Bosnia and Herzegovina – Corridor VC 2 Project

Non-technical Summary

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Bosnia and Herzegovina – Corridor VC 2 Project

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Project: Bosnia and Herzegovina – Corridor VC 2 Project – Environmental and Social Assessment
Report: Non-technical Summary
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1. Introduction

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

The European Bank for Reconstruction and Development (EBRD) is considering providing finance to PC Motorways for the Corridor Vc 2 Project to construct three road sections which form part of Corridor Vc. These would be a follow on operation of the Company’s previous project, the construction of four key road sections along Corridor Vc.

PC Motorways has conducted the local Environmental Impact Assessment (EIA) process for the entire Corridor Vc alignment in accordance with FBiH regulatory requirements. The Corridor alignment is divided into four lots, and separate local EIAs have been produced for each lot. Three project sections are considered for financing are: section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km) (part of Lot 2), section Zenica North - Donja Gračanica (2.12 km) (part of Lot 2) and section Buna - Počitelj (7.2 km) (part of Lot 4).

This Non-Technical Summary (NTS) provides a summary of the expected environmental and social impacts and measures needed to structure the project to meet the EBRD Environmental and Social (E&S) Policy (2014) Performance Requirements. The purpose of the NTS is to give information to everyone that may be interested in the Project. Within the NTS, consideration is given to both the construction and operation phases.

2. Project Description

The project involves the construction of (1) 1.8 km motorway section between Zenica North Interchange/Donja Gračanica and Tunnel Zenica, (2) approximately 2.12 km motorway section between Zenica North and Donja Gračanica (tunnel Pečuj) and (3) approximately 7.2 km motorway section from Buna to Počitelj. The section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km) and the section Zenica North - Donja Gračanica (tunnel Pečuj) are located in the central part of the country, whereas the Buna – Počitelj section is located in the south, as shown in Figure 1.

![Figure 1 - Road Corridor Vc2 in FBiH and Locations of Three Project Sections](image)

Section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km) starts northeast of the urban part of the Zenica City, close to the settlement of Vraca at the entrance of the Tunnel Zenica (from the direction of south), and ends at the northernmost part of the Zenica North Interchange in the settlement of Donja Gračanica. At its beginning, it comprises the road between tunnels Zenica and Vraca.
After the Tunnel Vraca, the road route will be constructed at two different levels due to steep slopes of the terrain, with retaining walls on both sides. The alignment includes a viaduct and routes further with deep notches on both sides to the beginning of another viaduct. From this viaduct, the alignment continues with a notch on right side and the section ends at the northernmost part of the Zenica North Interchange. The proposed section is parallel to the water flow of the River Bosna, and runs over a relief elevation. The proposed alignment is shown in Figure 2.

Figure 2 - Proposed Alignment in the Section Entrance into Tunnel Zenica – Zenica North Interchange/Donja Gračanica

Section Zenica North - Donja Gracanica (tunnel Pecuj) (2.12 km) starts northwest of the town of Zenica close to a large steel manufacturing plant, and ends at the entrance of the tunnel Pecuj, above the Donja Gračanica village. This motorway section starts with a diamond-shape interchange, which is located on a steep uninhabited area. It comprises a roundabout and a viaduct (70-80 m in length) above it. After the interchange, the alignment routes through a cut and enters a tunnel (about 420 m in length) through the hill Hum. After the tunnel, the alignment includes a viaduct (380 m long) above Donja Gračanica village, and routes further along the slope to the entrance of the tunnel Pečuj. The section ends before the tunnel entrance. It also includes the connecting road to the regional road network, which links the town of Zenica with the motorway. The connecting road has two lanes and is approximately 1 km long, to the junction to main road. Connecting road include a bridge over the Bosna River (850 long) and approximately 3.5 km of two-lanes road along the left bank of the river Bosnia to connect to the main city road in the town of Zenica. The proposed associated infrastructure includes a toll station at the connecting two-lane road. It is unlikely that there will be adverse impacts associated with this development. The proposed alignment is shown in Figure 3.

Figure 3 - Proposed Alignment in Donja Gračanica – Zenica North Section
The Buna - Počitelj section is proposed to start approximately 4 km south of the village of Hodbina. The alignment continues along the vacant land, passing close to several settlements and ends immediately before the Počitelj interchange. The alignment will include two overpasses, one underpass and two wildlife crossings. The proposed associated infrastructure comprises of a service area (which includes a restaurant with toilets), a parking area and petrol station. Environmental issues here will be related to appropriate management, i.e. collection and pre-treatment of sanitary wastewater, pre-treatment of storm water from the parking area and maintenance of the oil/water separator, and municipal waste management. The proposed alignment is shown in Figure 4.

Figure 4 - Proposed Alignment in Buna – Počitelj Section

3. Background

Rationale of the Project

Corridor Vc is considered FBiH’s key transport route, running north-south and connecting Budapest (Hungary) to Adriatic port Ploče (Croatia). The main aim of the project is to improve transport connections between FBiH and the surrounding countries to promote economic development.

