Republic of North Macedonia
Ministry of Transport and Communications

WORLD BANK GROUP

Republic of North Macedonia

Ministry of Transport and Communications

Western Balkans Trade and Transport Facilitation Project - P162043

Deployment of ITS on Highway A1 (Corridor X) (BC Tabanovce – BC Bogorodica)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Deployment of Intelligent Transport System (ITS) on Highway A1

(BC Tabanovce - BC Bogorodica)

April 2023

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ABBREVIATIONS

AMSM	Auto Moto Association of Macedonia
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
EHS; H&S	Environment, Health and Safety
PIU	Project Implementation Unit
RM	Republic of Macedonia
RNM	Republic of North Macedonia
WBTTFP	Western Balkans Trade and Facilitation Project
WB	World Bank
PVC	Polyvinyl Chloride
ITS	Intelligent Transport System
WIM	Weight in Motion
EA	Environmental Assessment
ESE	Environmental Science & Ecotechnology
TCC	Traffic Control Center
VMS	Variable Message Signals
SOS	Emergency Call System
PEHD	High-density polyethylene pipes
MTC	Ministry of Transport and Communications
MoI	Ministry of Interior
PESR	Public Enterprise for State Roads
BC	Border Crossing
NTMC	National Traffic Management Center
TCC	Traffic Control Center
AADT	Average Annual Daily Traffic
PoW	Programme of Works
WB6	Western Balkan Countries (6)

1. INTRODUCTION

The Republic of North Macedonia undertakes intensive activities improving transport safety, traffic management and environmental protection on the Trans-European Road Network (TEN -T). With the deployment of the Intelligent Transport System (ITS), the roads will be equipped with traffic-technical and telemetry systems on the built profile of the highway A1 (Corridor X) and all road structures, taking into account climate zones, terrain types, traffic oscillations, vehicle structure, etc. Deployment of ITS will increase the traffic safety, mobility and sustainability compared to the current conditions on Corridor X.

Along with the development of the project for deployment of the ITS along Corridor X, the Environmental and Social Management Plan (ESMP) has been prepared in accordance with the Environmental and Social Management Framework (ESMF) adopted for the Western Balkans Trade and Transport Facilitation Project (WBTTFP) and refers to the sub-project "Deployment of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)", which will be implemented by the Contractor and supervised by an Engineer. The procedure for screening project activities is in accordance with the World Bank's protection policies and Environmental and Social Management Framework (ESMF) adopted for the Western Balkans Trade and Transport Facilitation Project.

The Pan - European Corridor X (Salzburg - Ljubljana - Zagreb - Belgrade - Skopje - Thessaloniki), with a length of 2,300 km, passes through six countries and connects Central Europe with the southeastern part of Europe and is part of the European route E-75. From a construction point of view, it is a high category road, built as a Highway for the most part, and in Austria, Slovenia and Croatia it is equipped with transport management and control systems - Intelligent Transport System (ITS). Corridor X enters the Republic of North Macedonia on the north border with Serbia, through t border crossing (BC) Tabanovce, passes through the central part of the country (mainly along Vardar River valley), passes nearby the capital Skopje (20 km on east), and exits on south border with Greece, through BC Bogorodica.

The Highway A1 (north-south direction) is an integral part of the Pan-European Corridor X. The total length of the Highway A1 is 174.34 km. It is equipped with basic traffic signals and equipment. The Highway A1 should be equipped with the only traffic communication-information systems for traffic control and management (ITS). This Highway represents a high category road where it is possible to develop high road speeds, with a charge for use, which requires ensuring a high degree of safety and reliability.

Operation and maintenance of the Corridor X, as per the Law on public roads, is under competences of the Public Enterprise for state roads (PESR). PESR will be the End beneficiary of the deployed ITS equipment and National Traffic Management Center in Petrovec. The Ministry of Transport and Communications (MTC) and the PE for state roads will sign and Implementation Agreement which will regulate the obligations of the End beneficiary for sustainable management, operation and maintenance of the ITS. PESR will need to amend its Systematization Act in order to accommodate new Department for ITS and NTMC which will be properly equipped, trained and staffed.

2. PROJECT DESCRIPTION

The strategy and legal framework for ITS and its development on Highway A1, part of Corridor X it's a process of integrating the highway with basic traffic signalization and ITS equipment, in order to make it compatible with EU Acquis (Directive 2010/40/EEC) and in compliance with national legislation (to be amended in compliance with EU acquis). The project envisages deployment of ITS on A1 Highway, part of Corridor X, section Tabanovce – Gevgelija (BC Bogorodica) in the length of ≈174 km.

Deployment of Intelligent Transport System (ITS) on Highway A1 (Corridor X) and establishing of National Traffic Management Center (NTMC) (the Project) will be implemented in the Republic of North Macedonia, on the Pan European Corridor X (Salzburg-Ljubljana-Zagreb-Belgrade-Skopje-Thessaloniki).

Corridor X is 2.300 km long, it runs through six countries, connects Central and South Europe and it is a part of the European Route E-75. From a construction point of view, it is a high-class road, with two separated carriageways along a large part of the highway and mostly with three traffic lanes. On its route through Austria, Slovenia and Croatia the highway is equipped with Intelligent Transport Systems (ITS) on traffic management and controls. Corridor X through North Macedonia is not equipped with ITS.

Corridor X in North Macedonia extends north-south direction, in length of 174 km (starting chainage at north), starting at Border Crossing (BC) with Serbia (Tabanovce) and ending at BC with Greece (Bogorodica). Corridor X on the entire length in North Macedonia is built at highway standards with two carriageways and mostly with three traffic lanes (2 driving lanes and one stopping lane). At some parts of the highway, the old road was used as one of the carriageways, where only two driving lanes exits (e.g., Section Katlanovo - Veles, Miladinovci – Kumanovo). Along the route, Corridor X is equipped with basic horizontal and vertical traffic signaling and equipment. The highway is tolled with five toll stations (Romanovce, Sopot/Otovica, Gradsko, Demir Kapija and Gevgelija), which by the perspective of road users, requires higher levels of service, security and reliability under all traffic and weather conditions.

Corridor X in North Macedonia passes mainly along Vardar River valley. At BC Tabanovce (starting chainage) passes through lowland area at an altitude of approximately 200-300 msl, and goes nearby City of Kumanovo, the International Airport Skopje (20 km southeast from Skopje). The dominant climate in this region is the continental with hot and dry summers and cold and dry winters. In this region, fog and ice are frequent in winter months.

After Katlanovo, the section between chainage km 41+900 till km 70+100 (the righthand (RH) carriageway) and chainage km 65+100 (the lefthand (LH) carriageway), the carriageways are separated: the old road with two traffic lanes is used as RH carriageway of Katlanovo - Veles direction and the route of the new built LH carriageway is for Veles - Katlanovo direction with two driving lanes and one stopping lane.

After reconnection of both carriageways (at the Veles-East interchange), the A1 highway is at full profile highway till BC with Greece (Bogorodica) with two driving lanes and one stopping lane, including median green belt.

The Corridor X route from Taor Gorge (downstream from Katlanovo) till Demir Kapija runs through Vardar River valley. After Demir Kapija the route goes through the mountainous terrain of Marijanska Mountains and descends towards the lowland part of Gevgelija valley, along the Vardar River again and ends at the BC with Greece (Bogorodica). The southern sections of Corridor X are influenced by mild continental climate and sub-Mediterranean climate in Gevgelija valley. The lowest altitude of BC Bogorodica is 60m asl.

The maximum driving speed on the Corridor X in North Macedonia is limited up to120 km/h.

Note: Corridor X is passing 20 km east from Skopje, therefore, the sections Interchange Miladinovci (on Corridor X) - Interchange Hipodrom (entrance to Skopje) and section Interchange Hipodrom - Interchange Petrovec (Corridor X) considering the intensive daily traffic and heavy vehicles traffic between Corridor X and the City of Skopje, through the mentioned sections, this project also envisages deployment of ITS on the Miladinovci – Hipodrom and Hipodrom – Petrovec Sections (please see the map).

The Republic of North Macedonia has received financing from the World Bank within the cost of the "Western Balkans Trade and Transport Facilitation Project" and intends to apply part of the proceeds toward payments under the contract for "Deployment of ITS on A1 highway (Corridor X). Due to high inflation rates and new technical requirements, the current WB Loan No. IBRD-8929-MK will be sufficient to cover ITS implementation on the South Part only, chainage from km 74+950.00 to km172+127.44 - Provision, Installation and Commissioning of software, hardware and road monitoring devices as well as training on ITS systems for the operator staff" and the tendering will go in two phases. ITS implementation on the South part consists of the following investments/activities:

- traffic light signalization on the route: Variable Message Signals (VMS), Dynamic Message Display (DMS), Variable Lane Signals (VLS);
- weather stations on the route (Automatic Weather Station (GMS));
- video-data equipment on the route: video cameras (CCTV), Distribution system, Video detection system – (AID), Video management system – (VMS);
- control and management devices on the route and the local communication network (Local Traffic Station (LTS);
- supporting structures (Steel load structures for Variable Message Signs and Displays, Cameras and Weather stations);
- Traffic Control Center Negotino – operational center, hardware and software equipment, SCADA.

The ITS implementation/activities on North part, as well as, NTMC with required IT system solutions for the entire Corridor X (WIM and HAZMAT), including section Miladinovci – Hipodrom and Hipodrom – Petrovec in length of 20 km will cover the following:

- traffic light signalization on the route: Variable Message Signals (VMS), Dynamic Message Display (DMS), Variable Lane Signals (VLS);
- weather stations on the route (Automatic Weather Station (GMS));
- video-data equipment on the route: video cameras (CCTV), Distribution system, Video detection system – (AID), Video management system – (VMS);
- control and management devices on the route and the local communication network (Local Traffic Station (LTS);
- supporting structures (Steel load structures for Variable Message Signs and Displays, Cameras and Weather stations);
- National Traffic Management Center (NTMC in Petrovec) – operational center, hardware and software equipment, SCADA;
- Weight in Motion (WIM) System;
- HAZMAT System.

The WIM and HAZMAT software and hardware solutions will be applicable for the entire Corridor X length.

Overall, the Project for Implementation of ITS on highway A1 will improve safety conditions along the Pan-European Corridor X from BC Tabanovce with Serbia to the BC Bogorodica with Greece (174km), including 20 km sections connecting Corridor X with Skopje. Main strategic objective of this project is the development of ITS system and provide real time information for Corridor X users.

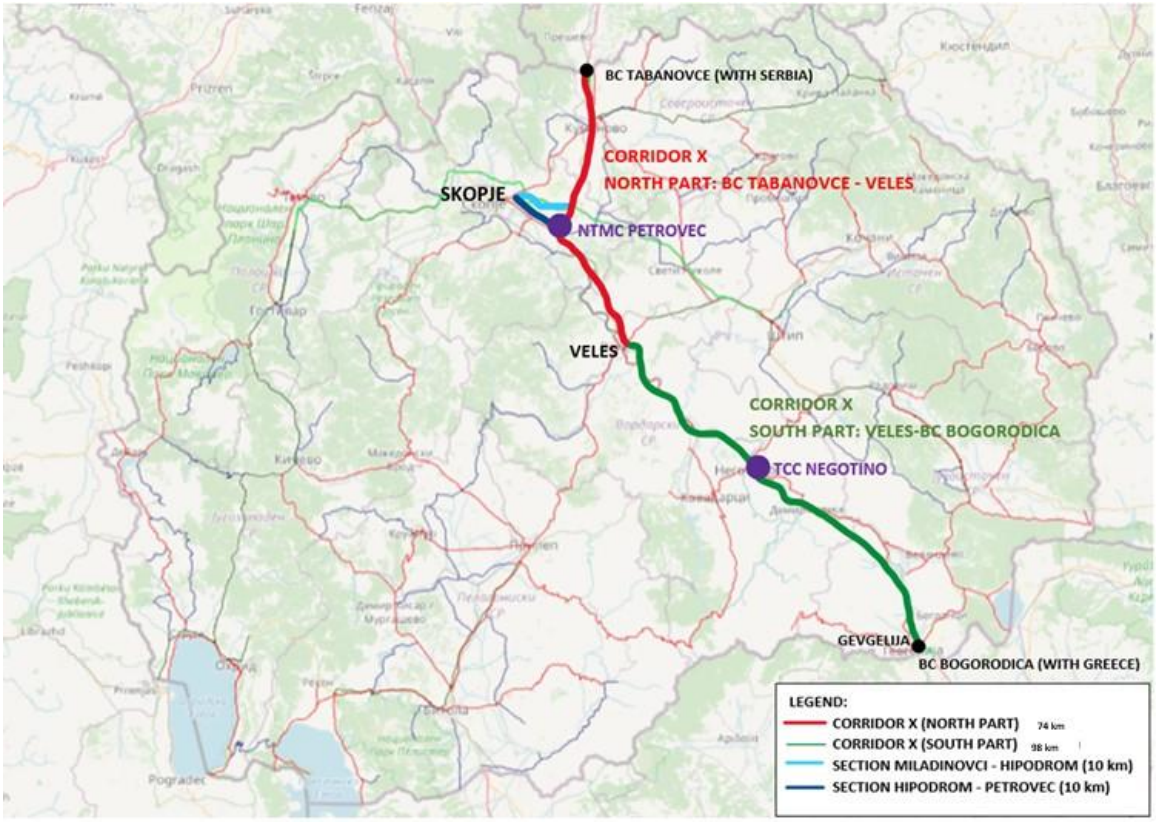


Figure 1 – Project location and main elements

In order to implement the ITS within the available Loan amount, due to enormous price increase in 2022 and change in the technical specifications, the design for ITS on Corridor X was divided in two parts – North and South Part.

Northern part

The northern part, with a length of 74 km, starts at the BC "Tabanovce" and extends to the "Veles-South" interchange. It passes through the lowland area, at an altitude of about 200-300 m. The climate in this region is mainly continental with hot and dry summers and cold and wet winters with snowfall. There is frequent occurrence of fog during the winter months. The maximum speed is limited to 120 km/h.

The full highway profile in North part ends at the chainage km 41+900 (approx. 0.6 km before the Katlanovo Interchange), where carriageways are separated by driving directions. At Veles-East Interchange the two carriageways are reconnected. From autumn to spring this highway section is exposed to fog, precipitation (rain, snow, ice) and wind. The RH carriageway from km 41+900, Katlanovo Interchange till Veles-North Interchange, consists of two driving lanes (2x3.5 m), and has no stopping lane. On this section there are 3 tunnels (320 m, 181 m and 66 m long), several viaducts (between 60 to 160 m span), the Sopot Tool Station, the connection to Mladost Lake and the rest area. Longitudinal elements of the RH carriageway constrain a speed limitation to the range of 50-80 km/h.

The LH carriageway (Veles - Katlanovo direction) span over hilly terrain above Mladost Lake and entails a large number of structures possibly endangered by ice. On this section there are 10 viaducts (with 90 to 515 m span), the bridge spanning 266 m, the 698 m long tunnel (with no evacuation tube and no exits in case of danger). Traffic Management and Control Center of the North Part is planned at „Petrovec" Traffic Control Center that is located in the maintenance facility at the „Petrovec" Interchange zone. NTMC will be operated by the PE for state roads.

Northern Part includes following interchanges: BC "Tabanovce", Rechica, Kojnare, Kumanovo, Refinery OKTA, Miladinovci, International Skopje Airport, Airport service, Petrovec/Traffic control center "Petrovec", Hipodrom, Katlanovo, Otovica, Lake "Mladost", Veles North, Veles East and Veles South.

Southern part

The southern part begins after the "Veles-South" interchange at km 74+950, in a mostly lowland area, along the Vardar River, where a relatively mild sub-Mediterranean climate prevails. After Demir Kapija, the Highway crosses the Vardar River, passes through the mountainous terrain of the Marianska Planina and descends to the lowland part of the Gevgelija Valley along the Vardar River and ends at the border crossing "Bogorodica".

At this Part the highway is built in full profile, with two carriageways (2x3.75 m) + stopping lane (2.5 m) in each direction and with the median strip between them, except for the route parts (the RHC from km 79+500 to km 81+600 and the LHC km 78+400 to km 76+600), where the profile has three traffic lanes and no stopping lane (3x3.50 m). The newly constructed section with IPA funds/EBRD/EIB loan, Demir Kapija – Smokvica has two traffic lanes (2x3.5 m) and one stopping lane (2.20 m). It begins with the bridge over Vardar River and the two tubes «T1» tunnel (the right-side tube is 1210m long, the left-side - 1260 m) and also the two tubes „T2" tunnel (the right-side tube is 1285 m long and the left-side - 1155 m). The width of traffic lanes in tunnels is 2x3.50 m. The maximum driving speed along the route is 120 km/h and in the Tunnels "T1" and "T2" to 80 km/h. Tunnels on this Section are equipped by variable messages signaling, phone call equipment, ventilation system and fire alarm and are connected with the Remote Control and Management System at the Negotino Traffic Control Center (TCC). The other highway parts, as well as structures on this section, are not equipped by devices or equipment for traffic control and management. Southern part includes following interchanges: Gradsko "West", Gradsko "East", Stobi, Negotino (central part), Negotino, Demir Kapija, Miravci, Smokvica, Negorci, Gevgelija and BC "Bogorodica".

Traffic load data (AADT) on A1 highway are collected upon available traffic count data from individual counting points collected at the Public Enterprise for state roads (PESR). In general, the traffic load in last few years has increased mainly due to opening of highway section Demir Kapija – Smokvica. There is a noticeable difference between a winter and a summer traffic load. The peak summer traffic load is in July and August due to tourists' movements. Also, the increase of freight transit share from today's 10% to 20-30% in the period of next five years is expected. AADT in summer months grows above 30%, which makes the deployment of ITS even more important element on Corridor X.

Overall, the Project for Implementation of ITS on highway A1 will improve safety conditions along the Pan-European Corridor X from BC Tabanovce with Serbia to the BC Bogorodica with Greece (174km), including 20 km sections connecting Corridor X with Skopje. Main strategic objective of this project is the development of ITS system and provide real time information for Corridor X users.

The latest AADT data for the period 2020-2021 has decreased due to Covid 19 Pandemic (strict restrictions on movement). From 2022, noticeable increase of AADT is evident again. The real AADT data from the PE for state roads for the last three years (2019, 2020 and 2021) are given in the table below. The data for 2020 and 2021 are very low due to Covid 19 Pandemic outbreak. The AADT data for 2019 show significant increase of vehicles along Corridor X. As per real AADT data, the REBIS projects on AADT was surpassed, and we expect to surpass in the years starting from 2022.

Table 1. AADT for Corridor X in North Macedonia for years 2019, 2020 and 2021 (Source: PESR)

State no.	Count place		Corridor X (Highway A1)	AADT		
	No.	Type		2019	2020	2021
A1	3449	AC	BC Tabanovce (with Serbia) - Kumanovo	11435	4551	7920
A1	3450	AC	Kumanovo – Miladinovci	15002	5837	7367
A1	3	MC	Miladinovci - Petrovec	11254	6185	8823
A1	02+36	AC	Petrovec – Veles and vice-versa	14931	7754	10994

A1	3451	AC	Veles – Gradsko Interchange	12051	5587	8268
A1	3452	AC	Gradsko Interchange – Negotino Interchange	6156	3603	5552
A1	3453	AC	Negotino Interchange – D. Kapija Interchange	8967	3012	4097
A1	3448	AC	D. Kapija Interchange – Miravci Interchange	8305	2975	3136
A1	3454	AC	Miravci Interchange – Smokvica Interchange	7840	2640	4022
A1	3455	AC	Smokvica Interchange – Gevgelija Interchange	9421	3963	5930
A1	3456	AC	Gevgelija Interchange – BC Bogorodica (with Greece)	10650	4052	4159

AC – Automatic fixed traffic counters

MC – Mobile traffic counters

The ITS project defines the technical solutions for the implementation of ITS that will constantly and in real time show the situation along the entire Highway. This is made possible through the automatic collection of data on: weather conditions, traffic load, the status of light signaling and the status of various messages, the status of the functioning of devices and all sensors, the status of transmission cables, recording, recording of offenders and recording of extraordinary situations.

At the moment, there is no applicable legislation that regulates the punishment of the drivers, who are recorded while they didn`t follow the traffic rules. Video surveillance already exist on new/reconstructed Toll stations along Corridor X. Camera recordings and materials from this type of object on the routes are regulated according to the Law on Public Roads (Article 65-b),Law on personal data protection and in compliance with procedures of the Ministry of Interior (for offenders).

Meanwhile, the National ITS Strategy (under preparation) will set-up these elements and later, the national legislation will be amended accordingly.

In summary, the ITS covers the following segments:

- light traffic signaling;
- meteorological stations;
- video equipment for route data;
- devices for control and management of the route and the local communication network;
- emergency phone calls;
- information and communication functional network;
- supporting structures;
- construction projects for the planned installation of equipment;
- NTMC in Petrovec (existing objects operated by PESR)
- traffic control center - operations center, hardware and software (in the existing facility in Negotino control center, operated by PESR);
- cable conduit for optical cable.

Figure 2 Example of ITS

2.1 Project macro location

The Highway A1 extends from the northern to the southern part of the Republic of North Macedonia (RNM), passing through the central areas near the cities of Kumanovo, Skopje, Veles and Gevgelija. It is equipped with basic traffic equipment, vertical and horizontal traffic signals, direction posts, guardrails and fence.

The Highway A1 begins at the border with Serbia, at the BC Tabanovce, which is divided into two spatial parts - the Northern part (74 km long) and the Southern part (98 km long). The Northern part starts at the BC Tabanovce and extends to the junction “Veles-South”. The Southern part starts at the “Veles-South” junction at chainage km 74+950.00 and ends at the BC Bogorodica, with the fact that the design will be aligned (and possibly upgraded) with the already designed and installed ITS on the Demir Kapija - Smokvica section.

Figure 3 The macro location of the Intelligent Transport System

2.2 Ecological category

The World Bank implements protective policies aimed at accelerating the efficient identification of potential negative environmental impacts and social aspects of the project, as well as mitigating them.

