JP CESTE FEDERACIJE BIH

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR THE PROJECT OF ROAD PAVEMENT AND AXIS CORRECTIONS ON SECTION JAJCE JUG - DONJI VAKUF 1 (M5)

October, 2018

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LIST OF ABBREVIATIONS

BH - Bosnia and Herzegovina

CFD - Central Feedback Desk

CSOP - Construction Site Organization Plan

EIB - European Investment Bank

EIA - Environmental Impact Assessment

EMP - Environmental Monitoring Program

ESMF - Environmental Social Management Framework

ESMP - Environmental and Social Management Plan

EP - Environmental Permit

FBH - Federation of Bosnia and Herzegovina

FMoET - Federal Ministry of Environment and Tourism

CBC - Central Bosnia Canton

IFI - International Financial Institutions

MP - Main project

MPCA - Management Plan in Case of Accidents

OP - Operational Policy of the World Bank

PAP - Project Affected Person

PPE - Personal Protective Equipment

PC Roads FBH - Public Company Roads of the Federation of Bosnia and Herzegovina

RAP - Resettlement Action Plan

RPF - Resettlement Policy Framework

TD - Tendering Documentation

TMP - Traffic Management Plan

WB - World Bank

WMP - Waste Management Plan

AEHS - Annual Environmental Health and Safety

EXECUTIVE SUMARY

INTRODUCTION AND OBJECTIVES OF THE ESMP

This Project of road pavement and axis corrections on major road M5, section Jajce jug – Donji Vakuf 1 (the Project) for which this ESMP is developed, is one of the sub-projects included in the "FBH Road Sector Modernization Project"co-financed by the WB and EIB. The Project is screened as a category B project according to the triggered Operational Policies OP 4.01 on Environmental Assessment of the WB as well as the screening procedure outlined in the project-specific ESMF. As such, this activity needs to have an ESMP developed, whereas pursuant to the local legislation this project does not require a water permit, an environmental assessment or an environmental permit - whether federal or cantonal. PC Roads FBH will ensure all required local permits (urban and construction permit) for this Project are obtained.

LOCATION AND TRAFFIC DESCRIPTION

The Project is situated on the main traffic direction of Jajce and Donji Vakuf municipalities, on the major road M-5, section Jajce jug – Donji Vakuf 1. This road section is located in the central part of Bosnia and Herzegovina and connects Jajce and Donji Vakuf with Travnik (Cantonal center). The nearest relevant traffic count device is located in the settlement Vinac (Jajce municipality), less than a kilometer up the road from the start of project stretch 2, and it shows that, in 2016, 3582 vehicles were passing daily (AADT). This number rises to 4398 vehicles daily during the summer months.

PROJECT DESCRIPTION

The project Road Pavement and Axis Correction on Main Road M5, Section Jajce Jug- Donji Vakuf consists of the reconstruction of the Tunnel Skela in the municipality Jajce and the reconstruction of road section Jajce Jug - Donji Vakuf, divided into the reconstruction of 5 road stretches:

I. Reconstruction of Tunnel Skela
II. Reconstruction of road section Jajce Jug-Donji Vakuf:

- stretch, chainage 10+400 – 13+900 and the reconstruction of the Tunnel Vinac on chainage 11+560-11+680[1]
- stretch, chainage 19+778.1 – 20+678.5
- stretch, chainage 22+740 – 23+626
- stretch, chainage 24+005 – 24+700
- stretch, chainage 25+800 – 26+190

[1] *The Main design for the reconstruction of the Tunnel Vinac is by the time of completion of this document not developed, and will be a caontractual obligation of the Contractor*

BASELINE OF PARTICULAR INTEREST

The terrain of the Project is mostly hilly with an attitude in the range from 300 to 500 meters above sea level. Meteorological station in Jajce, closest to the site of reconstruction, reports the following data. The average multi-annual temperature for Jajce is 10,1 °C, the warmest month is July, with an average perennial air temperature of 19,1 °C and the coldest month is January when the average perennial temperature is -0,9 °C. The average rainfall measured in Jajce, during multi-year period is 78,3 mm per month. The rainiest month is June, when the average precipitation is 94,1 mm. The least precipitation occurs in March, only 61,7 mm on average.

Judging by the location of the Project, it can be concluded that the highest air pollution refers to the traffic of the major road. Waters of the wider area belong to the Black Sea watershed. The Vrbas River flows along this entire section. No monitoring of noise levels near the Project area was conducted; therefore there is no available baseline data of the impact of the noise on the environment. The largest source of noise, in general, is traffic. Discontinuous urban objects, industry objects, complex cultivation patterns, broad - leaved and mixed forest and pastures are the dominant land cover type covering large areas in the wider area of the Project site according to the CORINE methodology. There are neither protected areas nor cultural-historic heritage near the project area according to Spatial plan of FBH, Spatial plan of Central – Bosnia Canton and Commission to Preserve National Monuments. There are also no recorded archeological findings in the observed area.

The Project road section lies in the far north-west of the Central Bosnia Canton. The project stretches are located on main road M5 between the towns Jajce and Donji Vakuf and follows the course of the River Vrbas. Hence, these two municipalities are directly affected by the project. However, the importance of this project lies mainly in the significance of the road for transit traffic as well as in connecting Jajce and Donji Vakuf with the North of the Country and the neighboring Entity, as well as to the cantonal capital Travnik.

IMPACTS DURING PRECONSTRUCTION

Socio economic impacts: this project envisages the reconstruction and road pavement, and axis correction of the existing road on section Jajce South –Donji Vakuf. The Project activities regarding stretches 1-5 imply the expropriation of 20 publicly and 77 privately owned land plots. Expropriation data for project activities regarding the Reconstruction of Tunnel Skela are not available at the time of creation of this document.

IMPACTS DURING CONSTRUCTION

The main impacts associated with the construction works include: emissions from the machinery used on site, dust generation from works, potential increases in noise and vibration levels, impact on soil from accidental leaks and spills, impact on geomorphology, soil quality and land use, and trafic safety impacts. The contractor is bound by the provisions

of this ESMP to conduct a baseline of the biological and natural resources specific to the site, and to adapt the measures of the ESMP and their work performance based on such findings.

Socio-economic impacts:

- At this time, it is not expected that it will be necessary to temporarily occupy any privately or publicly owned land plots for lodging machines and disposal of materials. Machines and materials will be disposed on land owned by the Investor.
- No access restriction to nearby residential or any other facilities is expected during construction works.
- New business opportunities are expected to be created for local businesses such as transporters, suppliers and other service providers.
- Although the project area is uninhabited the following adverse impacts during construction are expected: Noise increase, Inappropriate disposal of construction waste, Local businesses can be affected in means of late delivery of goods and products.

MITTIGATION MEASURES

The mitigation measures focus on the major identified impacts during pre-construction and construction works, such as emissions from the machinery used on site, dust generation from works, potential increases in noise and vibration levels, impact on soil from accidental leaks and spills, impact on geomorphology, soil quality and land use, trafic safety impacts, waste management, impacts on living conditions and impacts on local traffic. As for mittigation measures on social impacts, namely land acquisition and Involunatry resettlemet, an Abbreviated Resettlemet Action Plan will be developed in line with the project-specific Resettelment Policy Framework and implementeed before construction commencement since the project envisages activities that imply expropriation of public and private land.

ENVIRONMENTAL MONITORING PROGRAM

The monitoring program focuses on major impacts identified during pre-construction and construction works, such as emissions from the machinery used on site, dust generation from works, potential increases in noise and vibration levels, impact on soil from accidental leaks and spills, impact on geomorphology, soil quality and land use, trafic safety impacts, waste management, impacts on living conditions and impacts on local traffic.

IMPLEMENTATION AND REPORTING

PC Roads FBH is the implementer of the project and will be responsible for the implementation and compliance of the project in line with ESMP. The Contractor will be responsible for the implementation of the environmental mitigation measures during construction.

PUBLIC DISCUSION AND INFORMATION DISCLOSURE

Public consultation of the subject ESMP will be organized in Jajce and/or Donji Vakuf (depending on which project stretches will be chosen for implementation) after the WB and PC Roads FBH approve the draft of the ESMP. The record on public discussion, that is, grievances presented at the public discussion shall be recorded in the Grievance Register, and opinions and suggestions of the public shall be integrated into the final ESMP. The results of the public consultation will be incorporated into the final ESMP.

Grievance Mechanism

Besides the institutionally available ordinary and extraordinary legal remedy, and existing institutional channels, PC Roads FBH will ensure and form a special Grievance Redress Mechanism in collaboration and direct involvement of those municipalities under whose administrative authority the project is carried out, in this case with the Jajce and/or Donji Vakuf municipality.

Requirements for start of works

The Contractor shall establish all required baseline data before the commencement of works. The Baseline – Monitoring data shall include air quality data, water quality data, soil quality data, survey and analysis of vegetation cover prior to the beginning and upon completion of works on construction site. The Contractor shall develop a Construction Site Organization Plan (CSOP) that is made up of Implementation Plan of this ESMP, a detailed Waste Management Plan (WMP), Study on Safety (includes Elaborate on Safety at Work and Elaborate on Protection From Fire and Explosions), Traffic Management Plan (TMP) must be developed, which will be created by the Contractor prior to the beginning of construction works. Furthermore, the requirments for the strat of works include:

- public consultations on the approved draft of this ESMP
- implementing the changes derived from the public consultations (if any) to the ESMP
- Preparation and disclosure of RAP (Resettlement Action Plan)
- Public consultation on RAP
- Implementation of RAP
- Agreement upon payment of compensation with respective owners
- Payment of compensation in accordance to provisions determined in the RAP

1. INTRODUCTION

Based on the guidance and requirements from the Environmental and Social Management Framework (ESMF)[2] this site-specific Environmental and Social Management plan (ESMP) has been prepared.

The Public Company Roads of Federation of Bosnia and Herzegovina (further in the document referred to as PC Roads FBH) has initiated an overarching program "Modernization of Major roads in the Territory of the Federation of Bosnia and Herzegovina" (The Program) to ensure appropriate road infrastructure by 2020. For this purpose, it has been requested from the Government of the FBH to ensure credit funds from international finance institutions (IFIs).

In the framework of the abovementioned umbrella Program, the Public Company "Roads of FBH" (PC Roads FBH), a limited liability company wholly owned by the Government of FBH, has initiated the FBH Road Sector Modernization Project. FBH filed an application for a credit/loan from the European Investment Bank (EIB) and from the World Bank (WB) in total amount of 103,38 million EUR for funding abovementioned Project.

FBH Road Sector Modernization Project comprises several small and mid-sized investment schemes including:

1. This component includes reconstruction of roads:
    - Construction works for completion of the construction of major road M17.3 Neum–Stolac (in total 32,9 km);
    - Construction of third lanes for slow vehicles (in total 40 km on 8 sections of major roads);
    - Reconstruction of roadway, correction of axes (in total 18 km on 5 sections of major roads, where a correction of axes is to be done on one section only in the length of 1 km),
    - Reconstruction of 3 tunnels (with a total length of 1,86 km);
    - Reconstruction of 7 bridges (with a total length of 0,55 km).
2. Interventions on improving road safety: The reconstruction of intersections, which are classified as "black spots" on major roads, in total 9;
3. Institutional reforms: Road Management in the FBH with a particular focus on sustainability of investments and road safety;

[2] *ESMF has been disclosed and available to the public in local language on the website of PC Roads FBH in March 2016., http://jpcfbih.ba/bs/aktivnosti/modernizacija-magistralnih-cesta/38*

4. Project Implementation Support: Construction supervision and capacity building of the PC Roads FBH.

This Project of road pavement and axis corrections on major road M5, section Jajce jug – Donji Vakuf 1 (the Project) for which this ESMP is developed, is one of the sub-projects included in the group of sub-projects co-financed by the WB and EIB.

2. METHODOLOGY AND OBJECTIVES OF ESMP

The project of road pavement and axis corrections on the major road M-5, section Jajce jug – Donji Vakuf 1, is screened as a category B project according to the triggered Operational Policies OP 4.01 on Environmental Assessment of the WB as well as the screening procedure outlined in the project-specific ESMF. As such, this activity needs to have an ESMP developed, whereas pursuant to the local legislation this project does not require a water permit, an environmental assessment or an environmental permit - whether federal or cantonal[3]. PC Roads FBH will ensure all required local permits for this Project are obtained.

This ESMP aims at identifying all of the potential environmental and social impacts associated with this project activity. As such, the ESMP includes mitigation measures for all identified potential impacts that are to be undertaken throughout the different phases of the project including preparation, implementation and operation of the facilities. The measures set forth in this ESMP are meant to avoid, neutralize or diminish adverse environmental and social impacts if not completely then to a satisfying level.

ESMP identifies feasible and cost-effective measures which can reduce potentially negative impacts on the environment and society to an acceptable level. If mitigation measures are not possible, profitable or sufficient, compensation should be included as the last measure.

In order to ensure the mitigation measures have been implemented, fully or partially, the ESMP sets forth a monitoring plan to be implemented during the specific stages of project preparation/designing and implementation. Monitoring during project preparation and implementation provides information on the key environmental and social aspects of the project, particularly on the environmental and social aspects of the project and efficiency of mitigation measures. Prior to commencement of works, in accordance with requirements of the ESMP, and a minimum of monitoring requirements, described in this ESMP, without

[3] *In FBH investments requiring EIA are identified by the Regulation on Plants and Facilities Subject to Obligatory Environmental Impact Assessment, and Facilities Which May be Constructed and Commissioned Only if Granted Environmental Permit (Official Gazette of FBiH No. 19/04). In Central Bosnia Canton investments requiring an EP are regulated by Regulation on Activities, Plants and Facilities Which May be Constructed only if Granted Environmental Permit (Official Gazette of CBC, No. 5/06).*

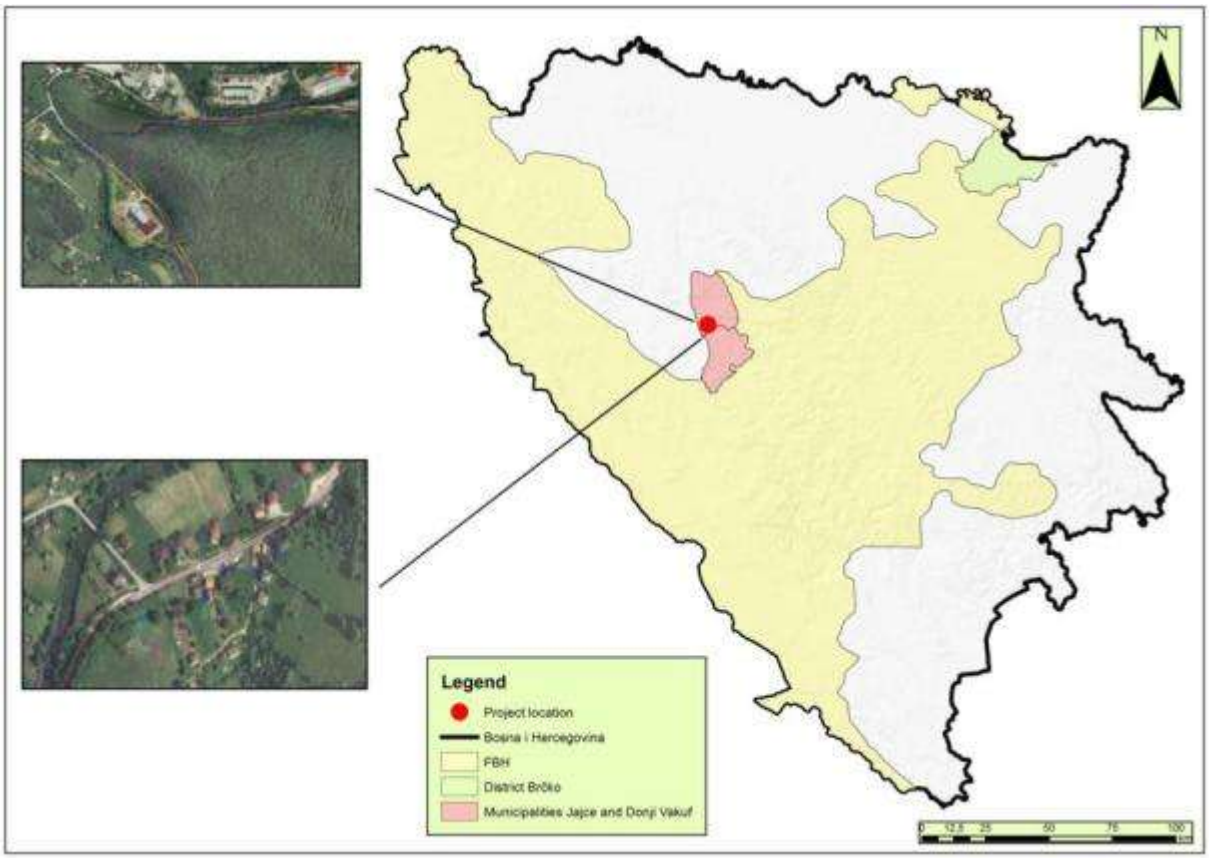
limitation to these requirements, the Contractor shall prepare detailed list of mitigation measures and parameters to be monitored.

3. LOCAL DESCRIPTION

The Project is situated on the main traffic direction of Jajce and Donji Vakuf municipalities, on the major road M5, section Jajce jug – Donji Vakuf 1. This road section is located in the central part of Bosnia and Herzegovina and connects Jajce and Donji Vakuf with Travnik.

The major road M-5 connects the international border crossing Izačić near Bihać in the northwest of the country and Višegrad in the east of BH. In addition, the major road M5 is part of the international E-road network E761 that connects Bihać in Bosnia and Herzegovina and Zaječar in Serbia.

Figure 1: The geographical location of the project



Source: PC Roads Federation of BH

The area of reconstruction is located outside of the urban area of Jajce and Donji Vakuf. The section passes in a hilly area, covered with forests and low vegetation, which is sparsely inhabited.

This section of the major road M5 is used as a transit since it lies on the most important direction to the capital city of Sarajevo from the direction of the Una – Sana Canton and Central Bosnia Canton. This area is hilly and predominantly mountainous, and the main road M5 is the best choice for traffic between the mentioned parts of Bosnia and Herzegovina.