Legal Aspects and Compliance with Relevant Environmental and Social Laws

As a potential candidate country to the EU, BiH has adopted the EU Directives relevant to the ESIA process, including the EIA Directive (2014/52/EU). The EIA is primarily regulated by the Law on Environmental Protection and the Regulation on Facilities Subject to Obligatory Environmental Impact Assessment and Facilities Which May be Constructed and Operated Only with a Valid Environmental Permit. According to the Law and the Regulation, construction of motorways is subject to mandatory EIA and environmental permitting procedures at the level of FBiH. The procedure for EIA and environmental permitting for construction of the motorway on Corridor Vc is also regulated by the Law on Motorway on Corridor Vc. The environmental assessment process for the project has been compliant to the national regulatory requirements.

The procedures for the issuance of Urban Permits, Construction Permits and Use Permits are regulated by the Law on Motorway on Corridor Vc and the Law on Physical Planning and Land Use at the Level of FBiH and they will be issued by the Federal Ministry of Physical Planning.

With regard to the public consultations in the EIA process, stakeholder engagement has been undertaken in relation to spatial planning (Spatial Plan of FBiH in 1982) and more recently, where spatial plans of cantons and municipalities have been adopted (Spatial Plans of the Zenica Doboj Canton and the Municipality Čapljina in the Herzegovina-Neretva Canton), in accordance with the Law on Spatial Planning and Land Use at the Level of FBiH (Official Gazette of FBiH, No. 02/06, 72/07, 32/08, 4/10, 13/10 and 45/10) and the spatial planning laws of the respective cantons. Public consultations were undertaken in 2012 in relation to the new Spatial Plan of FBiH 2008-2028 which is still in parliamentary procedure and in 2009 in all Municipalities.

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3 Official Gazette of FBiH, No. 33/03, 38/09
4 Official Gazette of FBiH, No. 19/04
5 The Federal Ministry of Environment and Tourism issues the Environmental Permit.
6 Official Gazette of FBiH, No. 8/13
7 Official Gazette of FBiH, No. 2/06, 72/07, 32/08, 4/10, 13/10 and 45/10
in which the Corridor Vc is located within the procedure for adoption of the Spatial Basis for the Spatial Plan of Areas with Special Characteristics of Interest for FBiH - "Motorway on Corridor Vc".

Land acquisition for the project is carried out by PC Motorways in accordance with the Law on Expropriation (Official Gazette of FBiH 70/07, 36/10, 27/12), as well as the Law on Administrative Procedure (Official Gazette of FBiH, No. 02/98 and 48/99), Law on Roads of FBiH (Official Gazette of FBiH, No.12/10, 16/10 and 66/13), Law on Motorway on Corridor Vc (Official Gazette of FBiH, No. 8/13), Law on Land Registry and other relevant laws regulating the expropriation procedure.

**Current Environmental and Social Considerations**

**Section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km)** is situated near to the settlement of Vraca located between the Tunnel Zenica and Tunnel Vraca at an approximate distance of 50 m from the road. The area between the exit of the Tunnel Vraca and the beginning of the first viaduct is not populated. The area between the existing main road M-17 and parallel to the planned route of the motorway is populated (proximity of houses: 30-70 m). The largest watercourse near the Project area is the River Bosna (approx. distance is 200 m). Beneath two viaducts along this section, perpendicular to the direction of the motorway, occasional watercourses occur. With regard to land use, forest and semi-natural area is represented in the area of: Tunnel Zenica, road between tunnels Zenica and Vraca; agricultural area and pastures are represented in the corridor route that will be constructed at two different levels due to steep slopes of the terrain. Residential areas and discontinuous urban areas are represented in the area beneath the both viaducts and near the in the area of Zenica North Interchange. There are no protected areas that would be affected by the construction of this section, and there are no cultural heritage or archaeology sites within the Project area.

**Section Donja Gračanica - Zenica North (2.12 km)** is situated in a suburban area, close to a large steel manufacturing plant, a two-lane regional road and the village of Donja Gračanica. The first part of the alignment is planned to pass over the vacant land which hosts a linear group of houses in the vicinity and enters the tunnel. The second part will include viaduct piers installed within the village of Donja Gračanica and will require the acquisition and clearance of land and structures below the viaduct. No designated ecological or heritage sites (local or international) are present in the area. The main sensitive receptor, with regard to construction impacts, traffic noise, air emissions and visual effects, is the village of Donja Gračanica.

**Section Buna to Počitelj** is planned to pass through a sparsely-populated area, over the high plateau which rises above the Neretva river gorge. The plateau includes agricultural land, sparse settlements and sub-Mediterranean vegetation. The main geological feature of the area is karstified limestone which favours a high underground infiltration, resulting in potential for groundwater contamination. The alignment does not intersect any designated ecological or heritage sites, with the closest (Hutovo Blato wetland, Ramsar site and Important Bird Area) being approximately 8 km south.

