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Chapter 14 Landscape

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Chapter 14 Landscape

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14 Landscape

14.1 Introduction

This chapter reports the findings of the assessment of the potential effects of the Project in relation to landscape character and visual amenity during both the construction and operational phases. For both phases, source and significance of potential effects are identified, and the measures that will be employed to minimise these described.

A desk-based review was undertaken in order to determine existing landscape features, landscape character, and potential visual receptors. The baseline data has been obtained through a combination of site visits during 2020 and 2021 and desk-based reviews. The photographs in this Chapter were chosen as being representative of key visual receptors in the study area. The photographs were taken from publicly accessible locations. The photomontage of the motorway in the natural environment was not available.

This Chapter considers the likely effects of the Project upon the two separate (but linked) topics of landscape character and visual amenity. The key stages when carrying out assessments on the effects of landscape character and visual amenity are following:

- Assessment of the existing situation (baseline), analysing the existing landscape and visual amenity context of the receiving environment and human receptors,
- A review of local landscape character, including the existing site and features on the site,
- A review of surrounding potential visual receptors, located within the Project area, including identification of representative viewpoint locations,
- Identify potential impacts associated with the Project, relevant to landscape character and visual amenity during the construction and operational phases of the Project, to determine the potential for significant effect,
- Identify practicable mitigation measures, where the assessment identifies potentially significant effects, and
- Describe residual effects i.e., those effects upon the receiving environment that cannot be offset by mitigation measures.

This Chapter should be read in conjunction with the following Chapters:

Chapter 1	Introduction
Chapter 2	About the Project
Chapter 3	Detailed Project description
Chapter 4	Policy, legislative and institutional context
Chapter 5	Assessment methodology
Chapter 6	Biodiversity
Chapter 17	Cumulative impacts
Chapter 18	Residual impacts
Chapter 19	ESMP.

14.2 Baseline Conditions

All natural and anthropogenic components of the Project area act as mosaics and intertwine their features, projecting an overall image seen as landscape. Analysis separated these landscape components with the aim of easier understanding of their characteristics and effects on the surrounding area, but in the field, they do not have individual character and appear as a joint system.

Each natural landscape contains three main components: terrain, water, and vegetation. The cultural landscape, in addition to the natural components, contains anthropogenic interventions in an area, such as agricultural activities, infrastructure, and the formation of settlements and facilities.

Landscape elements along the route are characterized by:

- natural systems, with an accent on karst morphology and forest ecosystems, and
- systems created by anthropogenic influence (extensive agricultural area, local settlements, as well as existing infrastructure).

14.2.1 Natural Components of the Landscape

The natural component of the landscape along the route is characterized by the terrain structure with hilly, hilly-mountainous, and mountainous zones.

