



and during construction and operation. KS are implementing a grievance mechanism in line with the SEP. KS is committed to respond to all comments and complaints, either verbally or in writing. KS is committed to raise the awareness to the existence of a project specific Grievance mechanism streamline its use and aim for the grievance mechanism to pick up any Grievance at a very early stage promoting the social sustainability, avoiding lengthy time, resource and money consuming administrative and legal proceedings. The SEP is disclosed and available at [www.koridorisrbije.rs](http://www.koridorisrbije.rs).

### **Land Acquisition Planning Process**

The Project will require the Project execution will require permanent acquisition of land by using eminent domain power and expropriation in the total area of approximately 398,4 Ha of different types of land, represented in 3440 land parcels and 72 physical structures in both municipalities Merošina and Prokuplje as the direct area of influence.

The execution of the Land acquisition process shall be the remittance of the PE Roads of Serbia as the Beneficiary of expropriation and adherence and compliance to commitments and standards set forth in the RPF and RAP overseen by KS.

As said the assessment of 18 alternatives in a MCA has determined the option with the least agricultural land take and resettlement needs commensurate to the technical and economical feasibility overall.

A project Specific RPF has been prepared and adopted compliant with EBRD, EIB and National standards. The RPF is available at [www.koridorisrbije.rs](http://www.koridorisrbije.rs). The main objective of RPF is to define overarching principles, procedures, actions, organizational structures and capacity requirements during resettlement, if such should be required, and its impact attributable to Project implementation. It provides the framework for individual RAPs under the Project.

A detailed Resettlement Action Plan will be developed in accordance with the RPF. A Socio-economic survey will be undertaken during the next phase of

Project development to understand more fully the scale and magnitude of the economic and physical displacement and these impacts on the Project Affected Persons (PAPs). The socio-economic survey will be used to inform the RAP and help design household specific compensation packages to ensure that losses are compensated at full replacement cost, livelihood is effectively restored and PAPs maintain or improve their socioeconomic conditions and living standards compared to pre-Project level.

## **3.3 Comparison between International ESIA and Serbian EIA Processes**

The two processes are aligned regarding the requirements for assessment of environmental impact. However, the international ESIA is a more integrated process and needs to encompass the requirements associated with regulatory

mechanisms such as those which are part of the local “planning process” and are outside the formal environmental impact assessment process. For example, issues associated with local grievances arising from land purchase for the project are managed locally by local regulatory authorities. In the ESIA process, these local issues must also be encompassed in the integrated impact assessment. The Table below summarises the similarities and differences between the ESIA and Serbian EIA process.

*Table 4 Relation with the local EIA procedure*

Activity	ESIA	EIA	Comments
Screening Study	✓	✓	Due to nature and scale of the proposed project and the clear requirement under international standards and national legislation the project is a Category A /List I project and a formal screening study was not produced for this project. The procedure started from the scoping study.
Categorisation	✓	✓	Formal categorisation in accordance with banking standards and national legislation indicates that the proposed project is a Category A / List I project and requires a full impact assessment.
Stakeholder Engagement Plan	✓		A formal stakeholder engagement plan is not required under national legislation. However, stakeholder consultation is part of the EIA process.
Scoping Study	✓	✓	Due to the requirements of the ToR, an International Scoping Study was not produced for this project. The local Scoping Study was submitted to the local regulatory authorities. The EIA Scoping Application and Decision are presented in Annex 4.
Consideration of alternatives	✓	✓	Both the impact assessment process for investment and national regulatory requirements, require the consideration of other feasible approaches, including alternatives locations, technologies, scales and ‘no project’ options.
Environmental Impact Assessment	✓	✓	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.
Environmental impacts assessment in cases of accidents	✓	✓	The Serbian EIA legislation requires quite detailed analysis of environmental impacts in case of accidents which includes specification of hazardous substances used, emergency preparedness and response, remediation measures, etc.
Socio-Economic Impact Assessment	✓	Limited	The impact assessment for investment requirements requires an integrated approach including full deliberation of the socio-economic effects. 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.
Environmental and Social Management Plan (ESMP)	✓		ESMP is not typically included as a requirement according to local legislation. It is required for Category A projects according to EBRD requirements. ESMP describes the roles, the responsibilities, the key commitments and general measures which should be implemented. The Approved Study is the base document for the preparation of ESMP
Non-Technical Summary (NTS)	✓	✓	NTS is required for investment requirements for use as a disclosure document. It is recognised 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.



Activity	ESIA	EIA	Comments
Public Consultation & Disclosure	✓	✓	The public consultation process for both investment and national regulatory purposes is required. Given the length of the motorway (40km) and that this project involves the construction of new road, the project is categorised in Category A, requiring the full ESIA disclosure package to be publicly disclosed for a minimum of 120 days.
Management of Grievances and Objections	✓		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).



## 4 Environmental and Social Baseline

### 4.1 Topography and Relief

Niš - Pločnik highway route passes through valley lowlands and hilly region. Highway route elevation range is from 210 (join to Belgrade – Niš highway) to 420 m a.s.l (bypass of Prokuplje, “Računkovo hill” tunnel).

### 4.2 Geomorphology

With respect of different characteristics, the new highway corridor can be divided into three main sections: From the existing junction “Merošina” up to approximately km 5+500 the alignment passes through the valleys of rivers and streams in plain and hilly terrain.

Prokuplje Bypass is placed on the north side of Prokuplje on a terrain that is characterized as hilly to mountainous with settlements along the roads that pass through the valley between the hills.

Section Prokuplje – Pločnik extends along the Toplica River Valley. The first part of the valley up to Beloljin is much wider and provides opportunities for alternative routes within a flattened area.

*Figure 12 Morphology of the first section*



*Figure 13 Prokuplje Bypass, 3D model – tunnel-bridge-tunnel*

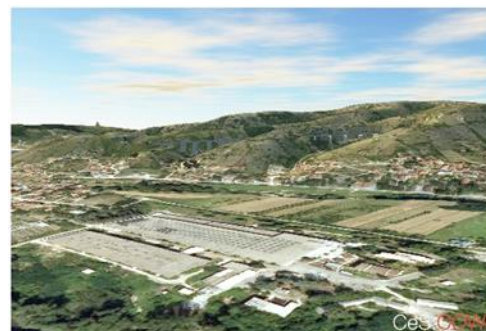


Figure 14 Morphology of the last section



## 4.3 Geology

Table 5 Engineering geological zones with extracted geological units

Section	Approximate length	Represented geological units
Interchange Nis south – to approximately km: 17+000	km: 0+000 to km: 17+000	Alluvial and river-terraced plateaus (al, t <sub>1</sub> , t <sub>2</sub> , pr) Neogene hilly terrains (dpr, ed, Pl, M-Pl)
Interchange Nis south – to approximately km: 23+000	km: 17+000 to km:21+000 km: 21+000 to km:23+000	Alluvial and river-terraced plateaus (al, t <sub>1</sub> ) Crystalline schists complex (Gn, M, Q)
Prokuplje – Plocnik	km: 23+000 to km:39+300	Alluvial and river-terraced plateaus(al, t <sub>1</sub> , t <sub>2</sub> ) Neogene hilly terrains (dpr, dl, pr, ed, Pl, M-Pl, M) Crystalline schists complex (Gn, M, Q)

## 4.4 Hydrogeology

Based on the research it was found that the terrain in the entire area is basically built from rocks that are watertight. The largest part of the surface water drains by gravity down the slopes to the local erosion basis - local stream ravines and river valleys. Also in addition, due to the steep slope of the terrain, water intensive transported decomposed material and formed gullies in the middle, and ravines in the lower parts of the slopes.

### Water supply and thermal mineral springs

Prokuplje water supply is now performed from underground sources (40%) and from accumulation (60%). There is a deficit in the amount of water for water supply.

Water supply of the city of Prokuplje is from dam and reservoir on the Bresnička River, from the spring „Hisar” and source “Bumburek”. Municipality Prokuplje water supply will be solved permanently when building a water supply system "Selova" is completed.

A bottled water from this area was mineral water “Milan Toplica” from the wells near Viča. This mineral water factory is not active now, but it will be open soon. The project of reconstruction of the pipeline is in the phase of adoption.

## 4.5 Climate Settings

The climate of the wider area of the highway section Niš-Pločnik is a temperate continental; with moderately warm summers and moderately cold winters. At altitudes above 1000 m it changes towards a mountain climate, with short and fresh summers and longer, colder and snowy winters. It is mainly influenced by orography, with the Kopaonik Mountains on the west and the Toplica River valley along the highway route.

Climate conditions are described through the analysis of normal monthly and annual values of relevant parameters (minimum, maximum and mean air temperature, precipitation, humidity and winds) in the period 1981-2010, observed at meteorological stations Niš, Prokuplje and Kuršumljaja.

Mean annual air temperature in the period 1981-2010 measured at the three meteorological stations is between 10.3 and 11.9°C. The warmest month is July and the coldest is January. Autumns are warmer than springs due to a mild influence of the Mediterranean Sea. The temperature gradually rises from west to east as elevation decreases.

Mean annual precipitation for the same period is about 600 mm, with slightly more precipitation on the west and less on the east. Precipitation is uniform and it has a continental regime, with a maximum in summer and minimum in winter.

Common wind directions at Niš are north-northwest and east-northeast due to the shape of the orography that is open to the northwest through the South Morava valley and to the east along the Nišava River valley.

Common wind directions at Kuršumljaja are south to southeast, as well as north and northeast. Similarly to Niš, orography streams air masses along the Toplica (northeast) and Kosanica (east) River valleys. The largest mean velocity is for winds from the south-southeast and north-northwest.

## 4.6 Surface Water

Surface waters from this area are drained by streams that belong to the basin of the Toplica River. Tributaries are generally torrential flows. At the time of high water some parts of the field are flooded, it is especially the case in alluvial area of the Toplica River.

List of all watercourses which crosses the route is presented in the following table.