In order to avoid, minimize or mitigate environmental and social risks and impacts associated with the sub-projects during their selection, preparation and implementation, as well as to enhance the environmental and social outcomes of the Western Balkans Trade and Transport Facilitation Project, the Environmental and Social Management Framework (ESMF) has been developed. The ESMF provide compliance requirements for future project sites which would satisfy both, national requirements of the Republic of North Macedonia and the World Bank.

The Bank classifies a proposed project into one of four categories (A, B, C, FI), depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts:

- Category A: proposed project is classified under this category, if it is likely to have highly significant, diverse, and/or long-term adverse impacts on human health and valuable natural or cultural resources. These impacts may also affect an area broader than the sub-project sites.

- Category B: A proposed project's potential adverse environmental impacts on human population or environmentally important areas – including wetlands, forests, grasslands, or other natural habitats-are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases migratory measures can be designed more readily than Category A projects.

- Category C: A proposed project is likely to have no, minor or minimal adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

- Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in sub-projects that may result in adverse environmental impacts.

The initial Screening and Scoping during the Project preparation have determined that the Project will have low to moderate impacts which should be easily mitigated with proposed mitigation measures. The impacts are less adverse, limited, site-specific, and reversible and are considered as a **Category B Project**. The Project triggers OP.BP 4.01 WB Safeguard policy on Environmental Assessment which provides effective and rigorous screening criteria to eliminate any sub-project potentially affecting adversely the social and natural environment.

This particular sub-project envisages deployment of ITS on Highway A1 (BC Tabanovce - BC Bogorodica), in the length of 174 km. The sub-projects activities according to the ESMF are within the Component 2: Enhancing transport efficiency and predictability, Sub-component 2a): Intelligent Transport System (ITS). In order to categorize this sub-project, the Environmental and Social Screening Check List has been developed, completed by the proponent and submitted to the PIU. In accordance to the ESMF and this specific environmental and social due diligence instrument, none of the impacts is expected to be large-scale or irreversible. Therefore, this particular sub-project has been classified as Category B in accordance with World Bank operation policies.

For the sub-project for ITS on Highway A1 (BC Tabanovce - BC Bogorodica), after the approval of Project Categorization performed in Environment and Social Screening (ESS) Checklist, the Environmental and Social Due Diligence Instruments that the Proponent prepared is this document - Environmental and Social Management Plan (ESMP). This document was prepared after completion and submission of ESS Checklist to the PIU, in accordance to the ESMF, the activities corresponding to the World Bank Category B Projects required to have an Environmental and Social Management Plan in place prior to approval that would identify potential environmental impacts and provide adequate mitigation measures.

2.3 Project micro location

The deployment of ITS is planned to take place parallel to the Highway A1 (within the road belt). The route starts from BC Tabanovce and will be led from the left side of the Highway looking in a southerly direction at a distance of a few meters from the stop lane.

Starting from BC Tabanovce the planned route of the cable ducting follows the Highway A1 on Corridor X in the direction of Greece on its left side, passes the settlements Rechica, Konjare, Kumanovo, Romanovce toll station, Miladinovci interchange, Miladinovci toll station and Petrovec interchange. The NTMC will be located at Petrovec Interchange, in the existing building of the PESR (maintenance part). Corridor X is passing 20 km east from Skopje, therefore, the sections Interchange Miladinovci (on Corridor X) - Interchange Hipodrom (entrance to Skopje) and section Interchange Hipodrom - Interchange Petrovec (Corridor X) considering the intensive daily traffic and heavy vehicles traffic between Corridor X and the City of Skopje, through the mentioned sections, this project also envisages deployment of ITS on the Miladinovci – Hipodrom and Hipodrom – Petrovec Sections.

Furthermore, after Petrovec Interchange, the route continues to Katlanovo East interchange where the two directions of the Highway separate, and the cable route follows the direction from Veles to Skopje on its left side, looking in the direction to the south. The cable route passes Otovica toll station and continues to the Veles East interchange where the two directions of the Highway bond. From Veles East junction, the route again continues on the left side of the Highway in the direction seen to the south. Along the way, the route passes near the following settlements: Gradsko, Stobi, Negotino until Demir Kapija, i.e., to the junction with the new section on Corridor X, Demir Kapija - Smokvica, where a cable ducting has already been constructed and it will be used for the realization of this project.

After the completion of the new section, i.e., from the settlement Smokvica the newly planned cable ducting will continue south from the left side of the Highway through the settlements of Miravci, Negorci and Gevgelija to BC Bogorodica.

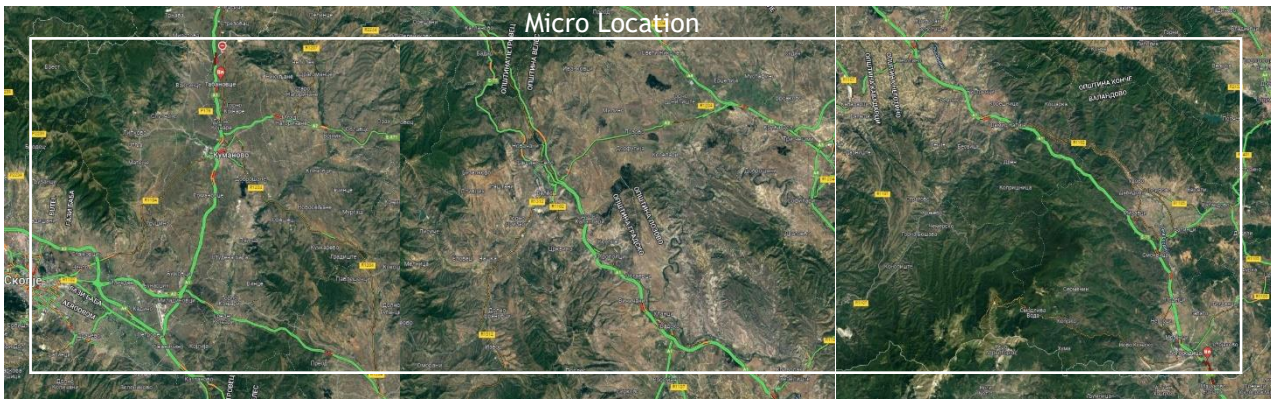


Figure 4 The micro location of the ITS

2.4 Description of the existing road

Project activities for the construction of the ITS are planned to take place parallel to the Highway A1 (within the road belt). The Highway A1 is equipped with basic traffic equipment, vertical and horizontal traffic signals, road marking posts, guardrails and fence. An open tooling system is currently in operation along Corridor X in North Macedonia.

The ITS will be deployed along Corridor X, which extends from the northern to the southern part of the Republic of North Macedonia, which passes through central areas near the cities of Kumanovo, Skopje, Veles and Gevgelija. The length of the route is ≈174 km. Since the ITS passes through the entire length of the Republic of North Macedonia, it passes through several municipalities that are embraced in 4 Planning Regions: Northeast, Skopje,

Vardar and Southeast regions. The municipalities through which the route passes are: Kumanovo, Ilinden, Petrovec, Veles, Gradsko, Rosoman, Negotino, Demir Kapija and Gevgelija.

The Highway A1 begins at the border with Serbia, at BC Tabanovce, which is divided into two spatial parts - the Northern part (74 km long) and the Southern part (98 km long). The Northern part starts at the BC Tabanovce and extends to the junction "Veles-South". The Southern part starts at the "Veles-South" junction at chainage km 74+950.00 and ends at the BC Bogorodica.

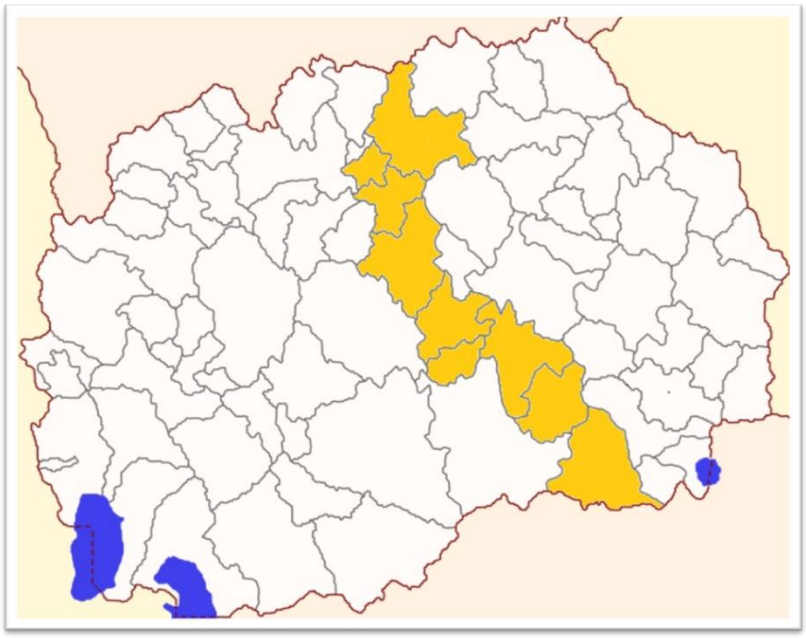


Figure 5 Administrative map of RNM with marked municipalities through which the ITS passes (along Corridor X)

Northern part and Southern part

In the subject project documentation, the Highway A1 is divided into two spatial parts:

- Northern part: BC Tabanovce – Skopje – Veles South Interchange;
- Southern part: Veles South Interchange – Demir Kapija – BC Bogorodica.

The NORTHERN PART consists of:

Subsector I. BC Tabanovce (border with Serbia) - Skopje - Katlanovo, 42 km

It passes through a lowland area, at an altitude of approx. 200-300 meters. A continental climate prevails, with hot and dry summers and cold and wet winters with snowfall. The appearance of fog is pronounced in the winter months.

A full profile Highway with two carriageway and a central belt was built. The carriageways have 2 lanes (2 x 3.75 m) + a stop lane (2.2 m). The maximum permitted driving speed is 120 km/h.

Junctions and pay tolls:

1. Junction "Konjare" - chainage km 9+000, junction with A2 (E871) direction towards BC Deve Bair with Bulgaria;
2. Junction "Kumanovo" - chainage km 12+000, connection to the city of Kumanovo;
3. Paytoll "Romanovce" - chainage km 15+500, toll station;
4. Junction "Rafinerija OKTA" - chainage km 28+000;

5. Interchange “Miladinovci” - chainage km 30+000, merging with A2, northern entrance to Skopje via junction “Hipodrom” (10 km):

5.1. Paytoll “Miladinovci”;

5.2. Junction “TIDZ Skopje 2”;

5.3. Junction “Ilinden 1”;

5.4. Junction “Ilinden 2”;

5.5. Merging of Interchange “Hipodrom”;

6. Junction “Aerodrom” - chainage km 33+500;

7. Interchange “Petrovec” - chainage km 35+000, merging with A4, eastern entrance to Skopje via junction “Hipodrom” (11 km):

7.1. Entrance-exit “Petrovec 1”;

7.2. Paytoll “Petrovec”;

7.3. Junction “Idrizovo”;

7.4. Merging of Interchange “Hipodrom”.

The full profile of the Highway ends at chainage km 41+900 (approx. 0.6 km before “Katlanovo” junction).

Subsector II. Katlanovo – Veles South Interchange, 32 km

In subsector II, the carriageways are separated according to the travel direction, that is, the right carriageway is in the direction of Katlanovo - Veles, while the left carriageway is in the direction of Veles - Katlanovo. In the period from autumn to spring there is a pronounced occurrence of fog, precipitation and wind.

Junctions:

1. Junction “Katlanovo” west - chainage km 42+500, right carriageway;

2. Junction “Katlanovo” north - chainage km 42+600 left carriageway;

3. Junction “Veles-North” - chainage km 66+300, right carriageway;

4. Junction “Veles-East” - chainage km 69+990 right carriageway, km 64+700 left carriageway.

5. Junction “Veles South” – chainage 74+950, end of North part for ITS.

Right carriageway:

It passes through hilly terrain, over Pčinja River and Vardar River. From chainage km 41+900 to “Veles-North” junction there are two lanes (2x3.5 m), without a stop lane with occasional stops. Longitudinal elements of the right carriageway limit the driving speed to 60-80 km/h.

From “Veles-North” junction to the next junction of two carriageways at the “Veles-East” junction, the carriageway has two lanes (2x3.75 m) and a stop lane (2.20 m). The permitted driving speed is limited to 100 km/h.

Facilities:

- 3 tunnels with a length of 320 meters, 181 meters and 66 meters;
- several viaducts with a length of 60 to 160 meters;
- 3 places to stop;
- paytoll “Sopot” at chainage km 61+500;

- plug (separation-connection) to Mladost lake at chainage km 61+900;
- resort area at chainage km 54+200.

Left carriageway:

It passes through hilly terrain, above Lake Mladost, with a large number of facilities, on which there is a danger of frost occurrence during winter months. From "Veles-East" junction to the "Otovica" pay toll (chainage km 57+200) the carriageway has two lanes (2x3.75 m + stopping 3.00 m). There is no stopping lane on the facilities. The maximum driving speed is 120 km/h.

From chainage km 57+200 to km 52+500 the carriageway has three lanes (3x3.50 m). There is no third lane on the facilities. The driving speed is limited to 100 km. The route is going uphill.

On the part of the route from chainage km 52+500 - junction "Katlanovo" - km 41+900 (junction of two carriageways) the carriageway has two driving lanes (2x3.75 m) + a stopping lane (which varies around 3.0 m). There is no stopping lane on the facilities and in "Stradza" tunnel. The driving speed is limited to 110 km, in the junction zone 100 km, and in the tunnel 80 km.

The following facilities are on the left carriageway:

- 10 viaducts (range from 90 to 515 meters);
- bridge (range 266 meters);
- a tunnel with a length of 698 meters, one pipe, without an evacuation pipe and exits in case of danger. Not equipped with ventilation, fire extinguishers, telephone for emergency situations;
- paytoll "Otovica" at chainage km 60+000.

The SOUTHERN PART consists of:

Subsector I. Veles - Demir Kapija, 47 km

The full profile of the Highway was built with two lanes and a center lane. The carriageways have 2 lanes (2x3.75 m) + a stop lane (2.5 m). On the part of the route (right carriageway from km 79+500 to km 81+600 and left carriageway from km 78+400 to km 76+600) the profile has three lanes without a stop lane (3x3.50 m). The maximum permitted driving speed is 120 km/h. The route is located in the valley of the Vardar River.

Junctions and pay tolls:

2. Paytoll "Stobi" - chainage km 92+700;
3. Junction "Gradsko" - chainage km 94+900;
4. Junction "Negotino" - chainage km 110+500;
5. Junction "Demir Kapija" - chainage km 126+700.

Subsector II. Demir Kapija - BC Bogorodica (border with Greece) 51 km

It is divided into two parts, namely:

I. section of the Highway from "Demir Kapija" junction to "Smokvica" junction with two carriageways. The length of this section is 34 km, from the Demir Kapija junction to the Smokvica junction.

The route passes through the hilly terrain of the Marijanska Mountains.

It has two junctions, two tunnels, six viaducts, two rest areas and four parking lots. The section is in full profile with two separate carriageways and a central strip.

Each carriageway has two lanes (2x3.5 m) and a stop lane (2.20 m). It starts with a bridge over the Vardar River and the "T1" tunnel, two pipes, right pipe 1,214 m, left pipe 1,275 m. Tunnel "T2", two pipes, right pipe 1,295 m, left pipe 1,155 m. The width of the lanes in the tunnel is 2x3.50 m. It is located in an area where two climatic zones collide, with significant precipitation in the winter period.

From Demir Kapija to Smokvica (it covers Klisura, Miravci and Miletkovo) in a length of 28.18 km, an Intelligent Transport System has already been built.

II. section from the "Smokvica" junction to the border crossing "Bogorodica", with a length of 16 km, is mostly built in a full profile (2x(2x3.75+2.20). The route is in flat terrain, along the Vardar River. Predominantly mild Mediterranean climate. The maximum permitted driving speed is limited to 100 km/h.

The following interchanges are located on that part:

- "Miravci" - chainage km 149+500;
- "Smokvitsa" - chainage km 161+400;
- "Negorci" - chainage km 167+900;
- "Gevgelija" - chainage km 174+200;
- BC "Bogorodica" - chainage km 177+700.

The cadastral municipalities through which the Highway A1 passes are given in the following table no.2:

CADASTRAL MUNICIPALITIES THROUGH WHICH THE HIGHWAY A1 PASSES	CADASTRAL DEPARTMENTS					
	Kumanovo	**Skopje**	**Veles**	**Kavadarci**	**Negotino**	**Gevgelija**
	Tabanovce	Dolno Konjare	Rudnik	Palikura	Kurija	Miravci vongrad
	Gorno Konjare	Deljadrovce	Novachani		Crveni Bregovi 2	Miravci
	Rechica	Tekija	Bashino Selo vongrad		Negotino	Gabrovo
	Kumanovo	Bujkovci	Otovica vongrad		Dubrovo	Miletkovo
	Romanovce	Miladinovci	Otovica		Timjanik	Smokvica
	Agino Selo	Kjojlija	Veles		Tremnik	Prdejci
		Petrovec	Kalaslari		Prdzdevo	Negorci
		R`dzanichino	Crkvino		Demir Kapija	Mrzenci
		Katlanovo	Grchishte		Koreshnica	Gevgelija
		Badar	Zgropolci		Chelevec	Bogorodica
		Breznica	Svekjani			
		Letevci	Vinichani			
			Vodovrati			
			Gradsko			

2.5 Planned project activities

Pan European Corridor X (Salzburg - Ljubljana - Zagreb - Beograd - Skopje - Thessaloniki) is 2.300 km long, it runs through six counties, connects Central and South Europe and it is a part of the European Route E-75. Corridor X enters the Republic of North Macedonia in the north part of the country, at the "Tabanovce" border crossing (border with Serbia), traverses the central part of the state, runs nearby the capital (Skopje) and exits in the south of Macedonia,

at the “Bogorodica” border crossing (border with Greece). The Highway A1 is the high-class road that allows high speeds. Along the Highway there are pay tolls, which imposes a high level of safety and consistency in all traffic and weather conditions. The Highway A1 extends from the north to the south of Macedonia, traverses the central areas near cities of Kumanovo, Skopje, Veles and Gevgelija. It is equipped with the basic traffic equipment, vertical and horizontal traffic signaling, directional poles and guardrails.

On the route of Corridor X across Macedonia, paytolls are open at the following places: „Romanovce“ (16+500 km), „Sopot“ (61+580 km, south lane), „Otovica“ (58+500 km ,north lane), „Gradsko“ (92+700 km), Demir Kapija and Gevgelija.

At the section between 41+900 km till 70+100 km (the right-side of the carriageway) and 65+100 km (the leftside of the carriageway), carriageways are separated: the old carriageway with two traffic lanes is used as the right-side carriageway of Katlanovo - Veles direction and the route of the new built (left) carriageway is used as the oneway carriageway of Veles - Katlanovo direction. After reconnection of both carriageways (at the Veles-East junction), the Highway A1 is the full profile Highway till the „Bogorodica“ border crossing (171+900 km). Carriageways have 2 traffic lanes (2x3.75 m) + the shoulder (2.5 m), except for the part (the right-side carriageway from 79+500 km to 81+600 km and the left-side carriageway from 78+400 km to 76+600 km), where the profile has three traffic lanes (3x3.50 m).

The Highway A1 route till Demir Kapija runs through the Valley of Vardar River. After Demir Kapija Gorge the route goes through the mountainous terrain of the Marijanska mountains and descends towards the lowland part of Gevgelija valley along the Vardar River and ends at BC „Bogorodica“.

In the subject project documentation Highway A1 is divided into two spatial parts – the North Part and the South Part. The exception is the tunnel facilities and the section in the Southern part, between the interchanges Demir Kapia and Negorci, which are completely "covered" with ITS elements from the system, merged into the existing TCC Negotino for that section, which will also represent the future TCC for the entire South Part.

- **North Part**

The 74 km long North Part begins at BC “Tabanovce“ and runs to the „Veles-South“ Interchange.

The National Traffic Management Center (NTMC) will be placed on the North Part at „Petrovec“ Traffic Control Center that is located in the maintenance facility at the „Petrovec“ Interchange zone (existing building).

North Part interchanges:

1. BC “Tabanovce”
2. “Tabanovce”
3. “Rechica”
4. “Kojnare”
5. “Kumanovo”
6. “Rafinerija OKTA”
7. “Miladinovci”
8. “International Skopje Airport”
9. “International Skopje Airport Servis”
10. “Petrovec”
11. Traffic Control Center “Petrovec”
12. “Hipodrom”

13. “Katlanovo”
14. “Otovica”
15. “Ezero Mladost”
16. “Veles North”
17. “Veles East”
18. “Veles South”

- **South Part**

The South Part begins at Veles-South interchange at 74+950 km, in the mainly lowland area with relatively mild, sub Mediterranean climate near the Vardar River. After Demir Kapija Gorge the Highway route crosses the Vardar River, runs through the mountainous terrain of the Marijanska mountains and descends towards the lowland part of the Gevgelija valley along the Vardar River and ends at BC „Bogorodica“.

Tunnels at Demir Kapija – Smokvica section are equipped by variable messages signaling, phone call equipment, ventilation system and fire alarm and are connected to the Remote Control and Management System at the “Negotino” Traffic Control Center (TCC). The other route parts as well as structures on this Section are not equipped by devices or equipment for traffic control and management.

South part interchanges:

19. “Gradsko West”
20. “Gradsko East”
21. “Stobi”
22. Negotino (central part)
23. “Negotino”
24. “Demir Kapija”
25. “Miravci”
26. “Smokvica”
27. “Negorci”
28. “Gevgelija”
29. BC “Bogorodica”

Weather Conditions Overview at Highway A1 Area

Relatively small territory of North Macedonia is exposed to the sub-Mediterranean climate (from the south) and to the sharp continental climate (from the northwest). During winters on the territory of the whole North Macedonia prevails air flows from the northwest direction („Vardarac“ wind). Temperatures are low and the number of days with frost is huge. Summers are hot and dry.

Temperature, precipitation and windy conditions during the cold season of a year are the risk factor for the traffic flows, safety and for the road maintenance.

