JP CESTE FEDERACIJE BIH

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN FOR THE PROJECT OF THE RECONSTRUCTION OF THE BLACK SPOT ROUNDABOUT KAMENICA IN BIHAĆ

October, 2017

Table of Contents

LIST OF FIGURES

List of Tables

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
USC - Una Sana 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 ESMP

Reconstruction of the Black spot roundabout Kamenica R403a on the Major road M-5, section 001 Border BH/RH (Izačić) – Bihać in Bihać (the Project) for which this ESMP is developed, is one of the sub- under the FBH Road Sector Modernization Project co-financed by the WB and EIB. Reconstruction of the Black spot roundabout Kamenica R403a on the Major road M-5, section 001 Border BH/RH (Izačić) – Bihać in Bihać is screened as a category B project according to the 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 an environmental assessment or an environmental permit - whether federal or cantonal. PC Roads FBH will ensure all required local permits for this Project are obtained.

LOCATION AND TRAFFIC DESCRIPTTION

The Project is situated at the intersection of the major road M-5, section 001 Border BH/RH (Izačić) – Bihać, regional road R 403a and the local city road in the city of Bihać, settlement Kamenica... The nearest relevant traffic count device is 640-Kamenica, section Border BH/HR (Izačić)-Bihać (1 km south-east from the crossroad) and the data collected from the device shows that, in 2015, 8.293 vehicles were passing daily.

PROJECT DESCRIPTION

The existing intersection of the M5 road and the regional road R 403a is not in accordance with the applicable regulation. Characteristic of this crossroads is that (the regional and local road connections) do not have properly defined and channelled traffic flows. The new designed envisages a roundabout with four arms, in which the traffic takes place by circulating around the middle of the island opposite to the direction of clockwise, the traffic in the rotor is regulated so that within the circle are preferred to the vehicle including the rotor only. The drainage from the carriageway is solved by projecting the rainwater drainage with the new collector and drains set up according to the requirements of the transverse and deadening inclines of road. The project envisages the construction of drainage basins laid out in the sidewalks.

BASELINE OF PARTICULAR INTEREST

The terrain of the Project is mostly flat with an attitude in the range from 200 to 250 meters above sea level. Meteorological station in Bihać, closest to the site of reconstruction, reports following data: the average multi-annual temperature is 10.6 ° C, the warmest month is July, with an average perennial air temperature of 20.0 ° C and the coldest month is January when the average perennial temperature is 0.3° C. The average rainfall measured at

the same meteorological station, during multi-year period is 1307.5 mm per year. Based on geographical features and the fact that there are no significant polluters, it considers that the air quality is good. Stream Mrežnica is the closest surface water flow, approximately 300 m of air distance from the Project location. Due to the distance of the Project in relation to watercourses, it can be concluded that there will not be any direct impact on the waters. In close proximity to the Project area, we can find mostly facilities for business purposes (stores, gas stations etc.) and residential purposes (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.

In the vicinity of the Project the dominant land use is for commercial buildings and residential facilities of individual housing. Individual housing facilities mostly represent buildings which are mainly ground floor, one-story and two-story houses. From the public buildings there is an elementary school located about 150 meters and a post office located about 200 meters away from the crossroad. The location of the Project is not located within a protected area according to Spatial plan of FBH and Spatial plan of Una-Sana Canton. The City Bihać is the centre of the Una-Sana Canton. According to the 2013 Census, the municipality has a population of 61.186 people on an area of cca 900 square meters. The importance of the project crossroad for the local community is reflected trough the fact that this is the fastest and most convenient way for locals to reach the municipality, healthcare, educational and administrative centre of the region. Furthermore, the planned reconstruction would greatly improve the safety of pedestrians including children who in a great part cross the project crossroad every day on their way to school.

IMPACTS DURING PRE-CONSTRUCTION

Socio economic impacts: The project roundabout is a part of the Integrated Resettlement Action Plan which was publicly consulted and disclosed in March 2016. According to the Integrated RAP parts of 61 private and 1 public land plots will be expropriated. The affected part of 7 plots is larger than 10%, while less than 10 % will be expropriated from 54 plots.

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 and groundwater from accidental leaks and spills and 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.

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. No complete traffic stoppage is likely to occur due to construction activities of the project roundabout due to the. Trenches are likely to be made

during implementation of construction activities, including earthworks and temporary storage of construction material. Population Safety Impacts: The impact regarding the presence of workers is minor, because, according to local practice no working camp will be set up. Safety issues regarding local population can occur due to the vicinity of the construction site.

Socio-economic impacts: at this time, 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. However, if additional temporary occupation of private land in needed during construction activities, this will be agreed upon with respective land owners and compensation will be paid in accordance with provisions determined in the RPF before the land is accessed. Impacts related to road access difficulties to 9 businesses and 50 residential plots are expected to be temporary and are associated with limited access due to heavy machinery parks and disposal of construction waste. Businesses might experience the impact of access difficulties due to the potential loss of customers. All losses will be compensated in accordance to the provisions of the Integrated RAP and RPF. New business opportunities are expected to be created for local businesses such as transporters, suppliers and other service providers. This impact is considered to be short-term and small Following adverse impacts on living conditions during construction are expected: noise increase, construction waste disposal, short-term disruptions of utilities.

POSITIVE IMPACTS

Project implementation will contribute to better conditions and will have positive impacts on the quality of transport on road M5.

MITTIGATION MEASURES

The mitigation measures focus on the major identified impacts during 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 and safety impacts, waste management, impacts on living conditions, temporary occupation and restrictions on land use, impacts on local traffic.

ENVIRONMENTAL MONITORING PROGRAM

The monitoring measures focus on the major identified impacts during works, such as emissions from the machinery used on site, dust generation from works, potential increases in noise and vibration levels, impact on soil and groundwater from accidental leaks and spills and safety impacts, waste management, impacts on living conditions, temporary occupation and restrictions on land use, 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 Bihać 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. 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 World Bank in English. During the process of public consultation the interested public will obtain all information regarding the project, including social and environmental issues.

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 Bihać 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, surface water quality data, soil quality data, survey of the site for any endangered and endemic species and other environmental issues in zone of corridors of direct and indirect impacts.

The Contractor shall develop a Construction Site Organization Plan (CSOP) that is made up of a 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), and a Traffic Management Plan (TMP) must be developed, which will be created by the Contractor prior to the beginning of construction works.

Social aspects

- Implementation of the integrated RAP

- Payment of the compensation in accordance with RAP provisions before the land is accessed

1. INTRODUCTION

Based on the guidance and requirements from the Environmental and Social Management Framework (ESMF has been disclosed and available to the public in local language on the website of PC Roads Federation of Bosnia and Herzegovina (FBH) in March 2016, http://www.jpcfbih.ba/ba/aktivnosti/program_modernizacije.shtml), 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 PC Roads FBH) has initiated an overarching program for the project "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 (IFI).

In the framework of the abovementioned umbrella Program, the Public Company "Roads of FBH" (PC Roads FBiH), a limited liability company wholly owned by the Government of FBiH, has initiated the FBiH 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 40km 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;

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

Reconstruction of the Black spot roundabout Kamenica R403a on the Major road M-5, section 001 Border BH/RH (Izačić) – Bihać in Bihać (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

Reconstruction of the Black spot roundabout Kamenica R403a on the Major road M-5, section 001 Border BH/RH (Izačić) – Bihać in Bihać is screened as a category B project according to the 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 in force this project does not require an environmental assessment or an environmental permit - whether federal or cantonal[1]. 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. 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.

The 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.