Table 6 List of all watercourses on the route

No.	Name of watercourse	Station	Permanent watercourse	Crossing method	Piers in river bed	Length of river regulation (crushed stone)
		(km)	(Yes/No)	L/diameter (m)	Yes/No	(m)
1	Aleksandrovački Stream	2+988	N	Bridge, L=12m	N	97
2	Golema Padina Stream (occasional watercourse)	5+825	N	Viaduct, L=210m	N	
3	Mala Padina Stream (occasional watercourse)	7+420	N	Pipe culvert, diameter 1,6m	-	
4	Krajковаčka River	8+105	Y	Bridge, L=70m	N	75
5	Lepajski Stream	8+514	N	Bridge, L=70m	N	280
6	Jugbogdanovačka River	14+062	Y	Viaduct, L=500m	N	113
7	Suvi Stream	14+235	N		N	302
8	Ciganski Stream	17+785.4	N	Bridge, L=130m	N	170
9	Stržavska River	18+433	N	Bridge, L=315m	N	103
10	Bezimeni Stream	19+184	N	Viaduct, L=140m	N	
11	Trnavska River	22+679.4	N	Viaduct, L=975m	N	135
12	Randelov Stream	25+550	N	Bridge, L=35m	N	
13	Planska River	27+538	N	Bridge, L=18m	N	408
14	Drenovački Stream	29+019	N	Box culvert, L=5m	-	345
15	Zdravinjska River	30+108	N	Bridge, L=15m	N	115
		31+791	N	Bridge, L=35m	N	80
16	Kondželjska River	33+131	N	Bridge L=50m	N	
17	Draguška River	34+928	Y	Bridge, L=35m	N	
18	Tisin Stream	36+578	N	Bridge, L=35m	N	
19	Suvodolski Stream	37+533	N	Bridge, L=15m	N	
20	Backa River	38+278	N	Bridge, L=15m	N	
21	Toplica River	38+550	Y	Bridge, L=140m	N	

Recent data about surface water quality, as well as physico-chemical, chemical, microbiological parameters of the river network in the neighbouring area, from hydro meteorological stations, are available from the “Survey results of surface and groundwater quality for 2013”, Environmental Protection Agency Belgrade, 2014. Therefore, additional quality measurement wasn’t conducted during the project.

## 4.7 Natural Hazards

Climate-related hazards rated with high sensitivity are floods, landslides and soil erosion, all caused by the intense rainfall. Heavy showers may cause soil erosion, landslide or rock fall, increase ground subsidence and endanger embankments. Excess water on the highway may impact the traffic safety. Floods and river currents may damage bridges or other parts of road's infrastructure. Since the climate change simulations show a likely increase of the heavy precipitation events, both in frequency and intensity, the risk of such threats will be even higher in the future.

Another hazard marked as highly sensitive is the increase in extreme temperature during summer. It is almost certain that annual and seasonal mean temperatures will continue to grow by the end of the century, as well as the intensity and frequency of days with high maximum temperatures. This may cause an asphalt melt and rutting, as well as thermal expansion of bridge joints, thus increasing the maintenance costs.

High vulnerability is found for extreme precipitation, floods, landslides and soil erosion, both in the present and future climate conditions. For extreme temperatures the vulnerability in the present climate is medium, while in the future climate it is expected to be high. It may be a threat to the surface asphalt layer that has a relatively short lifespan and this issue may be addressed later through the highway maintenance.

## 4.8 Soil Settings

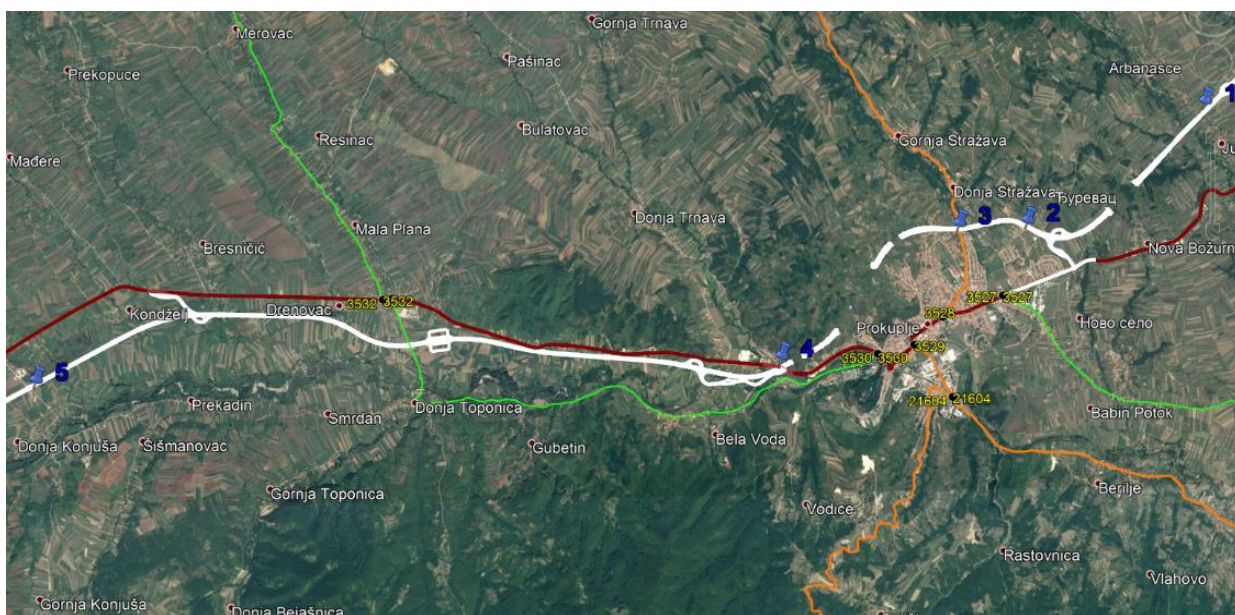
Agricultural production is the main activity of the population on the whole route. Soils have medium productivity potential (classes from 2 to 4), and are suitable for agriculture, horticulture and viticulture. In the wider area of Toplica District on higher altitudes soils have lower quality and are used mainly for animal husbandry, fruit growing and cultivation of cereals, while the great part of the district is covered by forests. In the area around Toplica River dominates semi-intensive and intensive fruit growing, field crops cultivation and vegetable production.

## 4.9 Ambient Air Quality

At the area of highway E-80 there is no official data provided by continuous measurements of air quality, except for Nis. However, it is envisaged that state road IB-35 and state road IIA-216, as well as one track non-electrified railway line no. 71 could be a major air pollution source with the limited impact in the vicinity of existing roads. Also, during the winter period house heating is a source of significant pollution in the towns of Prokuplje and Kursumlija. For the purposes of this assessment air quality measurements were performed in five locations close to the future highway. The results of these measurements show that the air pollutants do not exceed the values prescribed by the Regulation on the Conditions for Monitoring and Air Quality Requirements. Only at one measuring point, number 3, the concentration of soot is exceeded the value in the Regulation. It is a measuring site located near the state road IIA-216.



Figure 15 Measurement points for the noise and air quality measurements



## 4.10 Noise and Vibration

The noise sensitive area along the route is the zone with residential receptors In Prokuplje, Jugbogdanovac, Arbanasce, Mala Plana, Merošina and Beloljin. The area comprises mainly residential houses and some commercial properties. No schools, hospitals, kindergartens or similar receptors have been identified near the route.

For the purposes of this study in March 2018, noise measurements were made at 5 measuring points in Prokuplje and its surroundings. Measurements were made in the open space in the same locations with the air quality measurements.

On the basis of the performed measurements, it can be concluded that the relevant noise levels do not exceed the noise values of the noise indicators for the daily, evening and night periods at all measuring points

## 4.11 Ecology and Nature Conservation

### Protected plant species

No plant species recorded within the influenced area are included within the Red Book of Flora of Serbia 1 (Stevanović, 1999), or in the Annexes of International Conventions (i.e. the Bern Convention, CITES).

The planned activities of constructing the highway with their scope and character do not represent a threat to the status, survival or preservation of the state of natural populations of these protected species in the Republic of Serbia. All of these plant species are marginal in the investigated area, with few populations or scattered individual specimens. As such they are not vulnerable and or irreplaceable and they cannot be considered as Priority Biodiversity Features following EBRD PR6.



However, one should highlight the presence of four plant taxa that are not located on the highway route, but in the wider area. These are described in the Red Book of the Flora of Serbia 1 as extremely vulnerable taxa in Serbia. All are strictly protected according to the “Rulebook on the designation and protection of strictly protected and protected wild species of plants, animals and fungi”. It is estimated that these taxa are not directly endangered by the highway route, but given that the habitat types mentioned below may be found in the wider surroundings of the route, their presence must be taken into account in the planning of possible accompanying activities, in the wider area of the intended highway.

**Table 7** *Four strictly protected plant taxa located in the wider vicinity of the highway route, outside the zone of direct and indirect impact.*

Latin name	Serbian/English name	Habitat	Distribution in Serbia
<i>Allium guttatum</i> Stevan subsp. <i>dalmaticum</i> (A.Kerner ex Janchen) Stearn	Spotted Onion	salt marsh	Little Lalinac, Lalinačka slatina
<i>Allium cyrilli</i> Ten.	Cirilijev luk/ cyrillic garlic	On neglected land and along the periphery of arable land	Niš (surrounding), Donja Vrežina, Gornji Komren
<i>Aster oleifolius</i> (Lam.) Wagenitz.	Maslinoliski zvezdan	On dry, sunny and bare peaks of hills on the edge of the plateau above the Lalinačke slatine. It occurs in a distinctly steppes community and borders with surrounding pasture and ruderal parts.	Mramorski plato, Little Lalinac
<i>Lamiaceae Stachys milani</i> (Petrov.)	Čistac Kralja Milana	Slightly swollen fertile soil in the flood meadows	Mramor, Little Lalinac

### Natural habitat types

In this area habitat types are not important and/or representative (small areas, already fragmented and disconnected stands, a certain degree of human influence, etc.), compared to other parts of Serbia, in order to be protected according to the provisions of the Rulebook. As such they cannot be considered as natural habitats, based on the EIB description, or of significant biodiversity value so as to trigger the status of critical habitats beased on EBRD 6.

### Fauna

Although there are numerous animal species (Mammals, Birds, Amphibians & Reptiles and Fishes) that are on the thematic tables, with formal conservation importance on the national and international level, none of them would be substantially impacted as a priority biodiversity features by the planned road highway), since there are common and widespread species on the territory of Serbia.

### Protected areas

In the area of the highway neither officially designated Natural Protected Areas nor areas for which the protection procedure has been initiated were found.

Natural Monument „Lalinačka Slatina“ is located about 4.5 km away from the route of the highway. The Important Plant Area (IPA) of "Laliinačke Slatine" consists of 11 small unconnected parts of a total area of 2012, 35 ha. The vegetation of the part of the IPA area (the locality of Jug Bogdanovac), that will be affected by the

highway works, consists of old abandoned orchards, vineyards, fields and similar agricultural areas. Though the highway intersects the periphery of the IPA, no qualifying features of the site will be directly or indirectly affected by the project and there will be no secondary impacts from the project. Therefore no significant impact is anticipated.

## 4.12 Landscape and Visual Settings

From the viewpoint of visual perception, the landscape is very dynamic with developed relief forms (from the river valley, across the lowland to hilly and mountainous areas).

Forests as natural elements of the landscape are fragmented and occur sporadically, mostly along watercourses.