In order to make decisions on locations for weather stations along the Highway route, that are very important for traffic safety as well as for roads' maintenance costs in winter conditions, data of the National Hydrological and

Meteorological Service were used. In total 17 meteorological stations are envisaged (10 on the north part and 7 on the south part).

Objectives of ITS Project for Traffic Management and Control

The objective of the Highway A1 ITS Project development (Intelligent System for Traffic Management and Control) is to equip roads with traffic-technical and telemetry systems on the built up Highway profile and all road structures, taking into account climate zones, terrain types, traffic oscillations, vehicle structures etc.

The reason is increasing the traffic safety by dynamic responding to the current route and climate conditions. The current data recording on traffic and weather conditions and switching proposals (warnings, speed limits, current status information) are very important functions of the traffic impact system at the level of each Highway section. Reliability of these weather-conditioned switchings is the basis for accepting and supporting behavior of traffic participants.

The ITS defines technical solutions of ITS implementation that will permanently and in the real time display the state along the entire Highway route; it is possible due to the automated data collection on weather conditions, a traffic load, a light signaling status and a status of variable message signaling, functioning status of devices and all sensors, a transmission lines status, offenders recording and an atypical situation recording.

Fulfillment of a task implies security, reliability and efficiency in a hierarchical distribution of the appropriate management level, from a local operation through certain subsystems, till a future Integration Supreme System (the NTMC).

To make the process of the road traffic secure at the level of the operator (PESR or other entitled entity), efficient and fully satisfactory for traffic participants, all involved processes must function equally efficiently and reliably:

- road traffic based on use of Highway infrastructure;
- process of Highway infrastructure maintenance;
- preventive action process that includes road traffic regulation and control;
- reactive action process involving all forms of assistance and traffic troubleshoot in case of any;
- interruption or accident;
- customer information process;
- planning and improvement process in which responsible services of road maintainer or owner take part;
- traffic flow harmonization process at the state or interstate level.

This ITS project refers to the implementation and construction of technical systems that enable the implementation of traffic management in the implementation of the above services; all together constitute the ITS.

It covers the following segments:

- light traffic signalization;
- meteorological stations along the route (17 in total);
- video-equipment for data on the route;
- devices for control and management of the route and the local communication network;
- emergency phone calls;
- information and communication functional network;

- supporting structures;
- construction projects for the planned installation of equipment on the route;

  NTMC in Petrovec;
- Traffic control center - operational center, hardware and software (TCC in Negotino).

Variable message signaling

Variable Message Signals (VMS) are used on Highways to display and transfer to drivers the following group information:

- text messages;
- restrictions and prohibitions;
- current traffic status (traffic jams, incidents, etc.);
- current weather conditions (wind, rain, ice, fog);
- current maintenance works.

Portals are used for placing the light signs provided by this project documentation, which are placed over several traffic lanes. Due to the different widths of the Highway A1, two types of steel portals of different spans with two sub-types for each of the spans are planned to be installed along Corridor X.

For spans up to 15 m, the following two sub-types of steel portals are used:

- The steel portal type CPI-1500 is a portal with a span of L=15.00 m, designed as a load-bearing portal for an info display with 7,000/1,700 mm dimensions and 1,000 kg weight.
- The steel portal type CPI-1500 is a portal with a span of L=15.00 m, designed as a load-bearing portal for traffic signs or static info plates with 5,200/1,300 mm dimensions and 270 kg weight.

For spans up to 18 m, the following two sub-types of steel portals are used:

- The steel portal type CPI-1800, is a portal with a span L=18 m, designed as a load-bearing portal for an info display with 7,000/1,700 mm dimensions and 1,000 kg weight.
- The steel portal type CPI-1500 is a portal with a span of L=15.00 m, designed as a load-bearing portal for traffic signs or static info plates with 5,200/1,300 mm dimensions and 270 kg weight.

The foundation of the steel portal is planned as a massive pad foundation with dimensions appropriate to the type of portal and its installation location. It is planned to be concreted with concrete brand C35/45 based on the “Technical regulations for concrete structures” and B 500B reinforcement will be used.

After concreting the foundations, it is necessary to embank the foundation with the excavated material, thus conducting the embankment in layers of 30 cm evenly in all four sides with mandatory compaction.

Weather station

For the collection of microclimate data from the highway route, the Project foresees appropriate weather stations. Automatic weather stations are an integral part of road equipment intended for analysis of the state of the highway surface and atmospheric conditions for surveillance purposes.

Based on the collected data on the weather conditions on the highway, the locations with the possibility of the fastest change in the weather conditions are determined; weather conditions are measured on each highway section, because it is an important part of the management function.

The ITS project is categorised as 'do no significant harm' principles and the Paris Agreement, as benefits will enhance actions that are related to early warning systems, digitalisation, safety, sustainability, emergency preparedness, comprehensive risk assessment and traffic management, decarbonisation, innovations and less damages.

As part of the global effort in combating climate change, the Western Balkan Six countries committed to reduce their Green House Gases (GHG) emissions and identified a number of policies and measures to achieve such related targets. Therefore, modernizing transport infrastructure and services, as well as improving traffic flows will support the efforts to achieve their climate change mitigation targets, including those that have been put forward as part of their Nationally Determined Contributions (NDCs) under the UNFCCC (where transport is included as a priority sector).

Specifically, GHG emissions reductions and mitigation co-benefits will be achieved through activities in Components 1 (NSW) and 2 (ITS) of the WBTTFP Project: (i) digitalization of customs clearance process through the adoption and implementation of National Single Window (NSW) will reduce the use of paper and demand for traveling and transport of government officials and traders; (ii) faster crossing will reduce truck idling times at border crossing points, (iii) construction works at existing and new border crossing points will include installation of solar panels, energy efficiency improvements on buildings, and planting trees around parking areas.

Weather stations (or more convenient the locations for HAZMAT) that will be installed within investments for Intelligent Transport Systems (ITS) will collect data and monitor GHG emissions from road transport (specifically Short-lived Climate Pollutant (SLCP) with a high climate-warming impact emissions causing air pollution). This data is scarce for all regional participants, which increases their value for further research related to air quality management and climate action. The information that will be collected through GHG (SLCP) emissions monitoring systems will help linking specific climate change and development priorities (e.g., mitigation, adaptation and improving air quality) and be a valuable support to governments of the WB6 in developing regulatory and policy reforms and institutional strengthening for pursuing low-emissions development.

Deployment of ITS will increase the climate-resilience of transportation networks, more specifically with the installation of Road Weather Information System (RWIS), which consists of road weather stations built to collect data on weather conditions and air pollution and an early warning system along corridor X, which is a system for monitoring stability of bridges, tunnels, embankments, landslides and slopes (resilience dimension). The weather stations shall become part of the meteorological services' monitoring network, which may use the data to further refine their predictions and emit regional alerts related to extreme weather events (such as storms, flooding events, etc.) or alerts on air pollution. This information will be sent to the ITS control centers which, following a previously designed protocol, will display warning messages along the potentially affected areas and provide alternative routing, recommended mitigation measures vis-à-vis air pollution, and safety recommendations to road users. The control centers will also have direct access to the weather stations' data (and/or HAZMAT stations) in order to display warning messages on real time weather conditions or air pollution and improve communication and responses in the event of a natural disaster or pollution. Monitoring GHG emissions (SLCP) will contribute to climate change mitigation and building resilience in participating beneficiaries by supporting policy development and additional activities in pursuing low-emissions development path in the WB6. This data is scarce in all WB6 regional participants, which increases their value for further research related to air quality and reducing SLCP emissions from road transport.

Cable conduit for fiber optic cable

Project documentation also provides installation of a cable channel for an optical cable to connect the ITS for advanced signaling and monitoring of Corridor X.

The route of the cable ducting will be laid inside the regulation line of the road (road belt) and will be run in parallel to the Highway. The route starts from BC Tabanovce and will be led from the left side of the Highway looking in a southerly direction at a distance of a few meters from the stopping lane.

Starting from BC Tabanovce, the planned route of the cable ducting follows the Highway A1 on Corridor X in the direction of Greece on its left side, passes nearby the settlements Rechica, Konjare, Kumanovo, Romanovce toll station, Miladinovci interchange and continues to the Petrovec Interchange. The main control center – NTMC will be located at Petrovec Interchange (maintenance part area). From this center, a branch will be separated in the direction of Skopje, from the right side of the road to the road junction in Ilinden, where it joins the Highway branch from the toll station Miladinovci to Skopje. From Miladinovci toll center, the route makes a loop and returns in direction of Petrovec toll station, on the right side of the Highway until the toll station.

Furthermore, after Petrovec toll station, the route continues to Katlanovo East interchange where the two carriageways of the Highway separate, and the cable route follows the direction from Veles to Skopje on its left side, looking in the direction to the south. The cable route passes Otovica toll station and continues to Veles East interchange where the two carriageways of the Highway bond again. From Veles East interchange, the route again continues on the left side of the Highway in the direction seen to the south. Along the way, the route passes nearby the following settlements: Gradsko, Stobi, Negotino until Demir Kapija, i.e., to the interchange with the new section of Corridor X, Demir Kapija - Smokvica, where a cable ducting has already been constructed and it will be used for the realization of this project.

From Smokvica onwards the cable ducting will continue south from the left side of the Highway, that passes nearby the settlements of Miravci, Negorci and Gevgelija, up to BC Bogorodica.

Based on the situational solution for the position of the cable channel, it is possible to adopt a solution with a typical trench for the installation of the pipe.

The adopted embedment depth of the pipes is the result of the conditional requirements to ensure minimum thicknesses of the overlay above the highest point of the pipe. The depth of the trench will be 80 cm, taking into account the thickness of the substrate of fine sand, i.e., the number of rows of pipes. When passing under the carriageway, the same depth of installation of the pipes is foreseen. For the introduction of the pipes into cable ducts, the use of typical hard PVC inlets is foreseen. The basic configuration of 3 x Ø110 PEHD pipes is laid on the entire route along the road, outside the buildings. At the crossings under the road, four pipes made of high-density polyethylene PEHD with a diameter of Ø110 are foreseen. For the connection of the cable ducting, the installation of typical, prefabricated concrete cable shafts is envisaged.

Description of the works and performance conditions (by the Contractor/s)

Preparatory works

Preparatory works include all the works that are carried out for the purpose of organization for the construction site and the application of certain technologies for performing the works.

The staking of the route covers:

- All geodetic measurements with which project data are transferred to the field;
- Staking out is secured;
- Renewal and maintenance of markings and stakes in the field during construction, i.e., before handing over the works to the Investor.

Earth works

The following activities are included:

- Trench excavation for pipe laying;

- Excavation of a pit for installation of cable shafts;
- Arrangement of the trench bottom;
- Preparation of sand bases;
- Ducting trench fill.

Excavation of the trench is carried out in soil material, with vertical notched sides, the material from the excavation is placed laterally 1 meter from the edge of the excavated trench. If the ground works affects to the carriageway, it is necessary to restore it to its original condition after the completion of the works.

The position, width and depth of the trench are defined in the project. The width of the trench depends on the number of pipes in one row, the distances between the pipes, the width of the space required for manipulating the pipes and the depth of the trench. The width for manipulating the pipes is 10 cm on both sides of the pipes.

Excavation of the trench is mechanical or manual, especially in the parts that are close to other installations or in embankments with a greater slope. Works can be performed without leaning. If there is a need for propping, the method will be proposed by the Contractor, depending on the quality of the excavated material and will be approved by the Supervisory Authority.

Any loose material created by the excavation must be compacted and bonded with the surrounding hard substrate. The bottom of the excavated trench must be clean of debris and other material. During the excavation, it is necessary to ensure the exhaustion of water that will come into the trench in any way. The contractor is obliged to keep the construction pits clean and free of water. The excavation should be supported by a suitable structure.

The position, shape and dimensions of the construction pit are defined by the projected cable shaft and ensuring the necessary working space for the construction of the shaft. The depth of the pit is defined in the project.

Rough excavations with soil material should be completed 0.2 m above the projected elevation, and the excavation at the projected elevation should be performed immediately before the sand bottom of the shaft is constructed. The bottom of the construction pit should be well compacted. The required density according to Proctor's standard is:

- Earth Coherent Ground 97%;
- Coarse-grained earth or mixed soil 95%.

The construction of the filling of the cable trench implies the installation of a layer of sand with a depth of 10 cm under the pipe, a sand coating around the pipes and the construction of a sand layer of 10 cm above the highest vertex of the pipes.

Natural or crushed sand with fractions of 0.09 - 2.0 mm without clay components (max 5%) and organic impurities (max 5%) can be used for the production of the cable bed and coating. After the construction of the bed and the laying of the pipes and the coating, the trench is backfilled by compaction in layers of 20 cm. The distance between the top of the uppermost trench of pipes and the height of landscaping should be min 50 cm for footpath and green belt (bank-berm), and min 80 cm for pavement. In places where it is not possible to achieve this distance, special protection measures are applied, that is, the pipes are laid in a concrete lining. After installing the cable shaft, the remaining part of the construction pit is filled with material from the excavation.

Construction of cable ducting

The performance of cable ducting implies the installation (laying, splicing and conduit bushings) of the cable ducting pipes in the projected position.

High-density polyethylene pipes (PEHD) are used for the production of cable ducting in accordance with the technical conditions for polyethylene pipes for cable ducting according to DIN 8074.

This project envisages the use of polyethylene pipes, which are much more flexible for installation and have a longer length of coil packaging, thus reducing the number of necessary extensions. The pipes are extended with couplings that should fully match the quality of the pipe, and the installation should be simple and efficient. The pipes are laid in a prepared trench. After they are joined and connected to a cable duct, they are buried. The first laid row of pipes is filled with a layer of sand, which is carefully compacted with a manual compactor. A coating of sand with a minimum thickness of 10 cm is performed above the top row of the pipe. A minimum of 3 pieces of PEHD pipes with a diameter of 110 mm are laid along the entire length of the route.

At the crossings under the road, PE pipes are installed at a depth of 120 mm under the carriageway, so that the material from the top layer is not less than 80 cm. At the crossings under the road, a minimum of 4 pieces of PEHD pipes with a diameter of 110 mm are installed.

If the overlay must be less than 80 cm, the pipes should be covered with loose concrete. Pipes are introduced into cable shafts with the help of an inlet that is placed in the side walls of the cable shaft and then they are concreted. Before concreting, the inlet should be smeared with glue on the outside and rolled in sand. The water tightness between the pipe and the joint is performed with a rubber seal.

Concrete works

In order to maximally rationalize the performance of cable ducting, the installation of finished cable shafts manufactured for appropriate use, designed and manufactured in accordance with appropriate rules and recommendations is foreseen.

Table 3 Planned project activities on ITS deployment

Project activities for the project: Deployment of ITS on Highway A1 (BC Tabanovce - BC Bogorodica)	
Project phases	**Project activities**
Design phase	• Development of relevant technical documentation – (studies and elaborates) and different investigations related to the design of the ITS; • Collection of the opinions from various authorities related to the location and characteristics of the project; • Findings from preparatory studies (OHS, Plan for fire protection), investigation and restriction received by authorities had been taken in consideration during the Detailed design development.
Pre-construction and Construction phase	• The staking of the route covers: All geodetic measurements with which project data are transferred to the field; Staking out is secured; Renewal and maintenance of markings and stakes in the field during construction, i.e., before handing over the works to the Investor; • Earth works includes: Trench excavation for pipe laying; Excavation of a pit for installation of cable shafts; Arrangement of the trench bottom; Preparation of sand bases; Cable ducting trench fill; • The main activities are equipping the A1 Highway with traffic-technical and telemetry systems on the built profile of the highway and all structures on it, taking into account climate zones, terrain types, traffic oscillations, vehicle structures, etc.; • This ITS project refers to the implementation and construction of technical systems that enable the implementation of traffic management of the services and that Includes: light traffic signalization on the route; meteorological stations along the route; video-equipment for data on the route; devices for control and management of the route and the local communication network; information and communication functional network; supporting structures; construction projects for the planned installation of equipment on the route; NTMC, traffic control center - operational center, monitoring of GHG pollutants, hardware and software; • Variable Message Signals (VMS) are used on Highways to display and transfer to drivers the following group information: text messages; restrictions and prohibitions; current traffic status (traffic jams, incidents, etc.); current weather conditions (wind, rain, ice, fog); current maintenance works; • Portals are used for placing the light signs provided by this project documentation, which are placed over several traffic lanes. Due to the different widths of the Highway A1, two types of steel portals

	of different spans with two sub-types for each of the spans are planned to be installed along Corridor X (The steel portal types: CPI-1500 and CPI-1800); • Weather station, for the collection of microclimate data from the highway route; • Provides installation of a cable channel for an optical cable to connect the ITS for advanced signaling and monitoring of Corridor X; • Construction of cable channels. The performance of cable ducting implies the placement (laying, joining and conduit sleeves) of the pipes in the projected position. The implementation of the pipes into cable ducts, the use of typical hard PVC inlets is foreseen. • Establishment of WIM and HAZMAT. • Implementation of the ESMP measures during pre-construction and construction phase.
Operational phase	• Regular operation and maintenance of the ITS system; • Implementation of the ESMP measures during operation phase.

2.6 Environmental and social baseline information

Deployment of the ITS stretches from the northern to the southern part along Corridor X in the Republic of North Macedonia. The length of the highway A1 is 174 km. The municipalities through which the route passes are: Kumanovo, Ilinden, Petrovec, Veles, Gradsko, Rosoman, Negotino, Demir Kapija and Gevgelija.

The following subchapters will describe the baseline information and characteristics of the environment and social aspects through which the route passes.

2.6.1 Demography

Total resident population of the Republic of North Macedonia, by municipalities according to the 2021 Census data is as follows (Table 4):

MUNICIPALITY	TOTAL RESIDENT INHABITANTS
Kumanovo	98.104
Skopje	526.502
Veles	48.463
Gradsko	3.233
Rosoman	3.796
Negotino	18.194
Demir Kapija	3.777
Gevgelija	21.582

In the total, resident population of the Republic of North Macedonia, 50.4% are women and 49.6% are men.

According to the age structure, the largest percentage of the population 7% - are in the age group of 40 to 44 years. A curiosity is that in North Macedonia, 51 people over the age of 100 were registered.

According to their religious affiliation, 46.14% declared themselves as Orthodox, 32.17% as Muslims (Islam), 0.37% as Catholics, as well as a number of other religious communities that were not present in the previous censuses, such as: Evangelical Protestant Christians, Agnostics, Buddhists, and others.

61.38% of the enumerated population stated that their mother tongue is Macedonian, 24.34% Albanian, 3.41% Turkish, 1.73% Romani, 0.17%, Vlach, 0.61% Serbian, and 0.85% Bosnian. The number of households is 598 632, and the average number of household members is 3.06.

The number of highway A1 users, expressed as AADT is presented in Table 1. In average 70.000 vehicles per day are using the Corridor X. The frequency of transit tourists along the Corridor X increases over summer period for 30%.

2.6.2 Climate features

The relatively small territory of the Republic of North Macedonia is exposed to a sub-Mediterranean climate (from the south) and a harsh continental climate (from the northwest). During the winter period, the air flows from the north ("Vardarec" wind) prevails throughout the territory of North Macedonia. Temperatures are low and there are many frosty days. Summers are hot and dry. Temperature, precipitation and wind during the winter months of the year are a risk factor for traffic flow and road maintenance.

Weather stations

For collecting microclimatic data along the Highway route this Project provides corresponding weather stations. The automatic weather station is an integral part of the road equipment intended to perform a state analysis of the carriageway surface and atmospheric conditions for monitoring purposes.

Based on data collected about weather conditions on the Highway carriageways, locations with the possibility of fastest changes of weather conditions were detected; each Highway section is provided with weather conditions measurement, because it is very important in the management function.

Automatic Weather Station (AWS) has the electronic device with connected sensors (temperature and humidity sensors, air pressure sensor, rainfall sensor, visibility sensor, wind speed and direction sensor) and carriageways probes, surface and deep temperatures sensor, salt residues measurement sensor.

The program system implementing special weather algorithms represents several categories of data:

- measuring data from the carriageway surface (surface temperature, beneath surface temperature, water layer thickness, quantity of chemical defrosting agents),

- weather measurements (temperature, relative air humidity and air pressure, wind speed and wind direction, precipitation/no precipitation, rainfall intensity and quantity), calculated data (dew point temperature, freezing point temperature),

- warnings (ice alarm, risk of ice warning) and condition of the carriageway (dry, damp, damp with chemicals, wet, wet with chemicals, snowy, freezing),

- weather stations (or HAZMAT) that will be installed within investments for Intelligent Transport Systems (ITS) will collect data and monitor GHG emissions from road transport (specifically Short-lived Climate Pollutant (SLCP) with a high climate-warming impact emissions causing air pollution). The information that will be collected through GHG (SLCP) emissions monitoring systems will help linking specific climate change and development priorities (e.g., mitigation, adaptation and improving air quality) and be a valuable support the Government in developing regulatory and policy reforms and institutional strengthening for pursuing low-emissions development.

2.6.3 Seismology

A large part of the northeastern region belongs to the Vardar tectonic zone, which is a significant tectonic unit. According to the concepts of modern tectonic theory - plate tectonics, this zone is a subduction zone extending eastwards under the Serbian-Macedonian plate. The municipality of Kumanovo is in close proximity to Skopje seismic zone. As of the earthquakes happen so far, the maximum recorded intensity caused by the local epicentral hotspots

is 5 degrees according to the Mercalli scale of intensity. For the area of the city and the immediate surroundings, the longest-lasting maximum degree of expected earthquakes was obtained, which is up to 8 degrees on the same scale.

From a seismic and tectonic point of view, Skopje region together with the city of Skopje belongs to the Vardar seismic zone, in which the epicentral area of Skopje is the most affected by destructive earthquakes. The seismicity of the Skopje Valley with its tectonic processes caused strong and even catastrophic earthquakes in the past.

