

July 2017



Bosnia and Herzegovina Corridor VC 3 Project

Non-technical Summary
Updated July 2017

Contents

1	Introduction	3
2	Project Description	3
3	Background	9
3.1	Rationale of the Project	9
3.2	Legal Aspects and Compliance with Relevant Environmental and Social Laws	9
3.3	Current Environmental and Social Considerations	10
3.4	History of Project Development and Planning	11
4	Process	12
5	Summary of Environmental Benefits, Potential Adverse Impacts, Mitigation and Management Measures	13
5.1	Air Quality	13
5.2	Noise and Vibration	13
5.3	Water Resources	14
5.4	Biodiversity and Nature Conservation	16
5.5	Waste Management	18
5.6	Raw Material and Sourcing and Transportation, Including Borrow Pits	18
5.7	Landscape and Visual Impacts	18
5.8	Cumulative Impacts	19
5.9	Indirect Impacts	20
6	Summary of Social Benefits, Potential Adverse Impacts, Mitigation and Management Measures	20
6.1	Road Safety	20
6.2	Land Use, Land Acquisition and Displacement	21
6.3	Community Impacts	23
6.4	Contractor Management, Including the Siting and Management of Impacts	24
6.5	Cultural Heritage	24
6.6	Disruption to Public Health and Safety during Construction	25
6.7	Economy and Employment	25
6.8	Public Infrastructure and Services	26
6.9	Influx of Workers	26
6.10	Occupational Health and Safety Issues	27
7	Monitoring	27
8	Communications	27
9	Conclusions	29

1 Introduction

Motorways of the Federation of Bosnia and Herzegovina ("FBHM") is a public company from the Federation of Bosnia and Herzegovina (FBiH) in charge of management of motorway construction, and management, maintenance and protection of motorway operation in FBiH. One of the 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 FBHM for the Corridor Vc 2 Project to construct seven road sections which form part of Corridor Vc. These would be a follow on operation of the previous project for construction of four key road sections along Corridor Vc with a total length of 66.5 km. Namely, EBRD has already provided financing for the following sections of the Corridor Vc in FBiH: Zenica to Kakanj section with a length of 15.2 km, Vlakovo to Tarčin section with a length of 18.9 km, Pocitelj to Southern Border with Croatia with a length of 21.4 km, and Odzak to Northern Border with Croatia with a length of 10.9 km¹.

FBHM has conducted the local Environmental Impact Assessment (EIA) process for the entire Corridor Vc alignment in accordance with FBiH regulatory requirements². The Corridor alignment is divided into four lots, and separate local EIAs have been produced for each lot. The project sections that are considered for financing are section *Svilaj – Odžak* (10.4 km) (part of Lot 1), section *Zenica Tunnel - Donja Gračanica* (3.9 km)³ (part of Lot 2), section *Donja Gračanica-Klopče*⁴ (5.8 km) (part of Lot 2), sections *Poprikuse – Nemila* (5.1 km) (part of Lot 2) and *Tunnel Zenica* (2.8 km) (part of Lot 2), section *Tunnel Ivan* (2.0 km) (part of Lot 3) 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 Requirements⁵. 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) **10.4 km motorway section between Svilaj and Odžak** (LOT 1),
- (2) **5.1 km section Poprikuse – Nemila**, which includes 3.5 km long tunnel Golubinja (LOT 2)
- (3) **2.8 km Tunnel Zenica**, located between settlements Ponirak and Vraca (LOT 2)
- (4) **3.9 km section between Zenica Tunnel and Donja Gračanica** (i.e., 2.1 km motorway section between *Zenica North - Donja Gračanica* and 1.8 km motorway section Entrance into Tunnel Zenica - Zenica North Interchange/ Donja Gračanica) (LOT 2)
- (5) **5.8 km motorway section from Donja Gračanica to Klopče**⁶ in direction south (LOT 2),
- (6) **2.0 km Tunnel Ivan** (LOT 3)
- (7) **7.2 km motorway section from Buna to Počitelj** (LOT 4).

¹ The PSD for these sections is available at EBRD's web site : <http://www.ebrd.com/work-with-us/projects/psd/corridor-vc.html> (accessed on 10 July 2017)

² EIA for LOT 1: Svilaj – Doboj South (Karuše), IPSA Institute (BiH), 2007 available on <http://www.jpautoceste.ba/images/llot1.pdf>

EIA for Lot 2: Karuše – Tarčin, IPSA Institute (BiH), 2007 available on <http://www.mkt.gov.ba/doc/default.aspx?id=1081&langTag=bs-BA>

EIA for Lot 4: Mostar North – Border crossing, prepared by IGH (Croatia), 2007 available on <http://www.mkt.gov.ba/doc/default.aspx?id=1073&langTag=bs-BA>

³ Part of the *Zenica Bypass*

⁴ Part of the *Zenica Bypass*

⁵ <http://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html>

⁶ Part of the *Zenica Bypass*

Bosnia and Herzegovina – Corridor Vc 3 – Environmental and Social Assessment Non-technical Summary