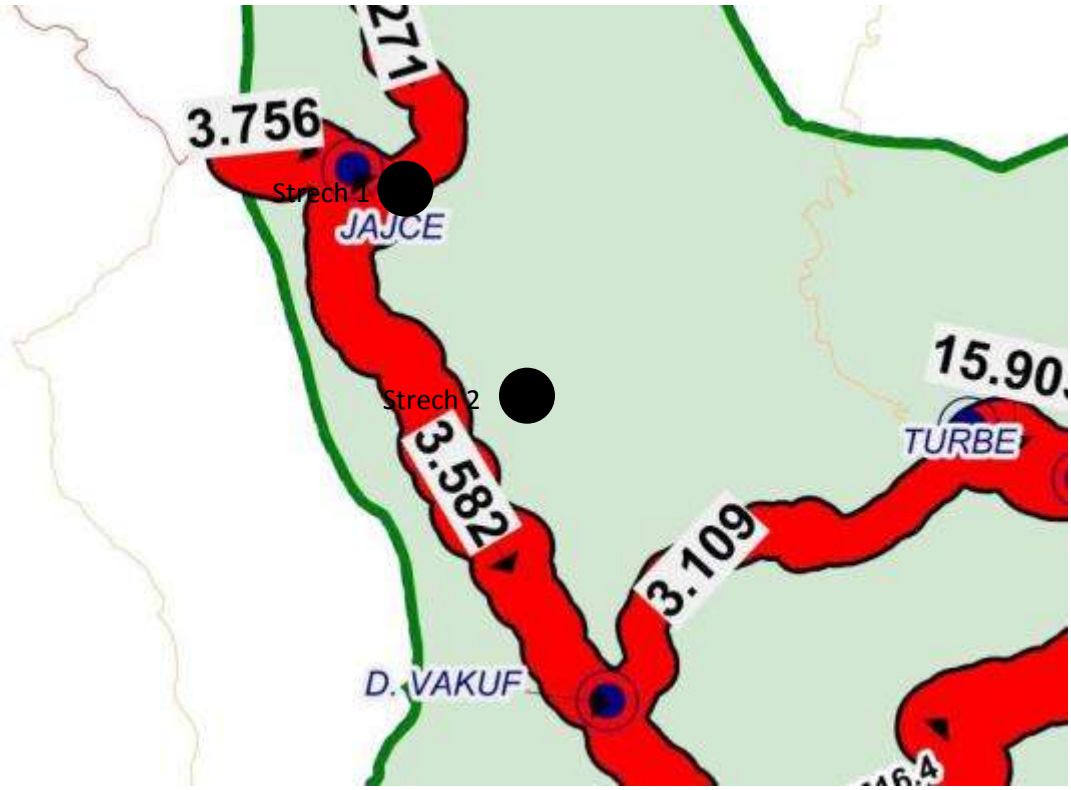
Figure 2: Lookup Map of Wider Area with the Project Location

Source: PC Roads Federation of BH

3.1. ROAD SAFETY AND TRAFFIC DATA

PC Roads FBH has installed automatic traffic counting along the major traffic network throughout FBH. Automatic traffic counting is being done since 2005 and last report[4] is published in 2016 with data for the previous year. The nearest relevant traffic count device is located in the settlement Vinac, less than a kilometer up the road from the start of project stretch 2, and it shows that, in 2016, 3582 vehicles were passing daily (Figure 3). This number rises to 4398 vehicles daily during the summer months.

Figure 3: The average amount of vehicles per day in the year 2016



Source: PC Roads Federation of BH

By request of PC Roads FBH, traffic prognosis for the same network was made by IPSA Institute Sarajevo in 2014[5] for the period 2013 to 2040. Analysis of the traffic flow was made for every year applying "equilibrium" procedure. The project section has been analyzed within the relevant sections for the project: Jajce Jug-Kamenice, Kamenice- Bypass Donji Vakuf West. The amount of predicted average daily number of vehicles is shown in Table 1 below.

[4] *"Traffic count on major roads in Federation of BH in 2015", PC Roads Federation BH, Sarajevo 2016*

[5] *„Justification study for modernization of major roads in FBH programme", IPSA Institute Sarajevo, 2014*

Table 1: Traffic prognosis for sections of main road M5

Major road	Section name	AADT								
		2018	2020	2022	2023	2025	2030	2035	2037	2040
M5	Jajce Jug-Kamenice	4399	4252	4519	4600	5950	6826	7689	7908	8392
M5	Kamenice- Bypass Donji Vakuf West	3415	3202	3403	3446	4724	5418	6097	6244	6618

Source: PC Roads FBH, 2014

The number of vehicles that has been predicted in 2018 has been overcome already in 2016 according to "Traffic count on major roads in Federation of BH in 2016" (PC Roads Federation BH, Sarajevo 2016). Thus, an even greater increase in the number of vehicles can be predicted throughout the implementation period showing the major need of reconstruction of the project road.

4. PROJECT DESCRIPTION

The project Road Pavement and Axis Correction on Main Road M5, Section Jajce Jug- Donji Vakuf consists of the reconstruction of the Tunnel Skela in the municipality Jajce and the reconstruction of road section Jajce Jug Donji Vakuf, divided into the reconstruction of 8 road stretches, of which 3 located in the municipality of Jajce and 5 located in the municipality of Donji Vakuf:

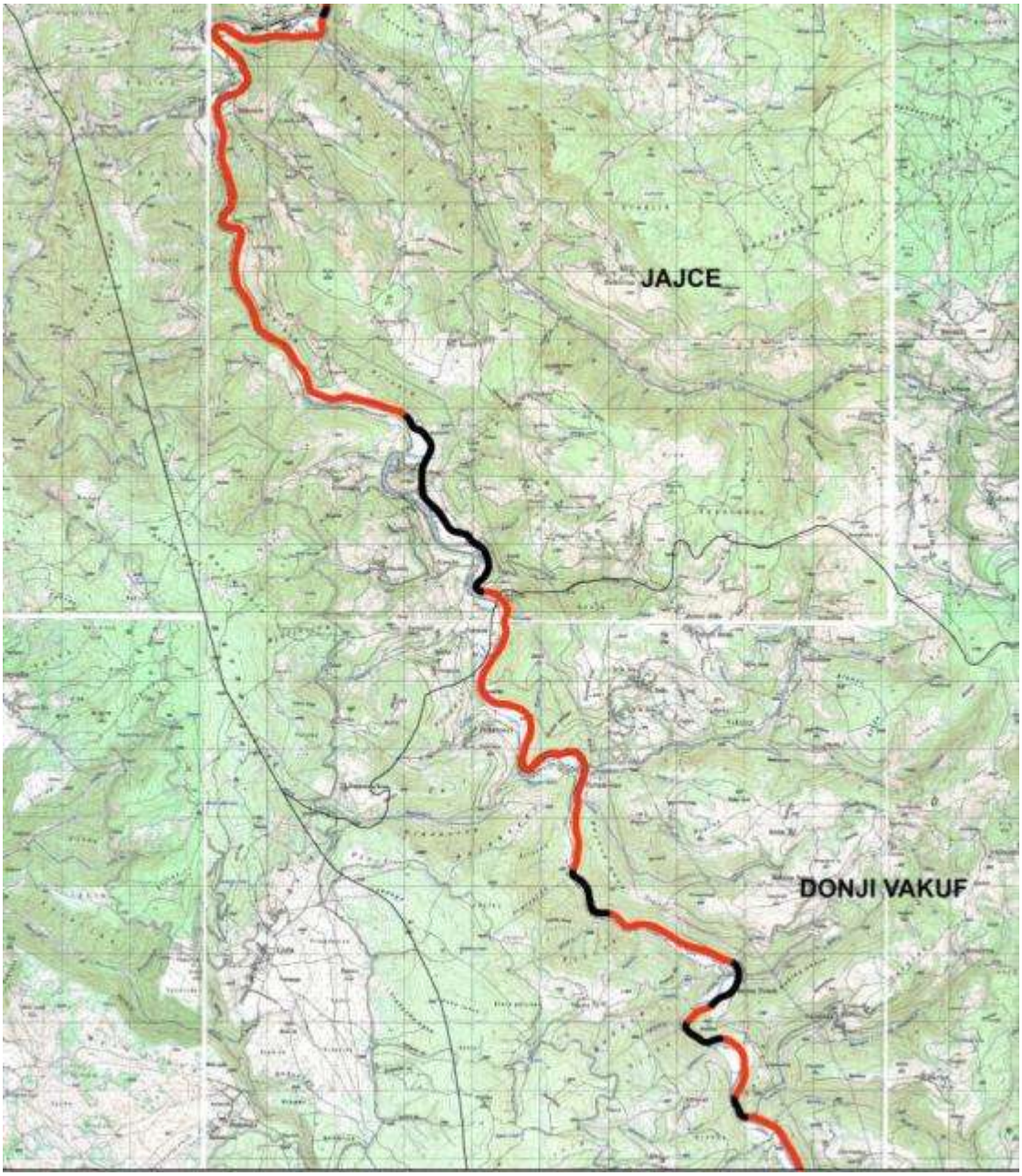
I. Reconstruction of Tunnel Skela

II. Reconstruction of road section Jajce Jug-Donji Vakuf

- stretch, chainage 10+400 – 13+900 and the reconstruction of the Tunnel Vinac on chainage 11+560-11+680[6]
- stretch, chainage 19+778.1 – 20+678.5
- stretch, chainage 22+740 – 23+626
- stretch, chainage 24+005 – 24+700
- stretch, chainage 25+800 – 26+190

[6] *The Main design for the reconstruction of the Tunnel Vinac is by the time of completion of this document not developed, and will be a caontractual obligation of the Contractor*

Figure 4: Overview of project's streches



Source: PC Roads FBH, 2018

4.1. Reconstruction of the Tunnel Skela

Road Tunnel Skela was built in 1953 at the Main Road M5, section Jajce jug – Donji Vakuf, and presents a black spot as shown by the results of the Study on Black Spots compiled in 2010. Tunnel is located within the Skela settlement, and sees rather heavy pedestrian traffic. The main goal of this Project is addressing the black spot i.e. increase traffic safety for all participants as the same time keeping the axis adopted in the Preliminary Design.

Upon analysis of the existing route and minimal technical requirements, radius of R=75,0 m was adopted instead of R=65,0 m with minimal widening of roadway.
Pedestrian traffic requires for construction of footpath for two files of pedestrians, with RC crash barrier in shape of New Jersey guardrail. Tunnel formation level must be widened by 2,20 m, which means that the entire lining and portals must be removed first, followed by re-profiling and tunnel construction.

Analysis of cross sections and existing inadequate geometric elements of the Route located in the immediate vicinity of the Tunnel resulted in designing new axis and grade lane for the Tunnel. Immediately in front of the Tunnel the axis lies in R=50,0 m radius, with inadequate lengths of connecting platforms. Upon analysis of cross sections, it became obvious that the grade line within the tunnel must be lowered by approx. 90,0 cm.
Considering all of the above, new axis and grade line were designed in such a manner as for them to seamlessly fit with the existing Tunnel.

Visual inspection immediately reveals numerous deformations and damages of all visible surfaces of the lining, deformed roadway, drainage issues, cracks and fissures. Tunnels at the Main Roads, according to the Rulebook, are supposed to have only service paths bordered by high curbs, while pedestrian traffic within the tunnel is forbidden. There are no service paths within this tunnel but footpath was formed at the level with the roadway itself enclosed with guardrail sans bumper. Tunnel lining is concrete up to approx. 2,0 m, while vault is made of concrete cubes. Entire structure of portals is concrete. Current clearances do not meet the requirements, and there are numerous visible mechanical damages to the lining due to vehicles scrapping it. Destruction at the intrados surface is the result of technological process applied and of quality of work in general.
Due to nonexistence of hydro insulation, uncontrolled leaching and complex route geometry, traffic conditions are both unfavorable and dangerous form the aspect of safety and conveniences available to end users.

The undertaken analysis of the surveyed tunnel sections resulted in defining new grade line and road axis of the route. This new grade line along the tunnel has longitudinal gradient of 1,7462%. Curve R=50,0 m is corrected to R=75,0 m curve with accompanying connecting platforms.

During designing of cross section all requirements posed by road geometry, geological-geomechanical conditions, hydrology, clearance requirements, primary lining construction method, construction of new secondary lining were met.

The new design envisages protection of the Tunnel section from seepage water by modern hydro insulation and appropriate drainage system. The designed drainage system is separate i.e. rock water inlet by system of lateral polypropylene drainage pipes Ø 200 mm exhausting

water from the tunnel. Proposed drainage system represents a modern method of collecting and leading water from the tunnel. It is planned for all visible water to be led via sealing foil to the height of the drainage concrete which encircles lateral drainage pipes. From there the water is led into lateral drainage pipes.

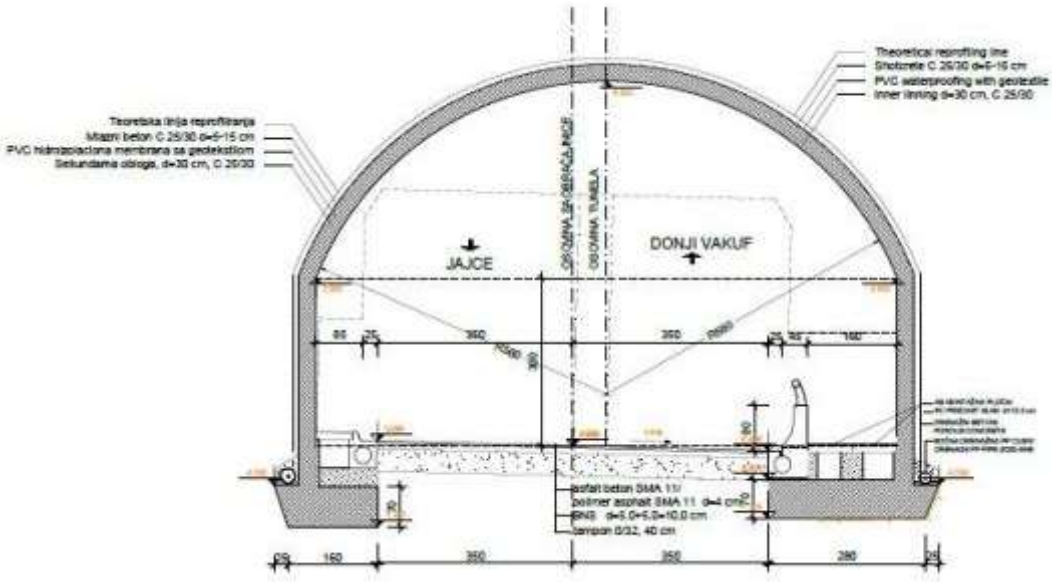
The project solution is designed so that all incident waters from the tunnel asphalt surfaces are controlled from the canal that collects water to the water purifier and further to the recipient. So, the project includes drainage and water purification after leaving the tunnel. It is planned to install an oil and grease separator according to the standards. Therefore, it is necessary to perform regular control of the condition in the separator at least once a month, in order for the device to function properly, which is done through the regular maintenance of the main roads. There is no legal obligation to monitor these waters, but in the monitoring plan of this document we have foreseen the taking of control samples in the operational phase of tunnel.

Clear span of tunnel barrel is constructed for previously described cross section.

Tunnel cross gradient varies and ranges from 7,0% at the entry portal to -2,5 % at the exit. This is addressed by keeping foundation benchmarks uniform regardless of the roadway warping. Installation canals / ducts are placed under inspection chambers and footpaths.

Entry portal structure is to be completely demolished and is replaced by the new one with the km marker 1,0 m in front of the existing one. Structure is situated in open cut, same as the existing one. Thickness of portal structure is 60,0 cm, while the thickness of portal wall is 50,0 cm. Due to planned backfilling, it is planned for the lateral vertical wall t= 50,0 cm to be constructed. Exit portal structure is designed identically to that of the entry one. Due to "penetration" of the new route into re-profiled rock mass, portal structure is lengthened up to P-37-1 i.e. 9,28 m.

Figure 5: Normal Cross section of the reconstructed profile



Source: Main Design, Divel Ltd Sarajevo, 2017

4.2. Stretch 1, chainage 10+400 – 13+900 and the reconstruction of the Tunel Vinac on chainage 11+560-11+680

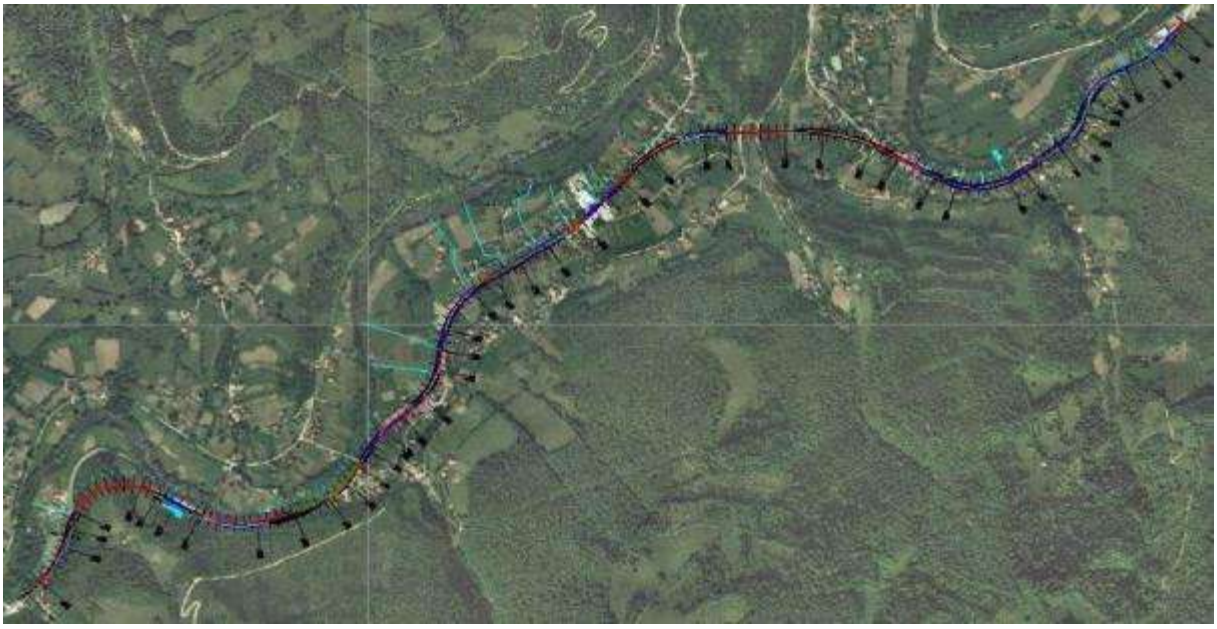
The observed part of the route is a total length of 3,348 m. The reconstruction of the road consists of the cuts and embankments towards the river.
The project strech passes through the settlement Vinac and the possibility of improving the route is limited by the existing degree of construction. In the design of the project, the designer tried, and given the above mentioned circumstances, to minimize to disturb the existing state except in locations where the project task required reconstruction for the purpose of improving the project elements (St 10 + 580 - 10 + 860 and st: 13+ 440 - 13 + 800) and calculation speeds.
Technical design elements applied:

- Terrain: "hilly"
- Calculating speed 70 (60) km/h
- Rmin 150 (100) m
- Lmin = 45 (40) m
- Carriageway width: 2 x 3.0 m
- Marginal strip width: 2 x 0.3m
- Shoulder width: 1.3m
- Berm width (without drain lines): min. 1.0 m
- Asphalt drain line width: 0.75m

Description of the technical solution applied:

- Applied technical elements of the route are as follows:
- Total length of the route: 3500m,
- Length of the location 1 that is under reconstruction: 3162m,
- Min. applied radius of a horizontal curve: R=100
- The minimum length of the transition curve L=40m,Min. radius of a horizontal curve:100m
- Max. applied reference level gradient: 2.90%
- Min. applied reference level gradient: 0.30%
- Min. vertical curve radius: 2000m, applied once
- The extension of the carriageway was taken for two trucks with a trailer, and it was made on both sides.