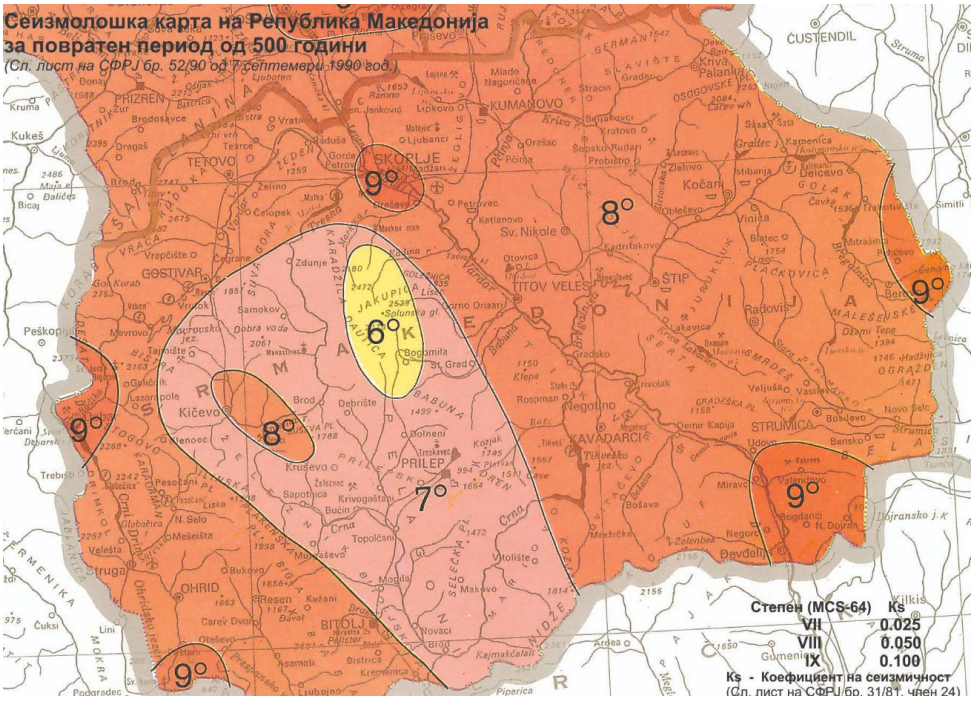


Figure 1 Seismology card for RNM

In terms of the seismological activity, the Southeast region belongs to terrains exposed to moderate earthquakes. Earthquakes originate both from remote epicentral hotspots (Ohrid, Skopje and Valandovo) and from local epicentral hotspots. The territory of the region is characterized by seismological activity with a strength of 9 and 10 according to the MCS. According to the engineering-geological characteristics of the soil in the planning scope, it belongs to an area with unfavorable seismic conditions - seismically very sensitive environments.

2.6.4 Water

The territory of the North-East region includes the catchment sub-areas of the river Pcinja and Kriva Reka and for the most part belong to the Vardar basin, and a very small part to the international basin of river South Morava. In its hydrographic structure, the region has various types of water sources and two artificial accumulation lakes (Lipkovsko Ezero and Glažnja). The water potential is due to the relatively high altitude at which part of the region is located, as well as the geological composition of the land. The region abounds with numerous rivers and small basins belonging to Kriva Reka and Durachka Reka.

The territory of Skopje region includes the catchment area of Vardar River and the catchment area of South Morava. South Morava basin includes the South Morava basin on the territory of the RSM, up to the Macedonian-Serbian state border. This river basin covers the area of Skopje region with the Municipality of Čučer Sandevo. In Skopje Valley, 5 major tributaries flow into Vardar River, from the right side Treska River, Markova Reka and Moranska Reka, and from the left side Lepenec and Serava Rivers. The territory of Vardar region covers the catchment area of Vardar River, that is, the sub-area of Crna Reka. Right tributaries of the Vardar River that enter Vardar planning region are: Crna Reka, Babuna, Bosava and Topolka. In its hydrographic structure, the region has various types of water sources and three artificial accumulation lakes (Tikveshko Ezero, Mladost and Lisiche).

The Southeast region as an area is the poorest in terms of water resources. Although the smallest, Dojran Lake is of great importance for the entire region, both from a hydrographic, economic and tourist point of view. It is located in the southeastern part of the country. Dojran Lake is the third largest natural lake in RSM, which belongs to the catchment area of Vardar River. Strumica and Gevgelija microregions are characterized by thermo-mineral hydro potential. The project site is spread along the A1 highway and will not have negative impacts on water potential nor is there any risk of flooding. The impacts and risks from high precipitation are taken into account in the design phase of the project.

2.6.5 Air quality

In the Republic of North Macedonia, monitoring of the ambient air quality is performed by the Ministry of Environment and Physical Planning, which manages the State automatic air quality system composed of 18 stationary and 2 mobile measuring stations of which 5 are located in Skopje. One of the measuring stations is located in Veles, in Municipality of Gradsko. In this air quality measuring station, monitoring is performed of the following: Sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone and suspended particles with a size of 10 micrometers (PM10). The monitoring station is located in an urban area.

At the monitoring station the only exceedances value is noted for PM10. The number of times the average daily threshold limit value of PM10 at the Veles measuring point in 2020 was exceeded for 123 days.

The expected impacts from air emissions, in the preparation and construction phase of the project, will be minimal, local and temporary.

2.6.6 Waste

Disposal of municipal solid waste and other types of waste is done collectively and individually. Communal waste is collected by Public Utility Companies (PUCs), since the Highway A1 passes by several municipalities.

The following PUCs are responsible for dealing with communal waste in the municipalities:

- PUC Vodovod from the settlement of Kumanovo organized collection of communal waste from settlement Kumanovo. The waste from the Municipality of Kumanovo is disposed on the municipal landfill Krasta;
- PUC Ilinden from the settlement of Ilinden organized collection of communal waste from settlement Ilinden. The waste from the Municipality of Ilinden is disposed on the landfill Drisla;
- PUC Petrovec from the settlement of Petrovec organized collection of communal waste from settlement Petrovec. The waste from the Municipality of Petrovec is disposed on the landfill Drisla;
- PUC Derven from the settlement of Veles organized collection of communal waste from settlement Veles. The waste from the Municipality of Veles is disposed at “Veles municipal Landfill” (near the state road Veles – Stip);
- PUC Klepa from the settlement of Gradsko organized collection of communal waste from settlement Gradsko. The waste from the Municipality of Gradsko is disposed in the locality Golema Glava, near the village Gradsko;
- PUC Rosoman from the settlement of Rosoman organized collection of communal waste from settlement Rosoman. The waste from the Municipality of Rosoman is disposed on the municipal landfill;
- PUC Komunalec from the settlement of Negotino organized collection of communal waste from settlement Negotino. The waste from the Municipality of Negotino is disposed on the municipal landfill, in the locality Bucheto;
- PUC Boshava from the settlement of Demir Kapija organized collection of communal waste from settlement Demir Kapija. The waste from the Municipality of Demir Kapija is disposed on the municipal landfill Kosh;
- PUC Komunalec from the settlement of Gevgelija organized collection of communal waste from settlement Gevgelija. The waste from the Municipality of Gevgelija is disposed on the municipal landfill Suva Reka.

2.6.7 Geology and soil

The soil along the Highway A1 belongs to the Class of undeveloped hydromorphic soils, i.e., soil type of alluvial soil (fluviosol). These soils do not represent only a simple sediment, which serves as a substrate, in which an initial

phase in the genesis of some soils occurs. Even during their deposition, they show the characteristics of any soil, contain humus, organo-mineral complexes, clay minerals and biogenic elements, sometimes have a structure and are characterized by fertility.

The northeastern region has a turbulent geological history, so there are a variety of geological and landforms. On certain mountain parts, rocks almost one billion years old can be found, and in the river valleys of the bigger rivers, the rocks are very young or are being formed even today. The region is distinguished by the appearance of volcanic rocks and structures, which represent remnants of volcanic activity in these areas. In the low, flattened parts, clay materials are present, deposited several million years ago when these areas were under lakes. The geological composition of the flat area in the region, along the river courses in a narrow belt, is made up of Quaternary alluvial sediments which, according to the lithological composition, are composed of gravel, sands and clay-dusty functions. In the territory of the municipality of Kumanovo, flat and undulating hilly terrains are represented as pedogeographic areas. From a geological point of view, the bottom of the Kumanovska valley is covered with neogene (lake) and river sediments. Since the eastern part of the valley was affected by strong volcanic activity, proof of this is the mounds around Sredorek and Stracin and the large basalt slab near the village Nagorichane. Considering the geological features of the Osogovo Mountains in the region, several deposits of lead-zinc ore are located here, in which exploitation is carried out.

The Skopje region belongs to two geotectonic units: the Pelagonian horsten anticlinorium and the Western geotectonic unit of the Republic of North Macedonia, which are characterized by their special lithological composition, tectonic structure and degree of metamorphism. The Skopje Valley was formed by tectonic movements in the Neogene-Eocene, and in the Miocene by additional tectonic movements, it was broken into faults, and then modeled by the action of exogenous processes. The basin is filled with Eocene, Miocene, Pliocene and Quaternary sediments that in some places are more than 1,600 m thick. Skopje Lake existed in the valley, which had its highest level at 900 m, and then rhythmically descended, leaving traces in the form of abrasion terraces. The Skopje region belongs to two geotectonic units: the Pelagonian horsten anticlinorium and the Western geotectonic unit of the Republic of North Macedonia, which are characterized by their special lithological composition, tectonic structure and degree of metamorphism.

The geological composition of the Vardar region is quite mosaic composed of volcanic, metamorphic and sedimentary rocks of different ages from the Precambrian to the youngest Halocene forms. In the region itself, several smaller mesomorphological units can be distinguished such as: Veleshko Pole, Tikvesh, Vitachevo, Boshavia, Raec, Azot and others. All these areas, due to their micro location, are characterized by their own geomorphological, pedoclimatic and vegetation specifics, and as a consequence, an appropriate settlement structure has developed.

The southeastern region includes the basin of the Strumica-Radovishka and the Gevgelisko-Valandovo Basin, specifically the catchment area of the Strumička River and the region of the lower reaches of the Vardar River. The region in its entirety includes the mentioned valleys and the massifs of the Belasica Mountains in the south, Ograždden in the east, Plachkovica in the north, Serta in the central part and Kozuf Mountain on the eastern side. There are also picturesque valleys and rivers in the region. The valleys are - Strumica-Radovishka, Valandovsko-Gevgeliska and Dojranska Valley, then there is also a river network consisting of the rivers Vardar, Strumica, Kriva Lakavica, Konjska reka and others, and here is Demir Kapija (20 km) - the longest and most picturesque gorge in the region.

2.6.8 Flora and fauna

Several plant communities are distinguished along the analyzed area of the route of the A1 Highway: a plant community of oak and oriental hornbeam (ass. *Querco-Carpinetum orientalis macedonicum* Rud. 39 apud Ht. 1946), acacia plantations, agricultural arable land and a community of ruderal plants species.

Excessive exploitation in the past led to changes in the basic plant composition and the appearance of certain types of bushes such as the Christ's thorn (*Paliurus spina - Christi*), *Pyrus amygdaliformes and Prunus spinosa*. Tree

species and the appearance of herbaceous plant species, the most characteristic of which are *Minutartia glomerata, Cornus mas, Euphorbia myrsinites, Ajuga laxmanii, Knautia orientalis, Tunica illyrica, Altea sp.* etc.

The composition of the above community has an influence on the composition of the animal world found in it. From the group of mammals on the site, present are eastern hedgehog, rabbits, field mice, rats, as well as large species of mammals: fox, wolf, wild cat, etc. Bird species found in the area are: pigeon, cuckoo, common sparrow, common owl, wild pigeons, crows, common buzzard, raven, etc. From amphibians, salamander, green frog, common frog, yellow-white frog and from reptiles *Hermann's turtle*, wall lizard, green lizard, river worm and *Caspian snake* were found. In the group of insects, representatives of several groups can be found, the most important of which are representatives of diurnal butterflies and grasshoppers.

The nature monument "Island" is characterized by specific flora and fauna of the former bed of the Vardar River. According to the international status of the diversity of species, it was concluded that the Ostrovo locality has species of fauna that are important for the biodiversity of RSM, but also more broadly, at the European and world level. Namely, 6 species of herpetofauna have the status of protected species in Europe.

Several representative protected areas are partially or completely located on the territory of the Vardar planning region, such as: Jakupica, Dolna Bregalnica, Tikvesh, Demir Kapija Gorge, etc. Other significant representative areas in the territory of the Vardar region are: Taorska gorge, gorge on the river Topolka, Pesti, Eneshevo, Orlovo brdo, Moklishko Lake, Ljubaš, Meshnik, Alshar, Lukar and Doshnica.

The Demir Kapija Gorge canyon is one of the richest ornithological reserves in Europe in terms of the representation of rare birds of prey: *griffon vulture (Gyps fulvus*), *Egyptian vulture (Neophron percnopteruc), golden eagle (Aqyila chrscaetos), snake eagle (Circaetus gallicus), leaf mouse (Buteo rufinus), various falcons (Falco peregrinus, Falco naumanni)*, as well as other rare species of birds. Important species of mammals, reptiles and insects, as well as rare and endemic plants, can be found in Demir Kapija Gorge.

The deployment of ITS will not affect none of the protected areas as, either they are located few kms away from the highway, are in the vicinity, the works will imply only within the road belt of the highway, without occupation of additional agricultural or forest areas.

2.6.9 Noise

The municipalities through which the highway A1 passes are: Kumanovo, Ilinden, Petrovec, Veles, Gradsko, Rosoman, Negotino, Demir Kapija and Gevgelija. Taking into account that the route of the Intelligent Transportation System (ITS) is outside the settlements, the ITS deployment activities at the construction sites will not have negative noise effect over human health and safety. Close receptors, several towns and villages follow the highway, are distributed from: Tabanovce - Miladinovci, Hipodrom - Petrovec, Miladinovci - Veles South and Veles South - Bogorodica. Impacts of noise will appear only during the full construction phase, but will be insignificant and temporary for the closer receptors/road users. The greatest impact of noise and vibration will be on the workers who will perform the construction work or manage the machinery, for whom the Contractor will take appropriate measures for safety and health at work (use of personal protective equipment).

2.6.10 Cultural heritage

The following archaeological sites and churches are located near the section of the A1 Highway (GP Tabanovce - GP Bogorodica) and in its immediate vicinity. However, none of the listed sties will be affected by the deployment of the ITS along Corridor X.

Municipality of Kumanovo:

• Padalište, village Tabanovce, a settlement from Roman times. It is located 500 m on the right side of the Tabanovce-Kumanovo road, and in close proximity to the A1 motorway.

• Church- Kosturac, village. Tabanovce. Medieval settlement. It is located 1 km south of the village, on the left of the Tabanovce-Kumanovo road and 800 m from the A1 highway. On an area of 1 ha fragments of ceramics and building material are found.

• Gradiste, village Gorno Kojnare, a fortified settlement from the Iron Age and Early Antiquity. It is located near the village and the road.

Municipality of Ilinden (city of Skopje)

• Tumba, village Miladinovci, a settlement from Roman times. It is located 1 km southeast of the village, on the right side of the Petrovec - Miladinovci road. It is located on an area of 2 ha where ceramic vessels and building material meet.

Municipality of Petrovec (city of Skopje)

• Shamak, village Rzhanichino, a settlement from the Neolithic era. It is located near the highway, along the old Skopje - Katlanovo road and east of the ZIK Skopsko Pole farm. It is located on a slight elevation where fragments of ceramic vessels, stone and flint tools are found.

Veles municipality:

• Bela Voda, village. Bashino village, a settlement from Roman times. It is located 5 km northeast of the village, near the highway. It is located on an area where the foundations of several buildings, as well as ceramic and building material, have been discovered.

• Kale, Gradiste, village. Bashino Selo, a building from the Late Antiquity period. 2 km northeast of the village, on the left side of the road, there is a high hill with a flattened plateau, on which there are fortification walls, architectural plastic and construction material.

Gradsko municipality:

• Gradiste, village Zgropolci, a settlement built from Roman times. It is located near the A1 highway, 2 km south of the railway station on the right side of Vardar. It is located on the surface of a flattened plateau, where ceramic vessels are found, and a necropolis was discovered on the western side.

• Burlatica, village Vinicani, a settlement from late antiquity and a necropolis from the early Middle Ages. It is located east of the village, to the left of the A1 highway, on an area of 1.5 ha. Parts of marble stone plastic have been discovered, as well as early Slavic graves with a construction of stone slabs and rich grave goods.

• Djurdjevica, village Vinicani, a settlement from Roman times. It is located 3.5 km southwest of the village, and 1 km from the A1 highway. It covers an area of 1 ha where fragments of ceramic vessels, pitos and building material are found.

• Stobi, Gradsko, city settlement from ancient times. It is located in close proximity to the A1 highway on three low terraces that descend towards Crna, surrounded by walls with towers and gates, a rampart with walls and gates.

Demir Kapija municipality

• Demir Gate, temple from early antiquity and Roman times. It is located in close proximity to the A1 highway, next to the Skopje-Gevgelija railway. Remains of a smaller building were discovered, with reliefs, statues, and fragments of ceramics. The site has been dated from the 4th century BC to the 2nd century AD, it is assumed that the sanctuary was dedicated to the Dioscuri.

• Monastery, Demir Kapija, settlement from prehistoric to late antiquity, early Christian and medieval necropolis. It is located on the right side of Vardar on a cut wall, right next to the A1 highway. Numerous remains have been discovered from several layers, from prehistory to the Middle Ages. Early Christian graves and remains of buildings were discovered, as well as an early Christian three-nave basilica with a martyrium area.

• Church, Demir Kapija, an old Christian basilica with a necropolis. It is located on the right side of the A1 highway. The foundations of an early Christian three-nave basilica with a narthex have been discovered. A later one-nave church was built on the central nave. A necropolis was formed around it, which spreads on the northeast side.

Gevgelija municipality:

• Tufka, village. Smokvica, a settlement from the Bronze and Hellenistic times, It is located on the stretch between the railway and the A1 highway, between the railway and the highway on an elongated hill there is ceramic and building material.

• Gajki-Odrina, village. Bogorodica, a settlement from late antiquity. Located 500 m from the A1 highway, ceramic and building materials have been discovered.

• Milova Cheshma, village. Bogorodica, a settlement from late antiquity. It is located near the A1 highway, in close proximity to the state border with Greece.

The identified localities in the wider area of the project scope do not conflict with the planned activities. However, the Chance Find Procedure in compliance with the national legislation should be respected. During the execution of the pre-construction and construction works, the Contractor should be expected to take all measures to prevent damage to artefacts that could be potentially discovered and, in the event of their discovery, to stop the works and for that reason informs the Administration for the Protection of Cultural Heritage, as well as the public institutions for the protection of cultural heritage, in order to involve them and obtain further guidelines for work.

2.7 Sensitive receptors

Local communities who live nearby Highway A1, and workers (who will be engaged during the project activities) will be defined as sensitive receptors during the implementation of the project. Potential environmental impacts and risk assessment for each aspect, is given below. This highway is a high-category road where there is a constant frequency of vehicles, which develop high speeds on the road, which requires ensuring a high degree of safety and reliability. The goal of the development of the ITS project for the A1 Highway is to equip the roads with traffic-technical and telemetry systems on the built profile of the highway and all road structures, taking into account climatic zones, types of terrain, traffic oscillations, the structure of the vehicles, etc.

Sensitive receptors will be also the drivers, passengers or in fact the users of the Highway A1. There is the need to organize the traffic during the construction activities and to provide mechanisms to protect all road users (including road workers). There may be a need to close a lane or part of the highway during the construction phase. It is important to note that the construction site must be organized so that vehicles and workers using site routes can move around safely. This will result in safer work sites for workers and all road users.

As prescribed in the Law on public roads, the Public Enterprise for State Roads (PESR) is responsible body for performing the planning, construction, reconstruction, rehabilitation, maintenance, protection of the public roads, and managing the state roads. The PESR is in charge of the state roads management; constant monitoring and control of the situation on state roads; etc. In that context, there is need to include PESR actively during the construction phase. PESR will be the Final beneficiary of the project, and to regulate the obligations an Implementation Agreement prior project implementation will be signed between MTC and PESR.

Control activities on the roads are in the competences of the Ministry of Interior. Namely, there is a need for mobile unit for traffic safety regulation to continue with regular controls in order to sanction drivers who do not follow traffic rules and regulations on the roads. The control of the driver's behavior should be continued without interruption and adapted to the new conditions related to the constructive phase.

All the regulations that cover this matter will be amended in order to accommodate deployed ITS, its operation, maintenance and functions thereof, including controlling traffic offenders.

3. ASSESSMENT OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACT AND RISKS

In addition to the planned project activities presented in 3 the potential impact and risks that can occur during implementation of the project phases are given in 5.

Table 5 The potential impact and risks during implementation of the project

Possible impacts		
Design phase	***Pre-construction and Construction phase***	***Operational phase***
• Omission related to the planning project realization, including: Permits, Landscape and nature protection, biodiversity protection, soil stability and water quality, flood, increase of traffic/ access difficulties	• OHS risks; • Community safety risks; • Traffic management • Air quality; • Noise; • Waste generation; • Water pollution • Impact to soil;	• Waste generation; • Community (traffic) safety and Privacy risk[1].

As a result of implementation of project activities along the route of the A1 highway where the ITS system will be installed, the main adverse environmental impacts from the sub – projects can be seen through: increased level of noise (temporary generated from construction machinery), possible disturbance of the inhabitants of local communities nearby the Highway A1, users of the Highway A1, possible air emissions, improper waste management, non-compliance with the OHS requirements.

Prior to project activities, the Contractor is required to prepare and implement an OHS plan, including labor management procedures (for the prevention of worker injuries); Traffic management plan with a time schedule of the project activities and directions for diverting the traffic flow if necessary (ensuring proper transport of goods, directions for diverting traffic and safe passage of the local population as well as horizontal or vertical signaling along the project road);

Community Safety Plan (with proper preventive measures which will be part of the project design documentation, marking and securing the project site (placement of alert signalization). This ESMP's mitigation plan as well as the other aforementioned Plans incorporate limits and requirements of WB Environmental Health and Safety Guidelines (WB EHSG) as well as Good International Industry Practice (GIIP). To ensure maximum safety for the local population during the sub-project activities, the contractor will mark and secure the project site (placement of alert signalization and forbid the entry of unemployed people to project locations). Grievance mechanism and forms for complaints by the surrounding population to be at their disposal during the construction activities. The forms will be placed in the premises of PIU of MoTC and on dedicated Project's website. Information note/Press will contain information about the type of construction activities and the information will be post on Project's website.

