Financed under a specific grant agreement no 2018/402-850 from EU IPA II Multi-Beneficiary Programme for Albania, Bosnia and Herzegovina, North Macedonia, Kosovo*, Montenegro and Serbia

Western Balkans Investment Framework Infrastructure Project Facility Technical Assistance 8 (IPF 8)

TA2018148R0 IPA

Mediterranean Corridor, Bosnia and Herzegovina - Croatia CVc Road Interconnection, Subsection: Konjic (Ovcari) - Prenj Tunnel - Mostar North

Gap Analysis & ESIA Disclosure Pack

WB20-BiH-TRA-02 Component 1

Volume 1: Environmental and Social Impact Assessment Report

Chapters 1-5 Introductory Chapters

December 2025

COWI | IPF

Western Balkans Investment Framework (WBIF)

Infrastructure Project Facility Technical Assistance 8 (IPF 8)

Infrastructures: Energy, Environment, Social, Transport and Digital Economy

TA2018148 R0 IPA

Volume 1: Environmental and Social Impact Assessment Report

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The Infrastructure Project Facility (IPF) is a technical assistance instrument of the Western Balkans Investment Framework (WBIF) which is a joint initiative of the European Union, 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 infrastructure investments. This technical assistance operation is financed with EU funds.
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PROJECT NO.	DOCUMENT NO.
WB20-BiH-TRA-02	

VERSION	DATE OF ISSUE	DESCRIPTION	PREPARED	CHECKED	APPROVED
1	25/09/2021	ESIA Report	Team of experts	Irem Silajdžić Konstantin Siderovski	Richard Thadani
2	21/11/2022	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani
3	03/03/2023	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani
4	10/10/2023	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani
5	06/01/2025	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani
6	01/08/2025	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani
7	31/12/2025	ESIA Report – Chapters 1-5 Introductory Chapters	Team of experts	Irem Silajdžić	Richard Thadani

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List of abbreviations

Abbreviation	Meaning
AADT	Average Annual Daily Traffic
AoI	Area of influence
BiH	Bosnia and Herzegovina
BMP	Biodiversity Management Plan
CBA	Cost-Benefit Analysis
CEPF	Critical Ecosystem Partnership Fund
CESMP	Construction Environmental and Social Management Plan
CHA	Critical Habitat Assessment
CKS	Centre for Karst and Speleology
CSOP	Construction Site Organisation Plan
CWMP	Construction Waste Management Plan
DCWMP	Detailed Construction Waste Management Plan
E&S	Environmental and Social
EAAA	Ecologically Appropriate Area of Analysis
EBRD	European Bank for Reconstruction and Development
EBRD ESP	EBRD's Environmental and Social Policy
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EUNIS	European Nature Information System
FBiH	Federation of Bosnia and Herzegovina
FBiH CR	Federation of Bosnia and Herzegovina Critically Endangered Species
FBiH LC	Least-concerned Species
FBiH RL	Red List
FBiH VU	Vulnerable Species
FIDIC	International Federation of Consulting Engineers
FMOET	Federal Ministry of Environment and Tourism
FMoPP	Federal Ministry of Physical Planning
GHG	Greenhouse gas

Abbreviation	Meaning
GIIP	Good International Industry Practice
ILO	International Labour Organisation
IUCN	International Union for Conservation of Nature
JPAC	Motorways of the Federation of Bosnia and Herzegovina
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
LC	Local Community
MP	Measuring point
NGO	Non-governmental Organisation
NTS	Non-technical Summary
OHS	Occupational Health and Safety
PAP	Project Affected People
PAs	Protected Areas
PR	Performance Requirement
SBR	Sequencing Batch Reactor
SEA	Strategic Environmental Assessment
SEP	Stakeholder Engagement Plan
SFRJ	Socialist Federal Republic of Yugoslavia
SP	Sampling point
SPZ	Sanitary protection zones
TEN-T	Trans-European Transport Network
VEC	Valued Environmental and Social Components
WBIF	Western Balkans Investment Framework
WMP	Waste Management Plan
ZGI	Zagrebinspekt
NR	Northern Access Road
SR	Southern Access Road
Q&A	Questions and Answers

1 Introduction

1.1 Overview of the Entire Corridor Vc Project

PC Motorways of the Federation of Bosnia and Herzegovina (the Company or JPAC) is a public company from the Federation of Bosnia and Herzegovina (FBiH) in charge of management of motorway construction and management, maintenance, and protection of motorway operation in FBiH. One of the JPAC's key projects is the development of the motorway which is part of the Trans-European Corridor Vc connecting Budapest (Hungary) and Port of Ploce (Croatia). The total length of Corridor Vc in FBiH is approximately 335 km. Over 100 km of the motorway is already constructed and operational.

The Corridor alignment is divided into four LOTs, as shown in Figure 1-1 below. The subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North belongs to LOT 3 of the Corridor.

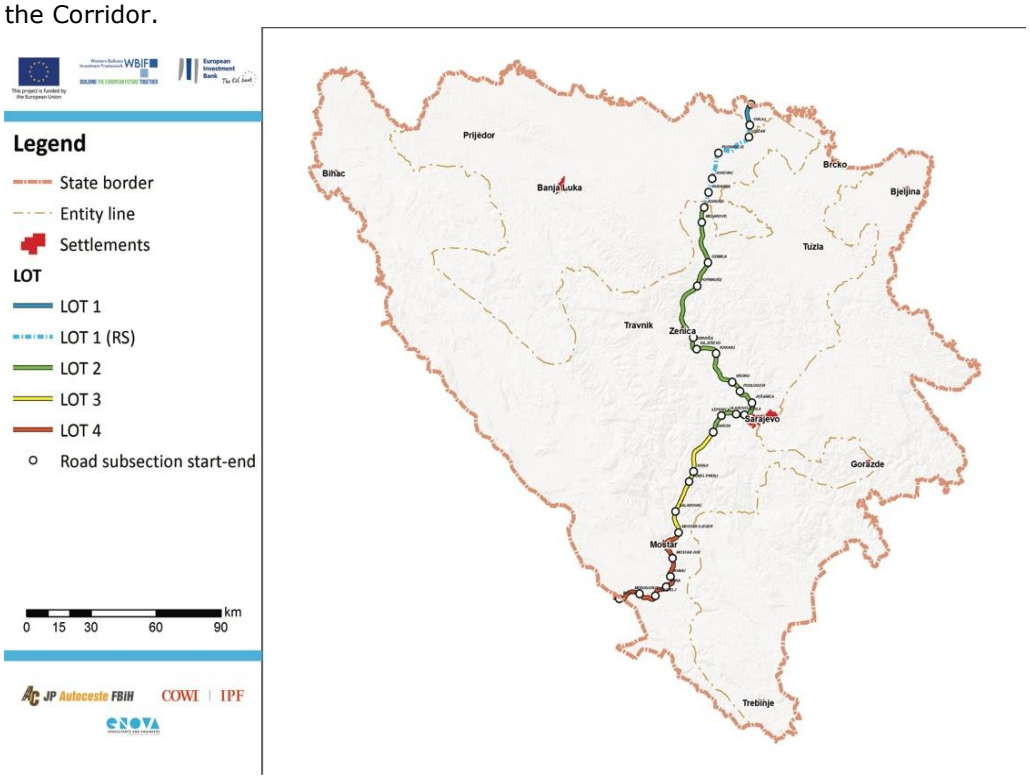


Figure 1-1: LOTs of Corridor Vc in Bosnia and Herzegovina

The status of all motorway subsections concerning the operational and financial aspects, and the list of all financiers to date is given in Table 1-1, including the subsections where European Bank for Reconstruction and Development (EBRD) financing has been provided or is under consideration.

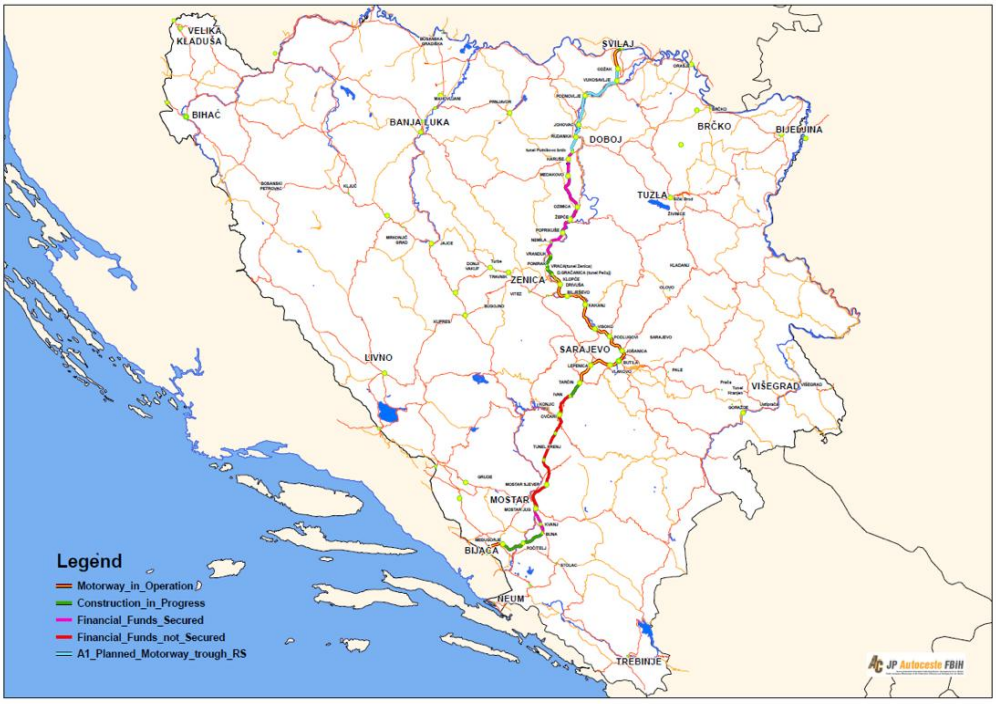


Figure 1-2: Status of the operation and availability of finances for subsections on Corridor Vc

Table 1-1: List of sections where EBRD financing has been provided or is under consideration

NO.	UNCONSTRUCTED SECTIONS OF CORRIDOR VC IN FBIH	LENGTH	IFI FINANCING PROVIDED OR UNDER CONSIDERATION	LINK TO THE DISCLOSED E&S DOCUMENTATION	STATUS
1.	TUNNEL PUTNIKOVO BRDO 2 - MEDAKOVO	8.5	EBRD financing and WBIF grant provided	Available at: https://www.jpautoceste.ba/okolisno-drustvena-dokumentacija/#1618736889612-d16abad2-f2b3	Under construction
2.	MEDAKOVO - OZIMICE	21.7	EIB financing and WBIF grant provided		Under construction
3.	OZIMICE - POPRIKUSE	12.8	EBRD financing and WBIF grant provided		Procurement in progress
4.	POPRIKUSE - NEMILA	5.5	EBRD, EIB financing and WBIF grant provided		Under construction
5.	NEMILA - VRANDUK	5.6	KFAED financing provided		Under construction
6.	VRANDUK - PONIRAK	4.8	OFID financing provided		Under construction
7.	PONIRAK – VRACA TUNNEL ZENICA	2.65	EIB financing and WBIF grant provided		Under construction
8.	TUNNEL ZENICA - (ZENICA NORTH) - DONJA GRACANICA	2.7	EIB financing and WBIF grant provided		Under construction
9.	TARCIN – ENTRANCE TO TUNNEL IVAN	5.1	EIB financing and WBIF grant provided		Completed

10.	TUNNEL IVAN	1.7	EBRD financing and WBIF grant provided		Completed
11.	IVAN - OVCARI	10.38	Financing considered by EIB		Preparation of project documentation
12.	OVCARI KONJIC - TUNNEL PRENJ	10.32	Financing considered by EBRD and EIB		Preparation of project documentation
13.	TUNNEL PRENJ	10.9	Financing considered by EBRD and EIB		Preparation of project documentation
14.	TUNNEL PRENJ - MOSTAR NORTH	12.34	Financing considered by EBRD and EIB		Preparation of project documentation
15.	MOSTAR NORTH - MOSTAR SOUTH	13.8	EBRD financing and WBIF grant provided		Procurement in progress
16.	MOSTAR SOUTH - TUNNEL KVANJ	9.2	EBRD financing and WBIF grant provided		Procurement in progress
17.	TUNNEL KVANJ - BUNA	5.2	EIB financing and WBIF grant provided		Procurement in progress
18.	BUNA - POCITELJ	7.18	EBRD financing provided		Completed but not operational
19.	POCITELJ – ZVIROVICI, LOT 1	10.10	EIB financing provided		Completed
20.	POCITELJ – ZVIROVICI, LOT 2	0.98	EIB financing provided		Completed
EBRD FINANCING PROVIDED					**53.06 km**
FINANCING CONSIDERED BY EBRD					**-**
EIB FINANCING PROVIDED					**48.42 km**
FINANCING CONSIDERED BY EIB					**10.38 km**
JOINT EIB AND EBRD FINANCING PROVIDED					**5.5 km**
FINANCING CONSIDERED BY EIB AND EBRD					**33.56 km**
FINANCING PROVIDED BY OTHER IFI					**10.04 km**

1.2 Objectives of this ESIA

The EBRD as the lead IFI and the European Investment Bank (EIB) as the co-financier are considering providing financing to JPAC to construct a new motorway subsection on Corridor Vc. The new motorway section Konjic (Ovcari) - Prenj Tunnel - Mostar North is 35.26 km long and consists of three subsections (Project). In accordance with lender requirements, an Environmental and Social Impact Assessment (ESIA) must be carried out for the project.

A previous EIA was prepared and publicly disclosed in 2007 as part of the entire Corridor Vc project, covering four LOTs, including the section in question under LOT 3. However, the Environmental Permit issued for LOT 3 has since expired. Therefore, JPAC prepared a new EIA in late 2016 in line with national legislation, based on the Preliminary Design also prepared in 2016. Public consultations were carried out, and the local EIA study was approved in 2018, but an Environmental Permit was not obtained due to a lawsuit filed by the Municipality

of Jablanica. The lawsuit requested a connection to the motorway that was not foreseen by the Preliminary Design. As a result, the Cantonal Court in Sarajevo has annulled the Conclusion of the Federal Ministry of Environment and Tourism regarding the approval of the EIA Study. The national EIA procedure must be repeated for this section.

The ESIA for the Project will address the requirements of the EBRD's Environmental and Social Policy (2019), EIB's Environmental and Social Standards and the national regulations. It will form part of an ESIA disclosure package that will be publicly available and subject to a public disclosure and consultation process. The objective is to ensure that the Project is environmentally and socially sustainable, in line with the requirements of the lenders. The ESIA approved by the Lenders will also be used in the repeated national EIA procedure.

1.3 Project Parties

The Project will be constructed and operated by JPAC, a limited liability company, established in accordance with the Law on Roads of FBiH. The Company is wholly owned by the Government of FBiH.

The following activities are performed by JPAC:

- Preparation of long-term, mid-term and annual plans and development programs regarding maintenance, protection, construction, and reconstruction of roads and road facilities, along with reports on their implementation,
- Performing motorway maintenance works,
- Management of investment projects including studies, design, construction, reconstruction, and maintenance of motorways and related facilities,
- Proposal of financial plans and enhancement of funding collection methods for motorway construction,
- Maintenance of databases for motorways, facilities, traffic signs, equipment, and motorway land cadastre,
- Execution of works on reconstruction, construction, reconstruction and maintenance of motorways,
- Preparation and monitoring of programs for traffic safety improvement on motorways,
- Provision of basis for granting concessions and expert technical supervision,
- Organisation of toll collection system,
- Data collection and public information dissemination regarding motorway conditions and traffic flow,
- Implementation of necessary measures for environmental preservation and protection,
- Organisation and provision of services to motorway users.

The Contractor for the construction of the Project had not been selected as of the date of drafting this ESIA.

1.4 ESIA Report Structure

The ESIA disclosure package includes seven volumes organised as follows:

- Volume 1: Environmental and Social Impact Assessment (ESIA) Report (including the Environmental & Social Management Plan (ESMP)) (*this volume*)
- Volume 2: Technical Annexes to the ESIA Report
- Volume 3: Environmental and Social Action Plan (ESAP)
- Volume 4: Biodiversity Management Plan (BMP)
- Volume 5: Non-technical Summary (NTS)
- Volume 6: Stakeholder Engagement Plan (SEP)
- Volume 7: Land Acquisition and Resettlement Framework (LARF).

Volume 1 - ESIA is structured as presented below in Table 1-2.

Table 1-2: ESIA Report structure

Section	Description of content
Chapter 1-5	Presents a brief overview of the entire corridor Vc project, description of key role players and purpose of the ESIA study and report. Presents the purpose and rationale of the Project, describes the history and timeframe and describes conducted public consultations. Provides detailed description of the Project, its main elements and activities for construction and operation, and summarises the alternatives considered to the proposed Project site and design, including the no project alternative. Defines key national policy, legislation, and international lender guidelines applicable to the Project, as well as key national institutions. Sets out the stages of the ESIA, key assumptions and methodologies for undertaking the ESIA.
Chapter 6 Biodiversity	Presents the assessment of the baseline conditions and potential impacts on biodiversity of the Project during the construction and operational phases. It also identifies proposed mitigation measures to minimise or control likely adverse effects arising from the Project on biodiversity.
Chapter 7 Geology and Groundwater	Reports the findings of the assessment of potential geology and hydrogeology impacts of the Project during the construction and operational phases. The assessment of impact significance took into consideration the results of vulnerability and hazards/risk assessment. This chapter also identified proposed mitigation measures to minimise or control likely adverse effects arising from the Project on hydrogeology.
Chapter 8 Surface Waters	Reports findings of the assessment of the impacts of the Project to the surface water environment and flood risk during both the construction and operational phases. The impacts are assessed analysing the risk of direct impact of construction and operation activities and discharge of pollution in the surface waters. Where appropriate, this chapter also identified proposed mitigation measures to

Section	Description of content
	minimise or control likely adverse effects arising from the Project.
Chapter 9 Climate	Presents findings of the assessment of the potential climate and climate change impacts during both the construction and operational phases. The methodology for impact assessment included calculation of GHG emissions for baseline and project scenarios, as well as climate vulnerability assessment, and, where required, mitigation measures are suggested.
Chapter 10 Air Quality	Describes the assessment of the baseline conditions and potential impacts on air quality of the Project during the construction and operational phases. For this phase of the Project, the types and sources of air pollution are identified, significance of potential effects are identified using computer simulations based on the Computational Fluid Dynamics (CFD) method, and the measures that will be employed to minimise the impact are described.
Chapter 11 Noise	Reports findings of the assessment of the potential noise impacts during both the construction and operational phases. The specific and optimum noise mitigation measures to comply with national, European, and international standards are identified in this chapter.
Chapter 12 Vibration	Presents the assessment of the potential impacts that may arise from the vibrations emitted during the construction phase of the motorway section to nearby dwellings and population. The impact from vibration during construction works are assessed considering the E&S baseline conditions analysed for the study area, and, where necessary, mitigation measures are suggested.
Chapter 13 Soil	Reports the findings of the assessment of the impacts of the Project to the soil during both the construction and operational phases. The impacts are assessed analysing the risk of direct impact of construction and operation activities and discharge of pollution in the soil along the motorway. Where appropriate, this chapter also identified proposed mitigation measures to minimise or control likely adverse effects arising from the Project.
Chapter 14 Landscape	Describes the findings of the assessment of the potential effects of the Project in relation to landscape character and visual amenity during both the construction and operational phases. For both phases, source and significance of potential effects are identified, and the measures that will be employed to minimise these described.
Chapter 15 Waste and Materials Management	Reports the findings of the assessment of the potential impact caused by inappropriate management of waste and materials during the construction and operational phases. The significance of potential effects is assessed and the measures that will be employed to minimise them proposed.
Chapter 16 Social Impact Assessment	Presents the findings of the assessment of potential social impacts of the Project during the pre-construction, construction, and operational phases. It identifies impacts on communities likely to be affected by the Project and the proposed mitigation measures to minimise or control likely adverse effects arising from the Project.

Section	Description of content
Chapter 17 Cumulative Impacts	Provides an assessment of cumulative impacts carried out in line with good practice guidelines and includes identification of valued E&S components (VECs), assessment of the predicted impacts to the viability or sustainability of the VECs, and design and implementation of mitigation measures to manage the cumulative impacts and risks.
Chapter 18 Residual Impacts	Presents residual impacts that will remain after implementation of all mitigation measures, as well as assess their significance.
Chapter 19 Environmental and Social Management Plan (ESMP)	Documents the Project's risk management strategy for those impacts that are assessed to be significant. It integrates the findings of all impact studies carried out until now, the plans and other provisions for complying with the requirements of the standards that were triggered as well as country- and site-specific information relevant for the Project's risk management strategy. It provides monitoring related information and key performance indicators for measuring the success.

1.5 Contact Details

Contact details for enquiries on this ESIA are listed in the table below.

Table 1-3: ESIA contact details

Project proponent	Information
Company name	Public Company Motorways of the Federation of Bosnia and Herzegovina Ltd. Mostar
Address	Adema Buca 20, 88000 Mostar, Bosnia and Herzegovina
Telephone	+387 36 512 300
e-mail	info@jpautoceste.ba
Website	www.jpautoceste.ba

2 About the Project

2.1 Overview of the Subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North

The subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North is part of the Pan-European corridor V linking the North Europe to the Adriatic Sea, and its route called "Corridor Vc" passes through BiH, ultimately making this country a part of the European international roads network. This motorway subsection is further divided and will be designed and constructed under three separate contracts as follows:

- Konjic (Ovcari) - Prenj Tunnel = 11,500 m,
- Prenj Tunnel, L=10,936 m + 1,150 m of the route before the tunnel + Southern Connection to the Main Road M17 L=3,535 m
- Prenj Tunnel - Mostar North, L=12,400 m.

The following figure shows the location of the entire subsection:

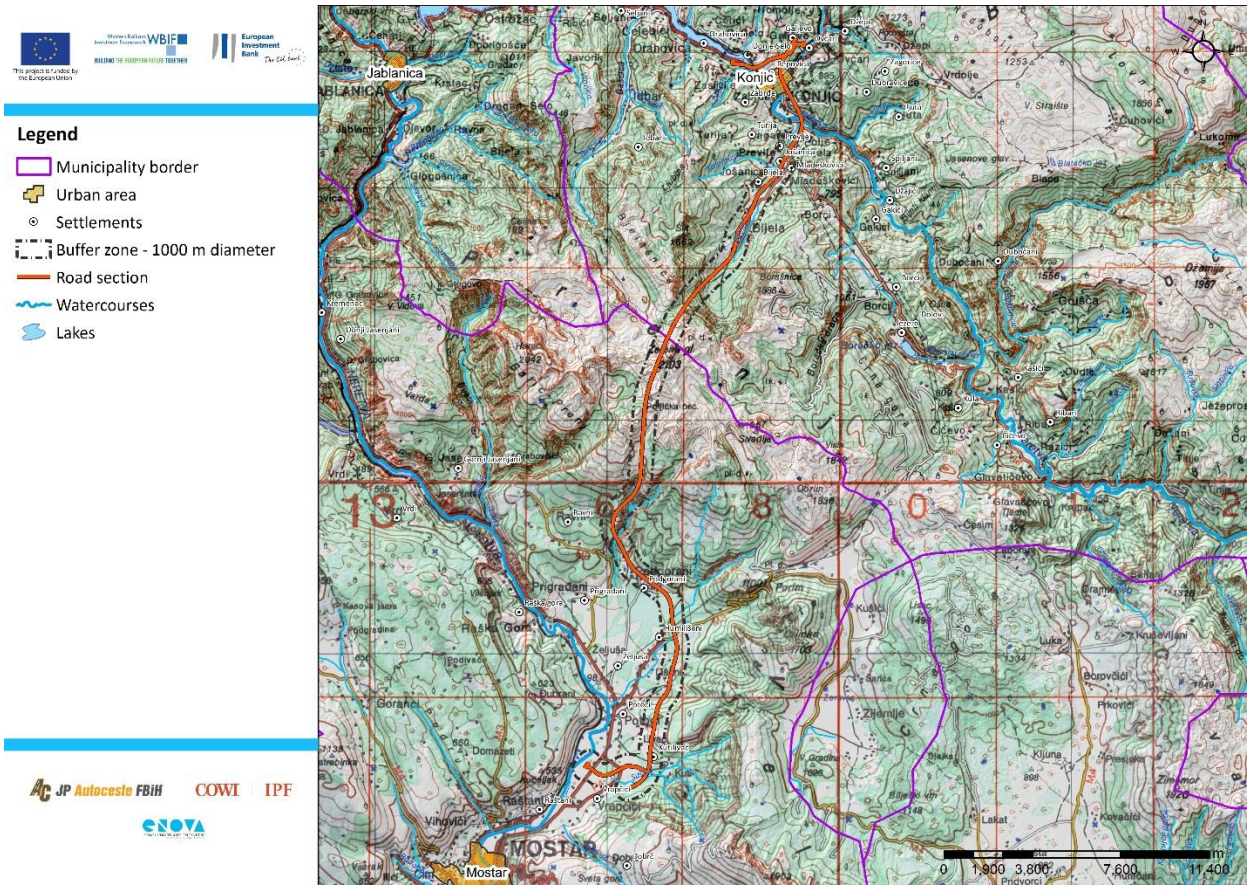


Figure 2-1: Location of the Konjic (Ovcari) - Prenj Tunnel - Mostar North subsection on the topographic map

A summary of key Project details is provided in Table 2-1.

Table 2-1: Details of the Project

Aspect	Details
Project name	Mediterranean Corridor Bosnia and Herzegovina - Croatia CVc Road Interconnection, Subsection: Konjic (Ovcari) - Prenj Tunnel - Mostar North
Country	Bosnia and Herzegovina
Location	City of Konjic and City of Mostar
Purpose	Construction of Trans-European Corridor Vc connecting Budapest (Hungary) and Port of Ploce (Croatia)
Project main and supporting components	Konjic (Ovcari) - Prenj Tunnel, L=11.50 km Prenj Tunnel, L=10.16 km + 1.20 km of the route before the tunnel Prenj Tunnel - Mostar North, L=12.40 km *Total length of the subsection from Konjic (Ovcari) to Mostar North, L=35.26 km* Northern Access Road to Prenj Tunnel, L=6.0 km Southern Access Road to Prenj Tunnel, L=6.62 km Southern Connection to the Main Road M17 (Konjic Bypass), L=2.50 km
Structures on the motorway	› Ovcari interchange with side toll station "Ovcari" › Viaduct No.1, L=463.50 m › Viaduct No.2, L=60 m › Viaduct No.3, L=480 m › Tunnel T1, L=682 m (left roadway), L=580 m (right roadway) › Tunnel T2, L=1,171.30 m (left roadway), L=1,160 m (right roadway) › Viaduct No.4, L=540 m (left roadway), L=605.20 m (right roadway) › Konjic South interchange with side toll station "Konjic" › Rest area Konjic › Viaduct No.5, L=590 m (left roadway), L=610 m (right roadway) › Tunnel Prenj - T3, L=10,160 m › Tunnel Klenova Draga - T3A, L=742 m (left roadway), L= 785 m (right roadway) › Viaduct No. 8, L=351 m › Tunnel Gradina - T4; L=642 m (left roadway), L= 639 m (right roadway) › Viaduct No. 9; L=332 m (left roadway), L= 338 m (right roadway) › Viaduct No 9A: L=148 m (right roadway only) › Viaduct No. 10; L=360 m (left roadway), L= 445 m (right roadway) › Rest area › Tunnel Orlov Kuk - T5; L=2,290 m (left roadway), L= 2,210 m (right roadway)
Technical characteristics of the motorway	› Calculated speed, Vr = 120 km/h (Vr = 100 km/h) › Minimum radius of horizontal curve on the open route, Rmin = 700 m › Minimum radius of horizontal curve in the tunnel, Rmin = 1,000 m

Aspect	Details
	› Longitudinal slope, Imax = 4% › Vertical convex curve radius, Rks = 12,000 (17,000) m › Vertical concave curve radius, Rkv = 6,000 (8,000) m › Traffic lanes, 2 x (2 x 3.75) m › Transverse strip edge profile along the dividing strip (green area included), 2 x 0.50 m › Edge strip along the stop lanes (stop lanes included), 2 x 0.25 m › Dividing lane, 4.00 m › Emergency lane = 2 x 2.50 m › Embankment, 1.50 m + gutter › Width of embankment (berm), 3.00 m, in deep cut min. 3.00 m › Motorway profile, 4.7 + 0.10 m › Local road profile, min 2.50 m › Relevant axle load, 115 kN
Investor	Public Company Motorways of the Federation of Bosnia and Herzegovina
Financier (under consideration)	European Bank for Reconstruction and Development (EBRD) as lead IFI and European Investment Bank (EIB) as co-financier
Available documentation[1]	› Route-Ovcari-Mostar north Preliminary design, Tunnel T1-T5, Divel d.o.o. Sarajevo, 2015 › Route-Ovcari-Mostar north Preliminary design, Geological investigations, Divel d.o.o. Sarajevo, 2015 › Route-Ovcari-Mostar north Preliminary design, Divel d.o.o. Sarajevo, 2016 › Tunnel Prenj T3, Preliminary design, Divel d.o.o. Sarajevo, 2016 › Route-Ovcari-Mostar north Preliminary design, Bridges, Divel d.o.o. Sarajevo, 2016 › Execution of Geotechnical Investigation Works for The Selected Route on the Section Konjic - Mostar North (Tunnel Prenj), Report on engineering geological, hydrogeological, and geotechnical works for tunnel, Winner Project d.o.o. Sarajevo, 2016 › Execution of Geotechnical Investigation Works for The Selected Route on the Section Konjic - Mostar North (Tunnel Prenj), Investigation works documentation, Winner Project d.o.o. Sarajevo, 2016 › Execution of Geotechnical Investigation Works for The Selected Route on the Section Konjic - Mostar North (Tunnel Prenj), Preliminary geotechnical design, Winner Project d.o.o. Sarajevo, 2016 › Execution of Geotechnical Investigation Works for The Selected Route on the Section Konjic - Mostar North (Tunnel Prenj), Seismic investigation, Winner Project d.o.o. Sarajevo, 2016

[1] The project documentation listed in the column on the right is owned by PC Motorways of the FBiH and can be obtained based on a written request. The studies on the protection of water sources Bosnjaci and Salakovac are owned by the Utility Company "Vodovod Mostar" and can also be obtained for inspection based on a written request.

Aspect	Details
	› Traffic Study & Feasibility Study, Civil Engineering Institute "IG" Banja Luka, 2016 › Environmental Impact Study, Zagrebinspekt "ZGI" d.o.o. Mostar and Civil Engineering institute "IG" Banja Luka, 2016 › Preliminary Water Consent Study, Agencija za vodno podrucje Jadranskog mora Mostar, 2018 › Additional engineering-geological works for tunnel Prenj, Winner Project d.o.o. Sarajevo, 2020 › Additional engineering-geological works on Konjicka Bijela and Idbar sites for needs of defining geotechnical conditions of Tunnel construction (Phase I), Winner Project d.o.o. Sarajevo, 2021 › Corridor Vc section Konjic-Mostar North, Tunnel Prenj, Project of detailed geological, geoengineering, geotechnical, geophysical and hydrogeological research, Winner Project, June 2021 › Technical description of the alignment, Ovcari Interchange-Prenj Tunnel, AIK Inzenjering Banovici, 2021 › Technical description of the alignment, Exit from Prenj Tunnel-Mostar North Interchange, IPSA Institut Sarajevo, 2021 › Comparative analysis of alignments from 5+240 to Tunnel Prenj, Infrastructure Project Facility, Technical Assistance 8 (IPF 8), March 2022 › Corridor Vc – Ovcari – Tunnel Prenj – Mostar North Development of Preliminary and Main Design for Preparatory Works, Design QC, Sarajevo, August 2022 › Comparative analysis of alignments from Tunnel Prenj Exit to Exit Tunnel T4, Infrastructure Project Facility, Technical Assistance 8 (IPF 8), September 2022 › Conceptual Design of the Southern Connection to the Main Road M17, AIK Inzenjering Banovici, 2022 › Results of geophysical, hydrogeological, and hydrological investigation in the framework of supplemental detailed geological, engineering-geological, geotechnical, geophysical, hydrological, and hydrogeological research and investigation on the section Konjic (Ovcari) – entrance to the Prenj Tunnel, Winner Project, 2022 › Preliminary Design of the alignment, Ovcari Interchange-Prenj Tunnel, AIK Inzenjering Banovici, 2023 › Preliminary Design of the alignment, Exit from Prenj Tunnel-Mostar North Interchange, IPSA Institut Sarajevo, 2023 › Study on Protection of the Bosnjaci spring, Zavod za vodoprivredu, December 2022 › Study on Protection of the Salakovac spring, Zavod za vodoprivredu, December 2022

2.2 Project History and Timeframe

Information of the key milestones in the Project development are given in Table 2-2 below. More information about the analysis of alternatives is given in Chapter 3.4 Analysis of Alternatives. It is important to note that the *Spatial Plan for the Area of Special Interest for FBiH "Motorway on Corridor Vc" 2008-2028* did not undergo a Strategic Environmental Assessment (SEA). This was due to the lack of secondary legislation that would have provided detailed regulations for the SEA process.

Table 2-2: Project milestones

Year	Activity	Description
2003	BiH Government Decision on public interest for the motorway on Corridor Vc	The BiH Ministry of Transport and Communications adopted the Decision on public interest for construction of the motorway on Corridor Vc through BiH, and started the procedure of development of spatial, planning and technical documentation for the motorway.
2006	Feasibility Study of Motorway on Corridor Vc	Seven alternative solutions of the road route for this subsection were considered: (0) no-project scenario, (1) improvement of the existing M17 road to motorway standards, (2) section after Jablanica follows the route along the Neretva River, (2A) the same as under (2) but with route from Jablanica going further away from Neretva river, (3) section after Jablanica very distant from the River Neretva (4) route which does not pass next to Jablanica and (5) connects to Mostar through a very long tunnel. Based on four criteria: (a) technical and operational criteria, (b) investment costs, (c) time and facilities construction, and (d) the spatial criterion, alternative (3) was selected. The 43.35 km long alternative (5) that included the construction of a 12 km long tunnel through Mountain Prenj was assessed as unfavourable at the time due to length of the tunnel and high construction and maintenance costs (Chapter 3.4, Figure 3-64).
2006	Environmental Impact Assessment Study - LOT 3: Sarajevo South (Tarcin) - Mostar North	An initial Environmental Impact Assessment (EIA) study was developed by C. Lotti & Asociati, SPT, TZI-Inzenjering and Energoinvest in 2006. Seven alternative solutions for the subsection route were explored in Multi-Criteria Analyses I, II and III. The route passing close to the community of Jablanica and looping around the Prenj mountain range (Alternative 3) was recommended (Chapter 3.4, Figure 3-64). More information on the process of public consultations is provided in section section 2.3 (Project Consultations).
2006	Project documentation verification process	The Ministry of Transport and Communications of BiH defined two new alternatives: (i) construction of a tunnel through the Mountain Prenj (ii) route in the valley of Idbar River. The Government of FBiH issued a Conclusion that JPAC should further explore the alternative route through the Mountain Prenj.
2011	Adoption of Spatial Plan for the Area of Special Interest for FBiH "Motorway on Corridor Vc" 2008-2028"	The Government of FBiH adopted the *Spatial plan for an area of special interest for FBiH "Motorway on corridor Vc" 2008-2028*. More information on the process of

Year	Activity	Description
		public consultations is provided in section section 2.3 (Project Consultations).
2014	Analysis of the Preliminary Design (PD) of Motorway on Corridor Vc: Subsection Konjic - Jablanica - Mostar North	In 2014 companies DIVEL, Sarajevo and IG, Banja Luka prepared the Analysis of the Preliminary Design (PD) of the Motorway on Corridor Vc: Subsection Konjic - Jablanica - Mostar North for the previous approved alternative (3) from Bradina (Zukici) to Mostar. The conclusion of the analysis was that this alternative is very expensive and difficult to construct, and therefore an alternative alignment with the 10 km long tunnel though the Mountain Prenj was suggested. This change would result in an 18 km shorter section and savings of 300 million euros. The recommendation to JPAC was to change the alignment and prepare a new PD for the alternative route involving the construction of a 10 km long tunnel through the Mountain Prenj.
2016	Revised Preliminary Design of Motorway on Corridor Vc, Section: Konjic - Mostar North	In March 2016 DIVEL, Sarajevo prepared the revised PD of Motorway on Corridor Vc, Section: Konjic - Mostar North for the alternative involving construction of 10 km long Tunnel Prenj. According to this PD the previously planned connection to the motorway for the Municipality of Jablanica in the settlement of Glogosnica (Jablanica), in the Prenj Mountain range, is not foreseen.
2016	Study on geological, hydrogeological, and geotechnical investigation works for the tunnel Prenj	WINNER PROJECT, Sarajevo prepared the Study on geological, hydrogeological, and geotechnical investigation works for the tunnel Prenj in February 2016. The study only proposes a program of investigative works.
2016	EIA Study for the revised alternative named "the alternative through the Mountain Prenj".	Zagrebinspekt, Mostar and IG, Banja Luka prepared new local EIA Study for the revised alternative named „the alternative through the Mountain Prenj". The EIA confirmed that the alternative 5 (the alternative that includes tunnel Prenj), has lower impacts on the environment. The public hearing for the EIA Study was held on 23rd of April 2018 in Municipality Hall in Konjic, and on 30th of April 2018 in Mostar City Hall. More information on the process of public consultations is provided in section 2.3 (Project Consultations). In December 2018, the Federal Ministry of Environment and Tourism (FMOET) issued the approval of the EIA study, but an Environmental Permit was not issued. The main reason was the lawsuit filed by the Municipality of Jablanica which requested the connection to the motorway which is not foreseen by the Preliminary Design. On June 25th, 2021, the cantonal court in Sarajevo issued a verdict annulling the Conclusion of the Federal Ministry of Environment and Tourism (FMOET) that had approved the EIA Study. The court has ruled that the EIA procedure must be carried out again.
2016	Preliminary Design for Prenj Tunnel	DIVEL, Sarajevo prepared a Preliminary Design for two variants of the Prenj Tunnel in February 2016. Variant I envisaged the construction of a two-lane tunnel with a minimum distance between axles of 25.0 m, and Variant

Year	Activity	Description
		II envisaged the construction of a tunnel with two-way traffic.
2016	The Expropriation Study for the Prenj Tunnel	The Expropriation Study for the Prenj Tunnel was prepared in December 2016 (and will need to be updated due to the lapse of time), and this subsection was declared to be of public interest in July 2022 by the Government of FBiH. Expropriation Studies have not been developed yet for any of the other three subsections.
2017	Adoption of the „the alternative through the Mountain Prenj".	In 2017 the FBiH Government, the House of Representatives, and the House of Peoples of the Parliament of FBiH, adopted the suggested alternative which is more economic and offers a solution for the motorway passage through the Prenj Mountain.
2017	Adoption of amendments to the Spatial Plan for the Area of Special Interest for FBiH "Motorway on corridor Vc" 2008-2028	*Spatial Plan for the Area of Special Interest for FBiH „Motorway on corridor Vc"* was adopted by the FBiH Parliament thus setting out the final alignment of the motorway in BiH (Chapter 3.4, Figure 3-64). Prior to the adoption of the Spatial Plan, based on the request by the Municipality of Jablanica, the House of People of the Parliament of FBiH adopted the conclusion that the Government of FBiH, responsible ministries and JPAC shall plan the optimisation, modernisation and improvement of traffic flow by ensuring the best alternative for the connection to Motorway on Corridor Vc with interchange in municipality of Jablanica for the municipalities on the routes (i) Jablanica-Prozor Rama-Gornji Vakuf-Uskoplje-Bugojno-Donji Vakuf-Jajce, (ii) Tomislavgrad-Posusje-Jablanica, as well as (iii) from the Konjic direction in parallel with the construction of tunnel Prenj.
2020	Additional geological, geotechnical, geophysical, hydrological, and hydrogeological investigation works relevant for the construction of the Prenj Tunnel	WINNER PROJECT, Sarajevo carried out additional investigation works and developed in June 2020 the Study on results of geophysical, hydrogeological, and hydrological investigation in the framework of supplemental detailed geological, engineering-geological, geotechnical, geophysical, hydrological, and hydrogeological research and investigation on the section Konjic (Ovcari) - entrance to the Prenj Tunnel.
2021	Verdict of the Cantonal Court in Sarajevo in the lawsuit by the Municipality of Jablanica against the Federal Ministry of Ecology and Tourism	The Environmental Permit could not be obtained due to a lawsuit filed by the Municipality of Jablanica in 2019. In 2021, the Cantonal Court in Sarajevo annulled the conclusion of the Federal Ministry of Environment and Tourism and required a new EIA procedure to be carried out.
2021	Technical description of subsections Konjic (Ovcari)-Prenj Tunnel and Prenj Tunnel-Mostar North	In 2021 Technical descriptions of two subsections: Ovcari Interchange to Tunnel Prenj and Tunnel Prenj to Mostar North Interchange, were prepared by AIK and IPSA Institute respectively. Prepared Technical descriptions proposed some changes in technical elements of the routes from 2016 Preliminary Design.
2022	Preliminary EIA (Step 1 of the national EIA procedure)	In January 2022, JPAC conducted a preliminary environmental impact assessment for the subsection from Konjic (Ovcari) to Tunnel Prenj to Mostar North. The purpose of the preliminary EIA was to define the

Year	Activity	Description
		scope and content of an Environmental Impact Assessment Study. In February 2022, the FMOET published the preliminary EIA conducted by Enova doo Sarajevo on its website, making it available to the public. Based on the consultations carried out, FMOET issued a Decision on the need for, content, and scope of the EIA Study on April 12, 2022.
2022	Comparative analysis of alignments from 5+240 to Tunnel Prenj	As part of Infrastructure Project Facility, Technical Assistance 8 (IPF 8), during the March 2022 AIK Inzenjering, Banovici prepared comparative analysis of alignments from 5+240 to Tunnel Prenj. Initial results showed that the 2016 PD alignment passes through several zones of landslides, unstable soils in cut that present major geotechnical and hydrological risks that would need to be mitigated with major stability works and subsequent maintenance. As a result, this document compared an alternative alignment that has been developed to the Concept stage that would not only reduce the geotechnical risks but would also improve the impact on hydrology, reduce the requirement for waste areas, and also improve the motorway geometry on the approach to the Prenj tunnel itself.
2022	Preliminary Design of the alignment, Ovcari Interchange-Prenj Tunnel	Based on the results of Comparative analysis of alignment, the second variant is chosen. AIK Inzenjering Banovici developed the Preliminary Design of the route alignment for the subsection from Ovcari to the entrance of Prenj Tunnel. The other components of the design are still under development.
2022	Conceptual Design of South connection to main road M17	AIK Inzenjering, Banovici, together with development of PD from Ovcari to Prenj Tunnel, prepared the Conceptual Design for the alignment of south connection to main road M17 (i.e., Konjic Bypass).
2022	FBiH Government Decision on public interest for the motorway on Corridor Vc subsections Konjic (Ovcari)-Prenj Tunnel and Prenj Tunnel-Mostar North	In June 2022, the Government of FBiH made two decisions designating the construction of two subsections of Corridor Vc as being of public interest: one for the subsection Konjic (Ovcari)-Prenj Tunnel and the second for the subsection Prenj Tunnel-Mostar North.
2022	FBiH Government Decision on public interest for the preparatory works related to the construction of the motorway on Corridor Vc, subsection Tunnel Prenj	In November 2022, the Government of FBiH made a decision designating the construction of Tunnel Prenj as being of public interest. This decision is made to allow for the start of the preparatory works including expropriation process.
2022	Preliminary and Main Design for access roads to Prenj Tunnel	Design QC Sarajevo prepared in August 2022 the Preliminary and Main Design for the construction of access roads to Prenj Tunnel.
2022	Comparative analysis of alignments from Tunnel Prenj Exit to Tunnel T4	As part of Infrastructure Project Facility, Technical Assistance 8 (IPF 8), during the September 2022 IPSA Institute Sarajevo prepared comparative analysis of alignments from Tunnel Prenj exit to Tunnel T4. Comparative analyses consider Variant 1 through Klenova Draga valley, which is an adaptation of the alignment of the 2016 PD. Variant 2 diverts the Concept alignment within Prenj Tunnel over the final 3 km (through more favourable geological conditions) and

Year	Activity	Description
		bypasses Klenova Draga entirely with an additional tunnel 300 m to the south of the Prenj tunnel exit.
2022	Preliminary Design of the alignment, Exit from Prenj Tunnel-Mostar North	Based on the results of comparative analysis of alignment, the second variant was chosen. IPSA Institute Sarajevo developed the Preliminary Design of the route alignment for the subsection from Tunnel Prenj to Mostar North. The other components of the design are still under development.
2022	Preliminary Design of the Tunnel Prenj	In November 2022, JPAC selected a contractor for development of the new Preliminary Design with elements of Main Design for the Prenj Tunnel.
2024	Decision on the approval of the Environmental Impact Assessment	On January 22, 2024, FBiH Ministry of Environment and Tourism issued Approval of the Environmental Impact Assessment Study for the new motorway section between Konjic (Ovcari) and Mostar North, after the completion of all legal procedures, including public consultations. Following the provisions of the relevant legislation, JPAC may continue to urban and construction permitting. There are no further requirements on the environmental and social (E&S) issues. It is noted that the consent expires if the construction permit is not obtained within a period of 3 years.