Figure 6: Stretch 1, 10+400-13+900



Source: Main Design, IPSA Ltd Sarajevo, 2018

4.3. Stretch 2, chainage 19+778.1 – 20+678.5

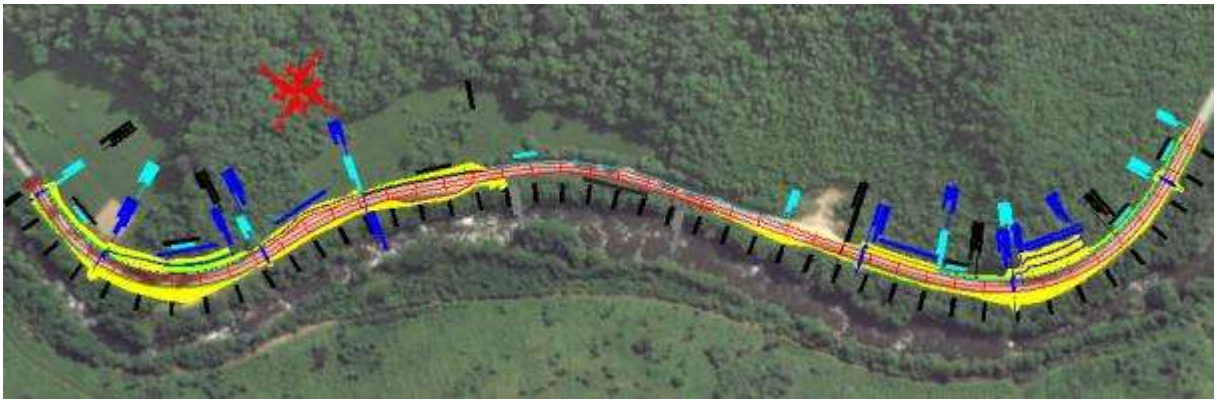
By the Conceptual design the axis of the route was corrected at the beginning and at the end of the intervention in critical curves, increasing the radius of horizontal curves to R = 100m, or R = 120m. Part of the route between these two reconstructed curves is retained according to the existing condition, since these are extremely good elements of the route, but with the assumption of rehabilitation of the asphalt cover. The somewhat larger cuttings into rock masses on smaller sections are justified from the aspect of increasing traffic safety, moving away curves from the river bed and adopting berms of sufficient widths to provide greater traffic safety and stability of slopes.

In the previous phase (Conceptual design), the proposed solution by the designer and adopted by the investor, at this stage, was improved by the reference level correction to a minimum extent, in order to better fit the existing condition on the part of rehabilitation of asphalt.

The beginning of the road section is in the direction of the main road M5 (direction Jajce - Donji Vakuf), at the coordinates: 6445504.127; 4897275.696, and the end is at 6445925.752; 4896600.187. The ground level at the beginning of the section is 451.62 MASL, and the end is 464.75 MASL, which is also the highest point on the reference level.
Applied technical elements of the route are as follows:

- Length of the route: 900.396 m
- Number of curves 4 or 4.4 per km
- Curve length: 716.712 m or 79.6%
- Length of straight routes: 183.684 m or 20.4%, the longest straight route, L = 128.990 m
- The minimum length of the transition curve, L = 40 m, applied 4 times, and the longest is L = 120 m
- Min. radius of a horizontal curve: 100m, applied once
- Route stretching: 900.396m / 796.29 = 1.13
- Max. reference level gradient: 2.17% at 104.4 m
- Min. reference level gradient: 0.17% at 15.58 m
- Min. vertical curve radius: 5000m, applied once
- The extension of the carriageway was taken for two trucks with a trailer, and it was made on both sides of the curve.

Figure 7: Stretch 2, 19+778.1-20+678.5



Source: Main Design, IPSA Ltd Sarajevo, 2018

4.4. Stretch 3, chainage 22+740 – 23+625

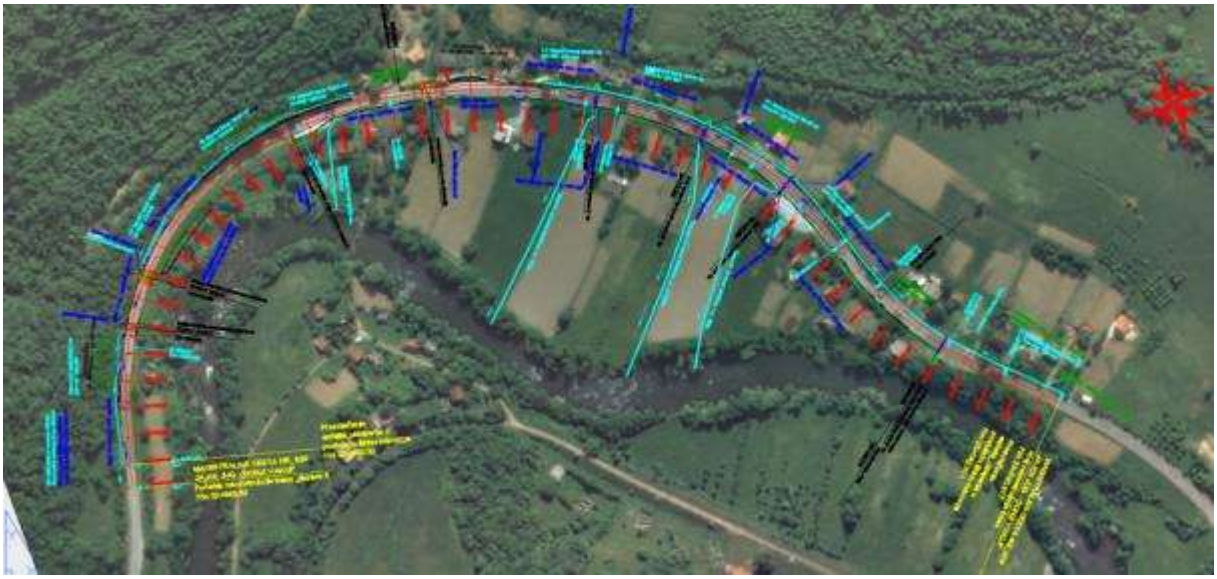
Given that it is a road section through a populated place, the existing route does not meet, by its dimensions, the required standard in terms of driving-dynamics and safety conditions. Therefore, the reconstruction of the route is planned with the application of adequate elements of the project geometry with application of double pedestrian paths. It is also planned to reconstruct the existing plate culverts and the bridge with 5m opening.

The beginning of the road section is in the short direction of the main road M5 (direction Jajce - Donji Vakuf), at the coordinates: 6447710.138 ; 4895915.901, and the end is at 6447542.043 ; 4895274.488. The ground level at the beginning of the section is 476.47 MASL, and the end is 485.81 MASL, which is also the highest point on the reference level.

Applied technical elements of the route are as follows:

- Length of the route: 929.317 m
- Number of curves 5 or 5.38 per km
- Curve length: 869.484 m or 93.56%
- Length of straight routes: 59.833 m or 6.44%, the longest straight route, L = 43.606 m at the end of the section
- The minimum length of the transition curve, L = 40 m, applied 2 times, and the longest is L = 85 m
- Min. radius of a horizontal curve: 200m, applied two times
- Route stretching: 929.317m / 869.484 = 1.06
- Max. reference level gradient: 1.42% at 97.53 m
- Min. reference level gradient: 0.51% at 80.86 m
- Min. vertical curve radius: 3000m, applied once
- The extension of the carriageway was taken for two trucks with a trailer, and it was made on the inner side of the curve.

Figure 8: Stretch 3, 22+740-23+625



Source: Main Design, IPSA Ltd Sarajevo, 2018

4.5. Stretch 4, chainage 24+005 – 24+700

On the section from km 24 + 006 to km 24 + 700 by the Terms of reference was planned reconstruction of the existing road on two locations with the implementation of minimal elements of project geometry, radius of horizontal curve which are equal to R = 100m (at location 24 + 025-24 + 226) and R = 120m (at the location of 24 + 413-24 + 591) since the existing elements of the route do not satisfy requirements for Vr = 60km/h and the designer at these locations has corrected the axis and reference level of the existing main road.

Applied technical elements of the route are as follows:

- Total length of the route: 695 m
- Length of location 1 which is reconstructed 201m
- Length of location 2 which is reconstructed 178m
- Length of curves: Location 1: 197m or 98%, Location 2: 178m or 100%
- The minimum length of the transition curve, L = 40 m, applied 3 times
- Min. radius of a horizontal curve: 100m
- Max. reference level gradient: 1.15%
- Min. reference level gradient: 0.30%
- Min. vertical curve radius: 2000m, not applied
- The extension of the carriageway was taken for two trucks with a trailer, and it was made on both sides.

Figure 9: Stretch 4, 24+005-24+700

Source: Main Design, IPSA Ltd Sarajevo, 2018

4.6. Stretch 5, chainage 25+800 – 26+190

On the section from km 25 + 800 to km 26 + 190, it is planned to reconstruct the route using the minimal elements of the project geometry, of the horizontal curve radius, which is R =

100m, since the existing elements of the route do not satisfy for Vr = 60km/h, and it is necessary to perform correction of the axis and reference level on the given section.

Also, this situation, having in mind the direct contact of the route with the river, is very unfavorable from the point of view of the traffic safety.

The beginning of the road section is in direction of the main road M5 (direction Jajce - Donji Vakuf), at the coordinates: 6447872.337 ; 4893935.677, and the end is at 6448055.992 ; 48963611.368. The ground level at the beginning of the section is 497.61 MASL, and the end is 498.93 MASL, which is also the highest point on the reference level.

Applied technical elements of the route are as follows:

- Length of the route: 440.745 m
- Number of curves 3 or 6.8 per km
- Curve length: 421.315 m or 95.59%
- Length of straight routes: 19.43 m or 4.41%, the longest straight route, L = 10.28
- The minimum length of the transition curve, L = 40 m, applied 6 times
- Min. radius of a horizontal curve: 100m, applied two times
- Route stretching: 440.74m / 372.70 = 1.18
- Max. reference level gradient: 0.74% at 54.39 m
- Min. reference level gradient: 0.30% at 59.94 m
- Min. vertical curve radius: 2000m, applied once
- The extension of the carriageway was taken for two trucks with a trailer, and it was made on the inner side of the curve.

Figure 10: Stretch 5, 25+800-26+190

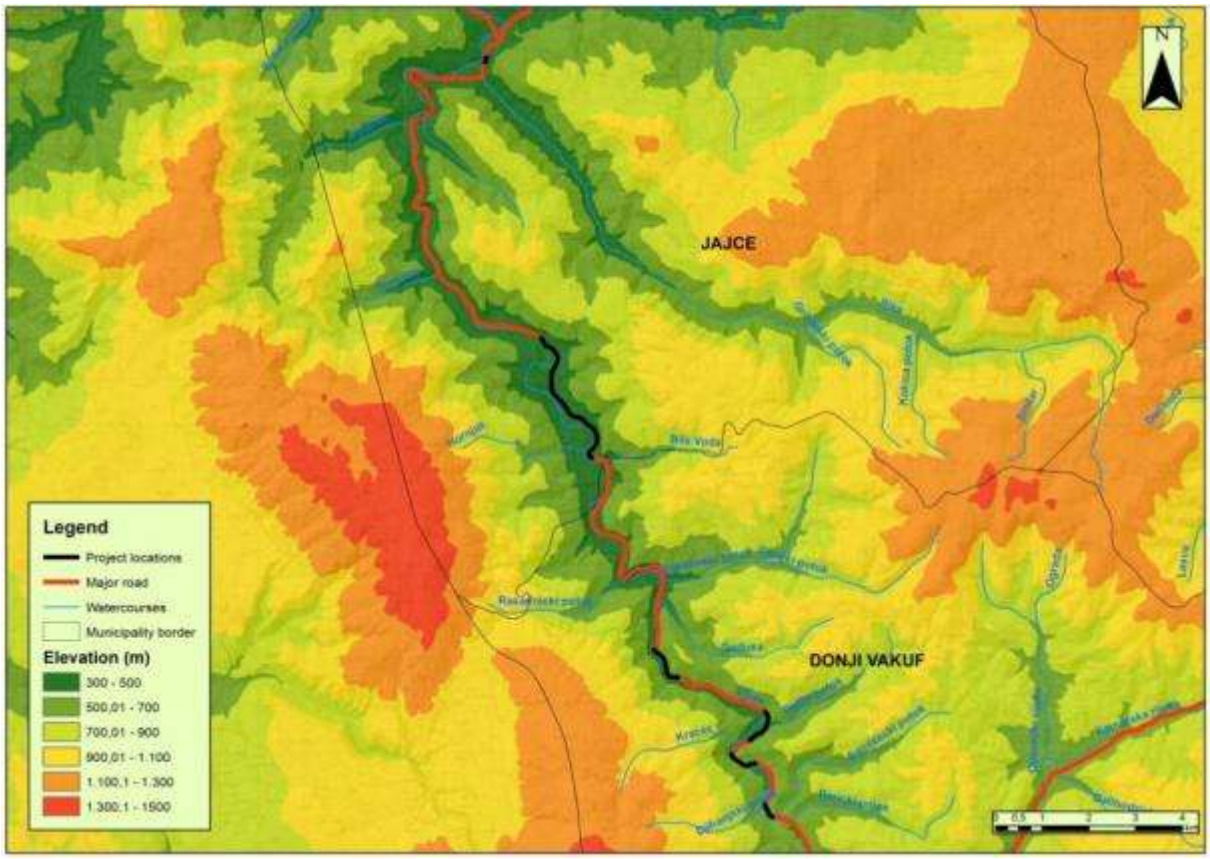
Source: Main Design, IPSA Ltd Sarajevo, 2018

5. BASELINE OF PARTICULAR INTEREST

5.1. GEOGRAPHIC CONDITIONS

The terrain of the Project is mostly hilly with an attitude in the range from 300 to 500 meters above sea level. In the wider area the altitude goes up to 1500 meters above sea level, as indicated in the next figure. From stratigraphic – petrographical point of view this area is composed from stable and waterproof rocks, and from structural geomorphological point of view this type of relief belongs to fluvial – accumulative type of morphostructure. Hydrogeological complexes are mostly without aquifers.

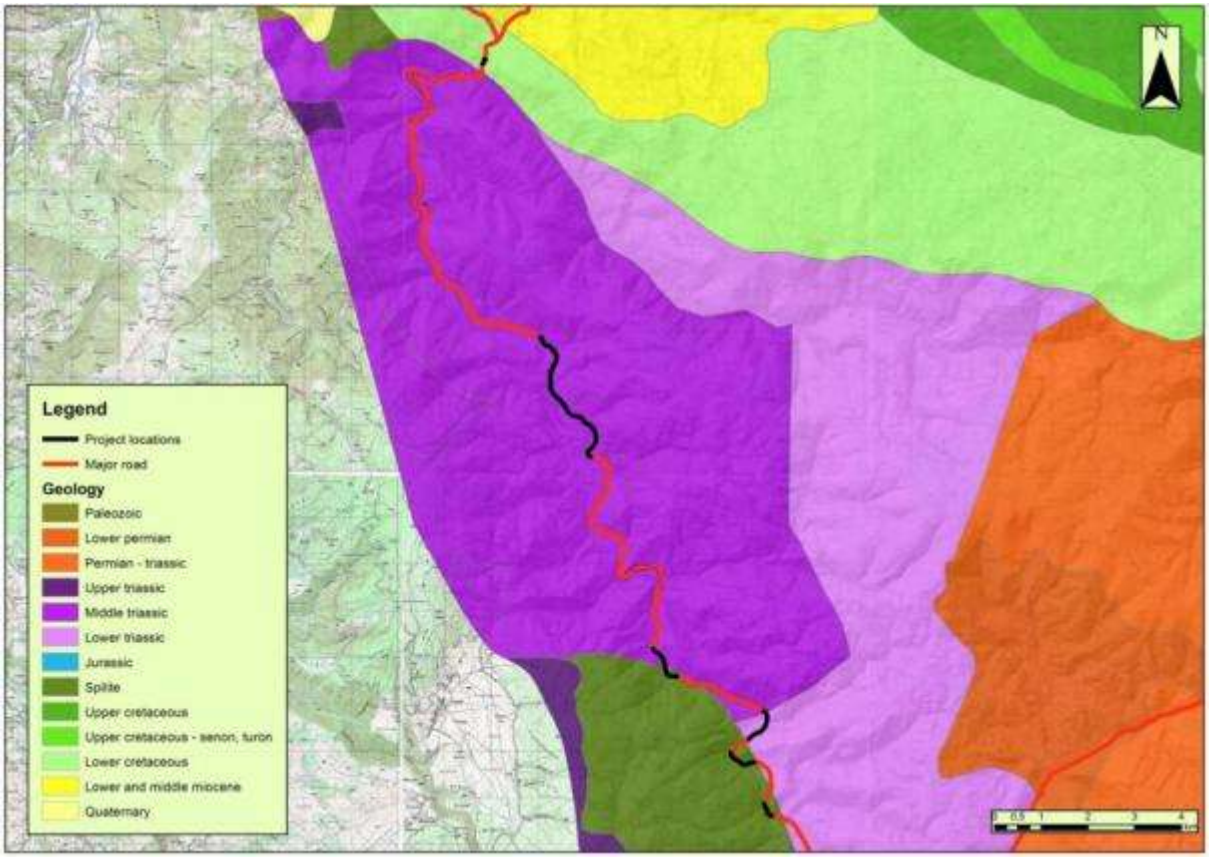
Figure 11: Geographical Map of Wider Area with the Project Location



Source: PC Roads Federation of BH

The geological structure of the area of reconstruction is characterized mostly by Middle Triassic sedimentary and volcanogenic formations*:* cherts, clay rock, sandstones, tuff rocks, limestones and magmatites.