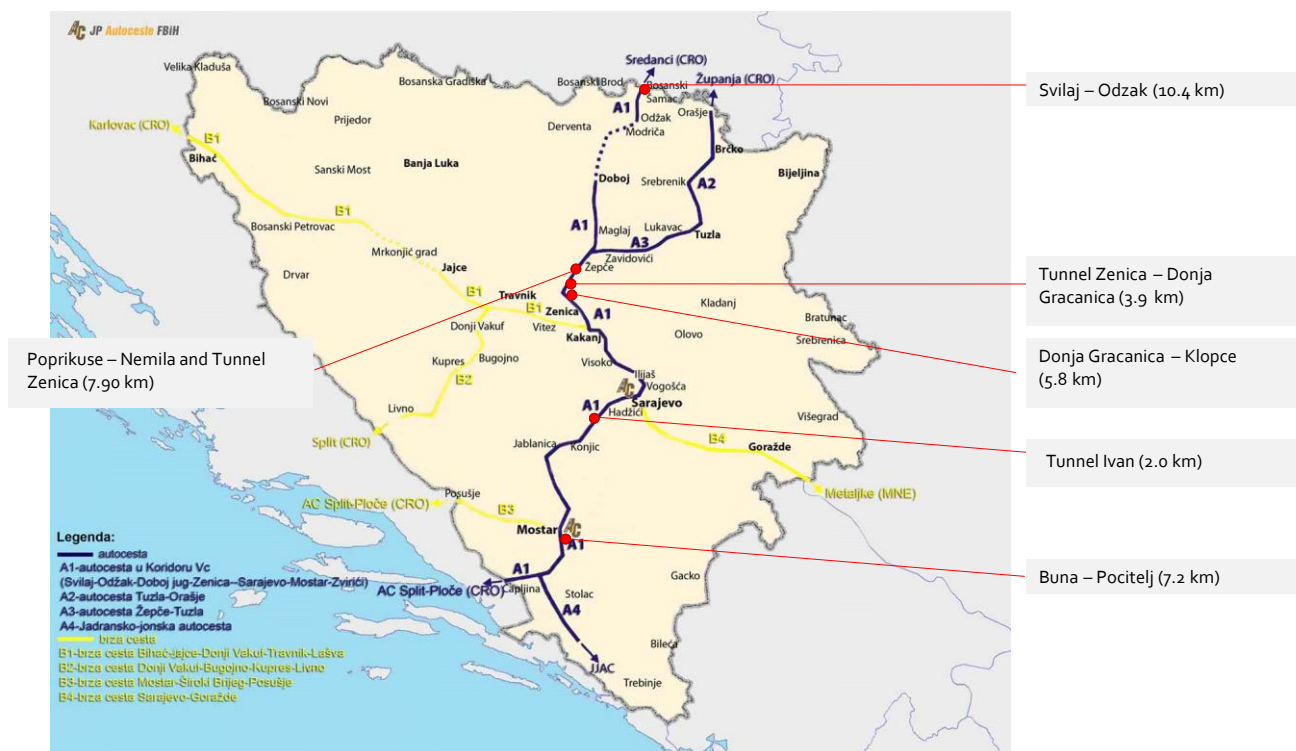


Figure 1: Road Corridor Vc2 in FBiH and Locations of the Project Sections

1) Section Svilaj - Odžak includes the construction of 10.4 km of a two-lane dual carriageway and the construction of 550 m border crossing⁷ (which will be under the jurisdiction of the Indirect Taxation Authority upon the completion of construction works which will be undertaken by FBHM). The first phase of construction has already been completed, and included works on the construction of embankments to the level of the motorway pavement (earthworks) and all concrete structures (overpasses, underpasses and culverts) along the route, the completion of the access road from regional road M14.1 to Intersection Odžak, external drainage, relocation of various installations, works related to hydrology as well as the construction of service roads. The second phase, which has commenced in March 2017, consists of the remaining drainage works, traffic equipment, pavement structure and border crossing. End of construction activities is anticipated by the beginning of 2018. The Corridor Vc starts at the middle of the Sava River⁸ (border between BiH and Republic of Croatia), where a 660 m long bridge (Svilaj Bridge) is foreseen, of which 330 m are located on BiH territory. Since the Bridge Svilaj is interstate project between Bosnia and Herzegovina and Republic of Croatia, the bridge is not considered under this project as it is part of a different financial package). Thus, the section Svilaj-Odžak starts at the chainage 0+328.05 and ends at chainage 10+762.5. The proposed alignment is shown in Figure 2. This section has been approved by the Board of EBRD in 2015⁹.

⁷ Only includes construction of parterre of the border crossing (earthwork and paving of asphalt). Installation and setting of buildings of the border crossing will be implemented by Indirect Taxation Authority

⁸ Chainage 0 + 000

⁹ The PSD for this section is available at EBRD's web site : <http://www.ebrd.com/work-with-us/projects/psd/corridor-vc-2.html> (accessed on 10 July 2017)



Figure 2: Route Svilaj – Odžak

2) Section Poprikuse – Nemila (5.1 km)

This section starts with the Poprikuse interchange, crossing the existing main road M17 and local road via viaduct $l = 168$ m. The section then enters the tunnel Golubinja ($l = 3,500$ m). The section continues over the bridge $l = 218$ m above the main road and river Bosna, crossing the railway line via viaduct $l = 108$ m. The viaduct end marks the section end with the joining of the subsequent section, Nemila – Vranduk (Figure 3).

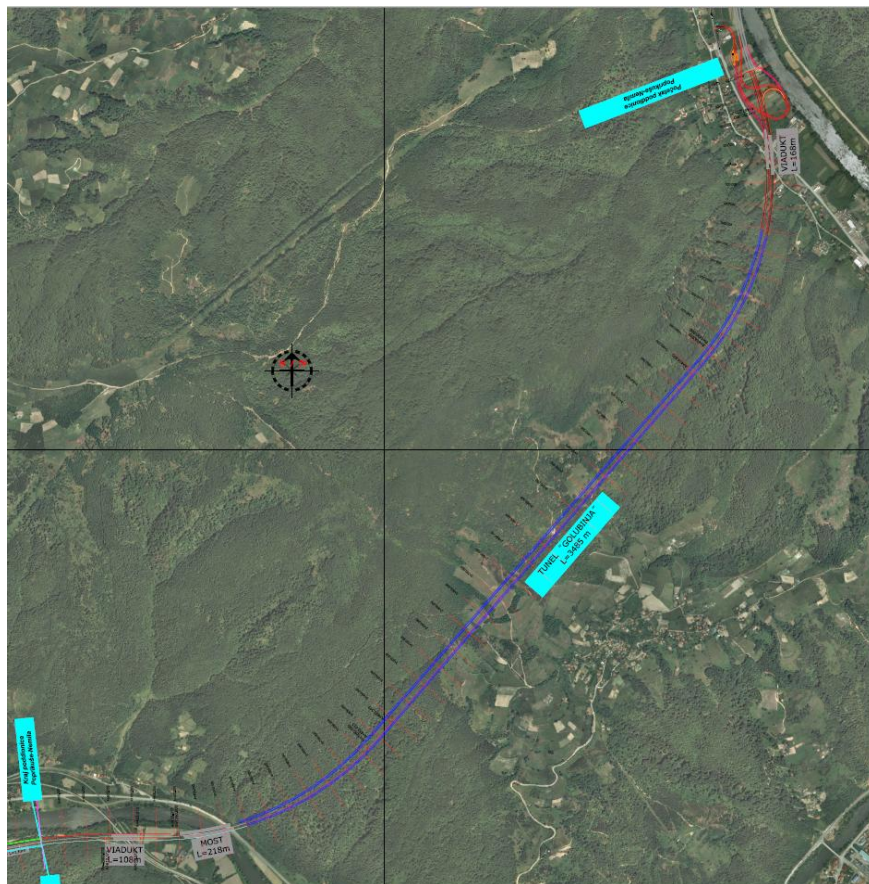


Figure 3: Section Poprikuse - Nemila (source: FBHM)

3) Section Tunnel Zenica (2.8 km)

The section starts with a 200 m long overpass in the vicinity of settlement Ponirak before entering tunnel Zenica $L = 2,400$ m. The end of the section is located on very steep and inaccessible terrain above the settlement Vraca, near the city of Zenica. Upon the exit from the tunnel, the section continues for an approx. 200 m before joining the following section (Figure 4). A temporary road connection (approx 900 m long and 5 m wide) from the local road to the planned tunnel construction site is foreseen to serve as construction site access road.