[1]It is significant to note that the traffic offenses are recorded by the installed cameras along the Highway A1, but there is no applicable legislation that regulates the punishment of the drivers, who are recorded while they didn`t follow the traffic rules. The argumentation for that is the invasion of their privacy. In that context, there is a need to pass a law regulations, in accordance with European directives and national legislation, according to which the recordings obtained by the installed cameras will be used for punishment of the offenders (or to sanction drivers who do not follow traffic rules and regulations on the Highway A1). But, as of today, there is no legal basis for monitoring and punishing drivers who have violated traffic rules. A very important question is how the footage from the cameras included in the ITS system will be used in this case. It is necessary for PESR to create a plan or a protocol for monitoring, storing, as well as, the method and the exact purposes of using the recordings, or the camera footage, in order to avoid the abuse of the gathered data, and to increase the traffic discipline of the drivers along the Highway A1.This aspect will have to be coordinated with the Ministry of Interior as well.

Significant number of drivers and passengers, as well as foreign tourists (especially from Serbia) who transit throughout the country use the Highway A1. The toll for use of the highway A1 is collected by the toll collection system at seven locations. The toll collection system is managed from a control center located in Petrovec. During the construction phase and embedding the optic fiber process the regular use of the highway may be impacted by limited use of one lane or part of the lane for implementation of construction activities. There is the need to share that information with the users of the highway. The information about the highway along its entire length and any change of the road and traffic will be signaled in a timely manner and published on the Auto Moto Association of Macedonia (AMSM) website. Also, the information will be shared with the similar institutions in the neighboring countries (especially Serbia due to the fact, that during the summer holidays the Serbian tourists more intensively use this highway to transit in Greece).

The workers on the project location need to always wear their Personal Protective Equipment (PPE) in order to avoid possible injuries, also they must be informed by their employer (Contractor/Sub-contractor) about the existence of Workers Grievance Mechanism and their rights to participate in workers organization. The current workers must be employed fulltime, have their health and pension insurance covered in full for their engagement by the employer. The grievance forms for workers (embracing even those of a subcontractors, not only contractor's workers) will be disposed in the premises used as a locker rooms for the workers, and be part of their contract. Grievance mechanism for the workers shall be established and functional (as described below). Code of conduct will be signed by each engaged workers (including those of the subcontractor/s) and it will be part of their employment dossier within the company where they are employed.

During the preparatory and construction activities the possible **air emissions** will be caused by the operation of the mechanical machinery and equipment (dust and gas emissions). **The risks and potential impacts on the air caused by the construction phase are local / short term with moderate significance and high probability of occurrence.**

During the operational phase air emissions are not expected. Exhaust gases from the machinery may be generated only during the maintenance and removal of defects in the installation of the ITS system. Since high quality equipment will be installed, no failure is expected to occur. However, if a defect occurs, the duration of the construction activities for its rehabilitation would be short-lived. **The effects of these impacts are expected to be of local and short-term significance**. For the prevention and mitigation of the adverse environmental impacts the Contractor should follow the measures proposed in the E&S Mitigation Plan (provided in the table below).

Increased **level of noise and vibration** is expected during the preparatory and construction phase of the project. Taking into consideration the noise sensitivity of the project location and national legislation for noise protection (Official Gazette of RM No.79/07, 124/10, 47/11, 163/13 and 146/15) **the project location belongs to an area with IV degree of protection against noise**, transport activities. The noise and vibrations that will occur during the preparatory and construction phase will occur as a result of the operation of the construction machinery, transport vehicles, as well as the equipment that will be used along the project activities for the installation of the ITS facilities on the route of the A1 highway. It will be temporary, discontinuous and interrupted. The noise levels will vary with the appearance of increased intensity during the preparatory works, and maximum values will be expected during the construction works during the installation of signaling, telecommunication and optical canalization equipment. **The risks and potential impacts on the level of noise and vibration caused by the construction phase are local/ short term with moderate significance along the project locations and moderate probability of occurrence**.

The contractor should properly manage the various waste streams (mixed communal waste, construction waste, biodegradable waste, excess soil digging trenches) that will be generated at the locations along the project activities. Further with appropriate selection, transportation and final disposal to municipal landfills (according to the national legislation, the Waste Law and the list of types of waste - Official Gazette of the Republic of Macedonia No. 100/05). The Contractor is expected to prepare and implement a **Waste Management Plan** to prevent possible improper disposal of waste, especially near Vardar River and along the highway. The Contractor should deal with the

waste in accordance with the Law on Waste Management ("Official Gazette of RNM" No. 216/21), and in agreement with the municipalities. The waste along the route `of the highway caused during the installation stages of the ITS system will be collected and disposed of by the public utilities of the municipalities included in this project and/or contracted licensed waste operator (company), who will further dispose it in the suitable municipal landfill/s. Landfills should meet the minimum sanitary standards and regulations, licensed for the disposal of construction waste as well. The hazardous waste that will be generated at the project locations will be temporarily stored in appropriate containers. The collection, transport and final disposal will be performed by licensed companies for different waste streams, and disposal/processing will be carried out in licensed facilities only. For the prevention and mitigation of the adverse environmental impacts the Contractor should follow the measures proposed in the E&S Mitigation Plan (Chapter 5). **The risks and potential impacts on the waste generation caused by the construction phase are local/ short term with moderate significance within the project locations and moderate probability of occurrence.**

According to the Basic Hydrogeological Map of Macedonia, the route of the A1 Highway is ranked among the hydrologically richer areas in the country. The largest water potential is the Basin of Vardar River with its tributaries, which is located almost along the entire length of the A1 Highway. Although the construction activities will be short-term and temporary, if not handled carefully, groundwater quality can be easily affected. **The risks and potential impacts on Vardar River caused by the construction phase are local/ short term with major significance within the project locations. The probability of occurrence is low due to distance, as well as infrastructure in place**.

Identified protected areas along the project activities of the implementation of the ITS system on the A1 highway are distant from the locations, the closest is 650 m (Katlanovsko Blato and Demir Kapija Gorge) and the furthest is 11.5 km (Orlovo Brdo). Because of the wider distance between the protected areas and the project site, the **implementation of the project activities is not expected to cause adverse impacts**. **The locations of these protected areas and Emerald sites, in relation to the project location, are shown in Annex 1**.

The risks and low potential impacts on the Strict Nature Reserve "Tikvesh" and Monument of Nature "Drenovo George" caused by the construction phase are local/ short term with minor significance within the project location and low probability of occurrence.

Other significant representative areas of the territory of the Vardar region are: Taorski canyon of the river Topolka, Pesti, Eneshevo, Orlovo brdo, Moklishko Lake, Ljubaš, Meshnik, Alshar, Lukar and Doshnica. Newly proposed natural significant areas are: Source of Babuna River; The caves: Damjanica, Four doors, Makarovec, Aramiska cave, Bela Voda, Goren zmejovec, Crkviche, as well as the cave church of St. Marko; Klisurska river; Laundry; Ulanci; Nemanjici; Pasinj bridge; Cover; Bashino village. All these localities have great biological, zoological, paleontological and geomorphological value, so their protection is of great importance for the protection of the landscape and the preservation of endemic species. **The proposed preventive and mitigation measures are presented in the E&S Mitigation and Monitoring Plan tables in Chapter 4 and 5 in order to minimize this risk for the Biodiversity in general (e.g., inspection of the site prior to works**). The project activities will not impact any of these locations as the ITS deployment will be within the road belt of the existing Corridor X in North Macedonia.

During the ITS operational phase minor environmental and social impacts are expected to occur. During regular maintenance, breakdown, and removing defects the potential impact from waste generation, noise, air emissions, and community (traffic) safety may occur. In that case, the operator of the ITS along Corridor X should follow the principles of good construction practice and the measures proposed in the E&S mitigation plan should be applied. In general, the operational ITS along Corridor X will have huge positive impact on safe and sustainable transport along Corridor X. The established meteorological stations will provide real-time information on the weather conditions, climate aspects, driving conditions etc., that will be of great Community and user' benefits.

Implementation of ESMP

This ESMP will form part of the Contract documents that the PIU will sign with the Contractor for implementation of the project activities. The proposed preventive and/or mitigation environmental and social measures in this Plan

must be executed by the Contractor and therefore the respected documentation related to applying these measures (e.g., Letter asking the municipality for disposal of inert waste, records on OHS training performed for all workers before start of activities, traffic management plans, OHS plan, etc.). All workers, especially those who work at heights and risky operations, must attend an OHS training organized by the Contractor prior the start of the project activities. The training shall be delivered by the authorized OHS company/person and everyday OHS risks should be assessed by the Contractor's OHS responsible person working on the location on daily basis. Evidence for all trainings delivered will be kept.

The implementation of the measures prescribed within the framework of the ESMP will be a mandatory requirement for the Contractor during the implementation of the construction activities and the Contractor based on this ESMP shall prepare Contractor (Site specific) ESMP. Contractor's ESMP shall be approved by the Supervisor Engineer.

The implementation of proposed measures by the Contractor and Contractor's subcontractors will be monitored by the Supervising Engineer by doing visual checking, reviewing the records of evidence that the measures have been applied and ask the Contractor to apply the measures as per programme of works. If there are any non-compliances they need to be recorded and the Report containing them needs to be sent immediately to the officials from the Ministry of Transport and Communications (Project Manager), and from here it will be reported to the PIU. The Environmental/Social Specialist engaged by the PIU will report the non-compliance and accidents/ emergencies cases to the Bank immediately upon occurrence. Each incompliance needs to be addressed and the evidence of the appropriate measures taken need to be kept. The regular monthly report will contain (i) implementation compliance report, (ii) monitoring report, and (iii) review on all environmental and social issues raised during that period and the evidence on solutions will be provided as well. Reporting will be on semi-annual basis. Each report shall be approved by the Supervisor Engineer.

The main responsibilities of the PIU will be in regards to the Project implementation, project coordination, monitoring activities and reporting.

The Environmental/Social Specialist engaged in the PIU will be responsible for ensuring proper environmental management of all Project activities, conduct its own environmental supervision by carrying out document reviews, site visits and interviews with Contractor, Supervising Engineer and municipality staff. He/she will supervise Contractors' compliance with ESMP and visit the project location at least once a month and the Monitoring Report reflecting main issues and arrangements and timing for their solution will be prepared and submitted to the PIU. The semi-annual Project Report should contain a chapter with Environmental/Social risks/impacts of the project and the status of implementation the ESMP proposed measures.

The PIU needs to organize regular meetings with the Project Manager (Engineer), Contractor, ES specialist responsible person/s from the Ministry of Transport and Communications, PESR on a monthly basis or during site visits.

Good communication between all involved stakeholders (Contractor, Supervisor Municipalities, Environmental Inspector, Communal Inspector, PIU from MoTC, PESR is very important for providing continuous performance of the project activities and successful completion of overall project. The PIU from MoTC will facilitate and maintain good communication and coordination of the project activities on site.

Overview of the national legislation in the field of environmental protection

The process of environmental impact assessment serves as the primary contribution to the decision-making process by the Macedonian authorities, which will approve the project before it is build and run by the World Bank, which provides funding for the project.

National legal framework

The Environmental Impact Assessment procedure has been prescribed into the Law on Environment ("Official Gazette of the Republic of Macedonia" No. 53/05, 81/05, 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13, 187/13, 42/14, 44/15, 129/15, 192/15, 39/16, 99/18 and "Official Gazette of the Republic of North Macedonia" No. 89/22 and 171/22) (Chapter XI/Articles 76-94) where the requirements of the EU Directives on EIA (Directive 85/337/EEC as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC) have been transposed.

The procedure starts when the Investor (Project Proponent) who intends to implement a project submits a Letter of intent, in written and electronic form to the Ministry of Environment and Physical Planning (MoEPP – Directorate/Administration for Environment), which is the responsible authority for the entire procedure. The Administration for Environment is obligated to give feedback on the specific request whether they should or shouldn't necessary to develop EIA or Elaborate for environmental protection (EEP).

The Screening procedure is a stage during which the MoEPP determines whether an EIA Study or Environmental Protection Report should be carried out or not for a certain project. For the development of projects that do not belong to the list of the projects for which the EIA procedure has to be carried out (small scale projects), there is a requirement for the preparation of an EPR (relevant for the Category B projects under the WB OP 4.0.1 Environmental Assessment procedure and projects with substantial and moderate risks according to WB ESS1 Assessment and management of environmental and social risks and impacts).

There are two Regulations/Decrees that refer to the projects for which the EPR must be prepared:

- The Decree on the activities and activities for which an EPR must be prepared, and the approval of which is the responsibility of the competent authority for performing professional work in the field of the environment (Ministry of Environment and Physical Planning) (Official Gazette of RM" No. 36/12);
- Decree on the activities for which an EPR must be prepared, and for whose approval the Mayor of the municipality, the Mayor of the City of Skopje and the Mayor of the municipalities in the City of Skopje are responsible (Official Gazette of RM" No. 32/12)

The content of the EPR should be in line with the Rulebook on the form and content of the EPR in accordance with the types and activities or activities for which the report is prepared, as well as in accordance with the performers of the activity and the scope of the activities and activities performed by legal and natural persons, the procedure for their approval, as well as the way of keeping the register of approved reports ("Official Gazette of RM" No. 44/13 and 111/14).

List of legal regulations and documentation on which the proposed environmental management measures are based:

1. Law on Environment ("Official Gazette of the Republic of Macedonia" No. 53/05, 81/05, 24/07, 159/08, 83/09, 48/10, 124/10, 51/11, 123/12, 93/13, 187/13, 42/14, 44/15, 129/15, 192/15, 39/16, 99/18 and "Official Gazette of the Republic of North Macedonia" No. 89/22 and 171/22)
2. Law on Waste Management ("Official Gazette of the Republic of North Macedonia" No. 216/21)
3. Law on protection against noise in the environment ("Official Gazette of the Republic of Macedonia" No. 79/07, 124/10, 47/11, 163/13 and 146/15 and "Official Gazette of the Republic of North Macedonia" No. 151/21)
4. Law on ambient air quality ("Official Gazette of the Republic of Macedonia" No.100/12, 163/13, 10/15 and 146/15 and "Official Gazette of the Republic of North Macedonia" No. 216/21)

5. Law on nature protection (“Official Gazette of the Republic of Macedonia” No. 67/04, 14/06, 84/07, 35/10, 47/11, 148/11, 59/12, 13/13, 163/13, 41/14, 146/15, 39/16, 63/16 and 113/18 and “Official Gazette of the Republic of North Macedonia” No. 151/21)
6. Law on packaging management and packaging waste (“Official Gazette of the Republic of North Macedonia” No. 215/21)
7. Law on waters (“Official Gazette of the Republic of Macedonia” No.87/08, 6/09, 161/09, 83/10, 51/11, 44/12, 23/13, 163/13, 180/14, 146/15, 52/16 and “Official Gazette of the Republic of North Macedonia” No. 151/21)
8. Law for construction (“Official Gazette of the RNM” No. 130/09, 124/10, 18/11, 36/11, 54/11, 59/11, 13/12, 39/12, 144/12, 25/13, 70/13, 79/13, 137/13, 163/13, 27/14, 28/14, 42/14, 115/14, 149/14, 187/14, 44/15, 129/15, 217/15, 226/15, 30/16, 31/16, 39/16, 71/16, 132/16, 35/18, 64/18 and 168/18 and “Official Gazette of the Republic of North Macedonia” No. 244/19, 18/20 and 227/22)
9. Law for protection of the cultural heritage ("Official Gazette of the Republic of Macedonia" No. 20/04, 71/04, 115/07, 18/11, 148/11, 23/13, 137/13, 164/13, 38/14, 44/14, 199/14, 104/15, 154/15, 192/15, 39/16, 11/18 and 20/19)
10. Law on Occupational Health and Safety (“Official Gazette of the Republic of Macedonia” No. 92/07, 136/11, 23/13, 25/13 137/13, 164/13, 158/14, 15/15, 129/15, 192/15 and 30/16 and “Official Gazette of the Republic of North Macedonia” No. 18/20).
11. Law on Social Protection (“Official Gazette of the Republic of Macedonia” No. 79/09, 148/13,164/13, 187/13, 38/14, 44/14, 116/14, 180/14, 33/15, 72/15, 104/15, 150/15, 173/15, 192/18, 30/16, 163/17, 51/18).
12. Law on Health Protection (“Official Gazette of the Republic of Macedonia” No. 43/12, 145/12, 87/13, 164/13, 39/14, 43/14, 132/14, 188/14, 10/15, 61/15, 154/15, 132/15, 154/15, 192/15, 37/16).
13. Law on Public Health (“Official Gazette of the Republic of Macedonia” No. 22/10, 136/11, 144/14, 149/15, 37/16).
14. Law on Sanitary and Health Inspection (“Official Gazette of the Republic of Macedonia” No. 71/06, 139/08, 88/10, 18/11, 53/11, 164/13, 43/14, 144/14, 51/15, 150/15, 37/16).
15. Labour Law ("Official Gazette of the Republic of Macedonia" No. 62/2005, 106/2008, 161/2008, 114/2009, 130/2009, 50/10, 52/10, 124/10, 47/11, 11/12, 39/12, 13/13, 25/13, 170/13, 187/13, 113/14, 20/15, 33/15, 72/15, 129/15, 27/16 и 120/18 and “Official Gazette of the Republic of North Macedonia” No. 110/19, 267/20 and 151/21).
16. Law on Protection from Harassment at the Workplace ("Official Gazette of the Republic of Macedonia" No. 79/13 and 147/15).
17. Law on personal data protection ("Official Gazette of the Republic of Macedonia" No. 7/2005, 103/2008, 124/10, 135/11, 43/14, 153/15 and 99/16 and “Official Gazette of the Republic of North Macedonia” No. 42/20 and 294/21). The security and confidentiality of personal data is also guaranteed in the Macedonian Constitution Art. 18.

18. Law on Free Access to Public Information ("Official Gazette of the Republic of Macedonia", No. 13/06, 86/08, 06/10, 42/14, 148/15, 55/16, 64/18, 101/19).
19. Law on Traffic Safety ("Official Gazette of the Republic of Macedonia" No. 169/15, 226/15, 55/16, 11/18, 83/18 and "Official Gazette of the Republic of North Macedonia" No. 98/19 and 131/20).
20. Law on Public Roads ("Official Gazette of the Republic of Macedonia" No. 84/08, 52/09, 114/09, 124/10, 23/11, 53/11, 44/12, 168/12, 163/13, 187/13, 39/14, 42/14, 166/14, 44/15, 116/15, 150/15, 31/16, 71/16 and 163/16).
21. Expropriation Law (Official Gazette of the Republic of Macedonia No. 95/12, 131/12, 24/13, 27/14, 104/15, 192/15, 23/16, 178/16) – if necessary.
22. Law on Ownership and other real rights (Official Gazette of the Republic of Macedonia No. 18/01, 92/08, 139/09, 35/10).
23. Law on prevention and protection against discrimination (Official Gazette of the Republic of Macedonia No. 101/19, 258/20).
24. Law on equal opportunities for men and women (Official Gazette of the Republic of Macedonia No. 06/12, 166/14).

The Contractor and beneficiaries of the projects are obliged to follow and work according to the applicable national legislation, so, this list of legislation is only core part of the enormous set of legislation related to environmental, social, OH&S aspects, emergency events etc.

For this project "Deployment of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)", the Notification of intent and Environmental Protection Report for this Project have been submitted to the MoEPP in September 2022. According to the Opinion issued by the MoEPP on 27.10.2022, there is no need EPR to be prepared. (See MoEPP Letter in Annex 4).

World Bank Environmental and Social Safeguards

Safeguard Policies developed by the World Bank present set of obligatory guidelines and instructions with the main objective to foster efficient and effective identification and mitigation of potentially adverse environmental and social impacts that may occur in the development process. WB policies are applied in parallel to the national and supranational policies where, as a rule, the stricter one prevails. Summary of the most relevant Safeguard Policies for this Project are described below:

OP/BP 4.01 ENVIRONMENTAL ASSESSMENT (EA)

EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and physical cultural resources); and Trans boundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant

international environmental treaties and agreements. EA is initiated as early as possible in project processing and is closely integrated with the economic, financial, institutional, social, and technical analyses of a proposed project.

The Bank classifies a proposed project into one of four categories (A, B, C, FI), depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

- Category A: proposed project is classified under this category, if it is likely to have highly significant, diverse, and/or long-term adverse impacts on human health and valuable natural or cultural resources. These impacts may also affect an area broader than the sub-project sites.

- Category B: A proposed project's potential adverse environmental impacts on human population or environmentally important areas – including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases migratory measures can be designed more readily than Category A projects.

- Category C: A proposed project is likely to have no, minor or minimal adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

- Category FI: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in sub-projects that may result in adverse environmental impacts.

Depending on the project, a range of instruments can be used to satisfy the Bank's EA requirement: environmental impact assessment (ESIA), regional or sectorial EA, strategic environmental and social assessment (SESA), environmental audit, hazard or risk assessment, environmental management plan (EMP) and environmental and social management framework (ESMF). EA applies one or more of these instruments, or elements of them, as appropriate. When the project is likely to have sectorial or regional impacts, sectorial or regional EA is required.

OP/BP 4.01 Environmental Assessment has been triggered with the project, mainly for the ITS deployment during the construction works. The sub – projects (contracts) already identified for financing under the WBTTFP project for installation of equipment, CCTV, cameras, hardware and software, etc., fall under Category C, according their potential impacts.

With the project the following aspects are triggered.

Community health and safety – Taking into consideration that the planned project facilities are located at border crossing areas with frequent flow of the population, the Contractor is obliged to meet the community safety requirements according to the good international practice (GIP) and national regulation before, during and upon completion of sub-project activities.