2.3 Project Consultations

Consultations with stakeholders were performed during different phases of Project preparation. The table below contains a summary of implemented consultation activities of relevance for this Project.

Table 2-3: Summary of previous consultation and stakeholder engagement activities

Document/Study/Stage	Summary of activities and issues of concern
Public consultations in line with environmental permitting requirements	Initial public consultations related to the Preliminary EIA and EIA Study In **2005** and **2006**, public consultations for the Preliminary EIA were organised by FMOET in cooperation with the state-level Ministry of Transport and Communications. According to the official Minutes of the Meetings, these were held: › in June 2005 in the Municipality of Hadzici in Canton of Sarajevo (attended by 33 people); Municipality of Jablanica (attended by 25 people); Municipality of Konjic (attended by 54 people); and in the Municipality of Mostar (no information on the number of attendees), › in September 2006 in the Municipality of Jablanica (attended by 63 people) and in the Municipality of Konjic (attended by 30 people), and in October 2006 in the Municipality of Mostar (attended by 51 people). A number of local community representatives and NGOs attended these consultations. Key issues and concerns

Document/Study/Stage	Summary of activities and issues of concern
	discussed included: the need to take into account protection of water sources and water protection zones, noise impacts, disposal of excavated materials, issues related to the route and the possibility of negative impacts on the future National Park (Prenj, Cvrsnica and Cabulja), especially because of the exceptional geomorphology and mountain Prenj as an endemic centre. *It should be noted that the design of the section Konjic (Ovcari)-Mostar North discussed at the time is different from the final adopted route through the Bijela River valley and "Tunnel Prenj" which was later chosen on 12 February 2016 by the Government of FBiH and approved by the Parliament of FBiH. Therefore, a new set of consultations was held in 2018 as described below.* <u>New public consultations related to the EIA for motorway section Konjic (Ovcari)-Mostar North</u> JPAC initiated the environmental permitting procedure for the section Konjic (Ovcari Interchange)-Mostar North by preparing the EIA Study in **2016** for this motorway section, including Tunnel Prenj. The EIA study was publicly disclosed for 30 days, and two public consultations were organised by Federal Ministry of Environment and Tourism (FMOET). The first was held in Konjic on 23 April 2018, and the second was held in Mostar on 30 April 2018. The first was attended by 49 people, and the second by 15 people. Following the public meetings, additional time was given for submission of public comments. A number of local community representatives and NGOs participated in these consultations. The key issues and concerns raised included the need to conduct monitoring of the environmental baseline, to protect agricultural land during construction, to take into account the water sources and protected species of the Prenj massif, to define measures for traffic management, etc. After the public consultation process, the EIA study was amended in 2018 to take into consideration the received comments, after which FMOET approved the EIA study in December 2018. Although the EIA Study was approved, the Environmental Permit was not obtained. The main reason was the lawsuit filed by the Municipality of Jablanica which requested the connection to the motorway which is not foreseen by the Preliminary Design. The cantonal court in Sarajevo passed a verdict on 25 June **2021** that the Conclusion of the Federal Ministry of Environment and Tourism (FMOET) on approving the EIA Study is annulled and the EIA

Document/Study/Stage	Summary of activities and issues of concern
	procedure must be carried out again. The new EIA Study is currently under preparation.
Public consultations in line with spatial planning requirements	Spatial Plan of FBiH 2008-2028 According to the report on consultations undertaken during the development of Spatial Plan of FBiH 2008-2028, public consultation meetings were organised in all ten cantons in FBiH, including a meeting in Mostar for the Herzegovina-Neretva Canton in March **2012**. Issues raised related to the Corridor Vc were not relevant for this motorway section. Spatial Plan for Area of Special Interest to FBiH – Motorway on Corridor Vc Two public hearings for the Spatial Plan were organised in **2011**: › a public hearing in Mostar in November 2011 by the Federal Ministry of Spatial Planning, and › a public hearing in Sarajevo in November 2011 by the BiH Parliament (Committee for Transport and Communication). No official Minutes of Meetings are available. The Plan was amended and adopted by the FBiH Parliament in December **2017**. No official Minutes of Meetings from any consultations during the adoption process are available. The long period between the public hearings (in 2011) and the adoption of the Plan (2017) is due to environmental concerns raised by municipal/city authorities in the meantime, such as the issue of protecting the planned future National Park Prenj-Cvrsnica-Cabulja, the inclusion of the Konjic interchange-connection, and other changes to the local EIA study – *please see the item above for information on EIA study approval.* Spatial Plan of Herzegovina-Neretva Canton (HNC) In June 2018, the Government of HNC adopted the Proposal of the Spatial Plan for HNC. This Proposal of the Spatial Plan for HNC was available to the public through a series of public hearings held in Stolac, Mostar and Jablanica in April and May 2017. The Spatial Plan was finally adopted by the HNC Assembly in 2021. During these public hearings and the public review process, no particular comments of relevance to the Project were received. Only the representatives of the Municipality of Jablanica raised the issue of a lack of a connection to Jablanica.

Document/Study/Stage	Summary of activities and issues of concern
	It should be noted that the Parliament of FBiH issued in 2017 a decision which states that a connection for Jablanica to the motorway must be provided, along with modernising a portion of the existing M17 road which would run north from Jablanica to the connection to the motorway.
Request from the City of Konjic	The City of Konjic sent in 2005 a request to JPAC to consider an additional interchange – connection to Konjic in the design phase, on the site from the Neretva River to the site Vrabac, which would provide a bypass around the city, connection to industrial zone, good access to the mountain Prenj, Boracko Lake, the upper course of the Neretva River with all settlements, the planned National Park, as well as a better connection with the RS entity. JPAC accepted this request and asked IFICO to consider this additional interchange in the design phase. Consequently, the Konjic South Interchange was added in the current design in 2022.
Consultations with households during the development of this ESIA	<u>Socio-economic surveys by the Consultant in 2021 and 2022</u> Socio-economic surveys were conducted among 132 households living in the wider study area to solicit their opinions about Project impacts and compensation arrangements, as well as to obtain specific data on current livelihoods and living conditions of households, including the identification of vulnerable categories. Almost all (97.7%) of the surveyed households stated that they have been informed about the Project, mostly through media (TV and online media) and informally through other local residents. While two thirds (65.1%) indicated that they are satisfied with the level of information received so far, 22.7% indicated that they are partially satisfied, whereas 10.6% expressed the need for better information about the Project through organised meetings with JPAC, local communities, and municipalities, as well as public hearings and media news. To address these needs and ensure adequate stakeholder engagement, comprehensive disclosure and engagement methods have been designed and are included in the Stakeholder Engagement Plan. 83.3% of the surveyed households indicated that they have a positive opinion about the Project.
Consultations with Local Community Offices during the	In June 2021 and August 2022, consultation meetings were organised with the representatives of five Local Community Offices (LCOs): Centar, Dzepi, Bijela, Bijelo

Document/Study/Stage	Summary of activities and issues of concern
development of this ESIA	Polje and Tresanica (including its branch office "Donje Selo"). Key topics discussed during these meetings were related to the water sources used by the inhabitants, use of land plots and roads, livelihoods of the local population, familiarity with the Project and concerns regarding perceived Project risks and impacts. Representatives of LCOs Centar, Dzepi and Tresanica stated that they were not informed about the Project by JPAC, municipality or any other institution and that all information they have were obtained through publicly available means. The main concerns regarding the perceived Project risks and impacts reported by the representatives of LCOs were related to the water source Bosnjaci located at a distance of approx. 1 km of the motorway section alignment. The concerns are related to the possible impacts of the construction of Tunnel Orlov Kuk on this water source which is used by many settlements. Additional concerns were related to the collision of the motorway section and existing local roads and the possibility to have new connection roads at locations where the existing local road will be cut by the motorway, in order to have access to other land plots and touristic places in the surrounding area. LCO representatives also expressed concerns regarding construction work impacts (such as traffic restrictions). These concerns were addressed throughout this ESIA and accompanying ESMP, which are part of the Project disclosure package.
Consultations with NGOs during the development of this ESIA	Throughout 2021 and 2022, consultation meetings were organised with the representatives of 15 NGOs: Aarhus Centre, Bankwatch, Neretva Zeleni, NGO Dinarica, NGO Farmer, Fruit Growers Association Konjic, NGO Travel Konjic, Hunting Association Konjic, Sports Fisherman Organisation Konjic, Hunting Organisation Koznik, Mountain Bike Organisation Konjic, NGO Boj, Tourism Association Mostar North, Organisation of Fighters and Defenders of Konjic, and Association of Serb Returnees Neretva - Konjic. All NGOs stated that they were previously informed about the Project, but 50% of them are partially satisfied with the level of information received. The NGOs expressed their readiness to further support the implementation of the Project but emphasised that the local residents must be timely informed about the exact route and planned activities.

Document/Study/Stage	Summary of activities and issues of concern
	The NGOs generally believe that the Project will have a positive impact on the local communities as it will increase the sales of local products, improve the infrastructure, and increase the number of tourists in the area but stated some concerns regarding impacts on, for example, the orchards used by fruit growers near the motorway section and beehives located in the Bijela settlement or possible negative effects on the Tresanica River and wildlife migrations. These concerns were addressed in this ESIA and accompanying ESMP, which are part of the Project disclosure package.
Consultations and field visit to water sources on Konjic side from Ovcari to entrance to Prenj tunnel	At the beginning of 2023, a field visit and consultations were organised with representatives of the Konjic Water Utility Company "Vodovod Konjic", the City of Konjic, JPAC, designers, and local residents who use water from an unnamed spring. Representatives of the "Vodovod Konjic" stated that they have jurisdiction over the water source Crna Vrela and the reservoir of Gornja Bijela, as well as the source of Bijela. In addition, they stated a request for regulation of the flow of the Bijela River in order to preserve the mentioned sources. Representatives of the company led the designers and JPAC to the Cemer reservoir, on the slopes of Zlatar, in order to show the location of concrete-asbestos pipes, with a flow rate of 150 L/s, and which would not be able to withstand the connection capacity if this water had to be used for the construction of a tunnel through Zlatar. The designer suggested that the water for the construction of the tunnel be provided by cisterns and not from this reservoir. In addition to these three springs that are in the water supply system, a tour of two more springs that are located near the route - the nameless spring and the spring at the shooting range of the company Igman. The nameless spring, which is not in the water supply system and is not managed by "Vodovod Konjic", consists of four springs that were captured by the local population, which have no alternative source of water supply. Representatives of the local community explained that this water supplies 35 to 40 houses that are located lower than this source, all the way to the location of the Crna Vrela. These are the settlements of Kula, Pajici and Duge, and the houses that are supplied are located 2 or more kilometres from the location of the source. The source is located below the route that lies on the embankment, at the chainage around km 8+780. The Designer suggested that, in the Main Design phase, a support wall should be

Document/Study/Stage	Summary of activities and issues of concern
	built at the location where the route passes above this source, which was subsequently included in the Preliminary Design. In this way, the impact on the springs would be avoided. Representatives of "Vodovod Konjic" said that it would not be possible for these houses to be connected to another source, for example Gornja Bijela, because in that case the water would have to be pumped to the location of these houses. The spring at the shooting range is captured for the purpose of using water in the building located at the entrance to the shooting range. Water is also used for drinking. During the field visit, it was concluded that this source is not on the route and is not under the influence.
Public Hearings organised for local EIA procedure	The Public Hearings were organised on 10 May 2023 in the Mostar City Hall and on 11 May 2023 in the Konjic City Hall by the FMOET in the framework of Environmental Impact Assessment procedure defined by the Law on Environmental Protection. The Consultant prepared PowerPoint presentation and presented the E(S)IA Study. The number of participants at the hearing in Mostar was 39, and in Konjic 41. Most frequently discussed topics by stakeholders are: <u>Social-related topics:</u> › Tailoring public engagement strategies, which were previously addressed in the SEP, but the document was not available in the national procedure. › Preserving and safeguarding culturally significant sites. › The necessity to address concerns raised by the local community, including issues related to noise, dust, and socio-economic impacts, safety risks associated with hazardous materials, traffic management, and adherence to regulatory requirements. <u>Biodiversity-related topics:</u> › The comments received strongly indicate that the Ministry did not provide the complete documentation to stakeholders, including the Biodiversity Management Plan, Critical Habitat Assessment, and Appropriate Assessment, despite these documents having been submitted. In response, the Consultant has requested that the Ministry send Book 2 Technical Annexes along with the Q&A Matrix. <u>Water and hydrogeology-related topics:</u> › Incorporating the measures outlined in the Preliminary Water Consent (PWC) and the Studies on Water Protection Zones for Bosnjaci and Salakovac. Particular attention was given to explaining whether mining activities are permitted within the III water protection zone, noting that PWC was not accessible to committee members. › The official adoption of the Studies on Water Protection Zones for all the springs affected by the Project, coupled with the formal adoption of the Decision on Protection.

Document/Study/Stage	Summary of activities and issues of concern
	› Addressing questions related to the specifics of the investigation works that have been conducted. It should be noted that many of these queries had already been addressed in the Study.
Consultations regarding the ESIA Disclosure Package	The Open House Days were organised after the ESIA disclosure in June 2024, and attracted 65 participants across Konjic, Jablanica, and Mostar, focusing on key issues like land acquisition, resettlement, environmental concerns, and infrastructure impacts. Discussions in Konjic emphasised importance of expropriation transparency, additional assessments regarding environmental impacts, and importance of existing access road protections. Stakeholders from Jablanica focused on regional connectivity and alternative routes, while Mostar addressed environmental protection, tunnel safety, and landowner concerns. Feedback included detailed assurances about environmental studies, road restoration, and project communication. After these meetings, Ekodvogled and Bankwatch raised additional ESIA-related concerns through follow-up letters.
Additional consultations after Open House Days	In early December 2024, meetings were held to address environmental concerns raised during the Open House Days with: › The Hunting Association "Koznik" Konjic – emphasised the motorway's impact on wildlife migration and hunting activities. › The Forest Management Company "Sumarstvo Prenj" discussed several important topics. These included the need for biodiversity preservation, the identification of critical forest road intersections, and the plan for reforestation of fire-damaged areas with seedlings provided by the Company. The meeting also addressed illegal logging, which affects 30-40% of resources, and the presence of wildlife such as lynx and otters, particularly near Prenj Mountain and in Konjic. › The Biospeleological Organisation "Biospeld" focused on speleological research, including the identification of speleological objects in the Prenj area, eDNA analysis for Proteus anguinus (olm), and sampling guidelines. It was suggested that research should involve collaboration with experts for mapping, sampling, and diving. Special attention was given to the need for permits and the timing of fieldwork to optimise results, with additional studies to explore springs for olm presence.

3 Detailed Project Description

3.1 Project Location

Main Motorway Alignment

The subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North (Vrapcici) starts on the north in the Ovcari settlement.

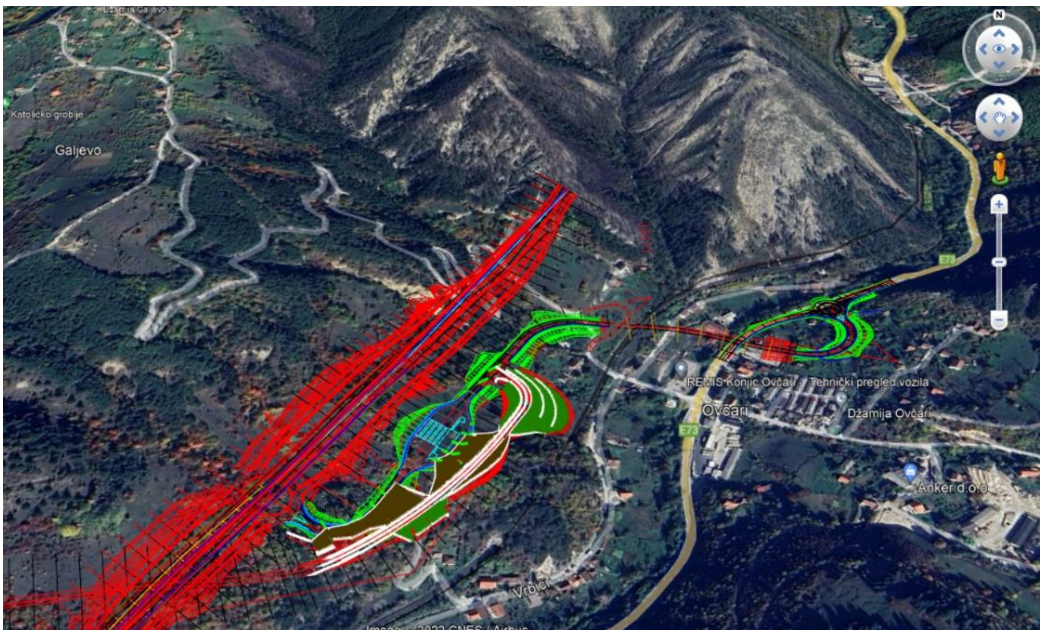


Figure 3-1: Interchange Ovcari (source: Google Earth)

At the northern entrance to the City of Konjic, after the interchange, the motorway crosses the Sipad industrial zone. Further ahead, the subsection passes through slopes where steep cuts are envisaged up to km 1+300.00, and where Viaduct 3 over river Tresanica was designed to cross to the opposite side of the M17 into the Zlatar mountain.

Immediately after the end of Viaduct 3, the route enters the slope which passes through two tunnels – Tunnel T1 and Tunnel T2.

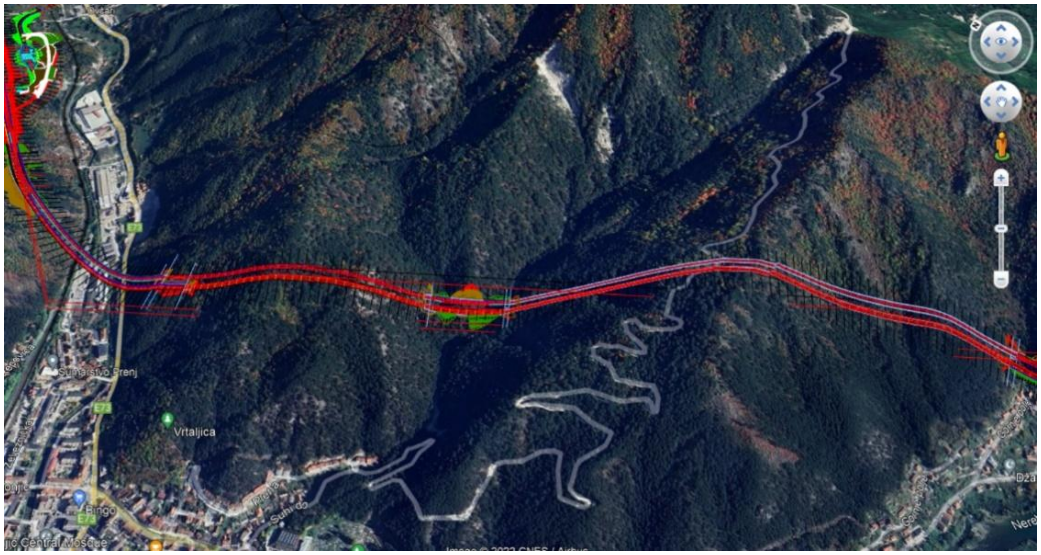


Figure 3-2: Viaduct 3 over Tresanica, Tunnel 1 and Tunnel 2 (source: Google Earth)

After exiting Tunnel T2, the route crosses over the Neretva River and the local road with Viaduct 4 to the Bijela settlement. Crossing to the opposite side, the motorway continues along the slopes at the rear of the Bijela settlement up to the Mladeskovici settlement, where the Konjic South Interchange is positioned. The interchange is designed to connect the settlements on the south with the motorway and the existing regional road R435a Konjic-Borci which leads to Boracko Lake.

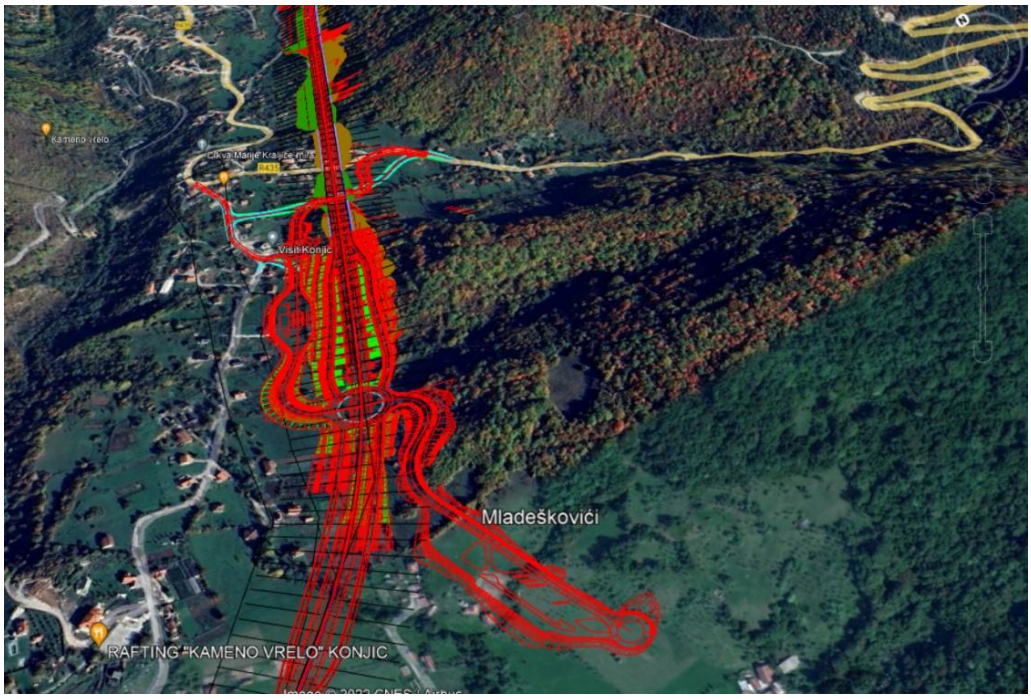


Figure 3-3: Interchange Konjic South (source: Google Earth)

Further on, the motorway route is laid at the foot of the slope above the settlements of Bijela and Gornja Bijela all the way to the end of the section. The route further runs along the slopes parallel to the Rakov Laz shooting range of the company Igman d.d. and continues through the uninhabited green landscape

to the slopes of Prenj Mountain, where the tunnel under Prenj (Tunnel T3) begins and ends on the territory of the City of Mostar.

After exiting the tunnel through the Prenj mountain, the motorway route traverses mountain curves towards the south and the City of Mostar, through a system of cuts and bridges through uninhabited mountain areas. At the exit from the Prenj mountain range, the road crosses the valley on a 300 m long embankment and enters the Klenova Draga Tunnel (Tunnel T3A) on the western cliffs of the gorge. This tunnel practically bypasses the high cliff slopes of the homonymous valley.

Figure 3-4: Location of the motorway in the Klenova Draga gorge (source: Google Earth)

After the Klenova Draga Tunnel, the next viaduct begins and turns into the Tunnel T4, which terminates some 300 m away from the last houses of the Podgorani settlement. The viaduct over Badnjena Draga near Seliste, which stretches parallel to the settlement, also begins here.

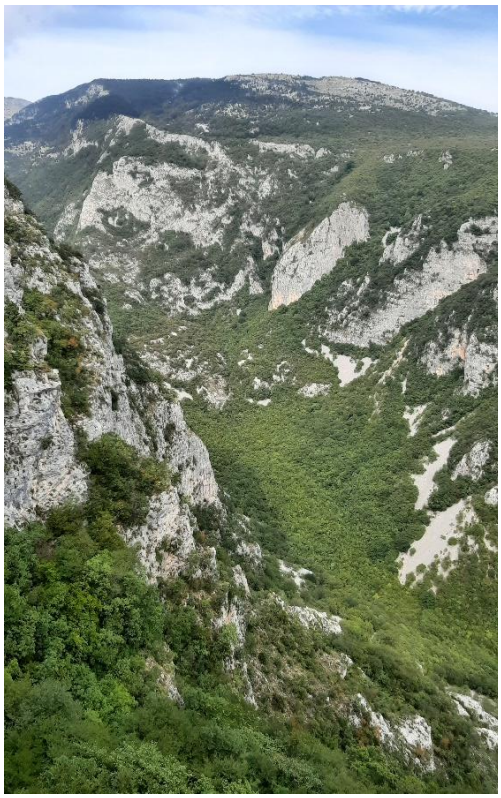


Figure 3-5: Klenova Draga gorge

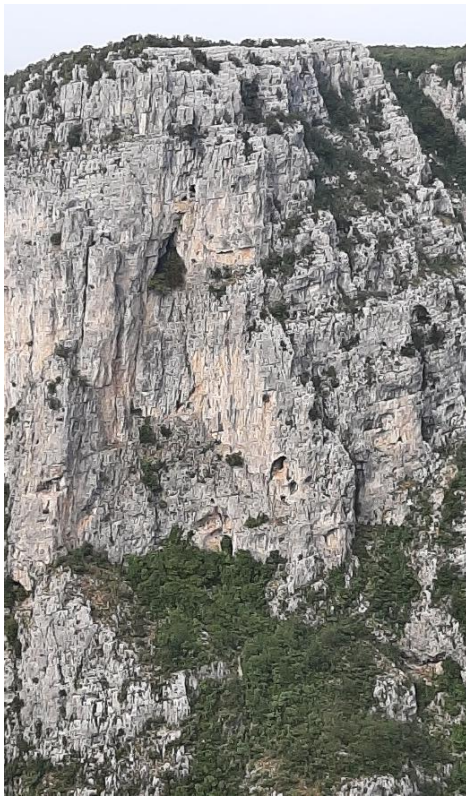


Figure 3-6: Steep cliffs of the Klenova Draga gorge

The route continues northeast of the settlement and extends along the edges of the hill north of Podgorani, where the bridge over Seocka Draga begins and leads the route to Dolac, north of Humilisani. Further, the route continues in a slight semicircle around the settlement of Humilisani along the slopes of Porim, approx. 800 m away from the inhabited area. Below Humilisani, the route runs south and under Sljemen, it enters the 2,200-m-long Tunnel T5, and exits into the Kuti area, the point where the Mostar (north) exit ramp is designed. The interchange is positioned approx. 1 km east of the Mostar municipal solid waste landfill Uborak-Budjevci in an uninhabited area.

South Connection to Main Road M17

The beginning of the South connection to main road M17 (the "Konjic Bypass") is in the Ovcari settlement on the right side of the main road M17 heading south from Sarajevo to Konjic, 550 m before the Ovcari Interchange. The road passes through the settlements of Vrbici, Galjevo, Repovica and Donje Selo. The viaduct starts in the Donje Selo settlement, crosses the Neretva River and ends in Drecelj. In the Drecelj settlement, the roundabout connects the settlement with the road M17 and the planned motorway.

The figure below shows the location of the Konjic Bypass.

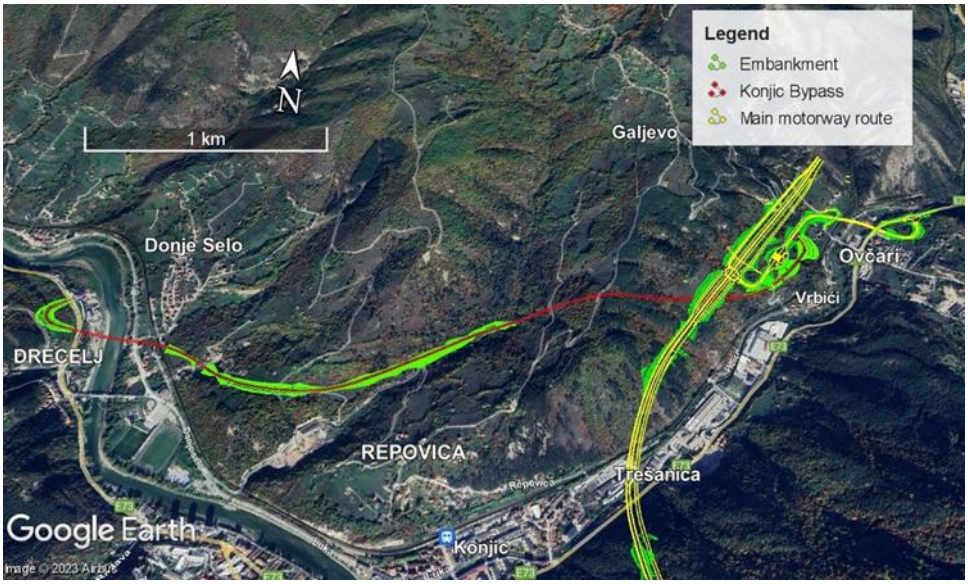


Figure 3-7: Konjic Bypass passing through the settlements of Ovcari, Vrbici, Repovica, Donje Selo and Drecelj

Access Roads to the Prenj Tunnel

The Prenj Tunnel's northern access road runs through the Bijela settlement and is divided into two sections, NR1 and NR2. NR1 starts at the intersection of the R435 regional road that connects Konjic to Odzaci. This section passes through populated area of Bijela and Gornja Bijela before transitioning into section NR2. Section NR2 begins just before the Igman Konjic company's shooting range and runs through an uninhabited forest road until it reaches the planned operational plateau.

Figure 3-8: Overview of sections NR1 and NR2 of access road to the Prenj Tunnel on the northern side

The southern access road to the Prenj Tunnel is divided into six sections (SR1, SR2, SR3, SR4, SR5 and SR6) according to the position and technical solutions.

Figure 3-9: Overview of sections SR1, SR2, SR3, SR4, SR5 and SR6 of access road to Prenj Tunnel on the southern side

Section SR1 represents an access construction road that connects to the existing main road M17 and HP Investing industrial area. The beginning of SR1 is at the interchange directly in front of the gate of HP Investing. The beginning of section SR2 is also the end of section SR1 and passes through a settlement Prigradjani. Section SR3 consists of two parts: the first one represents a relocated stretch of the existing road, while the second one passes through a populated settlement Podgorani. Section SR3 ends immediately before the beginning of the section SR4. SR4 represents a newly designed access construction road which is partly located on the existing roadway. The end of the section SR4 also represents the beginning of section SR5. SR5 is located in an uninhabited area between SR4 and SR6, which is characterised by an operational plateau. Section SR6 passes through an uninhabited area and there was no road at this location before.

3.2 Project Components

3.2.1 Technical Elements

Main Motorway Alignment

All technical elements of the motorway are defined according to the *Rulebook on the basic requirements that public roads, their elements, and structures must meet from the aspect of traffic safety*[2].

The most important technical elements of the route are:

- Road category: Motorway
- Terrain category: Hilly-mountain
- Calculated speed: Vr=120 km/h (Vr=100 km/h)
- Minimum horizontal curve radius on the open route: Rm=700 m
- Minimum horizontal curve radius in the tunnel Rmin=1,000 m
- Maximum longitudinal slope, imax=6%
- Minimum vertical curve radius; Convex, Rks=12,000 (17,000), Concave Rkv=8,000 m

Cross-section profile

- Traffic lanes 2 x (2x3.75) m
- Edge line along median strip 2 x 0,50 m (included in the green lane)

[2] Official Gazette of BiH, No.13/07

- Edge line along emergency lane (included in the emergency lane) 2 x 0.25 m
- Median strip 3.00 m
- Emergency lanes 2 x 2.50 m
- Shoulder (stabilised part) 1.50 m
- Gutters, ditches depending on hydraulic calculation
- Banquettes 3.00 m
- Free profile
- On the motorway 4.7 + 0.10 m
- On the local road min 3.5 m

Inclinations of cutting slopes and embankments were determined based on the results of geotechnical investigation works. Based on the relevant parameters, traffic load, climatic, topographic, and geotechnical characteristics of the soil and materials in the bed, available resources (natural and artificial materials), as well as the appropriate performance technology, a design of the pavement structure dimensioning was made.

The pavement structure has been harmonised with the neighbouring sections and subsections, and the following has been adopted for the main route:

Traffic lanes of the motorway
- SMA 11s, PmB 45/80 + Er. D=4 cm x 0,42=1.68 cm
- AGNS 22s, PmB 45/80 + limestone aggregate d=7 cm x 0,35=2,45 cm
- AGNS 32s, B 35/50 + limestone aggregate d=9 cm x0.35=2.45 cm
- Cement stabilisation d=20 cm x 0.20=4.00 cm
- unbound crushed stone material 0/45 mm (d=25 cm X 0.1=2.75)

Emergency lane
- BB 11 k, B 50/70 + Kr. D=4 cm
- AGNS 22s, B 50/70 + Kr. d=7 cm
- unbound crushed stone material roadbed bearing capacity 0/45 mm (d=52 cm (0.11=2.75))
- CBR beds 10%

Interchanges
- BB 11s, PmB 45/80 + Er. d=4 cm x 0,42=1,68 cm
- AGNS 32s, B 35/50 + limestone aggregate d=10 cm x0.35=3.50 cm
- unbound crushed stone material roadbed bearing capacity 0/45 mm d=35 cm x 0.11=3.85

Regional roads
- BB 11 k B 50/70 + limestone aggregate d=4 cm
- AGNS 22s, B 35/50 + limestone aggregate d=7cm 0.2 + 6
- unbound crushed stone material roadbed bearing capacity 0/45 mm d=30 cm

Local roads
- BB 11 k B 50/70 + limestone aggregate d=4 cm

- unbound crushed stone material roadbed bearing capacity 0/45 mm d=30 cm

South Connection to Main Road M17

- maximum speed of 70 km/h

Cross-section profile
- Traffic lane width b=3.25 m
- Shoulder width b=1.50 m
- Width of gutter b=0.75 m
- Edge strip width b=0.30 m

Transverse profile
- Traffic lane width b=3.25 m
- Edge strip width b=0.30 m
- Rigol width 0.75 m
- Concrete channel width 1.0 m
- Berm width 2.82 m
- Transverse buffer drop 4.0%
- Transverse fall of berms and banks 6.0%.
- Embankment slopes 1:1.5

Access Roads to the Prenj Tunnel

Northern access road NR1

The most important technical elements of the route are:
- Traffic lane width b=3 m
- Shoulder width b=0.75 m
- Width of gutter b=0.50 m
- Width of footpaths b=0.50 m
- Maximum applied horizontal radius Rm=500 m
- Minimum applied radius Rmin=20 m

Longitudinal Sections
- Slope i=0.40%
- Maximum longitudinal slope imax=14.5% in the length of approx. 72 m
- Minimum longitudinal slope imin=0.35% in the length of approx. 107 m

Cross sections
- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Cross section slope ic=2.5%

Road construction
- BC 11 s wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

Road construction for local connections

- AHNS 16 load-bearing layer d=8 cm
- Roadbase layer d=35-40 cm
- Embarkment

Road construction for footpaths

- BC 11 k wear layer d=5 cm

Northern access road NR2

The most important technical elements of the route are:

- Traffic lane width b=3 m + extension
- Shoulder width b=0.75 m
- Maximum applied horizontal radius Rm=300 m
- Minimum applied radius Rmin=60 m
- Slopes in the notch for the main road 1:1.5
- Slopes in the notch for machines 1:1

Longitudinal Sections

- Slope at the start of the access road is=2.70%
- Maximum slope imax=12%
- Longitudinal slope on the plateau ip=4.0%

Cross sections

- Cross section slope ic=2.5%
- Maximum cross section slope cmax=4.0%

Road construction

- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

Southern access road SR1

The most important technical elements of the route are:

- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m
- Maximum applied horizontal radius Rm=100 m
- Minimum applied radius Rmin=35 m

Longitudinal Sections

- Slope at the start of the access road is=5%
- Maximum slope imax=5.3%
- Longitudinal slope on the plateau ip=4.0%

Cross sections

- Slopes of the scarps 1:1.5
- Cross section slope ic=2.5%
- Maximum cross section slope cmax=3.5%

Road construction

- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

Southern access road SR2

The most important technical elements of the route are:

- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m
- Berm width b=1 m
- Maximum applied horizontal radius Rm=1.300 m
- Minimum applied radius Rmin=30 m

Longitudinal Sections

- Slope i=5.3%
- Maximum longitudinal slope imax=8.0%
- Minimum longitudinal slope imin=1.0%
- Maximum applied radius of vertical curves is Rm=8,000 m
- Minimum applied radius of vertical curves is Rmin=500 m

Cross sections

- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Transverse slope it=2.5%
- Maximum cross section slope icmax=3.5%

Road construction

- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

Southern access road SR3

The most important technical elements of the route are:

- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m under normal conditions; b=1 m on the part of the relocation of the existing road; b=1.5 m on the part of the relocation of the existing road with a high embankment
- Maximum applied horizontal radius Rm=467 m
- Minimum applied radius Rmin=15 m

Longitudinal Sections

- Slope at the start of the access road is=4.8%
- Maximum longitudinal slope imax=12% in the length of approx. 75 m
- Minimum longitudinal slope imin=1%
- Maximum applied radius of vertical curves is Rm=10,000 m
- Minimum applied radius of vertical curves is Rmin=300 m

Cross sections

- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Cross section slope ic=2.5%
- Maximum cross section slope icmax=4.1%

Road construction

- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

<u>Southern access road SR4</u>

The most important technical elements of the route are:

- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m
- Berm width b=1 m
- Maximum applied horizontal radius Rm=496.47 m
- Minimum applied radius Rmin=17 m

Longitudinal Sections

- Maximum longitudinal slope imax=12.5%
- Minimum longitudinal slope imin=5%

Cross sections

- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Cross section slope ic=2.5%
- Maximum cross section slope icmax=5.0%

Road construction

- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

<u>Southern access road SR5</u>

The most important technical elements of the route are:

- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m under normal conditions; b=1 m under designed reinforced soil
- Maximum applied horizontal radius Rm=650 m
- Minimum applied radius Rmin=73 m

Longitudinal Sections
- Maximum longitudinal slope imax=14%
- Minimum longitudinal slope imin=2%

Cross sections
- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Cross section slope ic=2.5%
- Maximum cross section slope icmax=4%

Road construction
- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm
- Final layer of embarkment

<u>Southern access road SR6</u>

The most important technical elements of the route are:
- Technical group: D (Vdoz=50 km/h)
- Traffic lane widths: 2x3.0 m
- Shoulder width b=0.75 m
- Berm width b=1 m
- Maximum applied horizontal radius Rm=695 m
- Minimum applied radius Rmin=110 m

Longitudinal Sections
- Maximum longitudinal slope imax=11% in the length of approx. 531 m
- Minimum longitudinal slope imin=4%
- Maximum applied radius of vertical curves is Rm=8,000 m
- Minimum applied radius of vertical curves is Rmin=800 m

Cross sections
- Slopes in the embankment 1:1.5
- Slopes in the notch 1:1
- Cross section slope ic=2.5%
- Maximum cross section slope icmax=4%

Road construction
- BC 11 k wear layer d=4 cm
- AGNS asphalted wear bearing layer d=8 cm
- Roadbase layer d=40 cm

> Final layer of embarkment

3.2.2 Structures on the Subsection Ovcari Interchange - Prenj Tunnel

According to the technical description from 2022, the subsection Ovcari Interchange-Prenj Tunnel has 5 viaducts, 2 tunnels, two interchanges and two toll stations. The list of all structure in order of their appearance along the route is as follows:

> Viaduct No. 1, L=463.50 m (both roadways)
> Ovcari interchange with side toll station "Ovcari"
> Viaduct No. 2, L=60 m (both roadways)
> Viaduct No. 3, L=480 m (both roadways)
> Tunnel T1, L=682 m (left roadway), L=580 m (right roadway)
> Tunnel T2, L=1,171.30 m (left roadway), L=1,160 m (right roadway)
> Viaduct No. 4, L=540 m (left roadway), L=605,20 m (right roadway)
> Konjic South interchange with side toll station "Konjic"
> Viaduct No. 5, L=560 m (left roadway), L = 610 m (right roadway)
> Rest area Konjic

The route begins in Ovcari, where it fits into the previous section of the motorway Ivan - Ovcari. The first structure on this subsection is **Viaduct No. 1** at the chainage km 0+010.50 on both roadways. The initial chainage of the route is km 0+000.00. The Ovcari interchange is planned at the chainage km 0+670.