## 4.13 Social and Land Use Baseline

The area of influence can be divided into three tiers. The first and most dominant is the direct area of influence of the project impacting two Municipalities Merosina and Prokuplje respectively. The second tier is the Toplica District and the third tier is the national area in terms of the impact to integration of the national road network into the European network. The Two Municipalities are located in the Toplica District of Serbia and according to the last Census Merošina with its population of 13.968 inhabitants belongs to a group of smaller municipalities, representing 0.19% of overall population. Prokuplje with population of 44.419 inhabitants (0.62% of total population) is the seventh largest municipality in Serbia without recently having the status of a City. The Municipalities make a homogenous social environment comprising mainly of semirural to rural settlements making the socio-economic baseline conditions rather unified across all settlements under direct influence of the Project. Prokuplje unlike Merosina has an urban center and information forming the baseline conditions were adequately disaggregated from the other more rural settlements.

The local economy in Prokuplje, relies on close of 200 small and Moderate enterprises (number of enterprises continuously changes, but for last ten years it varies around this number). Nearly 8.5% of Merošina active population and 12.88% in Prokuplje are employed in commerce. Usually, these are retail businesses and smaller shops satisfying local needs for general goods. One third of all small businesses in Prokuplje and Merošina are active in the field of commerce. There are only four large companies in the municipality of Prokuplje, and none in the municipality of Merošina (this does not include public utility companies). Most of them are engaged in commerce (32.99%), small-scale industrial production (25.77%), and only a small fraction (7.22%) in agricultural production despite the fact that agriculture is the single most important economic sector in both municipalities. In providing tourist services (including restaurants and bars) deal only 2.06% of all company. The situation is very similar in the municipality of Merošina.

At the same time, in the municipality of Prokuplje around 1,000 various shops are operating, more than 55% are working in commerce activities, around 10% are restaurants and bars, 7% are providing personal services, only about 6% are in craftsmanship and 9% in the manufacturing industry.

From a total of 4046 households in Merosina and 15119 in Prokuplje respectively 147 239 have agricultural based income, 476 or 3763 Non-agricultural based income, 1260 or 5283 live from a retirement pension, 120 and 546 of social assistance, and 169 or 692 of other sources of income.

Both Municipalitys have a 94.7 % Serbian ethnicity ratio compared to all other ethnicity.

For the development of the Social Impact Assessment focus group discussions were held to have targeted discussions on a specific topic and to allow exclusive discussions on a specific concern in respect to the specific group.

Key informant interviews were a very rich source of information for issues of concern otherwise difficult to obtain or to understand when put in the local context.

Questionnaires designed as a combination of attitude and explanatory surveys were used to collect and measures the local communities attitude and opinion and to verify the initial rapid assessment.

## 4.14 Cultural Heritage and Archaeology

A number of *Immovable Cultural goods*, and goods under protection, are close to the project area. The identified immovable cultural heritage archaeological site Pločnik and the under protection goods Viča, locality Veliki Breg, prehistoric settlement fall within the project path. The design team decided to change the route in this section to avoid collision with the protected zone of the archaeological site Pločnik.



## 5 Environmental and Social Impacts and Mitigation Measures

### 5.1 Benefits during Construction

The benefits of the Project are summarised below:

#### Education and Skills

Opportunities for sub-contractor's smaller companies to gain references shall be enhanced during assessment of available workforce in the local pool announce the tentative services, works subject to possible sub-contracting so small companies can cooperate in order to maximize the opportunity.

#### Employment and economy

Local employment should be maximised by establishing fair, transparent and equal opportunities for employment. This will be facilitated by a mandatory Employment plan to be prepared by the Contractor.

#### Labour and working conditions

The employment, although project dependent, has been assessed as moderately positive. The Project is required to comply, at a minimum, with national labour, social security and occupational health and safety laws, and the fundamental principles and standards embodied in the ILO conventions. The Contracts for construction work will specify such minimum principles and standards and regular Labour and working condition audits shall be performed.

### 5.2 Impacts and Mitigation Measures during Construction

The potential adverse effects are summarised below accompanied with the proposed key mitigation measures and an assessment and rating of the residual impacts. Additional actions to structure the Project fully compliant with EBRD's PRs are captured in the ESAP that KS will implement during future construction and transposed to the maintaining entity during operations. The ESAP is disclosed alongside the, NTS EIA, SIA, SEP and RPF on the website of KS.



Table 8 Summary of the main impacts and respective mitigation measures during construction

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
<b>Air quality impact</b>			
Spreading of construction material and dust in the air can be caused by: (1) demolition of buildings situated along the proposed route, (2) earthworks (including land clearing, excavation, levelling, tunnelling), (3) transport and disposal of excavated and surplus filling material and storage of filling and backfill material, (4) movement of construction mechanisation and transport vehicles.	Moderate impact from building demolition in the vicinity of residential receptors  Minor impact from air emissions during earthworks on dust soiling	Cleaning of vehicles before leaving the public areas Obligatory covering or wetting the material to be transported to avoid its scattering When weather is dry and windy, regularly wetting the surface that could lead to scattering of dust Provide technical validity of machinery, regular (if necessary emergency) technical controls of norms emissions	Negligible
<b>Soil erosion impact</b>			
(1) From the Krajковаčka River to Jugbogdanovačka River, terrain is characterised with moderate erosion category, III-6, with Z ranging from 0.56-0.70 and less often with strong erosion, category II-5, with Z ranging from 0.71-0.85. This is an area of vertisols and eutric cambisols. Attention should be paid on 10-13 km of the route where the highway passes over terrain characterized with colluo-alluvial processes. (2) Part of route north and west from Prokuplje passes over area highly affected by erosion, II-5 category.	(1) Possible launching of erosive processes and landslides during the construction of a section of the highway between Krajковаčka River and Jugobogdanovačka river (km 8+100 to km 14+100) (2) Possible launching of erosive processes and landslides during the construction of the highway section Prokuplje Bypass (km 17+000 to km 22+000)	All parts of terrain with greater slopes on the highway route are planned to be regulated with bridges or tunnels. In area (2) the tunnel "Računkovo hill" is planned to be constructed. In area (1), before and after tunnel Debelo brdo, slope cut stabilisation with bore piles is planned. In the area before tunnel Vrsnik (km 19+500), and after tunnel Računkovo brdo (km 21+400) a rock cut stabilization measure is provided by applying regular anchoring, placing of steel wire mesh, and geo-mats	Minor
Erosion coefficient ranges from 0.31-0.40 (IV – 8 category, weak erosion) on almost 17-18 km length of highway.	During construction phase erosion process could occur on locations with temporarily built engineering structures.	It is necessary to design a plan for remediation and rehabilitation of the affected soil by erosion.	Negligible

Impact desription	Impact assessment for the area of the interest	Mitigation measures	Residual impact
Soil impact			
(1) Removing of topsoil material for the construction of the highway	(1) Physical loss of land through expropriation, as well as removal of topsoil horizon and its permanent loss. Permanent loss within the narrow area is considered as minor significance	Complete topsoil material which will be removed during highway construction should be used for highway side slopes. It would be the best to embed the humus material without previous storage. If the storage is necessary, it must be provided on regulated dumps and based upon principles of humus material conservation;  After construction works, fertile soil should be embedded on side slopes of newly built embankment. This way of reuse of excavated soil is useful for fast vegetation development, which prevents erosion and lowers potential maintenance costs.	Minor
(2) Soil compaction during construction	(2) moving machinery at and around the site during construction coses compaction, considered as negligible impact	During construction works, construction sites should be marked with fence and nearby soil protected from compaction.	Negligible
(3) Improper handling of oil and its derivatives that are used for machinery	(3) soil pollution from oil and derivates considered as minor significance	All petroleum and its derivatives manipulations during construction works, like machine supply, are necessary to perform on defined place with maximum precautions to avoid spilling. It is the same for oil packaging and other oil derivate, which must be collected and taken on controlled contractor made landfills from where should be taken away by authorized utility company;	
Impact to surface and groundwater			
Impact of contamination from the waters washed from the costruction sites	Water from construction machinery, uncontrolled disposal of excavated material, uncontrolled drainage of the sanitary waters in places of accommodation of workers, as well as smaller (local) pollution from the process of food preparation.	<ul style="list-style-type: none"><li>● Spillage of any hazardous substances near the river must be avoided. The Contractor should be required to use biodegradable lubricants for their machines and biodegradable oils for transmissions, to minimize pollution during the works.</li><li>● Maintenance, refuelling and cleaning of construction machines execute at locations that are distant from watercourses and which will be defined before the start of works.</li><li>● River banks in the exploration area should be protected by fences during the construction phase, to prevent negative impact that may be caused by driving and unloading of materials nearby.</li></ul>	No impact



Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		<ul style="list-style-type: none"> <li>• Avoid driving machines inside rivers, streams, or on their banks, except where this is unavoidable due to the construction of a facility or structure. Also avoid discharge wastewaters originating from the workers into rivers and streams.</li> </ul>	
Possible turbidity of surface waters in the inundation zone,	During the works, there will be some turbidity especially of the Toplica, and Dragučka Rivers and Trnavska and Backa streams, and by erosion during the construction of the foundations and pillars of the new bridges. There are no pillars inside the river flows.	<ul style="list-style-type: none"> <li>• Excavation and preparation of foundations for the abutments, retaining walls and other objects that are on/near surface water bodies, execute in the period of low water levels (July - September) to minimize negative impacts on rivers and their banks.</li> <li>• It is obligation of the contractor is to test the quality of the water upstream from the bridge site before the start of construction work on the bridge</li> </ul> <p>Setting thresholds suspended particulate powder/ turbidity is required and any overruns will cause stop work</p>	Negligible
The impact on the Milan Toplica mineral water factory pipeline during the construction of bridge pillars	Moderate	<p>Provide protection of the pipeline before starting the construction of the highway on this section (km 38+495);</p> <p>Mandatory presence of representatives of mineral water producers during construction of pillars of the bridge over the Toplica River.</p>	Negligible
<b>Impact to biodiversity – habitat change</b>			
<b>Habitat loss and degradation</b> A number of activities during the construction can result in the damage and loss of habitats: Vegetation clearance, soil removal, rock excavations, borrow pits and quarries modification of landscape.	Moderate - Since the predominant vegetation along the route of the highway and the corridor around is not natural, but semi-natural or pure agro ecosystems, there are no flora species of conservation interest, or natural habitats of conservation interest. Animal societies in such habitats consist predominantly of species with considerable ecological plasticity and resilience, common and with widespread home ranges in Serbia, so their conservation status would not be affected significantly by the mentioned impact.	<ul style="list-style-type: none"> <li>• Construction facilities to be sited on unused land of no particular ecological value. This is especially important for and should be beyond the alluvial zone of the Toplica River and outside areas with high vegetation.</li> <li>• Opt for maximum use and upgrade of the existing network of roads and avoid construction of new temporary ones to minimize loss and fragmentation of vegetation and natural semi-natural habitats.</li> <li>• No construction materials will be taken from the surrounding environment unless approved by the competent authority;</li> <li>• Restoration of sites to their baseline condition where possible upon completion of construction (retaining as much of the original vegetation as possible for reinstatement); Species</li> </ul>	Minor

