public buildings, the integrity of cultural monuments, territories designated for strategic investment or the coastline (in sense of public interest for development of tourism).

4.3.9 Facilities and services

The following sections will address information on education and health system, water supply and sewage service, electricity supply and public lighting, telecommunications, waste management service, road system and transport in the municipalities affected by the project. Information in municipal level is provided by the General Local Development Plans of each municipalities and other relevant studies/reports. Data on settlement level was provided from consultations in the field with community and representatives at each municipality/administrative units affected.

4.3.9.1. Health service

The responsible institution regarding health care service in Albania is the Ministry of Health and Social Protection. Health care is offered without payment. In Albania Health service is organized in three levels: primary health care, secondary hospital service, and tertiary hospital. The primary health care is provided by polyclinics, health centers, ambulances and consultancy clinics for children and women. In 2017, the average number patient/health center is 4.9. Around Albanian there are 413 health centers, 2,022 ambulances and 46 polyclinics[46]. There is a Health center per each administrative unit, while in each Settlement there is an ambulance which offer basic levels of health care provided by a single nurse or doctor.

Secondary health care is provided by regional hospitals with basic and specialized services, in 42 public hospitals with 8.169 beds counted in 2017. On average there are 30 beds/10,000 inhabitants. The health system in Albania is largely public. All hospitals offer basic services (accident and emergency etc) and additional services (Paediatrics, Obstetrics-Gynaecology, Surgery, and Pathology), and regional hospitals offer specialised services in Ophthalmology, Orthopaedics, Trauma, Neuro- Psychiatry and Infectious Disease. Hospitals are found in each of the large population centres.

The private sector covers most of pharmaceutical service, dental service and some specialist diagnostic clinics and private hospitals mainly located in Tirane. In addition to the hospitals, health services are provided also by a number of national institutions such as; The National Blood Transfusion Center, the National Center for Health Care, Child Development and Rehabilitation, the University's Dental Clinic. All key institutions are located in Tirane.

Except the regional directorate of Public Health, in each prefecture of the country operates the Hospital Directorate and the Department of Primary Health Care. "Mother Teresa University Medical Center" in Tirana and Trauma University Hospital in Tirana offer at the same time secondary and tertiary health care. Tertiary Health care is provided also by university health structures which perform diagnostic, treatment and teaching with research functions.

Health services in the municipalities crossed by the AIC corridor, divided by sections of AIC Corridor

In the following section are presented information regarding health services in each municipality affected by the project, divided by sections of AIC Corridor.

There are 735 public Health centers/ambulances and 15 hospitals in the area under the study. Better coverage with health service has the Section 5B (Tirana municipality). The total number of health centers/ambulances and hospitals distributed by sections is presented in the following table.

[46] http://www.instat.gov.al/media/4936/vjetari-statistikor-2018.pdf

Table 4-125 Health institutions distribution by sections of AIC within affected municipalities

Sections of AIC	Municipality	Health center/ Ambulances	Hospitals
Section 1	Shkoder, Vau I Dejes, partially Lezhe	177	2
Section 2	Lezhe (other part of the territory)	52	2
Section 3	Kurbin (Thumane adm unit part of kruje municipality)	29	1
Section 4	Kruje and Vore	51	1
Section 5B	Tirane, partially Rrogozhine	112	4
Section 5C	Rrogozhine (other part of the territory) and Dushk adm unit in Lushnje municipality	7	0
Section 6+7	Lushnje municipality	53	1
Section 8	Fier partially	65	1
Section 9A2	Fier (other part of the territory) and Hekal adm.unit (Mallakaster)	36	0
Section 9B2	Mallakaster and Memaliaj	85	1
Section 10	Tepelene	32	1
Section 11	Partially Gjirokaster	21	0
Section 12	Gjirokaster (other part of the territory)	15	1
Section 13A	Dropull	14	0
Total		**735**	**15**

Data source; General Local Plans of affected municipalities

Section 1

Along this section, health service is provided in public hospitals, health centers, ambulances, consultancy clinics, but also through private health services, including clinics and pharmacies. In the municipality of Shkoder there are 5.5 doctors per 10000 inhabitants. All administrative units of the municipality of Shkoder and Lezhe are covered with health care services through polyclinics and consultancy clinics.