**History of Project Development and Planning**

The planning of a motorway through FBiH as a part of the Trans-European road corridors network started in the late 1970s. The corridor route was defined in 1981 and, after wide public consultations, formally approved as part of the Spatial Plan of BiH in 1982. However, the first major steps have been taken in 2004 when BiH Council of Ministers decided to start the corridor development.

Although the main route was proposed by the Spatial Plan, the alignment options were proposed and evaluated in the Feasibility Study and Preliminary Design. Evaluation of options involved a multi-criteria analysis, which included technical, economic, environmental and social criteria. Environmental and social evaluation of the alternatives was undertaken as part of the Scoping exercise of each Lot and has been subject to public consultations.

All sections have undergone proposed realignments as a result of stakeholder concerns. The alignment change in Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km) and Donja Gračanica – Zenica North sections (2.12 km) was based on a request from the Zenica Municipality for technical and economic reasons. The change of Buna – Počitelj section alignment was primarily driven by changes in other road sections. The Institute for Protection of Cultural Monuments requested that the route was re-aligned to reduce visual impacts of the
bridge on the Počitelj - Zvirovici road section resulting in the need to revise the Buna – Počitelj section. In addition, the alignment was changed to avoid crossing the agricultural land. The alignment changes have allowed for social benefits. In the Donja Gračanica – Zenica North section, the viaduct will be constructed over a narrower part of the Donja Gračanica settlement, which will impact fewer residential houses, and therefore require reduced physical displacement. In the Buna-Počitelj section, part of the new alignment routes close to the edge of the plateau raised above the Neretva river gorge, avoiding agricultural and affecting mostly unused land.

4. Process

PC Motorways have conducted the local EIA process for the entire Corridor Vc alignment (divided in four lots with respective EIAs) and the three project sections considered for financing are sections of Lot 2 and Lot 4. The Scoping decisions for both lots were issued in 2005 and the EIAs were approved in 2007. The environmental permit for the entire Lot 2 was first obtained in 2010 and renewed in 2014, including Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km) and Donja Gračanica – Zenica North (2.12) sections. The application for the environmental permit for Buna to Počitelj section has not yet been submitted and will be acquired in the forthcoming period according to the Law on Motorway on Corridor Vc.

Public consultations were carried out in two stages: (i) after the Scoping Report and (ii) after the Final EIA Report. In both stages the documents were publicly disclosed for 30 days. Public consultations were organised in the municipalities along the corridor, including Zenica (Lot 2), Mostar and Čapljina (Lot 4). No significant public complaints were recorded in respect to environmental and social issues on the two project sections.

As part of the application for successive permits for the project, the detailed environmental conditions and approvals will be issued by competent authorities and will be incorporated into the Detailed Design. During the design preparation, further investigations will be conducted to implement the proposed mitigation measures (e.g. noise measurements and modelling, calculations of run-off collection, detailed archaeological surveys, etc.).

In order for the project to be structured to meet EBRD PR’s an Environmental and Social Action Plan (ESAP) has been agreed between the PC Motorways and the EBRD. This document outlines mitigation measures from the EIAs which have been supplemented in some instances with best practice environmental and social management measures to comply with EBRD PRs (2014).

Land acquisition for the three project sections has not yet started. It will be initiated when Detailed Designs and expropriation studies have been completed. Due to previous EBRD involvement, a Compensation and Resettlement Framework for Corridor Vc was developed in 2008 and last updated in March 2009, to bring land acquisition into compliance with EBRD requirements at the time (World Bank Group’s OD 4.30). This Framework will be updated to reflect changes to the FBiH legal framework, particularly the Law on Expropriation and the recently updated EBRD E&S policy (2014). Resettlement Action Plans will be developed for all project sections based on the updated framework.

Consultations in the planning process were carried out according to the requirements of FBiH legislation. A Stakeholder Engagement Plan (SEP) has been developed for this Project in accordance with EBRD’s PR 10 to ensure that all stakeholders have been identified, to disclose sufficient information about issues and impacts arising from the project and to consult with stakeholders in a meaningful and culturally appropriate manner throughout project implementation. To date, the aforementioned alignment changes have not been presented to directly affected communities in the vicinity of the project footprint. To comply with EBRD PRs, public consultations in these communities will be held, as detailed in the SEP.
5. Summary of Environmental Benefits, Potential Adverse Impacts, Mitigation and Management Measures

A summary of the key environmental and social impacts, benefits and mitigation measures related to the project are provided below and based on the EIA process, the ESAP and SEP.

Air Quality

During construction and ground works, air quality could be temporarily and locally impacted by dust, as well as emissions from generators and vehicles.

During operation, exhaust fumes from vehicles will adversely impact the ambient air quality in the immediate vicinity of the motorway. Due to the Donja Gračanica village being situated between two proposed tunnels of section Donja Gračanica - Zenica North, a vertical tunnel exhaust system will be considered during the Detailed Design phase. Green barriers and noise barriers proposed in Donja Gračanica area may also reduce dispersion of air pollutants.