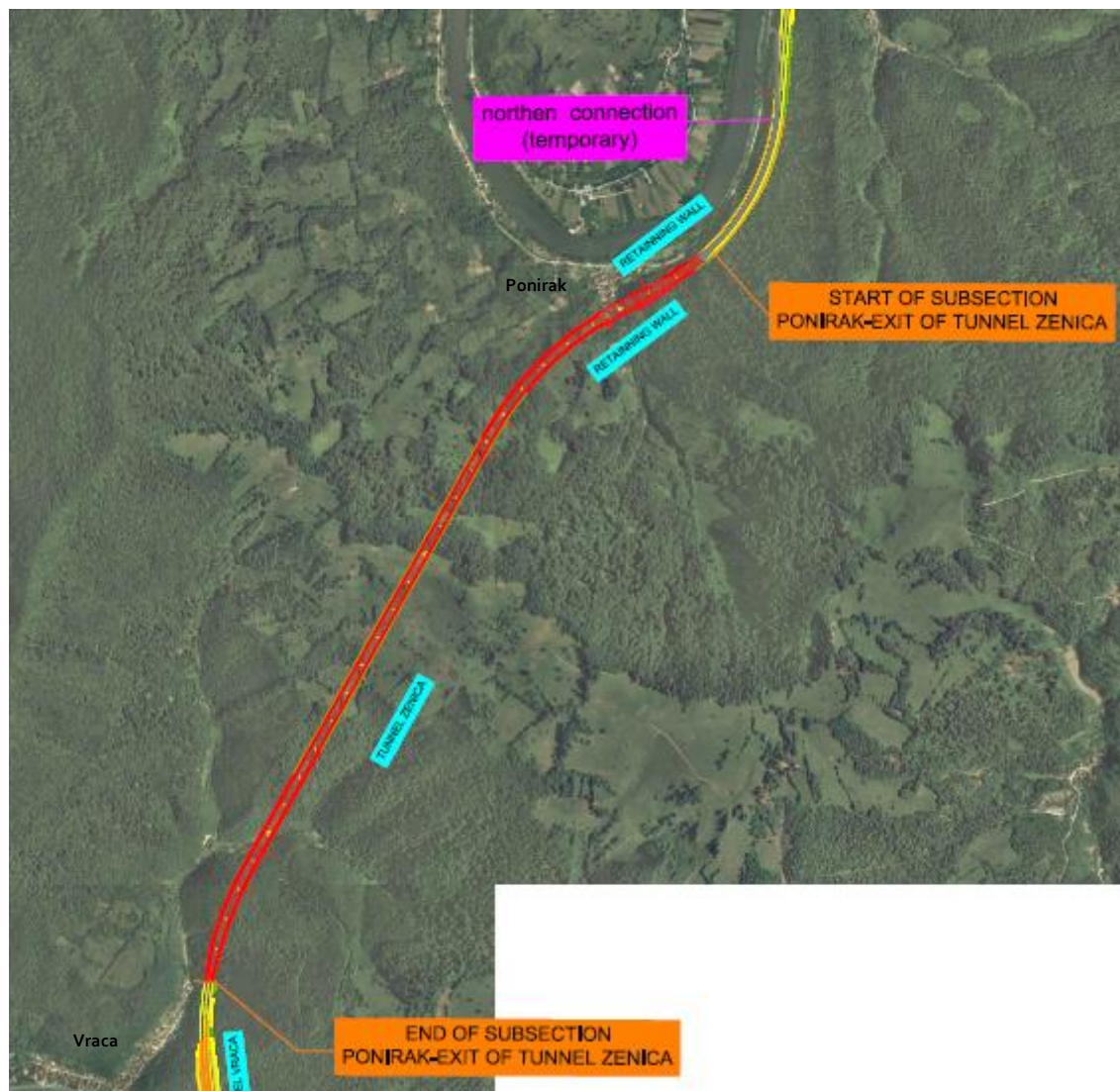


Figure 4: Section Tunnel Zenica (source: FBHM)

4) Section Donja Gračanica – Zenica Tunnel (3.9 km) consists of two subsections:

a) Subsection 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 exit 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 5.

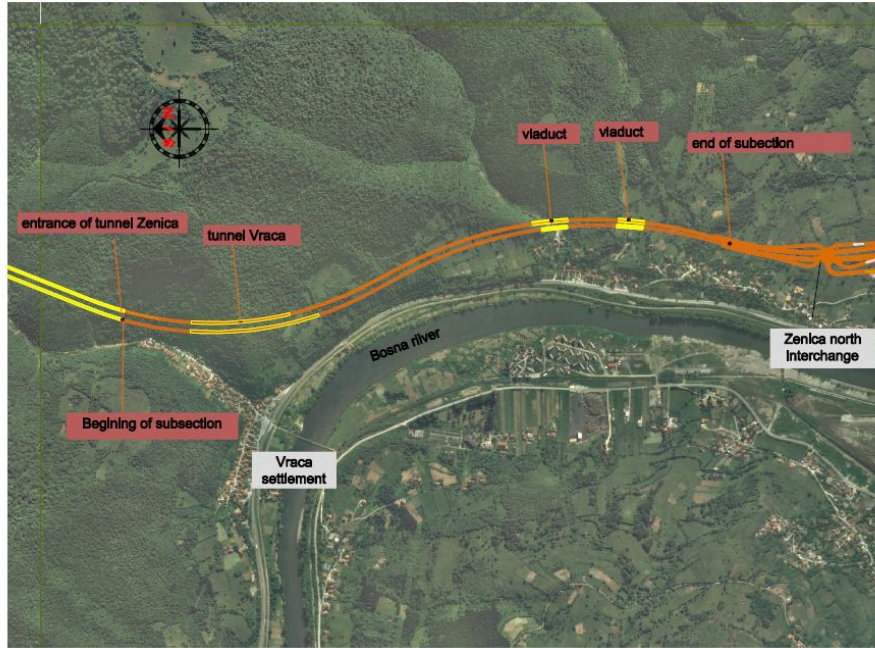


Figure 5: Subsection Entrance into Tunnel Zenica –Zenica North Interchange/Donja Gračanica

b) Subsection Zenica North - Donja Gračanica (tunnel Pečuj) (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 Pečuj, 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 6.



Figure 6: Subsection Zenica North – Donja Gračanica

5) Section Donja Gračanica - Klopče includes the construction of 5.78 km of two-lane dual carriageway with 3.75 m wide traffic lanes, 2.50 m wide emergency lanes, 1.0 m wide hard shoulders and a central reserve of

4.0 m, joining the subsection of Donja Gračanica and Klopče. The construction of the following structures is included: viaduct Klopče (106 m), viaduct Babina Rijeka (390 m), viaduct Pehare (390 m), tunnel Ričice (514 m), viaduct Ričice (168 m), tunnel Pečuj (875 m), four culverts (2.25 m), two underpasses, interconnection of nine existing local roads, construction of underpasses and relocation of certain local roads, as well as construction of drainage structures and rock fall protection. Construction activities on this section commenced in June 2016 and are expected to last until 2019. The proposed alignment is shown in Figure 7.

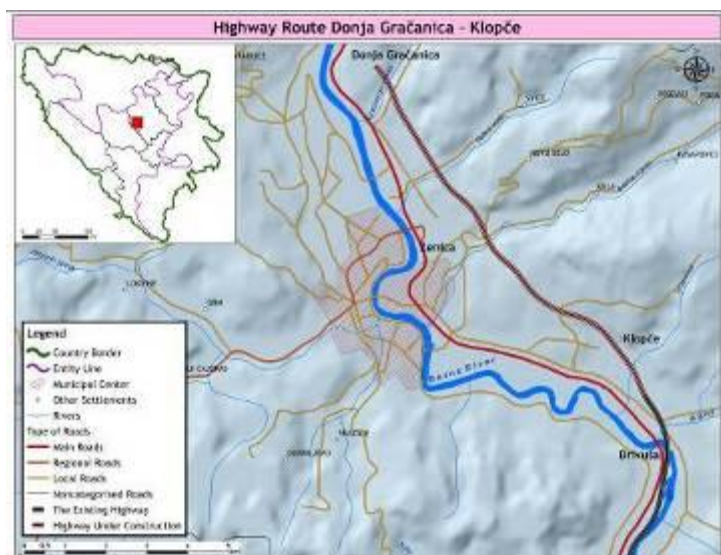


Figure 7: Proposed Alignment in Donja Gračanica- Klopče Section

6) Tunnel Ivan (2.0 km)

Tunnel Ivan belongs to the section Tarcin – Konjic and is a continuation of the planned motorway section ending with bridge M2. The tunnel is a dual tube tunnel with dual carriageway and it will pass through the mountain pass Ivan Sedlo. Upon exiting the tunnel, the section is connected to existing main road M 17 via temporary connecting road, which marks the end of this section (Figure 8).

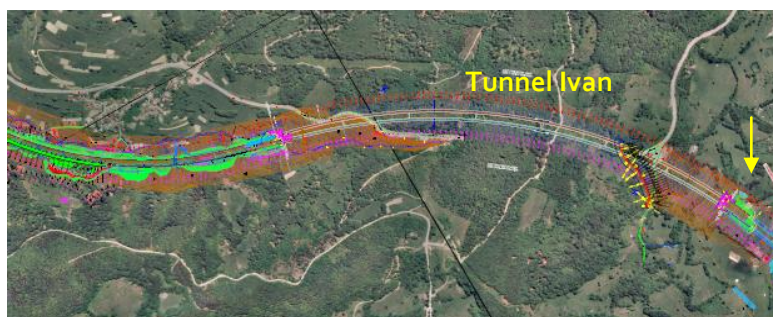


Figure 8: Section Tarcin - Tunnel Ivan (source: FBHM)

7) Section Buna - Počitelj 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 9.