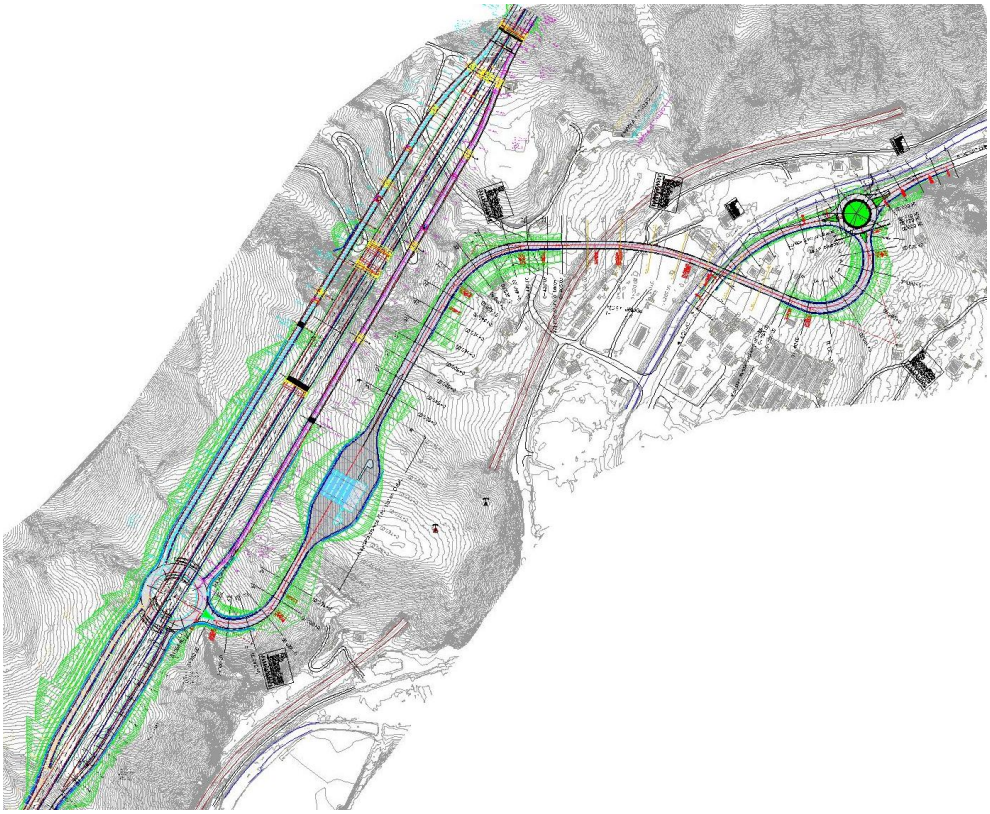


Figure 3-10: Beginning of the subsection Ovcari - Prenj Tunnel with Ovcari interchange

The Ovcari interchange, including the toll collection facility, is designed to connect the motorway route with the main road M17, specifically the City of Konjic and the motorway on Corridor Vc. The Ovcari interchange, which will provide access to the motorway for the City of Konjic, is located at the Ovcari-Borovci site.

The intersection is located under the motorway's structure at the chainage from km 0+670.00 to km 0+740.00. The intersection has an inner radius of R=25 m, with two 2 x 4.5 m wide traffic lanes inside the intersection. At the inner side of the rotor, the driving area with the total width of 1.84 m is planned. The access road is fitting into the intersection at approx. km 0+038.00 and approx. 90-degree angle. From the point of intersection with the main road, the access road turns with a radius R=45 m for Vr=40 km/h and in a straight line crosses the existing main road and railway line with a structure that is approx. 200 m long.

The Ovcari interchange includes a motorway and 4 ramps (arms) which are divided as follows:

- The ramp 1 is an entrance arm to the motorway from the direction of Konjic towards Sarajevo. The overall length of the ramp 1 is L= 688.13 m.
- Ramp 2 from the direction Sarajevo-Konjic fits into the motorway route at km 0+000.00 with total length of L=698.65 m.
- The ramp 3 is a descending ramp from the direction of Mostar towards Konjic, with total length of L=248.50 m.
- The ramp 4 is an entrance ramp at the motorway in the direction to Mostar. The overall length of the ramp 4 is L=259.89 m.

The Ovcari interchange is in the shape of a rhombus with a roundabout, and all connections are grade-separated with the entrance and exit lanes of maximum length. As part of the Ovcari interchange, the toll collection facility "Ovcari" is designed.

The side toll station "Ovcari" is located at the access road which connects the existing main road and motorway. The toll station has the total length of L=180 m. Five passing lanes (3+2) from which one is a reversible lane, are planned through the toll station. Also from the left side, a road for oversize passage is planned. The traffic lanes width is b=3.50 m, while the lane for oversized vehicles is b=6.0 m wide. At the toll station, 10 parking places are planned, from which 2 are for persons with disabilities. The length of an island through the toll station is 30 m, and 2.5 m wide. The longitudinal slope before the toll station is i=6.5%, in the pay toll zone it is 2.5%, and behind the pay toll it is 3.3% at the length of approx. 100 m. Almost the entire length of the toll station is located inside the cutting where the maximum height is in the level line of approx. 7.0 m.

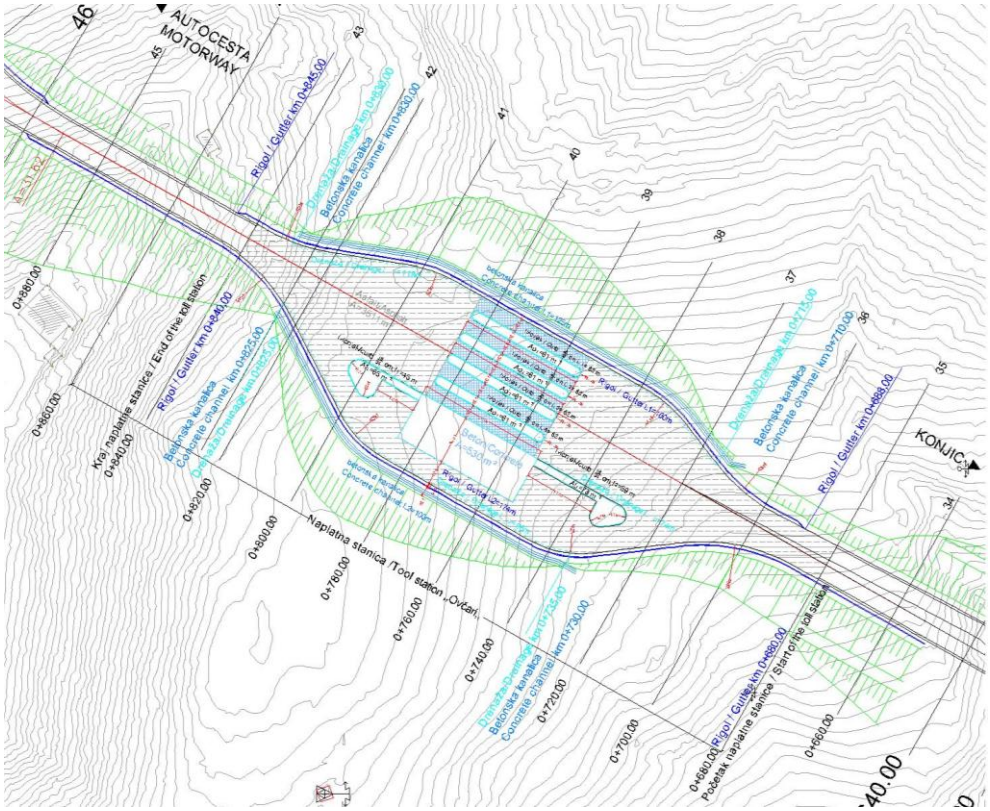


Figure 3-11: Design of the "Ovcari" toll station

The planned circular intersection is located approx. 300 m in front of the existing road connection, and it is positioned towards the slope so it can enter in the existing riverbed as minimal as possible. The circular intersection is projected as a single-lane intersection with an internal radius R=15 m and lane width of 5.50 m. The width of the inner part of the circular intersection is 2.00 m. The main road which is leading from Mostar towards Sarajevo will be reconstructed in the length of approx. 184.50 m. The arm of the road leading from Sarajevo towards Konjic will be reconstructed in the length of approx. 91.50 m. The access road goes over the existing main road, riverbed, and railway. After crossing the railway, it turns with the radius of R=100 m with L=25 m transitions and then it continues in the direction of the side toll station. At the end, the access road connects to the Ovcari Intersection. The access road crosses the local road for which a deviation is made, and it returns to the existing road under the bridge. The overall length of the access road is 988.85 m with the designed speed of 40 km/h.

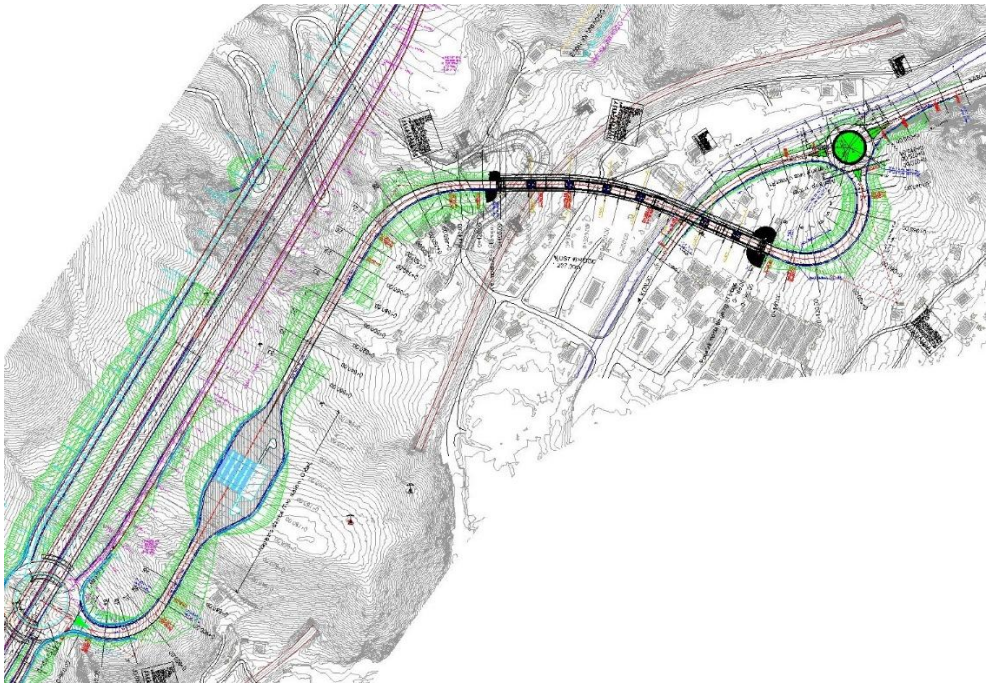


Figure 3-12: Situation of the designed access road

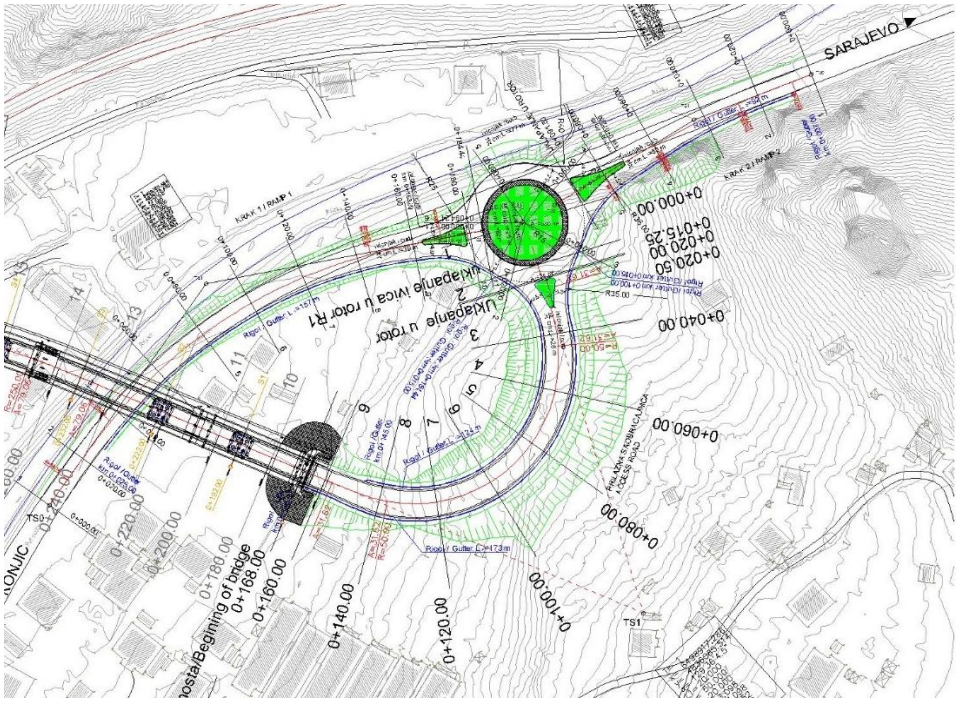


Figure 3-13: Situation of the designed circular intersection on the access road

At the km 1+025.007 the second **Viaduct No. 2** begins with the total length of approx. 60 m. Further away, the route continues and crosses the existing railway, riverbed, and main road M17. In this part, from km 1+300.825, it is planned to build **Viaduct No. 3** of 480 m length at maximum height of 84 m (Figure 3-14). The model of Viaduct 3 is given in Figure 3-14.

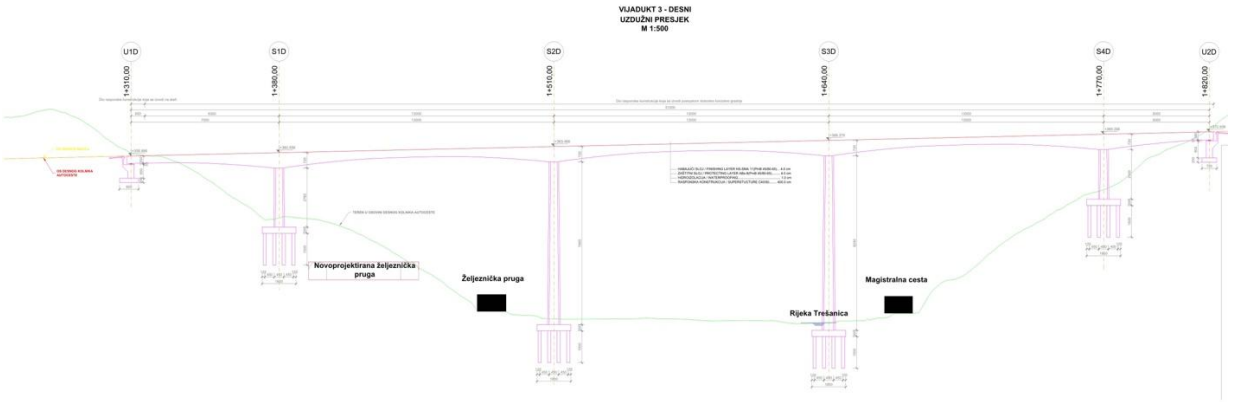


Figure 3-14: Model of Viaduct 3 over the Tresanica river

In order to avoid construction of pillars inside the Tresanica riverbed, the river training in length of 140 m will be done. The training structure will be made of stone lining laid on a 10 cm thick gravel filter layer under which a 200 g/m^2 geotextile layer will be placed. The banks above the slope will be grassed over a layer of humus and fertile soil. The stone lining ends with a transition section. The typical cross-section (Figure 3-15) is trapezoidal provided to clean the riverbed and protect eroded banks and concave curves. The structure will be able to drain high waters of 1/100 years occurrence.

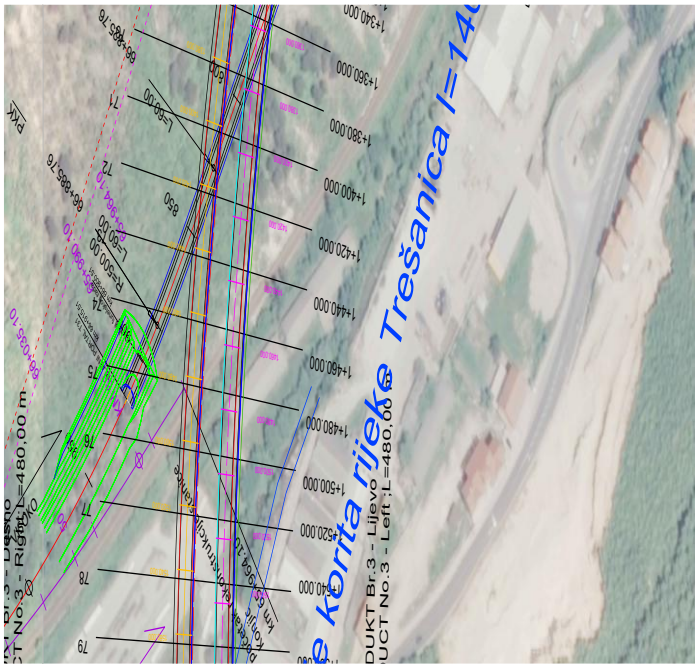


Figure 3-15: Training of the Tresanica River (L=140 m)

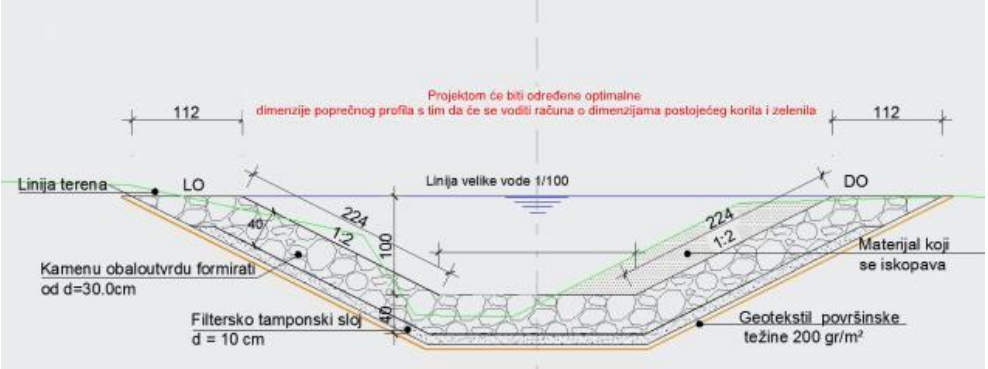


Figure 3-16: Typical cross section of training structure

Right after the Viaduct No. 3 the route enters **Tunnel T1**, L=682 m (left roadway) and L=580 m (right roadway) and **Tunnel T2** L=1,171.30 m (left roadway) and L=1.160 m (right roadway).

After exiting Tunnel T2, the route crosses the Neretva riverbed where a **Viaduct No. 4** of L=540 (left roadway) and L=605,20 m (right roadway) is planned.

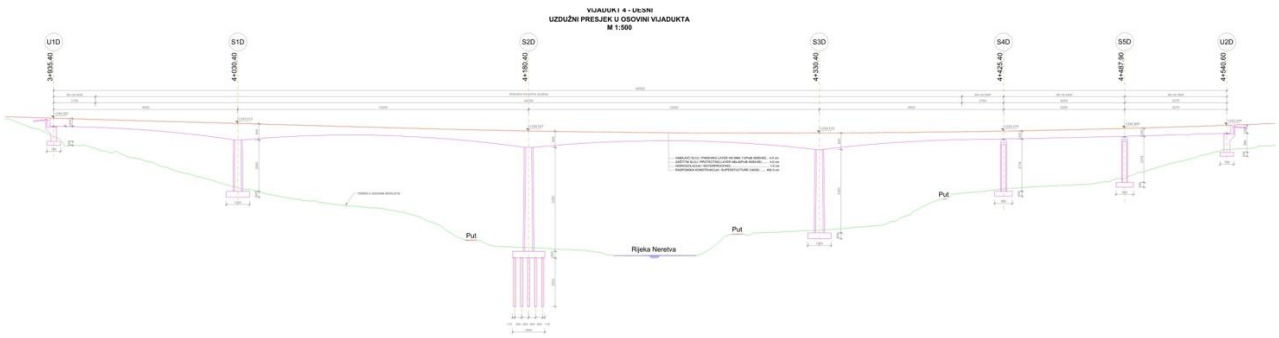


Figure 3-17: Model of Viaduct No. 4 over the Neretva River

After crossing the Neretva riverbed via Viaduct No. 4, the route enters a partially inhabited area that stretches from km 5+500 to km 6+200. The Konjic South interchange is planned at the chainage km 6+460.

The Konjic South interchange, including the toll collection facility, is located under the motorway's structure from the km 6+460.00 to km 6+530.00. Circular intersection with 4 ramps has an inner radius R=27,5 m, with two traffic lanes inside the circular intersection, which are 2 x 4,5 m wide. The access road, on which a side toll station is located, fits into the intersection at 90-degree angle, while the branches are located next to the motorway. The access road links to the existing regional road R435 to Boracko Lake. Since the motorway's route coincides with the existing regional road, it is necessary to relocate regional road from the existing location. At the access road at km 0+140,00 a T-connection is planned and relocation of the regional road (circa 390 m long). Regional road goes under the motorway's structure via an underpass. The access road for rest area Konjic South is connected to the intersection as well.

The following figure shows the layout of the Konjic South interchange.

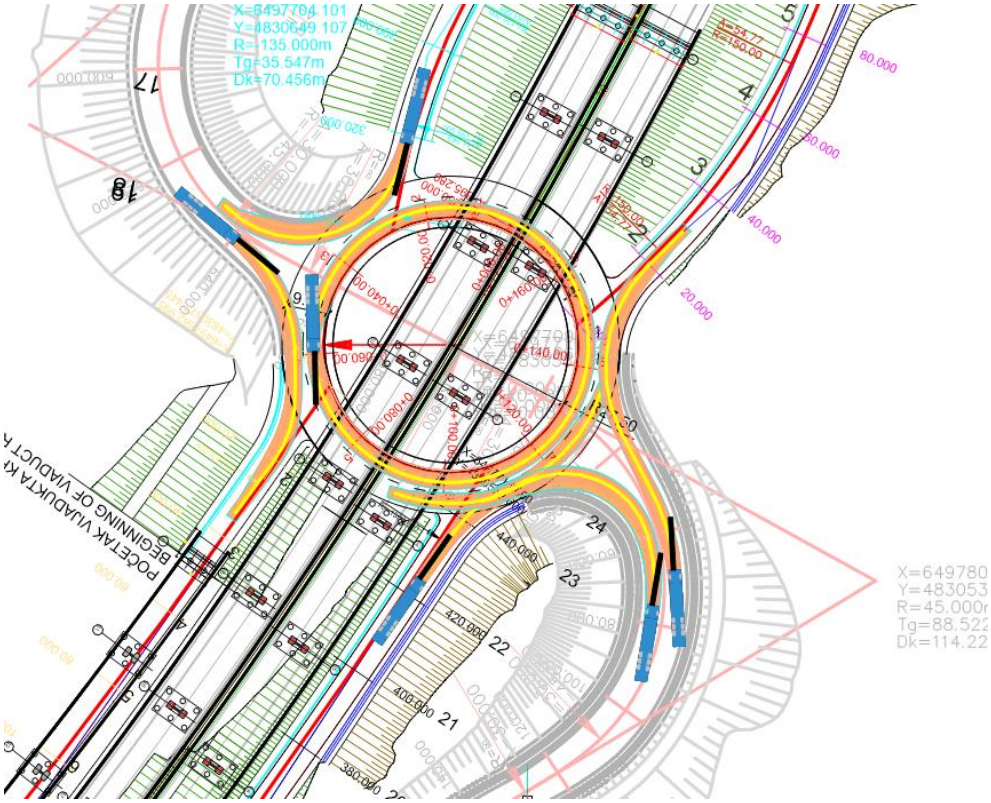


Figure 3-18: Design of the Konjic South interchange

At the approx. km 6+420.00 a **Viaduct No. 5** on the motorway section and goes over the Konjic South intersection and all the way to the 6+960,00. In addition to the viaduct on the main route, viaducts on ramps 3 and 4 were also designed due to the large height difference.

The Konjic rest area is located right after the Konjic South interchange in the Mladeskovici settlement and is shown in the figure below.

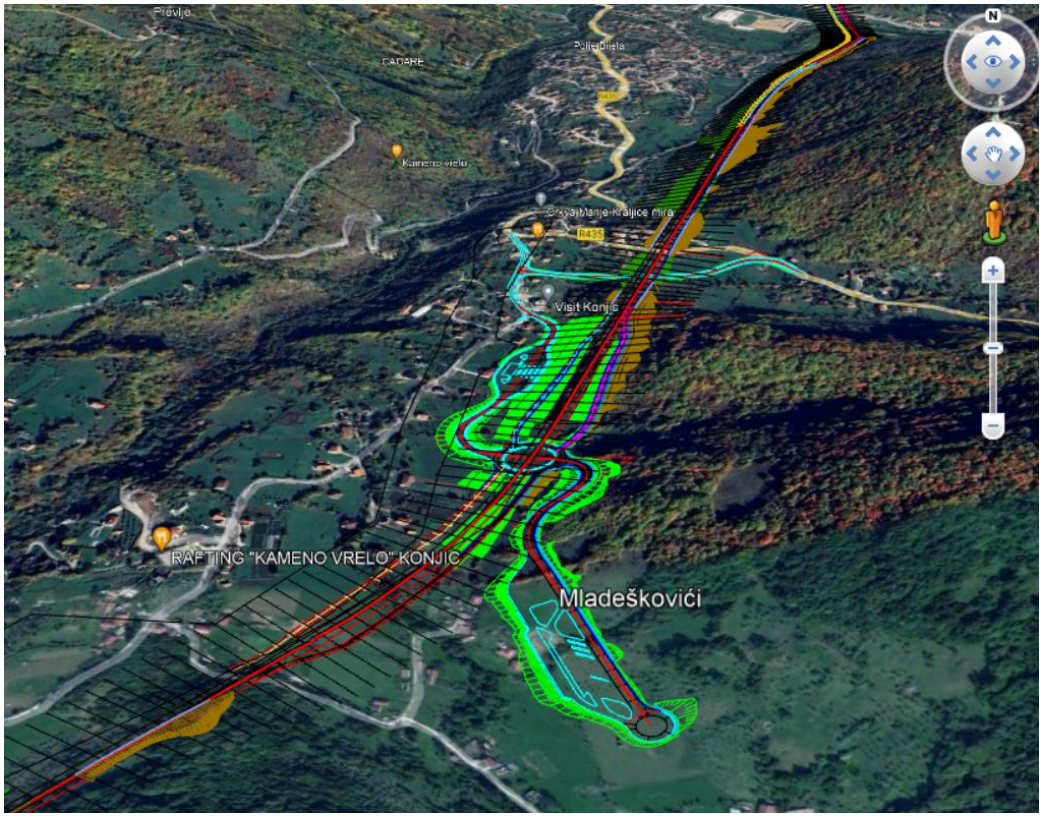


Figure 3-19: Konjic rest area

Further on, the motorway route is laid under the slope above the settlements of Bijela and Gornja Bijela. In order to avoid unstable ground for construction, the motorway has lowered from the steep slopes towards the Bijela river to avoid construction in cut in the unstable terrains. However, this will require for the upper section of Bijela river, called Suhi potok stream, to be trained just before entering the zone of the Rakov Laz shooting range (Figure 3-21). The width of the trained riverbed in the bottom is 6.0 m with a total length of trained section of 1,280 m, together with the construction of one culvert through the motorway embankment. The dimensions of the flow profile of this culvert would be approximately b x h = 10 x 3.2 m, with total length L=95 m. Figure 3-20 below shows the Bijela river canyon in relation to the Project.

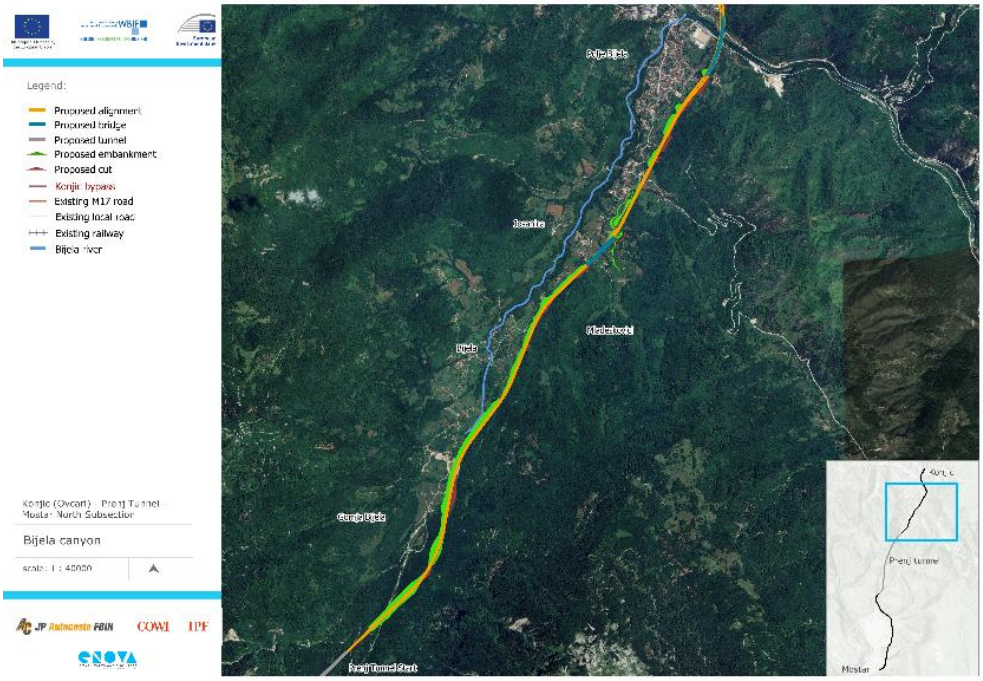


Figure 3-20: Bijela canyon

For most of the route, the newly regulated Suhi potok stream would be excavated in full profile, which in principle represents a new canal that would be dimensioned to accept and transport 1/100 years of high water from this part of the Bijela river basin. The technical solution foresees construction of a stone lining with a level that follows the natural slope of the Suhi potok riverbed. The same typical cross section of the structure shown in Figure 3-15 is also applicable to this case. In addition, measures are planned to protect the Bijela and Gornja Bijela springs from potential impacts caused by high waters in the Bijela River. These measures include the regulation of the natural riverbed of the Bijela River over a length of approximately 600 meters. This intervention aims to prevent changes in water quality within the riverbed that could compromise the tap water supply.

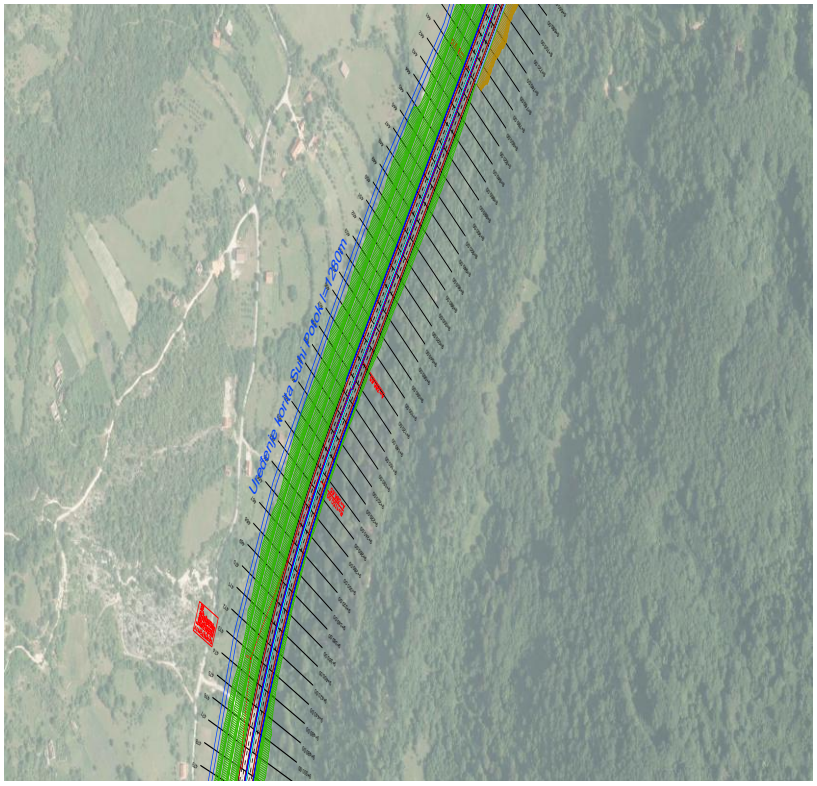


Figure 3-21: Training of the Suhi potok stream (L=1,280 m)

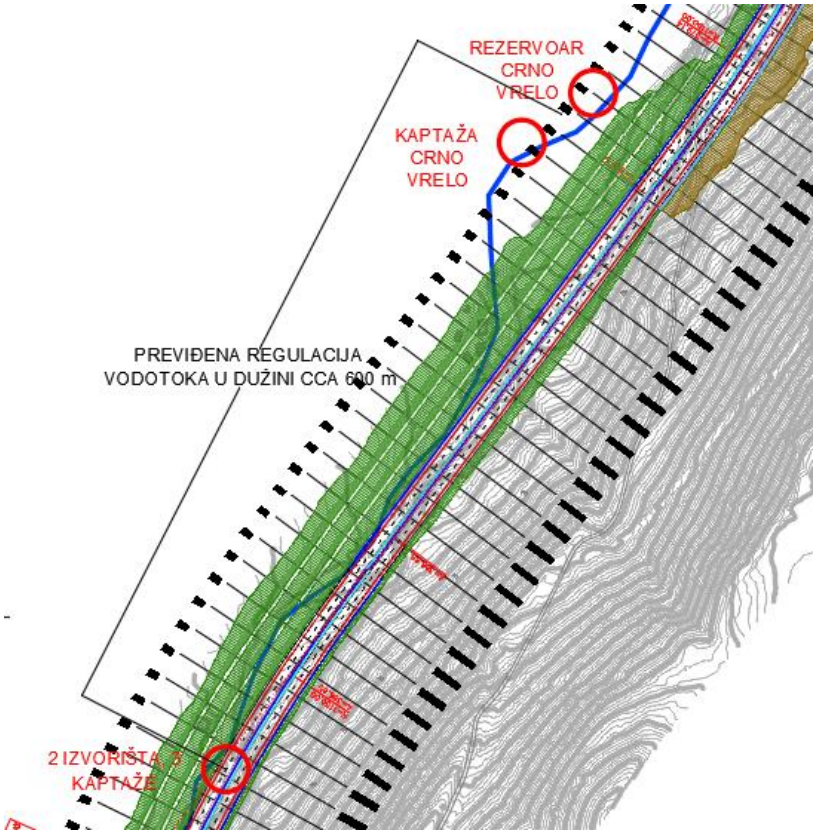


Figure 3-22: Regulation of the Bijela stream (L = 600 m)

3.2.3 Prenj Tunnel Structure

The Prenj Tunnel traverses the Prenj mountain range and consists of two unidirectional tunnel tubes running parallel to each other with an axial distance of 50 meters. This distance is reduced near the portals to minimise the size of the portal cuts.

The Tunnel Prenj project includes the following components (chainages refer to the left tunnel tube):

- Open section of the motorway: 0+000,00 - 1+147,048,
- Prenj Tunnel: 1+147,048 - 12+073,170,
- Open section of the motorway; 12+073,170 - 12+240.27.

The total length of the left tunnel tube is 10,926.122 meters, while the right tunnel tube measures 10,936.714 meters.

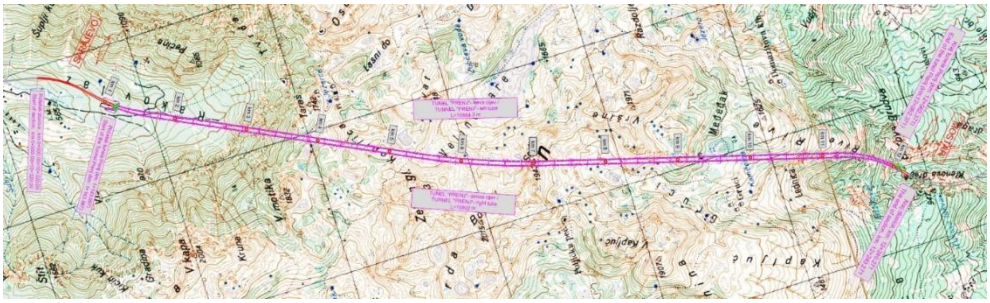


Figure 3-23: Plan View of the Tunnel Prenj Alignment

The tunnel is designed to be constructed according to NATM (New Austrian Tunnel Method).