For managing air quality, the following control measures are proposed:

- Assurances that all construction vehicles' engines operate to national standards and are fully maintained (this implies that machines and vehicles to be used in construction activities must have use/operation permits and installed filters to reduce emission);
- Water spraying on roads and excavated material stockpiles;
- Covering vehicles carrying raw materials;
- Speed limits in areas of the construction site which have unmade road surfaces to limit dust;
- Planting of dense leafy vegetation as a filtering screen between the road and the settlements;
- The equipment and machinery need to be shut down when not in use;
- High quality fossil fuels (with low percentage of sulphur and lead) need to be used as motor fuel for machinery and equipment.

Noise and Vibration

Traffic noise from the road could potentially cause significant nuisance to the nearby receptors. During construction noise emissions will increase, however this will be temporary and limited to daytime periods. During the construction of section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km), noise generation may result in disturbance to the population of the settlement of Vraca. At the main design phase, PC Motorways will undertake noise mapping to determine the necessity of noise mitigation measures for this section. During operation, the village of Donja Gračanica will be exposed to noise due to its vicinity to the proposed viaduct of section Donja Gračanica - Zenica North. In the Buna – Počitelj section there are no notable noise emission sources along the proposed alignment and only a minor number of residential receptors are likely to be exposed to traffic noise.

The following noise control measures are proposed:

- During construction, measures will be taken to reduce noise and vibration, and working hours will be limited to the daytime;
- Before operation commences, noise barriers will be installed to ensure that noise levels at the closest receptors do not exceed national limits. Technical details of barriers (e.g. length, height, and material) and locations will be selected based on noise measurements and communicated with local communities;
- A tree-planting programme will be established;
- During construction, in case of complaints by local residents, simultaneous use of machines that generate noise over 70 dB need to be limited;
- Machines and vehicles to be used in construction activities must have use/operation permits.

Water Resources

Construction works on section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica may potentially impact the River Bosna and two
occasional watercourses beneath two viaducts on this section. Construction works on the viaduct in Donja Gračanica - Zenica North section will cross the Gračanička River. Here, prevention measures will be applied to avoid river contamination. The section from Buna to Počitelj is located in a limestone area which is porous leaving the aquifer susceptible to groundwater contamination which therefore needs to be protected. No other water resources (e.g. drinking water supply sources) are likely to be impacted by the project.

During operation, the main issues related to protection of water resources will be run-off control and emergency response in case of accidental spillages.

During construction, the main mitigation measures to be implemented include:

- Excavated material will not be disposed of within the vicinity of surface water and will be protected from erosion;
- Only natural construction material (e.g. gravel) will be disposed of within the vicinity of surface water;
- Construction machines will be kept and maintained on waterproof surfaces with adequate pollution control measures incorporated into the drainage;
- Stormwater from the construction site will be collected in waterproof reservoirs and treated (on or off-site) prior to discharge;
- Tunnelling techniques will be implemented to avoid the changing of groundwater direction and supplementary feeding of surface water;
- The emergency preparedness and response plan will be implemented to prevent or mitigate against water pollution in case of the accidental release of contaminants during construction;
- Oil and fuel collection systems to be fitted to prevent leakage;
- Installation of oil separators during construction proposed section of the motorway in accordance with EN 858-1 and 858-2 standard (relevant for Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica and Donja Gračanica to Zenica North sections).

During operation, the main mitigation measures to be implemented include:

- The run-off control will be managed by a closed drainage system collecting and treating the run-off in oil-water separator units (and lagoons for attenuation in the Počitelj area) prior to discharge;
- Run-off treatment units will be regularly maintained by licensed contractors and waste sludge disposed in accordance to the national regulatory requirements;
- Erosion control measures will be implemented including stabilisation and planting;
- Road de-icing agents (salt, ice-melting chemicals) will be selectively applied at optimal rates and times, following the road weather information and avoiding any excessive application;
- A Spill Response Plan will be implemented to prevent or mitigate the water pollution in case of accidental release of contaminants on the road (i.e. in case of accidental spills during traffic, the use of absorbing materials is needed).

For all road alignments, it is understood that the risk of flooding is low.

**Biodiversity and Nature Conservation**

The construction of the project will result in the loss and fragmentation of surrounding habitats. Disturbance to mammals, reptiles and breeding birds may be expected during vegetation clearance and other construction activities, particularly in the Buna to Počitelj section.

The EIA Study for LoT 2 indicates the possible existence of *Coracias garrulus* (European roller) in the wider area of Zenica City that is NT on IUCN Global Red List but RE on the Red List of Fauna of FBiH (relevant for Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica and Donja Gračanica to Zenica North sections). Therefore, a preconstruction survey to determine the presence of active nesting birds is required.

Regarding the Donja Gračanica to Zenica North section (2.12 km), habitats within the area have already been impacted by human activity. Also, this section does not pass through a designated nature conservation area. Therefore, no major adverse impacts on biodiversity are expected on this section.