Figure 9: Proposed Alignment in Buna – Počitelj Section

3 Background

3.1 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.

3.2 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*¹⁰ 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*¹¹. According to the Law and the Regulation, construction of motorways is subject to mandatory EIA and environmental permitting procedures at the level of FBiH¹². 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*¹³. 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*¹⁴ 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 Doboje Canton and the Municipality Čapljina in the Herzegovina-Neretva Canton¹⁵), in accordance with the *Law on Physical Planning and Land Use at the Level of FBiH* 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. In addition, in 2011 in all Municipalities 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". This Spatial Plan was adopted in February 2017, but is awaiting official publication in the Official Gazette of FBiH.

Land acquisition for the project is carried out by FBHM in accordance with the Law on Expropriation¹⁶, as well as the *Law on Administrative Procedure*¹⁷, *Law on Roads of FBiH*¹⁸, *Law on Motorway on Corridor Vc*, *Law on Land Registry* and other relevant laws regulating the expropriation procedure.

¹⁰ Official Gazette of FBiH, No. 33/03, 38/09

¹¹ Official Gazette of FBiH, No. 19/04

¹² The Federal Ministry of Environment and Tourism issues the Environmental Permit.

¹³ Official Gazette of FBiH, No. 8/13

¹⁴ Official Gazette of FBiH, No. 2/06, 72/07, 32/08, 4/10, 13/10 and 45/10

¹⁵ The Spatial Plan for Municipality of Odžak 2015-2035 is currently being developed.

¹⁶ Official Gazette of FBiH 70/07, 36/10, 27/12

¹⁷ Official Gazette of FBiH, No. 02/98 and 48/99

3.3 Current Environmental and Social Considerations

1) Section Svilaj-Odžak is located in Municipality of Odžak between the settlements Odžak and Gornji Svilaj, and is situated in the lowland area of the Pannonia – the area of the north-north eastern area of BiH in the region of Posavina. The largest watercourse perpendicular to the motorway section is the River Sava. One main irrigation channel was identified close to the location of the planned border crossing. Geological features of the project area are characterized by alluvial substrate, upon which hydro-morphological soils developed. Hydrogeological features are characterized by a region of permeable water bodies of inter-granular and fracture porosity. Prior to the construction works undertaken in the first phase, the area was used for agriculture or consisted of the natural environment. For project needs, conversion of land from agricultural land to construction land was carried out. No protected areas or cultural heritage sites were identified within the Project area. The dominant vegetation near the motorway route is black poplar woods with patches of marshland vegetation with ponds, and agricultural land. Out of identified 17 bird species, none of them are identified as endangered according to the IUCN Red list. However, according to the Red List of Fauna of FBiH, 3 species were classified as endangered: Black Stork - EN¹⁹, and Bee-eater and Nightingale - NT²⁰. One residential area (settlement Potočani) may be affected by increased ambient noise caused by traffic on the planned motorway.

2) Section Poprikuse – Nemila: is located in the Municipality of Zenica and Žepče in central part of BiH, approx. 20 km north of Zenica City. The settlements near the motorway route are mainly dispersed. In the settlement of Golubinja there are 3 inhabited residential houses, with agricultural land and some meadows around, under the planned viaduct. In addition, both on left and right side of the viaduct, there are cultivated plots with approx. 20 houses (approx. 35-50 m from the section). The settlement of Gornja Golubinja is also along the route section and is located 400 m from the Tunnel Golubinja. The largest watercourse near the Project area is the River Bosna which is crossed via bridge and in addition this section intersects a number of smaller streams of the area. Given the water flow of River Bosna, the area near the river is prone to erosion. The relief type includes the area next to the alluvial flood plain in the bottom of the River Bosna valley. Further to the area of Topčić Polje the terrain inclines gently to the north up to the elevation of up to 310 m a.s.l. at the southern portal of the Tunnel Golubinja. The Poprikuše - Nemila section ends in the valley of River Bosna at plain field of up to 250 m a.s.l. (Interchange Golubinja, respectively the end of the section Poprikuše-Nemila). Most of the land is agricultural and forest. There are no protected areas that would be affected by the construction of this section, and there are no cultural heritage or archaeology sites on this section of motorway. Wildlife is predominantly restricted to species that are tolerant of permanently agricultural conditions. The main air polluting source is the road traffic on the existing main road M17.

3) Section Tunnel Zenica: the entrance into the tunnel is located in the settlement of Ponirak approx. 20-50 m from the nearest houses on very steep terrain at approx. 400 m a.s.l. Most of the land is agricultural and forest.

The entrance and exit of the tunnel is located in an area of farmland, woodland mosaic, so may provide suitable habitat for commonly occurring mammal species such as red squirrel, weasel and badger. These species are likely to be present in the forested areas, under which the tunnel will pass.

. There are no protected areas that would be affected by the construction of this section. The nearest cultural and historical heritage sites are at a distance less than 2 km air (flying) route (Old town Vranduk and medieval town and fortress Vranduk). The main air polluting source is the road traffic on the existing main road M17.

4) Section Donja Gračanica – Zenica Tunnel:

a) Subsection Entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica 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

¹⁸ Official Gazette of FBiH, No. 12/10, 16/10 and 66/13

¹⁹ Endangered

²⁰ Near Threatened

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.

b) Subsection Zenica North – Donja Gračanica 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.

5) Section Donja Gračanica - Klopče is planned in the suburban area of Zenica, and is part of the Zenica Bypass together with two above described sections. The largest watercourse near the Project area is the River Bosna - flowing parallel with the motorway section. The stream Babina Rijeka flows beneath the bridge/viaduct Babina Rijeka, and the stream Dobra Voda flows beneath the bridge/viaduct Pehare. Perpendicular to the direction of the motorway, occasional watercourses (streams) may occur due to the geomorphology of the terrain, rainfall or snowmelt in spring. Geological features of the Project area are characterized by flysch substrate. This is a region of mostly water impermeable rocks and partly karst-fracture porosity water bodies. The predominant soil type is dystric cambisol on acid silicate rocks. The dominant vegetation near the motorway route is hornbeam woods. Around human settlements, orchards and small patches of agricultural land are present. Vegetation bordering with areas of human settlement is characterized by a mix of indigenous and cultivated vegetation. 11 bird species were identified - none of them endangered according to the IUCN Red list. However, according to the Red List of Fauna of FBiH, 1 species is classified as endangered: Nightingale - NT²¹. No protected areas or cultural heritage sites were identified within the Project area. Several residential areas were identified that may be affected by increased ambient noise caused by civil works in the construction phase and traffic on the planned motorway in the operational phase.

6) Tunnel Ivan: At the entrance of Tunnel Ivan there are no residential structures or agriculture areas and the land is not cultivated. The exit of the Tunnel is located at the entrance of the village Bradina. In this micro area, there are 2-3 unfinished and uninhabited structures, with some meadows around and trees.. The Tunnel Ivan section sits on the watershed divide between the region of Central Bosna (River Sava - Black Sea Basin) and a valley which flows south in to the River Neretva and artificial lake Jablanicko Jezero (Adriatic Sea Basin). The area is comprised of the valley between far mountains (among which mountain Ivan) and the main road M17. The main air polluting source is the road traffic on the existing main road M17. There are no protected areas that would be affected by the construction of this section. The nearest cultural and historical heritage site is Memorial to the Victims of Fascism in Ivan-Sedlo in the zone of 200-300 m on both sides of the motorway alignment.