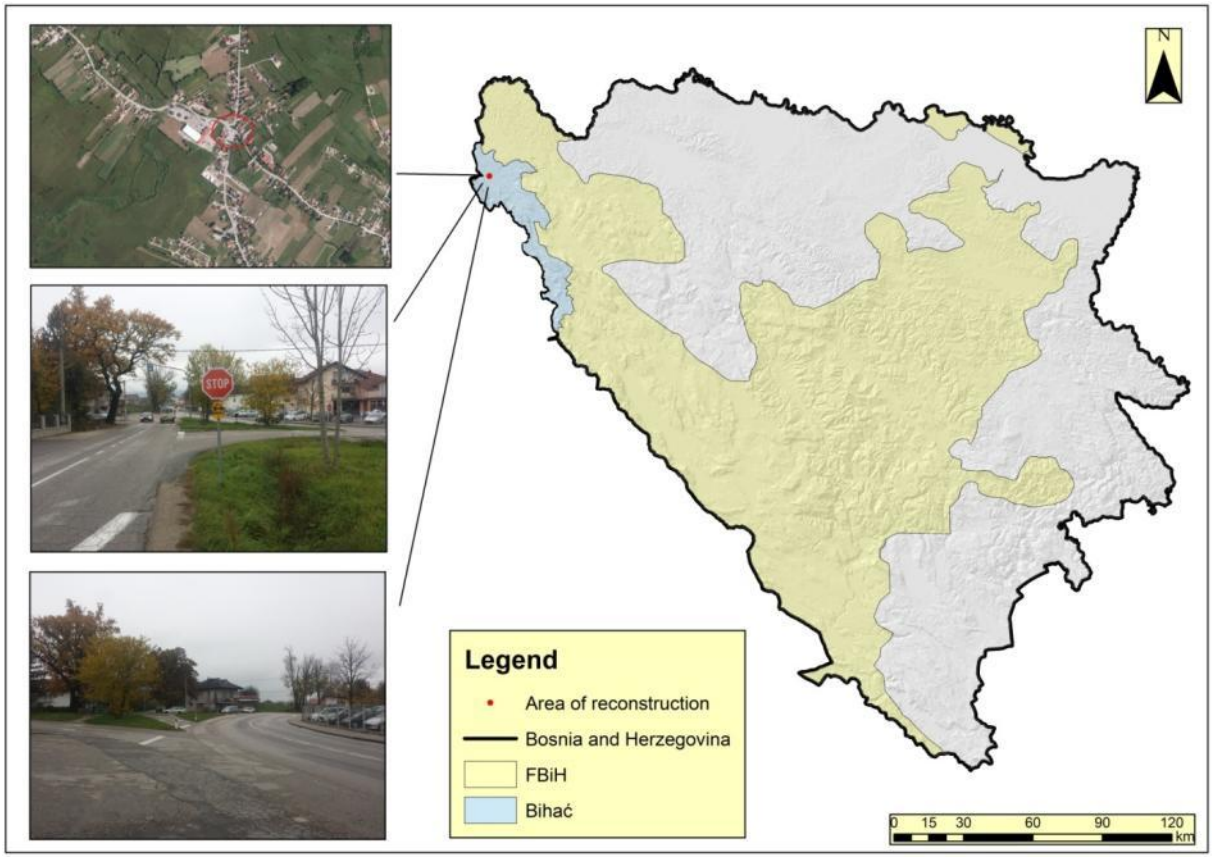
In order to ensure mitigation measures have been implemented, fully or partially, the ESMP sets forth a monitoring plan to be implemented during the specific stages of project preparation/designing and implementation. Monitoring during project preparation and implementation provides information on the 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 table below, without limitation to these requirements, the Contractor shall prepare detailed list of mitigation measures and parameters to be monitored.

[1] *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 FBH No. 19/04). In Una - Sana 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 USC, No. 18/07). Reconstruction of a crossroad is not a subject to neither a Federal nor a Cantonal EP.*

3. LOCAL DESCRIPTION

The Project is situated at the intersection of the major road M-5, section 001 Border BH/RH (Izačić) – Bihać, regional road R 403a and the local city road in the city of Bihać, settlement Kamenica. The reconstruction is positioned nearby and on the important traffic ways for Bihać as well as for BH. 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 M-5 that passes through the crossroad 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

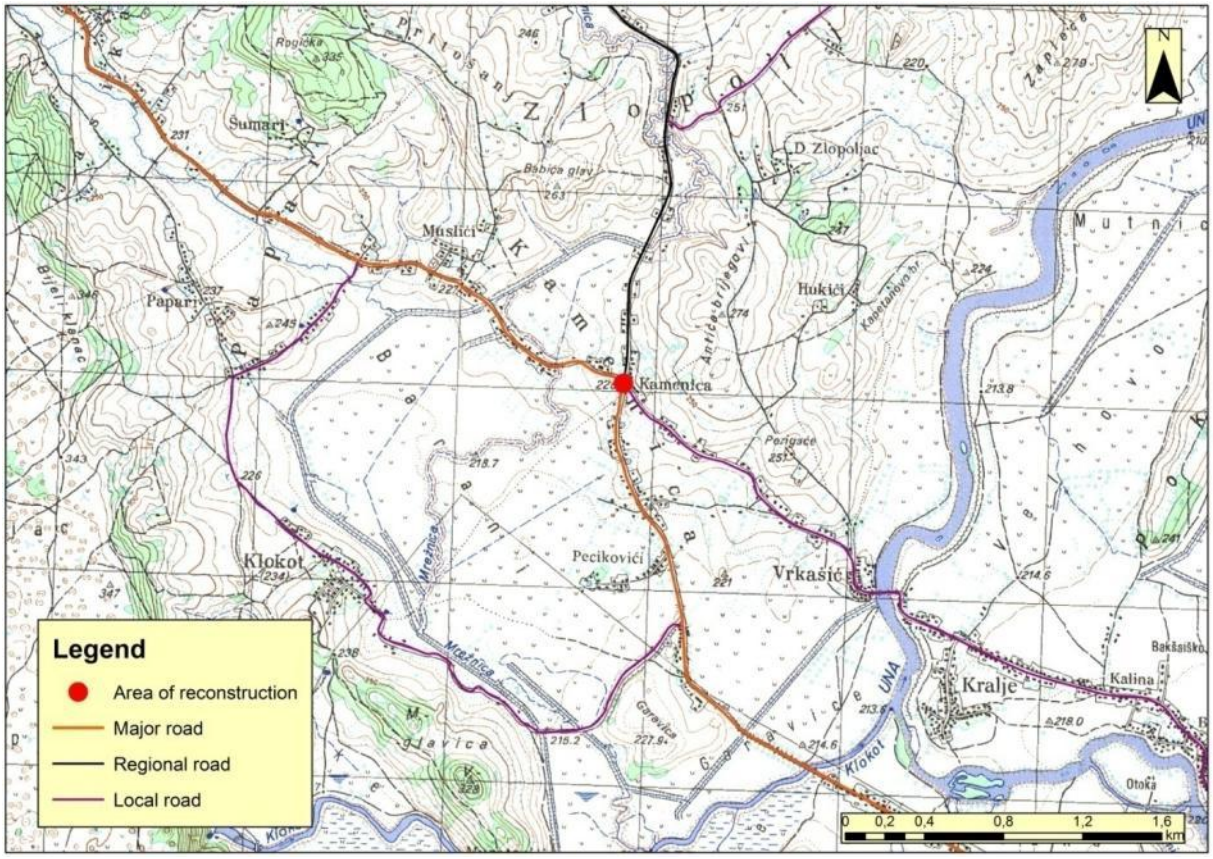


Source: PC Roads Federation of BH (October 2016.)

The area of reconstruction is located within the outskirts of Bihać, and the facilities situated near the project site are mostly private, public and business oriented. Residential buildings, in the neighbouring residential zones, mostly represent private houses, which are mainly ground floor, one-story and two-story houses. Majority of the mentioned buildings are located along the major road M-5 and the regional road R 403a. Regarding public

buildings, there is an elementary school about 150 meters away and the post office about 200 meters away from the crossroad.

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



Source: PC Roads Federation of BH

3.1. ROAD SAFETY AND TRAFFIC DATA

According to PC Roads FBH, in the period between 2009 and 2013, there were 5 road accidents with serious and light injuries and 11 with material damage registered at this crossroad.

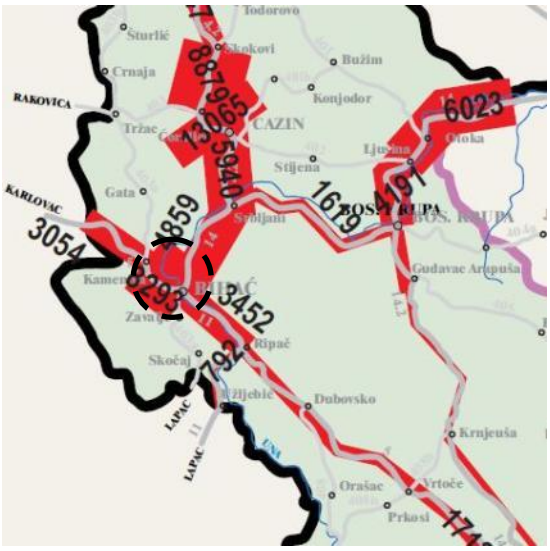
Since the project crossroad lies in the close proximity of a primary school and the border to Republic of Croatia with significant AADT the reconstruction of a place with such accident data is of the at most importance.

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[2] is published in 2016 with data for the previous year. Based on this information, the nearest relevant traffic count device is 640-Kamenica, section Border BH/HR (Izačić)-Bihać (1 km

[2] *"Traffic count on major roads in Federation of BH in 2014", PC Roads Federation BH, Sarajevo 2015*

south-east from the crossroad) and the data collected from the device shows that, in 2015, 8.293 vehicles were passing daily *(Figure 3)*.

Figure 2: The average amount of vehicles per day in the year 2014



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[3] for the period 2013 to 2040. Analysis of the traffic flow was made for every year applying "equilibrium" procedure. Since the procedure implied counting in projects that have not been yet constructed, this particular section has been analyzed within the section Juncture Kamenica- Kamenica South due to the planned construction of the bypass Bihać. The amount of predicted average daily number of vehicles is shown in *Table 1* below.

Table 1: Traffic prognosis for the M5, section Juncture Kamenica- Kamenica South

Major road	Section name	AADT									
		2016	2018	2020	2022	2023	2025	2030	2035	2037	2040
M 5	Juncture Kamenica-Kamenica South	6772	2268	1259	1335	1397	1625	2181	3157	3546	4017

Source: PC Roads FBH, 2014

Due to the planned construction of the bypass Bihać, as depicted in Table1, there is a decrease in vehicles throughout the operation period till 2023 when we see a light increase due to the predicted increase in number of vehicles in general.

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

4. PROJECT DESCRIPTION

For this Project, a Main design for the Project of Reconstruction of the Crossroad M5 and R403a in Kamenica was prepared by the company Design&QC Ltd, situated in Sarajevo, and contracted by PC Roads FBH in 2009.