The situation regarding health service is more problematic in the territory of Vau I Dejes municipality as primary health care is the only service offered in the territory of the municipality. Secondary health care service is provided only outside the boundary of the municipality, in Shkodra Regional Hospital. Coverage with this service is non-uniform. There are administrative units in which this service is not provided, such as in Vig-Minele. Health centers buildings are in bad conditions (amortized). Emergency cases in administrative units located in difficult geographic locations and with infrastructure problems, are mainly handled in health centers and in some cases by private doctors of the area.

Section 2

Health service along this section is provided through primary and secondary health care. The distance from the nearest health center/doctor in urban areas is 23 minutes, while in rural areas 19 minutes. The regional hospital is located in the city of Lezha and offers specialized healthcare services. It has a capacity of 162 beds and 35 specialist doctors. Pharmaceutical service is covered by private sector, dental service is offered by 7 state clinics and some other private dental clinics, most of them located near the health centers and hospital[47].

Section 3

[47]Deep Analysis and Evaluation of the Territory, Lezhe Municipality

Primary healthcare is provided in health centers located in each administrative unit. Secondary health care for the settlements that belong to municipality of Kurbin is offered in the hospital of Lac, meanwhile for the Settlement of Thumane (part of Kruje municipality) secondary health care is provided in the Hospital of Kruje. The hospital does not provide all specialties. It has a total of 75 beds. The number of health centers/inhabitants is lower than the minimum standard for planning health centers. The number of ambulances/inhabitants is within the standard[48].

Section 4

The largest number of health centers and ambulances along this section is encounter in the territory covered by the municipality of Kruje. Here are 1.3 ambulances per 2000 inhabitants. There is only one center that offer secondary health care along the entire section, the hospital in Kruje city which cover only the territory of Kruje Municipality. Hospital center offers specialized services and has 128 beds. The other part of the section (which include the territory of Vore municipality) is not covered by secondary health service, this service is provided in Tirane city, located only 17 km from Vora. In Vore adm.unit ratio people/doctors is 318/1, while in other administrative units the ration is up to 1608/1 (settlement of Marikaj).

Dental and pharmacy service along the section are offered by private sector and are located mainly in urban centers of Fushe Kruje, Kruje and Vore.

Section 5B

The situation regarding health care service is better for the first part of the section 5B till km 26+000, under administrative organization of Tirana municipality. The territory is covered with primary, secondary and tertiary health care service. The emergency service is distributed in several areas of the city of Tirane.. Expect public state hospitals in Tirane operates also about 8 private hospitals. Dental and pharmaceutical services are provided by private sector. . In addition, there are a number of national institutions such as the National Blood Transfusion Center, the National Center for Child Development and Rehabilitation, the University Dental Clinic. The National Center for Biomedical Engineering, the National Center for Drugs Control and the National Center for Quality Assurance and Accreditation of Health Institutions also operate in support of health institutions.

Other part of the section, from km 26+000 offer only primary health care services in one health center and 3 ambulances. The nearest hospital is located in the municipality of Kavaje.

Section 5C

Primary health care is offered in 9 health health centers, one specialty polyclinic located in the Rrogozhine administrative unit and ambulances distributed around the territory. The nearest hospitals are located in the municipality of Kavaje and in the city of Lushnje.

Section 6+7

Primary health care is provided in 54 ambulances and health centers distributed within the territory of Lushnje municipality. Secondary health care is covered by the hospital, located in Lushnje, with a total of 60 doctors and the Maternity hospital. Coverage with the health service is presented in moderate level. Regarding doctor/resident ratio, Lushnja appears in a relatively good condition compared to the national level, where 1.98 doctors serves 1000 residents (compared to the national report 1.14 / 1000 inhabitants).

[48]By Decision no. 671, date 29.7.2015 for approval of Territory Planning Regulation, article no.83 'Minimal standard of planning health and education public structure

Regarding the access to health centers, the average time to go to the nearest health center is 23 minutes (the highest in the country). The health service is also provided by private facilities, including dental clinics and pharmacies.

Section 8

Primary health care is provided in health centers distributed in each administrative units and ambulances in the villages. Secondary health care is offered in the regional hospital of Fier. The average distance from the nearest health center is about 19 minutes. Fier has the largest number of health centers and doctors, after Durres and Tirane. The ratio doctors/10,000 inhabitants is 11 (lower than the national average of 12.6). Also, the hospital capacity (beds/10,000 inhabitants) is low. On average in each health center there are 3-5 doctors and 12-19 nurses in rural areas, 10 doctors and 20-25 nurses in urban area. In rural areas there aren't specialized doctors, except family doctors. In the city of Fier there is also the Department of Public Health, and the State Laboratory of Bacteriological Analyzes. Secondary health care service is offered also in private hospital. Dental and pharmaceutical service is offered by private sector.