7) 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.

3.4 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 1970's. 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 were taken in 2004 when BiH Council of Ministers decided to start the corridor development.

²¹ Ibid.

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 of the sections comprising the *Zenica Bypass* was based on a request from the Zenica Municipality for technical and economic reasons. The initially planned route of the section Donja Gračanica-Klopče was also redesigned to avoid land acquisition to the extent possible, relocation of part of the cemetery and chapel, and cutting off of water supply for the local community. The initially planned route of the section Svilaj-Odžak was also redesigned at the request of the citizens in the Local Community “Potočani” – instead of the planned overpass which would have required the demolition of 25 structures, it was decided to construct a bridge over the local road. 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 realigned to reduce visual impacts of the bridge on the Počitelj - Zvirovići 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. The section Poprikuše – Nemila has undergone some changes in micro-alignment due to concerns raised by the local inhabitants in 2016. The main issue discussed was the Poprikuše interchange. All participants agreed that it is the best solution which also minimises the number of plots that will be expropriated. In February 2017 land owners/users in the settlement of *Ponirak* voiced their concerns that land to be acquired was used mostly for agriculture. This resulted in FBHM finding an alternative solution for access to the tunnel Zenica by reducing the number of plots to be expropriated.

4 Process

FBHM have conducted the local EIA process for the entire Corridor Vc alignment (divided in four lots with respective EIAs) and the seven project sections considered for financing are sections of Lot 1, Lot 2, Lot 3 and Lot 4. The decisions on development of EIA studies for all lots were issued in 2005 and the EIA studies were approved in 2007. The Environmental Permit for Lot 1 was issued in 2010 and renewed in June 2016. The Environmental Permit for the entire Lot 2 was first obtained in 2010 and renewed in 2014, including four sections in Zenica. The Environmental Permit for Sarajevo South (Tarcin) - Konjic (part of Lot 3), covering road section Sarajevo South (Tarcin) – Tunnel Ivan, including Tunnel Ivan was issued in 2012, and has expired on 4 June 2017. FBHM is currently in the process of obtainment of renewed EP for this section. The Environmental Permit for the Buna – Počitelj section (part of Lot 4) was issued in October.

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 Odžak (Lot 1), Zenica and Žepče (Lot 2), Hadžići and Konjic (Lot 3), Mostar and Čapljina (Lot 4). A public hearing for the new EIA for the Buna-Počitelj section was held in the Municipality of Čapljina in July 2016²².

No significant public complaints were recorded in respect to environmental and social issues on these 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 incorporated into the Main 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.).

²² <http://www.capljina.ba/index.php/arhiva-2012/522-odrzana-javna-rasprava-o-ocjeni-studije-o-procjeni-utjecaja-na-okolis-za-autocestu-buna-pocitelj>

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 FBHM 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).

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, and is continuously being updated, 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.

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.

5.1 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. The main air polluting sources are likely to be related to the M17 main road traffic, as well as pollution from the steel factory, located in Zenica (relevant for settlement Vraca and Tunnel Zenica).

During operation, exhaust gasses 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 Main/ Detailed Design phase. Green barriers and noise barriers proposed in the settlements Potočani (Odžak) and Donja Gračanica (Zenica) 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.

5.2 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 since construction activities will be implemented during day time²³. During construction works, noise generation due to tunnelling activities and other activities associated with construction may result in disturbances to the population of the:

- settlement Potočani – relevant for section Svilaj-Odžak,
- settlements Golubinja and Gornja Golubinja – relevant for section Poprikuse - Nemila

²³ According to the *Law on Protection from Noise* (Official Gazette of FBiH, No. 110/12) period of day lasts from 06:00 to 22:00 and period of night lasts from 22:00-06:00

- settlement Ponirak relevant for section Tunnel Zenica
- settlements Vraca and Gračanica – relevant for section Zenica Tunnel-Donja Gračanica and
- settlement Babina Rijeka and residential objects along road route of the section Donja Gračanica – Klopče
- settlement Vukovići – relevant for section Tunnel Ivan.

FBHM undertook noise mapping to determine the necessity of noise mitigation measures for sections: Svilaj-Odžak, Zenica Tunnel - Donja Gračanica and Donja Gračanica-Klopče. For the sections Poprikuse – Nemila, Tunnel Zenica and Tunnel Ivan noise mapping will be undertaken during Main design phase and appropriate locations for noise barriers subsequently determined.

During the operation phase, the population along the following sections will be exposed to noise due to the vicinity of works on tunnels, viaducts and road routes:

- settlement Potočani (near the Bridge Potočani on section Svilaj-Odžak),
- settlement Golubinja (near the viaduct)
- settlement Ponirak (tunnel Zenica)
- settlements Vraca and Gračanica (Zenica Tunnel - Donja Gračanica), and
- settlement Babina Rijeka and residential facilities along the both sides of the road route for part of the motorway in southernmost part of the section Donja Gračanica-Klopče

In the tunnel Ivan and 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, such as: provision of adequate noise protection/insulation for construction machines and working hours will be limited to the daytime at distances lower than 200m from populated areas;
- Before operation commences, noise barriers will be installed to ensure that noise levels at the closest receptors do not exceed national limits and in accordance with the Project on Noise. Projects on Noise are developed prior to the Main Designs and all the necessary noise panels are incorporated in the Main Designs. To ensure avoidance of noise generation during everyday traffic of vehicles, “silent asphalt²⁴” will be used during construction of upper layers of asphalt.
- 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.

5.3 Water Resources

Construction works on section Svilaj Odžak, in particular the part near the River Sava and main irrigation channel, may potentially affect water quality. Construction of sections Poprikuse – Nemila and Tunnel Zenica, entrance into Tunnel Zenica - Zenica North Interchange/Donja Gračanica may potentially impact the River Bosna and occasional watercourses beneath the viaducts on this section. Construction works on the viaduct in Zenica North - Donja Gračanica section will cross the Gračanička River. The construction of viaducts Babina Rijeka and viaduct Pehare may affect the quality of Gračanička River, Babina Rijeka and Dobra Voda streams, respectively. Prevention measures will be applied to avoid river contamination. Tunnel Ivan is not located in the vicinity of watercourses which might be impacted by its construction. Conditions are set out in the Water Acts issued by the Sava River Basin District Agency; Adriatic Sea River Basin District Agency that requires FBHM

²⁴ “Silent asphalt” is a two-layer, extremely elastic road surfacing which can be applied without joints in thicknesses of three to eight centimeters on any supporting base course and road surfacing.

to apply mitigation measures to prevent any contamination to surface and ground waters. The section from Buna to Počitelj is located in a limestone area which is porous leaving the aquifer susceptible to groundwater contamination. The section Svilaj-Odžak is located on water permeable substrate of the alluvial deposits. 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 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 sections of the motorway in accordance with EN 858-1 and 858-2 standard.
- avoid movement of heavy machinery in water courses wherever possible to prevent adverse impacts on aquatic species
- No parking of plant or storage of any equipment or oil, fuel or chemicals within 100 m of dry or wet river channel;
- River flow to be maintained at all times. If access is required to the flow channel, measures should be taken to divert the flow past the works.
- No storage or discharge of any wastewater, effluent, excavation spoil or any other material may be made to the river channels or watercourses;
- Contractor should be prepared for flash flood and sudden rises in water level and water flow, and should secure all works (including embankments under construction, shuttering, steel, etc.) so they are not disrupted by flood flows.
- Any pollution event in the watercourses shall be made good by the contractor, to the satisfaction of the PIU/Supervising Engineer.

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. The section Svilaj-Odžak has special embankments on the sub-base and base of the motorway to ensure protection against flooding.

5.4 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.