The existing intersection of the M5 road and the regional road R 403a is not in accordance with the applicable regulation. Characteristic of this crossroads is that (the regional and local road connections) do not have properly defined and channelled traffic flows.

The intersection location is in the village and near the school with a marked pedestrian traffic. Furthermore, in the intersection zone there is an unregulated bus stop. All of these are reasons why intervention is needed in this location.

At this location the main road is in a curve radius of approximately 90 m with a cross fall of 7.0%. The width of the existing pavement at this location is approximately 6.80 m.

Surface drainage is solved by rigols and junks.

The new designed envisages a roundabout with four arms, in which the traffic takes place by circulating around the middle of the island opposite to the direction of clockwise, the traffic in the rotor is regulated so that within the circle are preferred to the vehicle including the rotor only.

A single-rotor with single-entry inlets and outlets is designed.

Elements applied:

- Outer radius ..... 16,00 m
- Inner radious ..... 10,50 m
- Road width..... 5,50 m
- The radius of curvature at the entrance ..... 12,00 m
- The radius of curvature at the exit..... 15,00 m
- Input brench width..... 4,00 m
- The width of the output brench..... 4,00 m
- The width of the passage ..... 1,50 m

Cross falls in the rotor are given 2.5% on the outer side, and on all input / output ramps are designed drains that accept the water from the rotor and are transported by the collector to the receiver.

The drainage from the carriageway is solved by projecting the rainwater drainage with the new collector and drains set up according to the requirements of the transverse and

deadening inclines of road. The project envisages the construction of drainage basins laid out in the sidewalks.

Prior to and during the execution of civil works, it is necessary to inform road users and affected communities about the works through media. With respect to the safety and protection of workers and equipment at work as well as for traffic participants, the area where the work is being physically separated from the area where the traffic takes place.

Warning tables are set at the beginning and end of the stock, with the required construction of a construction table.

Traffic signs are located to the right of the road along the road in the direction of movement of the vehicle. The signs are placed on the stand and raised at least 0.30 m above the roadway surface, all according to the "Traffic Regulation and Road Signalling, road marking".

Traffic signs are placed in a new project berm. Also, the Contractor is obliged to renew the existing line on the side of the road from which the works are carried out.

The contractor will create a traffic regulation plan that will enable safe and efficient traffic flow during the execution of the works as well as the safety of the workers who perform the work.

Where works are to be performed, he Contractor must set appropriate traffic signs for speed limitation.

Figure 4: Masterplan of the project crossroad

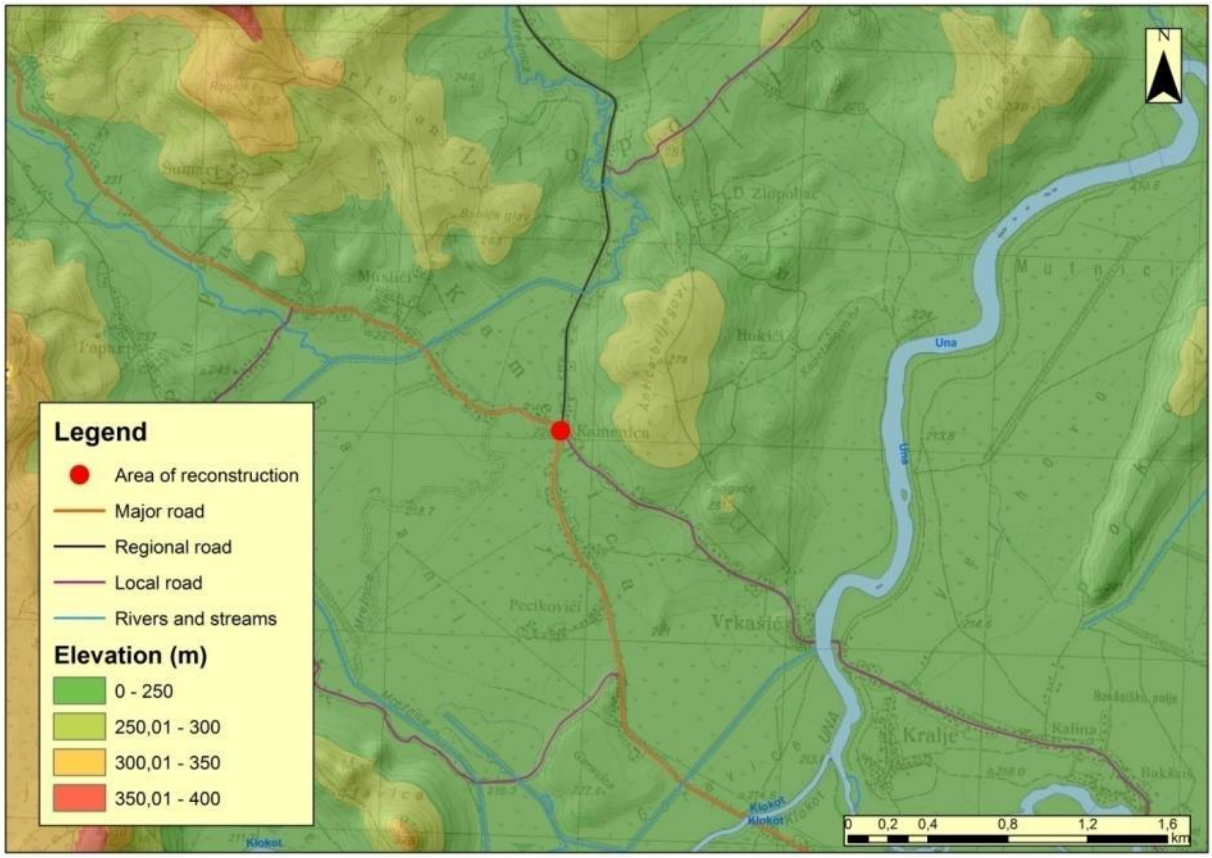
Source: Main Design, Design & QC, 2009

5. BASELINE OF PARTICULAR INTEREST

5.1. GEOGRAPHIC CONDITIONS

The terrain of the Project is mostly flat with an attitude in the range from 200 to 250 meters above sea level. In the wider area the altitude goes up to 400 meters above sea level, as indicated in Figure 5. From stratigraphic – petrographical point of view this area is composed from stable and well permeable rocks, and from structural geomorphological point of view this type of relief belongs to the fluvial – accumulation type of morphostructure.

Figure 5: Geographical Map of Wider Area with the Project Location



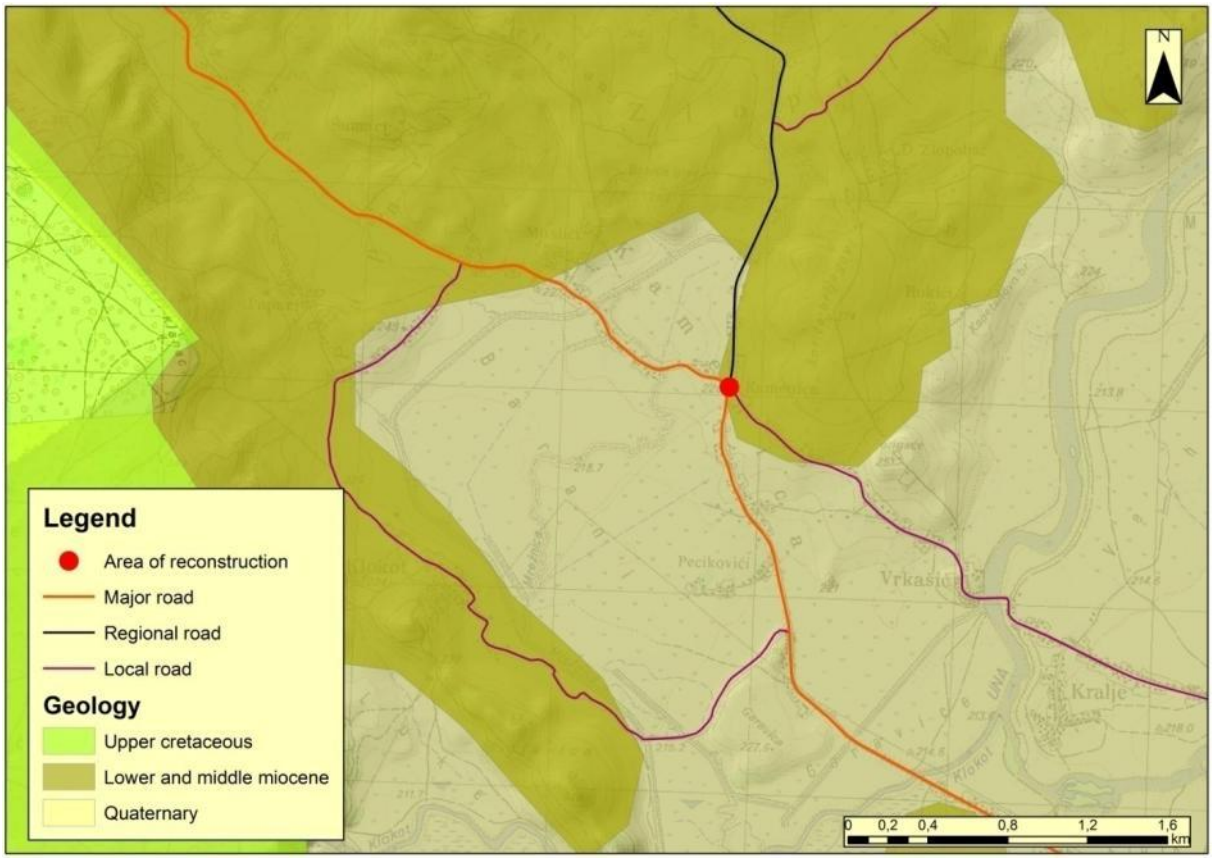
Source: PC Roads Federation of BH

The geological structure of the area of reconstruction is characterized by quaternary sediments of holocene marsh sediments. They consist of a multicolored impure clay, which are covered with a thick layer of humus and are overgrown with grass or wetland vegetation.