Section 9A2

Primary health care is provided in health centers distributed in each administrative units and ambulances in each settlement. Secondary health care is offered in the regional hospital of Fier and hospital in Ballsh.

Section 9B2

Along this section, primary health service is provided in 2 central polyclinics, one in Ballsh and one in Memaliaj, health centers distributed in each administrative unit and ambulances in each settlement. Secondary health service is offered in the hospital of Ballsh and that of Memaliaj. The hospital in Ballsh has just been reconstructed and the emergency service has been reorganized. In some villages, the minimal medical service is missing, as there is no medical assistance staff. The medical staff ratio per 10000 inhabitants is 7 doctors/10000 inhabitants (Mallakaster terrritory). In the territory of Memlaij municipality, the health facilities partially cover the needs of the population and are within the limits of their capacities. More specialized services, residents provide in the Regional Hospital of Fier and Gjirokaster.

Section 10

Primary health service is provided in 46 ambulances/health centers. Secondary health service is offered in the Hospital of Tepelene, but the hospital service does not appear in very good condition. There is a shortage of specialists for 90% of the services, there is a shortage of medical staff for children and elderly people. A large part of the inhabitants is addressed to the hospital of Gjirokaster or those of the capital, to receive more specialized health care. The ratio doctors/10,000 inhabitants are on average 33 doctors per 10,000 inhabitants.

Section 11

Along this section is offered only primary health service in ambulances (in each settlements) and health centers settled in the center of administrative units. Secondary health care is provided in Gjirokaster.

Section 12

Health service is organized into two main levels: a) ambulances/health centers and hospital care. Ambulances are distributed in almost all the settlements of Gjirokaster Municipality, except the city and villages which are covered by Health Centers. In the city of Gjirokaster is located the regional Hospital "Omer Nishani", as well as the Maternity Hospital. Health service is also offered in private clinic, located close to general Hospital. Health services provide also a number of dental clinics and pharmacies, located in the city of Gjirokastra.

Section 13A

Primary health service is provided in 3 Health Centers (in Sofratike, Vrisera and Polican) and 11 Ambulances. 6 family doctors and 33 nurses provide medical service. Secondary health care is not offered in the municipality,

so the residents are directed to the regional hospital in Gjirokaster for specialized services. There are 1.6 ambulances/2000 inhabitant.

4.3.9.2. Education System

The education system in Albania is run by the Ministry of Culture, Youth and Sports and is provided by a number of public and private institutions. The education system in the Republic of Albania consists of[49]:

- Pre-school education: This type of education starts at the age 0 to 5 years old. It is offered in creches and kindergartens. It is not obligatory.
- Primary education: Starts at the age six to 10 years old and it is compulsory.
- Lower secondary Education: Starts at the age 11 to 15 years old. It is part of basic education and is obligatory. It's offered private and public schools and it is compulsory.
- Upper secondary education: This type of education is offered in high schools. High schools can be general (gymnasium), Vocational school and oriented.
- Higher education: Higher Education system includes: Universities, Academies, Professional Colleges, Higher Schools and Inter-University Centers. Institutions of higher education may be public, non-public and public independent. Albania started reforming the higher education system by joining the Bologna Process in 2003.
- Adult education: is carried out in several ways through special programs of compulsory education offered to students over 16 who haven't completed compulsory education; special educational programs of secondary school offered by short-term periods of high schools to adults interested in completing secondary education; etc

In 2017, there were enrolled 649,938 pupils and students at all levels of formal education. At the beginning of the 2017-2018 school year, gross enrollment rate was 82.8 %. Student per class ratio for lower secondary education is 23.9.

Education Services in affected municipalities, divided by AIC Sections

As shown in the following table, there are 520 nursery school/kindergarten, 684 9-years schools, 135 upper secondary schools, 20 vocational schools and 4 socio-cultural schools in the territory of affected municipalities. Pre-school education, primary and lower and upper secondary education is offered in all municipalities, while university education is offered only in the municipality of Tirane (Section 5B of AIC), Shkoder (Section 1 of AIC) and Gjirokaster (Section 12 of AIC). The total number of children/students enrolled for the year 2016, the number of teachers and the children/educator; student/teacher ratio are presented in the following table.