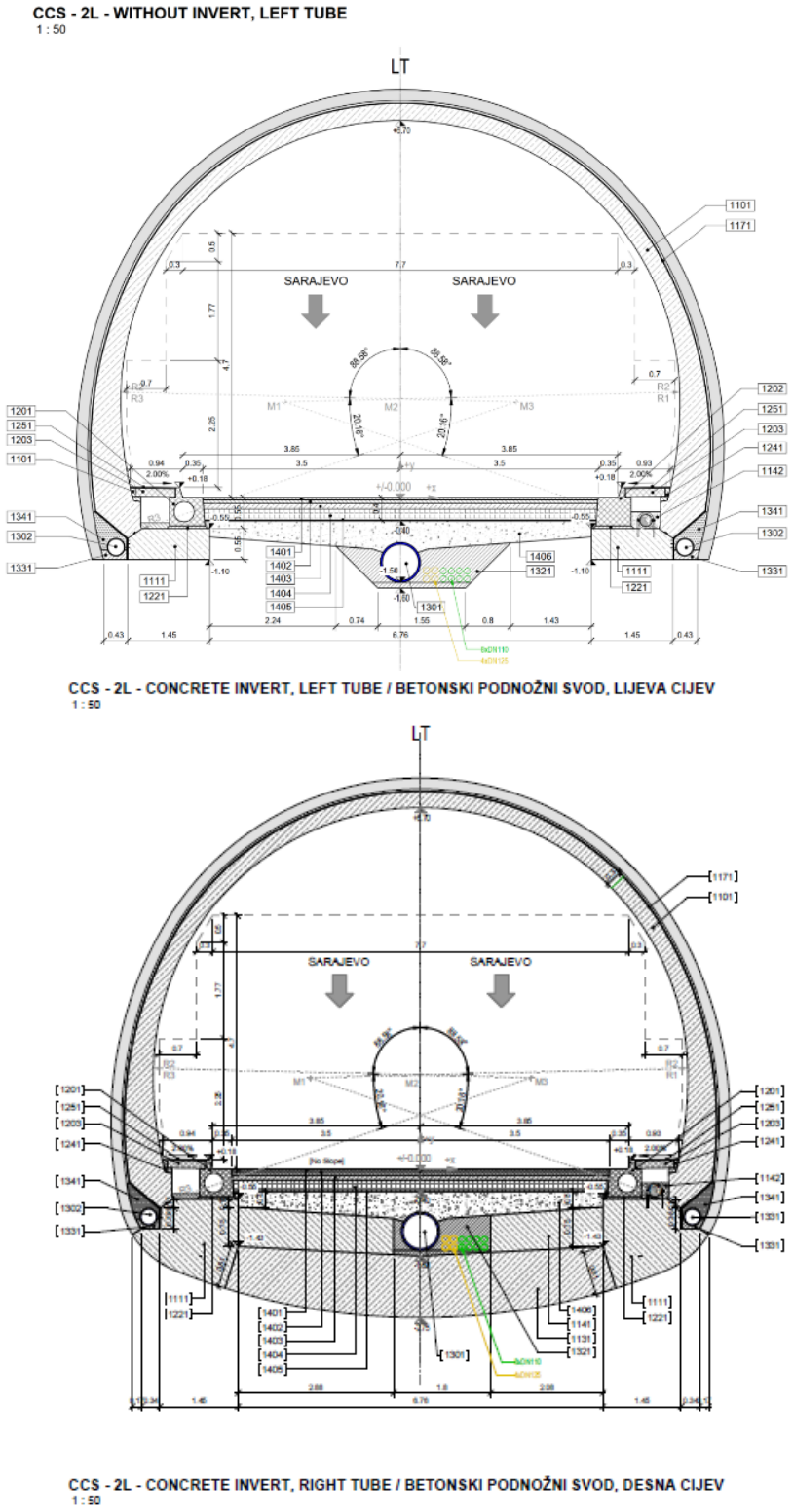


Figure 3-24: Normal Cross Sections of the Tunnel Prenj

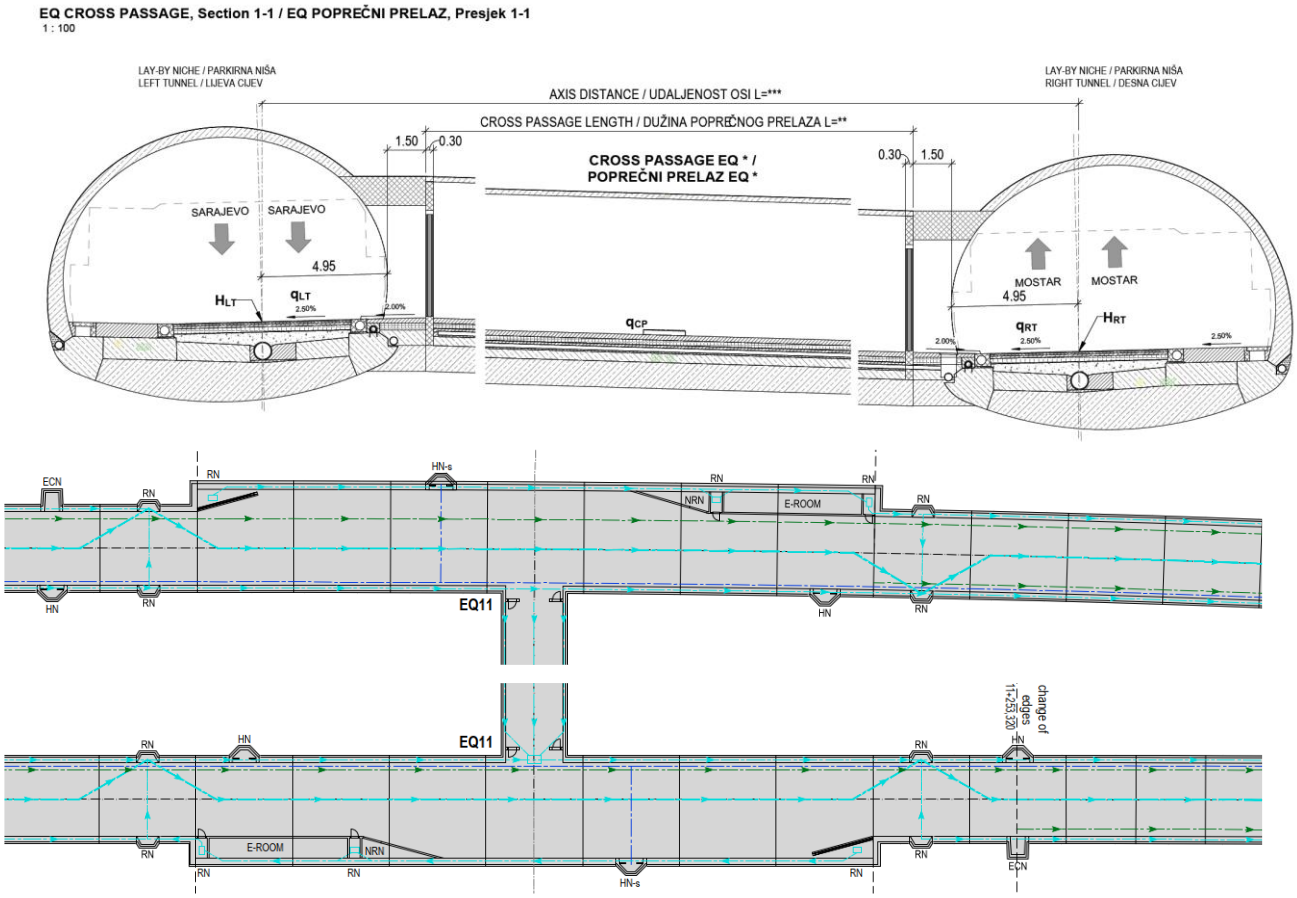


Figure 3-25: Plan View of Cross Passages for Emergency Vehicles with Adjacent Lay-Bys

The adopted shape and positioning of the portals are designed to integrate harmoniously with the natural terrain while also considering aesthetic aspects, with plans for a cohesive portal construction. The tunnel tubes are connected by a total of 35 walkable cross passages, including 24 pedestrian cross-links and 11 passages for emergency vehicles, spaced approximately every 303 meters. Each of the 11 emergency vehicle cross passages is accompanied by lay-by niches, each 65 meters in length.

The planned road construction consists of:

- Stone matrix asphalt 11s d=4.0 cm
- Bituminous crushed stone AGNS 22s, d=7.0cm
- Bituminous crushed stone AGNS 32s, d=9.0cm
- Cement stabilisation CS32 d = 20.0 cm
- Unbound bearing layer-crushed NNS 0/45mm, d=30.0cm.

The two-way tunnel, with a length of 10.93 km, requires exceptional safety and security measures to ensure the protection of users. Key features and protocols include:

- **Ventilation System:** The unidirectional tunnel tubes are equipped with a longitudinal ventilation system, utilising 48 jet fans in each tube to manage airflow and smoke control.

- **Supervision and Detection Systems:** The tunnel incorporates advanced monitoring systems, including CCTV cameras with integrated incident detection and a fire detection system using heat-sensitive cables.
- **Incident Detection:** In the event of a fire, the initial indication is often a traffic abnormality, such as a slow-moving or stopped vehicle. The incident detection system automatically identifies such abnormalities, often faster than detecting the fire itself, as over 90% of tunnel fires originate from vehicles. The system notifies the operator, and the corresponding video feed is displayed in the control centre.
- **Fire Alarm Activation:** If the operator visually confirms fire or smoke, they trigger the fire alarm by pressing the fire button. If the operator does not react or if the fire escalates rapidly, the fire alarm is automatically activated by the fire detection system.
- **Coordinated Safety Response:** Once a fire alarm is activated, the tunnel's safety systems respond in a predefined, coordinated manner, depending on the incident's location:
- **Traffic Management:** Traffic behind the incident is immediately stopped by activating red traffic lights at the tunnel portal and inside the tunnel. Vehicles downstream of the burning vehicle are directed to exit the tunnel, while traffic in the adjacent tube is also halted. The unaffected tube serves as a safe haven for evacuees via cross passages.
- **Smoke Management:** During normal operation, the movement of vehicles creates a "piston effect," generating airflow in the direction of traffic. In the event of a fire, the emergency ventilation mode is initiated. Jet fans push smoke in the driving direction at a controlled speed (2.5–3 m/sec) to prevent smoke from affecting vehicles queued behind the incident. Cross passages and the neighbouring tube are kept smoke-free through their dedicated ventilation systems.
- **Evacuation:** Occupants of stopped vehicles in the affected tube evacuate through the nearest cross passages to the safe neighbouring tube, guided by emergency protocols.

3.2.4 Structures on the Subsection Prenj Tunnel - Mostar North

According to the technical description from 2022, the subsection Prenj Tunnel-Mostar North has 4 viaducts, 3 tunnels, 1 underpass and 1 overpass. The list of all structure in order of their appearance along the route is as follows:

- Tunnel Klenova Draga - T3A, L=742 m (left roadway), L= 785 m (right roadway)
- Viaduct No. 8, L=351 m
- Tunnel T4; L=642 m (left roadway), L= 639 m (right roadway)
- Viaduct No. 9; L=332 m (left roadway), L= 338 m (right roadway)
- Viaduct No 9A: L=148 m (right roadway only)
- Viaduct No. 10; L=360 m (left roadway), L= 445 m (right roadway)
- Rest area
- Tunnel T5; L=2,290 m (left roadway), L= 2,210 m (right roadway)

This subsection starts at the exit portal of the Prenj Tunnel, at the location of Klenova Draga, at km 22+650 and ends at km 35+260, where the Mostar North interchange begins.

At the very beginning, the subsection crosses the open route on the embankment for approx. 300 m and at the km 22+950 enters the **Tunnel Klenova Draga - T3A** on the western cliffs of the Klenova Draga gorge. With a left curve with radius R=1.000 m, the route passes through the gorge and comes out on a **Viaduct No. 8** with an approximate length of 351 m, which bridges the part above the southern approach to Klenova Draga.

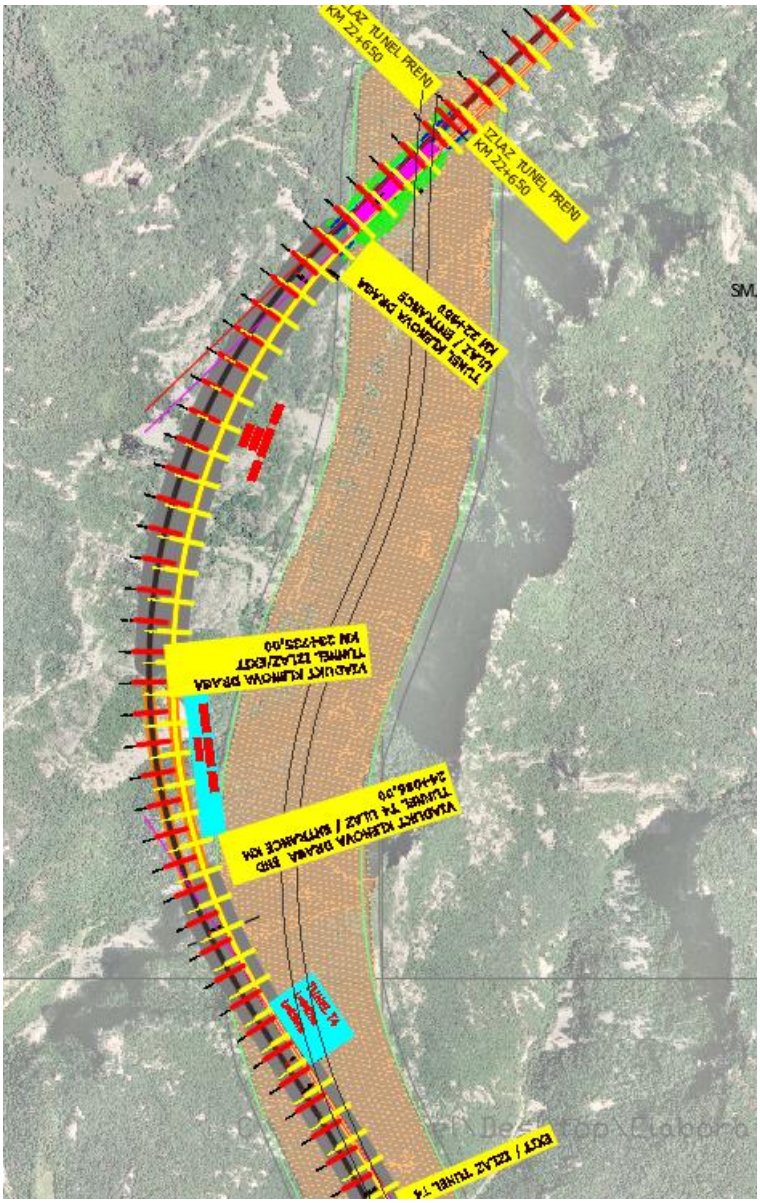


Figure 3-26: Beginning of the Prenj Tunnel-Mostar North subsection

In the area of Klenovo vrelo, the route consists of two facilities; an approximately 640-meter-long **Tunnel T4** and **Viaduct No. 9**. After leaving Viaduct No. 9, the route is laid in a slight cut for one km until reaching **Viaduct No. 10** of approx. 400 m in length, with the local road to Stinji dol and Prenj

passing underneath. Between viaducts No. 9 and No. 10, additional **Viaduct No. 9A** in length of 128 m was designed only on the right roadway.

After the Viaduct No. 10, the route continues on a slightly gentler slope at the Zelenika site from km 27+000 to km 28+000, where it intersects the regional road R435 towards Rujiste and several local roads. The **Mostar rest area** is planned at the location between the settlements of Podgorani and Humilisani from km 27+230 to km 28+030 in the most suitable part of the section in terms of the terrain configuration and geometric elements of the route.

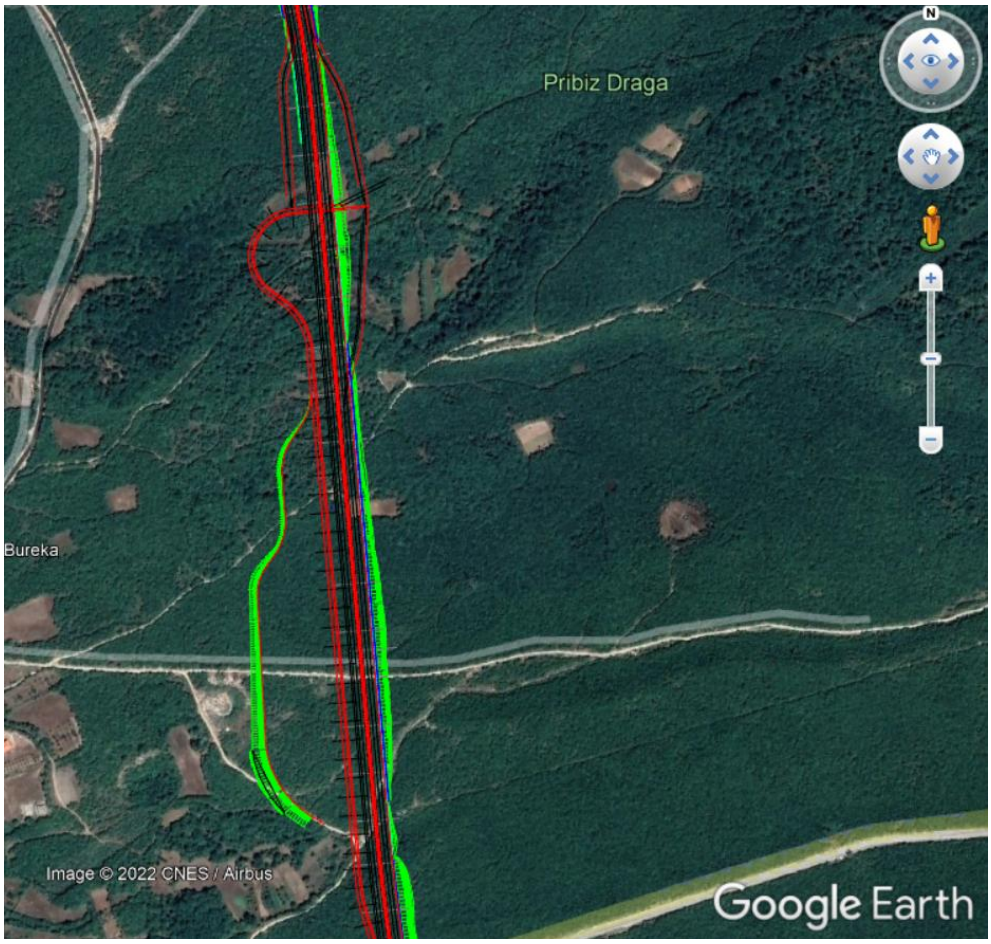


Figure 3-27: Design situation of the rest area (source: Google Earth)

For the next 3 km it descends towards Potoci at a 4-6% slope and enters **Tunnel T5** of approx. 2.2 km which is both the longest and the last facility on this subsection.

After exiting the tunnel, in the area of the settlement of Kuti, the route joins the Mostar North interchange at approx. km 35+260 which is the end point of Prenj Tunnel-Mostar North subsection. Mostar North interchange is part of the motorway section Mostar North-Mostar South and enables the motorway connection with the main road M17 and the City of Mostar in the area of the settlement Potoci.

Figure 3-28: Ending of the subsection Prenj Tunnel - Mostar North

3.2.5 Structures on the South Connection to Main Road M17

The Konjic Bypass begins with the exit from the Ovcari Interchange. The first 180 m of the route, from km 3+520 to km 3+340, are laid in an embankment, and the next 180m, part from km 3+340 to km 3+160, of the route is in a cut.

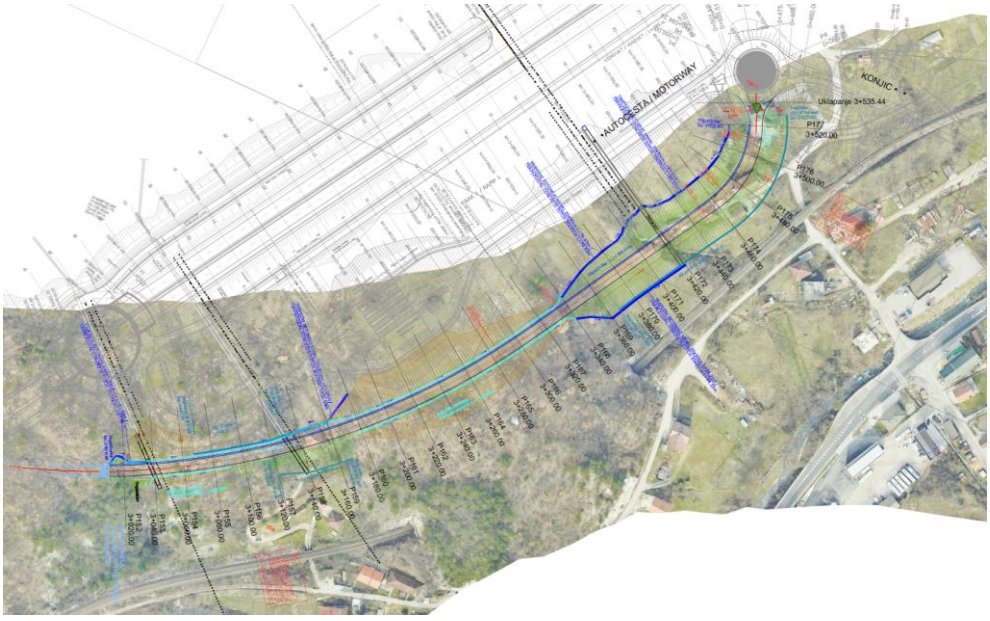


Figure 3-29: Connection of the Konjic Bypass to the Ovcari interchange (source: Preliminary Design)

After that, the road continues on an embankment for the next 60 m, from km 3+160 to km 3+100, followed by a 60 m stretch in a cut, from km 3+100 to km 3+040. The route then enters the 825-meter-long tunnel T1, from km 3+010 to km 2+185. After exiting the T1, the route continues for approx. 180 m through cuts, from km 2+180 to km 2+000 followed by another 140 m through an

embankment, from km 2+000 to km 1+860, when it reaches the intersection R2, where it connects to the local road leading to Repovica and Public Utility Company "Standard" Konjic. The next 300 meters of the route, from km 1+180 to km 0+880, are in a cut until it reaches the Viaduct V1.

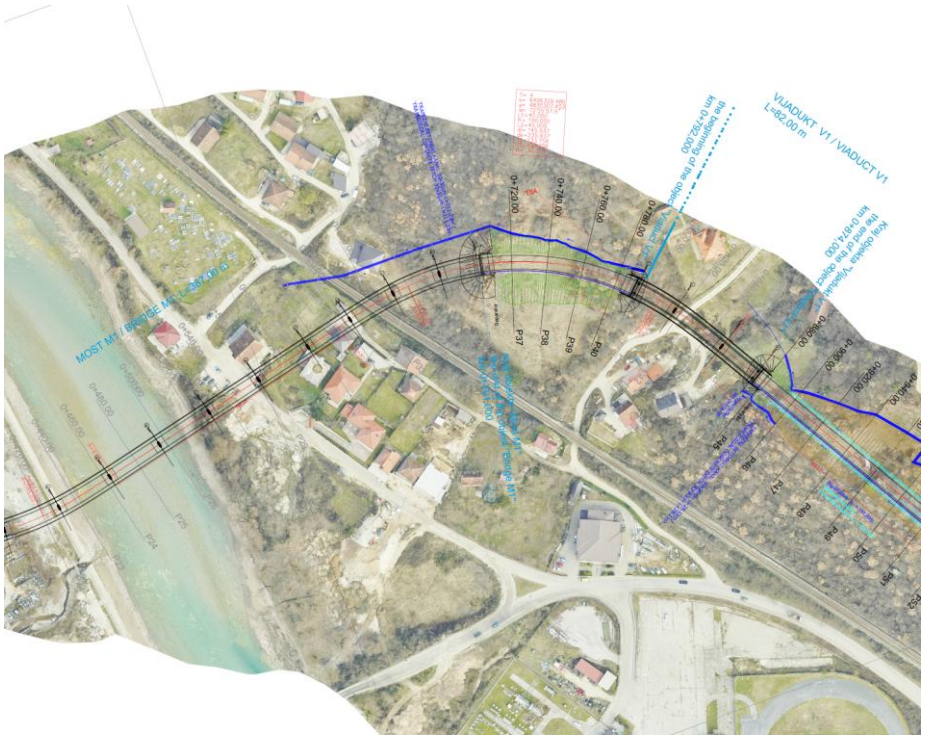
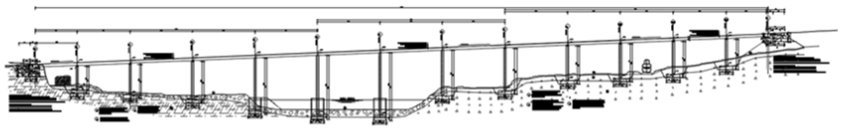


Figure 3-30: Viaduct V1 (source: Preliminary Design)

Viaduct V1 is an 82-meter-long, spanning from km 0+874 to km 0+792, with two columns positioned above local dead-end road that leads to several residential objects. After the viaduct, the next 60 m are on embankment, from km 0+780 to km 0+720. Following this, the route reaches the bridge M1, spanning from km 0+701 to km 0+314, that crosses the existing Sarajevo-Capljina railway, the Neretva River, and the main road M17. The 387-meter-long bridge M1 consists of a total of 12 columns spaced approx. 30 meters apart, with two of the columns located within the Neretva riverbed. The bridge is a prestressed reinforced concrete structure, that begins at km 0+314 and ends at km 0+701 of the Konjic Bypass length. The roadway width varies. The width of the driving lane is 3.25 meters, and the shoulder widths are 0.3 meters, while the width of the safety zone up to the guardrail is 0.8 meters.



Longitudinal section of the Bridge

Figure 3-31: Bridge M1 (source: Preliminary Design)

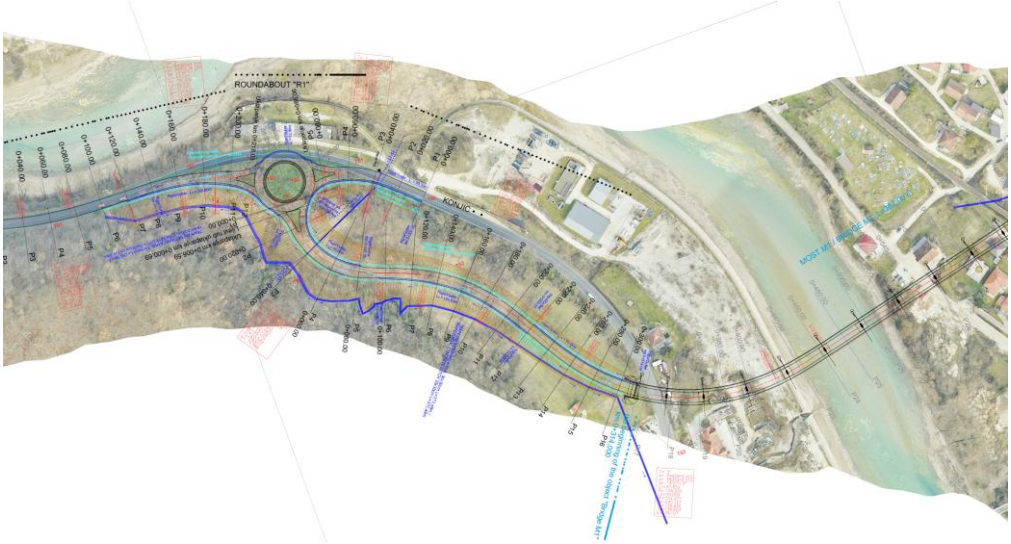


Figure 3-32: Connection of the Konjic Bypass to main road M17 to Jablanica (source: Preliminary Design)

After this, the road continues in a cut for approx. 280 m, from km 0+300 to km 0+020, until it reaches the roundabout R1, where it connects to the M17. The total length of the Bypass is 3.535 km, and it is designed for a maximum speed of 70 km/h.

3.2.6 Access Roads to Tunnel Prenj

Northern access road

According to the Main Design for access roads to the Prenj Tunnel[3], the northern access road (NR[4]) consists of two sections (NR1 and NR2).

The section NR1 has a total length of 4.6 km and represents an access road that connects to the existing regional road R435. At the location of NR1, there is already an existing road that passes through several populated areas. However, the existing road is only 3.5 to 4.5 m wide so it will have to be enlarged to suit the needs of the Project. The end of the section NR1 is located just before the shooting range of the company Igman Konjic. Section NR2 has a total length of approx. 2.0 km. The layout map consists of a service road and a plateau for the operation of machines with a total area of approx. 40,000 m^2. The plateau has a total length of 262 m.

[3] Corridor Vc – Ovcari – Tunnel Prenj – Mostar North Development of Preliminary and Main Design for Preparatory Works, Design QC, Sarajevo, August 2022
[4] „NR" is the abbreviated form of „Northern Access Road".

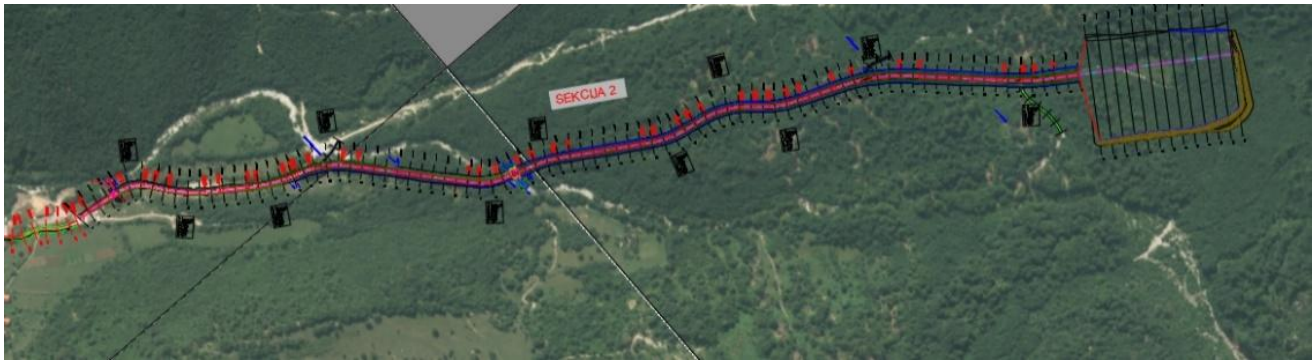


Figure 3-33: Design situation of the northern access road

Southern access road

The southern access road (SR[5]) to the Prenj Tunnel is divided into six sections (SR1, SR2, SR3, SR4, SR5 and SR6) according to the position and technical solutions.

Figure 3-34: Overview of sections SR1, SR2, SR3, SR4, SR5 and SR6 of access road to Prenj Tunnel on the southern side

Section SR1 is approx. 0.7 km long and represents an access construction road that connects to the existing main road M17 and HP Investing industrial area. The beginning of SR1 is at the interchange directly in front of the gate of HP Investing.

[5] „SR" is the abbreviated form of „Southern Access Road".

Figure 3-35: Design situation of the section SR1

SR2 is 1.16 km long and consists of 15 horizontal curves. The horizontal curves are roughly in line with the existing road, and the surrounding buildings, since SR2 passes through a settlement. With this approach, the roadway was fitted with a minimum applied radius of 45 m. The maximum applied radius is 1,300 m.

SR3 is approx. 1.46 km long and consists of two parts. The first part represents a relocated stretch of the existing road in the length of 330 m. It is necessary to widen of the road, so an appropriate connection in form of a T-interchange can be constructed.

Figure 3-36: Design situation of the section SR3, relocation of the existing road and newly designed T-interchange

SR4 is approx. 0.5 km long and represents a newly designed access construction road which is partly located on the existing roadway. The part of the roadway that is on the existing road which is approx. 2 m wide will be widened, along with modification of the longitudinal slope. SR4 is the most demanding section for access to the southern portal of the Prenj Tunnel. It is characterised by an existing steep serpentine whose elements do not meet the minimum required

width of 6 m. Therefore, it is necessary to reconstruct this section to reduce the longitudinal slope. Considering the minimum width of the access road and the extremely steep terrain, supporting structures on this part of the roadway will be necessary in the form of gabion walls, reinforced soil and reinforced concrete wall.

SR5 is in total 1.3 km long and is located between SR4, which is characterised by serpentines, and SR6, which is characterised by an operational plateau.

SR6 is 1.5 km long and is situated in a greenfield area. After a detailed site investigation, geological exploration works and review of the preliminary design of the motorway, it can be concluded that a collision between the motorway and the access road at the SR6 section is inevitable. Given the spatial constraints of the terrain, three operational plateaus were designed. The minimum designed horizontal radius is 110 m, while the maximum designed radius is 695 m. At the chainage km 0+060.00, on the right side, the first operational plateau is designed with an area of 1,867 m². At the chainage km 0+620.00 there is another operational plateau with an area of 3,886 m². The third operational plateau is located directly in front of the planned notch of the southern portal of the Prenj Tunnel and has an area of 9,352 m².

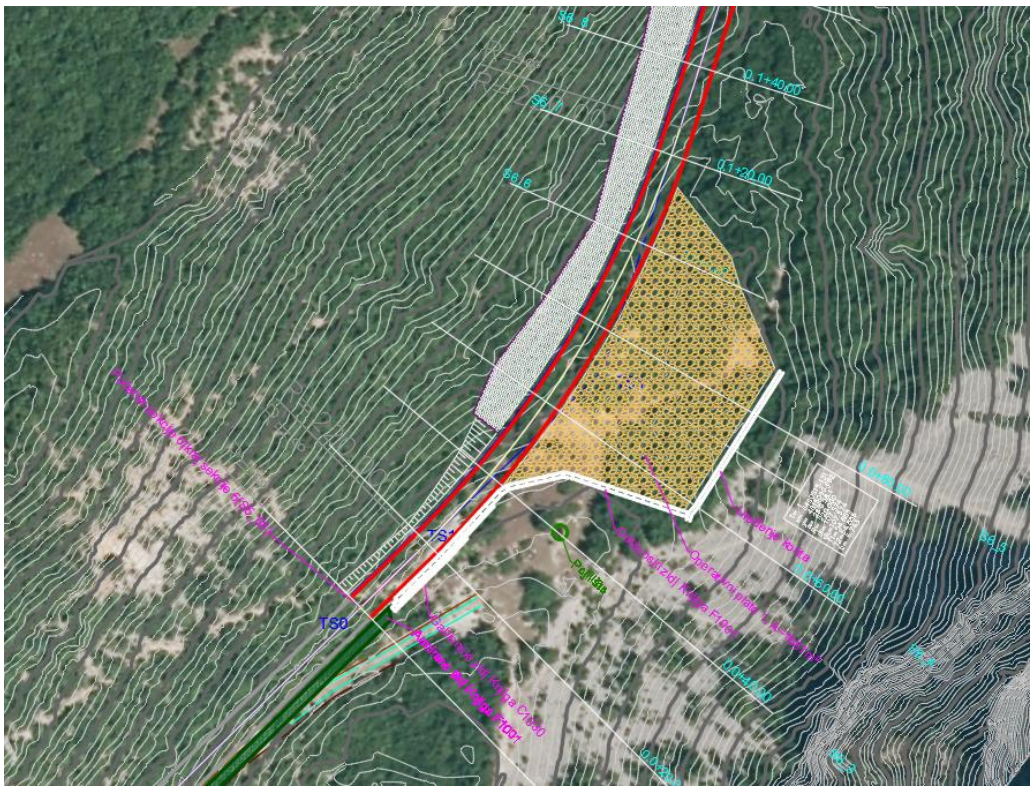


Figure 3-37: Design situation of the section SR6, operational plateau 1

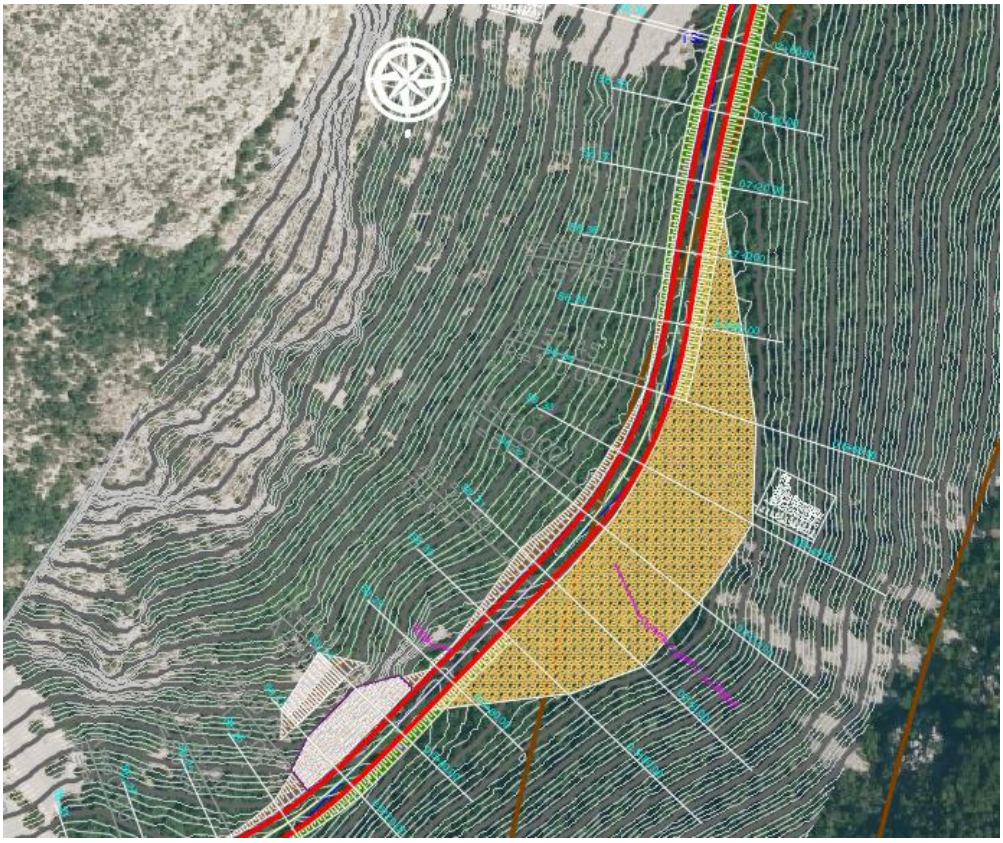


Figure 3-38: Design situation of the section SR6, operational plateau 2

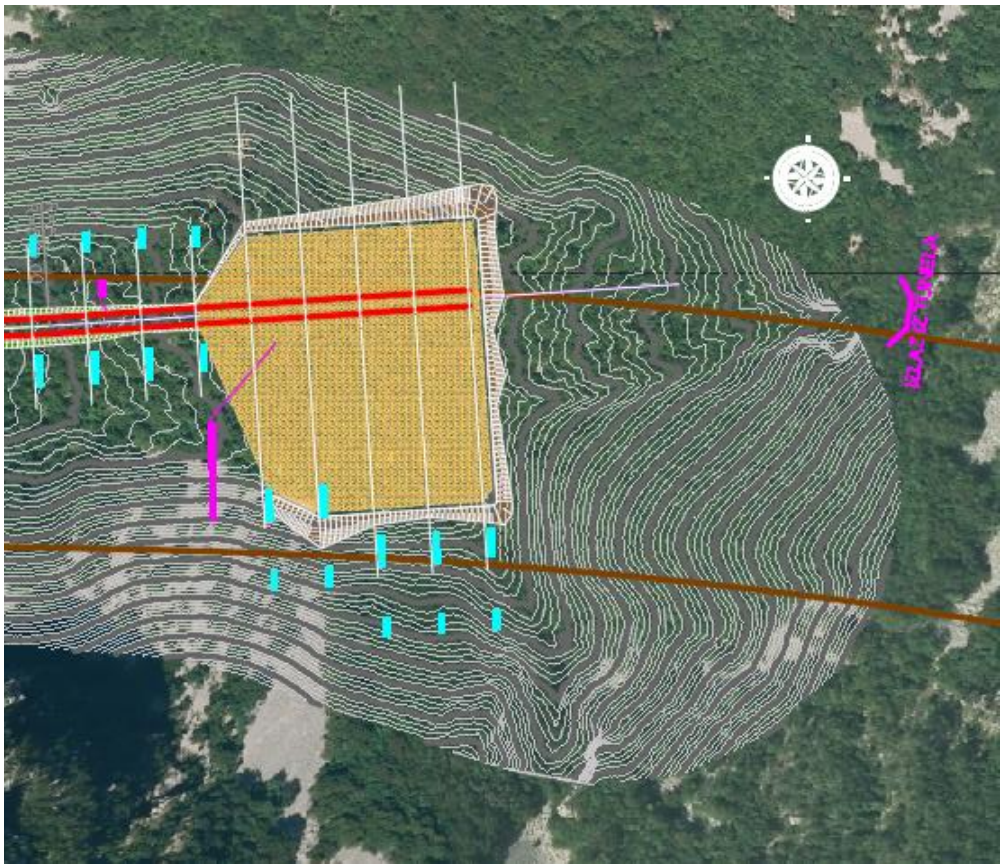


Figure 3-39: Design situation of the section SR6, operational plateau 3

3.2.7 Surface Water Drainage System

The water from the road surface will be received in a controlled manner, with a concrete gutter 0.75 along the green lane and 0.50 m along the emergency lane, conducted to the water drain and further into the collector, which is located in the median strip or shoulder. Water from the collector will be transported in pipes to the oil and grease separators and discharged into the recipient.

Drainage of surface water will be ensured by means of cast iron drains with sand traps. Depending on whether the drains are located along the overtaking or emergency lane, the distance of the drains will be determined according to the usual calculation methods.

Since the motorway route intersects individual torrents, it will be necessary to provide culverts for torrents and occasional flows for the evacuation of such waters, to prevent the emergence of barriers that would impede smooth outflow of water to the recipient.

3.2.8 Wastewater Treatment System

Run-off water from asphalt surfaces needs to be collected by an enclosed drainage system of the motorway and treated in the oil separator as recommended by JPAC's Technical Specifications for Design of the Motorway (2005). The purpose of oil and grease separators is to separate oils and grease and prevent their release into the environment.

In line with the requirements stipulated by the Preliminary Water Consent, the risk zone through which the motorway route passes is taken as the basis for determining the method of implementing water protection, while the water protection measures are aligned with the risks and possible ways of reducing them. Solutions and locations for oil and grease separators and water disposal are chosen compared to terrain, hydrogeological, and other relevant conditions. In the phase of defining water outlets and water disposition is foreseen so that the natural water regime should be preserved as best as possible, and minimally disturbed.