Figure 12: Geologic Map of the wider area of the Project



Source: Draft of Spatial plan of FBiH 2008.-2028.

5.2. CLIMATE FEATURES

Climatic features of subject area are determined by the thermal and pluviometric regime, and therefore it is necessary to define its basic parameters, using climatological monitoring and a detailed analysis of the same. It can be said that this area is under the influence of the moderate continental climate or moderately warm and humid climate type (Cfb climate according to Köppen climate classification), while the higher zones are characterized by subalpine and alpine climate (areas over 1000 meters above sea level).

Meteorological station in Jajce, closest to the site of reconstruction, reports following data: The average multi-annual temperature for Jajce is 10,1 °C, the warmest month is July, with an average perennial air temperature of 19,1 °C and the coldest month is January when the average perennial temperature is -0,9 °C.

Table 2. Average temperature and precipitation for the multi-year period (1960.-1984.)

Month	*I*	*II*	*III*	*IV*	*V*	*VI*	*VII*	*VIII*	*IX*	*X*	*XI*	*XII*	*Average*
Temperature (°C)	*-0,9*	*1,9*	*5,8*	*10,0*	*14,7*	*17,9*	*19,1*	*18,7*	*15,4*	*11,1*	*6,2*	*1,1*	*10,1*
Precipitation (mm)	*62,8*	*63,9*	*61,7*	*72,0*	*85,1*	*94,1*	*90,6*	*81,4*	*78,8*	*69,6*	*89,1*	*90*	*78,3*

Source: Federal Hydrometeorological Institute, Sarajevo

The average rainfall measured in Jajce, during multi-year period is 78,3 mm per month. The rainiest month is June, when the average precipitation is 94,1 mm. The least precipitation occurs in March, only 61,7 mm on average.

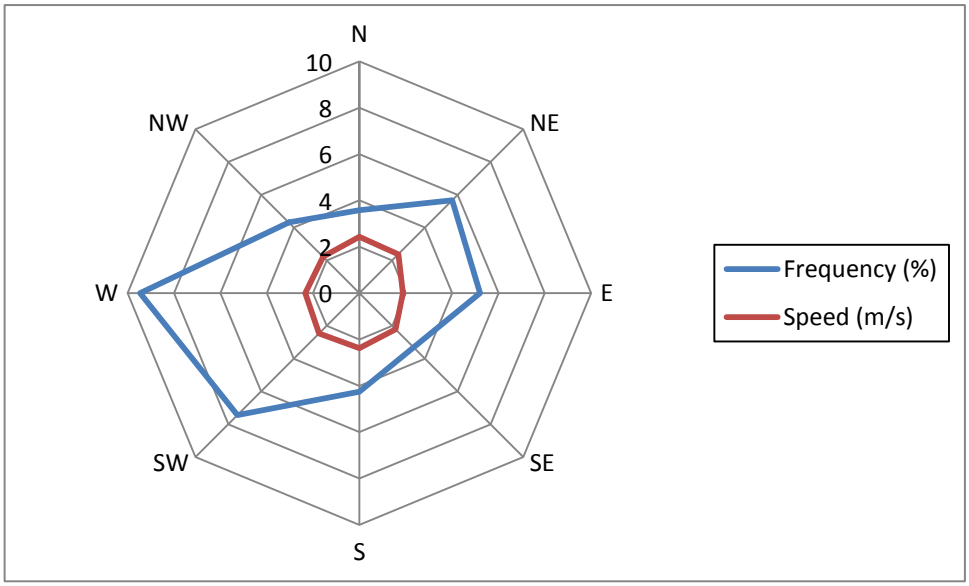
Table 3. Average wind speeds and frequency for the multi-year period (1960.-1984.)

Direction	*C*	*N*	*NE*	*E*	*SE*	*S*	*SW*	*W*	*NW*
Frequency (%)	*50,4*	*3,58*	*5,67*	*5,2*	*3,31*	*4,25*	*7,44*	*9,46*	*4,31*
Speed (m/s)	*-*	*2,43*	*2,37*	*1,87*	*2,21*	*2,37*	*2,47*	*2,34*	*2,22*

Source: Federal Hydrometeorological Institute, Sarajevo

Wind roses depend on geomorphology, mountain ridges and the direction of the rivers. The dominant winds come from the west and southwest, but most of the time calms are present.

Figure 13. Wind roses from MS "Jajce" for the multi-year period (1960.-1984.)



Source: Federal Hydrometeorological Institute, Sarajevo

5.3. AIR QUALITY

No particular monitoring of air quality for this location was performed, neither for the area of Donji Vakuf. The monitoring of air quality in Jajce has been carried out since 2013 from the Federal Hydrometeorological Institute. The monitoring station is located in Harmani, about 2 kilometers north from the nearest Project location. The following pollutants are measured at this monitoring station: sulfur dioxide (SO_2), nitrogen dioxide (NO_2) and particulate matter PM10.

Considering that the continuous measurements have been carried out only for a few years period, we present the data for 2014, 2015 and 2016 for this monitoring station.

Table 4. Average values and numbers of daily exceedances of tolerant and limit values[7] of pollutants at the monitoring station „Jajce“

	Average annual value SO_2 (µg/m^3)	Number of daily exceedances of tolerant and limit values (> 125µg/m^3)	Average annual value NO_2 (µg/m^3)	Number of daily exceedances of the limit value (> 85µg/m^3)	Average annual value PM10 (µg/m^3)	Number of daily exceedances of the limit value (> 50 µg/m^3)
2014.	15	0	9	0	26	36
2015.	22,9	4	12	0	21	19
2016.	12,1	0	15	0	26	55

Source: Annual reports on air quality in the Federation of BH for 2014, 2015 and 2016, Federal Hydrometeorological Institute, Sarajevo

[7] Limits and tolerance values prescribed by the *Rulebook on the Manner of Air Quality Monitoring and Defining the Types of Pollutants, Limit Values and Other Standards* (Official Gazette of FBH, No. 01/12).

Table 5. Average values of pollutants at the monitoring station „Jajce"by months

Average value (µg/m^3) /month	SO_2			NO_2			PM10		
	2014.	2015.	2016.	2014.	2015.	2016.	2014.	2015.	2016.
I	26	63	34	16	22	19	62	38	66
II	11	47	12	11	18	12	35	30	24
III	-	27	11	12	14	12	47	16	21
IV	10	17	5	9	10	8	29	7	8
V	9	8	5	6	6	6	15	3	8
VI	8	9	4	5	5	4	15	4	7
VII	8	10	4	5	6	5	12	-	5
VIII	9	13	3	6	7	6	13	-	5
IX	11	11	5	5	7	9	14	-	6
X	18	10	10	9	10	18	19	-	14
XI	27	20	17	12	16	28	18	-	42
XII	32	68	34	14	22	53	32	-	104

Source: Annual reports on air quality in the Federation of BH for 2014, 2015 and 2016, Federal Hydrometeorological Institute, Sarajevo

Based on the attached tables it can be seen that the maximum values of sulfur dioxide (SO_2) occur in the winter period. The same applies for the values of nitrogen dioxide (NO_2) and particulate matter PM10. Number of daily exceedances of tolerant and limit values of sulfur dioxide (> 125 µg/m^3) in 2015 were 4, and no daily exceedances of the limit value of nitrogen dioxide (> 85 µg/m^3) have occurred in the three year period. The number of daily exceedances of the limit value of the particulate matter PM10 (> 50 µg / m^3) range from 19 to 55 during the three year period.

The main air pollutants in the area of Jajce are industrial plants, and pollution from the traffic of the major road. Also, during the winter time, the air is loaded with the pollution that comes from individual furnaces and boiler units, from residential facilities. The same applies for the municipality Donji Vakuf.

Based on geographical features and the fact that there are no significant polluters, it considers that the air quality is good. The Contractor shall conduct a baseline measurement for air quality monitoring prior to the start of works.

5.4. WATER AND WATER QUALITY

Waters of the wider area belong to the Black Sea watershed. The Vrbas River flows along this section. Vrbas River, which is the right confluent to the Sava River, springs below the mountain Zec near Fojnica at about 1.715 meters above sea level, and after 250 km of flow,

Vrbas flows into the Sava River near Srbac, at 96 meters above sea level. The main left tributaries are Pliva, Crna River and Krupa River, while the main right tributaries are Bistrić, Ugar, Svrakava, Banja Turjanica and Povelić. Vrbas River Basin has a prolate shape with a length of 150 km and an average width of 70 km, and the total area of the basin is 6.386 km^2. The average altitude is 690 meters above sea level and the highest point in the basin is about 2.100 meters above sea level. Average annual precipitation ranges from 800 l/m^2 at the mouth of the Vrbas and Sava to about 1500 l/m^2 in the southern part of the basin. The average perennial flow Q_{av} is 114m^3/s, while the ecological flow is 26.3 m^3/s.

The Vrbas River is threatened by human activities such as transport, agriculture, non-sanitary waste disposal and discharging untreated wastewaters from the housing facilities in the vicinity.

According to the Vulnerability study of the Federation of BH, river Vrbas is classified into Class II according to its quality. Class II includes waters that can be used for drinking after a certain purification treatment, and in a natural state for swimming, water sports, and for the growth and development of certain fish species. The Contractor shall conduct a baseline measurement for water quality monitoring prior to the start of works.

The following table gives an overview of the water quality status of the Vrbas River, shown through the percentages of the prescribed class satisfaction.

Table 6. Water quality of the Vrbas River, for the period 2005-2007.

Vrbas river	MPC	Prescribed class satisfaction
		2005 – 2007 year
BIOLOGICAL PARAMETERS		
Saprobity Index	1,5 – 2,5	100
MICROBIOLOGICAL PARAMETERS		
Total number of coliform Bacteria at 37 ° C (N/100mL)	Average	14.977
PHYSICAL-CHEMICAL PARAMETERS		
Suspended substances		
Evaporative residue (mg/L)	<30	50
Alkalinity - Acidity		
pH	6,8 – 8,5	100
Oxygen regime		
Dissolved oxygen (mgO2/L)	>6	100
Oxygen saturation (% O2)	90 – 70	100
BOD (mgO2/L)	<4	100
COD (mgO2/L)	<12	100
Content of nutrients		
Ammonium ion (mg/L)	<0,25	100
Nitrites (mgNO2/L)	<0,05	100
Nitrates (mgNO3/L)	<10	100
Phosphates (mgPO4/L)	<0,25	100

Source: Water Management Strategy of the Federation of Bosnia and Herzegovina 2010 – 2022., Institute for Water Management d.d. Sarajevo - Institute for Water Management d.d. Mostar, 2012

Figure 14: Hydrographic Map of the wider area of the Project

Source: PC Roads Federation of BH

5.5. NOISE LEVELS

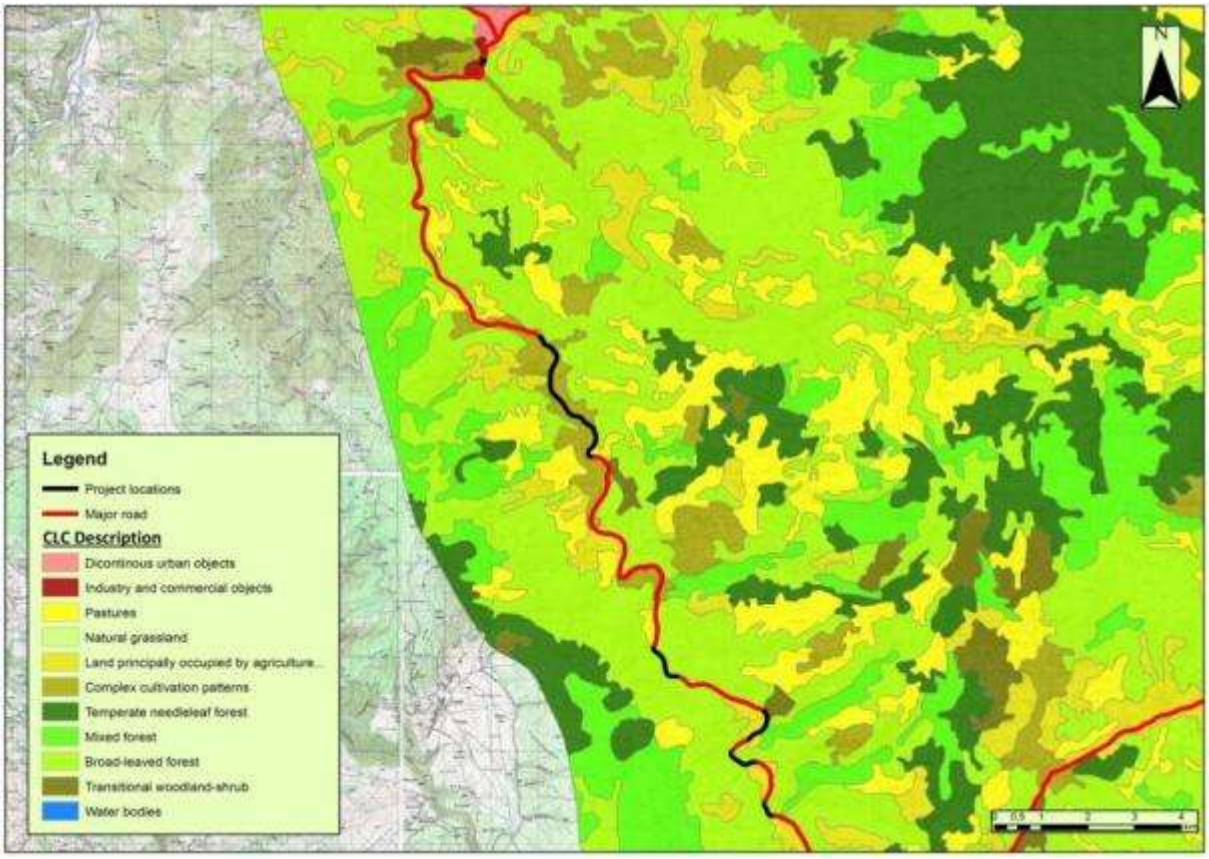
There was no monitoring of noise levels near the Project area; therefore there is no available baseline data of the impact of the noise on the environment. The largest source of noise, in general, is traffic.

In close proximity to the Project area, we can find mostly industrial facilities (factories) and residential facilities (houses) which are exposed to the traffic noise and according to the Law on Noise Protection, they fall under the fifth zone, where allowed noise levels are 65 dBA during day and 60 dBA at night.

5.6. LAND AND LAND USE

Discontinuous urban objects, industry objects, complex cultivation patterns, broad - leaved and mixed forest and pastures are the dominant land cover type covering large areas in the wider area of the Project site according to the CORINE methodology[8]. The Project area is located outside of the urban area of Jajce and Donji Vakuf. The section passes in a hilly area, which is sparsely inhabited.

Figure 15. Land use in the wider area of the project according to CORINE model



Source: Coordination of information of the Environment, European Environment Agency

5.7. FLORA AND FAUNA

The area of Central Bosnia Canton where the municipalities Jajce and Donji Vakuf are located, with geographic features of the terrain and large variety of ecosystem, it is

[8] Coordination of information of the Environment - **European Environment Agency**

considered that in the wider area reside over 4000 species of vascular plants many of which are endemic and relict, and more than 200 species of birds and other elements of the biodiversity.

There is no exact data on the flora and fauna for the particular location of the Project, but based on the fact that this is an existing road section, the risk to the flora and fauna is minimal. However the Contractor shall hire a biologist to conduct a review of the site for the baseline that needs to be prepared for monitoring prior to the start of works.

5.8. PROTECTED AREAS

There are neither protected areas nor cultural-historic heritage near the project area according to Spatial plan of FBH, Spatial plan of Central – Bosnia Canton and Commission to Preserve National Monuments. There are also no recorded archeological findings in the observed area.

5.9. POPULATION AND SETTLEMENTS

The Project road section lies in the far north-west of the Central Bosnia Canton. The project stretches are located on main road M5 between the towns Jajce and Donji Vakuf and follows the course of the River Vrbas. Hence, two municipalities are affected.

The municipality of Jajce has a population of 30 758 people who live in the area of 336,70km^2. The population density equals 91.35 people per km^2.
The GDP of the municipality equaled 4729 BAM in 2012 which makes Jajce a moderately developed Municipality comparing to the rest of the Municipalities in CB Canton
The municipality of Jajce has three primary schools and two high schools. The nearest universities are more than 100km away.
The health care system in the municipality is within the average of Federation BH with 810 people per one doctor. Primary and secondary health care as well as a public pharmacy and several private practices are present in the city.