[49]Statistical Yearbook of Education, Youth and Sports 2015-2016, page 6, Ministry of Education, Youth and Sports (MEYS) 2017.

Table 4-126 Educational institutions, students and teachers in affected municipalities, divided by AIC sections

AIC Sections	Municipality	Kindergarten	8-9 years school	Upper Secondary school	Vocational school	Socio cultural school	Number of children/students enrolled	Number of teachers	Children /Educator ratio	Pupil/ teacher ratio for 9-year school	Pupil/ teacher ratio for secondary school
Section 1	Shkoder	65	74	26	5	0	27,463	2,045	16/1	13/1	12/1
	Vau I Dejes	24	37	6	1	0	N/A/D	N/A/D	N/A/D	N/A/D	N/A/D
	Adm units of Lezhe (Balldren, Blinisht, Dajc, Kallmet, Ungrej)	21	12	6	0	0	4246	319	16/1	18/1	20/1
Section 2	Adm.Units of Lezhe municipality (Lezhe, Shengjin, Shenkoll, Zejmen,)	33	30	8	1	0	6642	499	20/1	16/1	18/1
Section 3	Kurbin	26	28	5	1	0	9840	612	20/1	15/1	17/1
	Adm.unit of Kruje municipality (Thumane)	2	2	1	0	0	644	37	23/1	15/1	22/1
Section 4	Kruje	22	25	4	0	0	11382	661	23/1	15/1	22/1
	Vore	16	17	3	0	0	6378	354	20/1	17/1	21/1
Section 5B	Tirane	65	181	29	4	4	89235	N/A/D	21/1	N/A/D	N/A/D
	Lekaj adm.unit of Rrogozhine municipality	2	9	0	0	0	N/A/D	N/A/D	N/A/D	N/A/D	N/A/D
Section 5C	Rrogozhine	20	21	3	0	0	N/A/D	N/A/D	N/A/D	N/A/D	N/A/D
	Dushk adm.unit of Lushnje municipality	1	4	1	0	0	880	64	17/1	14/1	13/1
Section 6+7	Lushnje	32	51	13	0	0	14081	1016	17/1	14/1	13/1
Section 8	Fier	90	55	15	4	0	24893	1689	18/1	14/1	15/1
Section 9A2	Adm.units of Fier (Levan, Frakull, Cakran)	17	26	3	0	0	6981	474	18/1	14/1	15/1
Section 9B2	Mallakaster	30	40	3	0	0	5221	395	16/1	12/1	16/1
	Memaliaj	16	26	4	0	0	N/A/D	N/A/D	N/A/D	N/A/D	N/A/D
Section 10	Tepelene	16	24	1	0	0	3617	411	11/1	7.3/1	13/1
Section 11	Partially Gjirokaster municipality	9	10	1	0	0	2496	234	12/1	11/1	10/1
Section 12	Gjirokaster	13	15	3	4	0	3743	351	12/1	11/1	10/1
Section 13A	Dropull	3	3	2	0	0	192	33	12/1	6/1	4/1
Total		**520**	**684**	**135**	**20**	**4**	**249,643**	**11,558**			

Source of data; Statistical Yearbook of Education, Youth and Sports, General Local Plans of affected Municipalities and author's calculation.

N/A/D-Not available data

From the table above it can be concluded that within the affected municipalities and from the one for which data is available the highest children/educator ration (23/1) is in municipality of Kruje whereas the lowest one is in municipality of Dropull. This hold eb considered when it comes to the impacts of the AIC in regard to affected population's education. Better accessibility of the schools may result in retaining of population in less developed area and improvement of children/education rate which at this point is below cost effectiveness (e.g. in Dropull). On the text below there are education related specifics per each municipality affected by AIC sections.

Section 1

The territory of municipalities along this section if well covered with educational facilities per inhabitants, expect for some rural and remote areas.

There are two school dormitories (in the territory of Shkoder Municipality); industrial school dormitory and arts school dormitory. There are also 81 students enrolled in the school for children with special development, 31 of them are females.The University 'Luigj Gurakuqi', in the city of Shkoder is the only university in the northern region of Albania. This university has 6 faculties, 26 branches and more than 190 professors. 11.988 students attend full-time and 2153 students are registered in part-time cycle.