Wastewater treatment in the zone of low risk of pollution

In low risk of pollution zones, it is planned that the water collected from the asphalt is transported through the storm sewer system, treated with prefabricated separators for oil and light liquids in a ratio of 1/10, and purified according to EN858. The rest overflows into the bypass line.

The separator is planned to be located within the extended berm of the plateau, on a dedicated platform specifically designed to match the dimensions of the device..

The separators contain a coalescing cartridge (filter) with a float/valve for automatic closing, which can be separately removed and cleaned without emptying the separator itself. It is foreseen that separators must ensure the required quality of the purified water at the outlet, which according to the EN 858 and DIN1999 standards, prescribes the maximum content of oily particles of 5 mg/l.

Wastewater treatment in zones of moderate and high risk of pollution

In the zones of moderate and high protection (e.g., near or inside the water protection zones), it is foreseen that water is purified in grease and oil separators, dimensioned in accordance with the calculated expected amount of water. 100% purification of wastewater in oil and grease separators is foreseen. For this level of liquid purification, separators of the NG type are foreseen, with an integrated precipitator for the separation of solid particles, in which the grease level drops to 100 mg/l of oily particles, which can be separated using only gravity.

In case of accidental pollution caused by the spilling of light liquids, a collector is provided with the volume adopted in accordance with JPAC's Technical Specifications for Design of the Motorway. In the event of an accidental liquid spill, the wastewater from the separation shaft first flows into the separator designed according to EN BAS 858, which should lower the concentration of oily particles to 5-10 mg/l. When the capacity of the separator is filled, the rest of the accidental spilled liquid flows out into the sump. The tank is emptied using an equipped vehicle, if necessary.

The effluent from the treatment device must meet the limit values prescribed by applicable legislation, *Decree on Conditions for Discharge of Wastewater into Environment and into the Public Sewerage System*[6]. After treatment, the treated effluent is discharged into the environment. The limit values of effluent quality are stipulated by the mentioned Decree.

The wastewater from toll stations and rest areas will be collected and treated in biological treatment units.

Details available at this design stage for each sub-section are given below. More detailed data with quantities and calculations will be available during the main design phase.

Subsection Ovcari - entrance to the Prenj tunnel

In the preliminary design of the internal drainage of the motorway, subsection Ovcari - entrance to the Prenj tunnel, eight autonomous networks of stormwater sewers were designed, which eventually end with a device for treatment before discharge into open streams. All networks are described separately below:

- M1, from km 0+500.00 to approx. km 1+320.00
- M2, from km 2+500.00 to approx. km 2+680.00

[6] Official Gazette of FBiH No. 26/20

- M3, from km 3+840.00 to approx. km 3+960.00
- M4, from km 4+500.00 to approx. km 6+000.00
- M5, from km 6+020.00 to approx. km 6+400.00
- M6, from 7+040.00 to approx. km 8+460.00
- M7, from km 8+480.00 to approx. km 9+980.00
- M8, from km 10+000.00 to approx. km 10+320.00

In low-risk zones, it is suggested that the water collected from the surface of the motorway be treated with oil and light liquid separators in a purification ratio of 10% of the flow for purification, and the rest is discharged through the by-pass.

Due to the flow limitation per separator of 500 l/s, two or more separators are adopted in parallel operation on networks where the calculated amount of water exceeds this value. Behind the separator, there is an opening for taking samples.

The adopted systems for the purification of rainwater by networks are given in the following table.

Table 3-1: Adopted devices for the purification of rainwater on subsection Ovcari-entrance to tunnel Prenj

Name	Surface for flow calculation (ha)	Flow Q (l/s/ha)	Adopted treatment device
M1	4.54	1192.53	3 x 400 bp 40
M2	0.67	175.44	200 bp 20
M3	0.58	153.96	200 bp 20
M4	4.36	1087.57	3 x 400 bp 40
M5	2.38	627.13	2 x 350 bp 35
M6	3.60	911.58	2 x 500 bp 50
M7	3.90	996.55	2 x 500 bp 50
M8	0.95	248.74	250 bp 25
Ovcari interchange	1.36	358.67	400 bp 40
Konjic South interchange	2.45	642.87	2 x 350 bp 35

In the case of discharge of rainwater upstream from captured sources, it is necessary to use separators with 100% purification. In addition, a tank is provided in case of incidents and spills of harmful substances on the motorway. So, in the event of an incident, i.e., fuel spillage, the automatic shut-off valve in the separator is activated upon detecting a high concentration of hydrocarbons. This action diverts the contaminated flow into the specially designed 50 m³ spill tank, which has sufficient capacity to accommodate both the transported cargo and the vehicle's fuel in the event of a major spill.

Below is the hydraulic treatment scheme for the case of discharge upstream from the captured springs.

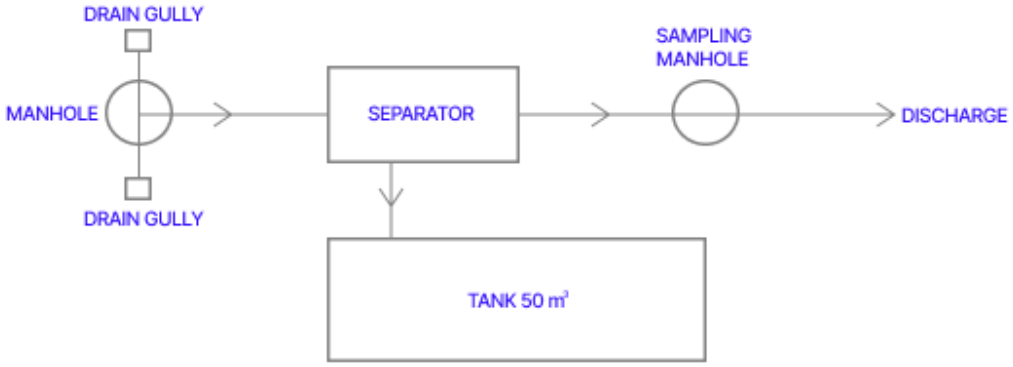


Figure 3-40: Hydraulic purification scheme in case of discharge upstream of the captured springs on the subsection Ovcari–entrance to the Prenj tunnel

In the discharge zones of the internal drainage from the tunnel, a water protection system is provided to treat contaminated water containing oil, as well as flammable and toxic contaminants. For tunnels 1 and 2, a separator NG 20 l/s with a cistern for incident liquids V=50 m^3 was designed. The separator is made of reinforced polyester in line with the EN858 standard, monolithic design, resistant to mineral oils, with a built-in safety external bypass, and equipped with a pre-installation for connecting a set intended for taking a sample at the outlet. The separator contains a coalescing filter with a float, an automatic shut-off valve, which can be separately removed and cleaned without emptying the separator itself. The separator, according to EN 858 and DIN 1999, prescribes a maximum content of oily particles of 5 mg/l. The tank for incident liquid has a total capacity of V=50 m^3. The tank is made entirely of reinforced polyester and is 100% waterproof. The operation of the separator and reservoir for incident liquid is automatic. If the amount of contaminated liquid is so large that the separator cannot purify it, the automatic float valve will shut off (block) the exit from the separator, and the incident liquid will be poured into the watertight reservoir. The tank is designed with a total volume of 50 m^3, which ensures the reception of liquid incident from one tanker truck.

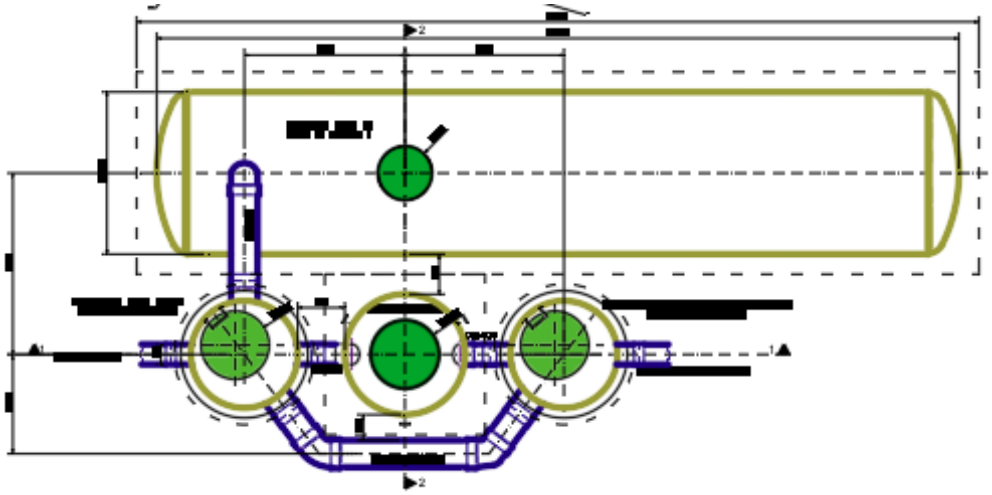


Figure 3-41: Schematic representation of the separator for stormwater purification

All Ovcari and Konjic toll stations have been designed on the subsection of the Ovcari - entrance to the Prenj tunnel. Sequencing batch reactor (SBR) devices of the same capacity have been designed for both toll booths for the purification of sanitary water. For the treatment of sanitary wastewater, SBR technology was selected as it requires less space and has good treatment performance. The purpose of the SBR device is to treat wastewater from residential and commercial buildings, apartments and settlements. In this particular case, the device SBR REG 8 was selected, which is intended for the cleaning of faecal wastewater, which is collected by the sewage network and brought to the device, from where, after purification, it enters the internal drainage system of the lateral toll booth Ovcari. The device is designed according to the BAS EN 12255 standard. The containers in which the cleaning process is carried out are made of reinforced polyester. The device is designed for the following composition of wastewater, and the calculation is based on 150 liters of wastewater per person per day. Loads are rounded to whole grams.

Parameters	Load (g per person per day)
BPK_5	60
N	12
P_2O_2 (phosphorus)	3,5

According to the *Regulation on Conditions for the Discharge of Wastewater*[7], wastewater must be purified to such a level that it corresponds to the following output parameters:

Parameter	Unit	Limit value on output
Chemical oxygen consumption (COD)	mgO_2/l	125
Biochemical oxygen consumption (BOD5)	mgO_2/l	25

[7] Official Gazette of FBiH, No. 101/15, 01/16

Parameter	Unit	Limit value on output
Suspended matter	mg/l	35

The SBR purification device is a complete system based on the principle of cleaning wastewater using activated sludge. In an independent SBR unit, wastewater flows into the mechanical part (mechanical chamber) of the device, where larger particles are deposited. The water then flows into the recovery pool (biological chamber) where aeration takes place, from where the purified water flows further into the area for immersion in the ground or in open water.

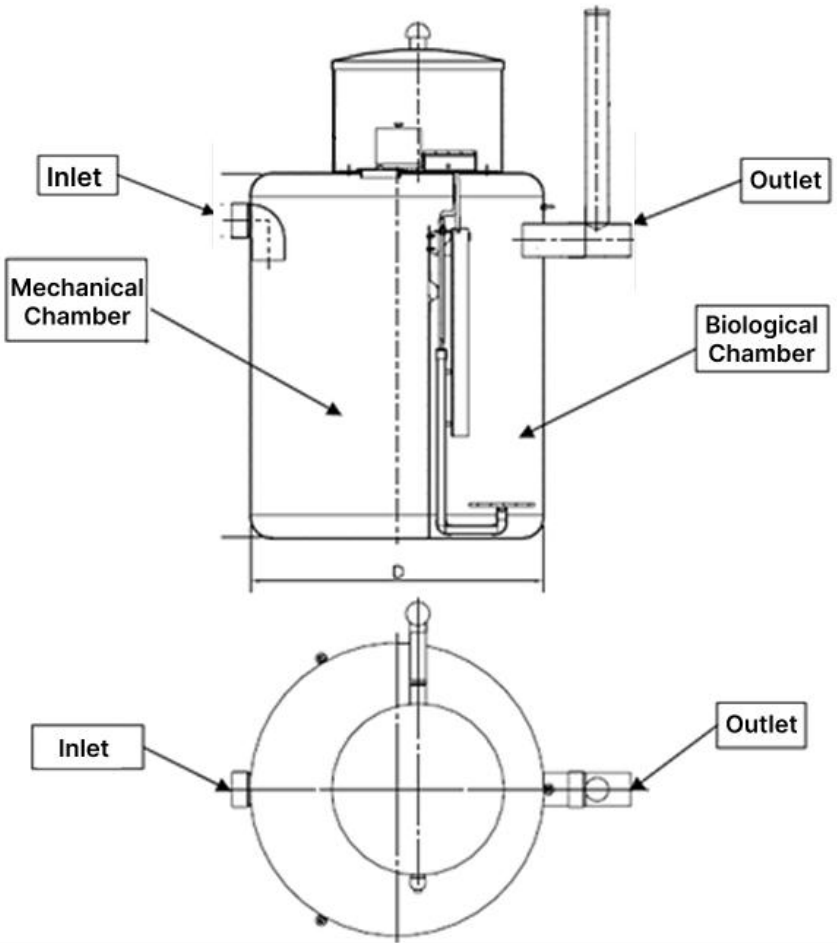


Figure 3-42: Schematic representation of the SBR device planned for the subsection Ovcari-entrance to the Prenj tunnel

The SBR must be equipped with an aeration system, which enables the drainage of fermentation gases. A vent with a diameter of 110 mm must be mounted on the outlet pipe. In the event that there are no residents nearby, the ventilation pipe that is mounted on the discharge pipe is led directly into the air, and if the SBR purification device is located in the immediate vicinity of the house, the ventilation is led along the house high into the air.

The SBR can be driven through the purification device or not, depending on the need and available space. The SBR purifier must be accessible for maintenance and emptying purposes. Care should be taken that the sediment does not flow out of the SBR purification device under any circumstances. The construction pit

must be of such dimensions that it does not interfere with installation, which means that the diameter of the bottom of the construction pit must be at least one meter larger than the diameter of the device. All applicable construction and safety regulations must be observed (e.g. with regard to bracing, occupational safety, etc.). The SBR biological treatment device is buried in the ground. Only part of the manholes remains above ground with covers that can be stepped on, which are protected from opening and the impact of atmospheric precipitation.

Tunnel Prenj subsection

The Preliminary Design for the Prenj Tunnel is currently under development. Presented below are schematics of the wastewater treatment systems that have been designed at this stage.

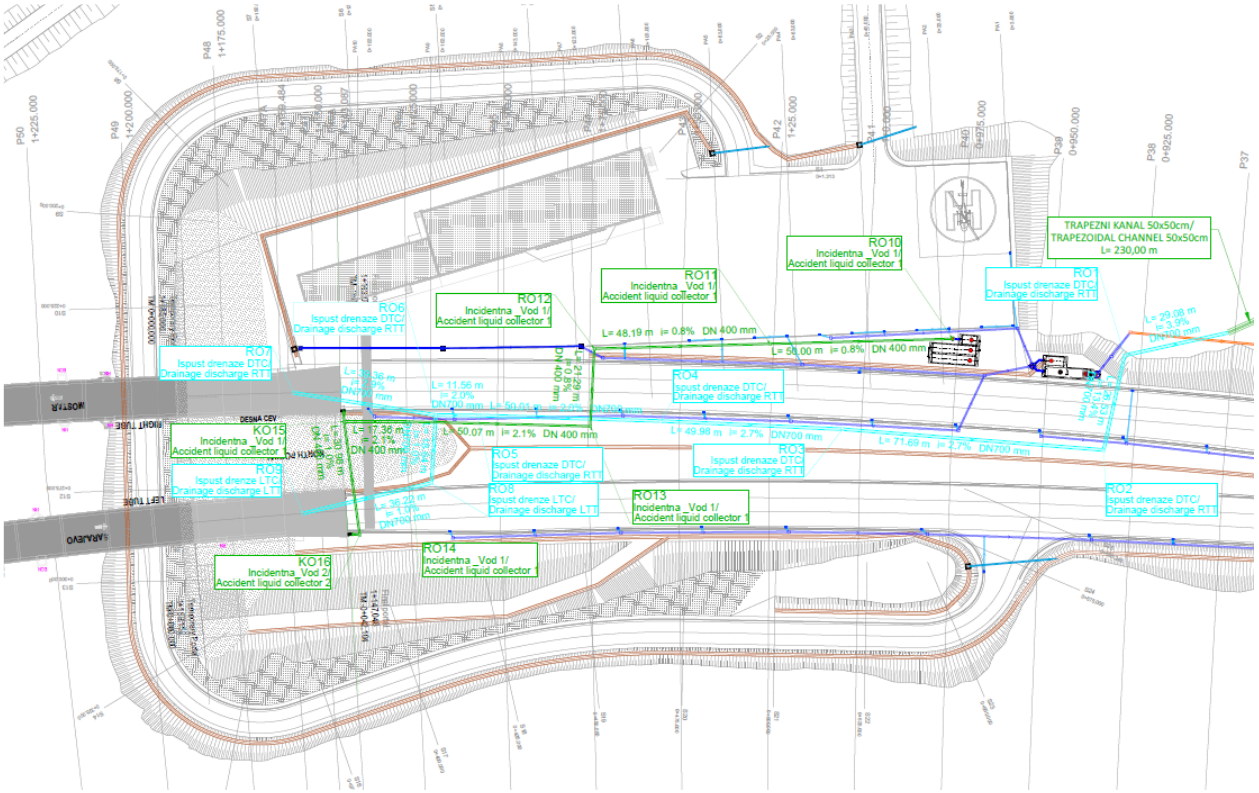


Figure 3-43: Purification system solution for drainage water from the Tunnel Prenj north portal

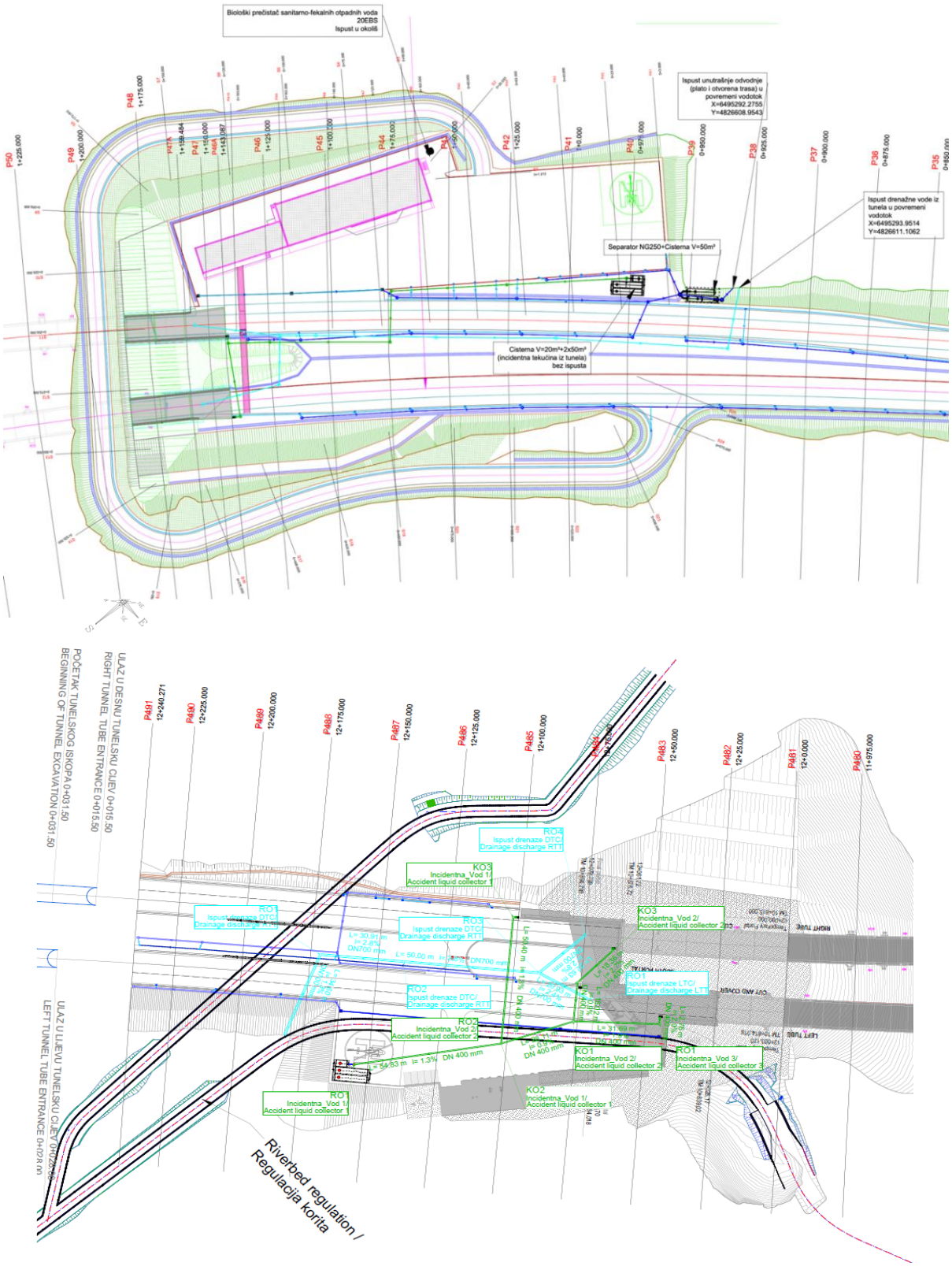


Figure 3-44: Purification system solution for drainage water from the Tunnel Prenj on the south side

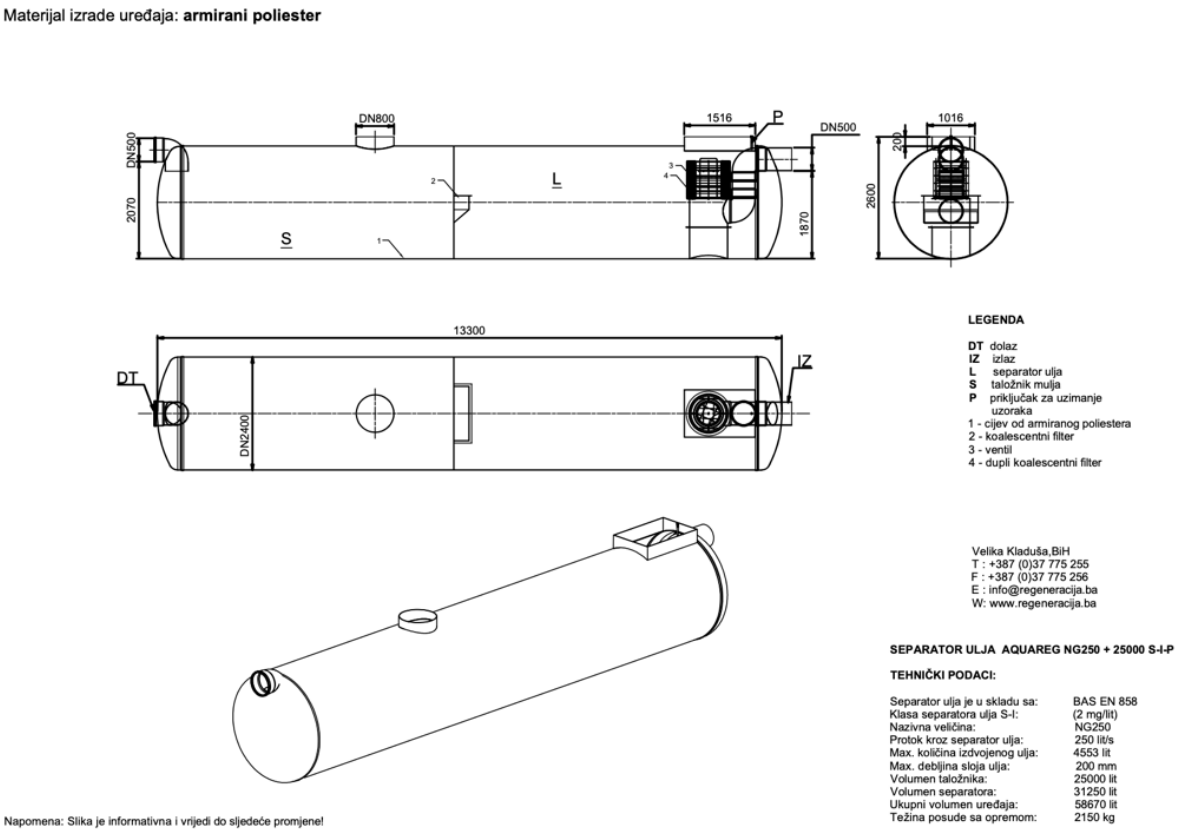


Figure 3-45: Presentation of an example of an oil separator that can be planned for installation at the exit from the Tunnel Prenj

Subsection Prenj tunnel exit – Mostar North Interchange

In the Conceptual Project of Internal Drainage of the Motorway, the section Exit from the Prenj - Petlja Mostar North tunnel, 14 autonomous networks of storm sewers were designed, which eventually end in a treatment device before discharge into open streams or absorption wells. All networks (M) are described separately below:

- M 1, km 0+000.00 to approx. km 2+360.00
- M 2, km 2+380.00 to approx. km 3+040.00
- M 3, km 3+060.00 to approx. km 4+020.00
- M 4, km 4+020.00 to approx. km 5+100.00
- M 5, km 5+140.00 to approx. km 5+480.00
- M 6 – collects water from rest area
- M 7, km 5+120.00 to approx. km 6+180.00 – motorway and rest area
- M 8, km 6+180.00 to approx. km 6+900.00
- M 9, km 6+900.00 to approx. km 7+300.00
- M 10, km 7+300.00 to approx. km 8+500.00
- M 11, km 7+540.00 to approx. km 9+280.00
- M 12, km 9+300.00 to approx. km 9+740.00
- M 13, km 9+760.00 to approx. km 12+180.00
- M 14, km 12+180.00 to approx. km 12+340.00 with connection to the drainage and purification system of Mostar North interchange.

In high-risk zones, it is suggested that water collected from motorway surfaces be treated with oil and light liquid separators at a purification ratio of 100% without by-pass.

Due to the flow limitation per separator of 250 l/s, two or more separators are adopted in parallel operation on networks where the calculated amount of water exceeds this value.

In addition, the installation of tanks for receiving incident liquids are planned. In the event of an incident the automatic shut-off valve in the separator is activated upon detecting a high concentration of hydrocarbons which will result in the contaminated liquid draining into a specially designed tank. The capacity of this tank is sufficient to collect both the transported liquid and the liquid from the tank of the vehicle itself.

The adopted systems for the purification of rainwater by networks are given in the following table.

Table 3-2: Adopted systems for the purification of rainwater on subsection tunnel Prenj-Mostar North

Name	Surface for flow calculation (ha)	Flow Q (l/s/ha)	Water protection system
M 1	1.986	751.02	2xNG250+NG150+ cistern 50 m^3
M 2	1.539	445.48	NG250+NG200+ cistern 3 m^3
M 3	2.353	649.07	2XNG250+NG150+ cistern 30 m^3
M 4	2.805	787.08	3XNG250+NG50+cistern 30 m^3
M 5	1.678	423.01	NG250+NG200+cistern 30 m^3
M 6	0.625	155.81	NG200+cistern 30 m^3
M 7	3.797	1046.45	4xNG250+NG50+ cistern 30 m^3
M 8	1.836	525.46	2xNG200+NG150+cistern 30 m^3
M 9	0.935	310.22	NG200+NG150+cistern 30 m^3
M 10	2.448	731.72	3xNG250+cistern 30 m^3
M 11	1.852	442.01	NG200+NG250+ cistern 30 m^3
M 12	1.183	343.29	NG200+NG150+cistern 30 m^3
M 13	0.691	296.56	NG200+cistern 50 m^3
M 14	x	x	Connection to the next subsection

Hydraulic scheme of purification process in high-risk zones is provided below.

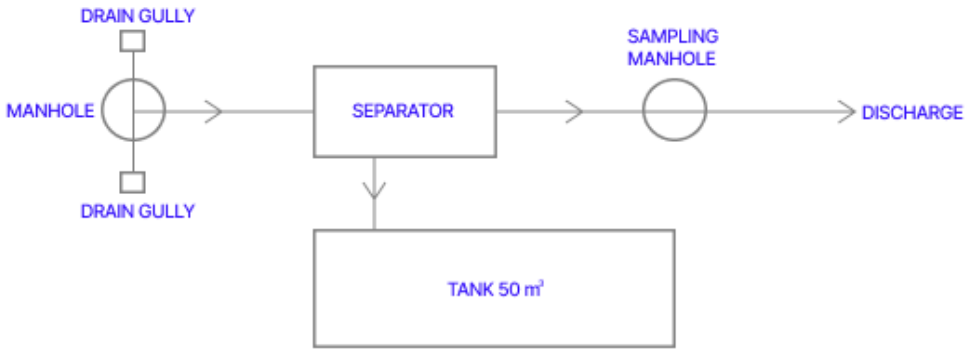


Figure 3-46: Hydraulic scheme of purification process in high risk zones of subsection tunnel Prenj-Mostar North

The installation of SBR devices is planned for the purification of water from the facilities at the rest area. According to the solution from the Conceptual Design, a SBR device with a capacity of 200 ES was designed for the final phase of building construction with the installation of retention due to impact loads (mechanical chamber with retention of 50 m^3).

In the device for the biological treatment of sanitary-fecal water (SBR), the wastewater first enters the mechanical chamber where larger particles settle. The water then flows into the biological chamber where aeration takes place, from where the purified water flows further to the monitoring shaft, that is, to the outlet as shown in the diagram below. After purification, sewage is discharged, together with purified oily water from the asphalt surfaces of the motorway, at chainage 6+180 km.

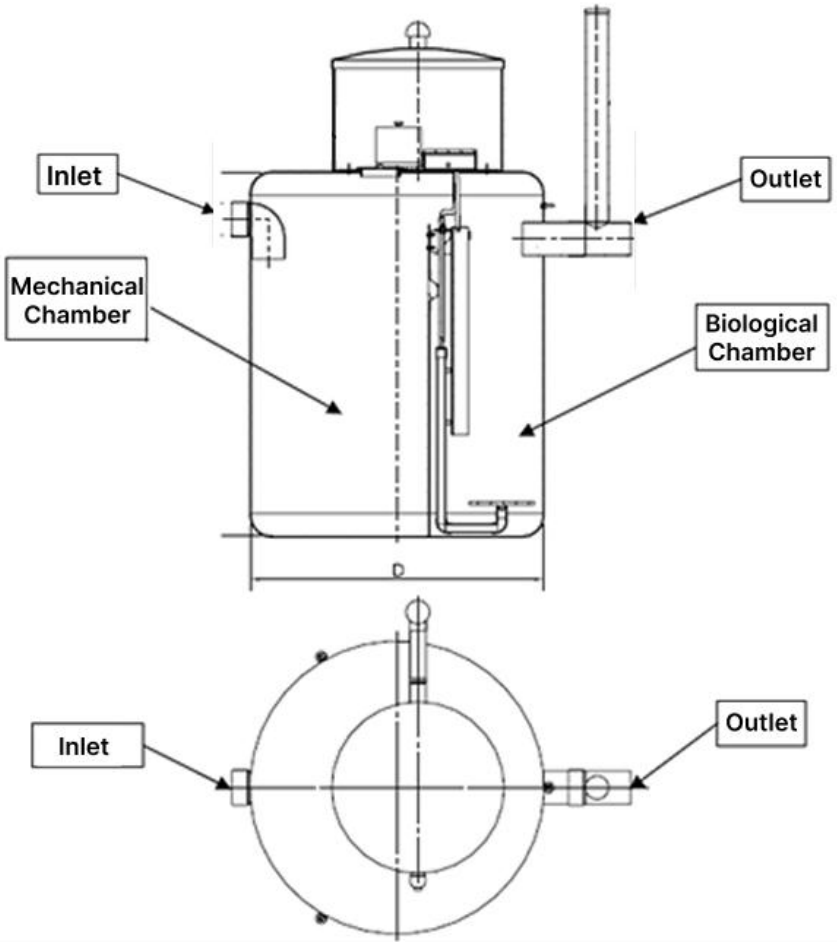


Figure 3-47: Schematic representation of the SBR device for tunnel Prenj-Mostar North subsection

The design foresees the discharge of fully treated motorway runoff to the Neretva River, either directly in the area of the Salakovac catchment or indirectly via an intermittent watercourse located outside the sanitary protection zones of the Bosnjaci catchment. Given the considerable distance between the motorway and the final discharge points, a dedicated collector system will be constructed under a separate design package.

The entire motorway section lies within a hydrogeologically sensitive zone classified as high-risk for contamination, requiring run-off water to undergo full (100%) treatment prior to discharge. In the Bosnjaci area, treated runoff will be directed to a permeable retention basin with an infiltration field before being discharged into an adjacent intermittent stream that ultimately drains to the Neretva River. The basin is designed to allow continuous percolation of stormwater through engineered infiltration layers (100–300 mm stone aggregates), gradually conveying flow toward the watercourse. In cases of prolonged or high-volume runoff, the system allows for temporary accumulation within the basin until the designed overflow is activated, thereby preventing uncontrolled discharged.

Figure 3 473 41: Bosnjaci retention basin layout

The main collector, referred to as Outlet 1, is the longest within the planned drainage system. It collects runoff from four sub-networks (Plateaus 1–4) and conveys it to the final discharge point at the Neretva. Due to the varied terrain and steep gradients, additional inspection chambers, including cascade types, are included to maintain hydraulic performance. At one location, where the collector route intersects the Sarajevo–Mostar main road (M17), trenchless construction using the Grundoram method will be applied to avoid open excavation. A concrete outfall structure is planned at the final discharge point into the Neretva.

3.2.9 Noise Barriers

The purpose of installing noise barriers is to mitigate the effects of noise pollution in urban areas. Detailed information on noise impact assessment is given in Chapter 11, but the basic technical requirements for noise barriers are defined in this Chapter. Requirements include architectural (e.g., visual fit), functional (noise absorption and reflection), structural (e.g., proof of stability for parts and the whole barrier), material requirements (e.g., corrosion resistance, frost resistance, resistance to UV radiation), maintenance requirements (e.g., unified system of production of sound barrier elements), durability (more than 20 years) and application of prefabricated systems (increase of execution speed, lower costs).

Although there are several types of columns for protection walls, it is estimated that steel columns HEA (B) 120-280 meet most of the requirements and are always used except in cases where the use of concrete columns is justified.

The following standards shall be used:

- Standards for reinforced concrete: Eurocode 2, EN 1793-1, EN 1793-2
- Standards for steel: JUS
- Standards for aluminium: DIN 52210, DIN 52212, Din 1725/1, ZTV-LSW 88, EN 1793-1, EN 1793-2
- Standards for wood: DIN 68 800 T3, DIN 68 800 T4, EN 1793-1, EN 1793-2, DIN 4074, DIN 52210, DIN 52212, Din 1725/1, ZTV-LSW 88
- Standards for acrylic glass: DIN 52210, DIN 52212, Din 1725/1, ZTV-LSW 88, EN 1793-1, EN 1793-2

Table 3-3: Minimum requirements for structural elements

Structural element	Type of material	Requirements	Standards
Foundation	Reinforced concrete	Material quality: C25/30 XC2	Eurocode 2
Pillar	Reinforced concrete	Material quality: C30/37 XF2	Eurocode 2
	Steel	Material quality: C 0361	JUS
		Surface protection: Hot-dip galvanised 85 µm	
Noise panels	Reinforced concrete	Material quality: C30/37 XF2	Eurocode 2
		Sound absorption: DLα > 5 Db	EN 1793-1
		Air sound insulation: DLR > 24 Db	EN 1793-2
	Aluminium	Dimension and quality standard	DIN 52210
			DIN 52212
			Din 1725/1
			ZTV-LSW 88
		Sound absorption: DLα > 5 Db	EN 1793-1
		Air sound insulation: DLR > 24 Db	EN 1793-2
	Wood	Vacuum impregnation of wood	DIN 68 800, T3
		Protection against fungi and insects	DIN 68 800, T4
		Sound absorption: DLα > 5 Db	EN 1793-1
		Air sound insulation: DLR > 24 Db	EN 1793-2
		Use of construction wood for developing elements	DIN 4074
		Dimension and quality standard	DIN 52210
			DIN 52212
			Din 1725/1
			ZTV-LSW 88
	Acrylic glass	Dimension and quality standard	DIN 52210
			DIN 52212
			Din 1725/1

Structural element	Type of material	Requirements	Standards
			ZTV-LSW 88
		Sound absorption: DLα > 5 Db	EN 1793-1
		Air sound insulation: DLR > 24 Db	EN 1793-2

3.2.10 Fences

3.2.10.1 Elastic-reflective Fence

Protective fences are technical safety construction equipment whose main purpose is to prevent vehicles from slipping off the road, i.e., to keep vehicles on the road. This equipment is made of steel, concrete (New Jersey type) or a combination of materials. Fences must be installed: in the central area between two lanes depending on the intensity of traffic, on road infrastructure, when the road is on an embankment higher than 3 m, in front of a dangerous place and near another traffic-reserved area.

The protective fence must be equipped with retroreflective markings with red markings on the right in the direction of travel, and white markings on the left side. According to relevant legislation in BiH (*Regulation on traffic signs and signals on roads, the manner of marking works and obstacles on the road and signs given to traffic participants by an authorised person*[8]), protective fences are installed in accordance with EN 1317 and local legislation.

Regulations for protective fencing on roads are:

- Above mentioned Regulation on traffic signs and signals
- JUS U.S 4.110, 1984
- EN 1317 – European standard since 1993. European standard 1317 was harmonised on 01.01.2008 with a transition period of 3 years, so that from 01.01.2011 in EU countries only the use of protective fences certified according to that standard is allowed, with CE certificate.
- EN 12676-1, the height of the anti-stick system (at 1.18 m)

3.2.10.2 Protective Wire Fence

A protective wire fence will be installed along the entire length of the motorway route, except in places where there are already natural or artificial barriers that functionally replace the protective wire fence.

All elements of the fence must be hot-dip galvanised, in accordance with European Standards. Zinc from which coatings are made according to BAS EN 10244-2 standard should have 99.95% purity.

[8] Official Gazette of BiH, No. 16/07

Standards: BAS EN 10219-1, BAS EN 10240, BAS EN 10244-2, BAS EN 10016-1 and BAS EN10016-2 for thicknesses and galvanising of columns and wires.

Table 3-4: Minimum technical requirements for protective fences

Middle pillars	The middle column is ø60.3 mm diameter and height 2450 mm. From that, 750 mm is at the base and 1700 mm is visible above the ground. The column is based on footing depth of 80 cm in concrete of strength class C16/20. The distance between the columns is 350-400 cm The wall thickness of the column is 2 mm according to BAS EN 10219-1. Galvanising of columns is according to BAS EN 10240-class A.1, 55μm.
Tension pillar and bowsprit	The tension pillar and bowsprit should be made of the same material as the middle columns, and the same conditions apply to them in terms of foundation, galvanising and wall thickness. The distance between the tensioning columns is 25 m and they are connected to each other with galvanised clamps which are fastened with galvanised M8 screws.
Mesh	The wire mesh has an opening of about 60x60 mm, wire diameter 2.7 mm and height 1400 mm. The connection mesh for tension wires is done with clips with a diameter of 2 mm and galvanisation in accordance with BAS EN 10244-2. The connection is made on 3 tension wires every 30-50 cm. The mesh can be additionally fastened with dowels to prevent the animals from slipping under the fence. The distance of the mesh from the ground should not exceed 5 cm. The dowels are galvanised with a hook on top of, dimensions of 50-80 cm and are placed at intervals of 1.0 m. By "wedging" the fence, the grounding of the protective wire fences is also achieved. Galvanising of mesh is performed according to EN 10244-2 – class A, 245g/m^2.
Tension wires	Three protective wires with a diameter of 3.0 mm are used to fasten the mesh. Two wires are arranged at the ends of the mesh, and one is in the middle. Additional two tension wires are located above the mesh and are 150 mm apart. Tension wires for pillars are fastened with galvanised self-tapping screws with bases, and they are stretched with galvanised tensioners. The tensile strengths of the wire must be in accordance with BAS EN 10016-1 and BAS EN10016-2, which means 350-500 N/mm^2. Galvanising of tension wires is performed according to EN 10244-2 – class A, 245g/m^2.

3.2.11 Spoil Disposal Sites

Reasoning behind disposal strategy

Earthworks quantities are based on the latest available designs for subsection Konjic (Ovcari)-Tunnel Prenj, subsection Tunnel Prenj-Mostar North, Tunnel

Prenj, Konjic Bypass, and Access roads to Tunnel Prenj and corresponding analyses following geotechnical missions G1 and G21 where completed[9].