The EIA Study for Lot 2 indicated the possible existence of European roller *Coracias garrulous* in the wider area of Zenica City that is LC²⁵, on IUCN²⁶ *Global Red List* but RE²⁷ on the *Red List of Fauna of FBiH* (relevant for sections in Zenica). Therefore, a preconstruction survey was conducted in April 2016. No signs of this species were noted and the habitat was assessed to be sub-optimal for the European Roller. The biodiversity assessment did however reveal the presence of Common Nightingale *Luscinia megarhynchos*, classified as Least Concerned on the IUCN Red List and Near Threatened (NT) on the FBiH Red Fauna List, but no nests were registered. Nevertheless, because of its NT status in FBiH, mitigation measures have been proposed such as:

- installation of bird houses near the motorway route in March, for birds to be able to find the potential nesting areas as soon as they come back to their nesting areas from the long migration journey.
- cutting of vegetation should be carried out as the peak of the autumn migration period ends beginning of December until the start of the spring migration until February.
- stop any construction activities in the nesting period (May-September),
- after the nesting period, if the trees have to be removed, place in the vicinity nesting boxes for the European Roller.

Three species of interest were found along the section Svilaj-Odžak: Black Stork, Bee-eater and Common Nightingale. The three species are classified as Least Concerned according to the IUCN Red List. According to the FBiH Red Fauna List, the species are classified as Endangered (Black Stork²⁸) and Near Threatened (Bee-eater²⁹ and Common Nightingale³⁰).

The following sections of proposed road: Poprikuše-Nemila and Tunnel Zenica), lie within the River Bosna Valley. The general character of the valley is steep sided wooded limestone hills, interspersed with farmland, settlements and other infrastructure. The Tunnel Ivan section sits on the watershed divide between the region of Central Bosna (River Sava - Black Sea Basin) and a valley which flows south in to the River Neretva and artificial lake Jablanicko Jezero (Adriatic Sea Basin).

A supplementary biodiversity assessment was undertaken for these sections, comprising of (i) additional field surveys that were conducted in June 2017 regarding habitats, vegetation and invasive species, herptiles (amphibians and reptiles), ornithology and mammals, (ii) additional desk survey and (iii) supplemental impact assessment.

No Annex 1 habitats or natural habitats, a range of generally common and widely occurring species, but some species of conservation concern were noted and taken forward for further assessment.

A Critical Habitats assessment has also been undertaken (none identified for Lot 2 or Lot 3), so too has a screening exercise, to screen out the candidate River Bosna Natura 2000 site. The assessment found that there are no Critical habitats present in the project areas, that the only potential for significant impacts (in the absence of mitigation) is on bats (all species) and otter. No other significant impacts were predicted. However mitigation has been proposed for a range of species, which builds on the information provided in the 2006 ESIs and supporting documents for the Lot 2 and Lot 3 sections.

An outline Biodiversity Management Plan (BMP) has been prepared, the plan includes outline sections for the following: summary of mitigation, monitoring plan, invasive species management plan and preconstruction survey plan. It is anticipated that the BMP will be updated once the detailed design aspects are known, and the construction timings.

²⁵The species was assessed as NT during the period 2005-2012, since 2015 it has been classified as LC

²⁶International Union for Conservation of Nature

²⁷Regionally extinct

²⁸ The black poplar woods are a potential nesting sites of Black Stork, but during the rapid biodiversity assessment no nests were identified. Nevertheless mitigation measures have been proposed.

²⁹ There are no potential nesting sites of Bee-eater along the Project route, therefore no mitigation measures are needed for this species.

³⁰ No nests were registered. Nevertheless, because of its NT status in FBiH, mitigation measures have been proposed.

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 included 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 Biodiversity Assessment was completed in March 2016.

The following mitigation measures to be applied will be detailed within the Biodiversity Management Plan and will include:

- Develop and implement Construction Site Organization Plan;
- 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;
- Cutting of vegetation should be done in winter where possible (from beginning of December to the end of February), unless an ecological clerk of works is on site and can advise otherwise;
- Re-planting should be done with indigenous plant species, to create new nesting sites for the endangered species Common Nightingale;
- Placement of bird houses/boxes in retained trees (at least 1 km far from the Corridor Vc route to prevent aggregation of large population of birds near the motorway route), especially at areas where significant tree removal has been undertaken (e.g. Ponirak, Koprivna, Nemila, both entrance and exit of tunnels Zenica, Golubinja (relevant for LOT 2 sections), as well as at entrance and exit of the Tunnel Ivan. Maintenance of placed bird boxes should be undertaken and all damage to the bird boxes should be repaired, during the period of maintenance;
- Re-planting with indigenous plant species using indigenous plants;
- Installation of fences and/or optical barriers to avoid intrusion of terrestrial animal species and collision of birds (flocks or individual) with vehicles;
- Reduce planting of trees and shrubs near the motorway to a sufficient minimum. Plant them to prevent erosion, but not to create new biotope for birds;
- Maintenance of fences/optical barriers and wildlife corridors (underpasses on section Svilaj- Odžak);
- 3 large open wildlife crossings and 16 small open wildlife crossings are constructed along the Svilaj- Odžak (underpasses),
- A 2m high fence will be erected along the road to prevent animals crossing;
- Maintenance of installed fence along each side of the motorway to prevent intrusions of animals and possible fatalities of animals on the motorway. All damage to the fence are to be promptly repaired, therefore regular inspections are required;
- Construction of underpasses for animals on locations defined in local EIA LOT 2 and at least five underpasses on section Tarčin to Tunnel Ivan (entrance) and preserve surrounding flora in order to lead the animals naturally towards the passage;
- 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.
- Invasive species mitigation plan to be implemented prior to construction;
- Pre-construction surveys to be undertaken on houses and mature trees to determine if bats are present, if presence is confirmed then suitable mitigation, supervised by a suitably qualified ecologist, to humanely evict the bats prior to works should be implemented (relevant for sections from Donja Vraca to Poprikuše comprising the part of the LOT 2 and Tarcin-Ivan sections comprising the LOT3);
- If any streams are to be impacted by the motorway alignment (relevant for sections from Donja Vraca to Poprikuše comprising the part of the LOT 2 and Tarcin-Ivan sections comprising the LOT3), then a preconstruction survey will be undertaken for Greek stream frog *Rana graeca* and yellow-bellied toad *Bombina variegata*. Where identified, habitats will be retained, or relocated to suitable alternative habitat;
- Areas where bridge crossings are to be sited over River Bosna (relevant for sections from Donja Vraca to Poprikuše comprising the part of the LOT 2) should be checked for the presence of otter, prior to works commencing. If otter holts or lie-ups are found, then further advice from a suitably qualified ecologist should be sought;
- In coordination with local hunting societies, construction and maintenance of alternative feeding facilities for large mammals is required.

5.5 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 can be used as cover material in nearby regional sanitary landfill Moščanica.

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. FBHM will manage the waste in cooperation with licensed waste management companies.

5.6 Raw Material and 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. FBHM 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.

5.7 Landscape and Visual Impacts

The motorway is a linear feature; therefore the project alignment will permanently 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 Zenica, and settlements of Ponirak and Golubinja 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 alignments in both the Svilaj-Odžak and Buna – Počitelj section will pass through flat land, away from settlements (except for settlement Potočani in Odžak), 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) where possible;
- Construction activities should be restricted to designated construction sites.

5.8 Cumulative Impacts

Cumulative impacts may occur when impacts of the new developments are combined with impacts of other past, present or future developments. Regarding the cumulative impact assessment, the Consultant reviewed all available spatial planning documentation on federal and cantonal level, public consultations held during development of the spatial documentation, past alternatives of the Corridor Vc, consideration of other relevant documentation etc. with the aim to identify possible impact interactions with other existing or planned facilities / projects. Information obtained from field visits were also used. Cumulative impacts may arise during both phases of the Project implementation, construction and operation phase.