There is a lack of pre-school education facilities in two administrative units (in the Municipality of Vau I Dejes) and of upper secondary schools in administrative unit of Ungrej (Lezhe municipality). In remote areas of administrative units of Temal, Shllak and Vig Minela (part of Vau I Dejes municipality) the education service network is not very well developed, and this means travel distance for students. In deeper rural areas there are 12 children per 1 educator, while in urban areas (Vau i Dejes) 28 children per educator[50]. The number of 9-year school students per teacher varies from 5 students/teacher in deep rural area up to 13/1 in urban area. Upper secondary school "Ndre Mjeda" in Bushat offers vocational education and training in veterinary, food technology and agriculture.

Section 2

The territory of Lezhe municipality along this section is well covered with education facilities. The education service is offered also by private sector, counting about 14 education facilities. In Kolsh administrative unit there is a lack of upper secondary schools. There are 1 kindergarten/1500 inhabitants, which is at the same level of the minimal standard of planning education facilities (1/1500 inhabitants)51. The number of 9-year schools is above the minimal standard, there are 9-year schools per 6000 inhabitants. Vocational school Kolin Gjoka located in the city of Lezha offers professional education in 5 main branches; business administration, pedagogy, office administration, ICT and English-French. There is also a dormitory school.

Section 3

There si a good coverage with education facilities along this section. Education service is offered also by private sector, counting about 4 education facilities (kindergarten and private secondary school), located in Lac. In some villages there is a lack of educational facilities. Also, urban areas between the Adriatic and Laç (Kurbin municipality) represent a certain distance from education facilities. In Thumane (administrative unit of Kruje municipality) there is only one upper secondary education and students in all other settlements of Thumane adm.unit needs to travel for 4 km on average to acces high school. After the earthquake the 9 years school in Thumane was damaged and the education proccess is performed in improvised classrooms.

Section 4

[50]General Local Plan of Vau i Dejes Municipality, 2017

[51] Decision no. 671, date 29.7.2015 for approval of Territory Planning Regulation, article no.83 'Minimal standard of planning health and education public structure', point a) – vi)

The territory of two municipalities affected by this section of the Corridor seems to be well covered with education facilities. The education service is provided in 92 public educational facilities. There is a private kindergarten and a 9-year private school in Kruje. In Vore there is approximately 1 kindergarten/1500 inhabitants, which is within the planning standard of education facilities, 4 9-years school/6000 inhabitants and 1.05 gymnasium/9000 inhabitants. An important problem is the vicinity of schools in Vore with the highway. Opportunities for people who want to be educated at a higher level of education are great, as the two municipalities are close to the capital city of Albania (Tirane), where are located most of the universities in the country.

Section 5B

Along this section education service is offered in 287 education facilities mainly located in municipality of Tirane. In the territory of Lekaj adm.unit (Municipality of Rrogozhine) affected by this section there is a lack of upper secondary school and the students needs to travel distances to access the closer school.

In municipality of Tirane there are 57 private kindergartens in the city of Tirane, 40-ty 9-year private schools and 38 general and professional private schools. University education is offered by a large number of object facilities public and private. There are 6 state universities and 20 private universities52.

Section 5C

The territory of the municipality of Rrogozhine along this section is well covered with education facilities, but this system is not very efficient, due to low attendance, lack of staff and pedagogic standards. This is reflected in the low level of population education. There are no vocational schools that may provide a skilled work force, better respond to the market. There are 1.4 kindergartens/1500 inhabitants, 7 9-years school/6000 inhabitants and approximately 1 upper secondary school/ 9000 inhabitants. There is insufficiency of these institutions in administrative units of Dushk (Lushnje municipality).

Section 6+7

There are 98 education facilities along this section. The largest concentration of educational institutions is in the city of Lushnje (18 institutions). Often, in the absence of physical infrastructure, kindergartens and primary schools operate in the same building, resulting in an insufficient number of classes and a significant lack of fulfilment of the standards set for each institution.

There are insufficient institutions in the city of Lushnje and insufficiency of these institutions in administrative units of Karbunare. Similarly, access to high schools becomes more difficult in the administrative units of Ballagat and Hysgjokaj (only two high schools operate). In Vajkan (municipality of Fier), where upper secondary school is provided in Verri settlement, about 2 km far from Vajkan.

Section 8

In the municipality of Fier, education service is offered in 164 kindergarten and school facilities. The city of Fier has better coverage with educational facilities, here are also all private educational facilities, as well as 3 vocational schools offering education in mechanical, electrical, information technology and chemical technology, art education and sport branches. The average students/class ratio is relatively low (15-18 pupils per class), but this refers to the low number of students in schools, rather than their accommodative capacity. There are 1.05 kindergarten/1500 inhabitants, which stands within the planning standard of education facilities, 4.03 9-years school/6000 inhabitants and 1.6 gymnasium/9000 inhabitants.