It has been assumed that the Prenj Mountain constitutes a physical barrier to any material being transported from the south side (where there is an excess) to the north side in case there is a need. The two subsections (each incorporating half of Prenj Tunnel material) are therefore considered as separate from a mass haul point of view. The transfer of material between the north and south sections should not be accepted for the following reasons:

- Any temporary access road over/around the mountain itself is environmentally undesirable, costly and will be subject to the limitations of winter conditions.
- Using the existing M17 to transport such material over a distance of approx. 50 km is costly and should not be accepted given that lorries will need to cross existing agglomerations such a Jablanica. The deterioration of the existing infrastructure and issues of road safety are also important negative factors.
- An alternative may be to transport such material through a constructed tube of Prenj Tunnel itself. However, this is not consistent with the procurement strategy of the Beneficiary who intends to commence tendering of the works for all sections early 2023. On the basis of 3 m of progress per day, (one sequential cycle being installations, explosives, excavation, support), the opening of 1/2 single tube of Prenj Tunnel may take up to 5 years to complete before transport through the tube may be considered. Such transportation may then hinder the continuation of construction of Prenj Tunnel itself.

Quantities arising from the excavation of Prenj Tunnel have been assumed to be evacuated evenly to the north and south on the assumption of concurrent excavation of the four faces.

A factor of 1.2 for swelling/compaction factor has been assumed for excavated material that will be placed either under the motorway or in waste/landscaped areas.

Earthworks for Konjic Bypass have been considered separately as have been both accesses to Prenj Tunnel and Mostar North Interchange, the latter being addressed under a separate ESIA process.

Konjic (Ovcari) to Prenj Tunnel

On the basis that 50% of Prenj tunnel excavation being "removed" on the north side, the following table summarises the quantities by section of the alignment.

[9] Official Gazette of FBiH, No. 12/10, 16/10

Table 3-5: Quantities of earthworks of the section Konjic (Ovcari) – Tunnel Prenj

Section Konjic (Ovcari) - Prenj Tunnel / Prenj Tunnel	Start (km)	End (km)	Total excavation (m^3)	Unsuitable for disposal (m^3)	Topsoil (m^3)	Excavated material available for embankment (m^3)	Embankment fill (m^3)	Material Excess / Deficit by section (m^3)	Comments
Interchange Ovcari			314,000	31,400	4,000	334 320	15,000	319,320	
Access road interchange			49,000	4,900	5,000	46,920	81,000	(34,080)	
Toll Station Ovcari Interchange			31,000	3,100	2,000	31,080	8,000	23,080	
Ovcari Interchange to Bridge 3	0+440	1+300	226,000	22,600	11,000	230,880	59,000	171,880	
Tunnel 1	1+820	2+487	126,000			151,200	-	151,200	
Motorway between Tunnel 1 and Tunnel 2	2+487	2+680	37,000	3,700	2,500	36,960	54,000	(17,040)	
Tunnel 2	2+680	3+840	234,000			280,800	-	280,800	
Motorway Tunnel 2 to Neretva Bridge 4	3+840	3+969	23,000	2,300	1,500	23,040	20,000	3,040	Konjic Municipality Landfill
TOTAL			**1,040,000**	**68,000**	**26,000**	**1,135,200**	**237,000**	**898,200**	
Neretva Bridge 4 to Konjic South Interchange viaduct 5	4+499	6+418	502,000	50,200	23,000	514,560	273,000	241,560	
Interchange Konjic South			74,000	7,400	4,000	75,120	165,000	(89,880)	
Toll Station Konjic south + access			2,000		2,000	-	13,000	(13,000)	
Rest area Konjic South			3,500		3,500	-	80,000	(80,000)	
Motorway from Viaduct 5 to cut off point	6+418	9+940 approx.	75,000	15,000	35,000	30,000	885,000	(855,000)	Hypoth Equilibrium Prenj Tunnel – can be used for motorway embankment completely
TOTAL			**656,500**	**72,600**	**67,500**	**619,680**	**1,416,000**	**(796,320)**	
Motorway cut off point to Prenj Tunnel Entrance	9+940 approx.	11+500	35,000	7,000	25,000	3,600	1,300,000	(1,296,400)	

Section Konjic (Ovcari) - Prenj Tunnel / Prenj Tunnel	Start (km)	End (km)	Total excavation (m^3)	Unsuitable for disposal (m^3)	Topsoil (m^3)	Excavated material available for embankment (m^3)	Embankment fill (m^3)	Material Excess / Deficit by section (m^3)	Comments
Prenj Tunnel 50% length - 2 tubes			1,300,000	-		1,560,000	100,000	1,460,000	Full reuse incl. 30% treatment
TOTAL Prenj Tunnel	-	-	1,335,000	7,000	25,000	1,563,600	1,400,000	163,600	
Total Motorway			**3,031,500**	**147,600**	**118,500**	**3,318,480**	**3,053,000**	**265,480**	
Access Road to Prenj Tunnel								150,000	
Southern Connection with M17	0+000	3+150	350,000	60,000	40,000	300,000	200,000	100,000	Figures from Concept Design

Note: Pointer shows that material needs to be transported from North of Neretva to South of Neretva

On the basis of the present studies and conclusion of the corresponding geotechnical studies, there is an overall need to dispose:

- 148,000 m^3 of unsuitable material (silt, organic material, etc.) and 265,000 m^3 of excess cut for the motorway,
- 160,000 m^3 for Konjic Bypass,
- 150,000 m^3 for the north access road.

The need for borrow pits seems limited to materials for pavement courses. However, the figures stated above are based on the fact that full reuse and transport is possible by considering the following programming issues and major constraints, otherwise, additional waste areas and borrow pits will be required:

- The excess excavated material north of Neretva River from Ovcari Interchange and the two tunnels will need to be transported and reused south of the river. Given that Konjic Municipality do not wish for construction traffic to traverse the town, it is important that Viaducts No. 3 and No. 4 be constructed as soon as possible to transport approx. 900,000 m^3 of material. Contractor should be set the constraint to construct these bridges first within the tender documentation. Construction of tunnels T1 and T2 north of the river will also need to be programmed to allow for transport of excess material.
- A hypothetical "cut off point" has been identified at approx. km 9+900 where material from Prenj Tunnel (including 30% following treatment/stabilisation that will be confirmed during detailed design) can be fully placed in embankment thus representing an equilibrium. Given that the tunnel excavation may be completed in 5 years, embankment construction may also take the same time. As a result, programming/procurement of the construction works may need to be considered to allow for complete reuse.

Given the characteristics of the project and nature of the terrain, with the motorway located at the foot of the side slopes, **it is now proposed that landscaped areas be constructed as extensions of the exiting motorway embankments**. For technical reasons these will be made of both excess cut and organic material. The key objective for landscaping these areas is to make provisions for ramps in case of brake failure in the zone with a 6.0% longitudinal slope. Upon completion of the landscaping, a thorough evaluation of the external drainage system will be carried out.

The parts of the route that are planned for landscaping are situated at the following sections:

- landscaping section 1: km 7+480.00 to km 7+920.00; capacity – 24,656.00 m^3,
- landscaping section 2: km 8+080.00 to km 8+540.00; capacity – 4,838.00 m^3,
- landscaping section 3: km 9+380.00 to km 10+140.00; capacity – 203,330.00 m^3,
- landscaping in the relocation zone of the regional road towards Borci; capacity – 32,500.00 m^3.
- In total, the capacity of these areas is **265,324.00 m^3**.

Landscaping sections 1 and 2 are located in Gornja Bijela, on the left side of the motorway route. Section 3 is where the largest landscaping project will take place, utilising approximately 203,330.00 m³ of excavation material from the route. It is located near the beginning of the Prenj Tunnel section. By reshaping the left side of the motorway route, the embankment's height will be less visible and will better blend in with the surrounding environment.

The material required for constructing the landscaping embankments can be sourced from excavated material that is not suitable for the embankment construction. Once the landscaping is completed up to the final elevation, the areas will be greened to blend with the surrounding environment.

These areas will be designed and constructed in such a way to ensure their perennity, i.e., having considered geotechnical and hydraulic constraints including drainage measures.

The remaining excess cut material of approx. 150,000 m³ will be required for sub-base and crushed aggregate bases of the pavement.

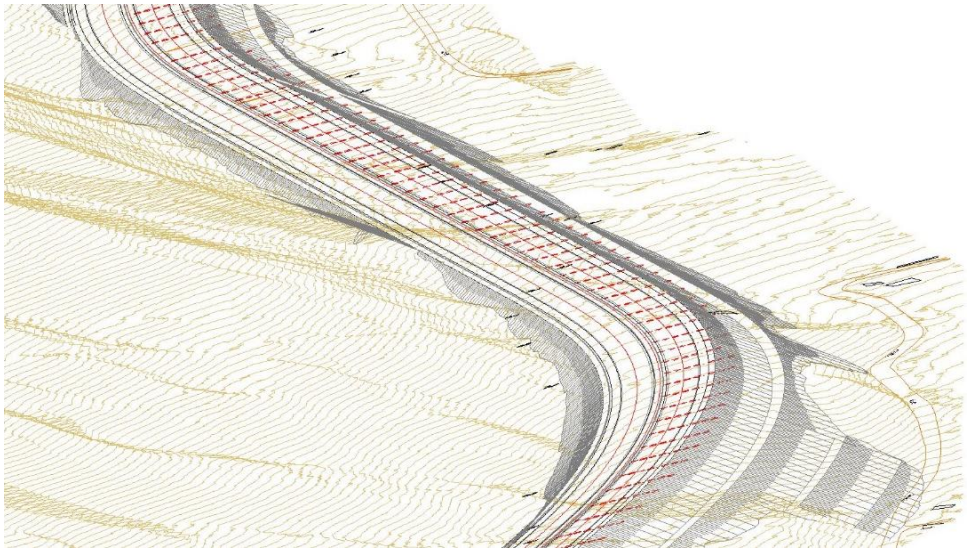


Figure 3-48: 3D model of Sections 1 and 2

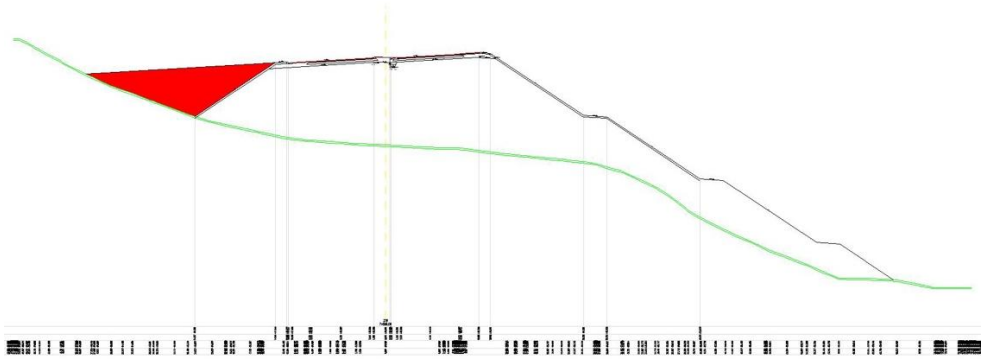


Figure 3-49: Embankment profile on Section 1 and 2

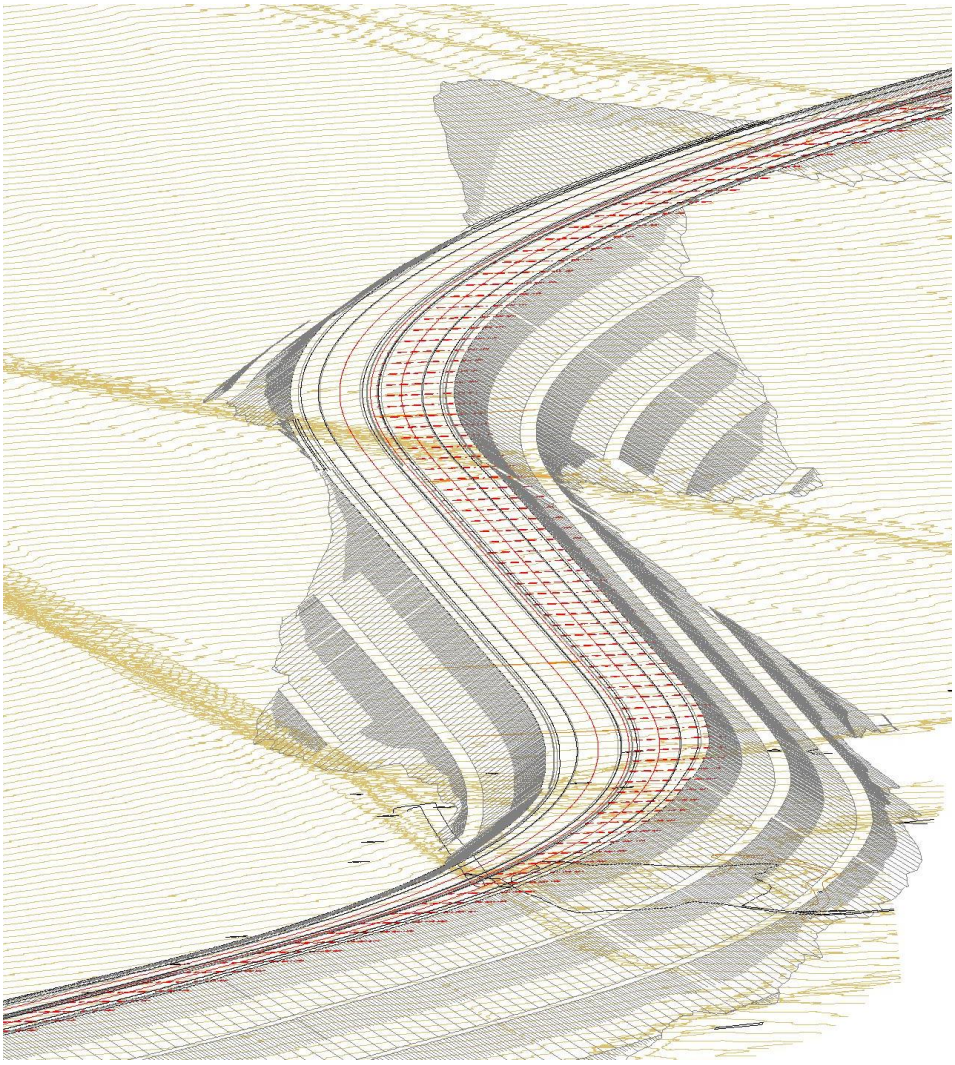


Figure 3-50: 3D model of Section 3

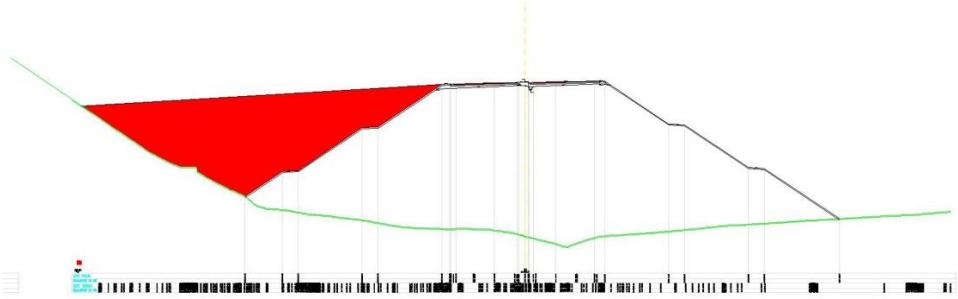


Figure 3-51: Embankment profile on Section 3

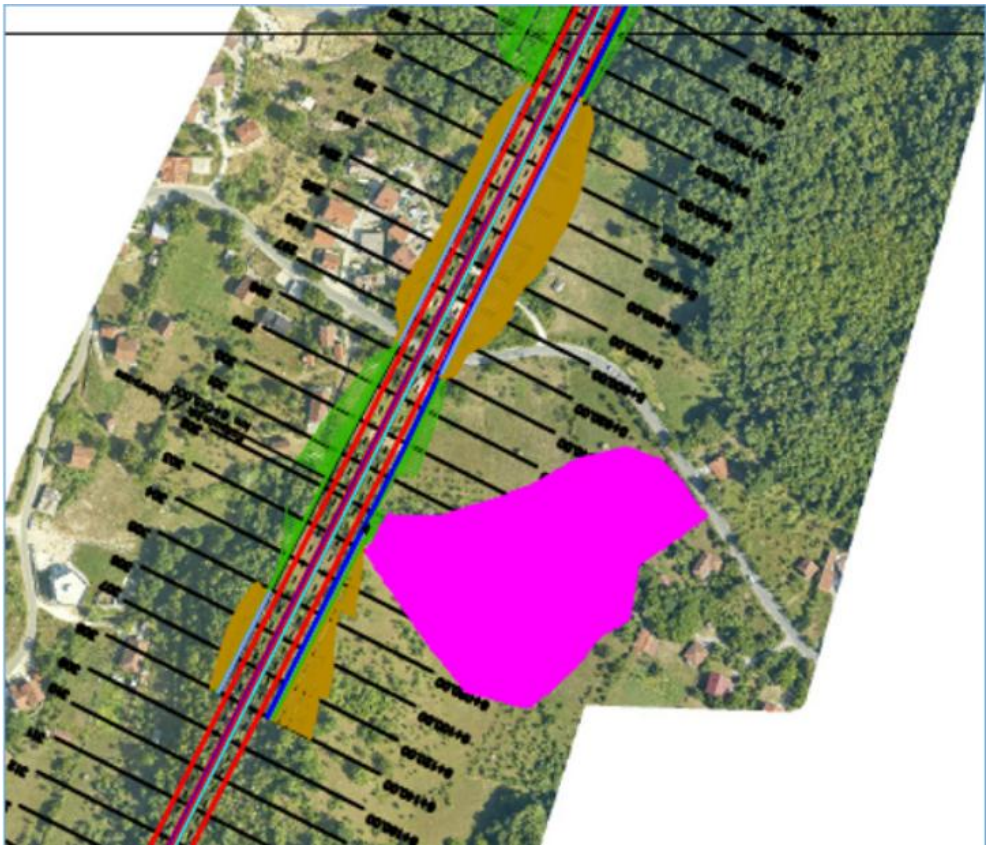


Figure 3-52: Landscaping area between regional road diversion and motorway

Prenj Tunnel to Mostar North Interchange

The following table summarises the quantities of earthworks of the section. The material "unsuitable" is considered as unusable even for treatment and includes any material containing vegetable or organic matter such as peat, or organic silts. Topsoil for reuse has been identified separately.

Table 3-6: Quantities of earthworks of the section Tunnel Prenj – Mostar North

Prenj Tunnel / Section Prenj Tunnel - Mostar North Interchange		Start (km)	End (km)	Total excavation (m^3)	Unsuitable for disposal (m^3)	Topsoil (m^3)	Excavated material available for embankment (m^3)	Embankment fill (m^3)	Material Excess / Deficit by section (m^3)	To Landfill Area (m^3)	Comments
Prenj Tunnel	50% length - 2 tubes			1,300,000		-	1,560,000	40 000	1,520,000	1,520,000	
Prenj-T4	Motorway			36,000	2,000	-	40,800	13 000	27,800	1,230,800	
	Tunnel Klenova Draga	0+031.00 0+042.00	0+872.00 0+843.00	131,000	9,000	-	146,400	-	146,400		
	T4	1+2251+170.00	1+910.50 1+854.50	107,000	7,000	-	120,000	-	120,000		
M9-Mostar north slip road	Motorway	2+273.00	9+796.00	1,547,000	101,000	117,000	1,735,200	1 253 000	482,200		
	T5	9+796.009 +781.50	11+923.00 11+945.50	336,000	22,000	-	376,800	-	376,800		
	Motorway	11+923.00	12+339.00	27,000	2,000	6,000	30,000	124 000	-94,000		
TOTAL				**3,484,000**	**143,000**	**123,000**	**4,009,200**	**1,430,000**	**2,579,200**	**2,750,800**	
Mostar North interchange				58,000				175,000	-175,000	-175,000	Covered under separate ESIA
Access Road to Prenj Tunnel							-		-	80,000	

Approximately 2.8 million cubic meters of material will therefore require disposing of:

- 1.5 million m^3 from Tunnel Prenj.
- 1.2 million m^3 from the construction contract for the motorway.
- With respect to Mostar North Interchange, this will require additional fill material that will come from either the construction works of this section or from those for the subsequent section Mostar North – Mostar South.
- Excess material from access roads construction is approximately 80,000 m^3.

One location in Humilisani is proposed for disposal site on southern side that should accept waste from the construction of section Tunnel Prenj - Mostar North, half of material from the Tunnel Prenj generated on the Mostar side and southern access roads to the Tunnel Prenj. The location of the proposed landfill is located outside the boundaries of water protection zones and of future natural protected areas, along the left side of the motorway, approx. from km 5+700 to km 6+300, and next to the regional road R435a.

Given that it is located approx. in the middle of the Tunnel Prenj - Mostar North section, the transport lengths are approximately equal on both sides. Thus, from the exit of the Prenj Tunnel as well as from the beginning of the Tunnel Prenj - Mostar North section, the transport length is approximately 9 km, and the distance to the landfill from the junction with the Mostar North interchange (exit from tunnel T5) is approx. 9.5 km.

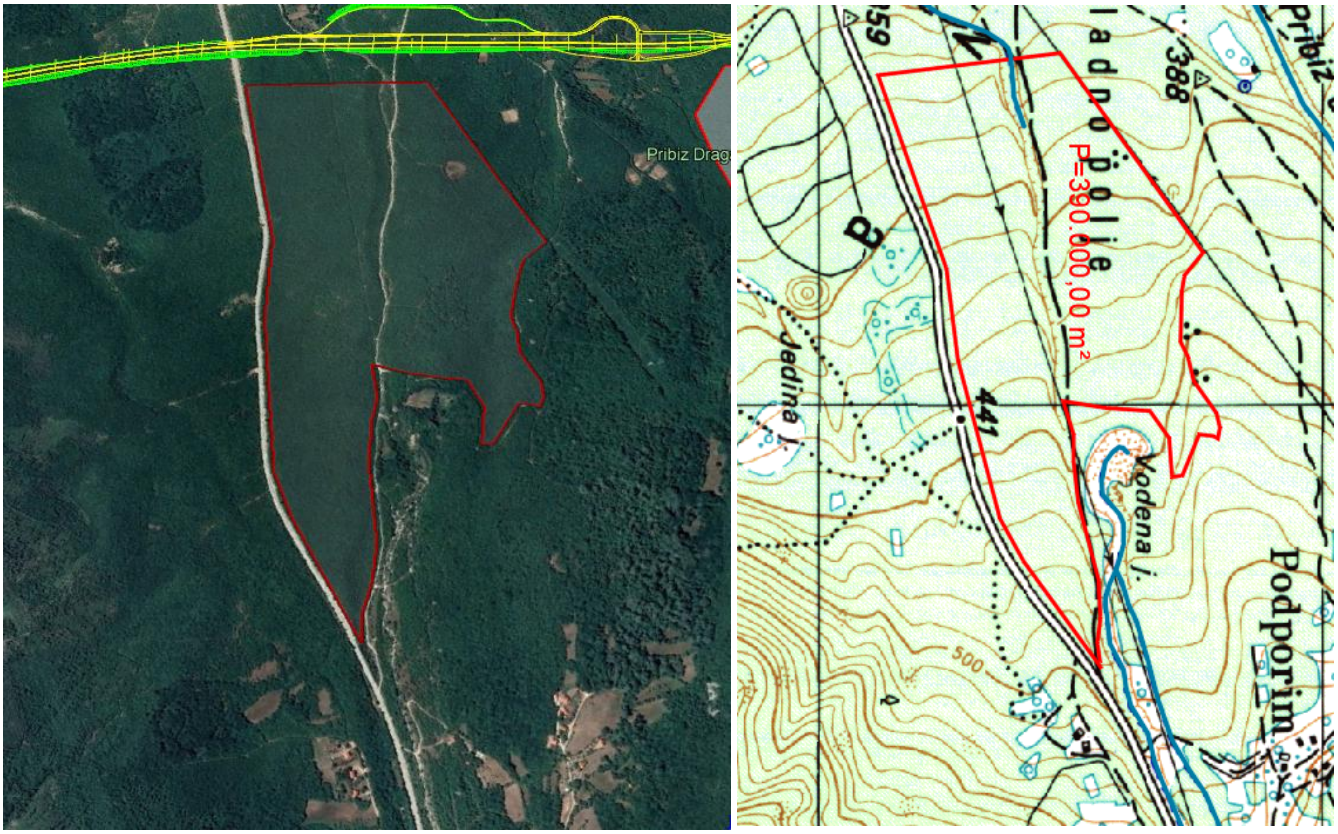


Figure 3-53: Location of the Humilisani disposal site

Mitigation works will need to be foreseen, however:

- the acquisition of one private land plot will be required,

- hydrotechnical facilities will be designed to allow for unhindered passage of watercourses,
- the proposed location of the landfill is not in conflict with the route of the transmission line but ends just before the transmission line,
- waste areas should be constructed in such a way to ensure their perennity, i.e., having considered geotechnical and hydraulic constraints. They shall also be landscaped and topsoiled,
- specific studies will be undertaken to ensure integration within the surrounding environment.

This sole area has the capacity to accept the 2,800,000 m^3 of excess fill including material from the construction of the access roads.

Northern Access Road to Humilisani Spoil Disposal Site

The northern access road, shown in blue in Figure 3-54 (with the motorway and landfill marked in yellow), is approx. 6 km long. This route avoids populated areas and features generally gentler slopes. The maximum longitudinal gradient is 15%, applied only on shorter segments.

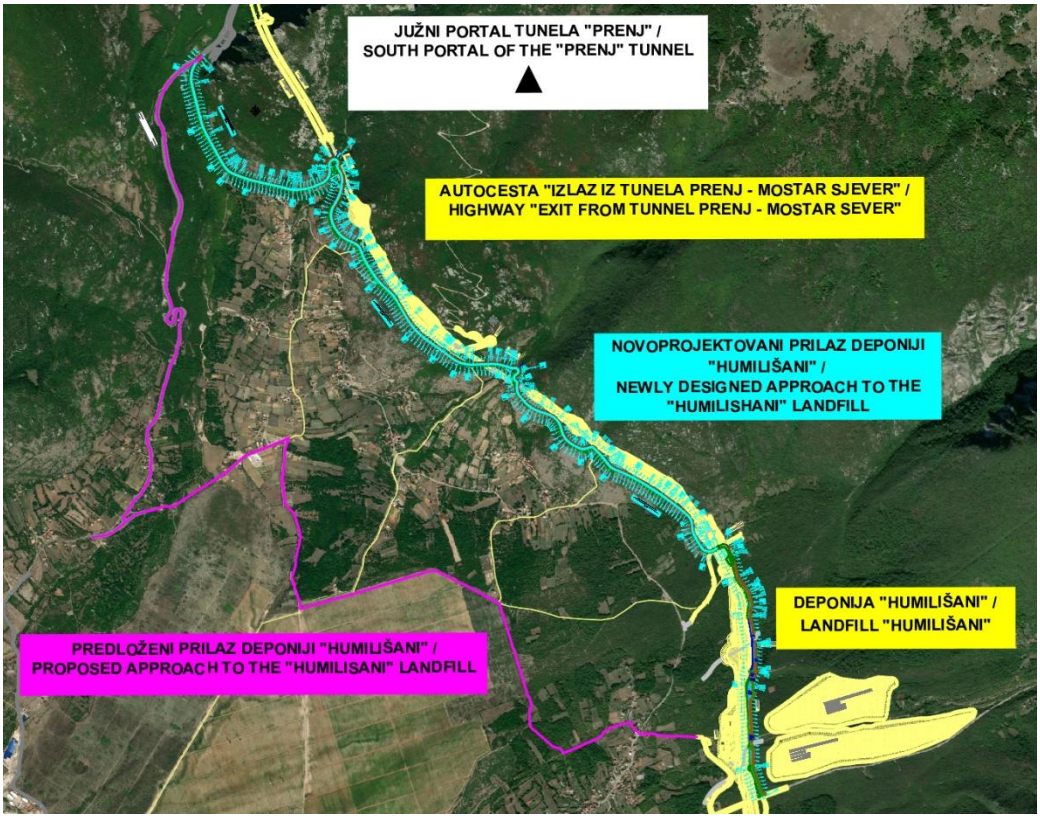


Figure 3-54: Northern access road to Humilisani disposal site (marked in blue)

The northern access road begins at Klenovik and connects to the previously designed road reconstruction near the southern portal of the Prenj Tunnel. The initial section follows the hillside cut toward the Badnjena Draga bridge on the motorway alignment. From there, the access road continues along the planned route, adapted

to the existing terrain. It ends by linking to a newly designed gravel service road leading directly to the landfill.

The road has a maximum gradient of 12% and a width of 2 x 4 m (including shoulders). Curve widenings allow for the safe passing of two heavy trucks. Three culverts are planned to accommodate existing small watercourses at km 0+140, 1+340, and 3+020. The road will be built as a gravel surface with a minimum cross slope of 4% and a compacted base layer of 35 cm. The total road length is approx. 4.6 km.

Southern Access Road to Humilisani Spoil Disposal Site

The southern access route to the Humilisanis disposal site stretches from the settlement of Humilisani to the southern portal of the Orlov Kuk tunnel, with a total length of approx. 6.7 km. It consists of two connected road sections, each with a distinct function and status.

Section 1: Humilisani – Kutilivac (2.3 km)
This section serves as a permanent gravel service road, forming the initial part of the landfill access. It runs along the left slope of the planned motorway corridor and provides access to adjacent parcels. The road is designed as a gravel-surfaced carriageway, with a total width of 2 x 4 meters (including shoulders) and widened segments in curves to allow safe passing of two heavy trucks. The design includes a minimum cross slope of 4% and a 35 cm compacted base layer.

Section 2: Kutilivac – Southern Portal of the tunnel Orlov Kuk (4.4 km)
This section is temporary in character and ensures connection from Kutilivac to the southern portal of the tunnel Orlov Kuk. The road initially follows the reserved motorway corridor up to the northern tunnel portal, then diverges along the hillside to reach the southern portal.

To avoid crossing the second-level water protection zone, the road was designed in the third-level zone. The alignment respects technical constraints related to longitudinal gradients, keeping the maximum slope at 12%, while either avoiding or only marginally touching sensitive protected areas.

The road geometry mirrors the design standards used in Section 1 – 2 x 4 meters total width (with curve widenings), gravel surface, 4% cross slope and 35 cm base layer. It descends from an elevation of 237 m at approx. km 0+696 (near the northern tunnel portal), rises to 340 m at approx. km 2+204, and then follows the terrain down to the southern portal of Orlov Kuk.

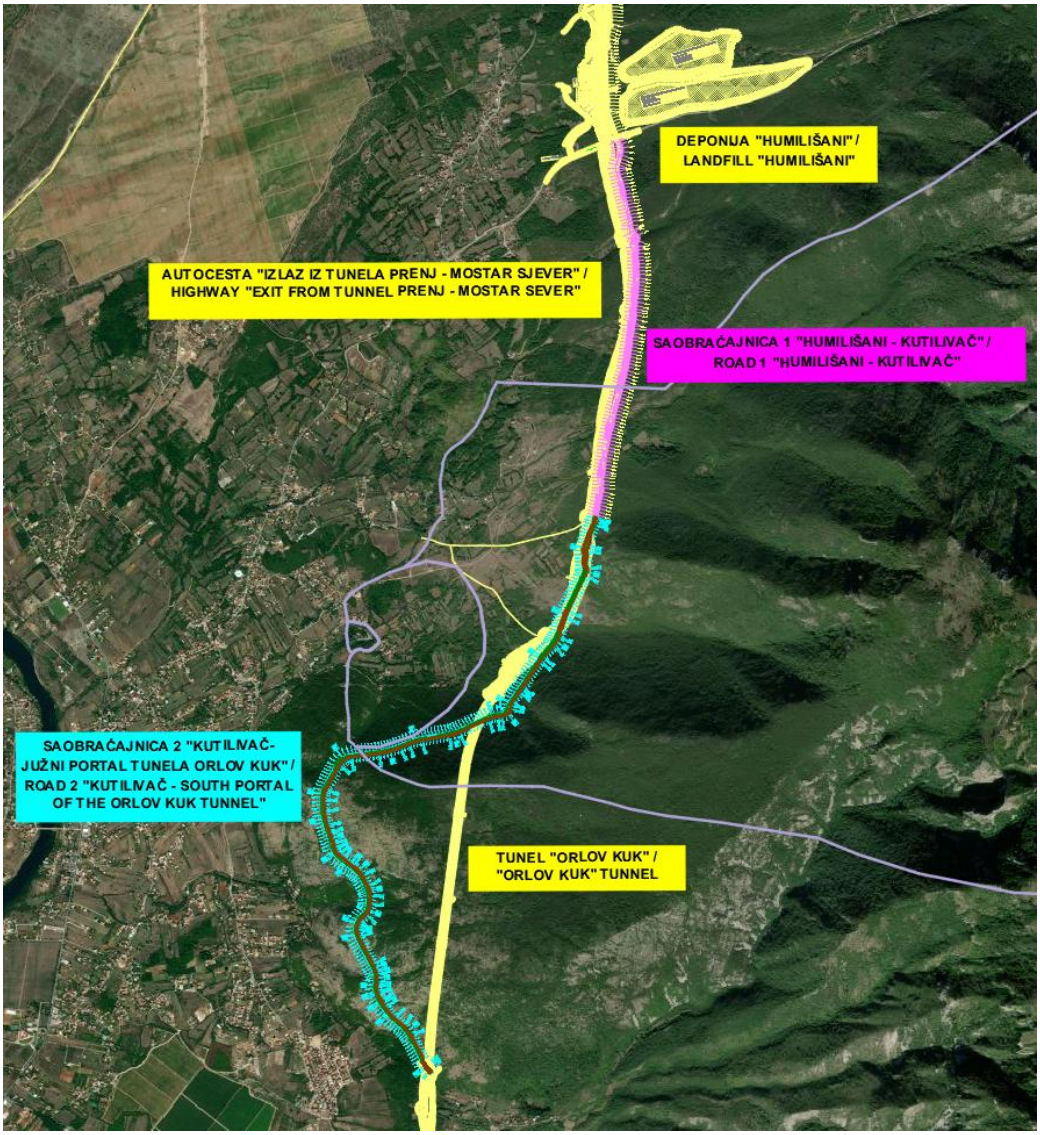


Figure 3-55: Southern access road to Humilisani disposal site (Section 1 marked in purple, Section 2 marked in blue)

Together, Sections 1 and 2 provide continuous southern access to the Humilisani disposal, with a combined length of 6.7 km.

Southern Connection to the Main Road M17 (Konjic Bypass)

This section, according to the current studies, will generate an excess of material for placing in waste areas of 160,000 m^3. It is foreseen that the excess material be placed in the Konjic Municipal Solid Waste disposal site that is located adjacent to the project and is located outside any future protection areas.

Particular constraints should be imposed on the contractor to avoid traffic crossing Konjic.

Figure 3-56: Location of the Konjic Landfill

Considering the different types of materials brought within the disposal sites, it is necessary to plan the transport and unloading of different materials. Materials will be brought by dump trucks or tippers. Machines for spreading, planning and compaction of imported excavated material should be provided at the sites. Material compaction will be done in layers with vibro rollers. Filling of the material should be done up to the projected slopes, while respecting the projected slopes which will ensure the drainage of the landfill surfaces. When excavation works are done, the sites will be flattened and closed.

After the formation of the disposal sites, it is necessary to carry out humification. For this process, removed humus will be used (deposited from the site) along with new humus if necessary. It is planned to carry out humification the slope in a layer of 20 cm.

Along the perimeter of the disposal sites, peripheral ditches are planned for the reception of external rainwater and rainwater from the closed part of the sites, which drain the water to the nearest recipient. On the other side, the projected ditch follows the edge of the sites and fits into the drainage ditch along the path of the existing road to the recipient. In places where the slope of the ditch is higher than 4%, it is necessary to line the ditch with concrete elements. During transport, trucks should be covered with a tarpaulin, and the wheels should be washed before using the main road.

The areas of the landfill closing plateau are projected horizontally. The slope of the scarp between the two layers is given in a slope of 1:2 so that the scarp of each subsequent surface is pulled by 2.00 m towards the middle of the landfill due to the shedding of material and the stability of the scarp.

3.2.12 Borrow Pits

Although both sections north and south show that the need for external sources of embankment material may not be required, borrow material will however be

required for example for pavement courses, hydraulic protection, and concrete. Such sources may be:

- from existing private quarries located within the future protection zones,
- from private quarries located outside the future protection zones,
- from future quarries that the contractor himself may open.

The works Contractor will have the responsibility to choose the source of such material. An inventory of existing licensed pits is shown below for the northern section. Of note are those located within the proposed Natura 2000 and Emerald protected areas and water protection zones.

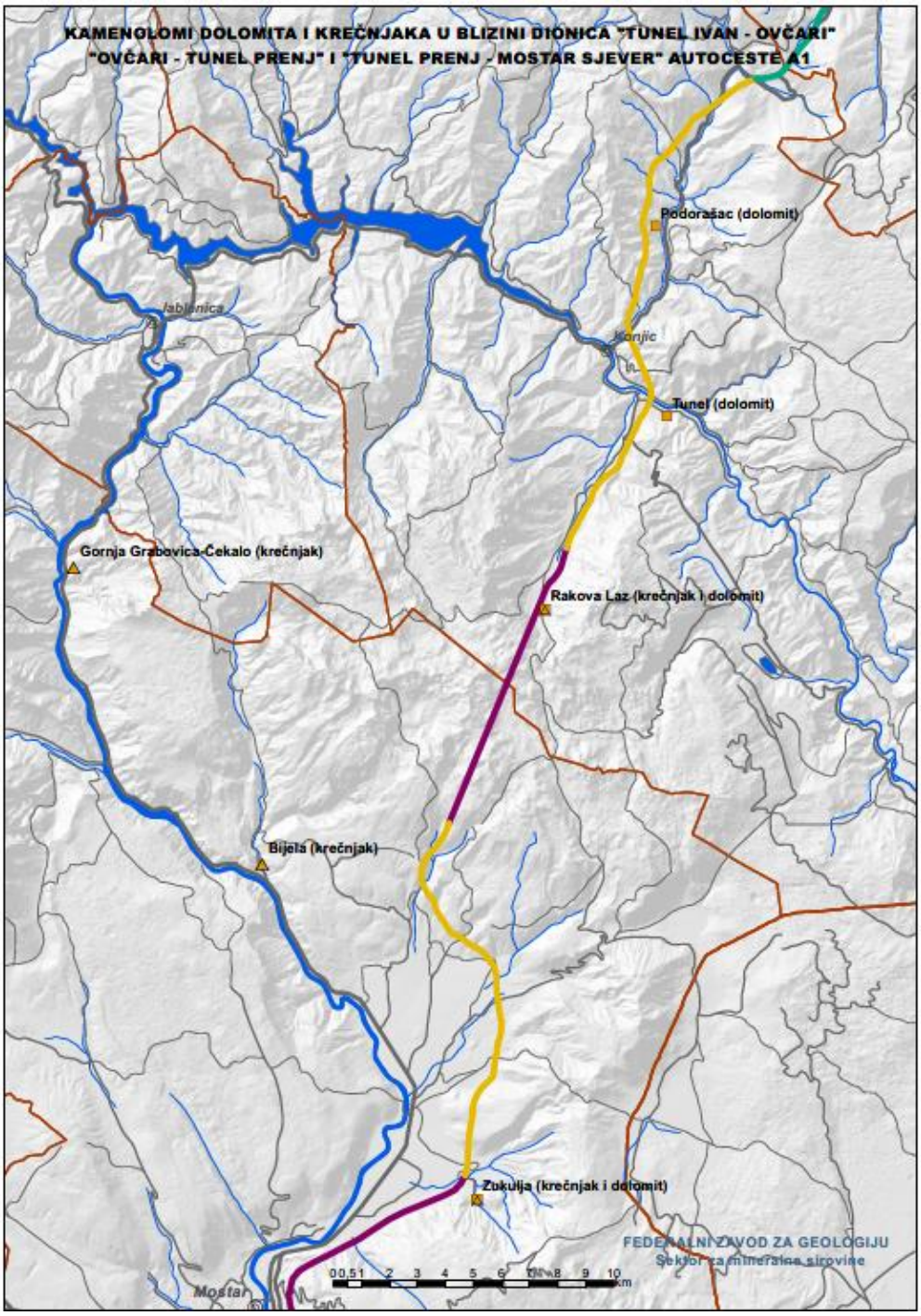


Figure 3-57: Location of the quarries in the vicinity of the motorway (source: FBiH Geological Institute)

In case the Contractor decide to open new borrow pits instead of material purchase, these pits must not be located in protected areas. Measures and guidelines for the opening of new borrow pits that must be implemented are outlined in *Chapter 15 Waste and Materials Management* and *ESMP*.

In addition, constraints concerning eventual itineraries through City of Konjic will be discussed by the Contractor and agreed with the City of Konjic.

3.2.13 Local Roads

Where local and other access roads will be cut by the motorway, new connection roads will be constructed for providing access of the local community to land plots.

At the point of intersection with the motorway route belonging to the subsection Prenj Tunnel-Mostar South, it is planned to relocate and place the existing road network under, above or parallel to the motorway route.

The motorway in the area of Seocka Draga, at km 25+200, intersects the local road; therefore, a local road is designed at this location parallel to the route and passes under the Viaduct 10 at km 25+450. Total length is 900 m, and total width is 5.5 m.

The figure below presents the intersection of local road with the motorway in Seocka Draga.