The impacts that can have cumulative effect in synergy with other developments in the area during *construction phase* are the same for both LOTs and include: impacts on land and air from open disposal of construction material and impacts on air quality from construction material sourcing (quarries and borrow pits). The location of disposal sites and borrow sites on both LOTs is not known at this stage. Therefore, this impact cannot be assessed at the moment. The details will be in the phase of Main Design development.

Regarding the cumulative impacts during *operation phase*, it is possible to only give general assessment of the cumulative impacts of the planned LOT 2 and LOT 3 sections of the Corridor Vc in relation to the existing infrastructure.

Both sections in Zenica are relatively close to the existing two-lane regional road and steel manufacturing plant “Arcelor Mittal” Zenica. The EIA for Lot 2 had taken into account the existing pollution sources.

Tunnel Ivan is located in the vicinity of existing main road M17, so cumulative impacts are related to air pollution and noise from the two road schemes.

Cumulative impacts will be pertinent to: noise levels, air emission, water pollution, waste generation and biodiversity. Adequate mitigation measures are suggested (noise barriers, drainage and installation of oil separators, waste removal and disposal to regional landfill “Smiljevići”, development of Invasive Species Management Plan, development of Biodiversity Management Plan e.g. promote the aim of no net loss of biodiversity through tree planting or management of existing habitats for wildlife conducting of pre-construction surveys for a range of fauna (e.g. bats and amphibians), upon which no residual impacts are expected.

The sections Svilaj-Odžak and Buna - Počitelj pass through an area with no significant air pollution or noise sources, therefore cumulative impacts are not expected.

5.9 Indirect Impacts

The motorway development will result in part of the traffic being redirected from the main road network and 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

6.1 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 Main (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. 10m 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 2004/54/EC 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 sections of the Zenica Bypass).

- Levelling of ground to reduce the occurrence of trenches and slopes will be necessary (relevant for sections of the Zenica Bypass);
- Road safety includes general traffic management /occupational road safety during the construction works.
- A Traffic Management Plan will be prepared by the Contractor prior to construction which should consider management of traffic on the existing access roads. The Plan will ensure suitable access or suitable alternatives to local communities is retained at all times and effects on journey times are minimised. Haulage routes shall avoid (as far as possible) local settlements and where they cannot strict driver provisions implemented (e.g. training of drivers and in code of conduct). The management of the mixed traffic (i.e. animal drawn carts, motorised vehicles, livestock accessing the work areas etc.) will be addressed clearly in the Plan.
- Contractor will be required to carefully plan the works to existing structures/crossings etc. and put in place relevant H&S warning signage and provisions to minimise any risks to workers, local communities, users of the route/areas etc.
- Necessary short-term diversions may be necessary for such works and the Contractor will engage with Municipalities and any locally affected parties (e.g. business, settlements etc.).
- In addition, FBHM will complete a Road Safety Audit in accordance with the EU Directive on Road Infrastructure Management (2008/96/EC). Following the RSA there should be mandatory inclusion of economically viable safety improvements into the design. RSA will be conducted by a certified auditor. Where the road safety auditor recommendations are not implemented, the reason why each recommendation has been declined needs to be confirmed to the Bank. A road safety inspection shall be carried out on road once operational, and if appropriate action plans developed for low cost remedial road safety measures.

6.2 Land Use, Land Acquisition and Displacement

With regard to the sections comprising the Zenica Bypass, forest and semi-natural areas dominate in the area of: Tunnel Zenica – 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 Poprikuse-Nemila and tunnel Zenica sections, Zenica North Interchange, settlement Donja Gračanica, Babina Rijeka and the southernmost parts of the road route.

The EIA for Lot 2 (all 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 3 (section tunnel Ivan) has identified agricultural land mostly belonging to agricultural zones II and III with land use categories IVa and IVb as the dominating use of land.

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 the Zenica and Tunnel Ivan sections most of the project footprint involves the construction of viaducts and tunnels.

Regarding the Svilaj-Odžak section, prior to the construction works undertaken in the first phase, the area was used for agriculture (wheat and barley agricultural fields) or consisted of the natural environment (deciduous forests of the Pannonia valley). For project needs, conversion of land from agricultural land to construction land was carried out. Due to the completion of the first phase, the area currently consists of the constructed area of lower layers of the motorway structure (sub-base (bed)). The lower substrate has been finished, whereas the upper substrate and wearing course are to be implemented within this project.

Land Acquisition

Land acquisition for section **Svilaj-Odžak** was fully completed in the period from 2011 to 2015. The expropriation beneficiary was FBHM for majority of land acquisition, and the Indirect Taxation Authority of BiH (ITA) for a small part of the section (550 m of Border Crossing). In both cases, the expropriation authority was the Municipality of Odžak. 467 private land plots were acquired under the jurisdiction of FBHM. The land plots mostly were agricultural land plots. A total of 4 residential structures were expropriated, two of which were inhabited. 6 private land plots were acquired under the jurisdiction of ITA. There were no structures on part of the road under the jurisdiction of ITA.

Land acquisition for section **Poprikuse – Nemila** has not yet started. The Expropriation Study required by local legislation has not yet been prepared for this section (currently estimated to be completed by the end of July 2017). At this stage, there are no estimates regarding the scope of land acquisition that may be expected.

For **Tunnel Zenica**, the land acquisition procedure for section Tunnel Zenica has been officially initiated by developing the aforementioned Expropriation Study, and submitting a Proposal for Expropriation (in November 2016) to the City of Zenica. A Land Acquisition and Resettlement Plan (LARP) has been developed for this section in line with FBiH and EBRD requirements and on the basis of the Land Acquisition and Resettlement Framework. A Socio-economic Survey was carried out in May 2017 for the purpose of developing the LARP. In total, 19 land plots and 6 residential structures will be acquired, leading to physical resettlement of 3 households and economic displacement of affected land owners/users. Initially, the scope of land acquisition was larger (by an additional 19 land plots, i.e. 38 in total initially), but was reduced in April 2017 due to the opposition of a part of the local community to the construction of an access road through the settlement of *Ponirak*.

Land acquisition for section **Donja Gračanica – Zenica Tunnel** is mostly complete, while land acquisition for section **Donja Gračanica-Klopče** was fully completed in the period from 2012 to 2015. The expropriation beneficiary was FBHM, and the expropriation authority was the Municipality of Zenica. 354 private land plots were expropriated, including 34 residential structures.

Expropriation Study for Corridor Section Tarčin – Konjic, subsection Tarčin – Zukići was developed and updated in August 2014, while the Expropriation Study has not been developed yet for the section of the temporary connecting road which connects Tunnel Ivan to the existing main road M 17. Thus land acquisition for section **Tunnel Ivan** has not yet started and there is currently no information on the expected scope of land acquisition and resettlement.

Land acquisition for section **Buna – Počitelj** has already started and expropriation procedure is ongoing.

Due to previous EBRD involvement, a Land Acquisition and Resettlement Framework (LARF) for the entire Corridor Vc in FBiH was developed by FBHM and published in 2017 (<http://www.jpautoceste.ba/images/larf.pdf>). LARF is in line with the FBiH legal framework, particularly the Law on Expropriation and the EBRD E&S policy (2014). Land Acquisition and Resettlement Action Plans will be developed for all project sections based on the updated 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.
- Restricted access to farmland during construction works.

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 fair 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 Land Acquisition and 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 Land Acquisition and Resettlement Action Plans, assess whether any land near the 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 Main (Detailed) Design to the extent possible.