Occupational Health and Safety – The OHS Plan should contain guidelines for using Personnel Protective Equipment (PPE) during the civil works such as proper prevention from possible injuries of the workers, employees and passengers during the construction/reconstruction activities. The Contractor must be obliged to meet the OHS requirements according to the GIP and national regulation before, during and upon completion of sub-project activities. The Plan should contain guidelines for the use of PPE

The other OP/BP are not triggered.

Grievance Redress Mechanism

Project Specific Grievance Redress Mechanism (GRM) would be designed in compliance with this ESMP. Stakeholders and citizens will be kept well informed about the Project and will be able to submit their feedback, suggestions and/or complaints to improve the activities envisaged by the project. Grievance mechanism will be one of the tools for monitoring the project implementation. It will be easily accessible, transparent, and accountable in grievance handling, and responsive both in terms of efficiency and effectiveness in sense of addressing the grievances

reported by the affected persons and groups. Grievance mechanism of the project aims to receive, resolve and follow the concerns and complaints of the project affected communities (regions, municipalities, settlements).

The following principles will apply to grievance management:

- Any grievance related to the project will be registered, acknowledged within five working days, and tracked until it is closed;
- The grievance management system will include at least one level of review/appeal, with the aim to reach an amicable settlement wherever possible without resorting to a judicial review;
- Grievances will be processed and responded to within 15 working days.

From the very beginning of this project, the Investor/ PIU pay much attention to the information, consultation, and cooperation with the stakeholders. Investor/PIU are truly committed to receiving and responding to all comments or complains, either verbally or in writing in relation to the project and recognizes that consultation is an ongoing process and different concerns may arise as the project moves into the next phases.

Grievance Mechanism is going to be managed by the PIU, and established on the site by the supervision engineer, whereby all the affected and interested stakeholders are going to be provided with means for lodging their official comments and/or complaints during all the project phases. Namely, the PIU is going to provide a fully operational grievance mechanism during design, pre-construction and construction, and operational phase. The prepared grievance form is provided in Annex 3. The grievance form (in Macedonian, Albanian and English language) will be available on official website of the PIU (Project's website) and PESR, and in hard copies at the toll stations along Corridor X (for easier access of the road users).

A worker`s Grievance Mechanism will also be established for the employees in the construction company/ies (as a separate mechanism). During the construction phase, the worker's grievance forms are going to be provided at the construction site, in hard copy. The Contractor shall be obliged to put up the corresponding grievance box and signs on the construction site (e.g., project information boards, named "Bulletin boards").

Finally, all the affected and interested stakeholders shall be duly informed about the availability of the grievance mechanism, whereby the PIU shall put up announcements along the entire project road section (e.g., local community notice boards), whereby these announcements are going to provide all the relevant information necessary for submission of grievances, i.e., available resources, contact information, etc. The PIU shall also provide an official announcement about the grievance mechanism on their website and make additional announcements in the local media (e.g., local newspaper, online news portals, radio, TV, etc.).

Accordingly, all stakeholders will be provided with a number of means for filing their grievances. The available grievance submission methods include email, online forms, grievance box at the construction site, and post. The grievances may be submitted anonymously, or they may be signed, and the complainants may provide all their relevant contact information in case they want to be contacted subsequently. All comments and complaints will be forwarded and processed by the responsible person of the PIU services, as shown in the next Table.

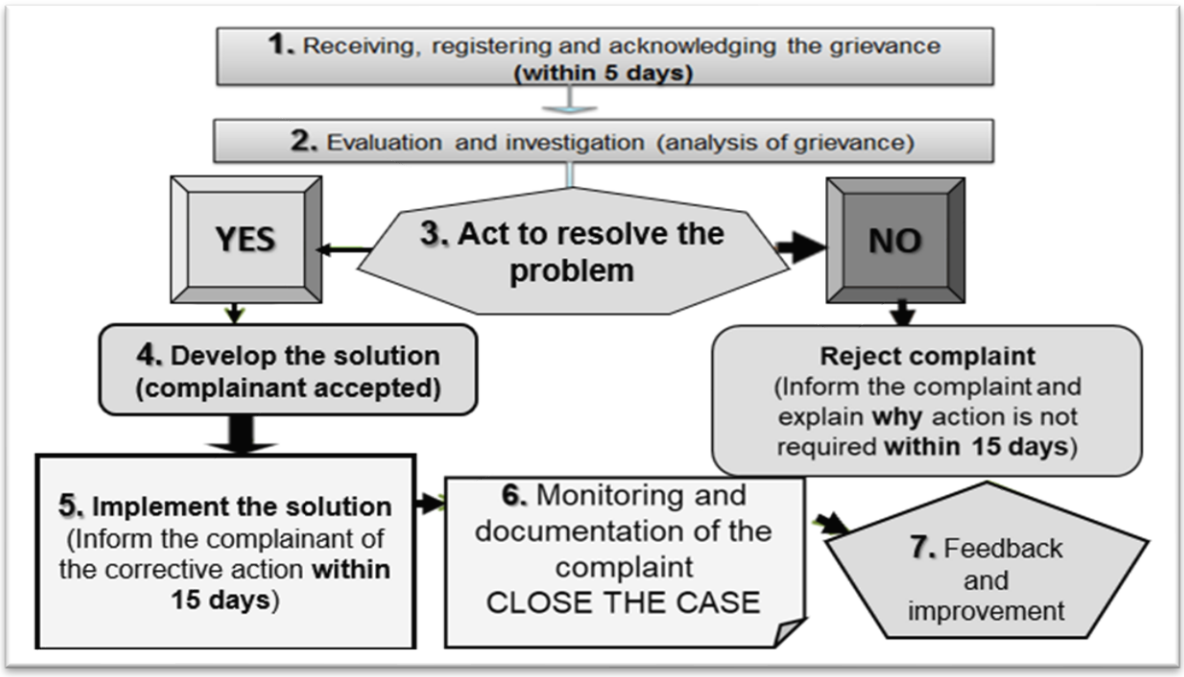
Table 6 Grievance redress mechanism contact information

Ministry of Transport and Communications - Skopje **The Republic of North Macedonia**
Project Implementation Unit (PIU) **Web: www.mtc.gov.mk and** **www.wbprojects-mtc.mk**

Contact person for Grievance mechanism
Mr. Jozhe Jovanovski **Environmental and Social Specialist in the PIU, financed by World Bank** **Phone: +389 2 3145 531** **E-mail: joze.jovanovski.piu@mtc.gov.mk**

The PIU shall be responsible for overall managing of the GRM. All received grievances on site will be forwarded to PIU. The PIU will record all received grievances into the GM logbook. Ones received, the PIU must inform the complainants about the receipt of the grievance within 5 days, which shall be done officially, either via email post or phone (depending on the contact information provided). Additionally, the PIU will have a deadline of 15 days for providing an official response to the grievance, i.e., to inform the complainant about the required corrective action and/or reason for rejection of the complaint. The PIU will manage the entire process of comments and complaints and the information will be transposed in the corresponding reports to the WB, which will be additionally posted on its website.

Grievance procedure is shown in the following figure.



All comments and complaints regarding the environmental and social issues will be entered in the complaints record. PIU will establish a registry of grievances and will monitor the resolution of grievances, which should be on a timely basis. Each grievance will be recorded in the Grievance log / registry with the following information:

- Description of grievance;
- Number of Grievance;
- Date of receipt acknowledgement returned to the complainant;
- Description of actions taken (investigation, corrective measures); and
- Date of resolution and closure / provision of feedback to the complainant.

The PIU will share the Grievance Registry with the WB on a monthly basis.

Public disclosure and citizen engagement

The draft ESMP is publicly disclosed on 17.03.2023 in Macedonian and English language for 14 calendar days.

The Draft ESMP is available for the public on web site of the Ministry of Transport and Communications MoTC (http://www.mtc.gov.mk/) and PIU www.wbprojects-mtc.mk accompanied by a Form for submitting comments from 17.03.2023. The social Media channels of the MoTC that will be used for the purpose of raising awareness about the Project implementation and identified E&S risks, impacts and mitigation measures is the Facebook page www.facebook.com/mtc.gov.mk.

14 days after the disclosure of the prepared ESMP document, the Ministry of Transport and Communications (PIU) held public consultation on 04.04.2023 in order to inform the public on the proposed project activities, anticipated impacts, ESMP, grievances etc.

Public announcement included brief description about the purpose of the project, project activities and duration of the activities, environmental and social impacts, proposed measures, availability of the ESMP together with the Form for submitting comments on the MoTC/PIU web site. Announcement also contained information about the possibility for public to raise opinion/ suggestion/comments on the prepared ESMP by filling the Form for comments and submission to the responsible person from PIU ESS Mr. Jozhe Jovanovski (e-mail: joze.jovanovski.piu@mtc.gov.mk). Form for submitting can be filled with a full identity or anonymously, and the comment or suggestion should be fully described in order to take it into account in the final version of the ESMP. Information about the date and time for conducting the public consultation, way how the stakeholder can take part on the public consultation were also be a part of the announcement. Within the given period of 14 days, the Form for submitting comments and suggestions given as **Annex 2** was published, but no comments in the provided Form were received.

Public announcement was published on the web sites of MTC/PIU and PESR, as Final beneficiary of the project.

Public consultation

The public meeting with physical presence has been organized on the draft ESMP by PIU of the MTC in cooperation with the officials of the Ministry and PESR as Project beneficiary on 04.04.2023, and the Minutes of the Public hearing are attached as **Annex 5** “Minutes of Public hearing”.

All relevant stakeholders were informed via public announcement on the MOTC and WBTTFP Websites on the time of the public consultation, with the following set of information:

- Purpose of the public consultation;
- Exact time and date for the event;
- Availability of the disclosed draft ESMP for comments and
- Possibility for submitting comments on the prepared ESMP by filling in the Form for submitting comments and suggestions on the ESMP to the responsible person from the PIU.

During the public consultation event after the presentation of the main project activities and main findings from the ESMP, attending stakeholders raised their comments/questions/suggestions and any concern about the project, as presented in the Minutes of Public hearing.

After the public consultation and the 14-day period for submitting comments, the final version of the ESMP is prepared including Annex 5 “Minutes of Public hearing”.

Final version of the ESMP after public consultation is available on the PIU and MoTC web sites for the whole period of the sub project implementation.

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Design	**Permits**	- All legally required permits (construction, environmental and other) have to be obtained before works commence. - Contractors and subcontractors have valid designing licenses	Included in the project cost / Consultants responsible for own design permits	Consulting company working on design documentation	- Documentation regarding Environmental protection legislation and Approval from MOEPP; - Main Design prepared and revised - All other studies and investigations are prepared.
Design	**Landscape and nature protection**	- Carefully plan design to avoid tree cutting along the Corridor X. In the case it is necessary to cut trees, to obtain a permission from the competent authority (if required); - The tree- cutting off will be discussed with WB, if required.	Included in the project cost	Consulting company working on the Detailed design	There are no trees in the road belt (if in any case there is need to cut some trees, these are in ownership of the PESR)
Design	**Biodiversity protection**	- Arrange for works to occur outside breeding season of any vulnerable or endangered species in the vicinity of project location if there is any based on opinion received by relevant institutions. No restrictions are imposed due the scope of the works on the existing highway under traffic regime.	Included in the project cost	Consulting company working on the Detailed design	No any restrictions related to biodiversity received by Institutions.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Design	**Soil stability and water quality**	- Trench excavation for pipe laying and excavation of a pit for installation of cable shafts are defined in the Detailed Design; - Development of procedures for emergency situations and plans for unforeseen situations in case of accident, breakdowns, spills, fires, etc.; - With proper and careful planning of the construction works, the negative effects on the soil stability and water quality will be reduced and its pollution will be prevented.	Included in the project cost	Consulting company working on the Detailed design	There are no water bodies nearby the works along the highway. Works on the road structures will be on only on the upper parts.
Design	**Flood**	- Design will incorporate adequate measures to successfully address risks from flooding. No special flooding analyses are required due to performing the works on the existing highway.	Included in the project cost	Consulting company working on the Detailed design	No special flooding measures are required, due to the nature of works - deployment of ITS.
Design	**Increase of traffic, access difficulties**	- Preparation, approval (by the police department) of Traffic design and Traffic Management Plan for temporary traffic regime during project activities.	Included in the project cost	Consulting company working on the Detailed design	Related documentation should be approved by competent authorities.
Pre-construction	**Announcement of the project activities to public and relevant institutions**	- All relevant institutions (e.g. traffic police, construction, environmental and H&S inspectorate, etc.) have been notified on the upcoming works in compliance with laws requirements; - Informing the local population about the time of commencement and duration of the construction activities, which will be posted on information board and on the MTC/PIU Website;	NA	Contractor / Supervisor Engineer / MTC/PIU and PESR	Compliance with WB and national legislation for information and community safety.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Pre-construction	**Community health and safety**	- Preparation, approval and implementation of **Community Safety Plan** prior the start of activities; - Appropriate marking out the project site, providing warning tapes, fences and appropriate signs informing danger, key rules and procedures to follow, section by section along the project area in compliance with traffic design and temporary regime; - Prohibition for entrance of unemployed persons, within the warning tapes and fences when/where needed; - Installation of Notice (Bulletin) board with general information about the project, Contractor and Supervisor at project location; - During the project activities the Contractor will provide easy access on the interchange's zones along the highway A1; - The highway will be kept clean during the construction activities.	Included in the Contract costs	- Contractor - Supervisor - PESR - Municipalities along the highway	Temporary traffic regime approved and implemented on site before construction starts. Community Safety Plan prepared and approved.
Pre-construction	**Occupational Health and Safety**	- Preparation, approval and implementation of **OHS Plan** for risky operations, including Labour management procedures, prior start of activities; - Mandatory use of personal protective equipment by the workers (PPE); - Worker's OHS measures will be applied throughout the project activities (first aid, protective clothes and equipment for the workers, appropriate machines and tools); - All workers are trained and experienced in the type of work they are carrying out. Workers are adequately certified for works, as required by the national law – e.g. to operate heavy machinery, manage fuels and chemicals, etc.;	Included in the Contract costs	- Contractor - Supervisor - PIU oversees	OHS Plan prepared and approved Emergency Preparedness Plan prepared and approved

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- Training register log kept on site; - Regular Control and service of vehicles; - Machines will be handled only by experienced and trained personnel, thus reducing the risk of accidents; - Personal protective equipment for workers is used continuously during construction activities; - Mobile toilets will be placed on the project sites; - Respect the established workers GRM; - All workers must be familiar with the fire hazards and fire protection measures and must be trained to handle fire extinguishers, hydrants and other devices used for extinguishing fires; - Devices, equipment and fire extinguishers should be always functional, so in case of need they could be used rapidly and efficiently. First aid kits should be available on the site and personnel trained to use it; - Larger quantities of flammable liquids will not be kept on the site along the road that will be upgraded; - Sign the Code of Conduct - All engaged workers on this project must have regulated employment status by Contractor/sub-contractors and must receive full health and pension insurance, all in compliance with local labour related legislation and International labour standards; - Notification for starting with construction activities is given to the body of the state administration responsible for labour issues; - Procedures for cases of emergency - **Emergency Preparedness Plan** (including spills, accidents, etc.) is in place prior to commencement of works. It is communicated to the workers and available at the site; - Purchased equipment will be installed and used respecting all safety measures prescribed by the producer of equipment and best practices; - The construction site is fenced and marked.			
Pre-construction	**Nature protection**	- All workers on site will be trained to protect nature and biodiversity along the highway A1 works;	- NA	- Contractor Supervising engineer - PIU oversees	Training register kept on site.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- Clearance of the site (shrubs or trees) shall not be done in nesting period. Nests shall be inspected prior construction works in order to minimise impacts on birds along the highway.			
Pre-construction	**Increase of traffic, access difficulties**	- Preparation, approval (by the police department) and implementation of **Traffic Management Plan** for temporary traffic regime during project activities, prior start the construction activities; - Limit/decrease the driving speed on parts of highway with active construction site, as per conditions on the road and in compliance with temporary traffic regime. .	Included in Contact costs	- Contractor - Supervisor engineer	TMP prepared and approved before construction starts
Pre-construction	**Waste management**	- Preparation, approval and implementation of **Waste Management Plan** (with reuse/recycling activities included) prior the start of activities; - For the management of communal waste, the Contractor should sign a contract with license companies, and hand over the waste to the Service Provider, who has a Waste Management Permit, i.e. collection and transportation of waste, in accordance with Articles 63 and 64 of the Law on Waste Management ("Art. Journal of RSM" No. 216/21); - Identifying licenced landfills for disposal of waste streams or signing a contract with license companies dealing with hazardous and non-hazardous waste; - Cleaning up of the work site from inert materials, dirt, concrete, old asphalt, etc.; - For handling of the selected biodegradable waste from site cleaning, the Contractor should act in accordance with Article 79 of the Law on Waste Management ("Official Gazette of RNM" No. 216/21), in agreement with the municipalities; - Mobile toilets placed on site in compliance with PoWs; - Clearance of site to be done in proper way and in compliance with the Lists of waste (if waste occur); - Temporary storage of waste shall be strictly regulated on certain places along the highway length.	Included in Contact costs	- Contractor - Supervision engineer - PIU to oversee - Inspectors	WMP prepared and approved

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Pre-construction	**Temporary land acquisition/ damage to private property**	The project activities will be implemented on state own land, in the road belt of highway A1 (operated by the PESR) Resettlement Action Plan to be prepared if private property or livelihood is affected. Checklist to be prepared first.	NA	- Contractor - Supervisor - PIU to oversee	No land acquisition is required.
Construction	**Occupational Health and Safety**	- Set the information table that the wearing the PPE is obligatory for each worker/visitor on construction site on the entry point. Appropriate PPE will be worn at all times; - Forbidden entrance of unemployed persons within the warning tapes; - Worker's OH&S Plan of measures will be applied (first aid, protective clothes for the workers, appropriate machines and tools); - Setting working mobile containers for project administration/ management, workers rest area and change of clothes, PPE closets, and dining area; - Machines will be handled only by experienced and trained personnel, thus reducing the risk of accidents; - The machinery parking lot will be established avoiding blockage of any movements along the highway not in compliance with the approved traffic regime; - Potable (drinking) water will be ensured on the site for the workers as well as water for cleaning purposes, dust suppression; - Waste bins to be posted on certain site not endanger the traffic for selection of municipal waste generated by the workers – glass/plastic/paper and biodegradable); - Constant presence of firefighting devices will be ensured in case of fire or other damage; - All workers must be familiar with the fire hazards and fire protection measures and must be trained to handle fire extinguishers, hydrants and other devices used for extinguishing fires; - The workers need to keep the project location cleaning excessive waste debris and liquid spills regularly; - Larger quantities of flammable liquids will not be kept on the sites along the road;	- Included in Contract costs	- Contractor - Supervisor - PIU to oversee - Inspection authorities	OHS Plan implemented and monitored OHS training register kept

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- All engaged workers on this project must have regulated employment status by Contractor/sub-contractor/s and must receive full health and pension insurance, all in compliance with local labour related legislation and International labour standards, well trained and experienced for work they are performing, and certified if required; - Traffic will be organised in the way that eliminates the risk of accidents. - The excavations and trenches are classed as confined spaces. Working in excavations and trenches can cause serious injury to workers. Working in confined spaces requires hiring qualified and experienced workers, application of the safety protocols, expertise, and equipment, as well as regular inspection to confirm their stability. The workers will go through the induction training of work on height, over water, electricity, etc. The OHS Supervisor must assure that the personnel on-site have the necessary training to carry out its activities, this includes contractors and subcontractors personnel. - it is important to underline that mitigation must be planned for each hazard where eliminating the hazard is the priority and the use of Personal Protective Equipment (PPE).The Contractor must be obliged to comply with the local legislation the Law on Occupational Health and Safety and the EU Directives on occupational safety and health, as well as on the use of personal protection equipment 89/654/EEC, 89/656/EEC, 89/686/EEC and 2009/104/EC.			
Construction	**Community Safety**	- Forbidden entrance of unemployed persons within the warning tapes; - The highway will be kept clean;	- Included in Contract costs	- Contractor - Supervisor - PIU to oversee - Inspection authorities	Community safety Plan implemented and monitored
Construction	**Traffic disruption during construction activity**	- **Traffic Management Plan** with appropriate measures to redirect traffic and is easy to follow (signs and signalling); in cooperation with the local authorities, include traffic police; - Regularly inform the local communities and traffic informational agencies of traffic disruptions. Continuously sharing the update information on	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	TMP implemented on site