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		<p>selection should be harmonized with the surrounding area and its purpose.</p> <ul style="list-style-type: none"> <li>• In forested areas, the construction corridor will be reinstated in cooperation with the competent authorities.</li> <li>• Establish a pre and post construction biodiversity baseline from which all mitigation, restoration, and loss / degradation can be measured;</li> <li>• Establish a Reinstatement Plan prior any construction work beginning. The reinstatement plan will be approved by the competent authority;</li> <li>• Restore as soon as possible after completion of works all surfaces that are in any way degraded with construction and other work;</li> </ul> <p>Develop appropriate measures against the spread of invasive species during reinstatement and /or landscaping of terrain. Pay attention that alien and especially invasive species are not used for greening.</p>	
<p><b>Habitat Fragmentation</b></p> <p>Linear infrastructures, such as highways, contribute significantly towards the habitat fragmentation. Building of a closed highway will cause fragmentation and separation of habitats. In addition, this may cause the interruption of daily or seasonal movements for some terrestrial animal species (i.e. reptiles and mammals), disturbing the usual behaviour patterns of certain species.</p>	<p><b>Minor.</b> The proposed route mostly crosses agricultural land with a few semi-natural habitats. So there will be no fragmentation of critical habitats or natural habitats of conservation importance.</p> <p>Some close to -natural habitats in the vicinity are not affected by the route of the highway</p>	<ul style="list-style-type: none"> <li>• Design and construct fauna crossing points (i.e. culverts) along the highway. This will facilitate movements and reduce the impact of fragmentation. A study before construction should identify both suitable points, type of crossing and technical provisions (inclination, type of substrate, etc).</li> <li>• Opt for maximum use and upgrade of the existing network of roads and avoid construction of new temporary ones to minimize loss and fragmentation of vegetation and natural semi-natural habitats, especially in Toplica River alluvion and the forest areas of the Vidojevica Mountain.</li> </ul> <p>Strictly adhere to planned route of the highway and its associated construction corridor. Limit the movement of heavy machinery to existing roads, in particular in the forest areas of the Vidojevica Mountain.</p>	Minor

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
<p><b>Degradation of riparian zone due to regulation of watercourses.</b></p> <p>The regulation and construction of river crossings could significantly affect the ecological characteristics of rivers and water streams (river banks, riparian vegetation), the riparian flora and vegetation and subsequently the fauna (esp freshwater fish, amphibians, freshwater terrapins) and some mammal species as well, esp. the otter.</p>	<p>Minor - The existing permanent watercourses are not significant for the spawning and seasonal migration of fish, amphibians, reptiles and/or mammals. Planned works are spatially and time restricted. Regulation is planned on the limited and minor part of watercourses. So, communication will be enhanced again, after the construction period.</p>	<ul style="list-style-type: none"> <li>• Prepare and implement a River Crossings Plan as part of the ESMP.</li> <li>• Vegetation clearance works will avoid affecting the riparian vegetation, whenever possible, since it provides areas for spawning and sheltering of many aquatic organisms such as fish, macroinvertebrates, amphibians and reptiles (freshwater turtles),</li> <li>• No temporary facilities to be constructed in the River Toplica alluvion zone.</li> <li>• During the regulation and landscaping of the riverbed of waterways and their banks, avoid concreting waterbeds (use stone and similar materials).</li> <li>• 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.</li> <li>• Strictly adhere to planned route of the highway and its associated construction corridor. Limit the movement of heavy machinery to existing roads, in particular the Toplica River alluvion.</li> <li>• All the above should be implemented especially to the following points of proximity to surface permanent water features: Krajčovačka river (8+105), Toplica river (38+550), Jugbogdanovačka river (14+062), and Dragaška river (34+928). These are watercourses which are permanent and where the presence of fish, amphibians and mammals species may be significant.</li> </ul> <p>Excavation and preparation of foundations for the abutments, retaining walls and other objects that are on/near surface water bodies, should be done exclusively in either the dry period (for temporary water streams) or the period of low water levels (July - September) to minimize negative impacts on rivers and their banks.</p>	<p>Minor</p>

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
<b>Degradation of freshwater quality</b> There are a number of activities during construction that can result in damage to the freshwater ecosystems. These include soil and rock excavations, borrow pits and quarries, the construction of culverts, bridges and viaducts and increased turbidity during construction activities within the water streams. Impacts are related to both deterioration of water quality (accidental spills of fuel or hazardous wastes are another possible threat)	Minor - Permanent watercourses that the highway crossing over are not important spawning places either for fish species or other ones (amphibians, reptiles and mammals). Although high levels of turbidity can affect fish populations, in most of the cases they are temporal events.	1.Prepare a Waste Management Plan as part of the ESMP. This Plan should include among its other objectives the avoidance of any spill affecting to the freshwater ecosystems. 2.Wastes as well as any other product containing hazardous chemical substances (i.e. fuel) will not be discharged in the surface waters and will not be stored in the proximity of freshwater features. 3.Excavated materials will not be dumped into freshwater features, nor will they be stored in their proximity, to avoid additional increase of the turbidity levels. 4.Maintenance, refuelling and cleaning of construction machines must be scheduled in locations distant from watercourses and which will be defined before the start of works. Avoid driving machines inside rivers, streams, or on their banks, except where this is unavoidable due to the construction of a facility or structure.	Minor
<b>Biodiversity - species loss, disturbance and displacement</b>			
<b>Loss of flora</b> Flora species will be directly affected from the road construction through vegetation removal.  <b>Accidental loss of fauna</b> Direct mortality may affect small mammals and reptiles (e.g. tortoise) and amphibian individuals by vegetation clearance, construction activities along the road or traffic on the access routes and machinery movement.  <b>Species disturbance</b> Construction activities can directly and indirectly cause disturbance to fauna species, mostly due to the presence and activity of the machinery.	Minor - There are no species whose conservation status would be affected and threatened by the occasional accidents on the highway. In addition, due to the temporary nature of the activities, no threats to populations are anticipated Regarding flora, it is unlikely that any particular mitigation measures will be a necessity regarding the recovery of protected plant taxa along the proposed route. No nesting of important bird species is expected in the area,	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Limit the traffic of heavy machinery to existing main roads (including forest ones) to the extent that is possible;</li> <li>• Speed of vehicles should be limited, in order to limit emission of noise and dust in non-paved accessed roads and in order to limit the risk of accidents with fauna.</li> <li>• Aim for gradual vegetation clearance in order to retain passage for species as long as possible across the corridor</li> <li>• Avoid dawn-dusk and night-time works, when activity of nocturnal animals such as carnivore species and bats is increased;</li> <li>• Conduct a pre-construction inspection of the areas to be cleared in order to manually transfer and remove observed tortoises to nearby locations. This is expected to reduce direct mortality.</li> <li>• In order to avoid any disturbance to species during the breeding season and subsequent breeding failure, vegetation</li> </ul>	Minor

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		<p>clearance works should start if possible before the breeding season (spring).</p> <ul style="list-style-type: none"> <li>• Develop and implement a Biodiversity Action Plan (BAP) as part of the ESMP.</li> <li>• In the unlikely case that nests of species of conservational interest (eg <i>Ciconia ciconia</i>) should be located, their relocation could be investigated, under the special conditions of the Institute for Nature Conservation of Serbia;</li> </ul> <p>5. Wastes created during construction will be managed under an Environmental Management Plan, to limit the disturbance to fauna as a result of presence of wastes and spills.</p>	
<b>Light</b> - Sources of artificial light can be jeopardizing factors, especially for nocturnal species and especially –bats, because they function as "light traps", and also increase stress acting on the species in the vicinity of the motorway.	Minor - The species of bats and nocturnal birds of prey that are present in the area are common and widespread in Serbia, and there are no expectations about the substantially threatening of their conservation status.	<ul style="list-style-type: none"> <li>• When planning installation of lighting in the corridor around the highway, bridges, overpasses, loop, access roads, etc., applied appropriate technical solutions (focus light sources "down", minimum illumination without using the "decorative" light sources).</li> </ul> <p>6. On the highway is advisable to use non shadowing screen for protection against the dispersion of light.</p>	Minor
<b>Excavated material and waste impact</b>			
The proposed construction works will generate a significant volume of non-hazardous and inert waste whose inadequate management could result in the major adverse environmental impact.	Major	<ul style="list-style-type: none"> <li>• Construction Waste Management Plan (CWMP) will be prepared and maintained by the Contractor of works. The Plan will identify the specific types and quantities of waste likely to arise during the construction process, including: excavated materials, construction, demolition and excavation waste;</li> <li>• The majority of excavated material that will be generated will be reused, if suitable, either as engineering fill material or in the environmental mitigation earthworks of the project;</li> <li>• Exact position of landfills will be determined in later phases, by examining locations "in situ".</li> <li>• In case new borrow pits are determined they should be subject to review for environmental impacts before use. Protected habitats, watercourses, fertile, arable and similar areas should not be used as a landfill locations</li> </ul>	Minor

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		A pre-demolition asbestos survey will be undertaken on all buildings to be demolished or refurbished to identify the presence of any asbestos-containing materials (ACM) that may be present. Where identified, ACM will be removed by licensed asbestos removal contractor and managed in accordance with the Serbian regulatory requirements on asbestos-containing waste.	
<b>Landscape and visual impact</b>			
Temporary impacts could damage the landscape, disrupting the identity of the area (the image of the landscape and visual continuity).	Minor	<ul style="list-style-type: none"> <li>After completion of the work, the obligation of the contractor is to bring the site to the state before the work started, except of the junction Prokuplje (West), where is the planned base for maintenance for the motorway during operation.</li> <li>Organize the site and setting up facilities concentrated mainly in places where planned bridges, viaducts and tunnels along the route are.</li> <li>All open cuts should be planted right after finishing to prevent soil erosion. This should include as less degradation and fragmentation, how the landscape would not lose its character.</li> </ul> <p>All degraded areas should be rehabilitated with new elements of greenery, so that land, and with it the landscape, returned to its original state.</p>	Negligible
<b>Noise and vibration impact</b>			
(1) There will be noise generated from the concrete batch plants and vehicle movements. Where construction noise levels are anticipated to be above 55dB LAeq,T during the day, significant noise impacts are expected to be registered. Such impacts are classified as moderate to high. Where construction noise levels are below 55dB LAeq,T during the day, insignificant noise impacts are expected, classified as low	<p>(1) Properties near the roads which will be used for construction traffic (including rotating mixer trucks) have the greatest potential for increases in noise due to construction traffic.</p> <p>(2) For a receptor sensitivity of high, which is the case in Prokuplje, Jugbogdanovac and Beloljin the adverse impact significance will be moderate.</p>	<ul style="list-style-type: none"> <li>Noise and vibration affected residential or business receptors will be timely informed of the construction activity through appropriate communication channels;</li> <li>All staff will be briefed on the requirement to minimise nuisance from construction activities;</li> <li>Where appropriate, haul routes for construction material will avoid additional nuisance in residential areas or at sensitive sites;</li> <li>Construction operations will have agreed and limited site working hours for "normal" construction activities; works that require working outside of normal working hours will be minimized;</li> </ul>	Negligible