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8 Nearly threatened
9 International Union for Conservation of Nature
10 Regionally extinct
Regarding the Buna to Počitelj section, the local EIA did not include a biodiversity impact assessment on this specific section however there is a requirement in the EIA for an assessment to be completed before construction works. The section routes approximately 8 km north of a wetland of international importance and the Important Bird Area (IBA) Hutovo Blato Nature Park. The ESAP therefore includes a requirement for a baseline biodiversity assessment to be undertaken and publicly disclosed with special focus on vulnerable habitats and species along the proposed route and in relation to Hutovo Blato wetland. The survey results should be incorporated in the Environmental and Social Management Plan.

The following mitigation measures to be applied include:

- Transport roads and construction facilities will be sited to avoid unnecessary removal of vegetation, utilizing existing transport corridors whenever possible;
- Removal of native plants will be minimised and disturbed areas will be replanted with native plant species;
- Excess excavation material will be disposed of in a controlled manner and not used for levelling over the vegetation;
- Slopes will be constructed to prevent landslides, erosion and adverse effects on edge vegetation;
- Upon completion of construction works, the disrupted land will be fully reinstated;
- A 2m high fence will be erected along the road to prevent animals crossing;
- Two wildlife crossings will be constructed along the Buna – Počitelj section (an overpass and a culvert);
- Based on results of the additional biodiversity assessment in Buna – Počitelj section, construction activities will be avoided or modified during breeding season or other sensitive seasons;
- With regards to protection of whereabouts of animals, only the land determined for use by the Project may be used for the construction activities (including storage of building material, parking of the heavy machinery etc.) and no other land in the vicinity of the construction site should be used for this purpose.

Waste Management

The main type of waste associated with a motorway construction is excavated material (rock and soil) from excess cut. Waste sites for excavated material will be managed by contractors in accordance with the FBiH legal requirements and the mandatory construction waste management plans. Other types of waste during construction (including hazardous waste) will be appropriately segregated, labelled, temporarily stored, recycled or safely disposed by contractors, in accordance with the national requirements.

During the construction works on sections on LoT 2, excavated material will be reused in lower layers of pavement and earth material as cover material in nearby regional sanitary landfill Mošćanica.

During the operation phase, small amounts of waste will be generated from maintenance activities and would include but not be limited to municipal, vegetation, sediment and sludge from the run-off drainage system maintenance, paint. PC Motorways will manage the waste in cooperation with licensed waste management companies.

Raw Material Sourcing and Transportation, Including Borrow Pits

A significant quantity of earth material will be used for the construction of the road base. Borrow pits used will be selected by the construction contractor. PC Motorways has a system in place to ensure that the contractor carefully selects the transport routes to and from them. The borrow pits are required to operate in line with national regulatory requirements, including environmental. Mitigation measures will be implemented during operation of the borrow pits regarding transportation of raw materials to reduce the adverse air and noise impacts.

The Construction Environmental and Social Management Plan (CESMP) will be implemented to ensure materials are transported in covered vehicles to reduce impacts on environment.
Landscape and Visual Impacts

The motorway is a linear feature, therefore the project alignment will change the existing landscape view. During the construction phase there will be a landscape and visual impact due to the change in land use and development activities. However, this impact will be temporary.

In both sections in Zenica, the most notable visual changes will be the new interchange and the viaducts passing over the village. The tunnels will not have notable negative visual impacts, except for the entrance and exit.

The proposed alignment in the Buna – Počitelj section will pass through flat land, away from settlements, therefore reducing the overall visual impact.

The following mitigation measures are proposed:

- Vegetation clearance will be limited only to the areas where it is necessary;
- Upon completion of construction, land use will revert back to previous use where possible;
- Tunnel portals will be designed to be part of the rock, covered by natural stone and visually blend into the background;
- Slopes of embankments and cuts will be protected by planting of native species;
- Green strips of native vegetation will be created along the open road sections;
- All planting will comprise native plant species to reflect the local landscape character;
- Service area facilities will be designed to integrate in the existing landscape and will be constructed by local materials (i.e. colour and texture);
- Construction activities should be restricted to designated construction sites.

Cumulative Impacts

Cumulative impacts may occur when impacts of the new developments are combined with impacts of other past, present or future developments.

Both sections in Zenica are located close to the existing two-lane regional road and steel manufacturing plant “Arcelor Mittal” Zenica. The EIA had taken into account the existing pollution sources. Cumulative impacts are likely to occur as a result of traffic in the operation phase, due to emissions of polluting matters in the air though the combustion of fuel and emissions of noise and vibrations, which may result in disturbance to the surrounding area. Noise barriers will be implemented to mitigate any potential cumulative impacts of noise.

The Buna - Počitelj section passes through an area with no significant air pollution or noise sources, therefore cumulative impacts are not expected.

Indirect Impacts

The motorway development will result in part of the traffic being redirected from the regional road network to the modern 2 x two-lane road which will host implemented environmental control measures. It is understood that overall this will result in positive environmental effects.