In addition to the above, the wider area is characterized by neogene sediments from the period of middle miocene. Neogene sediments are represented through clay marl, marl,

clay, sand and small gravel. Along these sediments in some places quite thick layers of charcoal are inserted.

Figure 6: Geologic Map of the wider area of the Project



Source: Spatial plan of Una – Sana Canton 2012.-2032.

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 the entire area is under the influence of the moderate continental climate or moderately warm and humid climate type (Cfb climate according to Köppen climate classification) which can be concluded from the analysis of thermal and pluviometric regime.

Meteorological station in Bihać, closest to the site of reconstruction, reports following data: the average multi-annual temperature is 10.6 ° C, the warmest month is July, with an average perennial air temperature of 20.0 ° C and the coldest month is January when the average perennial temperature is 0.3° C.

Table 2. Average temperature and precipitation for the multi-year period (1961.-1990.)

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Avrg./Sum m.
Temperature (°C)	0,3	2,5	6,1	10,7	15,1	18,3	20	19,2	15,9	11,3	6,3	1,7	10,6
Precipitation (mm)	85,9	90,8	99,3	114,6	116,3	109	107,4	109,4	107,9	109,3	146,2	111,4	1307,5

Source: Spatial plan of Una – Sana Canton 2012.-2032.

The average rainfall measured at the same meteorological station, during multi-year period is 1307.5 mm per year. The rainiest month is November, when the average precipitation is 146.2 mm. The least precipitation occurs in January, only 85.9 mm on average. The annual rain regime of this area belongs to the continental pluviometric regime.

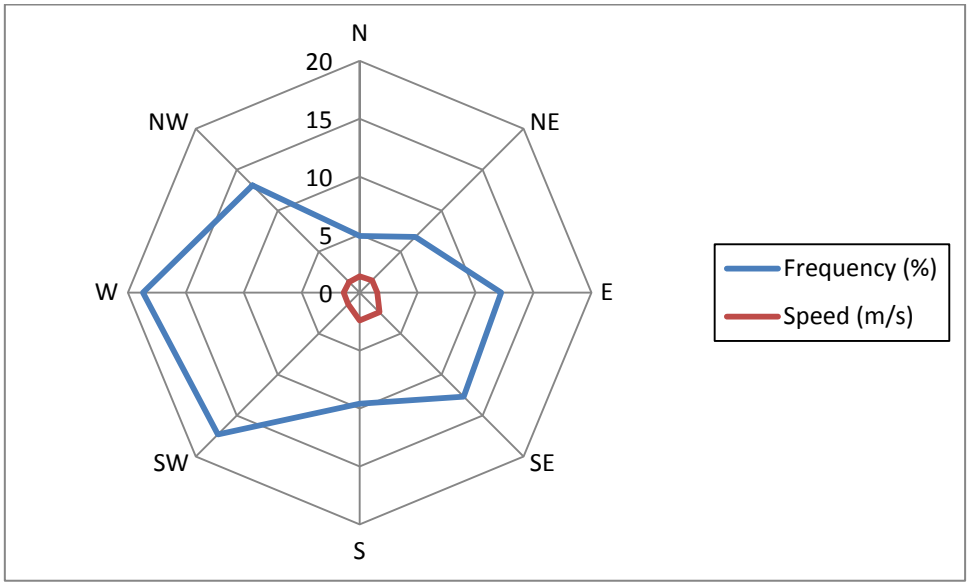
Table 3. Average wind speeds and frequency for the multi-year period (1961.-1990.)

Direction	C	N	NE	E	SE	S	SW	W	NW
Frequency (%)	4,6	4,9	6,8	12,2	12,7	9,6	17,3	18,7	13,1
Speed (m/s)	-	1,4	1,5	1,5	2,4	2,4	1,4	1,4	1,3

Source: Spatial plan of Una – Sana Canton 2012.-2032.

Wind roses depend on geomorphology, mountain ridges and the direction of the rivers. The dominant winds come from the west and southwest, but the presence of the northwest, southeast and east wind is very often. Extreme winds in the zone of moderate – continental climate, can reach up to 40 m/s, which occurs once or twice in 10 years. Speed of 25-40 m/s are recorded almost every year, while speeds of up to 17 m/s are common and occur several times a year. The highest average wind speed has the southern and southeastern wind of 2.4 m/s.

Figure 7. Wind roses from MS "Bihać"



Source: Spatial plan of Una – Sana Canton 2012.-2032.

5.3. AIR QUALITY

No particular monitoring of air quality for this location was performed, neither for the area of Bihać. Judging by the location of the Project, it can be concluded that the highest air pollution refers to the traffic of the major and regional road. Also, during the winter time, the air is loaded with the pollution that comes from individual furnaces and boiler units, from facilities that are located nearby the Project, while there are no other major air polluters such as industrial facilities near the site.

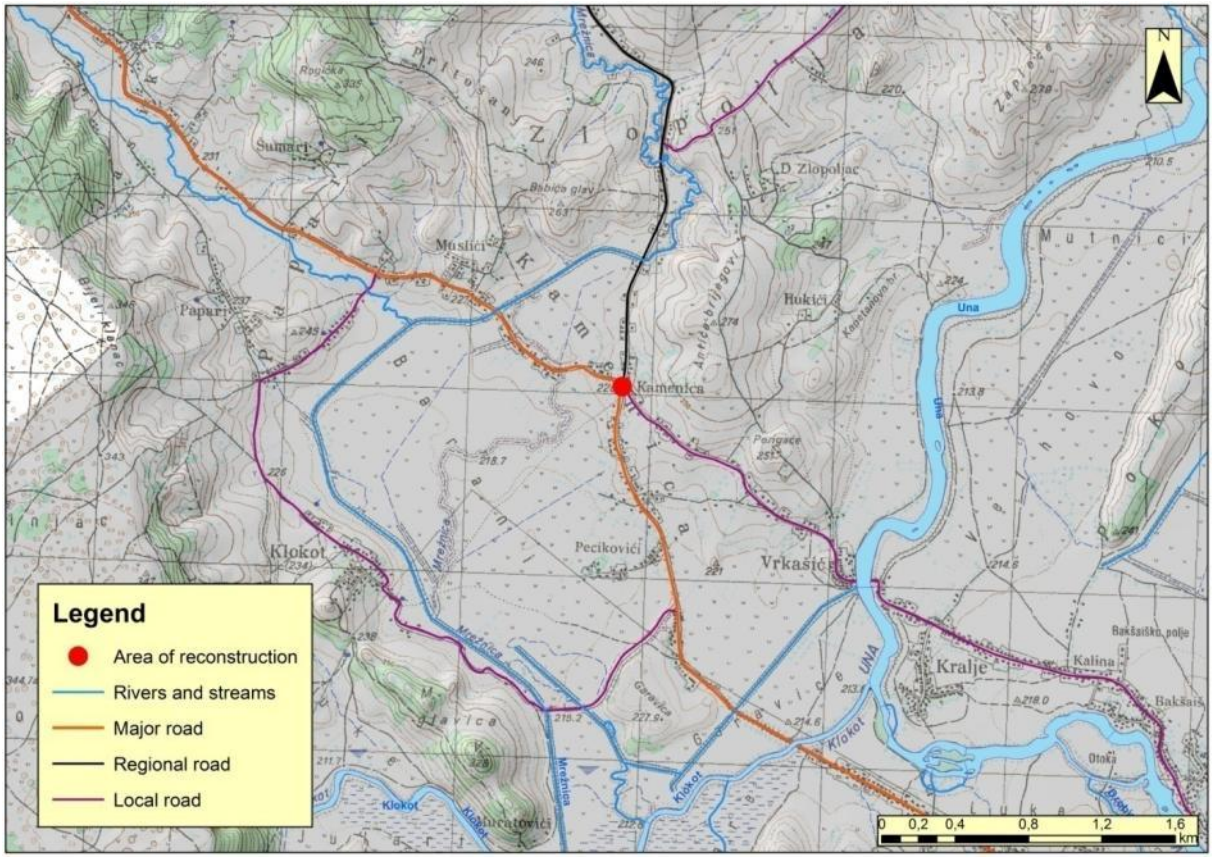
Based on geographical features and the fact that there are no significant polluters, it considers that the air quality is good. The Contractor shall conduct a baseline measurement for air quality monitoring prior to the start of works.