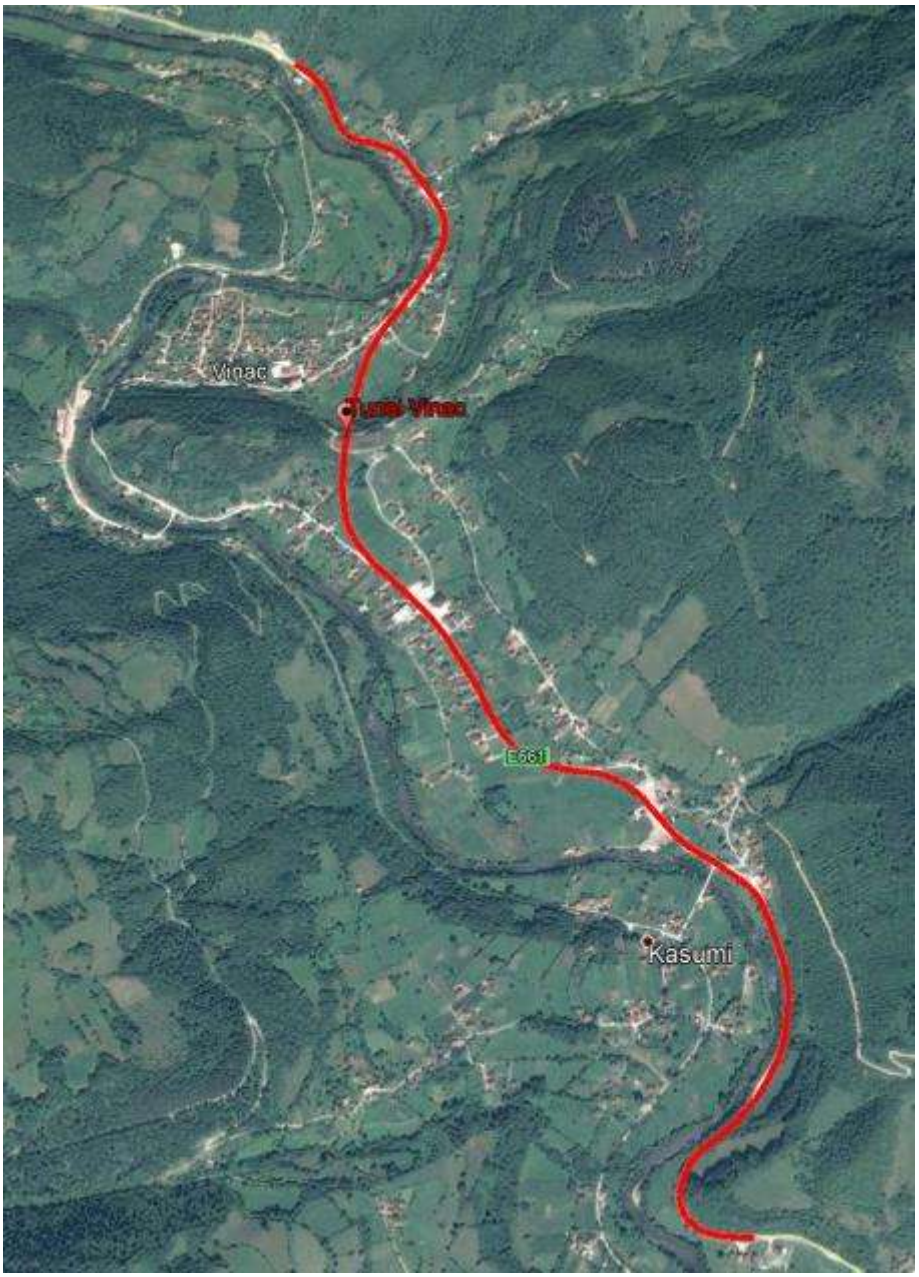
The reconstruction of the Tunnle Skela and the Reconstruction of the Road and axis correction on chainage 1+500-4+250 lie in the industrial zone Skela. In close vicinity of the project stretch there are several factories a gas station and a car wash.

Figure 16: Tunnel Skela

Source: PC Roads of FBH

The first project strech, the Reconstruction of the Road and axis correction on chainage 10+400-13+900, goes through a sparsely populated rural area on the north entrance to the city of Jajce, the settlement Vinac. Most of the local population works in the city of Jajce and gravitates to it.

Figure 17: 1st strech of project, the Reconstruction of the Road and axis correction on chainage 10+400-13+900



Source: PC Roads of FBH

The municipality Donji Vakuf is populated by 13985 people according to the population census from 2013. The area of the municipality is 320 km^2, thus making the population density equal 43,7 people per square kilometer. The municipality has 64 settlements and 16 local communities. Education in the municipality rests on 4 primary schools and 1 high school, while only primary health care is available.

The second project stretch, the Reconstruction of the Road and axis correction on chainage 19+778.1-20+678.5, goes through an unpopulated rural area on the south entrance to the city of Donji Vakuf, just down the road of the settlement Torlakovac.

Figure 18: 2nd strech of project, the Reconstruction of the Road and axis correction on chainage 19+778.1-20+678.5

Source: PC Roads of FBH

The third project stretch, the Reconstruction of the Road and axis correction on chainage 22+740-23+625, goes through a sparsely populated suburban area on the south entrance to the city of Donji Vakuf,the settlements of Babin Potok and Krivače. Most of the local population works in the city of Donji Vakuf and gravitates to it.

Figure 19: 3rdstrech of project, the Reconstruction of the Road and axis correction on chainage 19+778.1-20+678.5

Source: PC Roads of FBH

The fourth project stretch, the Reconstruction of the Road and axis correction on chainage 24+005-24+700, goes through a sparsely populated suburban area on the south entrance to the city of Donji Vakuf. Most of the local population works in the city of Donji Vakuf and gravitates to it.

Figure 20: 4th strech of project, the Reconstruction of the Road and axis correction on chainage 24+005-24+700

Source: PC Roads of FBH

The fifth project stretch, the Reconstruction of the Road and axis correction on chainage 25+800-26+190, goes through a sparsely populated suburban area on the south entrance to the city of Donji Vakuf. Most of the local population works in the city of Donji Vakuf and gravitates to it.

Figure 21: 5th strech of project, the Reconstruction of the Road and axis correction on chainage 25+800-26+190

Source: PC Roads of FBH

The importance of this project lies in the significance of the road for transit traffic as well as in connecting Jajce and Donji Vakuf with the North of the Country and the neighboring Entity, as well as to the cantonal capital Travnik.

6. DESCRIPTION OF POSSIBLE IMPACTS DURING PRE-CONSTRUCTION, CONSTRUCTION, OPERATION AND MAINTENANCE

6.1. IMPACTS DURING PRE-CONSTRUCTION

Socio-economic Impacts

PRE-CONSTRUCTION LAND ACQUISITION: this project envisages the reconstruction and road pavement and axis correction the existing road on Section Jajce South –Donji Vakuf. The project activities regarding stretches 1-5 imply the expropriation of 20 publicly and 77 privately owned land plots. Expropriation data for project activities regarding the reconstruction of Tunnel Skela are not available at the time of creation of this document.

(A)RAP will be developed in line with Resettlement Policy Framework (RPF[9]) and all persons compensated before commencement of works. Tables 7 to 13 depict an overview of the affected plots. The given data is approximate due the unreliable available baseline survey.[10]

The walkover survey has been conducted on the 2nd of October 2018 and it has been concluded that the public land necessary for the respective project activities, such as material and machinery storage, is not being used in any way, neither formally or informally.

Land acquisition process for public land is in fact administrative transfer of ownership and thus, no compensation will be paid.

Table 7. Overview of predicted expropriation on stretches 1-5

Stretch	Number or private plots	Number of public plots	Total number of plots
1	52	11	63
2	2	3	5
3	23	3	26
4	0	2	2
5	0	1	1
Total	77	20	97

Source: main design, IPSA 2018

[9] *http://jpcfbih.ba/assets/upload/dokumenti-modernizacija/okvir_politike_preseljenja.pdf*

[10] *Private owners are represented with a questionmark (?). Data on owners is not avalable on stretches 1 due to the listed cadastre. Once the Expropriation study is completed all data will be available and it will be possible to create a Resettlement Action Plan which will give more detailaed information about affected plots and provisions on the expropriation process.*

Table 8. Land plots to be expropriated on projects stretch 1a

NO.	NAME OF OWNER	PARCEL NUMBER	AREA	AREA TO BE EXPROPRIATED	COMMENT	LOCATION
			STRETCH III			
1	?	594	?	133,8	listed cadastre	K.O. Bavar
2	?	596	?	359,2	listed cadastre	K.O. Bavar
3	?	597	?	143,2	listed cadastre	K.O. Bavar
4	?	605	?	392,5	listed cadastre	K.O. Bavar
5	?	606	?	392,5	listed cadastre	K.O. Bavar
6	?	624	?	150,3	listed cadastre	K.O. Bavar
7	?	600	?	29,4	listed cadastre	K.O. Bavar
8	?	621	?	18,6	listed cadastre	K.O. Bavar
9	?	615	?	29,8	listed cadastre	K.O. Bavar
10	?	773	?	15,3	listed cadastre	K.O. Bavar
11	?	772	?	31,9	listed cadastre	K.O. Bavar
12	Public	?	?	722,4	listed cadastre	K.O. Bavar
13	Public	?	?	611,9	listed cadastre	K.O. Bavar
14	?	1162	?	209,5	listed cadastre	K.O. Bavar
15	?	975	?	20,9	listed cadastre	K.O. Bavar
16	?	976	?	4,6	listed cadastre	K.O. Bavar
17	?	977	?	4,9	listed cadastre	K.O. Bavar
18	?	978	?	70,4	listed cadastre	K.O. Bavar
19	?	986	?	12,9	listed cadastre	K.O. Bavar
20	?	978	?	31,2	listed cadastre	K.O. Bavar
21	?	988	?	26,6	listed cadastre	K.O. Bavar
22	?	989	?	36,6	listed cadastre	K.O. Bavar
23	?	996	?	32,7	listed cadastre	K.O. Bavar
24	?	997	?	20,2	listed cadastre	K.O. Bavar
25	Public	?	?	1366,1	listed cadastre	K.O. Bavar
26	Public	?	?	878,4	listed cadastre	K.O. Bavar
27	Public	?	?	432,9	listed cadastre	K.O. Bavar
28	Public	?	?	543,3	listed cadastre	K.O. Bavar
29	Public	?	?	222,2	listed cadastre	K.O. Bavar
30	Public	?	?	948,3	listed cadastre	K.O. Bavar
31	?	1071	?	182,4	listed cadastre	K.O. Bavar
32	?	1102	?	132,6	listed cadastre	K.O. Bavar
33	?	1103	?	13,1	listed cadastre	K.O. Bavar
34	?	1104	?	145,9	listed cadastre	K.O. Bavar
35	?	1103	?	84,5	listed cadastre	K.O. Bavar
36	?	1105	?	101,9	listed cadastre	K.O. Bavar
37	?	1106	?	97,1	listed cadastre	K.O. Bavar
38	?	1112	?	39,2	listed cadastre	K.O. Bavar
39	?	1113	?	30,6	listed cadastre	K.O. Bavar
40	?	1114	?	48,3	listed cadastre	K.O. Bavar

Source: main design, IPSA 2018

Table 9. Land plots to be expropriated on projects stretch 1b

41	?	1115	?	102,8	listed cadastre	K.O. Bavar
42	?	1116	?	114,5	listed cadastre	K.O. Bavar
43	?	1120	?	130,1	listed cadastre	K.O. Bavar
44	?	1121	?	66,4	listed cadastre	K.O. Bavar
45	?	1123	?	95,2	listed cadastre	K.O. Bavar
46	?	1125	?	77,6	listed cadastre	K.O. Bavar
47	?	1126	?	23,9	listed cadastre	K.O. Bavar
48	?	1127	?	41,3	listed cadastre	K.O. Bavar
49	?	1128	?	40,6	listed cadastre	K.O. Bavar
50	?	1129	?	18,1	listed cadastre	K.O. Bavar
51	?	1139	?	32,8	listed cadastre	K.O. Bavar
52	?	1140	?	43,1	listed cadastre	K.O. Bavar
53	?	1206	?	22,9	listed cadastre	K.O. Bavar
54	?	1207	?	25,4	listed cadastre	K.O. Bavar
55	?	1217	?	21,4	listed cadastre	K.O. Bavar
56	Public	?	?	343,3	listed cadastre	K.O. Bavar
57	Public	?	?	398,7	listed cadastre	K.O. Bavar
58	Public	?	?	1322,1	listed cadastre	K.O. Bavar
59	?	626	?	54,4	listed cadastre	K.O. Bavar
60	?	627	?	10,7	listed cadastre	K.O. Bavar
61	?	628	?	64,4	listed cadastre	K.O. Bavar
62	?	629	?	63,9	listed cadastre	K.O. Bavar
63	?	630	?	3,3	listed cadastre	K.O. Bavar
	TOTAL AREA TO BE EXPROPRIATED cca=			11885	m^2	

Source: main design, IPSA 2018

Table 10.Land plots to be expropriated on projects stretch 2

NO.	OWNER	PARCEL NUMBER	AREA	AREA TO BE EXPROPRIATED	COMMENT	LOCATION
			STRETCH V			
1	?	1523	11870	234	MEADOW	K.O. STARO SELO
2	Public	1524	3136	349	WOOD	K.O. STARO SELO
3	Public	1522	632140	334	WOOD	K.O. STARO SELO
4	?	1525	8770	116	MEADOW	K.O. STARO SELO
5	Public	1540	117780	91	RIVER	K.O. STARO SELO
	TOTAL AREA TO BE EXPROPRIATED cca=			1124	m^2	

Source: main design, IPSA 2018

Table 11.Land plots to be expropriated on projects stretch 3

NO.	OWNER	PARCEL NUMBER	AREA	AREA TO BE EXPROPRIATED	COMMENT	LOCATION
			STRETCH VI			
1	?	495	3445	201	WOOD	K.O. SANDŽAK
2	Public	183/1	2766758	528	WOOD	K.O. SANDŽAK
3	Public	1625	42336	250	ROAD	K.O. SANDŽAK
4	?	1527	280	22	ROAD	K.O. SANDŽAK
5	?	1528	320	50	YARD	K.O. SANDŽAK
6	?	1529	380	71	YARD	K.O. SANDŽAK
7	?	1530	620	125	YARD	K.O. SANDŽAK
8	?	1531	1161	144	ORCAHRD.	K.O. SANDŽAK
9	?	1532	1361	90	MEADOW.	K.O. SANDŽAK
10	?	1533/2	316	11	ARABLE LAND.	K.O. SANDŽAK
11	?	1534	2722	86	ARABLE LAND.	K.O. SANDŽAK
12	?	1535	2152	60	ARABLE LAND.	K.O. SANDŽAK
13	?	1536	1131	138	ARABLE LAND.	K.O. SANDŽAK
14	?	1498/1	526	52	ORCHARD	K.O. SANDŽAK
15	?	1498/2	379	59	ORCHARD	K.O. SANDŽAK
16	?	1497	683	60	YARD	K.O. SANDŽAK
17	?	1496/1	1470	58	ORCHARD	K.O. SANDŽAK
18	?	1490	272	22	ORCHARD	K.O. SANDŽAK
19	?	1489	251	35	ORCHARD	K.O. SANDŽAK
20	?	1488	292	50	ORCHARD	K.O. SANDŽAK
21	?	1487	613	70	ARABLE LAND.	K.O. SANDŽAK
22	?	1484/1	702	43	ARABLE LAND.	K.O. SANDŽAK
23	?	1479	3187	32	ARABLE LAND.	K.O. SANDŽAK
24	?	1476/2	583	50	ARABLE LAND.	K.O. SANDŽAK
25	?	1472/2	524	82	YARD	K.O. SANDŽAK
26	Public	1467	806	293	WOOD	K.O. SANDŽAK
	AREA TO BE EXPROPRIATED cca=			2682	m²	

Source: main design, IPSA 2018

Table 12.Land plots to be expropriated on projects stretch 4

NO.	OWNER	PARCEL NUMBER	AREA	AREA TO BE EXPROPRIATED	COMMENT	LOCATION
			STRETCH VII			
1	Public	1551	116785	2046	WOOD	K.O. SANDŽAK
2	Public	1619	125347	53	RIVER	K.O. SANDŽAK
	TOTAL AREA TO BE EXPROPRIATEDcca=			2099	m²	

Source: main design, IPSA 2018

Table 13.Lland plots to be expropriated on projects stretch 5

NO.	OWNER	PARCEL NUMBER	AREA	AREA TO BE EXPROPRIATED	COMMENT	LOCATION
			STRETCH VIII			
1	Public	1459/1	621968	563	WOOD	K.O. SANDŽAK
	TOTAL AREA TO BE EXPROPRIATED cca=			563	m²	

Source: main design, IPSA 2018

Figure 22 (a-f): Photographs made during the walkover survey on October 2nd and 3rd , 2018

a) tunnel Skela

b) land alongside project section1 (km 10+400-13+900)

c) land alongside project section 2 (km 19+778-20+6

d) land alongside project section 3(km22+740-23+626)

e) land alongside project section 4 (km 24+005-24+700)

f) land alongside project section 5 (km 25+800-26+190)

6.2. IMPACTS DURING CONSTRUCTION

Impact on Air Quality

Exhaust gases - The machinery which is used during the construction and delays, i.e. traffic standstills on the road due to works on road pavement and axis corrections will lead to a temporary increased emission of such gasses as SO_2, CO_2, CO, NO_X and Pb.

Dust generation - where the most important polluters are solid particles (PM10 and PM2,5). Possible sources of dust generation include demolition works, site preparation activities, especially excavation and leveling, handling of building materials such as gravel, sand, asphalt, cement and the construction itself.

Impact on Noise Level and Vibrations

Noise emission is likely to appear during site preparation. Possible sources of noise are: ground preparation activities such as excavation and leveling, use of tools and equipment, assembly of building materials on site; offloading of building materials such as gravel, sand, asphalt etc. and the work of construction machines in general.

Impact on Surface Water Quality

Possible contamination of water – may occur due to general construction activities and malpractice including inappropriate extraction of resource material, handling of hazardous substances (i.e. asphalt, chemicals and paint), inadequate waste handling, liquid and solid, equipment damage which may lead to leakage of lubricants and fuel (increased blurring, input of fats and oils) etc. These impacts can be avoided by working carefully, so the construction will not have a significant negative impact on the water.

Impact on Geomorphology and Soil Quality

- Possible occurrence of rockfall depending on the type of terrain and stability of slopes;
- Erosion – removal of topsoil may poses risk from erosion of bare soil and enhances the impact of rainwater;
- Soil compaction due to construction machinery (vehicles and equipment for construction) moving around the location;

- Uncontrolled (storing, handling and depositing) and untreated waste is one of the major sources of pollution that can disrupt soil quality.

Impact on Biological and Natural Resources

- Work of heavy machinery during construction phase may lead to plants being covered with dust (e.g. blockage and damage to stomata, shading, abrasion of leaf surface or cuticle), which will affect plants growth and feeding base for animals;
- Pollution of Vrbas river and soil with hazardous substances (fuel and oils in case of spills) can harm biodiversity of the surrounding area.
- Removal of a layer of vegetation may destroy animals' habitats.