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		<ul style="list-style-type: none"> <li>• Best Practicable Means will be used during construction work;</li> <li>• Where appropriate, silenced / enclosed construction equipment / machinery will be utilised;</li> <li>• All plants, vehicles and machinery used during construction will be regularly maintained and turned-off when not in use;</li> </ul>	
Vibrations caused by blasting and the effects of such vibrations can become dangerous if the tunnel passes through the populated area or close to buildings or structures.	For tunnels "Vrsnik" and "Plehane kuce" the significance of impact can be consider as minor.	<ul style="list-style-type: none"> <li>• During taking significantly noisy or vibration-causing operations near to sensitive locations (e.g. tunnelling), agreed criteria for works would be established.</li> <li>• It is recommended to perform in-situ measurements of vibration during the construction works. These measurements can be used to improve the system of blasting and excavation.</li> </ul>	Negligible
Impact to cultural heritage			
Within the corridor of the planned highway, but outside its borders, there is a number determined immovable cultural goods, and goods under protection.	Moderate	<ul style="list-style-type: none"> <li>• "Corridors of Serbia" (KSDOO) is obliged to provide all the conditions and enable smooth and constant monitoring of works, during the entire duration of the earthworks, by the archaeological team - archaeological supervision;</li> <li>• If during the performance of the works the contractor encounters at archaeological and/or historical sites or archaeological objects or objects from the past, he shall immediately suspend the works and notify the competent Institute for the Protection of Cultural Monuments from Niš without delay, and take measures to the finding does not destroy and not damage and is preserved in place and in the position in which it is discovered, as well as to provide conditions for protective archaeological research;</li> <li>• The investor of the facility is obliged to provide funds for research, protection, keeping, publishing and exhibiting goods that are discovered during the construction of the investment facility, until the transfer of the goods to the authorized institution.</li> </ul>	Negligible



Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
<b>Community health and safety and security impact</b>			
(1) road traffic disruption and safety	The construction phase will involve a large number of transport movements involving slow vehicles carrying aggregates and other materials. The works will also involve temporary closures and diversions of roads. In the area of Merošina and Prokuplje, which is most populated on the route and will primarily be affected by proposed road realignments.	A Construction Traffic Management Plan should be developed and implemented. The plan should be prepared in cooperation with the relevant local traffic authorities, especially where transport is moving through or near settlements or areas with vulnerable road users.	Minor
(2) presence of temporary workers in the local area	Probably the local workforce (Prokuplje and Merošina region) will be employed during the construction. Also, worksites along the major part of the route will be distanced from the settlements.		Minor
(3) safety risks due to unauthorised access to construction compounds and work sites	In case that members of the public access the construction site without authorisation, they will potentially be putting themselves at risk.	Appropriate security features will be implemented, including fencing, sign posting and potentially security personnel.	Negligible
<b>Occupational health and safety impact</b>			
(1) work at heights, (2) slips and falls, (3) moving machinery, (4) struck by objects, (5) dust and asbestos fibres dust, (6) confined spaces and excavations, (7) biological hazards (poisonous snakes).	Moderate	The contractors will employ workers are fully trained, have an appropriate awareness of the hazards of working at construction sites and are trained to use and use the appropriate equipment to undertake their tasks in a safe manner.  All workers associated with the project, and in particular the site management, will need to be familiar with appropriate safety measures for this type of construction works, starting with undertaking appropriate hazard and risk assessments 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.	Negligible

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
Key Social Impacts			
Land acquisition and resettlement	The Project execution will require permanent acquisition of land of approximately 398.4ha of different types of land, represented in 3440 land parcels in both municipalities Merošina and Prokuplje. The assessment identified 72 physical structures occupying a total area of 13679 m2 to be impacted by the development. It has been identified that 60 residential structures for dwelling, 10 ancillary structures such as barns, 10 storage houses, pig stays, outdoor WC, 1 local football stadium, 1 swimming pool are impacted. The overall impact from acquisition of arable agricultural land translated into the entire land holding of the impacted municipalities translates into impact of less than 3% of the total area of agricultural land in Merošina and less than 1% of the total area of agricultural land in Prokuplje respectively.	<p>KS will ensure that effects of physical and economic displacement are minimised and that people affected by the project will be compensated in accordance with the principles set in the Resettlement Compensation Framework</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• A Resettlement Action Plan (RAP) will be prepared, based on the Expropriation Study, the socio-economic assessment and the census.</li> <li>• The amount of land occupied/disrupted during construction will be minimised;</li> <li>• Users of land will be timely informed when construction is planned to begin and how lost crops and damages will be compensated;</li> <li>• All users of land whose crops are lost or affected by any other damage during construction will be compensated at full replacement value, in accordance with the Serbian legislation and the EBRD Policy;</li> <li>• Any business losses will be compensated at full replacement value, in accordance with the Serbian legislation and the EBRD Policy;</li> <li>• Grievance mechanism will be established;</li> <li>• Temporary affected land will be reinstated/restored to its pre-construction condition.</li> <li>• If compensation alone is not sufficient to restore livelihoods, implement livelihood restoration measures in accordance with IFI policies.</li> </ul>	Moderate
Temporary worker influx and population change	Minor	The influx of workers to be avoided by tapping into the local pool of workforce	Negligible

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
Infrastructure	Temporary loss of, or access to, infrastructure or services due to construction works	Avoided by providing alternative routes and roads, Inform local communities of program and sequence of works. The mitigation measures shall be designed through a Traffic Management plan Infrastructure and Utilities Management Plan; Emergency Response plan in respect to supply of water and electricity all mandatory documents to be prepared by the Contractor.	Negligible

## 5.3 Benefits during Operation

**Enhance Connectivity & Facilitate Economic Development:** This Route is part of the SEETO core network a priority highway according to the strategic documentation of Republic of Serbia and recently adopted by the EC as a priority project. As high priority project in view of the Berlin Process it was discussed and reconfirmed in the meeting of WB6 Prime Ministers in Vienna (27-8-2015). It is expected contribute to integration of Serbia into the transport system of the Region and entire Europe.

**Improvements in Road & Community Safety:** The Project will deliver road safety improvements by the new alignment and by providing safer driving conditions in general. Nis-Plocnik motorway Preliminary Design contains several integral parts where traffic and road safety is implemented. As a part of PD, ITS implementation is proposed (both on open route and in tunnels), electrical and mechanical installation are also proposed along the route and in tunnels, traffic signalization and equipment is proposed for alignment and side facilities. Finally, Road safety audit is performed for whole Nis-Plocnik proposed alignment.

**Local Employment:** The Project will provide some employment opportunities for local employment i.e. on the job training and creation of new employment for maintenance, monitoring and operation of the toll boots after the road has been handed over to the maintaining entity.

## 5.4 Adverse Impacts and Mitigation Measures during Operation

The potential adverse effects are summarised below accompanied with the proposed key mitigation measures and an assessment and rating of the residual impacts.



Table 9 Summary of the main impacts and mitigation measures during operation

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
<b>Soil and groundwater</b>			
(1) pollution due to surface water coming from the roadway,	Moderate	Due to planned drainage system, soil pollution from water flow from the roadway is eliminated, since protection from this type of pollution is foreseen.	Negligible
(2) deposition of emitted gasses (atmospheric deposition, wind deposition, scattering due to vehicle movement),	Minor	According to low traffic volumes, soil pollution impact can be considered as negligible.	Negligible
(3) Spillage of cargo.	Major	The only way for soil rehabilitation is to remove contaminated soil and transport it and store in safe places where endangering of environment will be minimized.	Negligible
<b>Surface water</b>			
(1) pollution due to surface water coming from the roadway,	Moderate	According to the planned drainage system, soil pollution due to water flow from the roadway is eliminated, since protection from this type of pollution is planned. This also applies to tunnels, bridges and all associated facilities	Negligible
<b>Biodiversity – habitats</b>			
<b>Habitat loss and degradation</b> During operation along the highway corridor forest or tall vegetation will be replaced with vegetation of mainly grass species. Thus, habitat conditions for many animal species (especially reptiles, birds and mammals) will be substantially altered.	Minor – The habitat lost during construction will not be fully reinstated. Nevertheless, since the predominant vegetation along the route of the highway and the corridor around consists of semi-natural habitats or pure agro ecosystems, there are no flora species of conservation the impact after post-construction reinstatement will be minor. Animal societies in such habitats (along the route and corridor) consist predominantly of species with considerable ecological plasticity and resilience, common and with widespread home ranges in Serbia, so their conservation status would not be affected significantly by the mentioned impact. Reptiles and small mammals may be favoured by the creation of openings along the highway corridor.	<ul style="list-style-type: none"> <li>Develop and implement during the operation phase a Monitoring Plan of terrestrial flora and fauna in order to timely recognise negative impacts and trends related to the highway operation and define additional and appropriate mitigation measures.</li> <li>Pay attention that alien and especially invasive species are not used for the maintenance of corridor.</li> </ul>	Minor -
<b>Habitat fragmentation</b> Linear infrastructures, such as highway projects, contribute	Given the already significant impact of the existing main road as well as of the numerous and almost uninterrupted	<ul style="list-style-type: none"> <li>All sites and surfaces affected by the construction works should be reinstated with the same type of vegetation.</li> </ul>	Negligible-



Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
significantly towards the habitat fragmentation. Building of a fenced highway will cause fragmentation and separation of habitats. In addition, this may cause the interruption of daily or seasonal movements for some terrestrial animal species (i.e. reptiles and mammals), disturbing the usual behavior patterns of certain species.	rural settlements along the existing main road, the expected additional impact will be negligible.	<ul style="list-style-type: none"> <li>Regularly maintain in a good and functional status the fauna crossing points constructed. Consider changes to these passages based on the results of the Monitoring Plan.</li> </ul>	
<p><b>“Barrier effect”</b> created by linear infrastructures can affect the dispersion and movement capacity of fauna (fish, amphibians, reptiles and mammals). This affects indirectly their capacity for searching food, shelter or other individuals of their same species during the breeding season. These factors are linked with the species population dynamics.</p>	<p>Minor - Habitats in both side of the proposed highway are quite similar or even the same (agricultural land), so the negative effects concerning capacity for searching food or shelter will be minor. The planned culverts and passages as well as the high bridges and tunnels will further minimise the “Barrier effect” for the existing fauna.</p> <p>In addition, human activity has already shaped and conditioned the scope and direction of migratory movements of many species. Extensive movement is expected in the east-west direction, longitudinal, more or less parallel to the axis of the highway route than the north-south direction, perpendicular to the route</p> <p>On the other side, the highway could prevent to some extent the expansion of species that are harmful to agriculture, such as the Wild Boar.</p>	<ul style="list-style-type: none"> <li>Develop and implement during the operation phase a Monitoring Plan of terrestrial flora and fauna in order to timely recognise negative impacts and trends related to the highway operation and define additional and appropriate mitigation measures (e.g. additional or different fauna crossing points)..</li> </ul> <p>Maintain the constructed fauna crossing points (i.e. culverts) clear from obstacles (debris, vegetation) and functional. This will increase the permeability of the motorway and will reduce the barrier effect.</p>	Negligible -
<b>Biodiversity - species loss, disturbance and displacement</b>			
During the operation phase of the highway some species such as rodents and reptiles are attracted by the new habitats and environmental conditions created after the road construction. This as the domino effect may favour the secondary	Minor –Approximation to the highway make species vulnerable to collisions and road killing. The impact is considered minor taking into consideration the low vulnerability and conservation importance of the species in question).	<ul style="list-style-type: none"> <li>Develop and implement a Biodiversity Action Plan</li> <li>Implement Noise mitigation measures</li> <li>Construct and maintain an impenetrable and resistant fence along the highway will prevent access of animals (esp. medium and large mammals) to the highway and will reduce the possibility of collisions and road mortality.</li> <li>Predict barriers for birds in corridors, especially for some game birds (Grey Partridge <i>Perdix perdix</i>) and for nocturnal birds of prey. These barriers will</li> </ul>	Negligible

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
increased presence of carnivore mammals which prey on these small mammals and reptiles. Impacts include mainly road mortality. Another negative impact stems from the use of salt during winter months that greatly attracts individuals of different bird species (mostly songbirds) in the immediate area of the highway route, significantly increasing the risk of collision accidents and road mortality		mitigate the risk of collision since normally these species are attracted to roads. <ul style="list-style-type: none"> <li>• Avoid the creation of habitats by the road that would attract fauna and lead to increased road mortality. Respect the physiognomic characteristics of natural vegetation landscapes;</li> <li>• Maintain the multifunctional passages for small and large animals clear of vegetation and debris, in a functional status.</li> <li>• Plan for the timely removal of excess salt after winter in order to reduce the risk of collision accidents and road mortality.</li> </ul> Develop and implement a Monitoring Plan as part of the ESMP that will also monitor road mortality.	
<b>Freshwater ecology</b>	Minor – if proper techniques and the proposed mitigation measures have been implemented during construction there will be no additional impact to freshwater ecology (riparian vegetation and water quality) during operation. The proposed technical solutions for the collection and treatment of the water from the highway, esp surrounding water bodies, will be sufficient for the avoidance of impacts to freshwater species. Therefore no additional mitigation measures are required. Major - A possible major negative impact will be the result of an accidental spill within all road sections close to surface water bodies such as stream crossings.	<ul style="list-style-type: none"> <li>• Develop and implement a Monitoring Plan as part of the ESMP also for freshwater ecology (especially fish, amphibians and overall aqua-ecosystem – invertebrate species composition, production etc.) in order to track possible impacts and define eventual additional mitigation measures to mitigate and reduce the harmful effects.</li> <li>• Monitoring of water quality is recommended as well.</li> </ul> Develop and implement an Accident Response Plan to determine the optimal location and type of emergency response equipment and the required capacities for handling liquid spills. Spill Response Kits should be available and personnel will be trained in their use.	Negligible – provided that all proper mitigation measures have been adopted.
<b>Landscape and visual</b>			
The highway has made a big visual change in environment	Moderate	<ul style="list-style-type: none"> <li>• To establish plant cover on all affected places, using indigenous species with a similar combination, to harmonize with the surrounding area</li> <li>• to arrange embankment horticulturally prevent erosion</li> <li>• The morphology of the area shows a special sensitivity to the presence of highway objects such as bridges and viaducts. Interventions for landscape integration are directed at creating green curtain along the cut and embankment.</li> </ul>	Negligible

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
		<ul style="list-style-type: none"> <li>The interventions are also necessary at the entrance to the tunnels, to mitigate the changes on a green blanket of the slopes.</li> <li>In the places where the highway is monotony, it is necessary to refresh it by planting decorative species that don't require maintenance</li> <li>In extremely poor soil (excavation, embankments with extreme slopes and exposure) is recommended meadow grasslands (priority - a year is sufficient, only one mowing).</li> <li>Arranging community trees and shrubs along the highway for re-giving natural-looking area.</li> </ul>	
Noise impact			
Noise impact from the highway traffic -first phase of highway operation	In the first phase of highway operation, traffic volumes are expected significantly below thresholds. Impact from traffic noise, even in populated areas of Arbanasce and Prokuplje are considered of negligible significance.	No measures	Negligible
Noise impact from the highway traffic -full motorway	Populated area receptors are private houses in Arbanasce and Prokuplje. There is no sensitive receptors as schools and hospitals in the vicinity	<ul style="list-style-type: none"> <li>Noise barriers are provided, in the area of objects which are exposed to the negative impact of the forecast traffic, at the total length of about 276 m</li> <li>In case noise level to exceed the legal limit, noise insulation of windows will be offered for the affected receptors.</li> </ul>	Negligible
Community health and safety			
(1) general operational safety of the highway	(1) Operational safety of the highway could affect passengers by the threat of injury or potential loss of life due to vehicle collisions, or vehicle overturns or other operational causes.	<p>The set of precautionary measures should be implemented, including</p> <ul style="list-style-type: none"> <li>road operational safety procedures,</li> <li>regular inspection, and</li> <li>maintenance of the highway and</li> <li>implementation of a safety management program equivalent to internationally recognised (EU) highway safety programs</li> </ul>	Negligible
(2) level crossings safety	The proposed project envisions only grade separated road crossings (underpasses and overpasses) thus eliminating the safety risks		Positive
(3) transport of dangerous goods	Transport of dangerous goods represents a potential environmental risk in the event of accidents, through leakage, safety valve releases, in pressurised and general service tank vehicles, or other hazardous material containers.	<p>The set of preventive measures will be proposed, including:</p> <ul style="list-style-type: none"> <li>the proper screening acceptance procedure,</li> <li>development of the Emergency Preparedness and Response Plan (including Spillage Response Plan),</li> <li>timing of transport,</li> <li>limiting speeds to minimise the risks, etc.</li> </ul>	Positive Project will contribute to the improvement of the

Impact description	Impact assessment for the area of the interest	Mitigation measures	Residual impact
			hazardous materials transport safety conditions in the area
Climate change impact			
Extreme temperatures	An asphalt melt and rutting, as well as thermal expansion of bridge joints, increasing the maintenance costs	Enhanced maintenance	Negligible
Extreme precipitation, floods, landslides, soil erosion	Major	<ul style="list-style-type: none"> <li>The impact of climate changes (increased value of maximum daily precipitation) is considered in the hydraulic calculation of the drainage system.</li> <li>Alignment is positioned in a way that has a minimum influence on existing watercourse network. Every watercourse has its bed regulated according to the position of alignment and new bridges.</li> <li>For every regulation of a river bed hydraulic calculations were made according to the hydrology study inputs.</li> <li>The position of major structures, bridges and piers is chosen in a way to avoid riverbeds and other watercourses.</li> <li>Clearance of structures above water is designed to be resistant on a 100 year flood level, in a way that the bottom level of the structure must be minimum 1.1 m above the 100 year flood level. This was particularly important to be implemented in the Toplica River potential flooding area, i.e. from km 22+000 to km 39+000 (area between Prokuplje and Plochnik)</li> <li>Embankment was raised in Toplica River potential flooding area, from km 22+000 to km 39+000, also according to the 100 year flood level. Embankment is stabilized on that sections with a gabion mattress (wire boxes filled with a large crushed stone) in order to avoid embankment to be washed away by flood water withdrawal</li> <li>On high cuts along the alignment, especially on Prokuplje bypass section, km 17+000 to km 22+000, slope protection and land stabilization is also proposed. Protection with a wire mesh and anchoring is proposed in order to avoid potential rock falls and landslides.</li> </ul>	Negligible

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## 6 Monitoring Programme

### 6.1 Environmental Monitoring

Proposed environmental monitoring during construction and operation stage is provided in Table 10 and Table 17.

Table 10 Construction stage environmental monitoring

Receptor	Location	Indicator	Frequency	Responsibility
Surface water quality	The Toplica River and all streams along the route, in the construction areas, before and after construction work zone	Natural stream flow and slowing of flow due to the sediment load	Prior to construction of bridges and riverbed regulations daily after major rainfall & weekly there after Visual	Contractor Supervisor
Soil erosion and sediment control	All construction sites and access roads Areas prone to erosion Disturbed areas	Erosion status/ soil stability	Daily After major rainfalls Visual or by erosion control devices, where required	Contractor Supervisor
Disposal of excavated material (spoil) and top soil stockpiles	Spoil disposal areas and top soil stock piles	Stability / erosion issues	Daily Visual and good community engagement mechanisms along with a grievance process	Contractor Supervisor
Soil quality	On every 4 km of highway route. In zones of 3, 10 and 100 m far from the highway route, on its left and right side.	Particle size distribution, soil reaction, calcium carbonate content, organic matter content, EC (due to use of salt on roads), soil compaction	Once prior to construction	Contractor Supervisor
Groundwater	Dewatering areas (if any)	Groundwater level in dewatering wells to be monitored until the natural regime is re-established	Weekly Monitoring equipment	Contractor Supervisor
Noise and vibration	In the zone of affected receptors: Merošina, Jugbogdanovac, Arbanasce, Mala Plana and Beloljin	Noise levels Vibration levels	At identified sensitive receptors throughout construction; good community engagement mechanisms along with a grievance process	Contractor Supervisor
Air quality	Maintenance locations for construction vehicles, plants and machinery, access roads, especially when adjacent to human and ecological receptors	Fugitive dust, fine particulate matter (PM2.5, PM10) and exhaust emissions	Daily	Contractor Supervisor