[52]Quality Assurance Agency in Higher Education

Section 9A2

Along this section, there are 46 education facilities in the territory of aministraive units of Fier municipality and 4 9-years school, 4 kindergarten and 1 high school in Hekal (Municipality of Mallakaster).

Section 9B2

In general, the territory of two municipalities affected by this section is covered by the three levels of education, but there is a lack of education facilities in some settlements, especially in municipality of Mallakaster, as kindergartens and nurseries are not present in all settlements. Education service is provided in 101 education facilities. In Mallakaster municipality there are 1.2 kindergarten/1500 inhabitants within the planning standard of education facilities, 8 9-years school/6000 inhabitants and 1 gymnasium/9000 inhabitants. In Primary education there are 16.5 pupils per class, in 9-year education-18 pupils per class and in secondary education-27.4 pupils per class. There is also a private 9-year school where there are enrolled 14 pupils and one private upper secondary school.

In some settlements of Memaliaj municipality, due to the lack of education facilities, students have to walk kilometers to go to school. It is noticed irregular attendance of classes and drop out of school due to poverty and infrastructure problems.

Section 10

There are 41 public educational institutions in total, included in the territory of municipality of Tepelene. Due to poverty and unavailability and/or inaccessibility of the education infrastructure, there is high rate of irregular school attendance and in some cases drop out of school.

Section 11

Although the territory of Gjirokaster municipality shows special care in providing education, in administrative units of Gjirokaster municipality affected by this section of AIC the coverage with educational faciliites is not very good. Education facilities are limitied due to small number of school-age population. One school usually serves two settlements, so students need to travel distances to access this service.

Section 12

The education service along this section is very good, as most of education institutions are located in the city of Gjirokaster. Except public institutions, pre-school education is offered in two private education facilities. There are also two private 9-years education facilities, one is under the administration of Orthodox Church.

The Industrial High School "Thoma Papapano", is located in the city of Gjirokaster. University "E. Cabej " in Gjirokaster offers education in social sciences, economics, nursing and natural sciences.

Section 13A

Along this section, the education service is offered in 8 education facilities. There is also 1 private kindergarten in Dervican, where are registered 31 children. Education indicators are very low compared in regional level. In relation to resident population, many of these services do not justify their existence as they have a low number of students or children. There are 1.3 kindergarten/1500 inhabitants, 5.1 9-years school/6000 inhabitants and 5.1 gymnasium/9000 inhabitants, which are over the minimal standard.

4.3.9.2. Water supply and sewerage in affected municipalities, divided by sections of AIC corridor

The water supply and sewerage service are provided by the Water Supply and Sewerage Companies (WSSC) established for each municipality in the study area. In the municipality of Memaliaj (Section 9B2) this service is offered by Tepelene Water Supply and Sewerage Company Sh.a and the data disaggregated for this municipality does not exist. Indicators regarding Dropull municipality (Section 13A) are not available, as the WSSC of the municipality is established at the end of 2017. As shown on the table below, 83.9 % of the

population in municipalities affected by the AIC sections is covered with water supply service. On average, the population is served with this service 13.13 hours per day.

Meanwhile, regarding the coverage of the population with sewerage service is presented at the level 58.3 %. Problematic remain rural areas, as most part of their territories are not connected to sewerage network. The polluted waters are discharged in septic tanks. The situation is better in urban areas. In many cases the waste waters are discharged without treatment into channels, river or streams causing environmental pollution. There are only 4 wastewater treatment plants out of which two in Shkoder municipality (Section 1 of AIC), by one in Lezhe (Section 2 of AIC) and Tirane (Section 3 of AIC).