Figure 3-58: Intersection of local road with motorway in Seocka Draga (source: Google Earth)

At chainage km 26+875, a new underpass is planned to secure the passage of the local road (2a) towards the Podgorani settlement on the left side of the motorway. Reconstruction of the local road in the part below the underpass at a length of approx. 90 m is planned. A parallel local road (2b) with motorway was also designed as a part of the underpass, to connect the local roads on the left side. The length of the local road (2b) is 315 m. The figure below presents the underpass in the Podgorani settlement.

Figure 3-59: Underpass in the Podgorani settlement (source: Google Earth)

At the chainage from km 27+750 to km 28+400, a parallel local road is designed which connects settlements and local roads on the left side of the motorway to the road R435a and on the right side it connects with the Humilisani settlement via an overpass. The length of the local road is 630 m. The figure below presents the underpass in the Humilisani settlement.

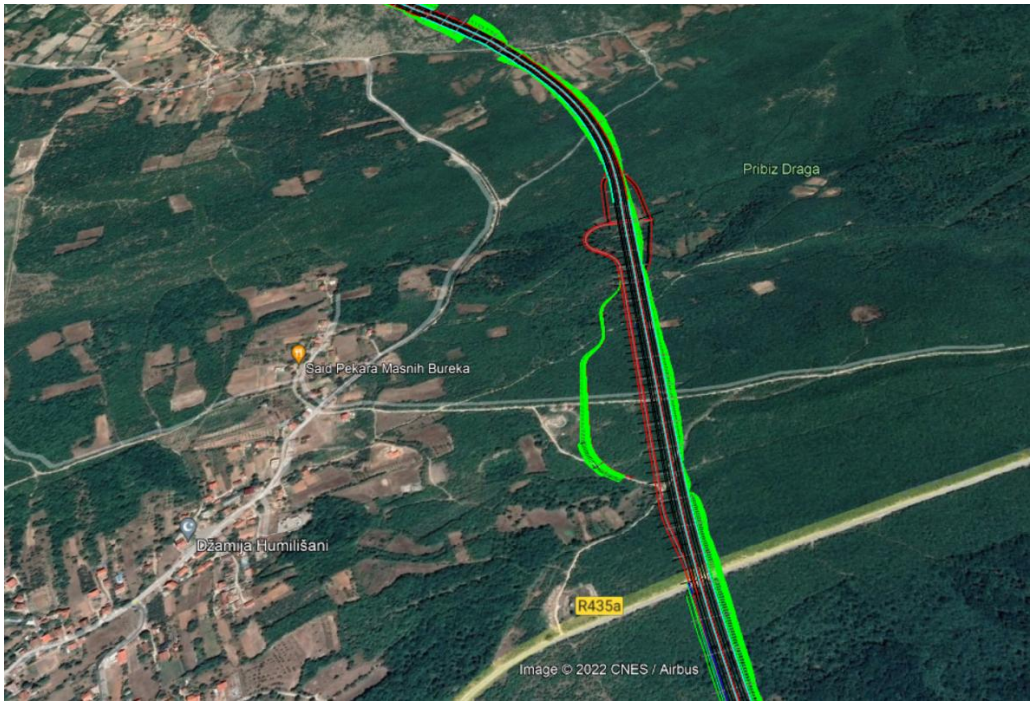


Figure 3-60: Overpass in the Humilisani settlement (source: Google Earth)

The route of the motorway intersects the regional road R435a at km 28+400, as presented in the figure below. For this reason, overpass 1 was designed to cross the route of the regional road above the level of the motorway. The axial route of the R435a is fitted into the existing road condition with the length of 600 m. The width of the regional road is 6.6 m.

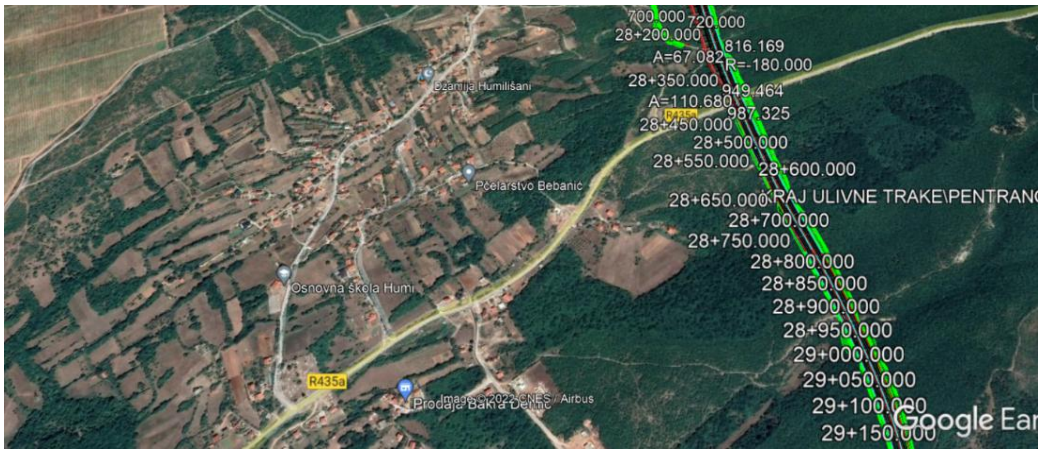


Figure 3-61: Intersection of motorway and regional road R435a (source: Google Earth)

The motorway leads to the existing local road infrastructure in the Kutilivac settlement at 34+450, from the right and left side of the motorway. From the right side, the underpass connects the motorway with the Potocina settlement and from the left, it leads further into the Kutilivac settlement. Further on, the Mostar North Interchange underpass leads to the roundabout in the Bijelo Polje settlement which connects the motorway and four different local roads, and finally, another roundabout at the end of the underpass that connects to the main road M17. The figure below presents the roundabout in the Bijelo Polje settlement and connection roads.

Figure 3-62: Roundabout in the Bijelo Polje settlement and connection roads (source: Google Earth)

The figure below shows the underpass that connects to the main road M17.

Figure 3-63: Underpass that connects to the main road M17 (source: Google Earth)

3.3 Construction Activities

All construction activities will be planned in accordance with technical elements of the motorway and other parts of the road which are defined according to the *Rulebook on the basic conditions that public roads, their elements, and facilities on them must meet in terms of traffic safety*[10]. The construction of both subsections and the Prenj Tunnel will be performed according to the Red FIDIC book, i.e., construction will be carried out in accordance with the design provided by the Investor. However, works may include some design elements for civil, mechanical, electrical and/or construction works.Workers' accommodation (camps) will be required for the Project, which will need to be set up in line with EBRD/IFC Guidance Note "Workers' accommodation: processes and standards" 2009. Currently, there are no estimates on the number of workers needed for the construction of this motorway section as this will be defined by the Contractor prior to the start of construction works. Some key personnel positions might include Project manager, Site manager, Earthworks manager, Electrical manager, Occupational health and safety manager, Environmental specialist, Responsible designer for tunnel, Responsible designer for bridge/viaduct, etc. In the invitation to the tenderers, only the positions and the required general and experience in similar works are defined, and tenderers should propose a first-choice candidate and an alternate. After the tender is awarded, the selected Contractor is solely responsible to ensure and select a sufficient number of employees needed for construction works.

The most significant works that are usually performed during the construction of the motorway are:

[10] Official Gazette of BiH, No. 13/07

- preparatory works - clearing the terrain (removal of bushes, felling and removal of trees, demolition, and removal of prefabricated and other buildings), opening the access roads, building of construction camp and associated facilities,
- earthworks and foundations - excavations (surface layers of humus with loading, excavations of soil material for foundations, canal trenches, culverts, manholes and drainages), embankments,
- placement of sub-base aggregate,
- protective layers with bituminous mask,
- asphalting,
- installation of noise barriers,
- installation of concrete fences,
- making of longitudinal and transverse drainage.

In addition to the construction of the motorway route, the Project also envisages the building of ancillary facilities that require specific construction works. Since the technical details of construction works are not available at the time of the ESIA development, the following table gives an overview of the typical construction works performed on different type of structures foreseen on this subsection.

Table 3-7: Type and approach to execution of works during the construction of the subsection Konjic (Ovcari) - Prenj Tunnel - Mostar North

Structure	Description of planned works
Motorway route and rest areas	› Preparatory works - Removal of shrubs and trees with trees, stumps, and branches from sparsely overgrown areas by machines in the zone of the expropriation line › Execution of earthworks - excavation and embankment works that are performed manually and with machines depending on the depth of excavation / embankment for the purpose of arranging the foundation soil plan, construction of stairs, foundations, canals, ditches, culverts, manholes, etc. › Construction of pavement structure - Making of unbound bearing layer, upper bearing layer of bituminised crushed stone of granulation 0 / 22s with road bituminous binder, wearing and protective layer of fines with bituminous mastic SMA 11s from crushed fractions from silicate rocks 4mB and debris cement concrete › Execution of works on water drainage – making of longitudinal and transverse drainage of cement concrete with adequate filling with delivered bulk materials › Erection of noise barriers and protective fences › Execution of works on adequate signalisation
Bridges and viaducts	› Preparatory works - Removal of bushes and green areas by machines, staking out the location, construction of all temporary structures required for the construction of the bridge › Execution of earthworks - excavation works by machines for the foundations of the planned pillars, installation of hard rock embankments between the abutment wings, soil reinforcement, on parts next to abutments, is done using uniaxial HDPE (High-density polyethylene) geogrids, which are clamped between segmental concrete blocks › Concrete works - installation of drilled piles of reinforced cement concrete, installation of reinforced cement concrete C30 / 37 in abutments, abutment wings and middle pillars, installation of reinforced

Structure	Description of planned works
	cement concrete C40 / 50 in span structure of solid slab type, installation of reinforced cement concrete C25 / 30 in piles, head beams and transition plates › Reinforcement works - installation of ribbed bars made of high-quality steel BSt 500 S and installation of ropes made of smooth steel wires of round cross-section, high tensile strength in the span structure
Toll collection booths	› Execution of earthworks - Excavation for footing, backfilling of material around the footing, spreading and compaction of a buffer layer of gravel under the floor of the structure › Concrete works - Concreting of base concrete below the footing, concreting of AB footing, concreting of AB foundation beams, concreting of AB slab, concreting of AB ceiling slab, concreting of AB columns, production of ceiling AB horizontal beams, production of cement lightly reinforced › Screed › Masonry works - Masonry of facade (external) walls made of modular brick blocks, Mechanical plastering of brick walls with extension mortar in two layers › Waterproofing and thermal insulation works › Sheet metal work › Installation works › Ceramic, facade, and roofing works
Tunnels	› Execution of earthworks - mechanical excavation of a wide excavation of materials for making incisions for a covered tunnel, mechanical excavation of soil for foundations and drainage pipes, possible mining › Execution of concrete works - installation of reinforced cement concrete in foundation strips, installation of reinforced cement concrete in the walls, wing walls and pillars of the tunnel, the installation of reinforced cement concrete into the tunnel slab. › Reinforcement works - installation of ribbed bars made of high-quality steel, installation of ropes made of smooth steel wires of round cross-section, high tensile strength in the tunnel plate › Construction of pavement construction - installation of stone material as a base for pavement construction, production of mechanically stabilised tampon, production of cement stabilisation, production of upper bearing layers of bituminised material, production of wearing layer, installation of prefabricated curb made of concrete, installation of prefabricated slabs for inspection tracks. › Execution of works on adequate tunnel drainage › Execution of works on adequate tunnel signalisation

3.4 Analysis of Alternatives

3.4.1 No Project Alternative

The "No Project" alternative represents a scenario in which the Corridor Vc motorway, specifically the section including the Prenj Tunnel, is not constructed. While this option was analysed during the initial Feasibility Study (2005–2006) and

revisited in subsequent assessments, it was ultimately deemed unacceptable due to significant economic, environmental, and social drawbacks.

Corridor Vc is a critical component of the Trans-European Transport Network (TEN-T), extending into the Western Balkans and integrating BiH into the broader European economic and transport system. Without the motorway, BiH risks being bypassed by regional and continental trade routes, resulting in missed opportunities for economic growth, reduced competitiveness, and continued reliance on outdated infrastructure. The current M17 road, which serves as the primary transport artery through this region, is already burdened by increasing traffic volumes, congestion, and environmental pressures.

Projections from the Traffic Study and Cost-Benefit Analysis (CBA) clearly illustrate the consequences of not proceeding with the motorway project. Traffic modelling was conducted in line with EIB guidelines and European Commission economic assessment tools, and the findings provide a compelling case for the project's necessity.

Below are the Average Annual Daily Traffic (AADT) projections for key motorway subsections with the motorway investment:

The motorway subsection	AADT in 2029	AADT in 2030	AADT in 2035	AADT in 2040	AADT in 2045	AADT in 2050	AADT in 2055
Tunnel Ivan - Ovcari North	13566	14136	17034	19940	23002	26280	29734
Ovcari North - Ovcari South	9556	9961	11993	14046	16204	18512	20944
Ovcari South - Konjic North	10117	10545	12701	14870	17154	19598	22174
Konjic North - Konjic 2	9875	10292	12396	14514	16744	19130	21644
Konjic 2 - Konjic South	9606	10013	12057	14118	16288	18610	21054
Konjic South - Prenj North	10475	10918	13149	15396	17762	20292	22960
Prenj North - Prenj South	10475	10918	13149	15396	17762	20292	22960
Prenj South - Mostar North	10475	10918	13149	15396	17762	20292	22960

In comparison, under a "No Project" scenario, the projected AADT in 2030 on the existing M17 road would be:

- 13,080 vehicles/day between Konjic and Jablanica,
- 12,439 vehicles/day between Jablanica and Mostar.

With the motorway in place, traffic volumes are projected to redistribute significantly, reducing the load on the existing M17 road to:

- 4,295 vehicles/day between Konjic and Jablanica,

> 3,341 vehicles/day between Jablanica and Mostar.

Additionally, motorway projections indicate an AADT of approximately 10,918 vehicles/day between Konjic and Mostar by 2030. These numbers clearly highlight the motorway's role in traffic redistribution, reducing congestion on the existing road while accommodating increased regional and transit traffic volumes.

Economically, failure to implement the Project would mean foregoing substantial macroeconomic benefits, including improved regional connectivity, enhanced market accessibility, and opportunities for foreign and domestic investments. The CBA[11] demonstrates that the Corridor Vc motorway is not only economically viable but essential for unlocking long-term economic potential in the region. Key Indicators from the CBA Analysis:

> Economic Internal Rate of Return (EIRR): 11.67%
> Economic Net Present Value (ENPV): 2,420.63 million BAM at a discount rate of 6%.

Without the Project, the economic benefits associated with reduced travel time, fuel savings, improved logistics, and increased trade volumes would remain unrealised. Furthermore, the potential for job creation during both construction and operational phases would be lost, impacting local and regional socio-economic development.

Socially, the "No Project" scenario would fail to address critical safety and quality-of-life concerns for communities residing along the existing M17 route. Increased traffic congestion and poor road infrastructure contribute to higher accident rates and unsafe driving conditions. Additionally, the absence of an alternative route would perpetuate elevated noise levels, air pollution, and overall environmental degradation in densely populated areas along the M17 road corridor.

In the context of national and international strategic frameworks, including Bosnia and Herzegovina's obligations under the TEN-T policy and agreements with the EBRD and the EIB, the "No Project" scenario would represent a significant setback. The alignment has been carefully selected and integrated into the Spatial Plan for the Area of Special Interest for FBiH "Motorway on Corridor Vc" (2008–2028), legally adopted by the Parliament of FBiH. Reversing this decision would require the reopening of strategic spatial planning processes, incurring delays, legal challenges, and significant financial losses.

In conclusion, the "No Project" alternative is not a viable option. The socio-economic and environmental consequences of failing to construct this section of the Corridor Vc motorway far outweigh any potential benefits of avoiding construction impacts.

[11] The socio-economic evaluation was conducted according to internationally accepted methodologies, including EIB's Guide to Economic Appraisal of Investment Projects (2023), European Commission's Guide to Cost-Benefit Analysis of Investment Projects (2008), European Cohesion Policy Assessment Tool (2014-2020)

3.4.2 Analysis of Alternative Routes

Initial activities for Corridor Vc in 2005-2006

The Ministry for Communication and Transport of BiH (MCTBiH) undertook the first activities related to comprehensive Project preparation in 2005 and 2006. A set of documents titled "**Planning and Study Documentation** (PPSD)" for the entire Corridor Vc" was developed[12], aimed to define the optimal technical solution for Corridor Vc, as well as its economic and financial feasibility. **The PPSD also included a Multi Criteria Analysis (MCA) and EIA documents (Preliminary EIA followed by full EIA Study).**

The **MCA** was carried out in 2006 to decide the most adequate corridors for the new motorway. Seven alternatives were considered, the first one being the no-project alternative. All the considered routes start from the same point, near Tarcin, and have the same ending point, in the north Mostar.

The main data of the alternatives studied are presented in the following table.

Table 3-8: Proposed project alternatives in the Planning and Study Documentation for Corridor Vc (2005-2006)

Alternative	Description	Length (km)	Interchanges	Number of bridges	Number of tunnels
0	No project alternative	-	-	-	-
1	Upgrading of existing road to motorway standards	about 70	To be evaluated	To be evaluated	To be evaluated
2A	Follows the River Neretva after Jablanica	63.8	Tarcin, Konjic and Jablanica	34	39 (max 3,800 m)
2B	Similar to 2A, but more far from Neretva	62.9	Tarcin, Konjic and Jablanica	32	32 (max 4,250 m)
3	After Konjic, passes far from Neretva	60.4	Tarcin, Konjic and Jablanica	22	35 (max 6,400 m)
4	Goes into mountains after Konjic, not passing by Jablanica	56.5	Tarcin and Konjic	31	27 (max 9,150 m)

[12] C. LOTTI & Associate and SPT, with sub-consultants: TZI Engineering Sarajevo and Energoinvest Sarajevo

	(*route foreseen by the Spatial Plan of BiH 1981-2000*)				
5	Arrives to Mostar through the Prenj Tunnel	45.3	Tarcin and Konjic	8	12 (max 12,070 m)

The analysed criteria included:

- Technical and Operational Characteristics – 40%
- Investment Costs – 30%
- Spatial Planning and Environmental Characteristics – 20%
- Time and Conditions of Construction – 10%

The MCA showed that the alternatives 2B and 3 were preferred for further consideration because of the advantage of serving existing cities along the alignment and the vicinity of the existing road, along with consideration of alternative 4 due to the fact that this route was foreseen in the Spatial Plan of BiH. The advantage of alternative 3 was emphasised because of the option of various connection points to LOT 4. Based on the above-mentioned criteria, alternative 2B had the lowest rank, alternative 4 was the second ranked, and alternative 3 was the highest ranked alternative. **Consequently, alternative 3 was chosen for Corridor Vc.** It is not known whether any consultations with stakeholders were carried out during the MCA process.

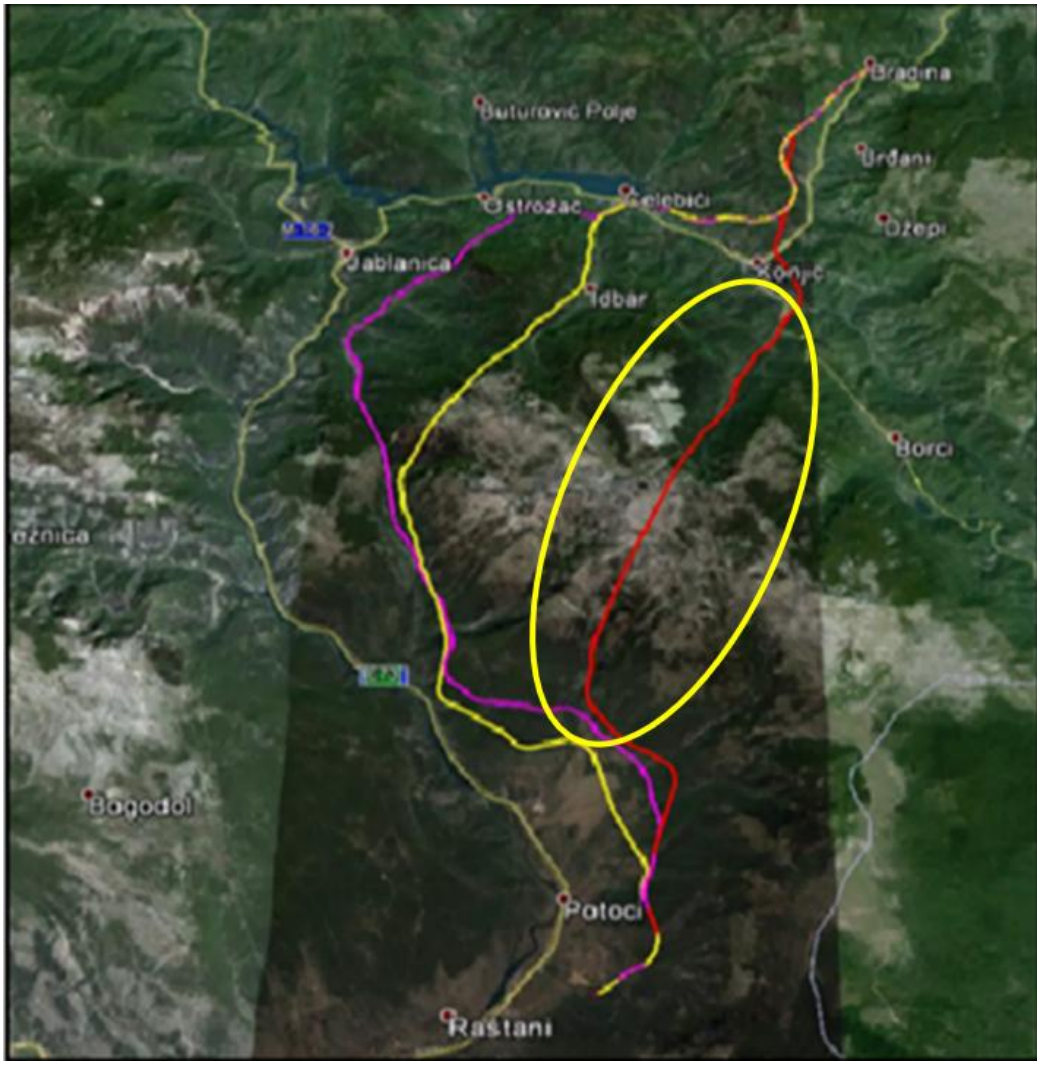


Figure 3-64: Corridor Alternatives; Light yellow – existing M17 road; Pink – alternative (3); Yellow – alternative adopted in 2006 (4); Red – alternative (5) through the Prenj Mountain

MCTBiH then initiated the Environmental Impact Assessment (EIA) procedure for Corridor Vc Motorway, LOT 3 – Section Sarajevo South (Tarcin)-Mostar North, in **2005** and **2006** in two phases (as required by the *Law on Environmental Protection of FBiH*[13]):

- Preliminary EIA, and
- EIA Study.

The Preliminary EIA was developed in 2005, followed by the EIA Study developed in 2006, which presented all the alternatives considered within the MCA. A series of consultation meetings were held in 2005 and 2006 in Jablanica, Konjic, Mostar and Hadzici. Members of several environmental NGOs, including NGO Fondeko and Zeleni Neretva, expressed concerns regarding the consideration of the route through Prenj Tunnel due to the possible effect of the excavation of a long tunnel on the physical integrity and natural characteristics of the Prenj mountain complex, as it was the site of a planned future National Park Prenj-Cvrsnica-Cabulja-Vran. These NGOs

[13] Official Gazette of FBiH, 33/03

emphasised that the preferred alternative should be alternative 3 (as also chosen by the MCA process).

Consideration and adoption of the alternative through the Prenj Mountain

In **2006,** after the MCA was finalised, MCTBiH decided to further explore other alternatives than the one selected by the MCA for subsection Ovcari-Konjic-Mostar North: the first was the route through the Idbar River Valley (**alternative 4**), and the second was the construction of a long tunnel through the Mountain Prenj (**alternative 5** – *the subject of this ESIA*). The Government of FBiH concluded that JPAC should explore these routes based on the shorter overall length and associated costs in the context of potential investor requirements.

In **2014**, the companies DIVEL Sarajevo and IG Banja Luka were engaged to **reconsider the route alignments and prepare the "Analysis of the Preliminary Design** of Motorway on Corridor Vc: Subsection Konjic-Jablanica-Mostar North" for the previously approved alternative 3 from Bradina (Zukici) to Mostar. The conclusion was that **alternative 3** is problematic in terms of technical and economic feasibility, and therefore an alternative alignment (**alternative 5**) with the 10 km long tunnel though the Prenj Mountain was suggested. This change would result in a 18 km shorter section and savings of 300 million euros compared to the previously selected alternative 3. The recommendation to JPAC was to change the alignment and prepare a new Preliminary Design for the alternative route involving Tunnel Prenj.

The **revised PD was then developed in 2016** by DIVEL Sarajevo, involving the construction of a 10 km long Tunnel Prenj. The revised PD does not foresee the previously planned connection to the motorway for Municipality of Jablanica (planned under alternative 3) in the settlement Glogosnica (Jablanica), in the Prenj Mountain range[14].

Second EIA procedure for adopted alternative through Prenj Mountain

A **new local EIA Study was developed in September 2016** by Zagrebinspekt Mostar and IG Banja Luka for the alternative through the Mountain Prenj (**alternative 5**). The EIA confirmed that this alternative has less environmental impacts compared to alternative 3 due to shorter route and anticipated less noise and air emissions. The public hearings for the EIA were held in 2018 in Konjic and Mostar (a more detailed description is provided in section 2.3 Project Consultations). In December 2018, FMOET approved the EIA for alternative 5. Despite the approval of the EIA Study, the project did not obtain the Environmental Permit. The main reason was the lawsuit filed by the Municipality of Jablanica which requested the connection to the motorway which is not foreseen by the Preliminary Design. In June

[14] It should be noted that the Parliament of FBiH, based on the request by the Municipality of Jablanica, issued in 2017 a decision which states that a connection for Jablanica to the motorway must be provided, along with modernising a portion of the existing M17 road which would run north from Jablanica to the connection to the motorway.

2021, the cantonal court in Sarajevo made a decision to annul the Conclusion of FMOET regarding the approval of the EIA Study. The court ordered that the EIA procedure must be repeated.

Adoption of the Spatial Plan for the Area of Special Interest for FBiH "Motorway on Corridor Vc" 2008-2028 with approved alternative through Prenj Mountain

In **2017**, the amended Spatial Plan for the Area of Special Interest for FBiH "Motorway on Corridor Vc" 2008-2028 was adopted, thus setting out the final alignment of the motorway in BiH (the initial Spatial Plan was adopted in 2011). No official Minutes of Meetings from any consultations during the adoption process are available.

Updated Preliminary Design

In **2022**, AIK Inzenjering conducted a comparative analysis of the alignment for the stretch of road between Ovcari and entrance to Tunnel Prenj. The initial findings highlighted **significant geotechnical and hydrological risks associated with the 2016 PD alignment**, which would require extensive stabilisation works and ongoing maintenance. As a result, alternative options within the same corridor were proposed to mitigate impacts to projects costs, technical feasibility and reduce the impact on the environment:

- Lowering of Ovcari Interchange by up to 15 m to reduce the visual impact of the Project on the surrounding environment. This option also contributed to reducing the overall Project cost.
- Between Konjic South Interchange and Prenj Tunnel, displacing the alignment by up to 200 m within the same corridor to avoid dangerous landslip areas as the motorway was intended to pass in cut at this location. The resulting alignment is now on embankment which allowed for materials from Tunnel Prenj to be used in embankment rather than being disposed of in new landfill areas.
- This section of the route traverses glacial (moraine) and talus deposits composed of slightly rounded limestone fragments mixed with crushed material, humus, and clay particles. These materials allow for slower groundwater flow compared to karstified limestone.

The embankment variant of the motorway is more acceptable and economical compared to the prior route, which proposed alignment further east into the scree zone. This earlier plan required a combination of cuts and embankments, necessitating numerous retaining walls and geotechnical anchors to stabilise scree slopes. The revised alignment avoided these extensive stabilisation measures, further reducing construction complexity and costs

Overall, a new alignment was developed, which not only mitigates these risks but also minimises waste areas and improves the overall motorway geometry leading up to the Prenj Tunnel. AIK Inzenjering developed the PD of the selected route alignment.

During the process of developing the PD, JPAC included the south connection to the main road M17 (Konjic Bypass) within the Project, in order to allow better connection from the motorway to the Municipality of Jablanica. JPAC held meetings

with the Municipality of Jablanica, where it was agreed that JPAC would produce project designs and cost-benefit analyses regarding:

- a road connection through Ostrozac with three variants,
- improvement/upgrade of the existing main road M17 especially through Celebici,
- including a motorway connection through Celebici, and
- the project design for the city bypass according to the city plan of the Municipality of Jablanica for 2009-2029.

In **2022**, IPSA Institute conducted a comparative analysis of alignments for the stretch of road between Tunnel Prenj exit and Tunnel T4:

- Comparison of the motorway through Klenova Draga Valley against the option to diverge from the conceptual alignment by bypassing Klenova Draga altogether and introducing an additional 300 m tunnel south of the Tunnel Prenj exit, taking advantage of more favourable geological conditions. Following the comparative analysis, the tunnel option was selected, and IPSA Institute developed the updated PD for the route alignment between Tunnel Prenj and Mostar North. This variant selection aims to mitigate risks of rock falling, reduce visual impact in the valley of the motorway, improve hydrological impact, and enhance overall motorway geometry in the area.
- With the retained option through Klenova Draga, the alignment of the Prenj Tunnel was as a result shifted by up to 200 m on the south side to accommodate this change in alignment. This change over a distance of 2.5 km also had the added advantage in that it reduced the risks of encountering ground water within an extreme highly faulted zone.

In addition, the vertical alignment was optimised to reduce the quantities of excavation and also reduce the overall gradient from 6% to a maximum of 4% to improve safety and avoid the construction of a third lane as required by current standards.

What is also important to note in the context of alternatives, is the lack of viable alternative routes that would have a smaller impact on biodiversity. The current alignment avoids and minimises impacts on sensitive ecosystems to the maximum possible extent. There are no viable alternatives to the current alignment with regard to avoidance of priority biodiversity features, critical habitats or (inter)nationally designated sites as the extent of such features is major in the Project area, i.e. there is no alternative within the region for development of the Project in habitats of lesser biodiversity value. Any other alternative would have at least comparable impacts on biodiversity, as demonstrated by lack of alternatives passing through designated sites (Figure 3-65).

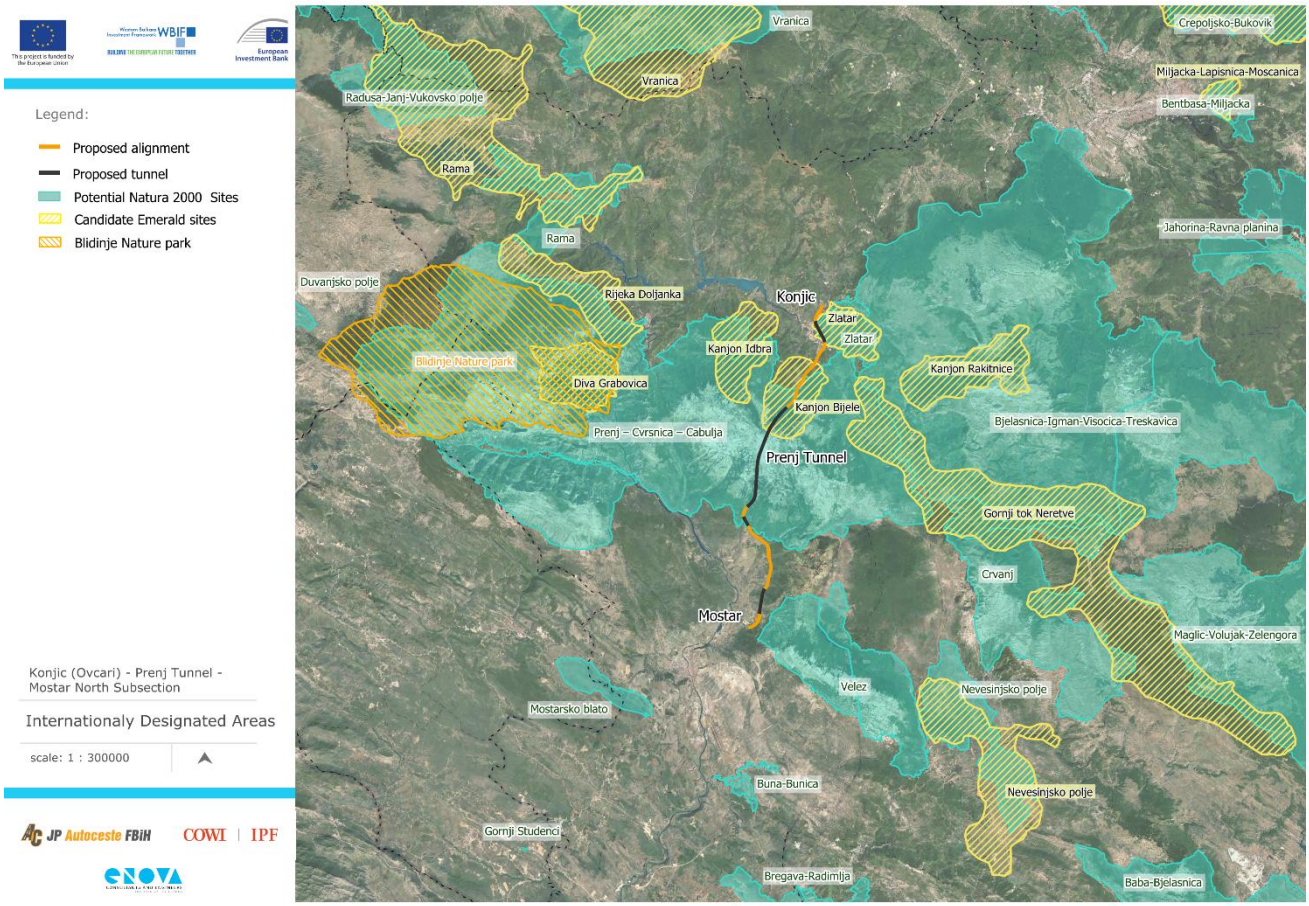


Figure 3-65: Project in relation to designated areas

3.4.3 Analyses of Alternative Spoil Disposal Sites

This Project involves the construction of a 35 km long motorway and a 10 km long tunnel through the Prenj mountain, which will result in a substantial spoil volume. The Project area, which covers the motorway route, is located in a region of Bosnia and Herzegovina known for its natural resources, such as the flora and fauna of the Prenj Mountain, as well as water sources that provide drinking water to settlements of Mostar and Konjic. Thus, identification of appropriate locations for the spoil disposal is of paramount importance.

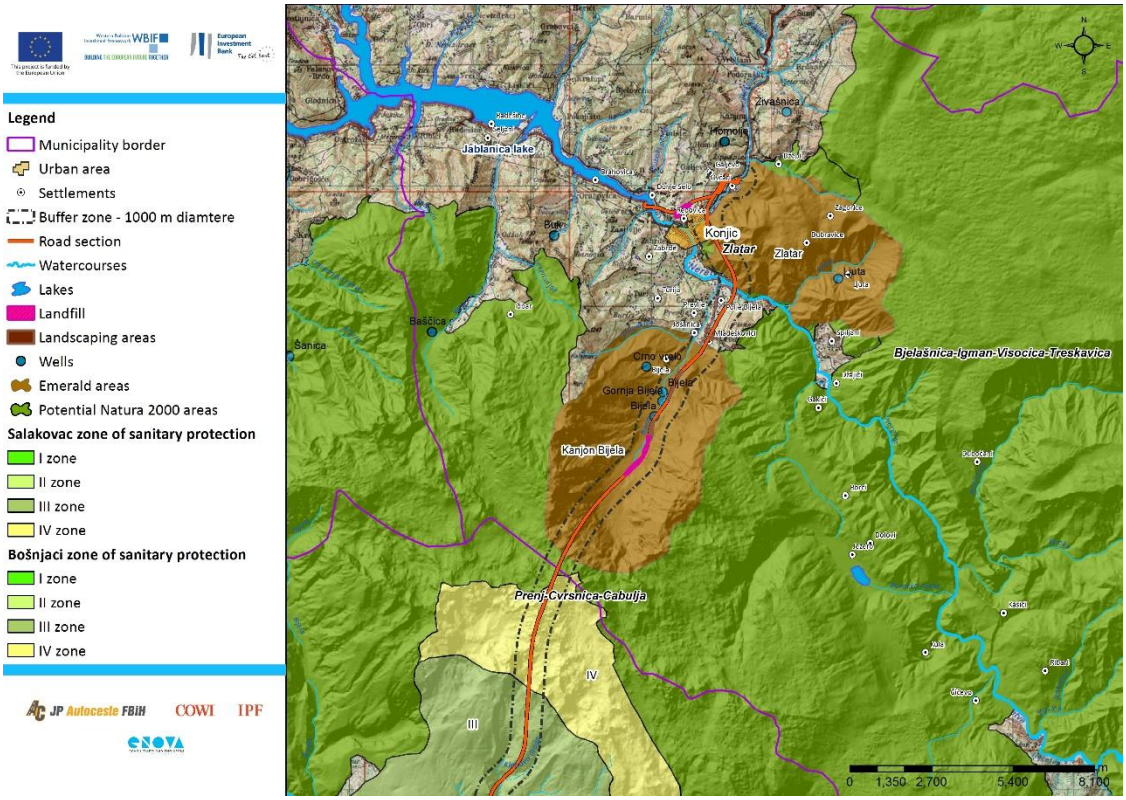


Figure 3-66: Spatial and environmental constraints for the disposal sites selections (source: Google Earth)

Konjic (Ovcari) – Prenj Tunnel

The northern side of the motorway alignment has multiple spatial constraints to the siting of the disposal sites. This location falls under proposed Natura 2000 and Emerald sites (Zlatar and Prenj Mountain), which are significant for their biodiversity. The sites in the Bijela settlement are located in the area of the Konjicka Bijela spring, which is currently used as a water source for Konjic but lacks official declaration and protective measures. Tracer tests, which were conducted as part of the ESIA (as explained in Chapter 7), revealed that the Konjicka Bijela spring is fed from the Prenj Mountain. Additionally, the City of Konjic requested to avoid transporting materials by trucks through its urban centre, meaning that all excavated materials from the Prenj Tunnel must be deposited south of the Neretva River.

In 2016 the Environmental Impact Study developed by Zagrebinspekt d.o.o Mostar identified a total of 8 potential locations for spoil disposal sites:

- Repovacki potok,
- Ovcari,
- Vrabac,
- Mladeskovici,
- Mraka,
- Location of the operational platform,
- Kula,
- Rakov Laz (Lovacka kuca and North portal of the Prenj Tunnel).

The analysis of the E&S acceptability was not carried out.

Figure 3-67: Spoil disposal sites for Ovcari-Tunnel Prenj subsection proposed in 2016

In 2021 a reassessment of proposed sites was conducted based on the amount of inert material (spoil) generated from the Preliminary Design for this section. After careful consideration, it was determined that Ovcari, Mraka, and Mladeskovici have sufficient capacity to accommodate all the generated inert material from this subsection, including access road material and half of the material from the construction of Prenj Tunnel. It is important to note that Mladeskovici was not intended to be a spoil disposal site. Rather, it is a location on the motorway alignment where the inert material was supposed to be utilised to construct a more than 20-meter-high embankment. Repovacki potok was not selected as it is currently being utilised as a municipal waste dump, while Vrabac was not deemed suitable due to the need for demining the surrounding area and previous protests from the local community. Other potential locations were deemed unnecessary to consider.

In October 2022, JPAC and the City of Konjic administration held a meeting to discuss potential sites for the disposal of inert material, which resulted in the confirmation of Ovcari and Mraka as viable options. However, no official consent was obtained at the meeting. The City administration requested that trucks carrying inert material avoid passing through the city and instead utilise construction roads along the proposed alignment. They also suggested using the Konjic municipal landfill for the disposal of inert material from the construction of the Konjic Bypass, which was added to the Project at a later date.

Having in mind the spatial constrains of the area, the proposed disposal sites of Ovcari and Mraka were evaluated from an environmental and social standpoint to determine that both sites are situated within proposed Natura 2000 and Emerald protected areas. Additionally, the Mraka site falls within the catchment area of the Konjicka Bijela springs. As a result, alternative options to these sites were reconsidered.

Due to the small amount of spoil (approximately 260,000 m^3), as well as the Project's characteristics and the nature of the terrain, which includes high embankments made of inert material from cuts and tunnels, it is suggested that the excess spoil material be repurposed for landscaping. Specifically, the material will be utilised to fill depressions created in between high embankments and surrounding terrain. These areas will be carefully designed and constructed to ensure their longevity, with consideration given to geotechnical and hydraulic constraints, including drainage measures. This proposed solution eliminates the need for the use of material at the Mladeskovici site.

The description of landscaping locations is given in section 3.2.11.