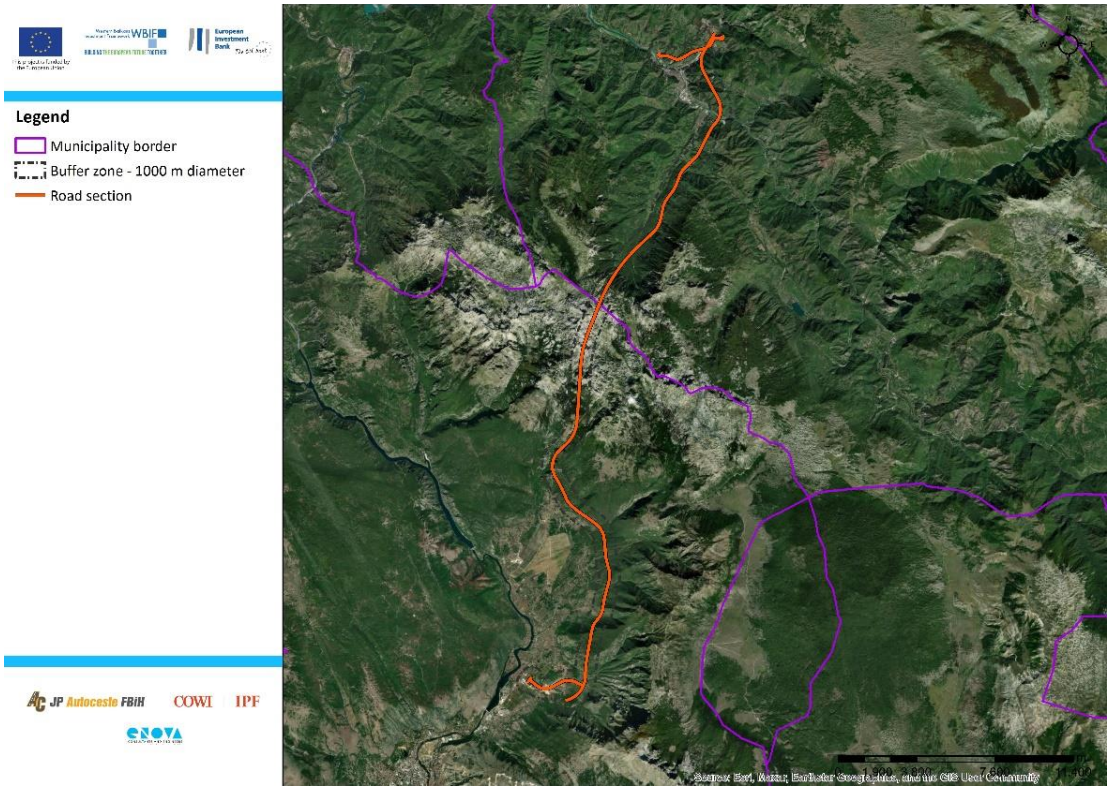

Figure 14-1: Terrain structured with hilly, hilly-mountainous, and mountainous zones

About 40% of the area belongs to the hilly-mountainous terrain over 500 m asl (e.g., Prenj, Cvrsnica, Cabulja mountains) and only about one-third of the terrain is located at the altitudes from 200 to 500 m asl. The rest is slightly hilly and flat terrain. Parts of the route outside the tunnels, especially in the canyon area and in the areas covered in screes, are characterized by landslides. The prominent elements of the landscape are in dynamic equilibrium with the climatic characteristics of the Project area and significantly depend on these characteristics.

The most dominant features of natural elements of the landscape are the karst morphology and vegetation cover. The karst-erosion terrain is dominant in the area of Prenj Mountain and occupies about 40% of the Project area. It is built of carbonate rocks, limestone, and dolomite of the Triassic, Jurassic, and Cretaceous ages. Karst formations are very specific - the slopes are very steep (gorge and canyon type).

zaštite

Figure 14-2: Northern slopes of the Prenj Mountain

Existing natural vegetation systems are represented as forest, meadow, and pasture systems. Significant differences in geomorphological, geological, pedological, and climatic characteristics in the different parts of Project area resulted in formation of forest ecosystems with a high degree of diversity. Various types of forests can be seen, from thermophilic sub-Mediterranean forests, high deciduous forests, coniferous and mixed forests, to extremely degraded forests and thickets with reduced productivity. The forest areas close to settlements have lost much of their natural condition as a result of excessive logging and overgrazing by livestock, especially goats. Constant use of these areas for livestock feeding affected the natural regeneration of an already modest vegetation cover. An important feature of this system is the susceptibility to fires and self-ignition during the hot summer months, and this has specific impacts on the landscape characteristics. Sustainable management measures are continuously oriented towards the regeneration and preventive action against damage caused by fires and/or overgrowth of pathogens and harmful insects. The agricultural area is characterized by an extensive way of cultivation, primarily due to the karst character of the area. Natural ecosystems are adapted to vineyards or family farms for food production.

The morphology of the wider area of the route is typical for mountainous areas in the sub-Mediterranean scope. The area around the route is mostly uninhabited and it is characterized by hilly, hilly-mountainous, and mountainous zones, which have a special ecological value. Such natural conditions represent one of the most important characteristics in the observed area.