5.4. WATER AND WATER QUALITY

Stream Mrežnica is the closest surface water flow, approximately 300 m of air distance from the Project location. Mrežnica stream is the left tributary of the river Klokot. Klokot springs near the town of Bihać, in the foot of the Plješevica Mountain, about 3 kilometers from the project site. The borders of the sanitary protection zone of Klokot spring lies cca 2 kilometres from the Project site. The length of Klokot is 6 km, the average width is 18-22 meters, and depth range from 5 to 7 meters. It flows in the west – east direction, and from the left side Klokot flows into Una River near the settlement Kralje, which is about 2.1 km from the

project site located. Hydrological measurements of the river Klokot in the eponymous settlement shows following data for the average annual flows of Q_{avrg}= 14m^3/s, Q_{min}= 4,4 m^3/s.

Figure 8: Hydrographic Map of the wider area of the Project



Source: PC Roads Federation of BH

Waters of the wider area, including river Una, belong to the Sava river watershed. Una springs in the Republic of Croatia, in the settlement Donja Suvaja, near the village Srb at 448 meters above sea level, and flows into the Sava River in Jasenovac at 83 meters above sea level. The length of the main stream is 207 kilometers, while the size of the Una river basin to the water – gage in Bihać – Kralje is approximately 3,300 km^2. Hydrological measurements of the Una River at the aforementioned hydrologic station shows the mean annual flow of Q_{avrg} = 104 m^3/s and Q_{min} = 27.8 m^3/s.

The aforementioned watercourses are 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 Una – Sana canton, rivers Klokot and Una are 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.

Due to the distance of the Project in relation to the listed watercourses, it can be concluded that there will not be any direct impact on these waters. The Contractor shall conduct a baseline measurement for water quality monitoring prior to the start of works.

5.5. FLORA AND FAUNA

The entire narrower area of the planned project was greatly changed i.e. the entire area is urbanized. In the closer Project area there is neither flora nor fauna, which must be taken into account. It is necessary to pay attention during construction works on spilling hazardous matter i.e. possibility that they could reach the Mrežnica stream, and further the Klokot river and its wildlife. However the Contractor shall hire a biologist to conduct a review of the site for the baseline prior to the start of works.

5.6. 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 facilities for business purposes (stores, gas stations etc.) and residential purposes (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.

5.7. LAND AND LAND USE

The soil around the planned project represents fluvial soil in the form of eugley which represent mineral – wetland soil. Besides them, in the wider area we can find other fluvial soils such as fluvisols and humofluvisols, and automorphic soils like vertisols, eutric cambisols, rendzinas and calcocambisols.

In the vicinity of the Project the dominant land use is for commercial buildings and residential facilities of individual housing. Individual housing facilities mostly represent buildings which are mainly ground floor, one-story and two-story houses. From the public buildings there is an elementary school located about 150 meters and a post office located about 200 meters away from the crossroad.

Figure 9: Land use in the wider area of the project

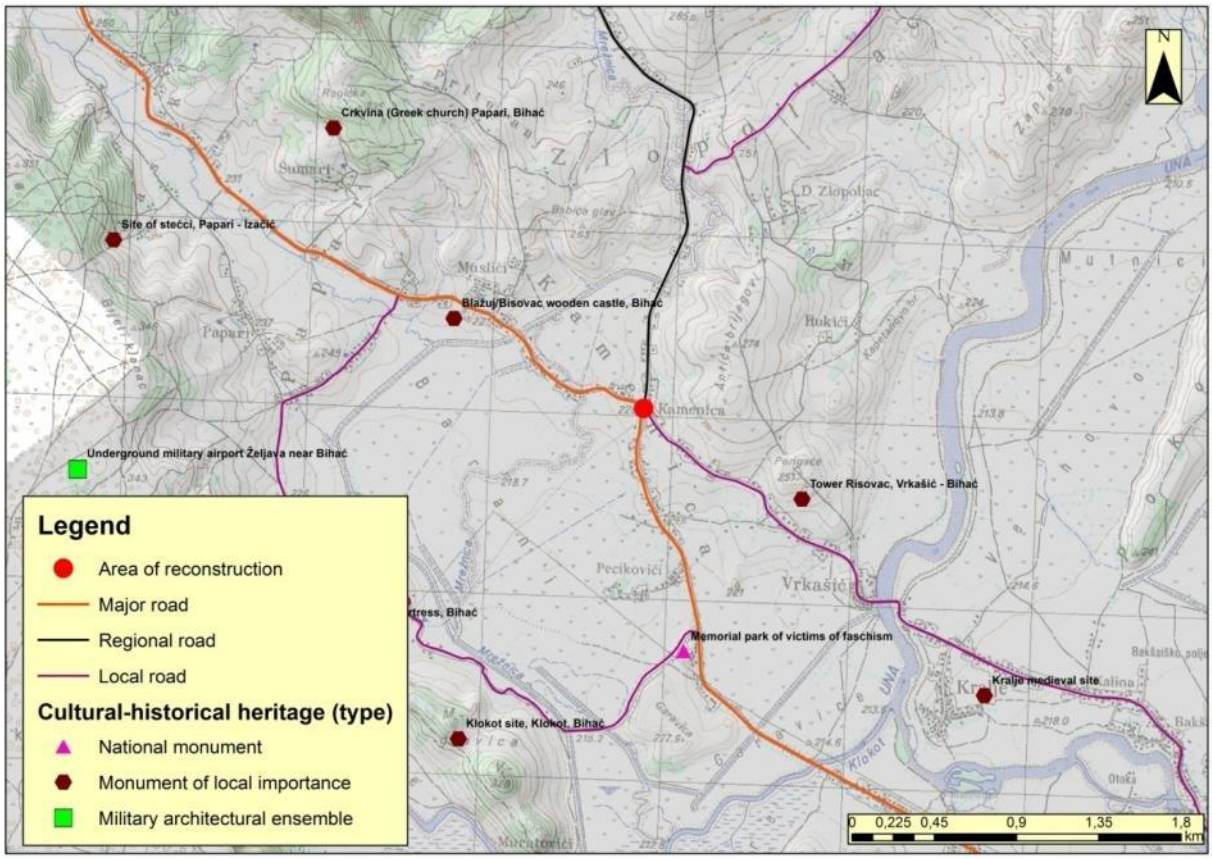
Source: PC Roads Federation of BH

5.8. PROTECTED AREAS

The location of the Project is not located within a protected area according to Spatial plan of FBH and Spatial plan of Una-Sana Canton. The National park "Una" lies more than 12 kilometres southeast from the Project site, and the borders of National Park "Plitvice lakes" are around 11 kilometres of air distance from the Project site away. There are also no recorded archeological findings in the observed area. Nearby there are several cultural – historical monuments. The nearest to the project site are monuments of local importance such as Blažuj/Bisovac wooden castle, located about 1200 meters northwest of the project site, and Tower Risovac whose location is about 1000 meters southeast of the project site.

Besides them, in the vicinity there is a national monument "Memorial park to the victims of fascism Garavice". The national monument is about 1300 meteres south of the project site away. There will not be any direct or indirect impact on the mentioned monuments.

Figure 10: Cultural – historical heritage in the wider area of the Project



Source: Spatial plan of Una – Sana Canton 2012.-2032.

5.9. POPPULATION AND SETTLEMENTS

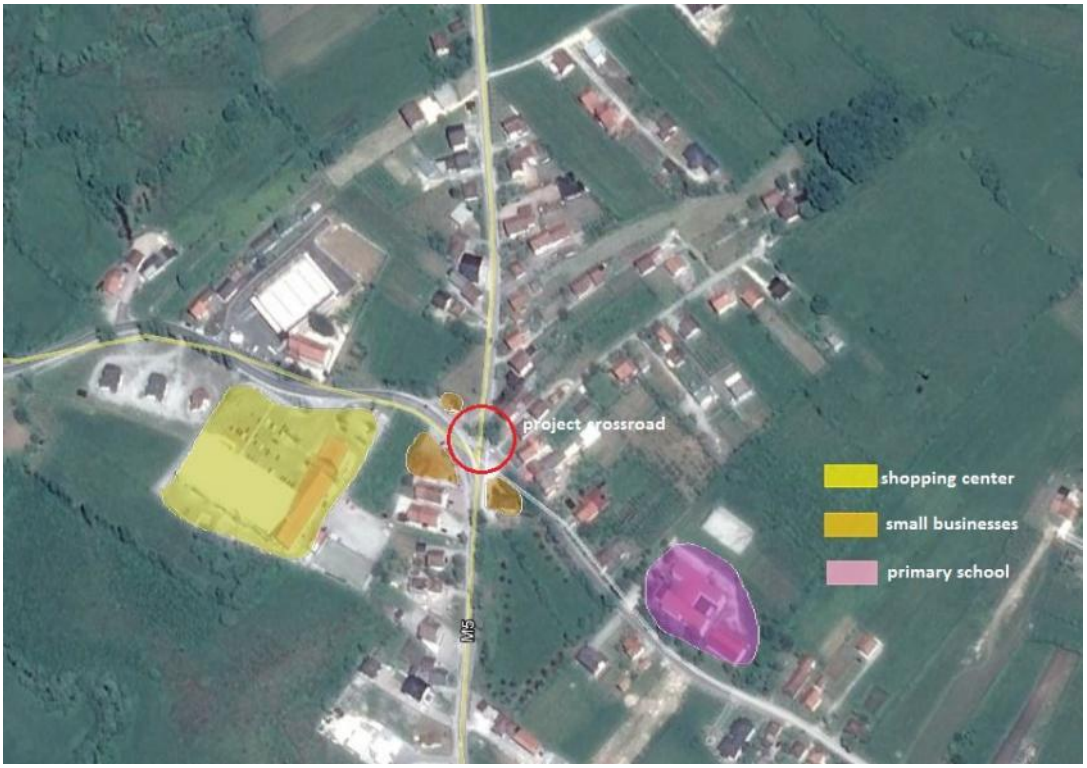
The municipality of Bihać is the center of the Una-Sana Canton. According to the 2013 Census, the municipality has a population of 61.186 people on an area of ca 900 square meters. The project crossroad is located on the far north-west part of the municipality Bihać in the Settlement Kamenica. Kamenica is a rural-type settlement with mainly ground floor, one-storey and two-storey residential houses.