Table 4-127 Water supply and sewerage indicators

AIC Sections	Municipality, adm.units	Water supply coverage	Water supply coverage Urban area	Water supply coverage Rural area	Sewage coverage	Sewage coverage Urban	Sewage coverage Rural	Duration of Water Supply (average service hours in 24 hours)	Staff Efficiency/ 1000 Connections	Number of water connections	Number of sewage connections
1	Shkoder	52.11%	78.3%	16.79 %	40.95 %	70.67 %	0.89%	20.14	6.7	27,327	22,363
	Vau I Dejes	46%	100%	39.1 %	0	0	0	11.59	15.28	3,418	0
	Partially Lezha municpality	92%	0	92%	23%	0	23%	20.66	5.32	4301	1075
2	Lezhe	93.2 %	93.13 %	92.78 %	78.54 %	93.31%	23.46%	20.66	5.32	8494	9784
3	Kurbin	45.12%	63 %	16.3%	0	0	0	4	14.51	7,543	0
	Adm.unit Thumane (Kruje municpality)	0	0	0	0	0	0	0	0	0	0
4	Kruje	63.7%	87.25%	12.92%	37.13%	54.36%	0	8.92	5.83	6,126	5,762
	Vore	40.82%	100%	37.6%	34.97%	100%	31.44%	8.09	8.77	1,835	979
5B	Tirane	95.49%	96.09%	92.17%	83.8%	90.61%	45.9%	10.2	3.92	233,946	216,433
	Adm.unit. Lekaj (Rrogozhine municipality)	100%	0	100%	0	0	0	9.4	7.5	1,070	0
5C	Rrogozhine	54.17%	38.1%	64.4%	34.97%	22.9%	0	9.46	7.58	3,315	1,531
	Dushk	23%	0	23%	52%	0	52%	6.86	6.52	478	1,085
6+7	Lushnje	67.54%	84%	55%	27.22%	63.6%	0	6.86	6.52	20,966	7,694
8	Fier	81.2%	91.44%	73.6%	38.67%	81.02%	7.36%	19.49	6.56	27,672	24,278
9A2	Adm units of Levan, Frakull, Cakran	95%	0	95%	21.6%	0	21.6%	19.49	6.56	7593	1,726
	Hekal (Mallakaster)	67%	0	67%	0	0	0	16.17	9.43	448	0
9B2	Mallakaster	77.2%	100%	67%	22.1%	70.7%	0	16.17	9.43	4,608	1,605
	Memaliaj	-	-	-	-	-	-	-	-	-	-
10	Tepelene	97.42%	100%	81.15%	86.29%	100%	0	21.7	9.59	4,414	3,449
11	Partailly Gjirokaster municipality	100%	0	100%	0	0	0	12.6	9.17	1,493	0
12	Partailly Gjirokaster municipality	100%	100%	100%	64.47%	67.07%	0	12.6	9.17	8630	6,894
13A	Dropull	-	-	-	-	-	-	-	-	-	-
Total		**83.9%**	**88.4%**	**58.8%**	**58.3%**	**80.9%**	**11.7%**	**13.13**	**9.48**	**373,677**	**304,318**

Data source; Generated by expert, using data of Performance indicators 2017, published by National Agency of Water Supply and Sewerage

In the following paragraphs are presented more detailed information regarding water and sanisation infrastructure per each section, in municipality level clustered within respective sections of AIC

Section 1

There are 3 branch of WSSC which provide water supply and sewerage service along this section; WSSC 'Shkoder UK sh.a', WSSC 'Vau I Dejes UK sh.a' and WSSC 'Lezhe UK sh.a'. Unserved population provide drinking water through natural resources and through the use of individual wells.

Water supply service in Shkoder appears difficulties in supplying the settlements in the mountainous areas with drinking water. The territory of municipality of Lezhe affected by this section (from km 23+500 to km 40+965) exploit the water from the catchments of Barbulloje and Rrile. In the territory of Vau i Dejes there is no clean water supply for 24 hours in the urban area. The total amount of water produced is 300-360 m3/day. The pumping station is amortized.

In 2017 were finalized the works for rehabilitation of drinking water supply system without interruption, 24 hours/a day in the village of Balldren[53].

Sewerage network in Shkoder and Lezhe municipality operates mainly for urban area. In rural areas it is almost non-existent. In municipality of Vau I Dejes there is only 7.5 km sewerage network and it serves 1.100 families. Polluted waters are discharged into septic tanks, which adversely affect the environmental parameters.

Most of polluted waters from Shkoder and Lezhe are discharged into Drini and Buna River or drainage channels without treatment.

Along this section, there are two water treatment plants, located in the territory of the municipality of Shkoder. in Velipoje and in Shiroke.

Table 4-128 WWTPs in Shkoder data

Location of the water treatment plant	Population served	Total area of service	Average flow 320 m^3/day
Zogaj, Shiroke	5000	500 m2	320
Pulaj, Velipoje	15000	2.8 ha	15800

Data source; General Directorate Water Supply and Sewerage

Section 2

Along this section, which affect partially municipality of Lezhe, the water supply and sewerage are provided by the same branch of WSSC Lezhe UK Sh.a (which provide also this service for some part of the territory of Lezhe municipality affected by section 1) and the information is provided above.