6. Summary of Social Benefits, Potential Adverse Impacts, Mitigation and Management Measures

Road Safety

Motorways in FBiH are designed and built to a high standard. The speed limits on the motorway are planned to be 120 km/h, 100 km/h in tunnels, and 40-60 km/h on access roads – depending on the alignment. The transition from motorways to existing roads is via toll stations and the merging into one lane includes many pre-warnings beforehand.

Issues and recommendations to be implemented during the Detailed Design phase to meet design standards and GIIP include:

- The beginnings of the guardrail are lowered and may function as ramp. Lowered guardrails should be avoided and instead energy absorbing guardrail beginnings should be used or they should be flared away until outside the safety zone (10 m at 120 km/h speed limit).
- The transition between steel guardrails and concrete parapets on bridges and tunnel walls should be designed with stronger connection.
There are many small gaps in the guardrail seen on existing roads. It is recommended to avoid short gaps less than 100 m between guardrails irrespectively of standards.

The safety zone is an area near the roadside (e.g. 10 m at 120 km/h.) where there should be no fixed objects (e.g. trees, poles, etc.) or steep slopes. Current design standards allow for trees 5 m from the roadside and for steep slopes (1:1.5) up to 2 m without use of guardrail. The ESAP recommends that a safety zone of 10 m where the speed limit is 120 km/h. If this is not possible, guardrails should be provided.

The current level of design does not confirm if crash cushions will be used as dividers at tunnel entrances. Crash cushions should be provided.

Generally, the design of the Project tunnels follows the EU Directive with the same type of equipment and intelligent transport system (ITS) in all tunnels. During tunnel design and construction, instructions contained in the Set of Instructions for the Design, Procurement, Installation and Maintenance of Motorway Elements, Structures or Their Parts on the Motorway (Chapter 18. Instructions for Design of Security Systems in Tunnels on Corridor Vc) will be implemented. However, in tunnels longer than 500 m emergency laybys are used with a dangerous end-wall. It is recommended that future designs avoid the use of end-walls with 90-degree angle and that guardrails should be installed across the features in existing tunnels. In new tunnels, the design may be changed with softer angles.

During the construction phase it is recommended that:

- The contractors prepare and implement traffic management plans and haulage plans to reduce the impact on local residents.
- Where haulage routes go through settlements and/or local roads are used, contractors are required to host meetings with local residents and local authorities to discuss their concerns, i.e. from cleaning the road to safety issues. The contractor will respond to the issues raised.
- In regard to traffic management, installation of proper traffic signs is required, in particular during delivery of construction material (relevant for Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km)).
- Levelling of ground to reduce the occurrence of trenches and slopes will be necessary (relevant for Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica (1.8 km)).

Land Use, Land Acquisition and Displacement

With regard to the section Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica, forest and semi-natural areas dominate in the area of: Tunnel Zenica (2.5 km) – entrance of the tunnel from direction south is included only, the road between tunnels Zenica and Vraca, and the Tunnel Vraca). Agricultural area and pastures dominate in the area of road route that will be constructed at two different levels due to steep slopes of the terrain, with retaining walls on both sides.

Residential areas and discontinuous urban areas exist in the area beneath both viaducts and near the Zenica North Interchange.

The EIA for Lot 2 (both Zenica sections), estimates that the following land types will be affected within a 500 m wide corridor:

- Agricultural land – 39% (Arable – 82.6%, Orchards – 3.1%, Meadows – 11.8%, Pastures – 1.8% and Infertile – 0.7%);
- Forests – 22.5%;
- Construction land – 9.7%;
- Water bodies – 3.7; and
- Other (tunnels) – 25%.

The EIA for Lot 4 (Buna – Počitelj section), estimates that the following land (according to land use) will be affected within a 500 m wide corridor:

- Agricultural land – 19% (high quality land - 33.57%, less valuable land – 55.74% and lowest quality land, i.e. pastures, meadows – 10.7%);
- Forests – 77%; and
- Other – 4%.

EIAs require specific measures for minimising impacts on agricultural land, one of which being the avoidance of such land, which was carried out during design phase of the Buna – Počitelj section, whereas for both Zenica sections most of the project footprint involves the construction of viaducts and tunnels.

Details of land acquisition and physical/economic displacement for all sections are still unknown. As required under the ESAP, the Compensation and Resettlement Framework for Corridor Vc2 will be updated to reflect changes in the Law on
Expropriation of FBiH and the requirements of EBRD’s E&S Policy of 2014. Resettlement Action Plans (RAP) for all sections will be developed on the basis of the revised Framework.

Potential impacts include:

- Acquisition of houses (physical displacement) located on the project footprint or if safety of residents is jeopardised.
- Loss of other physical assets such as crops, trees, fences, barns, sheds, and wells.
- Loss of agricultural land (including ‘orphan’ land) or access to land (permanent and/or temporary), leading to economic displacement.
- Damage to land or assets outside of that which has been acquired for the Project.
- EIAs identified that during operation there is potential for pollution of soil along the road, which would require prohibition of the cultivation of crops which can accumulate harmful and dangerous substances, such as lettuce, spinach, onions, mangold near the road.