Impact on the Protected Areas

- The observed project is not situated in any of the existing or planned protected areas, or in their close vicinity. No impacts on protected areas are expected.

Impact on Landscape Values

Partial alternation of landscape and visual aspects can be expected with organization of construction sites, presence of personnel and machinery on site. These impacts are temporary and negligible.

Impact on Traffic Safety and Traffic Flow

Traffic congestion and obstructions on road section - increased traffic flow, leading to congestion and obstruction is likely to be experienced on major road M5 during the construction.

According to the main design (Divel Ltd Sarajevo, 2017) of the reconstruction of Tunel Skela, the civil works will be conducted under full traffic stoppage and alternative routes will be made available.

For the other stretches no full traffic stoppage is predicted. Civil works will be conducted while the traffic flow will be enabled on minimum one traffic lane throughout the whole period of construction.

Trenches are likely to be made during implementation of construction activities, including earthworks and temporary storage of construction material.

Population Safety Impact

According to local practice, no working camps will be set up for the purpose of accommodation of workers. All workers will commute daily to the construction site. Thus the impact of worker’s presence on local community is minor.

The vicinity of the construction site: safety issues regarding local population that can occur due to the vicinity of the construction site includes:

- Inadequate noise levels that can impact the health of the local population
- Ilicit entrance to the construction sites by local population (children)
- Reconstruction also may lead to interruption of land use by inadequate waste management in terms of uncontrolled and untreated waste (e.g. accidental spills from construction machinery, solid waste generated by workers on the construction site) that might be harmful to local communities.

Socio-Economic Impacts

Temporary land use and damage to private property: At this moment it is not expected that it will be necessary to temporarily occupy any privately owned land plots for lodging machines and disposal of materials. Machines and materials will be disposed on land owned by the Investor alongside the project road. However, if temporary occupation of private land is needed during construction, this will be agreed upon with respective owners and the compensation will be paid in accordance with provisions determined in the RPF and the site-specific RAP.

Access restrictions: No access restriction to nearby residential or any other facilities is expected during construction works.

New workplaces and impacts on local businesses (positive): New business opportunities are expected to be created for local businesses such as transporters, suppliers and other service providers. The project is expected to have positive impact on the local employment opportunities with opening new workplaces during road construction. This impact is considered to be short term and small due to small scope of civil works.

Impact on living conditions of local communities

Following adverse impacts during construction are expected:

- Traffic disruptions,
- Noise increase,
- Inappropriate disposal of construction waste,
- Disruptions to water and electricity supply, telephone and Internet connections, waste collection, regular public transport, delivery of mail,
- Potential hazards form the proximity of construction activities.
- Local businesses can be affected in means of harder and late delivery/pick up of goods and products. The impact is short termed and minor due to the expected short duration of civil works. Any disturbances to business activities that have economic

impacts will be compensated in line with the RPF[11] provisions for impact on commercial payment.

6.3. IMPACTS DURING OPERATION AND MAINTENANCE

Neither new negative environmental impacts, nor deterioration of existing negative impacts, during operation and maintenance are expected.

6.4. POSITIVE IMPACTS

Project implementation will have positive impacts on the quality of life of the local community. There are several opportunities which were detected in the project:

- Improved safety for drivers due to the correction of unsafe elements of the road section;
- Improved pedestrian safety due to construction of pedestrian lanes along populated stretches.
- More efficient and safer traffic system: by decreasing the time of travelling, lower number of traffic accidents, lower costs of maintenance and management;
- Improvement of transport system and accessibility;
- Developed road structure with improved access to and out of the project area;
- Benefits to vehicle users and users of public transportation due to improved traffic connections and capacity;
- Increased pedestrian safety by reconstructing the pedestrian pavement on both sides of the tunnel;
- Tunnel improvement in the sense of constructive stability;
- Lowering traffic congestions by increasing traffic flow;
- Increased travel speed and travel quality;
- Improved quality of life on the whole (better access to important institutions: health, education, job etc.); and
- Less damages to vehicles.

[11] *http://jpcfbih.ba/assets/upload/dokumenti-modernizacija/okvir_politike_preseljenja.pdf*

6.5. Enhancement measures

Table 14: Enhancement measures

Impact	Improvements to be achieved	Cost Assessment (US$)		Institutional Responsibility	
		Operative	Implementation	Operative	Implementation
▪ Traffic	▪ Better traffic flow; ▪ Reduction in time travel and cost by reconstruction of the road surface and the Tunnel ▪ Improved road and travel safety; ▪ Increased pedestrian safety by designing footpaths in the Tunnel Skela and the populated area of the Road recoinstructions	Included in construction works	Included in supervision	Contractor	PC Roads FBH
▪ Socio-economic	▪ New job and business opportunities for local construction workers and firms (temporary); ▪ Improvement of connections of local population to the municipality center the town of Jajce	Included in construction works	Included in supervision	Contractor	PC Roads FBH
▪ Visual aesthetic and landscape	▪ Improving visual aspects of the road and surrounding area.	Included in construction works	Included in supervision	Contractor	PC Roads FBH

7. MITIGATION MEASURES

The purpose of this ESMP is to set forth mitigation measures associated with the environmental impacts identified for this given project activity. The mitigation measures are included in this section and summarized in *Table 15*. This chapter includes also the general provisions and mitigation measures that the contractor hired for construction will need to obey and/or perform. The requirements that the Contractor needs to follow, beyond the provisions of the ESMP, will be outlined in a number of planning documents (plans) that will be developed by the contractor prior to any start of works. The development of such documents will allow for adjustments of the ESMP measures based on the potential new findings on the site, as a result of the public consultations or developing the project specific baseline.

As a part of Tendering Documents (TD) for the Contractor, PC Roads FBH will require that the Contractor submits a Construction Site Organization Plan (CSOP), which will highlight certain requirements both for completion of works and implementation of mitigation measures.

CSOP consists of following components[12]:

(i) Description of the preparation works and description of location organization during and after the construction (design of access roads, internal roads, manipulative and parking spaces, layout of installations, design and organization of temporary construction site facilities, terrain rehabilitation upon completion of works). This part of CSOP needs to contain technical description, calculation and graphical appendices, and BoQ.

(ii) Technological scheme (location and operation of the storage and disposal sites of the materials, location of the mechanization maintenance, disposal sites for special types of waste, storage of dangerous and harmful substances). This part of CSOP needs to contain technical description, calculation and graphical appendices, and BoQ.

(iii) Elaborate on safety (Elaborate on safety on work and Elaborate on protection from fires and explosions), which shall include according to provision of this ESMP a Management Plan in Case of Accidents (MPCA); and

(iv) Practical plan of the implementation of this ESMP and among other a detailed Waste Management Plan (WMP)].

Additional request for the Contractor, as stipulated by ESMF and this ESMP, is to design and submit a detailed Traffic Management Plan (TMP) 30 days prior to commencement of works (in accordance with Appendix 4. Road Safety Management of the ESMF). The TMP

[12] *Ordinance on Construction Site Organization, Mandatory Documents on Site and Participants in Construction (Official Gazette of the FBH No. 48/09)*

shall also include management of traffic according to the season, notably trying to minimize impacts during the summer months.

Within the framework of the project, PC Roads FBH prepared a Resettlement Policy Framework (RPF) which clarifies land acquisition/resettlement and compensation principles, organizational arrangements and procedures for planning land acquisition/resettlement. The RPF also serves as a guide for preparation of site-specific Resettlement Action Plans (RAPs). This sub-project is included in the Integrated RAP, disclosed and consulted in March 2016.

7.1. MITIGATION MEASURES IN PRE-CONSTRUCTION PHASE

7.1.1. Contractor Management

PC Roads FBH will ensure that the construction activity is carried out without risk to the health and safety of all workers and local community though contract clauses. Therefore, the Contractor will plan, coordinate, control and monitor the undertaken activities to effectively minimize the risks presented during their work.

The ESMP is an integrated part of the TD and the Contract for Execution of Works. It is the Contractor's obligation to include the implementation of environmental and social mitigation measures into the overall cost.

The Contractor will be required to provide a short statement that confirms that:

- The ESMP conditions have been estimated and included into the bid price,

- The Contractor for Execution of Works has a qualified and experienced person on the Contractor‘s team who will be responsible for the environmental and social compliance requirements of the ESMP.

- The Contractor will comply with applicable BH and FBH laws, EU standards and WB requirements, including the relevant Operational Policies, this ESMP, framework ESMF and the Environment, Health and Safety guidelines, where applicable.

The following contractual conditions shall apply to the Contractors for Execution of Works employed by PC Roads FBH:

- The Contractor will be required to prepare site-specific CSOP in accordance with the requirements of this ESMP. All submitted CSOPs shall be formally reviewed by PC Roads FBH prior to agreement and signing.
- The Contractor will provide formal written reports to PC Roads FBH in accordance with requirements set-out in the ESMP which is part of this document;
- PC Roads FBH is responsible to introduce all contractors and sub-contractors and personnel working on the Project on the contents and provisions of this ESMP and any penalties arising from non – compliance therewith;

- The Contractor is responsible for notifying PC Roads FBH immediately upon receiving any complaints or grievances, as well as immediately upon identifying and implementing any of any corrective actions. The Contractor shall inform the complainant of the Grievance redress mechanism. All grievances will be registered with the Central Feedback Desk (CFD) and logged in the Central Grievance Log. Contractor will fill out the grievance registration template provided in Appendix 2 of this ESMP on aregular basis and will make it a part of the monthly reports to the Contractor.

The Contractor shall provide monthly reports on its management and monitoring of the working conditions of direct and indirect employees on the work site and ensure that systems are in place to monitor compliance with labor and health and safety standards.

The contractor shall:

- Ensure that all workers are required to comply with all national/federal legislation on labor and health and safety, as well as any other relevant standards including the World Bank Group EHS guidelines; and be held responsible if compliance is not met;
- Be responsible for all activities undertaken by his subcontractors;
- Maintain regular effective two-way communication with all workers, sharing information and assisting in dealing with any unforeseen problems promptly.
- Exchange information and request any plans from sub-contractors which deals with significant health and safety hazards and risks created by or associated with their work activities.

The recommendations and proposed mitigation measures will be attached to the tendering documentation and subsequently the contract with the Contractor. The ESMP is a part of the work program and as such, it needs to be addressed to the Contractor and carried out as required.

During the construction phase, Contractors will be required to allocate the responsibility of overseeing day-to-day compliance with the SS ESMP to a senior member of staff. Contractors will be responsible for the implementation of all measures included in the SS ESMP for all activities undertaken in terms of the construction contract (including work undertaken by subcontractors). Compliance of Contractors with these measures will be assessed by the Construction Supervisor appointed by the JP Ceste FBIH, in line with the Decree on Construction Site Organisation, Mandatory Documentation on Construction Site and Construction Work Participants.

7.1.2. Land Acquisition and Involunterry Resettlement

This project envisages the reconstruction and road pavement and axis correction the existing road on Section Jajce South –Donji Vakuf. The project activities regarding stretches 1-5 imply the expropriation of 20 publicly and 77 privately owned land plots. Expropriation data for project activities regarding the reconstruction of Tunnel Skela are not available at the time of creation of this document.
Accordingly, once the Expropriation study is finninshed and all relevat data is available a Resettlement Action Plan (RAP) has to be developed and implemented in line with project specific RPF, before construction initiation.

All land acquisition and expropriation will be conducted in compliance with the applicable legislation in FBiH (in particular, the Law on Expropriation of FBiH), the requirements set by WB OP 4.12 on Involuntary Resettlement.

All owners, occupants and users of affected properties at the time of the cut-off date, whether with or without fully recognized ownership rights, are eligible for compensation or assistance which will be outlined in the Entitlements Matrix in the integrated RAP.

All compensation must be paid in line with provisions determined the RAP and Resettlement Policy Framework (RPF). Compensation will always be effected prior to land entry or taking of possession over property by the expropriation beneficiary. The land cannot be taken physically (i.e. any civil works or construction cannot start) before compensation has been paid to the affected persons.

All affected persons will be informed, meaningfully consulted and encouraged to participate throughout the development and implementataion of the RAP and land acquisition process, in accordance with the information disclosure and consultation requirements set out in the RPF.

In addition, an effective grievance mechanism is in place for receiving and addressing in a timely fashion specific concerns about compensation and relocation raised by displaced persons, in the manner described in more detail in Chapter 10.2.1 of this ESMP (Grievance Mechanism).

7.2. MITIGATION MEASURES IN CONSTRUCTION PHASE

7.2.1. Environmental Management

During the construction phase, the Contractor shall award the responsibility of supervising everyday compliance with ESMP to a senior engineer.

The Contractor will be responsible for the implementation of all measures included in the ESMP for all activities undertaken in terms of the construction contract (including work undertaken by sub-contractors).

Compliance of Contractors with provision of ESMP will be assessed by the Construction Supervisor appointed by PC Roads FBH, in accordance with the Ordinance on Construction Site Development, Obligatory Documents on Construction Site and Participants in Construction Work (Official Gazette of the FBH, No. 48/09, 75/09 and 93/12).

Compliance reviews will be submitted by Contractor to PC Roads FBH on a monthly basis. Non-conformances, incidents and deviations from the ESMP will be communicated to PC Roads FBH, or the Supervisor, as soon as possible, within 24 hours form the time of occurrence, where PC Roads FBH shall react to the occurrence a.s.a.p. and impose corrective measures with a deadline for undertaking them.

All mitigation measures are specified in the Table 15. Environmental and Social Impacts Management Plan.

7.2.2. Health and Safety

Works on the reconstruction may pose health and safety risks for construction workers and visitors to the construction site. Population near the construction site and construction workers, as well as road users will be exposed to the risk of: biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), and (ii) road accidents from construction traffic.

Therefore, the Contractor is obliged to:

- Ensure that only properly trained/licensed people operate heavy machinery;
- Implement suitable safety standards for all workers and site visitors, which should not be less than those laid down in the international standards in addition to complying with the national standards of the FBH[13],
- Make sure basic safety features for visitors are in place, such as construction warning signs for protecting unsafe areas from being accessed or the obligation for every visitor to wear a helmet before entering the construction site

[13]- *Occupational Safety and Health Convention, 1981 (No. 155)*

- Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)

- The Safety and Health at Work Directive 89/391/EEC

-World Bank Occupational Health and Safety Guidelines (April 30, 2007.)

- and other Recommendations and EU directives

- Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular road rehabilitation activity and specific classes of hazards in the work areas,
- Provide personal protective equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty equipment and by replacing damaged equipment with new one.
- Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job.
- Appoint an environment, health and safety manager to look after the health and safety of the workers.

7.2.2.1. Safety Engagements

The Contract should ensure that all possible risks in the course of work are eliminated or reduced to a minimum. In order to prevent the possibility of higher-scale accidents it is necessary to plan and develop the measures to help reduce the adverse impacts. The Contractor's duty is to create a Management Plan in Case of Accidents (MPCA).

The MPCA should include organizational structure, responsibilities, procedures, communication, training, resources and other measures needed to provide appropriate reaction of the Contractor in case of accidents which might occur during the project. The most important items of the MPCA are as follows:

- Identify potential hazards and large-scale accidents,
- General procedures for all emergencies and accidents that might occur during the project due to natural disasters, defects on equipment of human errors,
- Description of preventive measures against accidents,
- Workers training for their roles and responsibilities when accident occurs,
- Determining responsible person at the spot,
- Urgent communication procedures,
- Information and contacts of important local authorities and emergency services,
- Internal and external alarming,
- Response plans for specific types of hazards, for example medical assistance, fire etc.

The MPCA should include:

- Spill Response Plan,
- Emergency Preparedness,
- Response Plan to Accidents.

The contractor is also obliged to:

- The contractor should provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities should be at least 6 m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment.
- Contractor should provide bottled drinking water facilities to the construction workers at all the construction sites.

The Contractor is obliged to secure the construction site in accordance with the Regulations on Occupational Safety and to provide adequate equipment

In case compliance is not met the contractor will be held responsible in accordance with Labor Protection Law.

7.2.2.2. First Aid

The Contractor shall:

- Ensure that facilities that provide health care and first aid are easily accessible. Appropriately equipped first aid stations are to be easily accessible in the whole work area;
- Documenting and reporting accidents, diseases and incidents on workplace;
- Prevent accidents, injuries and diseases originating from, in connection with or arising in the course of work, reducing as much as possible the possible cause of danger in the way which is in accordance with good international practice of;
- Identify potential dangers for works, particularly those that might pose threat to life, and provide the necessary preventive and protective measures;
- Ensure that construction site drivers strictly comply with the rules of driving;
- Ensure appropriate lighting in city urban area and alongside roads.

7.2.3. Traffic and Road Safety

The Contractor shall ensure traffic and road safety during performance of works.

The Contractor shall develop the CSOP which includes preparation and organization of construction site during and after construction, including roads on the construction site i.e. Traffic Management Plan (TMP).

Traffic on construction site is to be regulated the same way as public traffic roads.

The Contractor is obliged to:

- Prepare and deliver TMP to PC Roads FBH for its approval, no later than 30 days upon the beginning of works on any component of the project included in traffic redirection and management.
- For the purpose of uninterrupted traffic movement during the reconstruction of the crossroad, include in TMP the following parts: detailed drawings of traffic solutions by showing all bypasses, temporary roads, temporary turns, necessary barricades, signalization/lighting, traffic signs etc.
- Ensure signs in strategic parts of traffic roads.
- Install and maintain a sign on each important crossroad, on roads which will be used during reconstruction works, which will clearly indicate the following data in a local language:
    - Location: station label and settlement name
    - Duration of construction
    - Period of the proposed bypass/alternative road
    - Name and contact address/telephone number of responsible personnel
    - Name and contact address/telephone number of contractor
    - Sincere apology for the caused inconvenience

According to the Law on Roads FBH, article 77. For every construction on public road, for works on regular maintenance or any other works under traffic, appropriate temporary signage has to be set up. Respectively traffic has to be regulated in a way that will guarantee safety of traffic and contractor with minimum traffic flow disruptions.

The appropriate signage will be determined based on the Regulations on Traffic Signs (Regulations on Traffic Signs and Signage on Roads, Ways of Marking Works and Obstacles on Roads and Signs that an Authorized Person Can Give to Participants in Traffic ("Official Gazette of BiH", No. 16/07)) and in line with the Guidelines for Design, Construction, Maintenance and Control on Roads (Sarajevo/Banja Luka 2005).