In the close vicinity of envisaged project activities, there are three small businesses, a shopping complex with 10 businesses and a primary school (figure 11). The rest of commercial activities are concentrated in either in the settlement center, located cca 1 km north, down the M5, from the area of construction works or in the 4 km away town of Bihać.

The land around the area of activities envisaged by the project represents mostly first class agricultural land. The nearest primary school is located cca 200 m from the project crossroad. The majority of the population in Kamenica works and gravitates to Bihać.

The importance of the project crossroad for the local community is reflected trough the fact that this is the fastest and most convenient way for locals to reach the municipality, healthcare, educational and administrative center of the region. Furthermore, the planned reconstruction would greatly improve the safety of pedestrians including children who in a great part cross the project crossroad every day on their way to school.

Figure 11: Distances from project crossroad



Source: PC Roads of FBH

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

6.1. PRE-CONSTRUCTION IMPACTS

Socio-economic Impacts

Pre-construction land acquisition: The project roundabout is a part of the integrated Resettlement Action Plan which was publicly consulted and disclosed in March 2016.

As described in the integrated RAP parts of 61 private and 1 public land plots will be expropriated. The total area that has to be expropriated equals 2112,5 m².The affected part of 7 plots is larger than 10% (1% to 10%), while less than 10 % (15% to 50%) will be expropriated from 54 plots. None of the affected land plots have any productive use and there will be no economic impacts as a result of the expropriation.

On 11 affected plots orchards have been identified. Nevertheless, the affected parts of all of these land plots are less than 10 % of the total area of the plot (detailed percentage can be seen in table 5). In addition, it has been identified that no trees grow on the parts planed for expropriation. Thus, the impact on orchards is considered to be small.

On 2 affected plots growth of vegetables has been identified. The affected part of these land plots is 1% (land plot number 2533/1) and 3% (land plot number 2564). Parts of plots planed for expropriation do not feature growth of vegetables, thus the impact is considered insignificant.

On 39 affected plots auxiliary structures in form of gates and fences have been identified. These auxiliary structures will be moved on the remaining part of plot as requested by PAP. In case auxiliary structures cannot be moved, compensation will be agreed upon with respective owner and paid in line with provisions determined in the integrated Resettlement Action Plan before the land is accessed.

According to the Census in the Integrated RAP, one roadside vegetable stand/kiosk (see figure 12) will be relocated. The kiosk is erected as an auxiliary structure, and will likely be moved on the same land plot (2489/3) in the close vicinity of its current location. The store has three employees, but no job loss is expected, due to the above mitigation measure.

Figure 12: The roadside vegetable kiosk that will have to be relocated

Source: field visit, November 16th 2016

According to the integrated RAP Economic Displacement is defined as: "Loss of income streams or means of livelihood, resulting from land acquisition or obstructed access to resources (land, water or forest) resulting from the construction or operation of a project or its associated facilities."[4] Based on this definition and the above said, no such impact can be indentified for this Sub-project. Thus, it can be concluded that no economic displacement will take place.

Furthermore, neither physical displacement nor permanent access restrictions have been identified on this project.

9 businesses will be affected, 9 of which were surveyed. The impacts perceived as possible by the surveyed business owners are:

- Loss of customers
- Disruption of business due to construction works
- Noise,

While all said that access restrictions would be unavoidable.

These impacts are considered major but short termed

Furthermore, 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

[4] *Integated Resstellement Action Planfor Sub-projects, Enova Ltd. Marc, 2016*

with respective owners and the compensation will be paid in accordance with provisions determined in the RPF and Integrated RAP before the land is accessed.

Table 4: Excerpt from the Socio Economic Survey, Integrated RAP

No.	Location	GENERAL DATA ON BUSINESS				IMPACTS		COMPENSATION
		Land plot no.	Type of activity	Average annual income	Number of employees	Perceived impacts (loss of customers, etc.)	Access restrictions expected (yes/no)?	Compensation preferred
1	Bihać-Kamenica	2573	Car mechanic	10.000,00 KM	1	Loss of customers, disruption of business due to work	Yes	Money
2	Bihać-Kamenica	2551/2	Production of blocks	n/a	2	Loss of customers, disruption of business due to work	Yes	Money
3	Bihać-Kamenica	2518/4	Trade of the cars	n/a	2	Loss of customers, disruption of business due to work	Yes	Money
4	Bihać-Kamenica	2518/1	Agronomic sector	n/a	2	Loss of customers, disruption of business due to work	Yes	n/a
5	Bihać-Kamenica	2529	Catering	n/a	2	Loss of customers	Yes	n/a
6	Bihać-Kamenica	2518/2	Trade	n/a	3	Noise	Yes	n/a
7	Bihać-Kamenica	2489/3	Trade	500.000,00 KM	3	Loss of customers (business)	Yes	n/a
8	Bihać-Kamenica	Between 2564 and 2561/1	Car service	150.000,00 KM	6	Loss of customers	Yes	Money
9	Bihać-Kamenica	n/a	Carpentry	n/a	3	x	Yes	x

Source: Integrated Resettlement Action Plan, Enova, 2016

Table 5: Excerpt of Census, done as a part of the integrated RAP for Sub-project

Location (section)	Number	Land plot no.	Type of impact	Category	Total area of plot (m2)	% affected	Structure (commercial or residential)	Other assets (natural objects)	Other assets (auxiliary structures)
Kamenica (Granica BiH/RH (Izačić)-Bihać)	1	2495	part of land	Land plot	412,00	1%	no	grass	no
	2	2527	fence	Land plot	160,00	10%	no	orchard (cca 10 fruits)	fence
	3	2558	part of land	Land plot	8880,00	3%	no	grass. Trees	no
	4	2557	part of land	Land plot	1266,00		commercial		
	5	2507	fence, gate, draw-well	Land plot	497,00	8%	no	grass	fence, gate, draw-well
	6	2524	part of land	Land plot	1636,00	1%	no	orchard	no
	7	2523/2	fence	Land plot	815,00	3%	no	fence	no
	8	2571/1	part of land	Land plot	270,00	5%	no	orchard	no
	9	2509	fence, gate	Land plot	389,00	5%	no	trees	fence, gate
	10	2576	draw-well	Land plot	1323,00	3%	no	grass	draw-well
	11	2572/1	part of land	Land plot	628,00	15%	no	grass	no
	12	2575/4	part of land	Land plot	236,00	3%	no	grass	
	13	2575/3	fence	Land plot	393,00	1%	no	grass	fence
	14	2573	part of land	Land plot	831,00	3%	commercial	grass	no
	15	2505/3	fence	Land plot	212,00	3%	no	no	fence
	16	2511	fence, gate	Land plot	338,00	7%	no	grass, trees	fence, gate
	17	2500/8	fence	Land plot	227,00	3%	no	grass	fence
	18	2500/4	fence	Land plot	170,00	5%	no	grass	fence
	19	2551/4	fence	Land plot	11,00	50%	no	grass	fence

	20	2551/2	part of land	Land plot	1360,00	1%	no	grass	fence
	21	2500/2	fence	Land plot	947,00	3%	no	grass	fence
	22	2500/1		Land plot	1455,00	2%	no	grass	fence
	23	2496/3	fence	Land plot	788,00	1%	no	orchard	fence
	24	2565		Land plot	834,00	10%	no	orchard (cca 20 fruits)	n/a
	25	2518/4	Difficult access during construction	Land plot	272,00	30%	commercial	no	fence
	26	2518/1	Difficult access during construction	Land plot	703,00	3%	commercial	no	no
	27	2503	fence	Land plot	539,00	3%	no	grass	fence
	28	2502/2	part of land	Land plot	110,00	5%	no	grass	no
	29	2501/2	fence	Land plot	36,00	20%	no	orchard	fence, gate
	30	2519/1	Difficult access during construction	Business	9647,00	3%	commercial	no	no
	31	2521/1	fence	Land plot	2157,00	5%	no	orchard (cca 80 fruits)	fence
	32	2533/1	fence	Land plot	3136,00	1%	no	vegetables	fence
	33	2499/2	fence	Land plot	783,00	5%	no	orchard (cca 20 fruits)	fence
	34	2498/2	fence	Land plot	400,00	3%	no	grass	fence
	35	614/1	part of land	Land plot	11408,00	1%	no	grass	no
	36	614/3	part of fence	Land plot	5097,00	1%	no	grass	no
	37	2501/1	fence, gate	Land plot	368,00	1%	no	orchard (cca 20 fruits	fence, gate