6.3 Community Impacts

Potential positive and adverse impacts to the local communities include:

- Improved access to tourist centres, religious, recreational, catering and health facilities;
- Enhanced ability of communities to attract new business investment and economic development as a result of improved access to regional transport infrastructure,

- 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; potential increase in property values (and subsequent land use) as a result of improved accessibility that might affect the desirability of a location; 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.

6.4 Contractor Management, Including the Siting and Management of Impacts

Construction work will be undertaken by contractors to be appointed by FBHM. Engaging contractors in public sector projects requires using Conditions of Contract which meet EBRD PR 2 on Labour and Working Conditions. The contractor will be supervised both by the external Supervising Authority appointed by FBHM and directly by the Head of the Project employed within FBHM.

All works will also have to be carried out in accordance with FBiH laws, including the Labour Law³¹ and Health & Safety Law³², 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*³³ for the construction phase, while an Operational Environmental and Social Management Plan (OESMP) will be developed for the operational phase of the Project. Specific requirements in relation to labour and working conditions, including occupational health and safety, are contained within the ESAP.

6.5 Cultural Heritage

For the Svilaj-Odžak sections and sections of the Zenica Bypass, no significant archaeological material or cultural heritage that would require archaeological surveys before construction or supervision during the earth works have been identified.

The nearest cultural and historical heritage sites for Lot 2 are at a distance of 1.65 km air (flying) route from the settlement *Ponirak* (Tunnel Zenica section) and they include old town Vranduk in the settlement of Vranduk (designated as a national monument by the BiH Commission to Preserve National Monuments) and medieval town and fortress Vranduk (designated as a national monument). However, it is not necessary to

³¹ Labour Law (Official Gazette of FBiH, No. 62/15)

³² Law on Safety at Work (Official Gazette of SRBiH, No. 22/90)

³³ Official Gazette of FBiH, No. 48/09, 75/09, 93/12

apply specific measures, only general measures for archaeological areas as this area is not in the immediate vicinity of construction works.

The EIA for Lot 3 has identified the Memorial to the Victims of Fascism in Ivan-Sedlo is in the “highest risk strip”, i.e. a zone of 200-300 m on both sides of the motorway section Tunnel Ivan. However, the alignment passes through the tunnel, thus no significant damaging effects can be expected and it is necessary to apply only general protection measures that are undertaken in all cases.

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.

FBHM will require contractors at all seven 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 local regulations.

6.6 Disruption to Public Health and Safety during Construction

During construction, negative impacts to surrounding communities will occur especially in relation to construction traffic and use of local access roads. In addition, nuisances from tunnelling during tunnel works at Zenica Bypass sections are expected. However, these impacts will be temporary, and mitigated and monitored in line with the ESAP. FBHM will ensure that the Contractor establishes a Health and Safety Management Plan with special focus on (but not limited to): unexploded ordnances, 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, and biological hazards (poisonous snakes). A Hazardous Materials Safety Plan will be developed as part of the H&S Plan. FBHM will also ensure that all sub-contractors follow and implement the H&S Plan.

For the road operation and maintenance phase, a Health & Safety Operation Management Plan will describe the HS requirements for both the FBHM and the sub-contractor’s personnel. It will include (but not be limited to): hazardous materials management, traffic accidents, working at heights, working in confined spaces, electrical hazards, etc.

FBHM will also ensure that all sub-contractors follow and implement the H&S Plan and the H&S Operation Plan.

6.7 Economy and Employment

Potential impacts include:

- Improved access to markets for local producers.
- Construction local content.
- 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 construction and 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).
- 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.

6.8 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;
- Coordination with local service providers;
- 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 and electricity supply to local communities.

6.9 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.

In addition to ensuring 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, where possible, 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 practice³⁴.
 - Grievance procedure for workers and community.

³⁴ Including: 'Workers' accommodation processes and standards, EBRD/IFC Guidance Note, 2009

6.10 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 Construction*³⁵ 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. FBHM will prepare an Operation Environmental and Social Management Plan (OESMP), which includes Health and Safety Management Plan containing requirements for both FBHM 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. FBHM 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, FBHM will regularly monitor, for example air emissions, noise levels, effluent quality, soil contamination, and wildlife passes.

Technical assistance will be provided to FBHM by EBRD in implementation of environmental and social monitoring.

The ESAP sets 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. Monitoring results for the project were not publicly available during the previous period and it is necessary to overcome this gap and publicize the monitoring results.

8 Communications

FBHM intends to provide all relevant Project information to the public in local language and English (where appropriate).

The following documents have been/will be published on the FBHM's website (<http://www.jpautoceste.ba>) and the EBRD website (www.ebrd.com) both in local and in English language:

1. Environmental Impact Assessments and Non-Technical Summaries (most recent update – July 2017)
2. Environmental & Social Action Plan (ESAP) for sections Poprikuše – Nemila (5.1 km), Tunnel Zenica (2.8 km) and Tunnel Ivan (2.0 km) (July 2017)
3. Environmental & Social Action Plan (ESAP) for sections Donja Gračanica and Zenica Tunnel (3.9 km) and Buna-Počitelj (7.2 km) (November 2015)
4. Environmental & Social Action Plan (ESAP) for sections Svilaj-Odžak (10.4 km) and Donja Gračanica-Klopče (5.78 km) (August 2016)
5. Updated Stakeholder Engagement Plan (SEP) (most recent update – July 2017) including grievance mechanism

³⁵ Official Gazette of FBiH", No. 48/09, 75/09, 93/12

6. Land Acquisition & Resettlement Framework (LARF) 2017 for Corridor Vc
7. Land Acquisition and Resettlement Plan – Section Tunnel Zenica (2017)
8. Supplementary Biodiversity Assessment and Biodiversity Management Plan (July 2017)

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

- Motorways of FBiH d.o.o. Mostar (Address: Braće Fejića bb, 88 000 Mostar)
- Motorways of FBiH d.o.o. Mostar - Sarajevo Office (Address: Dubrovačka 6, 71000 Sarajevo)
- Municipal/City Buildings in Odžak, Žepče, Zenica, Hadžići, Konjic, Čapljina and Mostar
- Local community offices: Golubinja, Koprivna, Donja Vraca, Donja Gračanica, Klopče, Raštelica, Bradina, Bivolje brdo and Lokve
- EBRD office in Sarajevo

In order to ensure proper information disclosure and stakeholder engagement, FBHM will dedicate a responsible person for stakeholder engagement at corporate level. This person will have clear responsibilities in:

- updating this SEP as necessary
- coordinating the stakeholder engagement activities of other departments within FBHM
- monitoring the implementation of the Corridor Vc SEP
- keeping records of all stakeholder engagement activities undertaken by FBHM, including records of public meetings
- publication of all relevant information and documentation
- management of stakeholder grievances and keeping records of grievances as defined in SEP, as well as identification of risks associated with the filed grievances and defining corrective actions in cooperation with other involved FBHM departments
- reporting to FBHM management and EBRD on stakeholder engagement activities.

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. FBHM has the 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.

Contact information:

Attention: Jasmin Bučo

Managing Director for Design and Construction

Motorways of FBiH

Postal Address: Dubrovačka 6, 71000 Sarajevo

Telephone: +387 33 277 900

E-mail address: info@jpautoceste.ba

www.jpautoceste.ba

Other relevant contact details:

Motorways of FBiH d.o.o. Mostar

Braće Fejića bb, 88 000 Mostar

Motorways of FBiH d.o.o. Mostar - Sarajevo Office

Dubrovačka 6, 71000 Sarajevo

EBRD, BiH

15th Floor, Tower B Unitic Towers

Fra Andela Zvizdovica 1

71000 Sarajevo, Bosnia and Herzegovina