TMP should include details about the following:

- Construction plan by phases,
- Beginning and duration of works,
- Overview of the existing conditions near the construction site,
- Identification of affected areas,
- Mitigation measures,
- Plan of public transport, for example, timetable, change of timetable, disturbance and the like;
- Circulation plans, including zones of entry and exit, routes for towing of material, turnaround points, parking areas, zones of interlocking with other traffic roads etc.,
- Routes for pedestrians and vehicles,
- Traffic controls for each expected intervention, including illustrations of barriers, paths, signalization plan, warning signs etc.,
- Requirements for special vehicles, for example, those of large dimensions,
- Construction works paths (access, ramps, loading, unloading),
- Connection roads for supply vehicles and storage of material,
- Expected interaction of pedestrians and vehicles,
- Roles and responsibilities of persons on construction site regarding traffic management,
- Instructions on the procedures regarding traffic control, including urgent situations.

TMP should also include appropriate communication with affected population about traffic and timely information of traffic changes/road blockage.

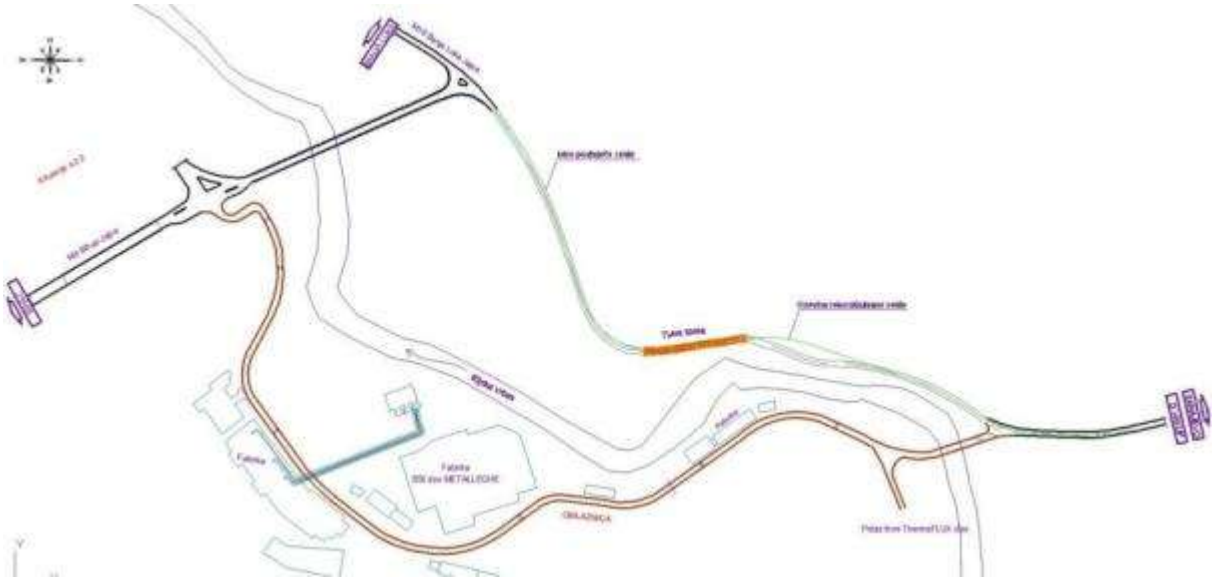
TMP should be monitored on a regular basis (responsibility of the supervision engineer) and audited to ensure effective implementation and to take into consideration any changes on construction site. All workers on construction site should be acquainted with the TMP.

Road safety measures envisaged during construction include vertical and horizontal signage based on Regulations on Traffic Signs (Regulations on Traffic Signs and Signage on Roads, Ways of Marking Works and Obstacles on Roads and Signs that an Authorized Person Can Give to Participants in Traffic ("Official Gazette of BiH", No. 16/07)) as shown in Figure 24.

In order to mittigate the full trafic stopage during the civil works on the reconstruction of Tunnel Skela, an alterantive route will be made available.

According to the Main design for the reconstruction of the Tunnel Skela done by Divel Ltd Sarajevo in 2017 the alternative route is envisaged through the complex of the factory Metaleghe BSI Ltd Jajce.

Figure 23: Propsed alternative route



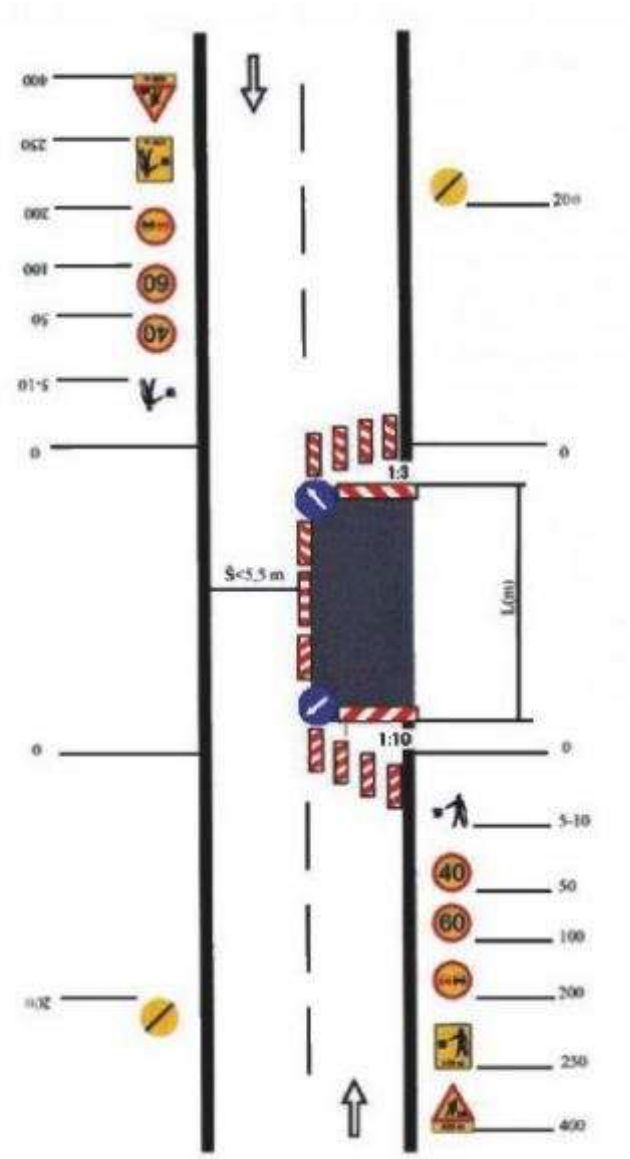
Source: Main design, Divel Ltd. Sarajevo, 2017

However the appointed Project Manager infront of PC Roads FBH argues that all civil works on all stretches under the subject sub-project should be implemented under a one way traffic regime, as depicted on Figure 24.

The contractor shall develop a Traffic Management Plan, which will analyze the proposed solutions as well as any other possibilities that may arise, with accent on the reconstruction of the Tunnel Skela since the Designer and Investor agree on the traffic management on Road pavement and axis corrections on the 5 remaining stretches(depicted on Figure 24).

Since the tunnel is used by the local population and pedestrians, the Contractor shall analyze and propose alternative routes for pedestrians that ensure the maximum level of safety for pedestrians. On the entire course of the tunnel, the main project envisages the construction of a pedestrian walkway for two rows of pedestrians with a width of 160 cm with a protective railing of 45 cm wide on the right. On the other side is an official pathway of 85 cm width.

Figure 24: Scheme of traffic signage that will be used during construction period on the Road pavement and axis corrections of raod section Jajce south Donji Vakuf



Source: PC Roads

7.2.4. Construction Site Safety

The Contractor shall secure the construction site. The construction site should be accompanied with a board with information on works and participants in construction (investor's name, contractor's name, project designer's name, name and type of construction being built, beginning and end of works). These measures are necessary so the

Contractor could ensure safety of construction site and prohibit entry ensure of unauthorized persons.

The Elaborate on safety on work and Elaborate on protection from fires and explosions should include detailed measures of safety on construction site in order to ensure safety of location and remove possible risks and adverse impacts on employees and unauthorized persons.

7.2.5. Land Acquisition, Involuntary Resettlement and Economic Displacement

At this moment, it is not expected that any private land will have to be occupied during construction for lodging machines and disposal of materials. However, if temporary occupation of private land is needed during construction, this will be agreed upon with respective owners and the compensation will be paid in accordance with provisions determined in the RPF and the previously developed RAP before the land is accessed. The contractor is responsible for keeping the works within the right of way.

7.2.6. Construction waste management

Due to inappropriate waste management and construction waste pollution of soil and water is possible (Vrbas River). Therefore, the Contractor is obliged to create and implement a WMP (Waste management plan) that shall ensure environmentally sound collection of waste and excess material, its storage, transport and final disposal, and primarily reuse/recycling and submit it to PC Roads FBH for approval.

All excavated material will be transported to the landfill according to the Scope of works. The Contractor is obliged to develop and implement the Construction Waste Management Plan, and to determine the location of the landfill in accordance with the national legislation. Accordingly, the Contractor undertakes to find a landfill site, develop a landfill project if necessary, and obtain the permits from the relevant institutions and all that is necessary to permanently deposit the material.

7.3. MITIGATION MEASURES IN OPERATIONAL PHASE

It is required from PC Roads FBH to undertake the instructions given in the Table 15. Environmental and Social Impacts Management Plan in operational phase.

7.4. SUMMARY OF MITIGATION MEASURES

Table 15: Environmental and Social Impacts Management Plan

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
PRE-CONSTRUCTION PHASE						
▪ Restricted access.	▪ Development of the TMP.	Included in the bid	Internal resources	Contractor	PC Roads FBH	
▪ Impacts on living conditions	▪ Informing the local communities on the extent of works and duration prior to the commencement of construction works via local newspapers, the municipality's notice board and website and via PC Roads' website as soon as the contract is signed. ▪ informing road users via the construction site information board, and an information leaflet at the construction site	Internal resources	Internal resources	PC Roads FBH	PC Roads FBH	Road users are orderly informed about construction works on roads via radio news and auto-moto club's press releases
▪ Compliance with national legislation	▪ Obtaining all necessary permits for Project implementation.	Internal resources	Internal resources	PC Roads FBH + Project designer	Competent body for issuing the permit	▪ Prevention of negative impacts

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
▪ Job creation and impacts on local business.	▪ Informing the public in advance about the construction works, in order to enable businesses and workforce in the area to prepare for the demand on the market via local newspapers, the municipality's notice board and website and via PC Roads' website as soon as the contract is signed. ▪ Informing business owners in advance about the construction works, in order to be able to plan the necessary road use accordingly (via local newspapers, the municipality's notice board and website and via PC Roads' website as soon as the contract is signed)	Internal resources	Internal resources	PC Roads FBH	Contractor + PC Roads FBH	-
▪ Expropriation, involuntary resettlement and economic displacement	-All land acquisition and expropriation will be conducted in compliance with the applicable legislation in FBiH and the previously developed RAP - Compensation will always be paid out prior to land entry or taking of possession over property by the expropriation beneficiary. -. Cash compensation will be provided at replacement cost according to the entitlement matrix that will be part of a previously developed and approved RAP -All affected persons will be informed, meaningfully consulted and encouraged to participate throughout the land acquisition process, in accordance with the information disclosure and consultation requirements set out in the previously developed RAP. ▪ Assuring an effective grievance mechanism for receiving and addressing in a timely fashion specific concerns about compensation and relocation raised by displaced persons, in the manner described in more detail in	Internal resources	Internal resources	PC Roads FBH, + Municipality		

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
	Chapter 10.2.1 of this ESMP (Grievance Mechanism).					
▪ Restrictions on land use and damages on private property and businesses.	▪ Avoid private properties where possible; ▪ The Contractor will organizethe construction site in collaboration and agreement with the municipality of Jajce and/or Donji Vakuf (depending on which project stretches will be chosen for implementation); ▪ In case occasional land occupation cannot be avoided, compensation will be provided to affected owners/users (application of RPF and RAP), as well as compensation for loss of the possibility to continue to use land and businesses as intended.	Internal resources	Internal resources	Contractor + PC Roads FBH	PC Roads FBH	If occasional land use cannot be avoided, it will be agreed upon with respective owner and compensation will be paid before the land is accessed
CONSTRUCTION PHASE						
▪ Temporary occupation of privately or publicly owned land plots in case of unforeseen events	▪ Avoidance of temporary occupation of privately owned plots; ▪ In case avoidance is not possible, minimize size of the area used and impacts on the vegetation and implementation of RPF and RAP provisions on temporary occupation.	Internal resources	Contractor	PC Roads FBH	PC Roads FBH	
▪ Impacts on living conditions of local	▪ Providing timely information to the citizens on any type of disruption and inconvenience via local newspapers, the municipality's notice board and website and via PC	Included in construction	Included in supervision	PC Roads FBH	Supervisory body*	

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
community	Roads' website as soon as the contract is signed.; ▪ Implementation of TMP; ▪ Implementation of CSOP; ▪ Implementation of ESMP provisions.	works		(providing informations to the citizens)+ Contractor (implementation of the TMOP, CSOP, ESMP)		
▪ Impacts on local traffic: ▪ increase of local traffic, including heavy machinery and trucks; ▪ closing one of the traffic lanes for construction purposes causing traffic delays and limited access.	▪ Implementation of TMP; ▪ Introduction of appropriate signalization and warning signs; ▪ Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours; ▪ Traffic management system and staff training, especially for site access and near-site heavy traffic; ▪ Provision of safe passages and crossings for pedestrians where traffic interferes.	Included in construction works	Included in supervision	Contractor	Supervisory body*	In collaboration with the local Ministry Internal Affairs
▪ Air emissions: - exhaust gasses; - dust generation	▪ High quality fossil fuels (with low percentage of sulphur and lead) need to be used for construction machinery and equipment;	Included in construction works	Included in supervision	Contractor	Supervisory body*	

* *Supervisor shall be a Consultant appointed by PC Road FBH according to Federal Legislation.*

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
	▪ All machines and vehicles to be used in construction/ reconstruction/ rehabilitation activities must have use permit; ▪ Vehicles need to be regularly maintained ; ▪ Equipment with installed filters to reduce soot emission needs to be used; ▪ When not in use the equipment and machinery need to be shut down; ▪ Maximum speed of the vehicle on unpaved roads should be restricted to 20 km/h; ▪ Moistening/ wetting the site to prevent dust occurrence (in areas with dry soils or where activities generate dust); ▪ Sand and gravel materials need to be transported in covered trucks.					
▪ Increased level of noise and vibration: - noise emission and noise disturbance; - vibration	▪ In the case of noise complaints by local residents, simultaneous use of machines that generate noise over 70 dB needs to be limited; ▪ In the case of noise complaints by local residents, number of trucks per day visiting the site needs to be reduced; ▪ All machines and vehicles to be used in construction/ reconstruction/ rehabilitation activities must have use permit; ▪ When not in use the equipment and machinery need to be shut down; ▪ Maximum speed of the vehicle on unpaved roads should be restricted to 20 km/h.	Included in construction works	Included in supervision	Contractor	Supervisory body*	

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
▪ Emissions into water: ▪ possible contamination of surface water.	▪ Ensure there is an emergency plan to contain all leaks and spills that result from an accident. ▪ Prevent any repairs, handling of machinery, fuels or lubricants in areas that are not designated for such use. ▪ Proper waste disposal and separation of hazardous waste is required, as well as the engagement of authorized companies for final waste disposal; ▪ Oil and fuel collection systems to be fitted to prevent leakage; ▪ Vehicles and machines need to be regularly maintained to prevent leakage.	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ Soil degradation and emissions to soil: - soil erosion; - soil contamination by oils, fuels and other hazardous substances;	▪ Control during earthworks to prevent degradation of terrain stability is required; ▪ Proper waste disposal; separation of hazardous waste; engagement of authorized companies for final waste disposal; track of the final disposal sites especially for removed asphalt; note/record of the waste amounts; ▪ Oil and fuel collection systems to be fitted to prevent leakage	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ Removal of vegetation cover and topsoil, degradation of biological and ecological resources at the construction site; ▪ Decrease in the current aesthetic	▪ Prevent and control oil, fuel, and chemical spillages that can find their way to the ground water; ▪ Topsoil must be must be returned and re-vegetated after construction activities are done; ▪ Planting ligneous plants around roads and adjacent areas can help to support local flora and fauna; ▪ All trenches up to 0,5 m of depth must be sloped or have ramps in case of necessity for animals' exit. All trenches shall be checked whether there are any	Included in construction works	Included in supervision	Contractor	Supervisory body*	

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
value of the landscape (construction site); ▪ removal of vegetative cover.	animals before covering them with soil; ▪ Seeding, planting and re-vegetation with autochthonous species should cover areas affected by the Project; ▪ The land intended for the Project needs can only be used for the construction activities and no other land is available for i.e. storage of building material, parking of the heavy machinery etc. in terms of soil disruption.					
▪ Inadequate traffic management during construction: ▪ traffic congestion and obstructions on road sections;	▪ Implementation of EMP which includes the: - Design and implementation of the TMP, ▪ Placement of adequate traffic signalization.	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ Inadequate waste handling ▪ Inadequate storage and disposal of the excess material	▪ Implementation of WMP that shall ensure environmentally sound collection of waste, its storage, transport and final disposal, and primarily reuse / recycling. ▪ All excess material should be removed in line with WMP and Scope of works; ▪ The excess material should be stored for a short period of time and should be removed as soon as possible; ▪ No clandestine waste disposal will be allowed on site, including open burning of wastes. ▪ The waste should be stored for a short period of time and should be removed as soon as possible. ▪ The waste should be primarily recycled or reused where possible and then finally disposed	Included in construction works	Included in supervision	Contractor	Supervisory body*	

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
	▪ No open burning of wastes is allowed on site ▪ All waste that cannot be reused should be handed over to a licensed company or agent (amounts are to be recorded as well as types of handling actions). ▪ Disposal sites of construction material will be determined by the municipality and should be handled in the most appropriate environmental manner.					
▪ Inadequate organization of construction site.	▪ Implementation of CSOP	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ Inadequate workers safety	▪ Implementation of work safety measures: - Provide workers with a safe and healthy work environment, - Provide personal protective equipment, - Respect safety procedures, - Provide portable toilets, - Provide drinking water	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ Accidental situations i.e. spills, leakage of oils, fats, fuels and similar hazardous materials	▪ Implementation of Environmental Management Plan which includes: - Spill Response Plan, - Emergency Preparedness and Response Plan. ▪ Implementation of Management Plan of Fire and Explosion ▪ Implementation of Labor Protection Law	Included in construction works	Included in supervision	Contractor	Supervisory body*	

* *Supervisory body shall be a Consultant appointed by PC Roads FBH according to Federal legislative*

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
▪ Materials supply and transport	▪ Implementation of CSOP to ensure materials are transported in covered vehicles to reduce impacts on environment	Included in construction works	Included in supervision	Contractor	Supervisory body*[*]	
CHANCE-FIND PROCEDURES DURING CONSTRUCTION PHASE						
▪ Impacts on cultural heritage	▪ If archaeological findings or other chance finds appear on or near construction site immediate work suspension and local authorities notification is required;	Included in construction works	Included in supervision	Contractor	Supervisory body*	In case of finding cultural heritage, supervision is implemented by the competent institution
OPERATION PHASE						
▪ Problems due to lack of maintenance	▪ Regular road maintenance works	Included in maintenance works	Internal resources	Contractor for maintenance works	PC Roads FBH	
▪ Contamination of river Vrbas	▪ Installation of oil separators in tunnel in accordance with EN ISO 858-1 and 858-2	Included in construction	Included in	Contractor	Supervisory	

[*] *Supervisor shall be a Consultant appointed by PC Road FBH according to Federal Legislation.*

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
	▪ Regular maintenance of oil separators in accordance with maintenance Department of PC Roads of FBIH	and maintenance works	supervision		body*	
▪ Decrease in road safety due to the increase of traffic and speed	▪ Regular maintenance of road safety equipment and signage	Incl. in maintenance works	Internal resources	Contractor for maintenance works	PC Roads FBH	

8. ENVIRONMENTAL MONITORING PROGRAM

The table below presents monitoring plan necessary for construction site – developed in connection with mitigation measures to avoid or reduce negative impact.