								)	
	38	2532	fence, gate	Land plot	409,00	2%	no	grass	fence, gate
	39	2529	gate	Land plot	176,00	1%	commercial	no	no
	40	2490/1	fence	Land plot	389,00	1%	no	no	fence
	41	2492	fence	Land plot	184,00	5%	no	no	fence
	42	2496/2		Land plot	828,00	10%	no	grass	fence
	43	2489/2		Land plot	56,00	3%	no	grass	fence
	44	2564	fence	Land plot	552,00	3%	no	vegetables	fence
	45	2561/2	fence	Land plot	650,00	1%	no	grass	fence
	46	2533/5	fence	Land plot	38,00	50%	no	grass	fence
	47	2518/2		Land plot	369,00	2%	commercial	no	no
	48	2556/2	fence	Land plot	79,00	50%	no	grass	fence
	49	2528	part of land	Land plot	613,00	1%	no	no	no
	50	2506	fence	Land plot	682,00	4%	no	grass	fence
	51	2533/3	expropriation of stall	Land plot	895,00	1%	no	grass	fence, draw-well, stall
	52	2519/3	part of land	Land plot	28,00	1%	no	grass	no
	53	2502/1	fence, gate	Land plot	242,00	3%	no	orchard (cca 10 fruits)	fence, gate
	54	2489/3	relocation of kiosk	Land plot	1216,00	20%	commercial	grass	relocation of kiosk
	55	2489/1	draw-well, fence	Land plot	30,00	1%	no	grass	draw-well, fence
	56	2559		Land plot	503,00	1%	no	grass	
	57	2487	gate	Land plot	498,00	1%	no	grass	fence
	58	2499/1	expropriation of draw well	Land plot	264,00	8%	no	orchard (cca 20 fruits)	draw-well, fence
	59	2561/1	gate	Land plot	248,00	1%	no	grass	gate
	60	2561/3		Land plot	26,00	1%	no	grass	fence
	61	2577	part of land	Land plot	856,00	3%	no	grass	fence

6.2. IMPACTS DURING CONSTRUCTION

Impact on Air Quality

Exhaust gases - The machinery that is used during the construction and delays, i.e. traffic standstills on the road due to works on reconstruction of crossroad will lead to an increased emission of such gasses as SO2, CO2, CO, NOX and Pb.

Dust generation - where the most important polluters are solid particles (PM10 and PM2,5). Possible sources of dust generation include: site preparation activities, handling of building materials such as gravel, sand, asphalt, cement and the construction itself. The spreading of this pollution will depend on the weather conditions (wind strength and precipitation). The impact of dust emissions is not significant, it is temporary and of local character.

Impact on Noise Level and Vibrations

Noise emission is likely to appear during site preparation. Possible sources of noise are: ground preparation activities, 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 Soil Quality

- Soil compaction due to heavy 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 Protected areas

The observed project is not situated in any of the existing or planned protected areas.

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.

No complete traffic stoppage is likely to occur due to construction activities of the project roundabout due to the

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

Population Safety Impact

The presence of workers: can sometimes impact the safety of the local population. Since, according to local practice, no working camps will be set up, this impact 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
- Illicit 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: Furthermore, 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. 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 Integrated RAP before the land is accessed.

Access restrictions: Neither businesses nor households will experience complete loss of access during the construction period. Impacts related to access difficulties to 9 businesses and 52 residential plots are expected to be temporary and are associated with limited access due to traffic congestions and civil works during the construction phase.

As before mentioned, 9 businesses will be affected, all of them surveyed. The impacts perceived as possible by the surveyed business owners are:

- Loss of customers
- Disruption of business due to construction works
- Noise

, while all said that access difficulties would be unavoidable during the construction period.

These impacts are considered short termed and minor

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 late delivery of goods and products. The impact is short termed and minor due to the

6.3. IMPACTS DURING OPERATION AND MAINTENANCE

Since this crossroad is an already existing object neither new negative impacts, nor deterioration of existing negative impacts, during operation and maintenance are expected.

6.4. POSITIVE IMPACTS

Project implementation will contribute to better socio-economic conditions and will have positive impacts on the quality of life of the local community. There are several social opportunities that were detected in the project:

- Improved local and pedestrian safety due to construction of separate pedestrian lane along the crossroad;
- 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;
- Lowering traffic congestions by increasing traffic flow;Increased travel speed and travel quality;

6.5. ENHANCEMENT MEASURES

Table 6: 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 enhancing road surface and building a roundabout; ▪ Improved road and travel safety; ▪ Increased pedestrian safety by designing footpaths.	-	-	Contractor	PC Roads FBH
▪ Socio-economic	▪ New job and business opportunities for local construction workers and firms; ▪ Improvement of connections of local population to the municipality center Bihać; ▪ Improved connection the border with Republic of Croatia;	-	-	Contractor	PC Roads FBH
▪ Air	▪ Due to construction of the roundabout there will be less congestion, meaning the emissions of traffic pollutants will decrease what will as a result have better air quality;	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 7*. This chapter includes also the general provisions and mitigation measures that the contractor hired for reconstruction 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 submit 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[5]:

(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

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

works (in accordance with *Appendix 4. Road Safety Management* of the ESMF). The TMP 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 intervention is carried out without risk to the health and safety of all workers and local community trough 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 should 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 a regular 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.

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 Involuntary Resettlement

Prior to construction parts of 61 private and one public land plot will be expropriated. A Resettlement Action Plan (RAP) for this and other subprojects was prepared. The RAP was publicly consulted and disclosed in February, 2016. Compensation for permanent land take will be provided to the affected owner/beneficiary in accordance with provisions determined in the RAP.

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 and the integrated RAP.

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 certain type of compensation or assistance as outlined in the Entitlements Matrix in the integrated RAP.

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 land acquisition process, in accordance with the information disclosure and consultation requirements set out in the integrated RAP.

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 DURING 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 Contractor 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 7. 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[6],
- 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
- 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

[6]- *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

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.

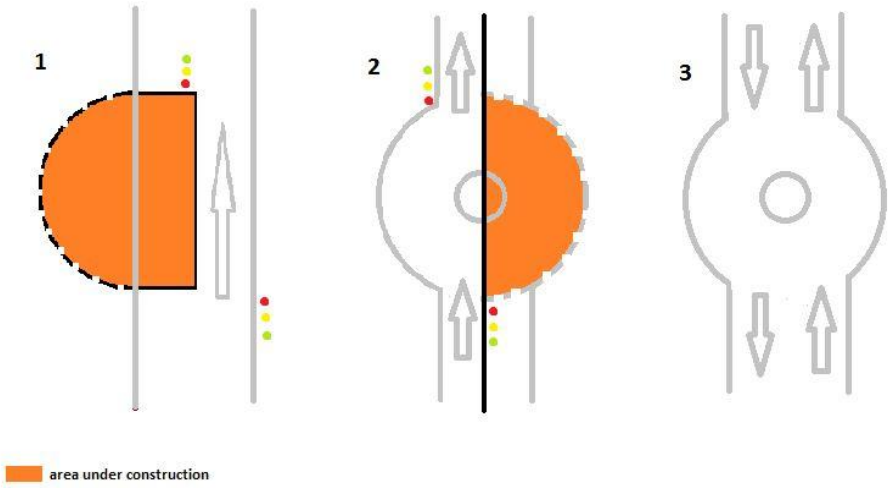
TMP should be monitored on a regular basis (responsibility of the supervision engineer) and audited to ensure effective implementation and to take into consideration any changes on construction site. All workers on construction site should be acquainted with the TMP.

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 14.

Organization of traffic flow will have three phases as depicted in figure 13:

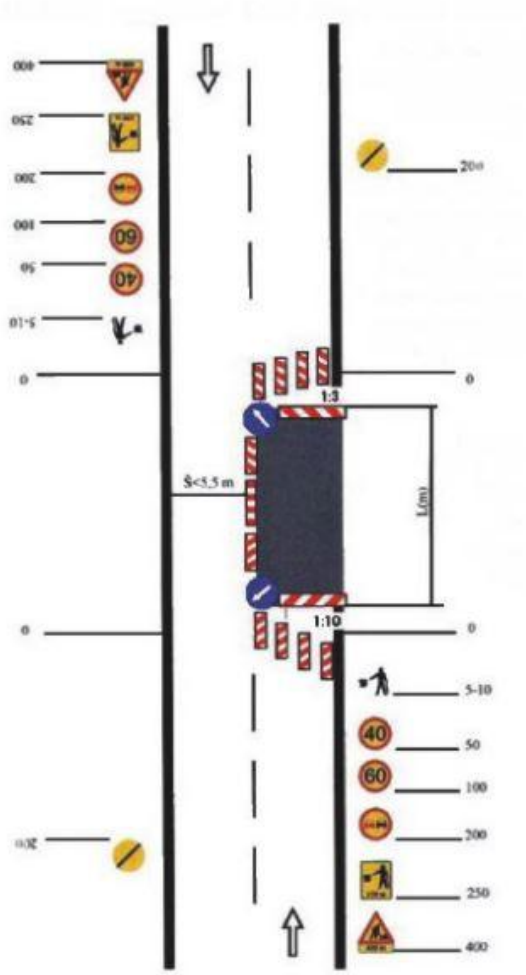
1. While the first part of the roundabout is being constructed traffic will flow on the other half in a one way regime
2. While the second half of the roundabout is being constructed, traffic will flow on the constructed half in a one way regime
3. Once the roundabout is formed traffic will flow regularly

Figure 13: Scheme of traffic flow during construction



Source: PC Roads

Figure 14: Scheme of traffic signage that will be used during construction period



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 Access restrictions

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 before the land is accessed. The contractor is responsible for keeping the works within the right of way.