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		works and traffic regime with AMSM. Sharing the information about the condition of roads and border crossings on MTC/PIU and PESR website.			
Construction	**Road safety measures**	- Timely announcement to inform the local population about the time of commencement and duration of the construction activities, which will be posted on construction site and PIU Website; - Signs and boards for construction related information are placed on the construction site; - Appropriate lighting and well-defined safety signs. - Signs for prohibited access are placed on the construction site; - The construction site will be adequately enclosed and marked; - The parking of the machinery and equipment will not be carried out on the highway - **Organizing safety campaign during summer** (due to intensive use of Highway A1 for transit of tourists) in cooperation with MTC/PIU, PESR, Republic Council on Road Traffic Safety, Traffic Police and sharing the information with AMSM. - Implementation of Traffic Management Plan	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	Information shared on proper way, Road safety campaign on ITS activities conducted during summer period (preferably during construction activities). This will include leaflets that will be shared with road users (mainly tourists). Indicative no. of leaflets = 2000 (1000 per south and north part).
Construction	**Incidental situations and accidents**	- In case of incidental situations and accidents, to act in accordance with the Law on Occupational Health and Safety ("Official Gazette of the Republic of Macedonia" No. 92/07, 136/11, 23/13, 25/13, 137/13, 164/13, 158/14, 15/15, 129/15, 192/15, 30/16, and "Official Gazette of the Republic of North Macedonia" No. 18/20); - Notify the PIU immediately of occurrence any incident or accident related to the project or that has an impact on it, and that has or could have a significant adverse effect on the environment, the affected communities, the public, or the workers included, for example, occupational accidents that could result in serious injury, minor injuries, falls, vehicle accidents, larger spills of chemicals, oils, fuels, etc.	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	EPP implemented and monitored. Reporting on incidents kept and shared with all authorities.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- Emergency Preparedness Plan implemented in case of accidents.			
Construction	**Waste Management**	- Identification of the different waste types at the construction sites (soil, humus, bottles, food, etc.); - Selection and classification of all types of waste in accordance with Article 15 and 63 of the Law on Waste Management ("Official Gazette of RNM" No. 216/21); - During the construction activities, rocks, stones and possibly a very small amount of excavated soil (inert waste-quantity that will not be reused in construction activities) and waste from construction activities (construction rubble) will be generated. The Contractor should deal with this waste in accordance with Article 44 of the Law on Waste Management ("Official Gazette of RNM" No. 216/21), in agreement with the municipalities; - For further handling of the selected biodegradable waste from site cleaning, the Contractor should act in accordance with Article 79 of the Law on Waste Management ("Official Gazette of RNM" No. 216/21), in agreement with the municipalities; - Hazardous waste (contaminated soil with waste oils and/or fuels in case of accidental spillage from machinery and transport vehicles), the Contractor shall remove it and hand it over to a Waste Oil Collector (who has a Permit for the collection and transport of hazardous waste), with which an Agreement will be concluded, in accordance with the Rulebook on the procedures and method of collection, transportation, processing, storage, treatment and disposal of waste oils, the method of keeping records and submitting the data ("Official Gazette of the Republic of Macedonia" no. 156/07). If the construction starts after January 1, 2023, then the Contractor should deal with this hazardous waste in accordance with the provisions of the Law on the Management of Additional Waste Streams ("Official Gazette of RNM" No. 216/21), that is, remove it and to hand it over to a collection point for waste oils or to an installation for the processing of waste oils, which have an appropriate Permit in accordance with the waste management regulations), with which he will conclude an Agreement;	- Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - Waste companies engaged - PIU to oversee	WMP implemented and monitored. Reporting on waste types and quantities generated.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- For further handling of the selected packaging waste (temporary storage of various packaging at a precisely determined and marked location), the Contractor should act in accordance with Article 31 of the Law on the Management of Packaging and Packaging Waste ("Official Gazette of RNM" No. 215 /21); - Regular servicing of vehicles and machinery during construction activities in order to avoid possible leakage of engine oil and/or fuel. The service should be performed in authorized places for that purpose; - The contractor should keep the route clean and waste should not be deposited along its entire length. It should be removed immediately at the temporary locations provided for waste disposal; - Keep a regular record of the quantities of generated and handed waste; - The incineration of waste is prohibited.			
Construction	**Management of hazardous substances and hazardous waste**	- Selection and classification of all types of waste in accordance with Article 15 and 63 of the Law on Waste Management ("Official Gazette of RNM" No. 216/21); - Hazardous waste (contaminated soil with waste oils and/or fuels in case of accidental spillage from machinery and transport vehicles), the Contractor shall remove it and hand it over to a Waste Oil Collector (who has a Permit for the collection and transport of hazardous waste), with which an Agreement will be concluded, in accordance with the Rulebook on the procedures and method of collection, transportation, processing, storage, treatment and disposal of waste oils, the method of keeping records and submitting the data ("Official Gazette of the Republic of Macedonia" no. 156/07). If the construction starts after January 1, 2023, then the Contractor should deal with this hazardous waste in accordance with the provisions of the Law on the Management of Additional Waste Streams ("Official Gazette of RNM" No. 216/21), that is, remove it and to hand it over to a collection point for waste oils or to an installation for the processing of waste oils, which have an appropriate Permit in accordance with the waste management regulations), with which he will conclude an Agreement;	- Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - Waste companies engaged - PIU to oversee	WMP implemented and monitored. Reporting on waste types and quantities generated.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- Temporarily storage on sites of all hazardous or toxic substances (including wastes) will be in safe containers labelled with details of composition, properties and handling information; - Chemicals are managed, used and disposed, and precautionary measures taken as required in the Material Safety Data Sheets (MSDS); - Large amounts of fuel will not be kept at the sites; - The containers of hazardous substances shall be placed in a leak-proof container to prevent spillage and leaking. This container will possess secondary containment system such as bunds (e.g. bonded-container), double walls, or similar. Secondary containment system must be free of cracks, able to contain the spill, and be emptied quickly; - The containers with hazardous substances must be kept closed, except when adding or removing materials/waste. They must not be handled, opened, or stored in a manner that may cause them to leak; - Hazardous waste will not be mixed and will be transported and handled only by licensed companies in line with the national regulation; - Paints with toxic ingredients or solvents or lead-based paints will not be used; - Hazardous waste will be maintained according the national legislation by the company that has License for hazardous waste;			
Construction	**Dust generation during transport of construction materials and during construction works**	- The vehicles and mechanization are regularly serviced and maintained; - Restriction of the vehicle speed to the reconstruction location; - Construction site transportation routes and materials handling sites should be water sprayed on dry and windy days; - Construction materials should be stored in appropriate places covered to minimize dust; - Workers on the site to wear dust protection masks; - Covering stored quantities of materials and waste at the site in order to prevent their spreading and generating dust emissions; - Exhausting the engines when vehicles and equipment are out of use; - Use of construction machinery and transport that meets legal technical requirements; - Burning of debris from ground clearance is banned.	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	Reporting on implemented measures kept.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Construction	**GHG emissions monitoring**	- Weather stations (or HAZMAT) that will be installed within investments for Intelligent Transport Systems (ITS) will collect data and monitor GHG emissions from road transport (specifically Short-lived Climate Pollutant (SLCP) with a high climate-warming impact emissions causing air pollution). The information that will be collected through GHG (SLCP) emissions monitoring systems will help linking specific climate change and development priorities (e.g. mitigation, adaptation and improving air quality) and be a valuable support the Government in developing regulatory and policy reforms and institutional strengthening for pursuing low-emissions development. GHG monitoring will be installed during the works on North part of the Corridor, but will collect data for the entire Corridor.	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee -	Reporting on implemented measures kept.
Construction	**Possible noise disturbance as a result of outdoor equipment usage, transportation vehicles driving around the sites and working near the active Highway A1, on open spaces**	- It is recommended to turn off the engines of vehicles and construction machinery at times when there is no need for their operation. All machinery that will be involved in the construction activities and all transport vehicles must be technically correct, which is a prerequisite for reduced noise and vibrations; - Use of modern "quiet" work equipment that meets the requirements of Directive EC/2000/14 of the European Union on noise emission from the use of work equipment in outdoor conditions; - The construction activities shall be performed only during the day, between 07:00 am - 17:00 pm and the exposure of workers shall be limited to eight hours on increased noise regardless of where it comes from; - Working near the active highway requires the possibility to close a lane; - Careful planning of preparatory work in order to reduce acoustic pollution in the project environment; - It is necessary to avoid equipment that emits noise above 90 dB(A); - Control of the machinery and regular maintenance of the equipment, installation of silencers in order to avoid high noise levels; - Workers working with equipment that generates a noise level greater than 80 dB(A) continuously for 8 hours or more should use ear	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	Reporting on implemented measures kept.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		protectors; in addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(A). - According to the nature of the activity and the activities in the preparatory and constructive phase, no sources of non-ionizing radiation will appear and therefore no measures are foreseen. - Workers shall be equipped with noise protection equipment working exposed on traffic noise.			
Construction	**Depletion in non-renewable resources and producing stress to the environment**	- Use raw materials (sand, gravel, and stone) only from suppliers that have valid licenses and concessions issued by the competent authorities.	Included in the Contract cost	- Contractor - Supervisor - Inspection authorities - PIU to oversee	Records on materials used, kept.
Construction	**Risk from surface soil erosion and landslides**	- The surface runoff management will be applied in the entire length of the project area; - Controlled removal of topsoil and storage in separate piles until its reuse for filling trenches or natural renewal with vegetation, stabilization and reclamation of the land; - Where works are necessary, they will be undertaken in such a way to minimize the occurrence of soil erosion, even for short periods. They will be rehabilitated as soon as possible; - After the completion of the construction works, it is necessary to properly clean the construction sites along the Highway A1; - With proper and careful planning of the construction works, the negative effects on the soil will be reduced and its pollution will be prevented.	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee	Records on rehabilitation of zones of earth works kept.
Construction	**Utility installations (gas, electricity, etc.)**	Competent authorities and agencies will be notified when utility installations are found, and their instructions followed; Utility installations will be protected from damage; If there is a need to work on/near the utility's pipeline/source, and the work could disturb the electricity, water supply, etc., the Contractor should announce these temporary disturbances. The work on utility installation shall be announced, communicated and agreed upon with the local community/owner prior the start of the work on that section.	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee	Records on possible dislocation are kept.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
Construction	**Possible environmental impact on water recipients due to ground contamination/water quality**	- Installation of mobile toilets, in those places along the route where longer-term construction activities will take place; - Minimizing the potential danger of contamination of soil, and therefore of groundwater, from possible leaks or leaks of fuel, oils and lubricants; - Parking of the vehicles and machines to be on a concrete waterproofing substrate on which measures should be taken to protect the soil from leakage of oils, petroleum and its derivatives; - Minimizing the potential danger of soil contamination from possible leaks or leaks of fuel, oils and lubricants; - The servicing of vehicles and machinery shall be carried out at the service center; - The storage of raw materials and auxiliary shall be carried out in appropriate containers or marked places; - Washing of vehicles, machines and concrete mixers must be strictly controlled and carried out in specially designated places that are designed to avoid soil contamination; - The waste should be collected in appropriate containers and handed over to authorized companies for further handling; - Interruption of construction activities in case of unwanted spillage of fuel, oils and lubricants from construction machinery and transport vehicles on the soil and quick removal of the contaminated soil layer. This contaminated soil with waste oils and/or fuels (hazardous waste) must be removed and handed over to a Waste Oil Collector (who has a Permit for the collection and transport of hazardous waste) with whom a Contract will be concluded, in accordance with the Rules of Procedure and the method of collection, transportation, processing, storage, treatment and disposal of waste oils, the method of keeping records and submitting the data ("Official Gazette of the Republic of Macedonia" no. 156/07); - Controlled removal of topsoil and storage in separate piles until its reuse for filling trenches or natural renewal with vegetation, stabilization and reclamation of the land (where applicable);	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee	Emergency Preparedness Plan implemented (when required). Records on events and waste kept.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- To provide collection vessels, absorption material and firefighting equipment for the purpose of intervention in case of unwanted leaks of dangerous substances; - Hazardous waste should be stored in properly marked containers that will prevent its leakage. They should be covered and protected from being washed away by precipitation and stored on waterproof bases/tanks; - Development of procedures for emergency situations and plans for unforeseen situations in case of accident, breakdowns, spills, fires, etc.; - Coordination of the time for carrying out the construction activities according to the weather conditions and avoiding the execution of the same under unfavorable conditions (rain, strong winds); - After the completion of the construction works, it is necessary to properly clean the construction sites along the A1 Highway.			
Construction	**Nature protection and biodiversity**	- During the construction and installation of ITS along the route of the Highway A1, the responsible persons should take care to give clear instructions and training to the workers, how to treat the environment and biodiversity; - Before works start, the area must be inspected for nests, dens and young of sensitive plant and fauna species. If any are found, competent authority will be notified and the found will be relocated in accordance with instructions of a competent authority; - The construction sites of the junctions in the northern and southern parts and the laying of pipes for cable ducting, should be limited to the minimum required area and the delay/storage of materials/equipment should be done within the scope of the project; - The locations provided for the disposal of the excess excavated earth, should be limited within the construction site, the location for the deposit should be chosen in an adequate way so that it is not located in an area that is of particular importance for the flora and fauna; - Open fires and burning of waste and other materials are strictly forbidden;	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee - Inspection authorities	Training register kept, Revegetation plan applied (if required).

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- The removal of bushes and trees (if any) should take place in the autumn-winter period, outside the breeding season of the birds, which starts from March 1st to September 30th, only if there are trees and bushes on the route where nests are found; - To minimize the cutting of plant vegetation and to make up for the loss by planting new compatible seedlings of trees and shrubs in the planned green zone (or elsewhere along the corridor in coordination with the Beneficiary institution and competent authorities); - Compensation for the caused damage and revitalization of the landscape along the Highway to be applied (where applicable); - All piles of building materials or temporarily deposited inert waste or topsoil should be protected from weather conditions (wind, rain) with appropriate covering materials; - Maintaining the tidiness of the construction site, properly handling all types of waste and not scattering the construction waste, which would prevent pollution of habitats of the surrounding living world.			
Construction	**Possible adverse impact on cultural heritage**	- If during the construction works (deployment of ITS), artefacts are discovered that can indicate the existence of archaeological heritage, the activities will stop, and the competent and trained staff will place a fence around the specific area. Measures will be applied in accordance with the legal regulation, which deals with the protection measures according to the Law on the Protection of Cultural Heritage ("Official Gazette of the Republic of Macedonia" no. 20/ 04, 71/04, 115/07, 18/11, 148/11, 23/13, 137/13, 164/13, 38/14, 44/14, 199/14, 104/15, 154/15, 192/15, 39/16 and 11/18), article 65, 66 and 67; - The contractor is obliged to immediately notify the Operator and the Ministry of Culture and follow their instructions. - The Contractor will organize Chance Find Procedure training for workers.	Included in the Contract cost	- Contractor - Supervisor - PIU to oversee - Inspection authorities	Chance Find Procedure applied (if relevant)
Operational	**Noise disturbance to local population/road users and workers caused by regular and**	- In terms of possible use of construction machinery and transport vehicles (when removing defects), the impact is expected to be very law, as the highway is under traffic. The noise protection measures for workers will apply.	Included in the operation and maintenance costs	Highway operator (PESR)/ or entity entitled.	Annual operation and maintenance programme.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
	scheduled maintenance works				
Operational	**GHG emissions monitoring**	- The information that will be collected through GHG (SLCP) emissions monitoring systems will help linking specific climate change and development priorities (e.g. mitigation, adaptation and improving air quality) and be a valuable support the Government in developing regulatory and policy reforms and institutional strengthening for pursuing low-emissions development.	Included in the operation and maintenance costs	Highway operator (PESR)/ or entity entitled.	Annual operation and maintenance programme.
Operational	**Waste management**	- All waste types that will be generated during the regular operation and maintenance of the ITS, should be managed, selected and classified in accordance with the Law on Waste Management ("Official Gazette of RNM" No. 216/21); - In terms of possible use of construction machinery and transport vehicles (when removing defects), the measures proposed in the previous two phases will be applied.	Included in the operation and maintenance costs	Highway operator (PESR)/ or entity entitled.	Annual operation and maintenance programme.
Operational	**Risk management**	- Emergency Preparedness and Response Plan prepared; - In emergency situations, it is recommended to act according to the stated measures proposed in the previous two phases (also applicable for operation phase).	Included in the operation and maintenance costs	Highway operator (PESR)/ or entity entitled.	Annual operation and maintenance programme.
Operational	**Maintenance of the ITS**	- Since high quality equipment will be installed, the occurrence of defects is minimal, that is, the possibility of ground contamination/water quality would be minimal; - If a breakdown occurs, the duration of the construction activities for its rehabilitation would be short-lived, so the possibility of leakage of oils, fats and fuels would be minimal; - During the regular maintenance, the measures proposed in the previous two phases will be applied, i.e., following the principles of good construction practice, with the aim of protecting surface and underground waters from pollution, i.e., ensuring their good ecological condition.	Included in the operation and maintenance costs	Highway operator (PESR)/ or entity entitled.	Annual operation and maintenance programme.

Phase	Issue	Mitigating measure	Cost (EUR)	Institutional responsibility	Comments (e.g. secondary impacts, source of verification)
			Design/ Construction / Operation	Design/ Construction / Operation	
		- It is necessary for the PESR to create a Plan or a protocol for monitoring, storing, as well as, the method and the exact purposes of using the recordings, or the camera footage, in order to avoid the abuse of the gathered data, and to increase the traffic discipline of the drivers along the Highway A1, in compliance with applicable laws and the amendments that will follow in this respect. - Private protection data and punishment policy for drivers will be conducted in coordination with all relevant institutions and the Ministry of Interiors. The purpose of the ITS is not to punish the drivers, but to manage the traffic for safety reasons. The punishment policy is under the MoI competences.			

5. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
Design phase										
Permits to be provided prior to the commencement of pre-construction and construction activities of the ITS development	PIU project manager/ Designers	Inspect and check all necessary documents and permits issued	During the entire design phase	To ensure that ITS can be deployed in compliance with laws and regulations	Included in the project budget	/	/	Consultant/ Revision MTC/PIU	/	/
Notifications to the public and relevant institutions, public disclosure	PIU project manager/ Designers	Relevant documentation and media press	Before tender lunch and the start of the work activities	To ensure public participation and information	Included in the project budget	/	/	Consultant MTC/PIU	/	/
Pre-construction and Construction phase										
Contracts with licensed companies	Contractor Engineer PIU project manager oversees	Visual check of contracts	Before the start of the work activities (in pre-construction phase)	To ensure a way of handling waste and all other aspects of construction works	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager Inspectors	/
Implementation of preventive measures for the health and safety of the workers and the road users (Fencing on the construction site,	At the locations where the construction activities are carried out (within the project location)	Visual checks of the fencing of the construction site, safety signs, personal protective	Before the start of the work activities (in pre-construction phase) and Unannounced controls during work activities	To be in compliance with national health and safety regulation and standards To prevent health and safety risks – mechanical injuries	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager Inspectors	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
warning signs and hazard warning signs, etc.)		equipment and clothes etc.		and accidents on the construction sites						
H&S Plan; Fire protection plan; Emergency preparedness Plan approved	In the Contractor's premises Engineer premises	Visual inspection of documentation	Before the start of the work activities (in pre-construction phase) and Unannounced controls during work activities	To prevent health and safety risks during construction phase	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager Inspectors	/
Contractor ESMP approved	In the Contractor's premises Engineer premises	Visual inspection of documentation	Before the start of the work activities (in pre-construction phase) and Unannounced controls during work activities	Fully to implement ES mitigation measures during construction phase	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Soil quality	All storage areas for materials, fuels and waste, waste water Excavation and storage sites	Visual monitoring of the method of excavation of trenches, as well as the method of storage and handling of materials, management of waste,	Controls during the performance of the activities	To ensure that there will be no disruption of the soil quality and ensuring implementation of mitigation and protection measures	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
		wastewater, etc.								
Water quality – Visual monitoring of the way materials and waste are handled, as well as waste water management	On construction sites, especially where activities take place near riverbeds and other water bodies	Visual monitoring, especially during heavy rainfall	Controls during the performance of the activities.	Minimizing the risk of pollution of water, soil, biological water diversity, etc. and ensuring the implementation of mitigating measures	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Fugitive dust and exhaust gases	On the construction site and in the immediate vicinity of populated areas as receptors.	Visual monitoring	Controls during the performance of the activities.	Minimizing impacts on sensitive receptors during construction and ensuring the implementation of air mitigations and protection measures	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
GHG emissions	Along Corridor X (at HAZMAT locations)	Instrumental / system	Controls during the performance of the activities (test monitoring)	Minimazing impact on air quality	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Quantity, type, waste sorting and	At the location	Visual surveillance	Regular record keeping	Documenting the status of waste	/	Included in the	/	/	Contractor; Supervisor;	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
waste fractions (hazardous, non-hazardous, biodegradable, inert, etc.)	where pre-construction and construction activities are carried out	and unannounced controls	regarding the type and amount of waste, as well as the method of disposal of different types of waste during the performance of the activities	during construction and ensuring the implementation of mitigation measures and protection of the environment		Contract Budget			PIU project manager PIU ES Expert Inspectors	
Noise level monitoring in dB (with appropriate equipment) in case of public complaints	Monitoring near settlements that represent sensitive receptors (if required)	Instrumental	Upon compliant	Determination of noise level status during construction and ensuring implementation of mitigation measures	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Types of flora and fauna distributed in the surroundings of the monitoring locations and protected areas	At the locations where pre-construction and construction activities are carried out and, in protected areas	Visual monitoring where pre-construction and construction activities are carried out	Regular controls during the performance of the activities	Prevention and reduction of direct habitat destruction	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Preserved cultural and historical heritage, as well	Along the route, at	Visual monitoring	Controls during the	Documenting accidental finds,	/	Included in the	/	/	Contractor; Supervisor;	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
as accidental archaeological finds at the sites	construction site		performance of the activities	undiscovered underground legacies during construction and ensuring implementation of mitigation measures Necessity of compliance with the Law on the Protection of Cultural Heritage (Protocol on Accidental Inventions)		Contract Budget			PIU project manager PIU ES Expert Inspectors	
Register / evidence of engaged workforces	Office On site	Document review	Before official start of the construction phase (pre-construction phase) / Semi-annual	Realization of mitigation measures. Administration and documentation the phase	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Number of meetings,	Office, On-site,	Review and updating of the SEP based on the	Semi-annually	Realization of mitigation measures.	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
information, leaflets, complaints, etc.	Local media, Information to stakeholders	evidence of the following indicators; Public meetings held, attendance o meetings, discussed topics, received comments and complains, explained complaints, addressed complaints, etc. Updated Complaint Log (number and type of complaints received, log of grievances, etc.)		Administration and documentation the phase		(2000 leaflets on ITS/road safety in summer period for tourists) – 1000 for south and 1000 for north part of the corridor.			PIU ES Expert Inspectors	