Receptor	Location	Indicator	Frequency	Responsibility
Terrestrial habitats and species	Along the route	Percentage of completion of required measures, including: passages, barriers, surveys for tortoises and nests. Percentage of implementation of mitigation measures, such as delimitation of clearance area, use of existing road network, fencing for protection of river banks and other habitats, timing of works Percentage of existing and new roads used for the Project to assess additional fragmentation Pre / During / Post Construction Survey	Monthly  Monthly	Contractor Supervisor
Restoration of natural vegetation	At areas of natural and semi-natural habitats, especially riverine habitats	Photographs to compare before and after restoration situation at crossings	Before clearing of vegetation and after completion of restoration. Breeding bird season to be avoided for vegetation removal	
Water quality	At the river crossings	Water turbidity and suspended solids Dissolved oxygen Oil and grease	During crossing works One month after completion of works	
River flow	At all permanent water courses that will be affected by construction works (Krajковаčka, Jugbogdanovačka, Draguška and Backa River)	River flow	One year before crossing and one year after completion of works	
River restoration	At all river crossings	Photographs to compare before and after restoration situation at crossings	Before starting of works and after completion	
Cultural Heritage	Along the route	Archaeological findings	During entire duration of earthworks	Institute for Cultural Heritage Protection of Nis
Landscape	Construction sites and ancillary areas	Landscape planting and seeding requirements Progress of new landscape works through the construction	Periodically, upon completion of construction at the section Visual	Contractor Supervisor

Table 11 Operational stage environmental monitoring

Receptor	Location	Indicator	Frequency	Responsibility
Soil and groundwater	Affected area	Spillage accident	Only in the event of accident Collect contaminated soil by authorized companies	PE"Roads of Serbia"
Soil quality	same as in the case of sampling during the construction phase	Particle size distribution, soil reaction, calcium carbonate content, organic matter content, EC (due to use of salt on roads), soil compaction	Once in spring and once in autumn	PE"Roads of Serbia"
Surface water	Affected surface water body	Spillage accident	Only in the event of accident Collect using pumps, buckets and tanks. For bigger watercourses use floating barriers and skimmers and absorption aids	PE"Roads of Serbia"
Erosion	Slopes of cuttings, embankments, other areas prone to erosion	Land stability/signs of erosion	Twice per year Visual	PE"Roads of Serbia"
Terrestrial ecology (species and habitats)	Animal crossings, bio-corridors underneath the bridges.	Use of crossings/passages by fauna based on traces. Status of crossings (vegetation at entrances, water levels, presence of obstacles).	Twice a year in the non winter season. If passages are not used alternative locations or measures should be considered.	PE"Roads of Serbia"
	Areas where restoration works will be implemented	Status of newly created habitat Presence of native species in the restored zones	Every six months for the first five years of operation. Depending on progress, additional planting may be required	PE"Roads of Serbia"

Receptor	Location	Indicator	Frequency	Responsibility
	At selected intervals along the road	Road mortality per species or species group so that any 'hot spot' areas can be identified	Quarterly for at least the first 2 years of operation. If hot-spots of road mortality are detected, modifications to passages and/or ecological corridors should be considered.	PE "Roads of Serbia"
	At selected sites of suitable habitat along the road, depending on species/species group	Presence and relative abundance of bird species (include EU protected species as well as species indicated by Institute of Nature Protection). Presence and relative abundance of mammals and herpetofauna (EU 92/43/EEC Annex II species as well as species indicated by Institute of Nature Protection). Changes in trends and spatial distribution of game species (roe deer, wild boar, grey partridge and quail).	Once a year. Based on research results compared to baseline study, identify and prescribe measures to mitigate highway residual effect (if any)	PE "Roads of Serbia" It is also important to engage professional organizations.  For game species cooperation with local hunting associations is important as they possess time-series data
Freshwater ecology	In the river crossings to ensure no-effect	Fish populations (species presence and relative abundance) Turbidity Phytobenthos Macroinvertebrate populations (abundance and diversity) Aquatic vegetation	Quarterly for the first 2 years of operation	PE "Roads of Serbia"

Receptor	Location	Indicator	Frequency	Responsibility
Landscape	Slopes of cuttings and embankment, tunnel portals, watercourses and banks underneath the bridges; Bridge abutments, etc.	Condition of vegetation cover Condition of rehabilitated zones and threatening processes (e.g. flood, erosion etc.) that may affect the success of rehabilitation	Annually in spring Visual	PE"Roads of Serbia"

## 6.2 Social Monitoring

Proposed social monitoring during construction and operation stage is provided in Table 12 and Table 13.

Table 12 Construction stage social monitoring

Receptor	Location	Indicator	Frequency and proposed mitigation measure	Responsibility
Physical and economic displacement	Each permanently or temporarily displaced property	Complaints from affected persons through the grievance mechanism.	To be defined by the RAP and good community engagement mechanisms along with a grievance process	Municipal authorities Tax administration
Noise and vibration	In the zone of affected receptors	Noise levels Vibration levels	Only in the event of complaint mobile barriers for noise protection Good community engagement mechanisms along with a grievance process	Supervision

Receptor	Location	Indicator	Frequency and proposed mitigation measure	Responsibility
Community health and safety	Affected community areas	Safety barriers and signage. Accidents involving the local community members Complaints from residents through the grievance mechanism.	Daily during construction	Contractor Supervision
Roads	All haulage routes	Condition of roads, need for repair, periodical cleaning	Random checks/minimum once per week Visual	Contractor Supervision
Cultural heritage	All construction areas along the route	Presence of chance finds, according to the relevant procedure	Visual	Contractor Supervision
Occupational health and safety	All construction sites along the route	Injuries PPE and safety equipment; according to regulatory requirements and EBRD PR; Complaints from workers through the grievance mechanism.	Continuously Visual	Contractor Supervision
Stakeholder engagement activities	The area of impact	As designed in the SEP (Actions listed in the Stakeholder Engagement and Information Disclosure programme are implemented as scheduled etc)	Annually through the publicly available report	KSDOO

Receptor	Location	Indicator	Frequency and proposed mitigation measure	Responsibility
Effectiveness of Grievance Mechanism	The area of impact	<p>Number of Grievances received;</p> <ul style="list-style-type: none"> <li>- Number (%) of Grievances acknowledged within the timeframe; unilaterally decided; closed within the specified time-frame, related to a same or repeated event and /or location to identify areas most affected by potentially negative impacts of the project: resolved comparing to the previous reporting period.</li> <li>- Number (%) of complainant satisfied with the process (timely, fair)</li> <li>- Number (%) of complainant satisfied with the outcome</li> </ul>	Annually	KSDOO CFD

Table 13 Operational stage social monitoring

Receptor	Location	Indicator	Frequency and proposed mitigation measure	Responsibility
Noise and vibration	In the zone of affected receptors	Noise levels	Only in the event of complaint New barriers for noise protection	PE“Roads of Serbia”
Community health and safety	Affected community areas	Accidents Complaints from residents through the grievance mechanism.	Annually and good community engagement mechanisms along with a grievance process	PE“Roads of Serbia”



Receptor	Location	Indicator	Frequency and proposed mitigation measure	Responsibility
Occupational health and safety	All workplaces obliged to health surveys	Worker's health PPE and safety equipment; according to regulatory requirements; Complaints from workers through the grievance mechanism.	According to the OHS Management Plan and OHS Risk Assessment and good community engagement mechanisms along with a workers grievance process	PE "Roads of Serbia"

## 7 Grievance mechanism, further information & contact details

Respecting the grievance panels and its authorities made available under the national legislation and a Project Specific Grievance Mechanism shall be designed. Given the type of potential Project impacts, the Project will have a central redress mechanism i.e. the Central Feedback Desk (CFD) at the level of Koridori Srbije. The CFD shall serve as both Project level information centre and grievance mechanism, available to those affected by implementation of all Project sub-components throughout the Project Cycle.

During the Construction Phase the Contractor shall, as per requirements of the national law, provisions of the contract for construction works, assign the role of a Grievance officer to complement the existing grievance mechanism. The CFD and the Contractors grievance officer shall liaison closely and publish reports on grievance jointly semi-annually following the procedure and tools, and covering the range of stakeholders as designed in this SEP. Any grievance can be brought to the attention of the CFD anonymously, personally or by telephone or in writing by filling in the grievance form by phone, e-mail, post, fax or personal delivery to the address below:

Koridori Srbije  
Central Feedback Desk  
Kralja Petra 21  
11000 Beograd

and to additional local addresses/numbers to be determined later in agreement with the respective members of local municipalities and the communities. The access points and details on entry points shall be publicized and shall be part of the awareness building process.

Once logged the CFD shall conduct a rapid assessment to verify the nature of grievances and determine on the severity. Within 3 days from logging it will acknowledge that the case is registered and provide the complainant with the basic next step information. It will then investigate by trying to understand the issue from the perspective of the complainant and understand what action he/she requires. The CFD will investigate by looking into the facts and circumstances interview all parties involved and confer with relevant stakeholders. Once investigated, and depending on the severity and type of grievance, the provisional decision shall be discussed with the complainant in the timeframe of 10 days after logging the grievance. Unilaterally announcement shall be an exception. The final agreement should be specific and issued and grievant informed about the final decision not later than 20 days after the logging of the grievance. Closing out the grievance occurs after the implementation of the resolution has been verified. Even when an agreement is not reached, or the grievance was rejected it is important to document the result, actions and effort put into the resolution, close out the case.

In case of anonymous grievance, after acknowledgment of the grievance within three days from logging, the CFD will investigate the grievance and within 20 days

from logging the grievance, issue final decision that will be disclosed on the website.

The Contractor grievance mechanism will be led by the Grievance officer. The mechanism adopted for raising, redress, timeframes, communication with grievant, anonymous grievances, administration communication and reporting will accordingly apply to Contractor grievance mechanism. The Contractor Grievance officer will monthly report to CFD about number of grievances received, categories of grievances, time taken for resolution of grievances, percentage of resolved grievances etc. The Contractor Grievance officer will inform grievant about the possibility to raise grievance before Project CFD if not satisfied with the decision of the Officer. If that grievance is then raised before CFD, CFD will issue its final decision.