Mitigation measures include:

- Affected households will be resettled to adequate replacement locations.
- Early identification and monitoring of cases of vulnerable affected people, and development of specific relocation and/or livelihood restoration measures.
- Funds for just compensation or equivalent replacement land for agriculture must be secured through the development of expropriation studies and investment programmes.
- Provision of compensation at replacement cost or replacement land must be carried out in a timely manner to avoid loss of harvest; livelihood restoration measures will be implemented, detailed in the Resettlement Action Plans.
- Minimising the amount of land disrupted during construction and ensuring that access to agricultural land is not restricted or cut off. Contractors and workers will be instructed to use minimal areas of land needed during construction and stay within the marked areas.
- Informing and consulting local communities on road crossing points, including those for machinery and animals, as well as on establishing alternative routes.
- All existing roads impacted by the motorway during construction and operation will include overpasses or underpasses where appropriate and be maintained.
- Provision of alternative routes to access agricultural plots, buildings and residential properties during construction and provision as necessary within design of road;
- Whenever possible, top soil conservation will be undertaken and land fully reinstated.
- During the development of RAPs, assess whether any land near the two road sections is being used for growing vegetables which should be prohibited in accordance with EIA suggested measures; undertake assessment of potential likelihood of soil contamination and determine protection measures; develop and implement mitigation measures, such as provision of greenhouses, assistance to change agricultural production to crops, plants and vegetables which would not be affected, planting of adequate trees along the road to protect agricultural land from dust, wind and pollution.
- Prompt response to grievances.
- Consideration of micro realignments in the Detailed Design to the extent possible.

Community Impacts

Potential impacts to the local communities include:

- Improved access to tourist centres, religious, recreational, catering and health facilities;
- Improved transport services (reduced travel time of people and transport time of goods), which will improve living and working conditions of local communities;
- Severance of communities, leading to more difficult access to public and other services (schools, religious facilities);
- Reduced value of residential properties at interchanges, as a result of increased noise and pollution; increased value of commercial properties, as a result of improved access to commercial activities; and
- Reduced traffic on local roads which can have positive impacts on local air quality, noise, severance and quality of life.

Mitigation measures include:

- Works will be carried out in accordance with best practices for the containment and limitation of nuisances, particularly in proximity of inhabited areas; noise will be reduced through use of adequate machines and equipment at construction locations;
- Setting up of access paths to ensure continuing and safe access to all structures, private and public, which are temporarily cut off by the working sites;
- Grievance management and regular disclosure of information on project progress;
- Install noise barriers along the road to mitigate noise in the operation phase;
- Re-routing and regulation of traffic;
- Planting of adequate trees along the road to protect residents from dust, wind and traffic emissions during operation;
- Informing the local communities in advance on the extent of works and duration prior to the commencement of construction works in line with the requirements set out in SEP.

**Contractor Management, Including the Siting and Management of Worker Camps**

Construction work will be undertaken by contractors to be appointed by PC Motorways. Engaging contractors in public sector projects requires using Conditions of Contract which meet EBRD PR 2 on Labour and Working Conditions.

All works will also have to be carried out in accordance with FBiH laws, including the Labour Law\(^\text{11}\) and Health & Safety Law\(^\text{12}\), as well as the International Labour Organisations (ILO) conventions, ratified by BiH. The Construction Site Organization Plan (CSOP) will be developed and implemented according to *Decree on Construction Site, Mandatory Documentation on the Site and Participants in Construction*\(^\text{13}\). Specific requirements in relation to labour and working conditions, including occupational health and safety, are contained within the ESAP.

**Cultural Heritage**

For both Zenica sections, no significant archaeological material or cultural heritage that would require archaeological surveys before construction or supervision during the earth works have been identified.

Buna-Počitelj section has several identified areas of archaeological findings. The Institute for Protection of Cultural Monuments have required a surface archaeological prospecting to be undertaken prior to commencement of earth works.

PC Motorways will require contractors at all three sections to develop and implement a chance finds procedure to ensure that all works will be stopped immediately and the Institute is notified to issue necessary measures, in accordance with the Bosnian regulations.

**Disruption to Public Health and Safety during Construction**

During construction negative impacts to surrounding communities will occur especially in relation to construction traffic, use of local access roads and nuisance from tunnelling during tunnel works. However, these impacts will be temporary and mitigated and monitored in line with the ESAP.

**Economy and Employment**

Potential impacts include:

- Improved access to markets for local producers.
- Improved opportunities for investments into local economies.
- Direct and indirect employment opportunities during construction, i.e. on construction works, supply of construction materials and equipment, as well as other goods.
- Employment opportunities during operation, i.e. management and maintenance of the road, as well as in various service facilities (EIAs estimated 1,000 jobs) and indirect employment opportunities (EIAs estimated 10,000 jobs).