Prior to commencement of works, in accordance with requirements of the ESMP, and a minimum of monitoring requirements, described in table below, without limitation to these requirements, the Contractor shall prepare detailed list of mitigation measures and parameters to be monitored and prepare the site-specific baseline data as foreseen in the monitoring plan below.

The monitoring plan on construction site will be used by Supervision Engineers of PC Roads FBH. These signed lists will be forwarded to PC Roads FBH, who will be responsible for monitoring and reporting about the compliance.

PC Roads FBH will maintain a registry of grievances, which will contain all information on grievances or complaints received by the community or other interested parties. That will include: type of grievance, time and actions for their resolution and outcome.

Table 16: Environmental and Social Monitoring Program

Potential impact	Which parameter is to be monitored?	Where will the monitoring be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost assessment (US$)		Responsibility	
					Implementation	Operative	Implementation	Operative
PRE-CONSTRUCTION PHASE								
▪ Job creation and impacts on local businesses.	▪ Number of employed persons from local communities; ▪ Timely informing the local communities about the forthcoming works.	Wider area of construction	Inspection	Prior to construction	Included in performance	Included in performance	Contractor	Contractor
▪ Expropriation, involuntary resettlement and economic displacement	▪ Implementation of the previously developed and approved RAP provisions	PC Roads of FBH	Monthly and quatery internal reports	Prior to construction	/	/[14]	PC Roads of FBH+ Supervisory body	PC Roads of FBH+ Supervisory body
▪ Temporary occupation of privately owned land plots for the purpose of construction of access roads and placement of staff, machines and material.	▪ Implementation of RPF provisions	Construction site	Visual inspection and inspection	Prior to construction and during construction when necessary	Included in supervision	Included in supervision	Supervisory body + PC Roads FBH	Supervisory body + PC Roads FBH
CONSTRUCTION PHASE								
Restrictions on land use and damage to the private	▪ CSOP in place; ▪ Implementation of RPF and the	Construction site	Visual inspection	Prior to construction and	Included in supervision	Included in supervision	Supervisory body	Supervisory body

[14] *The cost assesment on expropriation will be made in the RAP*

Potential impact	Which parameter is to be monitored?	Where will the monitoring be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost assessment (US$)		Responsibility	
					Implementation	Operative	Implementation	Operative
property (agricultural plots, horizontal infrastructure, fences and railings) due to disposal of construction waste, work camps and parks of heavy machinery	previously developed RAP provisions on compensation procedures in case occasional land use cannot be avoided, compensation will be provided to affected owners/users ▪ grievances		+ Central Grievance Log	random checks at least once a week during the construction			+ PC Roads FBH	+ PC Roads FBH
▪ Impacts on local traffic (increase of local traffic, including heavy machinery and trucks, operation of roads with only one lane causing traffic delays and limited access)	▪ TMP in place; ▪ Traffic patterns; ▪ Timely information to the citizens.	On construction site and nearby	Visual inspection and inspection	Random checks during the week	Included in supervision	Included in supervision	Supervisory body	Supervisory body
▪ Air emissions: - exhaust gasses; - dust generation	▪ Level of dust (amount of particles of sediment and floating particles) ▪ Emissions of exhaust gases from vehicles and equipment ▪ (SO_2, NO_2, dim and PM_{10})	Construction site	Measuring devices	As a baseline and during construction when needed and upon complaints by the citizens	-	500 USD/measuring	Contractor	Authorized laboratory
▪ Increased level of noise and vibration: - noise levels - vibration	▪ Level of noise	In populated places near the construction site	Measuring devices	Upon order by supervisory organ or upon complaints by the citizens	-	500 USD /measuring	Contractor + Supervision	Authorized laboratory
▪ Emissions into water: ▪ possible contamination of	▪ Analysis of parameters of surface water quality:	In watercourse	Standard laboratory	As a baseline and upon order by	-	1000 USD /measuring	Contractor	Authorized laboratory

Potential impact	Which parameter is to be monitored?	Where will the monitoring be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost assessment (US$)		Responsibility	
					Implementation	Operative	Implementation	Operative
surface water	- Chemical analysis (PH, turbidity, conductivity, temperature, suspended particles, COD, BOD, ingredients with nitrogen) ▪ Standard bacteriological analyses	near construction site downstream	equipment and methods of water quality monitoring	supervisory organ or upon complaints by the citizens			+ Supervision	
▪ Pollution of surface watercourses.	▪ Presence of oil film in surface watercourses.	In watercourse near construction site downstream	Visual inspection + Standard laboratory equipment and methods of water quality monitoring	Upon order by supervisory organ or upon complaints by the citizens	-	500 USD /measuring	Contractor + Supervision	Authorized laboratory
Soil pollution	▪ Soil quality, including, PH, heavy metals, phosphorus, nitrogen, Na, Ca, salts, PAHs hydrocarbons	On representative plots of land near construction sites	Taking samples and standard laboratory analyses	As a baseline and upon order by supervisory organ or upon complaints by the citizens	-	500 USD /measuring	Contractor + Supervision	Authorized laboratory
▪ Emissions into water and soil due to improper waste handling	▪ CSOP in place, ▪ WMP in place	Construction site	Visual inspection, disposal records or	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor

Potential impact	Which parameter is to be monitored?	Where will the monitoring be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost assessment (US$)		Responsibility	
					Implementation	Operative	Implementation	Operative
			receipts from landfills					
▪ Degradation of biological and ecological resources	▪ Survey of the site for any endemic or endangered species	In the zone of corridors of direct and indirect impacts	Field recordings and incorporation of the findings in the ESMP	As a baseline	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Waste and excess material management	▪ Implementation of WMP	Construction site	Visual inspection, disposal records or receipts from landfills	Regularly during construction, as appropriate. Amount and disposal records internal reports will be made daily and monthly	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Accidental situations i.e. spills, leakage	▪ Implementation of EMP which includes: - Spill Response Plan, - Emergency Preparedness and - Response Plan	Construction site	Visual inspection	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor

Potential impact	Which parameter is to be monitored?	Where will the monitoring be performed?	How will the monitoring be performed?	When will the monitoring be performed?	Cost assessment (US$)		Responsibility	
					Implementation	Operative	Implementation	Operative
▪ Materials supply	▪ Implementation of CSOP (the origin of material, material approvals etc.)	Construction site	Reports	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Material transport	▪ Implementation of CSOP (the origin of material, licenses etc.)	Construction site	Visual inspection	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Workers safety	▪ Implementation of work safety measures (protection equipment, toilets, drinkable water etc.)	Construction site	Visual inspection	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor
OPERATION PHASE								
▪ Water emissions	▪ Analysis of the water quality parameters: ▪ Chemical analysis (PH, turbidity, conductivity, temperature, suspended particles, COD, BOD, ingredients with nitrogen, total fats and oils, mineral oils);	At the treated water outlet from the oil separator	Sampling	Once a year	Internal resources	1000 USD/sample	PC Roads FBH	Licensed laboratory

Note: All mitigation measures and parameters to be monitored should be included in total price of works performance. The table includes additionally provided prices of sampling and laboratory testing, solely as information for assessment of overall costs of construction.

9. IMPLEMENTATION AND REPORTING

9.1. PROJECT IMPLEMENTATION

PC Roads FBH is the implementer of the project and will be responsible for the implementation and compliance of the project in line with ESMP.

The public has the right to participate directly or indirectly, with a possibility to state their interests and opinion in decision-making process during the entire period of project activities.

The application of all identified environmental and social mitigation measures and the environmental monitoring program will be ensured. The Contractor will be responsible for the implementation of the environmental mitigation measures during construction. The contracted supervisor will employ environmental experts to supervise the implementation of Contractor's responsibilities, and will be in communication with the investor. PC Roads FBH will constitute a Grievances Committee which will receive all grievances during Project implementation in accordance with grievance mechanisms as prescribed in the Environmental Management Plan and Environmental and Social Management Framework for the Program of Modernization of Major roads of the FBH (ESMF). Furthermore, the Project Implementation Unit of PC Roads FBH includes an environmental and a social expert. During project implementation, the Investor will supervise compliance of the Contractor with provisions and ESMP.

Upon project completion, PC Roads FBH will be in charge of structures' management and maintenance. Regular and timely payment will be carried out in accordance with monitoring plan.

9.2. REPORTING PROCESS

9.2.1. Contractor to PC Roads FBH

The Contractor shall prepare a Report on compliance with ESMP in form of a monthly progress report and submit it to PC Roads FBH in a local language (C/S/B and in English, in analogue and digital form.

In case of any accidental situations or jeopardizing the environment and society the reporting process must be immediate. The Contractor is obliged to inform the PC Roads FBH and local community immediately after any accidental situations that happened over the phone +387 33 250 370 or via email form at the PC Roads FBH website: https://jpcfbih.ba/bs/kontakt.

The Contractor's reports to PC Roads FBH are to include a list and description of the performed activities, as well as recommendations and planned future activities and protection measures.

9.2.2. Supervision Engineer to PC Roads FBH

The Supervision Engineer shall prepare a Report on compliance with ESMP in form of a monthly progress report and submit it to PC Roads FBH in a local language (C/S/B and in English, in analogue and digital form.

9.2.3. PC Roads FBH to WB

PC Roads FBH shall prepare Annual Environmental Health and Safety Reports (AEHS), including monitoring indicators and reports on the implementation of their requirements set in ESPM and submit them to the World Bank for review.

In case of higher-scale accidents or deaths on construction site, PC Roads FBH shall promptly notify the World Bank thereof.

10.PUBLIC DISCUSSION AND INFORMATION DISCLOSURE

10.1. PUBLIC CONSULTATION

Public consultation of the subject ESMP will be organized in Jajce and/or Donji Vakuf after the WB and PC Roads FBH approve the draft of the ESMP.

The public consultations will be announced in the local newspaper, on the web page of the municipality, on the notice board of the municipality and on the web page of PC Roads FBH minimum 15 days prior to the set date.

The record on public discussion, that is, grievances presented at the public discussion shall be recorded in the Grievance Register, and opinions and suggestions of the public shall be integrated into the final ESMP.

After public discussion the documents shall be disclosed again.

10.2. INFORMATION DISCLOSURE

ESMP draft will be available on the website of PC Roads of the (www.jpcfbih.ba) in a local language and on the website of the WB in English. During the process of public consultation the interested public will obtain all information regarding the project, including anticipated social and environmental impacts. The findings of the assessment will be presented in a simple way.

During construction period, the Contractors will submit monthly information to PC Roads FBH regarding process of work, which will be published on the websites of PC Roads FBH and BHAMK (Car Association of BH) regarding temporary traffic regulation.

Schedule of works and potential changes to the schedule will also be announced two weeks prior to the beginning of works on the website of PC Roads FBH and in local newspapers, radio and television stations for disclosure. The schedules will provide information on the beginning and end of works, which can impact the affected groups (such as changes to traffic/water/regime of electric energy supply and access, noise and dust due to construction works).

10.2.1. Grievance Mechanisms

Besides the institutionally available ordinary and extraordinary legal remedy, and existing institutional channels, PC roads FBH will ensure and form a special Grievance Redress

Mechanism in collaboration and direct involvement of those municipalities under whose administrative authority the project is carried out, in this case with the Jajce and/or Donji Vakuf municipality.

Grievance Redress Mechanism designed for this project is the **Central Feedback Desk (CFD)** at the level of the implementing agency PC Roads FBH which shall serve as both Project level information center and grievance mechanism, available to those affected by implementation of all project sub-components. The CFD shall serve the persons affected directly or indirectly by construction works.

The Grievance Registration Sheet (Appendix 1) as print out shall be available at municipal administration, at the construction site and in the offices of PC Roads FBH and shall be available for download on the website of JP Roads FBH (www.jpcfbih.ba) and the municipality's website.

The grievance can be logged in writing with the Contractor, at the construction site as well as in the contractor's offices. The contractor is obliged to hand out the Grievance Registration Sheet, explain the grievance mechanism to the concerned citizen and forward the filled in Grievance Form to the central Feedback Desk in PC Roads FBH . The grievance can also be filled in within PC Roads FBH, by phone, by fax, and by e-mailing it to the designated e-mail address zalbena@jpcfbih.ba, or by mail to the address Terezija 54, 71000 Sarajevo.

An information leaflet concerning the grievance mechanism be available at the construction site at all times, weather the construction site is closed or open. The information leaflet will be plasticized and hung on the construction site information board to be available to road users at all times.

All grievances will be recorded in the register and assigned a number, and acknowledged within 3 working days.

The CFD will make all reasonable efforts to address the complaint upon the acknowledgement of grievance. If the CFD is not able to address the issues raised by immediate corrective action, a long-term corrective action will be identified. The complainant will be informed about the proposed corrective action and follow-up of corrective action within 14 working days upon the acknowledgement of grievance.

If the particular issue raised through the grievance mechanism cannot be addressed or if action is not required, a detailed explanation/ justification will be provided to the complainant on why the issue was not addressed. The response will also contain an explanation on how the person/ organization that raised the complaint can proceed with the grievance in case the outcome is not satisfactory.

At all times, complainants may seek other legal remedies in accordance with the legal framework of FBiH.

11. Requirements for start of works

11.1. Environmental aspects

The Contractor shall establish all required baseline data before the commencement of works. The Baseline – Monitoring data shall include air quality data, water quality data, soil quality data, survey and analysis of vegetation cover prior to the beginning and upon completion of works on construction site. The Contractor is also obliged to ensure these measurements during and after completion of the construction works. The Contractor will ensure that the measurements are conducted by authorized agencies and that they are based on the findings and recommendations of a qualified expert.

The Contractor shall develop a Construction Site Organization Plan (CSOP) that is made up of:

a. Implementation Plan of this ESMP,
b. a detailed Waste Management Plan (WMP)]
c. Study on Safety (includes Elaborate on Safety at Work and Elaborate on Protection From Fire and Explosions),
d. Traffic Management Plan (TMP) must be developed, which will be created by the Contractor prior to the beginning of construction works.

These studies are to be developed in accordance with federal acts[15], before starting the execution of works, while the Contractor's legal obligations defined in the Bidding Documents and Contract shall be based on the a provisions of this ESMP . The Contractor shall submit these studies to the PC Roads FBH supervisory engineer, Environmental and Social Specialists, before beginning of works, and the company has to accept and approve them prior to start of works.

Due to the time constraints related to the issuance of the bidding documents, the public consultations are to be held prior to the start of works but once the bidding documents have been issued; therefore the EMP included in the bidding documents may need to be subsequently updated after the consultations. The contractor will be obliged to follow the updated ESMP.

[15] Provision on arrangements of construction site, mandatory documentation at the construction site and participants in construction, Official Gazette of FBH 48/09, 75/09 and 63/12

11.2. Social aspects

- Public consultations
- Implementing the changes derived from the public consultations (if any) to the ESMP
- Development of (A)RAP
- Disclosing the (A)RAP
- Public consultation on (A)RAP
- Implementation of (A)RAP, including:
    - Expropriation of 20 Public land plots + the land plots that will be affected by project activities in relation with the reconstruction of tunnel Skela
    - Expropriation of 77 Private land plots the land plots that will be affected by project activities in relation with the reconstruction of tunnel Skela
- Agreement upon payment of compensation with respective owners
- Payment of compensation in accordance to provisions determined in the RAP

APPENDICES

APPENDIX 1. GRIEVANCE FORM

	REFERENCE NUMBER (Filled by the office)	
CATEGORY OF COMPLAINTS	A) Affected by expropriation	
	b) All others	

PARTICIPANT INFORMATION OF GRIEVANCE			
FULL NAME			
YEAR OF BIRTH			
GENDER	M	F	
ADDRESS			
TELEPHONE/MOBILE NUMBER			
E-MAIL			

Description of Incident for Grievance
(What happened? Where did it happen? Whom did it happen to? What is the result of the problem?)

Date of the Incident?

- One-time incident/grievance – Date: _____
- Happened more than once (How many times?) _____
- On-going (currently experiencing problem)

What would you like to see happen?

DATE:	SIGNATURE:

RETURN THIS FORM TO: *CENTRAL FEEDBACK DESK*

PC ROADS OF THE FBH
Terezija 54,
71000 Sarajevo
Note: All copies are returned to PIU

APPENDIX 2. GRIEVANCE REGISTRATION TEMPLATE TABLE

No.	Date of receipt	Type of grievance	Description of grievance	Complainant		Date of acknowledgement of receipt	Description of actions undertaken	Date of solvation of grievance
				Status	Sex			

APPENDIX 3. REPORT ON PUBLIC DISCUSSION