## 8 Graphical presentation of right-of-way

Figure 16 Preview layout of the highway route

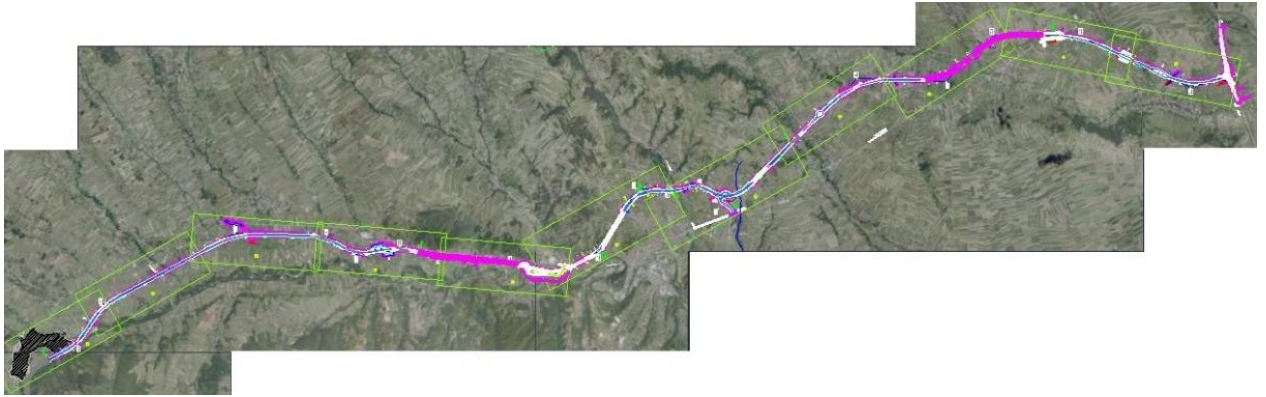


Figure 17 Highway route from the junction “Merošina” to km 3+700 (widening of existing road)



Figure 18 Highway route from km 3+250 to km 6+800 (new route from the junction “Merošina 1”, km 5+215)





Figure 19 Highway route from km 6+800 to km 10+770

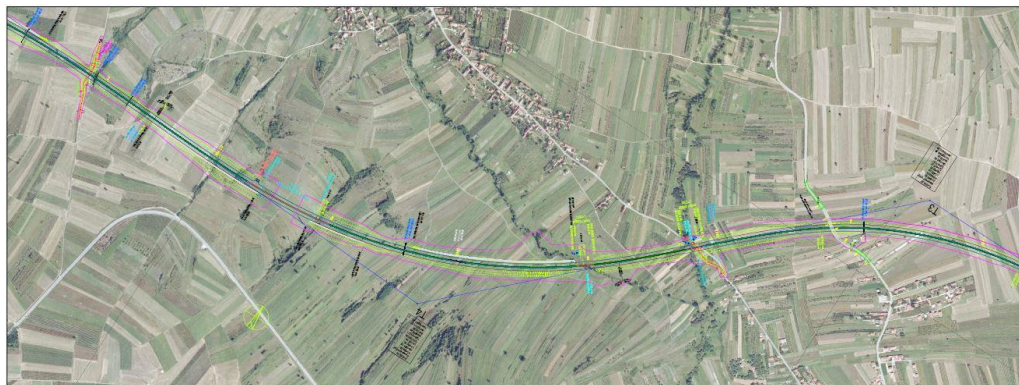


Figure 20 Highway route from km 10+770 to km 14+750

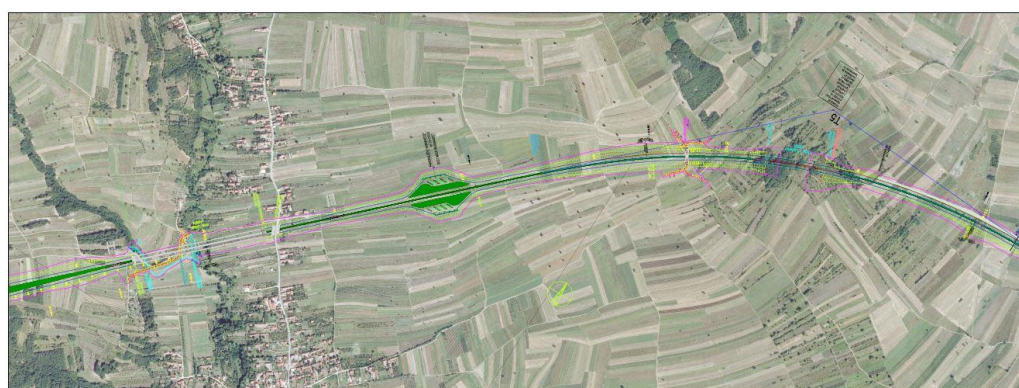


Figure 21 Highway route from km 14+750 to km 18+850

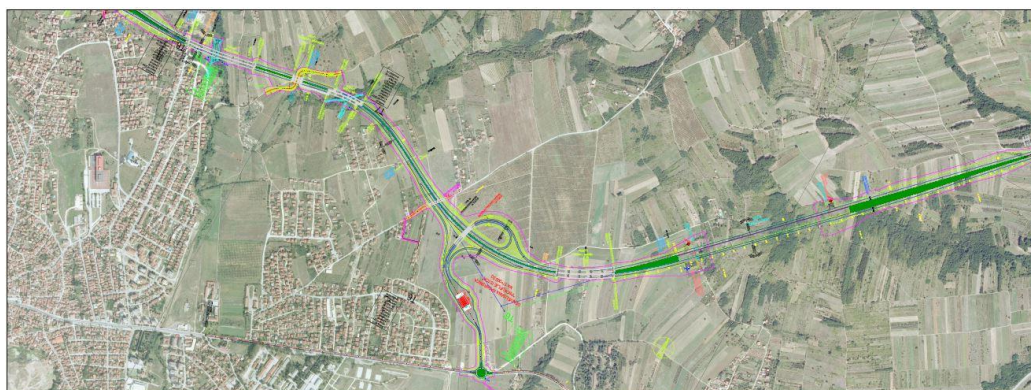


Figure 22 Highway route from km 18+560 to km 23+000

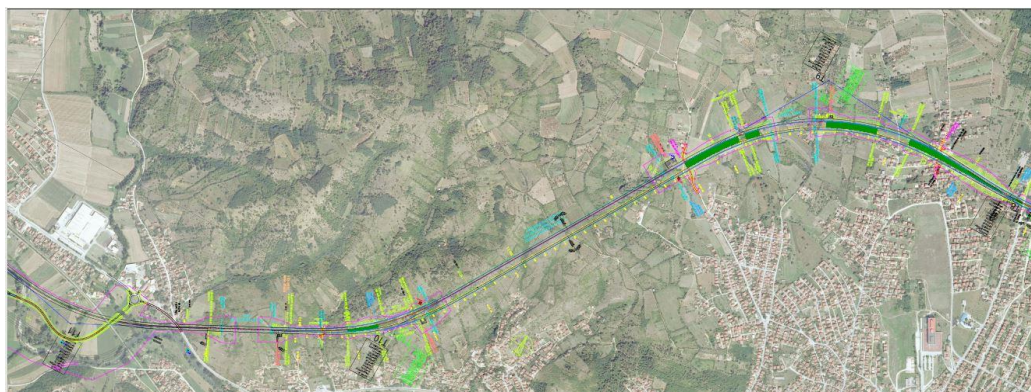




Figure 23 Highway route from km 23+000 to km 26+400



Figure 24 Highway route from km 26+400 to km 30+250

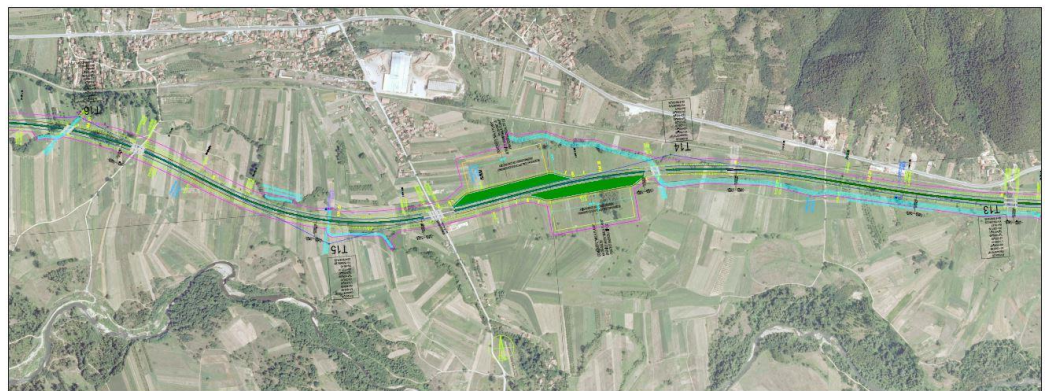


Figure 25 Highway route from km 30+250 to km 34+000

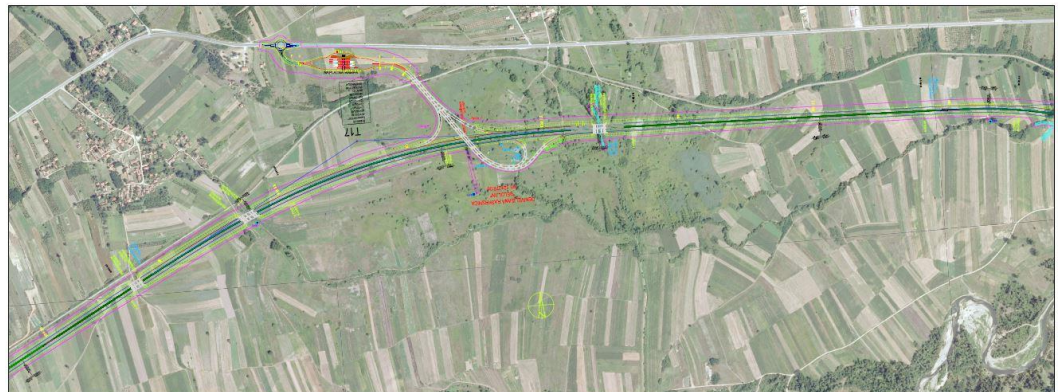




Figure 26 Highway route from km 34+000 to km 37+500

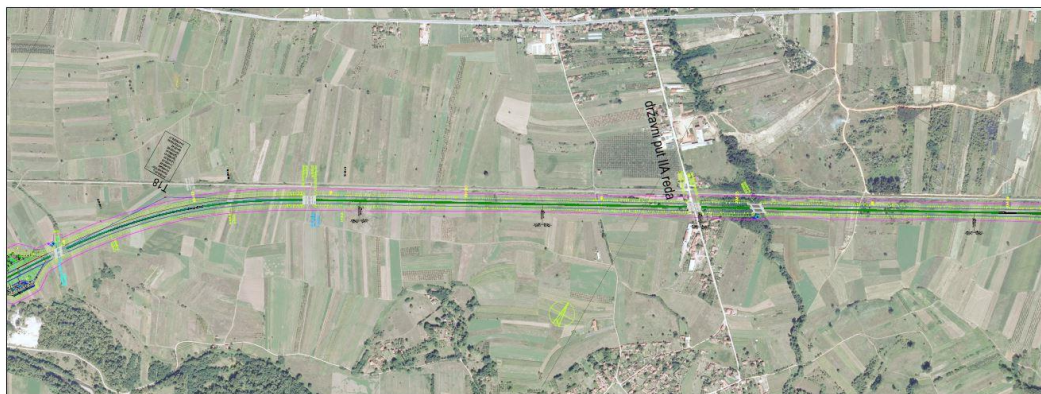


Figure 27 Highway route from km 37+000 to km 39+419 (end of the route)