Figure 14-3: Landscape at the beginning of the route

According to scientific criteria, Prenj Mountain represents an exceptional natural value and belongs to the group of natural rarities and localities that are of special interest. Geomorphological characteristics, glacial phenomena, hydrogeological specifics, hydrological specifics, represented flora and fauna, with a number of endemic species, are part of the natural values that rank this area high on the scale of natural and visual heritage.

Figure 14-4: Landscape near the Mostar North Interchange

14.2.2 Cultural Components of the Landscape

The motorway passes through a few settlements in Konjic and Mostar North area. These settlements are scattered, placed between forest areas, and have rural character, with a smaller number of inhabitants who are usually engaged in agriculture and animal husbandry.

The section starts in Konjic, 650 m before Intersection in Ovcari. Ovcari is a rural settlement with 488 inhabitants, according to Census 2013, characterized by agriculture activities and animal husbandry.

Figure 14-5: Settlement Ovcari (source: Google Earth)

After passing Ovcari, the road section crosses the river Tresanica at the northern entrance to the urban area of Konjic and then enters tunnels T1 and T2. The road then passes through the settlement of Bijela, known for small agriculture activities, animal husbandry and occasional touristic activities. The settlement Bijela has under 200 inhabitants.

Figure 14-6: Settlement Bijela

The route continues along the valley of the river Bijela and it ascends towards the Prenj tunnel. The route then enters the tunnel Prenj of approx. 10 km. After exiting the tunnel Prenj, the route descends towards Mostar and the area with a high forest cover, followed by the settlement of Potoci. The route passes through the tunnels T5 and T6.

Figure 14-7: Landscape in Podgorani settlement

Figure 14-8: Settlement Podgorani

The section ends 500 m before the Mostar North Interchange in Kutilivac, a rural settlement with a total of 1,624 inhabitants as per Census 2013. The Project area of Kutilivac is characterized by small agriculture activities, where the agricultural land is mostly altered to vineyards.

Figure 14-9: Settlement Kutilivac at the end of the motorway route

14.3 Assessment of Impacts

The construction phase will have a temporary effect on the landscape of the Project area. A variety of visual impacts are expected to occur due to unavoidable earth and civil works, erecting of construction camps and associated facilities inside them, temporary storages of building material, presence of personnel and machinery, and formation of new structures including the spoil disposal sites.

The **construction phase** will primarily result in the following landscape and visual impacts:

- removal of the existing vegetation,
- loss of soil productivity and original morphology,
- presence of new motorway and new and widened access roads,
- presence of temporary construction facilities (e.g., construction compounds) and associated equipment,
- spoil disposal sites,
- noise, dust, and wastewater.

The visual receptors include residents of the settlements situated in the Project area, local people working in outdoor occupations (such as farmers in the vineyards) and users of nearby infrastructure. Some of the works will be executed in the close vicinity of houses. The overall sensitivity of the receptors in the construction phase is considered to be medium, considering the general acceptance of the Project by the residents who understand the overall importance of the motorway construction and which expressed this opinion in the early stage consultation process (more details are given in the Volume 6 Stakeholder Engagement Plan which is part of the disclosure package).

The Prenj Tunnel is the longest and most demanding facility on the entire section of the road from Konjic to Mostar. The magnitude of change for the landscape at the entrance and exit portals is considered to be major in this area. The loss of woodland cover and impact on other natural systems is localised, but visually significant. Therefore, the overall effect on landscape during construction is considered to be moderate and significant.

Overall, the magnitude of changes for the visual receptors is considered to be moderate due to the public acceptance of the Project actions and the importance of the motorway construction.

The main landscape and visual impact in the **operation phase** will be associated with the permanent road construction above the ground and the same impact analysis is applicable as in the case of the construction impacts. Project area permanently changes topographic structure and connected impact on the landscape is recognized in two forms:

- impact on the physical structure and aesthetics of the landscape,
- the observer's experience of the landscape.

Permanent alternation to the nature of the existing view will occur through the inclusion of prominent structures including:

- 9 viaducts,

- 2 overpasses,
- 1 underpass,
- fences,
- noise barriers.