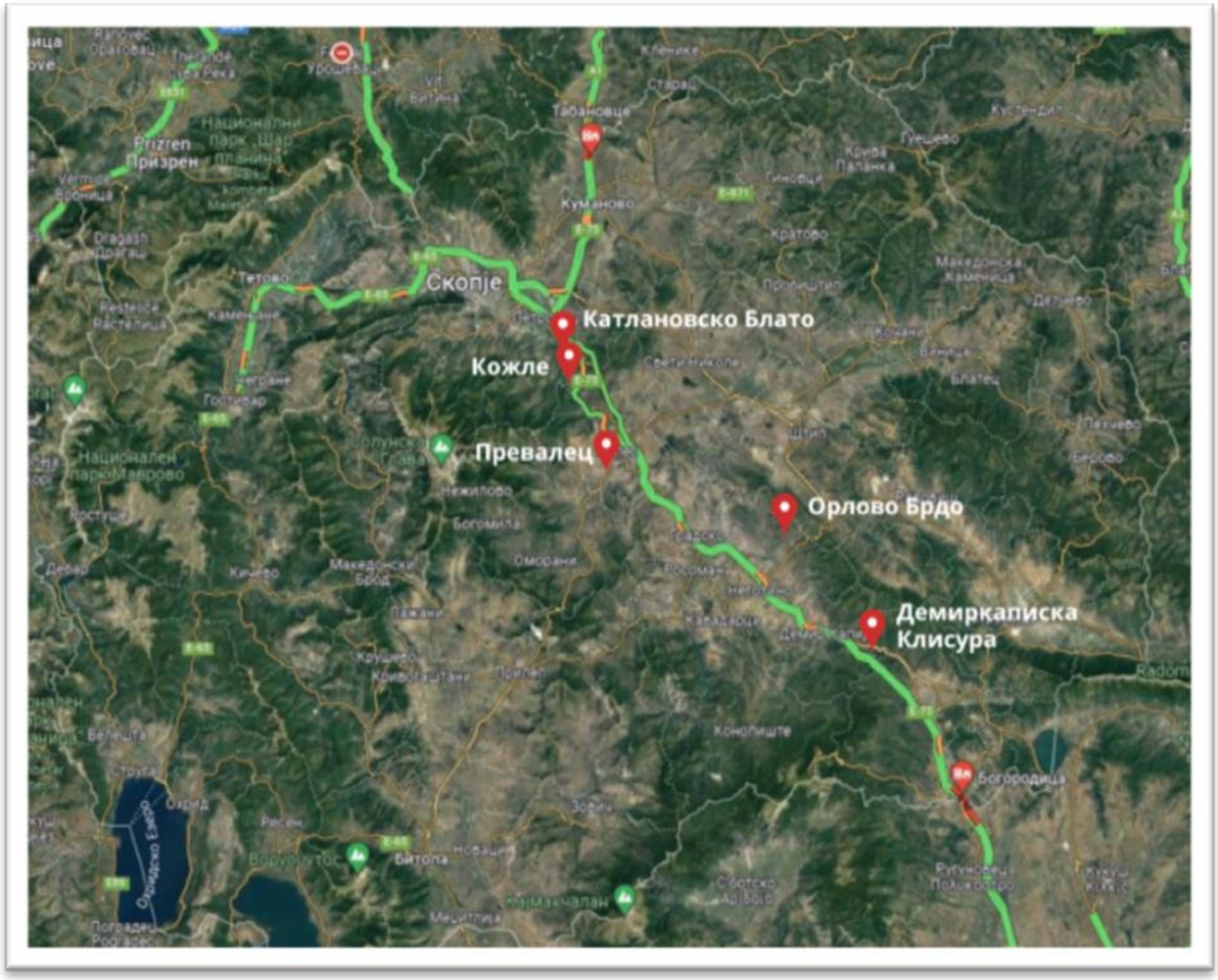
What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
Number of accidents, risks, injures, leaflets, informative bulletins, boards, signalization, complaints, etc.(Community Health and Safety)	Office, on-site, field	Monitoring of the Community health, safety and security plan and other documents. Implementation of the campaign for community safety during the timetable of construction activities, number of meetings and other implemented activities.	Monthly Reports	Implementation of mitigation measures. Administration and documentation the phase	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
Completed plans, number of accidents, risks, injures, leaflets, informative bulletins, boards, complaints, etc. (OHS)	Office On site	Monitoring of the Occupational health, safety and security plan, Emergency Preparedness and Response Plan, etc.	Monthly	Implementation of mitigation measures. Administration and documentation the phase.	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Completed plans, number of employees, period, qualifications, trainings, etc.	Office and field	Monitoring of the implementation of completed plans and assessment for local procurement	During pre-construction and construction phase	Completed plans, number of employees, period, qualifications, trainings held, etc.	/	Included in the Contract Budget	/	/	Contractor; Supervisor; PIU project manager PIU ES Expert Inspectors	/
Operation phase										
Waste management	At the location where possible reparations	Visual control and inspection based on contract with	Regular record keeping regarding the type and amount of waste	Controlling the waste management during operational phase	/	/	Included in the operation and maintenanc	/	/	Highway operator (PESR)/ or entity entitled.

What parameter will be monitored?	Where the parameter will be monitored?	How the parameter is monitored?	When the parameter is monitored (frequency)?	Why the parameter is monitored?	Cost			Responsibility		
					Design	Construction	Operational	Design	Construction	Operation
	activities could be appear	licensed company for waste management or road maintenance company					e costs (Annual Programme)			
GHG emissions	Along Corridor X (at HAZMAT locations)	Instrumental / system	Regular monitoring	Minimazing impact on air quality	/	/	Included in the operation and maintenance costs (Annual Programme)	/	/	Highway operator (PESR)/ or entity entitled.
Number of accidents, risks, injures, informative bulletins, boards, etc.	Office and field	Monitoring of the Occupational health, safety and security plan, Emergency Preparedness and Response Plan.	Semi-annually	Implementation of mitigation measures. Administration and documentation the phase.	/	/	Included in the operation and maintenance costs (Annual Programme)	/	/	Highway operator (PESR)/ or entity entitled.

6. ANNEXES

Annex 1 Map of sensitive/protected areas nearby project scope



Protected areas identified in the project scope

Annex 2 Form for submitting comments

Form for submitting comments and suggestions for Environmental and Social Management Plan ESMP for the project "Implementation of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)"

Main description of the project

Project activities for the construction of the Intelligent Transport System are planned to take place in parallel to the Highway A1. The Highway A1 is equipped with basic traffic equipment, vertical and horizontal traffic signals, road marking posts and a protective fence. An open tolling system is currently in operation. The project will be aligned (and possibly upgraded) with the already designed and installed ITS system on the section Demir Kapija - Smokvica.

The project route of the Intelligent Transport System extends from the northern to the southern part of the Republic of North Macedonia, which passes through the central areas near the cities of Kumanovo, Skopje, Veles and Gevgelija. The length of the route is ≈174 km. Since the ITS passes through the entire length of the Republic of North Macedonia, it passes through several municipalities that are distributed in 4 Planning Regions: Northeast, Skopje, Vardar and Southeast regions. The municipalities through which the route passes are: Kumanovo, Ilinden, Petrovec, Veles, Gradsko, Rosoman, Negotino, Demir Kapija and Gevgelija.

Electronic version of the Environmental and Social Management Plan (ESMP) for the project "Implementation of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)" is available on the following web pages:

- MoTC: http://mtc.gov.mk/
- PIU: www.wbprojects-mtc.mk

Name and surname of the person who provides comment*	
Contact information*	**E-mail:** _____ **Phone:** _____
Comment on the ESMP:	
Signature _____	**Date** _____

If you have any comments/suggestions or amendments to the proposed measures of Environmental and Social Management Plan ESMP for the project "Implementation of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)", please submit it to the responsible persons from the following institution:

Contact person: Mr. Jozhe Jovanovski, ES Specialist

e-mail: joze.jovanovski.piu@mtc.gov.mk

Within the 14 days period after the announcement of ESMP for the project "Implementation of Intelligent Transport System (ITS) on Highway A1 (BC Tabanovce - BC Bogorodica)"

(date of announcement: …….)

Referent number: _____

(fulfilled by the responsible persons for the project implementation)

* Fulfillment of the fields with personal data is not obligatory

Annex 3 Grievance Form for whole project implementation period

Reference Number	
Full name (optional) ☐ **I wish to raise my grievance anonymously.** ☐ **I request not to disclose my identity without my consent.**	
Contact information **Please mark how you wish to be contacted (by post, telephone, e-mail).**	☐ **By Post:** ***Please provide mailing address:*** _____ _____ ☐ **By telephone:** _____ ☐ **By E-mail**
Preferred language of communication	☐ **Macedonian** ☐ **Albanian** ☐ **English** ☐ **Other:** _____
Gender	☐ **Female** ☐ **Male**

Description of Incident for Grievance	What happened? Where did it happen? Whom did it happen to? What is the result of the problem?
Date of Incident / Grievance	
	☐ **One-time incident/grievance (date _____)** ☐ **Happened more than once (how many times? _____)** ☐ **On-going (currently experiencing problem)**
What would you like to see happen?	

Signature: _____
Date: _____

Please return this form to:

Name and surname	Jozhe Jovanovski	----------
E-mail	joze.jovanovski.piu@mtc.gov.mk	----------
Institution	Ministry of Transport and Communications Western Balkans Trade and Transport Facilitation Project St. Crvena Skopska Opstina 4,1000 Skopje, R. N. Macedonia	Contractor Company

Annex 4 Opinion from MoEPP that there is no need to be prepared Environmental Protection Report (EPR)

Република Северна Македонија
Министерство за животна средина и просторно планирање

Republika e Maqedonisë së Veriut
Ministria e Mjedisit Jetësor dhe Planifikimit Hapësinor

УПРАВА ЗА ЖИВОТНА СРЕДИНА - DREJTORIA PËR MJEDIS JETËSOR
СЕКТОР ЗА ЖИВОТНА СРЕДИНА - SEKTORI PËR MJEDIS JETËSOR

ГРАДЕЖЕН ИНСТИТУТ МАКЕДОНИЈА АД СКО
Примено: 27.10.2022
Орг. Един. 1005 Број 1039/23 Прилог: Времето:

Арх. Бр./Nr.Arh. УП1-11/4-1894/2022
Дата/Data: 19-10-2022 год./viti

ДО/DERI TE Градежен институт "МАКЕДОНИЈА" АД
ул. "Дрезденска" бр. 52
1000 Скопје

ПРЕДМЕТ/LËNDA: Мислење
ВРСКА/LIDHJA: Ваш број 1005-1039/12 од 23.09.2022 година

Во врска со Вашето барање со број УП1-11/4-1894/2022 за одобрување на Елаборат за заштита на животната средина (изработен од страна на Градежен институт "МАКЕДОНИЈА" АД од Скопје со технички број ПРР 060-09-22 од Септември 2022 година) кое се однесува за проект – Имплементација на интелигентен транспортен систем (ИТС) на автопатот А1 (ГП Табановце – ГП Богородица), за потребите на инвеститорот Министерство за транспорт и врски, Управата за животна средина при Министерството за животна средина и просторно планирање Ви го доставува следното:

МИСЛЕЊЕ

Согласно Законот за животна средина (Службен весник на Република Македонија бр. 53/2005, 81/2005, 24/2007, 159/2008, 83/2009, 48/2010, 124/2010, 51/2011, 123/2012, 93/2013, 187/2013, 42/2014, 44/2015, 129/2015, 192/2015, 39/2016, 99/2018 и Службен весник на Република Северна Македонија бр. 89/2022) и Уредбата за определување на проектите и за критериумите врз основа на кои се утврдува потребата за спроведување на постапката за оцена на влијанијата врз животната средина (Службен весник на Република Македонија бр. 74/2005, 109/2009, 164/2012, 202/2016 и Службен весник на Република Северна Македонија бр. 175/2022), Уредбата за дејностите и активностите за кои задолжително се изработува Елаборат, а за чие одобрување е надлежен органот за вршење на стручни работи од областа на животната средина (Службен весник на Република Македонија бр. 80/2009, 36/2012) и Уредбата за дејностите и активностите за кои задолжително се изработува елаборат, а за чие одобрување е надлежен градоначалникот на општината, градоначалникот на градот Скопје и градоначалникот на општините во градот Скопје (Службен весник на Република Македонија бр. 80/2009, 32/2012), Управата за животна средина при Министерството за животна средина и просторно планирање ја разгледа предметната документација за горенаведениот проект и е на мислење дека за наведената дејност **не треба** да се изготви Елаборат за заштита на животната средина.

Управа за животна средина / Drejtoria për mjedis jetësor
Директор / Drejtor
Hisen Xhemaili

Изработил/Përpiloi: Влатко Цветаноски
Контролирал/Kontrolloi: Александар Петковски
Согласен/Miratoi: Билјана Петкоска

Министерство за животна средина и просторно планирање
на Република Северна Македонија
Плоштад „Пресвета Богородица" бр. 3, Скопје
Република Северна Македонија

Ministria e Mjedisit Jetësor dhe Planifikimit
hapësinor e Republikës së Maqedonisë së Veriut
Bul. "Presveta Bogorodica" nr. 3, Shkup
Republika e Maqedonisë së Veriut

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Annex 5 Minutes of Public hearing

MINUTES OF MEETING

from the Public Hearing

on Environmental and Social Management Plan (ESMP) for Deployment of Intelligent Transport System (ITS) on Highway A1 (Corridor X) (BC Tabanovce - BC Bogorodica)

held in the Hall of the Ministry of Transport and Communications on April 4, 2023, AM 11:00 - 12:30 hrs.

On 04.04.2023, the Public hearing and presentation was held on the prepared draft Environmental and Social Management Plan (ESMP) for deployment of Intelligent Transport System (ITS) on Highway A1 (Corridor X) (BC Tabanovce - BC Bogorodica).

Present:

1. MSc Tanja Dimitrova Filkoska - CEIM;
2. MSc Elena Nikolovska - CEIM;
3. MSc Bojana Veljanoska - CEIM;
4. Darko Trajanoski - CEIM;
5. PhD Ruzica Cacanoska - CEIM;
6. MSc Joze Jovanovski – PIU/MTC;
7. Darinka Miteva - PESR;
8. Slavko Micevski – PIU/MTC.

The Public hearing has held as per the following Agenda:

1. Opening of the Public hearing

The Public hearing was opened by the representative from the Ministry of Transport and Communications, from the Project Implementation Unit (PIU) - Joze Jovanovski. The PIU/MTC representative explained that with the deployment of an Intelligent Transport System (ITS), roads will be equipped with traffic-technical and telemetry systems on the built profile of the highway A1, taking into consideration the climate zones, terrain types, traffic oscillations, vehicles categories, aiming at improving the traffic safety with dynamics that correspond to the current conditions of the alignment, environment and social aspects.

He emphasized that the national impact assessment procedure has already been carried out for the project, in accordance with the Law on the Environment, and it is not necessary to prepare an Environmental Protection Report, while the prepared ESMP is in accordance with the safeguards policies and procedures for environmental protection and social aspects of the World Bank. He emphasized that all environmental and social aspects will be included in the tender documentation for the project to deploy the ITS on Corridor 10, while the project is technically divided for implementation into two parts - the Southern and Northern Parts.

Then, he presented the team, Darko Trajanoski, a representative from the designers of the ITS system and representatives from the team of developers of ESMP, namely Tanja Dimitrova Filkoska, Elena Nikolovska, Bojana Veljanoska and Ruzica Cacanoska from the Civil Engineering Institute Macedonia JSC - Skopje. After the presentation of the team, he invited the

attendees to follow the ESMP presentation for deployment of Intelligent Transport System (ITS) on highway A1 (Corridor X) (BC Tabanovce - BC Bogorodica) and then if anyone have questions and comments to participate in the discussion that will follow after the presentation.

2. Presentation of the draft ESMP

MSc Tanja Dimitrova Filkoska, EIA expert, as a representative of the team, has presented the Environmental and Social Management Plan (ESMP). The section on social aspects, e.g., OHS measures, Community health and safety, road safety and GRM, was presented by the social expert Dr. Ružica Cacanoska. Briefly, the Project for deployment of Intelligent Transport System (ITS) on the A1 highway (Corridor X) (BC Tabanovce - BC Bogorodica) was presented, i.e., the technical characteristics, as well as the scope of activities that will be carried out within the Project, and that will have environmental adverse impacts. The environmental media were briefly explained, and then the impacts that the Project will have on air, water, soil, biodiversity, noise, waste and social aspects during all project phases were identified in details. At the end, the measures to reduce the potential impacts on the environment media, which are comprehensively described in the ESMP, were presented, which was followed by a discussion. Jože Jovanovski had the final word for the presentation, in the technical description section, and emphasized that continuous monitoring of GHG emissions will be ensured, and the data will be available to the PESR as the end user of the ITS on A1 highway. The data will be publicly available and the PESR will be able to create a policy for building roads resistant to climate change and will be able to share it with various institutions and the World Bank.

As a conclusion from the presentation, Jože Jovanovski stated that ITS is a classic activity within the road belt of the existing A1 highway, where there will be no need for expropriation and displacement, and the biggest civil construction activity is digging trenches for laying optical cable along its length on the route. At the same time, information boards will be placed on traffic safety, meteorological conditions and GHG monitoring, which will ensure safer and more comfortable transportation. In the operational phase, apart from road users, there will also be benefits for tourism development. It is planned to prepare leaflets of an informative nature for the highway users, where they can be informed about all the benefits, the temporary traffic regime, etc. The project for deployment of ITS on the Southern part of the A1 highway, from the Veles South interchange to the BC Bogorodica in a length of about 98 km will be implemented for about one year, i.e., 56 weeks, and the approval of a WBIF Grant for the Northern part is currently expected until July 2023.

It is planned to set up a National Traffic Management Center (NTMC) in the existing facilities of PESR in Petrovec. Considering that the connection of the capital city of Skopje with Corridor X is very important in terms of ease of use with traffic, heavy vehicles, the proximity of the Skopje International airport, within the framework of the project for the ITS deployment in the Northern part, the highway triangle sections Miladinovci Interchange - Interchange Hipodrom and Hipodrom Interchange – Petrovec Interchange (at the Petrovec toll station) is also included in the project scope. Furthermore, the plans are to set up the ITS along Corridor VIII. In order to properly use the ITS, the PESR will make an amendment to the Act on the systematization of jobs for the employment of experts in the operational phase and accordingly in its Annual work programs and Plans for public procurement will provide funds for the maintenance and use of the ITS, including the requirements from ESMP in the operational phase.

There will be a separate item in the tender for potential bidders to be able to offer a price for the implementation of measures and monitoring envisaged in the ESMP. If trees are cut during the installation phase of the ITS, the Contractor will also prepare a Plan for cutting the trees. The tender documentation will require two experts, responsible for OHS and ES. For the supervision over the ITS deployment, a separate Contract for the supervision has been provided, and in that tender, it is also provided for hiring of two experts for OHS and ES. In the process of drafting the tender documentation, as well as in the evaluation phase, representatives from the PE for state roads are constantly involved, as the end user of the project.

3. Discussion

Question from the PESR representative:
Darinka Miteva: Should an Environmental Protection Report be drawn up according to the national legislation?
Answer from the PIU/MTC representative:
Jože Jovanovski: In accordance with the National legislation, a procedure was carried out for EIA - Notice of Intent, to which the Ministry of Environment and Physical Planning responded with a Letter, stating that no EP Report is required. The opinion is Annexed to the ESMP.

Question from the PESR representative:
Darinka Miteva: Was the PESR consulted during the development of the ITS project?
Answer from the PIU/MTC representative:
Jože Jovanovski: During the development of the entire project and the ESMP, experts from the Maintenance Department were consulted, especially for technical aspects. Namely, in the process of drafting the tender documentation, as well as in the evaluation phase, representatives from the PESR are constantly involved, as the end user of the project.

Question from the PESR representative:
Darinka Miteva: Does the Waste Management Plan provide a location for excessive earth materials will be placed and has the amount of excavated earth material been calculated?
Answer from the PIU/MTC representative:
Jože Jovanovski: The Waste Management Plan provides aspects for the temporary storage of excavated earthen material from the excavation of an optical cable channel, which will then be reused to refill the excavated trenches, which means that most of the excavated material will be returned (reused). The minimum amount of inert waste (soil) that will remain after the completion of the construction activities will be dealt with in accordance with the Law on Waste Management. According to the preliminary amounts of excavated soil material, there will be no need to establish a new depo area, since it is a small amount of earthen material. The project does not envisage the expropriation of land, but if the need arises, an abbreviated Resettlement Action Plan will be prepared.

Question from the PESR representative:
Darinka Miteva: Does with the project trees will be cut off from middle green belt of the highway and whether permit from the competent authority or from the PESR is required?
Answer from the PIU/MTC representative:
Jože Jovanovski: There may be cutting of trees from the middle green belt or to the left and right sides of the road strip, which is owned by the PESR. It is foreseen within the ESMP, if there is a need to cut trees, to request permission from a competent authority in cooperation with the PESR. Also, the cut trees will be supplemented with new seedlings, according to the Bank's requirements. Before cutting trees, a check will be made for nests and nesting birds, based on which, activities will be planned to be outside the nesting period.

Question from the PESR representative:
Darinka Miteva: Is there a need to obtain a Water Management Consent for the project?
Answer from the PIU/MTC representative:
Jože Jovanovski: This project is not subject to the issuance of a Building Permit, there are no works in the river bed because equipment is being installed on the highway - above all, signalling on the upper layer and therefore there is no need to request a Water Management Consent. However, in the event of an inspection, instructions from a competent water inspector will be followed.

4. Closing the Public hearing

Considering that there were no other questions and discussion, Jože Jovanovski stated that all issues are already covered in the draft ESMP which was published on 17.03.2023 and therefore it can be concluded that after the Public hearing it will become final and will be included in the tender documentation for the project.

The Public hearing ended at 12:30 p.m.

Prepared by:

MSc Elena Nikolovska, Civil Engineering Institute Macedonia JSC Skopje

MSc Bojana Veljanoska, Civil Engineering Institute Macedonia JSC Skopje

MSc Jože Jovanovski, PIU/MTC

Annex I – List of Participants

Republic of North Macedonia
Ministry of Transport and Communications

TOWARDS THE FUTURE
with efficient transport and safe roads

WORLD BANK GROUP

LIST OF PARTICIPANTS

WESTERN BALKANS TRADE AND TRANSPORT FACILITATION PROJECT (WBTTFP)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

DEPLOYMENT OF INTELLIGENT TRANSPORT SYSTEM (ITS) ON HIGHWAY A1 (BC TABANOVCE - BC BOGORODICA)

Public Hearing Date: 04.04.2023, Tuesday, 11:00 AM (MoTC Meeting Room)

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Annex 2 – Photos of the Public hearing