Prenj Tunnel – Mostar North

On the southern side, the entire Prenj mountain is covered under the Natura 2000 scope, posing a limitation in choosing a suitable disposal location. Furthermore, there are two large springs on this side - Bosnjaci and Salakovac, which are fed from the Prenj mountain. Protective measures have been established for these sources, including completed and updated Studies on Protection of Bosnjaci and Salakovac springs, and all four source protection zones have been determined. The Rulebook on the method of setting the conditions for determining sanitary zones and on protective measures for water sources used for public water supply prohibits placing material dumps in the source protection zones, which significally limit the options for disposal site for this subsection.

- In 2016 the Environmental Impact Study conducted by Zagrebinspekt d.o.o Mostar identified a total of 6 potential locations for spoil disposal sites: Klenova draga,
- Otolez,
- Udolina Vrtline - Breznica,
- Gladno polje,
- Kuti,
- Municipal Landfill Uborak in Mostar.

These locations were considered sufficient for the material generated on this section.

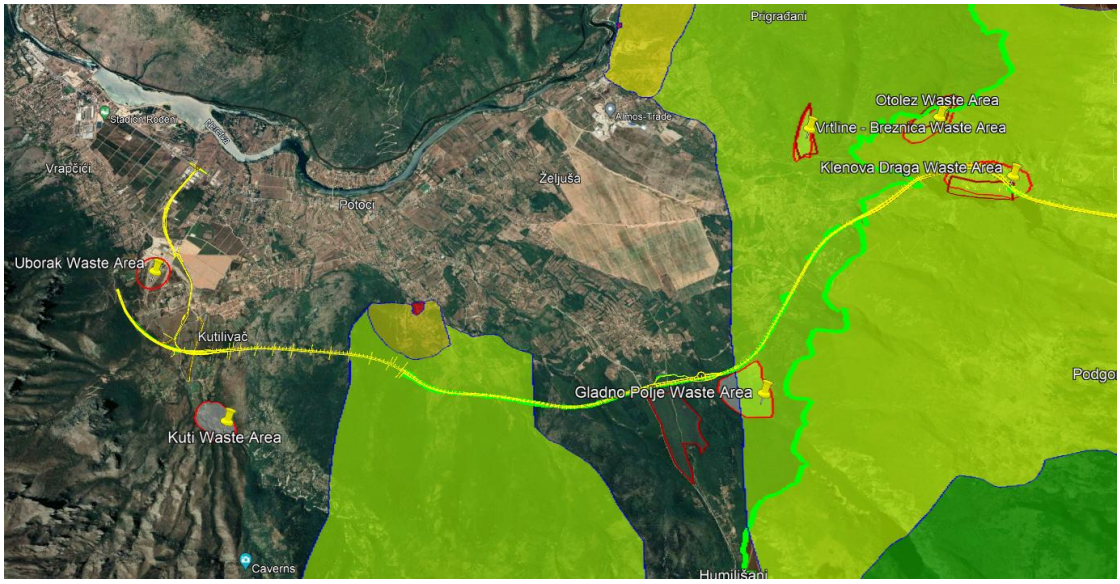


Figure 3-68: Spoil disposal sites for Tunnel Prenj-Mostar North subsection proposed in 2016

A reassessment of the proposed disposal sites was carried out in 2021. In May of that year, the Institute for Spatial Planning of the City of Mostar was consulted, and they recommended the Salakovac site for recultivation and future planning for the city's needs. This site boasts a high capacity, and its selection reduces the need for multiple landfills, making it a more environmentally friendly option. Based on the amount of inert material (spoil) generated from the Preliminary Design for this section, it was determined that the Salakovac site, in addition to Otolez and Kuti, would have sufficient capacity to accommodate all the generated inert material from this subsection, including access road material and half of the material from the construction of Prenj Tunnel. The other locations proposed in the 2016 EIA study were not considered necessary as the required capacity had already been met.

In 2022 the designers for this section came up with the proposal to use up 1 million m3 of inert material in construction of motorway embankment in the Klenova Draga gorge. With this, the need for additional spoil disposal sites would be eliminated.

In July 2022, JPAC addressed the City of Mostar asking for a preliminary consent for several potential sites including those from 2016, 2021 and 2022: Otolez, Klenova Draga, Vrtline, Salakovac and Gladno Polje. The City of Mostar granted consent for the locations of Otolez, Klenova Draga, and Vrtline.

However, in September 2022, an alternative alignment study recommended displacement of the motorway alignment from an embankment to a new tunnel variant, necessitating additional spoil disposal sites. Despite obtaining preliminary consent from the City of Mostar for the remaining two sites in Vrtline and Otolez, environmental evaluations determined that both locations were within the Category III water-protection zone of the Salakovac source. As a result, alternative options to these sites were reconsidered.

In 2023 a new disposal site location is proposed in the settlement of Humilisani. The excess material from both works contracts will be covered by this location. The disposal site is situated outside the boundaries of water protection zones and future

natural protected areas and is located on the left side of the motorway, between km 5+700 to km 6+300, adjacent to the regional road R435a. For further details on the site description, refer to section 3.2.11.

3.5 Project Area of Influence

The Project area of influence (AoI) is the geographical area that has the potential to experience environmental or social impacts related to the construction and/or operation of the project, and encompasses: (i) the primary project site(s) and related facilities including access roads, disposal areas, construction camps and alike; (ii) areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the ESIA is undertaken.

The AoI has been determined to include:

- the surrounding buffer zone of the motorway route,
- the surrounding buffer zone of the Konjic Bypass,
- the surrounding buffer zone of the access roads to Prenj Tunnel,
- areas reserved for borrow and disposal sites.

Due to the complexity of the Project, the AoI for each impact has been determined separately based on the observed situation on the terrain, knowledge about nature and intensity of impacts, performed surveys and/or modelling results.

For example, the ecologically appropriate area of analysis (EAAA) is determined to include the "wider distribution of potentially affected biodiversity features and the ecological patterns, processes and functions that are necessary for maintaining them throughout this distribution"[15]. The AoI reflects ecological characteristics of the area and biology of found biodiversity features based on conducted field research, characteristics of surrounding habitats and ecosystems (e.g., habitat type, land use, natural barriers), literature data, known distribution and expert opinion for each individual species.

Determination of EAAA is done separately for every biodiversity receptor, unless species belonging to a certain group have significant EAAA-overlap and EAAAs can be aggregated. In case of uncertainty around distribution, conservative approach was applied and EAAA slightly enlarged as a part of precautionary measures. Further evaluation of EAAA was done with regard to extent of occurrence based on IUCN data (if available) and expert inputs to facilitate critical habitat assessment (CHA).

The impacts on surface and ground water were considered in relation to the geological and hydrogeological structure of the terrain to include the territory of more than 1,200 km^2 belonging to three hydrogeological zones of the Bjelasnica, Prenj and Velez mountains.

[15] EIB Guidance Note for Standard 4 on Biodiversity and Ecosystems, 2022

The air quality, noise and vibrations impacts were subject to modelling based on which the intensity of impact is assessed relevant to the distance from the motorway axis.

The impact on land and soil quality is assessed within the direct impact zone of 500 m on each side from the road axis, which also includes the expropriation zone, and within the proposed area for spoil disposal sites.

The socio-economic impacts were assessed in 500 m wider study area from both sides of the motorway section and Konjic Bypass, and the expropriation corridor is considered as a 50 m wide principal study area through which the motorway alignment and the Konjic Bypass will pass.

4 Policy, Legislative and Institutional Context

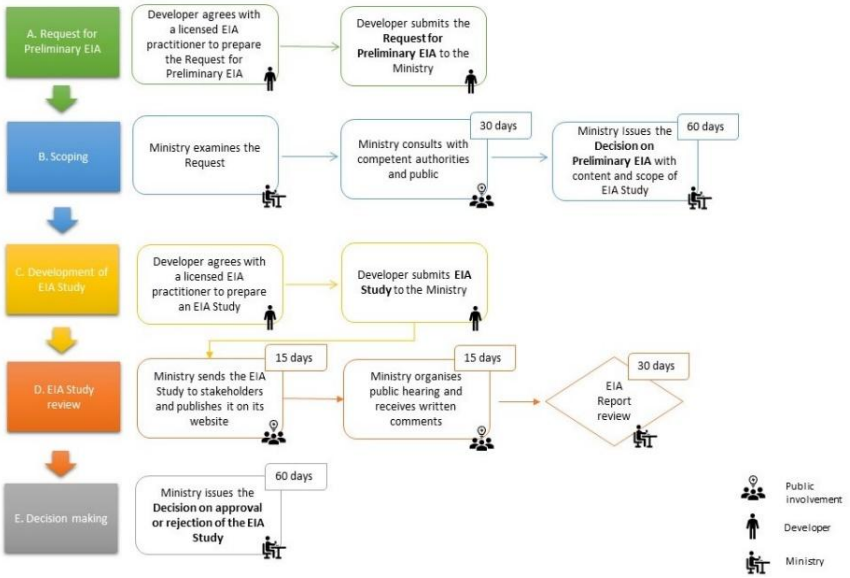
4.1 National Requirements

Implementation of the Project requires compliance with the provisions of relevant FBiH legislation on E&S issues, physical planning, construction and roads maintenance and management, construction of the motorway on Corridor Vc, health and safety at work, labour, and land acquisition and resettlement. A review of applicable FBiH requirements is given in Table 4-1.

Table 4-1: Overview of FBiH Requirements Relevant to the Project

Issue	FBiH requirements
EIA and environmental permitting	EIA related legislation The Environmental Impact Assessment (EIA) process and environmental permitting procedures in FBiH are regulated by the: › Law on Environmental Protection[16], and › Regulation on Projects for Which an EIA is Mandatory and Projects for Which the Need for EIA is Decided[17]. EIA procedure The EIA procedure is carried out in 2 phases: **Phase 1: Preliminary EIA (screening and scoping), and** **Phase 2: Development of EIA Study.** Construction of motorways is subject to mandatory EIA and permitting by the Federal Ministry of Environment and Tourism (FMOET), and the relevant process is described below. Phase 1: The developer submits a 'Request for the Preliminary EIA' to FMOET to determine the scope and content of the EIA Study. The Preliminary EIA must be developed by an EIA practitioner licensed by FMOET. The 'Request for the Preliminary EIA' must contain: a) a description of the project, b) an excerpt from the spatial planning document, c) data on the type and quantity of materials to be used, and the type and quantity of emissions, d) a description of the potential impacts of the project on the environment during construction, operation, and decommissioning, e) a description of basic and auxiliary raw materials and other sources of energy, f) a description of the environment in the area affected by the project, g) an overview of alternative solutions with regard to environmental impacts, h) information on possible difficulties encountered by the applicant in the collection of data, i) a non-technical summary of the above listed information. FMOET examines the request and ensures public review of the request for obtaining the opinions of relevant stakeholders: › cantonal and municipal/city-level authorities on whose territory the project is planned,

[16] Official Gazette of FBiH, No. 15/21
[17] Official Gazette of FBiH, No. 51/21

Issue	FBiH requirements
	› authorities and organisations responsible for environmental protection which may be exposed to significant impacts of the projects (responsible for the protection of cultural, historical, and natural heritage; health protection; any other stakeholders) › authorities responsible for environmental protection in Republika Srpska and Brcko District or another state if relevant › public concerned. These stakeholders are given 30 days to submit their comments. FMOET then issues (within 60 days from receiving the request) a 'Decision on Preliminary EIA' which specifies the content and scope of the EIA Study. Phase 2: The EIA Study has to be developed by an EIA practitioner licensed by FMOET. For projects requiring an Environmental Permit, the EIA Study must also contain a Waste Management Plan. The developer submits the EIA Study to FMOET. Within 15 days, the Ministry sends a copy to relevant authorities and the public concerned and publishes the EIA Study on its website. FMOET then organises a public hearing as near as possible to the project location and informs the public at least 15 days in advance. FMOET prepares minutes of the public hearing within 7 days. The public may submit its written comments to FMOET within 15 days from the date of the public hearing. FMOET's expert committee assesses the EIA Study within 30 days from the date of the public hearing[18]. Within a further 60 days from the completion of assessment, FMOET issues a 'Decision on the approval or (rejection) of the EIA Study'. The Decision on approval ceases to be valid if the developer does not obtain the construction permit within 3 years from the date of receipt of the Decision. The key steps in the EIA process are shown below in the graph. 

[18] If necessary, FMOET may ask the developer to revise the EIA Study and provide another 30 days for corrections. The EIA Study may only be revised once – in case the EIA Study is still not approved, a new Request and new EIA Study must be submitted by the developer.

Issue	FBiH requirements
Water permits	The water permitting procedure in FBiH is regulated by the *Law on Waters*[19] and the *Regulation on Content, Scope, Conditions, Ways of Issuing and Archiving of Water Documents*[20]. The required water acts are: › Preliminary Water Consent – defines whether the applicant has met the conditions for (i) exercising water rights; (ii) the manner of exercising this right; (iii) the documentation for the construction of new, reconstruction or removal of existing facilities. It needs to be obtained before applying for an Environmental Permit. It is valid for 3 years. › Water Consent – confirms that the documentation attached to the request for the Water Consent is in accordance with the Preliminary Water Consent, local legislation on water and spatial planning documents. It has to be obtained before obtaining the Construction Permit (CP). It expires after 2 years if a CP has not been issued and construction works initiated. › Water Permit – defines: (i) the purpose, manner, and conditions for water use; (ii) the operation of facilities; (iii) the manner and conditions for discharge of wastewater and disposal of solid and liquid waste. It confirms that the conditions defined by the Water Consent have been fulfilled. It is valid for up to 15 years. The agency responsible for issuing water acts for this Project is the Water Agency for Adriatic Sea Watershed.
Other permits	According to the *Law on Motorway on Corridor Vc*[21], the request for obtaining an Urban Consent (UC) is submitted by the investor to the Federal Ministry of Physical Planning (FMOPP). FMOPP issues the UC within 15 days. For the construction of motorway on Corridor Vc, the UC is valid until the CP is issued. The request for obtaining a CP is submitted to FMOPP which issues the CP within 30 days. CPs are issued for a 5-year period. Motorway sections may be used only after obtaining a Use Permit (UP). It is necessary to submit to FMOPP the request for technical inspection and the UP. The UP may be issued only after a technical inspection of the construction is performed by an expert committee appointed by FMOPP within 8 days. The technical inspection must be performed within 30 days from the day the request for UP is submitted to FMoPP. The expert committee submits its report to FMOPP within 8 days from the day of the completed technical inspection. If the expert committee reports any identified defects on the construction that need to be eliminated, the FMOPP sets a deadline for the completion of the elimination of defects (max. 90 days). If the committee reports that the construction may put into use /operation, FMOPP issues the UP after the submission of the report on technical inspection by the committee and within 7 days from the receipt of the EP by the investor.
Air quality	According to the *Regulation on the Monitoring of Air Quality and Defining Pollutant Types, Limit Values and Other Standards*[22], air quality is monitored by measuring the concentration of sulphur dioxide, nitrogen oxides, particulate matter PM_{10} and $PM_{2.5}$, lead, benzene, carbon monoxide, ground-level ozone, arsenic, cadmium, mercury, nickel, and benzo-a-pyrene, with instruments for automatic measurement and sample analysis. The maximum allowable daily concentrations, target values and alert thresholds for pollutants are also regulated by the mentioned Regulation.

[19] Official Gazette of FBiH, No. 70/06
[20] Official Gazette of FBiH, No. 31/15, 55/19 and 41/20
[21] Official Gazette of FBiH, No. 8/13
[22] Official Gazette of FBiH, No. 1/12, 50/19 and 3/21

Issue	FBiH requirements
Noise	The *Law on Protection Against Noise*[23] regulates the permissible noise levels, noise protection measures, the way of measuring and recording noise, noise limits classified according to the atmosphere, land use and the time of day (day or night), in order to protect human health, working and living space, and the environment in general. The Law defines the limit values of external noise for planning new facilities and sources of noise in FBiH. Vehicle noise standards are defined by the *Rules on the Dimensions, Total Weight, and Axle Load of Vehicles, on Obligatory Vehicle Devices and Equipment Vehicle, on Basic Requirements to be Met and Traffic Equipment on Roads*[24]. The Rules define the permissible sound level limits for individual vehicles.
Waste management	The *Law on Waste Management*[25] sets a general framework for all aspects of waste management, primarily: › Waste management planning (mandate, roles and responsibilities of authorities, types of planning documents, waste management permits, financial guarantees, etc.), › Waste management responsibilities (responsibility of waste producers, responsibility of waste retailers, responsibilities of waste producers and holders), › Main functional elements of waste management system (temporary storage, collection, transport, recovery, recycling and/or processing and disposal), › Main requirements for hazardous waste management, › Transboundary movement of waste, Controlling waste management operations.In addition, according to the *Regulation on Construction Waste*[26] a Preliminary Construction Waste Management Plan needs to be submitted for the issuance of the UC, while a Detailed Construction Waste Management Plan must be enclosed to the CP Request.
Water and wastewater management	The *Law on Waters*[27] regulates water and wastewater management and planning. The maximum permitted quantities of hazardous and harmful substances in wastewaters before discharging into natural recipients (surface waters) or into public sewerage system are stipulated by the *Decree on Conditions for Discharge of Wastewater into Environment and into the Public Sewerage System*[28].
Nature protection	The *Law on Nature Protection of FBiH*[29] defines the bodies for nature protection, general conservation measures, evaluation of operations in nature, habitats and ecologically important areas, species and subspecies, protection and conservation of biodiversity and ecosystems, the establishment of Natura 2000, etc. The Red List of Flora and Fauna of FBiH was developed based on the requirements of this Law. *Regulation on Protection Measures for Strictly Protected Species and Subspecies and Protected Species and Subspecies*[30] declares wild plant species, animals, and fungi important for preservation, and species that have a

[23] Official Gazette of FBiH, No. 110/12
[24] Official Gazette of BiH, No. 23/07, 54/07, 101/12, 26/19 and 83/20
[25] Official Gazette of FBiH, No. 33/03, 72/09 and 92/17
[26] Official Gazette of FBiH, No. 93/19
[27] Official Gazette of FBiH No. 70/06
[28] Official Gazette of FBiH, No. 26/20 and 96/20
[29] Official Gazette of FBiH, No. 66/13
[30] Official Gazette of FBiH, No. 21/20

Issue	FBiH requirements
	special significance in ecological, ecosystem, biogeographical, scientific, health, economic and other aspects for FBiH, and strictly protected wild species or protected wild species. Protection measures are established for protected species and their habitats.
Labour and employment	Both JPAC and the contractors are required to implement the provisions of the *Labour Law of FBiH*[31] which regulates all issued related to employment. The provisions of the Law are in line with International Labour Organisation (ILO) conventions related to forced labour, discrimination, child labour, equal remuneration, freedom of association, right to organise and collective bargaining.
OHS	OHS is regulated by the *Law on Safety at Work*[32] and the *Law on the Protection against Fires and Protection of Fire-fighters*[33]. JPAC has to require from its Contractors, through the public procurement procedure, to comply with the legal requirements regarding health and safety at work and during construction works in order to prevent any dangerous situation or harm to workers and local communities. Safety during construction works and documentation needed at construction sites are regulated by the *Decree on Construction Site Organisation, Mandatory Documentation on Construction Site and Construction Work Participants*[34].
Construction site organisation	According to the *Decree on Construction Site Organisation, Mandatory Documentation on Construction Site and Construction Work Participants*, Contractors are required to develop a Construction Site Organisation Plan (CSOP). CSOP includes organisation of preliminary works, organisation of site during construction, organisation of site after construction phase, technological scheme, safety projects and plans and description of measures for monitoring of emissions and their impact. The safety plan includes aspects of: › *Occupational Health and Safety* › *Fire and Explosion* › *Environmental Protection* including all requirements and measures listed in relevant permits and decisions obtained during the construction permit acquisition process. The CSOP must be developed by the Contractor prior to the commencement of construction works. The Plan has to be controlled and signed by the Supervisory Authority which is the legal entity responsible for the overall supervision of construction works, as stipulated by the above-mentioned Decree. The Plan should correspond to the requirements, safety measures and obligations contained in the environmental requirements laid down in the approval process for the construction.
Land acquisition	Land acquisition in FBiH is regulated by the *Law on Expropriation of FBiH*[35] which defines the conditions and procedure for expropriation of property for construction of facilities in public interest, compensation eligibility and amounts, handling of grievances and disputes handling and other issues pertaining to the expropriation process.
Cultural heritage	The *Law on Protection and Use of Cultural, Historical and Natural Heritage*[36] requires JPAC to cooperate with the Institute for Protection of Monuments (within the Federal Ministry of Culture and Sports) at different stages of Project development.

[31] Official Gazette of FBiH, No. 26/16, 89/18, 23/20 and 49/21
[32] Official Gazette of FBiH, No. 79/20
[33] Official Gazette of FBiH, No. 64/09
[34] Official Gazette of FBiH, No. 25/22, 42/22, 93/22
[35] Official Gazette of FBiH, No. 70/07, 36/10, 25/12 and 34/16
[36] Official Gazette of SR BiH, No. 20/85, 12/87 and 3/93

Issue	FBiH requirements
	JPAC is obliged to obtain the formal opinions and conditions related to protection of cultural heritage along the alignment. As part of the CP procedure, JPAC is required to apply for detailed conditions for cultural heritage protection. The Institute may require provision of archaeological supervising during the earth works.
Road safety	A General Audit of project documentation that includes the audit of Traffic Signalisation and Equipment Design is required by local legislation (*Law on Basis of Road Safety on Roads of BiH*[37], and the accompanying key Regulations[38], *Law on Roads of FBiH*[39], and the accompanying key Regulations[40]). Upon the completion of the Main Design (including the Main Traffic Signalisation and Equipment Design), investors publish a public call for an auditor who prepares the first report on compliance with the existing legislation, guidelines and specific standards. The investor forwards the report to the designer for review and response. The designer analyses the report and may accept or reject the provided comments. The report is then sent back to the auditor. If the auditor does not accept the rejections (if any) of his/her comments, an attempt is made to reconcile the opinions of the auditor and designer. In case such reconciliation is not achieved, the investor makes the final decision. The auditor prepares the final audit report which is an integral part of the Main Design (the audit report is attached as the first page of the Traffic Signalisation and Equipment Design, verified by the seal of the auditor). An inspection report by the committee for technical acceptance of buildings and facilities is required prior to the issuance of a UP for any built structure including roads. The *Regulation on Technical Inspection of Built Structures*[41] defines the manner of appointment of the committees for technical acceptance, the procedure of technical inspection and other related issues. The committee for technical acceptance prepares a report.
Motorway design	According to the *Law on Motorway on Corridor Vc,* JPAC defines the Technical Specifications (TS) for the design, construction, and maintenance of motorways on Corridor Vc. According to this Law, TS are developed taking into consideration BAS, EN and ISO standards as well as specific requirements for BiH. TS include: › Set of Instructions for the Design, Procurement, Installation and Maintenance of Motorway Elements, Structures or Their Parts on the Motorway developed by JPAC in order to standardise and uniform as much as possible necessary requirements regarding the construction of motorways and to give instructions for designers, supervisory teams and contractors › BAS standards, European EN and ISO International Standards › *Guidelines for the Design, Construction, Maintenance and Supervision*[42], in line with FBiH legislation as well as European and international requirements and legislation. These Guidelines are adopted into the FBiH legislation by FBiH Government through the *Decision on the Guidelines for the Design, Construction, Maintenance and Supervision of Roads in FBiH*[43]

[37] Official Gazette of BiH, No. 6/06, 75/06, 44/07, 84/09, 48/10, 18/13, 08/17, 89/17 and 09/18
[38] All published in the Official Gazette of BiH, No. 16/07
[39] Official Gazette of FBiH, No. 12/10, 16/10 and 66/13
[40] All published in the Official Gazette of FBiH, No. 48/03
[41] Official Gazette of FBiH, No. 58/14, 89/18, 44/20 and 42/21
[42] Faculty of Civil and Geodetic Engineering of the University of Ljubljana and DDC Consulting & Engineering Ltd, 2005
[43] Official Gazette of FBiH, No. 80/06

Issue	FBiH requirements
	› Laws, regulations, decrees, and other legal acts adopted by the FMoPP.
Public consultations	The primary law that ensures the rights of citizens to information is the *Law on Free Access to Information in FBiH*[44], which stipulates that all citizens and legal entities have the right to access information in the control of a public authority, and each public authority has a corresponding obligation to disclose such information. Procedures related to environmental information disclosure are further elaborated in *the Law on Environmental Protection*[45], which stipulates that every person and every organisation must have adequate access to information regarding the environment at the disposal of public authorities, including information on hazardous materials and activities in their communities, and be enabled to participate in the decision-making process. Regulatory bodies and governments are obliged to encourage public awareness and participation, facilitate access to information, judicial and administrative procedures, as well as to registers of installations and polluters in the future. Furthermore, BiH acceded to the Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters in 2008. This Convention regulates rights related to the environment and links the responsibility of public authorities with environmental protection. It aims at democratic cooperation of the public and public authorities and introduces a new procedure for public participation in negotiating and implementing international agreements. Under the Convention, access to information, public participation in decision making and access to justice are an integral part of environmental protection management. The public consultation requirements for the EIA procedure are described above under item "EIA and environmental permits".

[44] Official Gazette of FBiH, No. 32/01 and 48/11
[45] Official Gazette of FBiH, No. 15/21

4.2 Lender's Requirements

4.2.1 EBRD Requirements

The Environmental and Social Policy (ESP, 2019) is a key EBRD document, which details the commitments of the Bank's Funding Agreement to promote in the full range of its activities, environmentally sound and sustainable development. Bank-financed projects are expected to meet good international practice related to sustainable development. The Bank has defined specific Performance Requirements (PR) for key areas of E&S issues and impacts. The EBRD PRs and their applicability to this Project are given in Table 4-2. New facilities or business activities to be financed by EBRD should be designed to meet PRs from the outset. If a proposed business activity to be financed relates to existing facilities that do not meet PRs at the time of Board approval, the client will be required to adopt and implement an Environmental and Social Action Plan (ESAP).

This Project is subject to requirements of ESP 2019.

Table 4-2: EBRD PRs applicable to the Project

Performance requirements	Applicable to the Project
PR1: Assessment and Management of Environmental and Social Risks and Impacts	Yes
PR2: Labour and Working Conditions	Yes
PR3: Resource Efficiency and Pollution Prevention and Control	Yes
PR4: Health, Safety and Security	Yes
PR5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Yes
PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes
PR7: Indigenous Peoples	No
PR8: Cultural Heritage	Yes
PR9: Financial Intermediaries	No
PR10: Information Disclosure and Stakeholder Engagement	Yes

Under the EBRD ESP 2019, EBRD categorises each project to determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required. The categorisation of each project depends on the nature, location, sensitivity and scale of the project, and the significance of its potential adverse future environmental and social impacts.

- *Category A*: A project is categorised A when it could result in potentially significant adverse future environmental and/or social impacts which, at the time of categorisation, cannot readily be identified or assessed, and which, therefore, require a formalised and participatory environmental and social impact assessment process.
- *Category B*: A project is categorised B when its potential adverse future environmental and/or social impacts are typically site-specific, and/or readily

identified and addressed through mitigation measures. Environmental and social appraisal requirements may vary depending on the project and will be determined by the EBRD on a case-by-case basis.

- *Category C*: A project is categorised C when it is likely to have minimal or no potential adverse future environmental and/or social impacts and can readily be addressed through limited environmental and social appraisal.

Based on an assessment review of the Project against EBRD criteria and having in mind that this subsection totals approx. 35 km in length and belongs to the 335 km long motorway**, the Project is classified as Category A**.

4.2.2 EIB Requirements

EIB has adopted a set of 11 E&S standards that establish the requirements the promoter and the project must meet throughout the EIB project life cycle, defined in its publication Environmental and Social Standards (2022). These are:

- Standard 1: Environmental and Social Impacts and Risks
- Standard 2: Stakeholder Engagement
- Standard 3: Resource Efficiency and Pollution Prevention
- Standard 4: Biodiversity and Ecosystems,
- Standard 5: Climate Change,
- Standard 6: Involuntary Resettlement,
- Standard 7: Vulnerable Groups, Indigenous Peoples and Gender (Indigenous People – not applicable to this Project)
- Standard 8: Labour Rights,
- Standard 9: Health, Safety and Security
- Standard 10: Cultural Heritage
- Standard 11: Intermediated Finance (not applicable to this project)

4.2.3 EU Requirements

EBRD, as a signatory to the European Principles[46] for the environment, is committed to promoting the adoption of EU environmental principles, practices, and substantive standards[47] by EBRD financed projects, where these can be applied at the project level, regardless of their geographic location. When host country regulations differ from EU substantive environmental standards, projects will be expected to meet whichever is more stringent. Table 4-3 gives an overview of EU requirements applicable to this Project.

Table 4-3: Overview of EU Requirements Relevant to the Project

Directive	Brief description
EIA Directive **(Directive 2014/52/EU on the assessment of the effects of certain plans and**	The amended EIA Directive simplifies the rules for assessing the potential effects of projects on the environment that were part of the previous EIA Directive (85/337/EC) and its amendments. It requires an

[46]https://www.nib.int/filebank/a/1521315365/9ae732ab406cefafa3525b7bd10ad134/7215-European_principles_for_the_environment.pdf
[47] Substantive environmental standards of the EU are comprised in EU secondary legislation, e.g., regulations, directives, and decisions.

Directive	Brief description
programmes on the environment)	assessment to be carried out by the competent national authority for certain projects which have a physical effect on the environment. The EIA must identify the direct and indirect effects of a project on the following factors: man, the fauna, the flora, the soil, the water, the air, the climate, the landscape, the material assets and cultural heritage, and the interaction between these various elements.
Birds Directive **(Directive 2009/147/EC on the conservation of wild birds)** **and** **Habitat Directive (Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora)**	The two principal EU Directives relating to nature conservation provide a legal framework for the protection of habitats and fauna and flora species. Both Directives promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. The Habitats Directive led to the setting up of a network of Special Areas of Conservation to protect the 220 habitats and approximately 1,000 species listed in Annex I and II of the Directive which are considered to be of European interest following criteria given in the Directive. Together with Special Protection Areas which are designated under the Birds Directive, these form a network of protected sites across the European Union called Natura 2000. The Emerald network is an ecological network to conserve wild flora and fauna and their natural habitats of Europe, which was launched in 1998 by the Council of Europe as part of its work under the Convention on the Conservation of European Wildlife and Natural Habitats or the "Bern Convention".
EC Directive 2008/96/EC Road Infrastructure Safety Management	This Directive applies to all road schemes on the Trans-European Road Network at the design stage, under construction or in operation. The provisions of the Directive may also be applied as a set of good practices for national road transport infrastructure. The Directive imposes road safety responsibilities on Project Sponsors to demonstrate that road safety risks have been considered during the design and delivery of the Project. During the initial planning stage, this would comprise the production of a Road Safety Impact Assessment, in line with Annex I of the Directive. Subsequently Road Safety Audits should be undertaken as an integral part of the design in line with the criteria set out in Annex II of the Directive. Annex III of the Directive sets out criteria and requirements for the ranking of high accident concentration sections and network safety ranking during operation.
Water Framework Directive **(Directive 2000/60/EC establishing a Framework for Community Action in the Field of Water Policy)**	This Directive establishes a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater. Member States shall implement the measures necessary to prevent or limit the input of pollutants into groundwater and to prevent the deterioration of the status of all bodies of groundwater, subject to the use for the abstraction of water intended for human consumption and those bodies of water intended for such future use. Member States shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district for

Directive	Brief description
	groundwater such programmes shall cover monitoring of the chemical and quantitative status.
Urban Waste Water Treatment Directive (UWWTD) **(Directive 98/15/EC amending Council Directive 91/271/EEC on Urban Waste Water Treatment)**	The UWWTD aims to protect human health and the environment from the effects of untreated urban wastewater. UWWTD (Council Directive 91/271/EEC) , among the others, requires , pre-authorisation of all urban wastewater discharges, discharges from the food-processing industry and industrial discharges into urban wastewater collection systems, monitoring of the performance of treatment plants and receiving waters and controls of sewage sludge disposal and reuse, and treated wastewater reuse whenever it is appropriate. Directive 98/15/EC – amending the UWWTD and clarifying the requirements regarding discharges from urban wastewater treatment plants to sensitive areas subject to eutrophication.
Flood Directive **(Directive 2007/60/EC on the Assessment and Management of Flood Risks)**	The aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage, and economic activity. It requires Member States to first carry out a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. For such zones they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection, and preparedness by 2015. The Directive applies to inland waters as well as all coastal waters across the whole territory of the EU. This Directive now requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk. With this Directive also reinforces the rights of the public to access this information and to have a say in the planning process.
Waste Framework Directive **(Directive 2008/98/EC on Waste)**	This Directive sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest. Waste legislation and policy of the EU Member States shall apply as a priority order the following waste management hierarchy: prevention, preparing for re-use, recycling, recovery, disposal. The Directive introduces the "polluter pays principle" and the "extended producer responsibility". It incorporates provisions on hazardous waste and waste oils and includes sets recycling and recovery targets.
The Environmental Noise Directive **(Directive 2002/49/EC on the Assessment and**	The Environmental Noise Directive is the main EU law to identify noise pollution levels and act on them. The Directive does not set limit or target values for environmental noise, nor does it prescribe the measures to

Directive	Brief description
Management of Environmental Noise)	be included in the action plans. This is for the competent Member State authorities to decide. The Directive focuses on following areas: determining exposure to environmental noise and assessing its health effects at single dwelling level, ensuring that information on environmental noise and its effects is made available to the public, preventing, and reducing environmental noise and preserving environmental noise quality in areas where it is good. The Directive requires EU countries to prepare and publish noise maps and noise management action plans every 5 years for, among the othersmajor roads (more than 3 million vehicles a year).

5 Assessment Methodology

5.1 Assessment of Environmental Impacts

For every environmental component, this assessment will identify and report the likely significant environmental impacts. The significance can be described as the product of the degree of change predicted (the magnitude of impact) and the value of the receptor that is subjected to that change (sensitivity of receptor). For each impact, the likely magnitude of the impact and the sensitivity of the receptor are defined, quantitatively to the extent possible[48]. Common criteria for the definition of magnitude and sensitivity are summarised below.

The assessment of **impact magnitude** is undertaken in two steps. First, the identified impacts of the Project are categorised as beneficial or adverse. Second, impacts are categorised as major, moderate, minor, or negligible based on consideration of parameters such as:

- Scale of the impact – how intense or severe the extent of the impact is likely to be,
- Duration of the impact – ranging from "beyond decommissioning" to "temporary with no detectable impact",
- Spatial extent of the impact – for instance, within the site boundary, within district, regionally, nationally, and internationally,
- Reversibility – ranging from "permanent thus requiring significant intervention to return to baseline" to "no change",
- Likelihood – ranging from "occurring regularly under typical conditions" to "unlikely to occur",
- Compliance with legal standards and established professional criteria – ranging from "substantially exceeds national standards or international guidance" to "meets the standards" i.e., impacts are predicted to be less than the standard would allow.

These characteristics generally describe the nature, physical extent, and temporal condition of the impact. To facilitate a structured description of impact magnitude, a qualitative scale was applied, ranking the magnitude of change as negligible, minor, moderate, or major developed for each of the magnitude characteristics.

Table 5-1 presents generic criteria for determining impact magnitude (for adverse impacts). Each detailed assessment will define impact magnitude in relation to its environmental or social aspect.

[48] Typically, the approach for the assessments associated with health and safety, natural hazards and greenhouse gas emissions deviate from the methodology presented in the following subsections as significance cannot be uniformly assigned to the risks or impacts identified in these sections. Specific approaches and methodologies for these assessments are defined within these respective sections.

Table 5-1: Criteria for determining environmental impact magnitude

Category	Description (adverse impacts)
Major	Fundamental change to the specific conditions assessed resulting in long term or permanent change, typically widespread in nature and requiring significant intervention to return to baseline; would violate national standards or Good International Industry Practice (GIIP) without mitigation.
Moderate	Detectable change to the specific conditions assessed resulting in non-fundamental temporary or permanent change.
Minor	Detectable but small change to the specific conditions assessed.
Negligible	No perceptible change to the specific conditions assessed.

Receptor sensitivity is the degree to which a particular receptor is more or less susceptible to a given impact. Receptor sensitivity takes into consideration receptor resilience and value. Receptor resilience describes the ability of the receptor to withstand adverse impacts. It takes into consideration not only activity-impact-receptor pathways, but also environmental characteristics of the receptor that might make it more or less resilient to change.

Sensitivity is specific to each aspect and the environmental resource or population affected, with criteria developed from baseline information. Generic criteria for determining sensitivity of receptors are outlined in Table 5-2. Each detailed assessment will define sensitivity in relation to its specific environmental or social aspect.

Table 5-2: Criteria for determining sensitivity of an environmental receptor

Category	Description
High	Receptor (human, physical or biological) with little or no capacity to absorb proposed changes and/or minimal opportunities for mitigation.
Medium	Receptor with little capacity to absorb proposed changes and/or limited opportunities for mitigation.
Low	Receptor with some capacity to absorb proposed changes and/or reasonable opportunities for mitigation.
Negligible	Receptor with good capacity to absorb proposed changes and/or good opportunities for mitigation.

Likely impacts are evaluated considering the interaction between the magnitude and sensitivity criteria as presented in the impact evaluation matrix in Table 5-3.

Table 5-3: Impact evaluation matrix

		Magnitude						
		Adverse				Beneficial		
		Major	Moderate	Minor	Negligible	Minor	Moderate	Major
Sensitivity	High	Major	Major	Moderate	Negligible	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Negligible	Minor	Moderate	Major
	Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

For evaluating significance before mitigation measures, it is important to consider the likelihood that a given risk event is expected to occur and the magnitude of the expected impacts. Impacts that have been evaluated as being "moderate" or "major" are significant effects and identified as such in the specialist sections. Consequently, impacts that are "minor" or "negligible" are not significant. Understanding the significance of risks is important for prioritising the need for mitigation measures. Note: Some impacts/risk ranked as "minor" may still need mitigation measures to bring the risk to an even lower level.

Note: A specific methodology was used to assess the impacts of climate risks, as explained in detail in Chapter 9.

The impacts are assessed for pre-construction, construction, and operation phase. The impacts in decommissioning phase are not assessed since it is anticipated that the Project will have operational life of 50 years. If decommissioning take place, impacts are expected to be similar to those during construction.

Wherever the Project is likely to result in unacceptable E&S impacts, mitigation measures are proposed. Where mitigation measures are required, the impact will be rated again to show the residual impact after implementation of mitigation or management control.

5.2 Assessment of Social Impacts

During the development of the social impact assessment, the same methodology was used as for the assessment of environmental aspects, with some changes in criteria for determining the impact magnitude and sensitivity. The social impact assessment has included consideration of both intended and unintended socio-economic and community consequences of the Project, beneficial and adverse, and any social change processes invoked by those interventions.

Social impacts are conceptualised as changes to one or more of the following:

- people's way of life – how they live, work, play and interact with one another on a day-to-day basis,
- their community – its cohesion, stability, character, services, and facilities,
- their culture – shared beliefs, customs, values, and language use,
- their environment – air and water quality; availability and quality of food consumed; the level of hazard or risk, dust, and noise exposure; sanitation facilities; physical safety; and access to and control over resources,
- their health and wellbeing – whereby health is a state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity; perceptions of safety,
- their personal and community property rights – access issues; economic effects and experiences of personal disadvantage or advantage.

Adverse impacts will be avoided wherever possible; otherwise, management and mitigation measures have been identified to reduce effects on the community. Measures are included to enhance beneficial impacts and share their benefits more

widely, in particular amongst local people who may also be affected negatively by the Project.

The significance of the social impacts has been determined through consideration of the level of sensitivity of Project affected individuals, households, communities, and other social groups (social receptors), and the magnitude of the impact experienced by them. The assessment of impact significance has been undertaken using the overarching framework presented for assessing environmental impacts; however, specific magnitude and sensitivity criteria for socio-economic impacts are presented in the following tables.

Table 5-4: Criteria for determining social impact magnitude

Category	Description (adverse impacts)
Major	A highly likely impact that would have implications beyond the Project life affecting the wellbeing of many people across a broad cross-section of the population and affecting various elements of the local communities', or workers', resilience.
Moderate	A likely impact that continues over several years throughout the Project life and affects the wellbeing of specific groups of people and affecting specific elements of the local communities', or workers', resilience.
Minor	A potential impact that occurs periodically or over the short term throughout the life of the Project affecting the wellbeing of a small number of people and with little effect on the local communities', or workers', resilience.
Negligible	A potential impact that is very short lived so that the socio-economic baseline remains largely consistent and there is no detectable effect on the wellbeing of people or the local communities', or workers', resilience.

Table 5-5: Criteria for determining sensitivity of a social receptor

Category	Description
High	An already vulnerable social receptor with very little capacity and means to absorb proposed changes or with very little access to alternative similar sites or services, and/or minimal opportunities for mitigation.
Medium	An already vulnerable social receptor with limited capacity and means to absorb proposed changes or with little access to alternative similar sites or services, and/or limited opportunities for mitigation.
Low	A non-vulnerable social receptor with some capacity and means to absorb proposed changes and with some access to alternative similar sites or services, and/or reasonable opportunities for mitigation.
Negligible	A non-vulnerable social receptor with plentiful capacity and means to absorb proposed changes and with good access to alternative similar sites or services, and/or good opportunities for mitigation.