Construction activities may cause damage to land plots, fences and railings due to disposal of construction waste and heavy machinery parks. Before such activities occur, the land has to be agreed upon with respective land owners and compensation has to be provided in accordance with provisions determined in the Integrated RAP.

At this moment no access loss is expected. Nevertheless, access might get difficult during the construction phase due to traffic congestions and civil works. Thus, citizens have to be provided with timely information about upcoming construction works, expected duration of the works, alternative routes, etc. via an information leaflet on the construction site, via local newspapers, the municipality's notice board and website and via PC Roads' website as soon as the contract is signed. Furthermore, safe and continuous access to all adjacent business facilities, shops and residences during construction has to be ensured. If access restriction cannot be avoided the owner will be timely notified. The duration of the restriction will be agreed upon with respective owners. All applicable compensations will be paid according to the provisions determined in the Integrated RAP and RPF

7.3. MITIGATION MEASURES IN OPERATIONAL PHASE

It is required from PC Roads FBH to undertake the instructions given in the Table 7.Environmental and Social Impacts Management Plan in operational phase.

7.4. SUMMARY OF MITIGATION MEASURES

Table 7: 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-motto club's press releases.
▪ Expropriation, involuntary resettlement and economic displacement	▪ All land acquisition and expropriation will be conducted in compliance with the applicable legislation in FBiH and the Integrated 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 in the integrated	Internal resources	Internal resources	PC Roads FBH	PC Roads FBH + City of Bihać	

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
	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 integrated 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 Chapter 10.2.1 of this ESMP (Grievance Mechanism).					
▪ 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
▪ Restrictions on land use and damages on private property and businesses.	▪ Avoid private properties where possible; ▪ The Contractor will organization the construction site in collaboration and agreement with the municipality of Bihać; ▪ 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

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.	Internal resources	Internal resources	PC Roads FBH	Contractor + PC Roads FBH	Applicable if the Contractor needs new workforce.
CONSTRUCTION PHASE						
▪ Access restriction.	▪ Implementation of the provisions on providing timely information to citizens about upcoming construction works, expected duration of the works, alternative routes, etc. via an information leaflet on the construction site, via local newspapers, the municipality's notice board and website and via PC Roads' website as soon as the contract is signed.; ▪ Ensuring safe and continuous access to all adjacent business facilities, shops and residences during construction; ▪ If access restriction cannot be avoided the owner will be timely notified. The duration of the restriction will be agreed upon with respective owners. All applicable compensations will be paid according to the provisions determined in the Integrated RAP and RPF	Included in construction works	Included in supervision	Contractor	Supervisory body*	Supervisory body is appointed by investor PC Roads FBH

* *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	
	▪ Implementation of TMP.					
▪ Impacts on living conditions of local community;	▪ 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 Roads' website as soon as the contract is signed.; ▪ Implementation of TMP; ▪ Implementation of CSOP; ▪ Implementation of ESMP provisions.	Included in construction works	Included in supervision	PC Roads FBH (providing informations to the citizens)+ Contractor (implementation of the TMOP, CSOP, ESMP)	Supervisory body*	
▪ 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 of the Interior

Impact/Problem	Mitigation Measures	Cost Assessment (US$)		Institutional Responsibility		Comments
		Operative	Implementation	Operative	Implementation	
▪ 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, minimise size of the area used and impacts on the vegetation and implementation of RPF and RAP provisions on temporary occupation.	Internal resources	Internal resources	PC Roads FBH	PC Roads FBH*	
▪ 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; ▪ 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.	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	
▪ Increased level of noise and vibration: - noise emission and noise disturbance; - vibration.	▪ Restriction of works to period of day only (period of day: 06:00 to 22:00, period of night: 22:00-06:00) ▪ 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*	
▪ 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;	Included in construction works	Included in supervision	Contractor	Supervisory body*	

* *Supervisor 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	
	▪ Vehicles and machines need to be regularly maintained to prevent leakage.					
▪ Soil degradation and emissions to soil: - soil contamination by oils, fuels and other hazardous substances.	▪ 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*	
▪ Decrease in the aesthetic value of the landscape due to construction site organization.	▪ The land determined for use by the Project 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;	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ 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.	▪ Implementation of WMP that shall ensure environmentally sound collection of waste, its storage, transport and final disposal, or and primarily reuse / recycling . ▪ No clandestine waste disposal will be allowed on site, including open burning of wastes.	Included in construction works	Included in supervision	Contractor	Supervisory body*	+ local waste management operator

* *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	
	▪ 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 ▪ 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 are 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*	

* *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	
▪ Accidental situations i.e. spills, leakage of oils, fats, fuels and similar hazardous materials.	▪ Implementation of MPCA which includes: - Spill Response Plan, - Emergency Preparedness and Response Plan. ▪ Implementation of Elaborate on protection from fires and explosions ▪ Implementation of Labor Protection Law	Included in construction works	Included in supervision	Contractor	Supervisory body*	
▪ 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 archeological 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

* *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	
OPERATION PHASE						
▪ Regular occurrences during road operation	▪ Regular road maintenance	Incl. in maintenance works	Internal resources	Contractor for maintenance works	PC Roads FBH	
▪ Decrease in road safety due to the increase of traffic	▪ 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 8: 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 RAP provisions	PC Roads of FBH	Monthly and quatery internal reports	Prior to construction	/	25000	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 RAP provisions	Construction site	Reports from Contractor	Prior to construction and during construction when necessary	Included in construction contract	Included in construction contract	Contractor	Contractor
CONSTRUCTION PHASE								
▪ Access restrictions.	▪ TMP in place, ▪ Implementation of RPF	Construction site	Visual inspection	Random checks at least	Included in supervision	Included in supervision	Supervisory body	Supervisory body

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
	provisions on compensation procedures for businesses affected by access restrictions and livelihood restoration.			once a week during the construction			+ PC Roads FBH	+ PC Roads FBH
▪ Restrictions on land use and damage to the private property (agricultural plots, horizontal infrastructure, fences and railings) due to disposal of construction waste, work camps and parks of heavy machinery	▪ CSOP in place; ▪ Implementation of RPF provisions on compensation procedures in case occasional land use cannot be avoided, compensation will be provided to affected owners/users ▪ grievances	Construction site	Visual inspection + Central Grievance Log	Prior to construction and random checks at least once a week during the construction	Included in supervision	Included in supervision	Supervisory body + PC Roads FBH	Supervisory body + 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);	Construction site	Measuring devices	As a baseline and during construction when needed	-	500 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
	▪ Emissions of exhaust gases from vehicles and equipment; ▪ (SO_2, NO_2, dim and PM_{10}).			and upon complaints by the citizens				
▪ 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 surface water	▪ Analysis of parameters of surface water quality: - Chemical analysis (PH, turbidity, conductivity, temperature, suspended particles, COD, BOD, ingredients with nitrogen) - Standard bacteriological analyses	In watercourse near construction site downstream	Standard laboratory equipment and methods of water quality monitoring	As a baseline and upon order by supervisory organ or upon complaints by the citizens	-	1000 USD /measuring	Contractor + Supervision	Authorized laboratory
▪ 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

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
▪ Emissions into water and soil due to improper waste handling.	▪ CSOP in place, ▪ Waste generation and management.	Construction site	Visual inspection, disposal records or receipts from landfills	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Soil degradation	▪ Implementation of CSOP, ▪ Implementation of WMP.	Construction site	Visual inspection	Regularly during construction	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ Waste management.	▪ Implementation of CSOP and WMP.	Construction site	Visual inspection, disposal records or receipts from landfills	Regularly during construction. Amount and disposal records internal reports will be made daily and monthly	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
▪ Accidental situations i.e. spills, leakage.	- Implementation of MPCA which includes: - Spill Response Plan, - Emergency Preparedness and - Response Plan.	Construction site	Visual inspection	Daily	Included in performance	Included in performance	Contractor + Supervision	Contractor
▪ 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

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 all 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 Commitee 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 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: http://www.jpcfbih.ba/ba/kontakti/kontakti.shtml.

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.

PC Roads FBH shall prepare monthly progress reports to World Bank.

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 Bihać 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. The public consultations are to be held prior to the start of works but once the bidding documents have been issued.

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 World Bank in English. During the process of public consultation the interested public will obtain all information regarding the project, including social and environmental issues.

During construction works 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 Travnik 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 city 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 will 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 archived 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

The Contractor shall establish all required baseline data before the commencement of works. The Baseline – Monitoring data shall include air quality data, surface water quality data, soil quality data, survey of the site for any endangered and endemic species and other environmental issues in zone of corridors of direct and indirect impacts. 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:

1.) 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[7], 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.

[7] 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

11.1. Social aspects

-Implementation of the integrated RAP

- Payment of the compensation in accordance with RAP provisions before the land is accessed

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