The people living in local settlements are classified as the most sensitive receptors because of the ownership interests and the permanent exposure to negative impacts on parts of the Project area that are near settlements or individual residential buildings. Another group of receptors are future road users, but their short-term experience of the observed landscape, classifies their sensitivity to a lower level, in contrast to residents in the environment.

The construction of the road section should not significantly affect the agricultural zones as well as other natural and environmental specifics.

Important landscape values are found mainly in the area when approaching to the Prenj Tunnel and on the Prenj Mountain itself. Among other things, these areas, due to the abundance of endemic and relict species of flora, should be the subject of special concern in a sense of protection of natural resources and geomorphological specifics. The details related to their projection are given in Chapter 6 Biodiversity and Volume 4 Biodiversity Management Plan. Nevertheless, the motorway route will pass through the mountain with the tunnel so natural landscapes will not be negatively impacted.

Table 14-1: Summary of potential impacts on landscape and assessment of their significance before mitigation

Phase	Type of potential impact	Adverse/ Beneficial	Magnitude	Sensitivity	Impact evaluation	Significance (before mitigation)
Landscape						
Pre-construction	No impacts	-	-	-	**-**	**-**
Construction	Changes to the existing landscape and visual impacts due to the construction works	Adverse	Moderate	Medium	Moderate	Significant
Operation	Changes to the existing landscape and visual impacts due to the presence of permanent motorway structures	Adverse	Moderate	Negligible	Moderate	Significant

14.4 Mitigation and Enhancement Measures

14.4.1 Construction Phase

There are currently no industry standards or best practice guidance relating to landscape mitigation and management. As such the proposed mitigation measures associated with the Project have been derived from professional judgement to address potential impacts the landscape leading to significant effects in the construction phase identified in Table 14-1.

- As set out in the ESMP, a **Construction Environmental and Social Management Plan** (CESMP)[1] will be prepared by the Contractor, which will outline how the construction phase of the Project will be managed to minimise the effects on the surrounding environment. The CESMP will include the requirement for a **Land and Habitat Restoration Plan**. The Plan sets out how a development will maintain the retained landscape and existing ecology of the site through revitalization of habitats adjacent to the motorway route. It should include plans to ensure the designed landscape fulfils its roles, including providing habitats and recreational space. The Plan contains, among other topics:
  - Overall vision for the designed landscape,
  - Management responsibilities,
  - Identification and description of landscape components, including existing and proposed vegetation,
  - Litter removal.
- Implement measures relating to the proper organisation of construction site defined in **Construction Site Organisation Plan** (CSOP). Mitigation can be achieved by keeping the construction site cleaned after the construction works, and if the machinery is parked on the route of motorway, not around it.
- Disposal of inert material on designated disposal sites and recultivation afterward.
- Recultivation with autochthonous species characteristic for the area in order to preserve gene pool and amenity.
- Implement recultivation and restoration as stipulated by **Biodiversity Management Plan** (BMP) and where possible reforest land within the Project area of influence.
- All planting will be of local provenance and in keeping with the local character.
- During the construction phase of the works, restricted hours of working will be proposed within built up areas, where the construction phase of the works is considered to impact on residential properties, avoiding the of use of machinery during those hours when residents are most likely to be at home, thus reducing the potential of visual disturbance within view.
- Upon completion, areas used as construction compounds will be returned to their original use and state.

[1] Construction Environmental and Social Management Plan (CESMP) to be developed as a part of the Construction Site Organization Plan (CSOP), to meet the national requirements in accordance with the national *Decree on Construction Site Organisation, Mandatory Documentation on Construction Site and Construction Work Participants*, as well as the EBRD and EIB E&S requirements. The minimum content is stipulated in the ESAP.

14.4.2 Operational Phase

Mitigation or enhancement measures for changes to the existing landscape and visual impacts due to the presence of permanent motorway structures are no applicable. The motorway is a linear structure that remains permanently in space, and therefore changes its visual amenity.