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\(^{11}\) Labour Law (Official Gazette of FBiH, No. 62/15)

\(^{12}\) Law on Safety at Work (Official Gazette of SRBiH, No. 22/90)

\(^{13}\) Official Gazette of FBiH*, No. 48/09, 75/09, 93/12
Potential short-term disruption of local economic activities may occur because of construction nuisances and increased/interrupted traffic, for example temporary difficulties of accessing economic activities.

Mitigation measures include:

- Contractors will consider local employment when possible according to available skills and qualifications;
- Procurement policy will preferentially consider local suppliers;
- Best practices will be implemented to reduce construction nuisances and provide alternative access routes during construction;
- Prompt response to grievances;
- Informing the public in advance about the planned construction works, in order to enable businesses and workforce in the area to prepare for the demand on the market.

Public Infrastructure and Services

Potential impacts include:

- During construction, people may be temporarily prevented from using traditional travel routes, which could for example require increased travel time to employment areas;
- During construction, possible negative impacts on access to agricultural plots, increased costs of accessing land for agricultural production;
- Use of local roads for access during construction can damage them; and
- During construction possible damages and temporary disruptions of utilities (water, wastewater, electricity).

Mitigation measures include:

- Timely maintenance and rehabilitation of local roads used for highway construction impacted by construction vehicles;
- Implement measures where a collision with local water supply is anticipated to ensure uninterrupted supply during construction; and
- Implement required measures to ensure continuity of water, electricity supply to local communities.

Influx of Workers

Short term influx of workers can result in:

- Additional strain on existing services and infrastructure;
- Demands for goods and services;
- Community health issues; and
- Community tension between residents and workers.

As well as providing appropriate Personal Protective Equipment for all workers, mitigation measures include:

- Preventative health examinations.
- As contracts have yet to be defined details of workforce and accommodation of non-local workforce are not defined. However contractors will be encouraged to utilise local skills and labour for the project along with the use of local suppliers. Further measures will include:
  - Code of Conduct for workers setting out expectation for behaviour and integration in the local communities.
  - Accommodation needs will be assessed and any required worker camps will be developed in-line with international good practice\(^\text{14}\).
  - Grievance procedure for workers and community.

Occupational Health and Safety Issues

During construction phase the main health and safety occupational issues will be related to movement of vehicles and traffic management, working at heights, working in confined spaces, working with hazardous material (e.g. explosives), management of electrical hazards, prevention of unintended ground movements and collapse, biological hazards (poisonous snakes), etc. A Construction Site Organization Plan (CSOP) will be developed and implemented according to Decree on Construction Site, Mandatory Documentation on the Site and Participants in

\(^{14}\) Including: ‘Workers’ accommodation processes and standards, EBRD/IFC Guidance Note, 2009
Construction\textsuperscript{15} containing provisions for health and safety at construction site developed in the Occupational Health and Safety Management Plan (OHSMP). The construction contractor will implement the OHSMP in order to provide a safe working environment and reduce any occupational health and safety hazards. As part of the CSOP, a Fire and Explosion Management Plan, which includes a safety procedure related to unexploded ordnance, will be developed and implemented.

During operation the main health and safety risks will be related to hazardous material management, traffic accidents, working at heights, working in confined spaces, electrical hazards. PC Motorways will prepare an Operation Environmental and Social Management Plan (OESMP), which includes Health and Safety Management Plan containing requirements for both the company and contractor’s personnel.

7. Monitoring

Environmental and social monitoring will be implemented both during construction and operation of the project.

Before construction, key environmental baseline measurements (e.g. air, noise, water) will be undertaken. PC Motorways will require its construction contractors to monitor relevant environmental issues of their operation (e.g. dust emission, noise levels, water quality, habitat clearance, erosion). During operation PC Motorways will regularly monitor, for example air emissions, noise levels, effluent quality, soil contamination, and wildlife passes.

The ESAP will set out additional monitoring requirements, particularly in relation to the engagement with stakeholders and management of issues raised by local community. Key monitoring results of the project will be made publicly available.

8. Communications

The following information will be made publicly available:

- Non-Technical Summary (NTS);
- Environmental Impact Assessment (EIA);
- Environmental and Social Action Plan (ESAP);
- Resettlement and Compensation Framework; and
- Stakeholder Engagement Plan (SEP), including the grievance mechanism.

Upon completion, the company will also disclose the Biodiversity Assessment.

The company will make available hard copies of these documents at the following locations:

- PC Motorways FBiH d.o.o. Mostar;
- Address: Braće Fejića bb, 88 000 Mostar;
- PC Motorways FBiH d.o.o. Mostar - Sarajevo Office; and
- Address: Dubrovačka 6, 71000 Sarajevo.

9. Conclusions

The construction of the new road sections will improve the flow of regional traffic and should reduce local congestion. The suggested changes to the road design should improve road safety. PC Motorways has capacity and resources to successfully manage the environmental and H&S risks, if the Company fully implements the mitigation measures specified in the local EIAs, permits and ESAP.

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\textsuperscript{15} Official Gazette of FBiH*, No. 48/09, 75/09, 93/12