The sewerage network in rural areas is almost non-existent and polluted waters are discharged in Drini River or in drainage channels. This poses high risk of groundwater contamination.

Along this section, there is one sewerage treatment plant in village of Kune. It has capacity to serve 35,000 residents out of total 60,000. Treated wastewater flows into Kenalla Lagoon.

Section 3

Water supply service is provided by WSSC 'UK Kurbin sh.a' and "UK Kruje sh.a". The WSSC use the water of the catchment area of Kurbin. The average drinking water consumption for household consumer is 100 liters/inhabitant/day54.

[53]General Directorate Water Supply and Sewerage

[54]Strategic Environmental Assessment, Municipality of Kurbin

The sewerage network exists only in 65% of the territory of the city of Lac. During 2018 there was 37% of the population that was served with this service, only in the city of Lac. There isn't any waste water treatment plant along this section, polluted waters are discharged untreated into channels. Discharge of polluted water in septic tanks is the cause for environmental pollution, especially in the summer period.

During 2018, there was some improvements in sewerage network in Thumane area (municipality of Kruje), close to the end of section 3, mainly for the center of Thumane village.

Section 4

Water supply and sewerage service along this section is provided by WSSC 'Kruje UK Sh.a' and WSSC 'Vore UK sh.a'. Drilling wells have been used for drinking water supply both in municipality of Kruje and Vore. The main problem regarding water supply remain the contamination of drinking water in the village of Berxulle.

For the first pat of this section till km 15+000 (which affect the municipality of Kruje), the sewerage system exist only in urban areas. In rural areas, this system is almost non-existent. Polluted waters are discharged on the field, to avoid its discharge into the sea. By flowing into Ishem River they couse environmental pollution.

The section from km 15+000 to km 21+000, which affect the territory of Vore municipality, has three sewerage systems. These systems discharge water into rivers which then flows into the sea. Families not connected to the sewage network use individual septic tanks. Industrial buildings continue to discharge sewerage directly into rivers. The sewage collector is out of function. The sewage system is amortized.

There isn't any waste water treatment plant yet constructed along this section. The waste waters are discharged without any treatment, causing environmental pollution.

Section 5B

The territory of the municipality of Tirane (crosses by this section of AIC from km 0+000 to 26+000) has sufficient water sources to respond current and prospective requirements. However, quality and quantity of the drinking water supply is problematic due to technical and institutional issues. The urban area is better of than rural area.

The sewerage system of the municipality is a combined collection system without a treatment plant, as sewerage pipes are not properly split from rainwater disposal systems. Polluted waters are discharged directly into Tirana and Lana River. In rural areas, polluted waters are collected in septic tanks.

Other part of this section from km 26+000 to 33+573, which affect the territory of administrative unit of Lekaj (Rrogozhine municipality) is supplied with drinking water from water supply network. Territory is not covered with sewerage network. The waste waters are discharged in septic tank or in channels and agricultural lands.

Section 5C

The territory affected by this section does not have good coverage with water supply system. The drinking water is supplied from aquifer of Shkumbin by WSSC 'Rrogozhine UK Sh.a'. The water supply network is amortized as it is constructed in 1988. The situation in rural areas appears in better condition, as they provide drinking water from individual wells. Part of population receive drinking water from tankers.

Sewerage system exists in urban area of Rrogozhine and partially in Dushk (Lushnje municipality). Not all the dwellings are connected to the sewerage system. In rural areas this system is almost in-existent. These is no sewerage treatment plant. Population discharges polluted waters into streams or "septic tanks" (constructed out of technical conditions and posing a risk not only for the surface waters but also for groundwater).

Section 6 &7

Drinking water supply and sewerage companies for these sections are 'Lushnje UK Sh.a' and 'Fier UK sh.a'.

Lushnje UK sh.a is supplied with water from the catchment area of Cerme and Konjat. Unserved residents by WSSC are supplied from individual wells.

The sewerage service is provided only in the city of Lushnje. In rural areas polluted waters from households are collected in individual septic tanks and disposed in open drainage channels. There isn't any wastewater treatment plant along this section.

Section 8

The territory of municipality of Fier crossed by this section of AIC is supplied with drinking water from the aquifer of Kafaraj, through 10 drilling wells. Unserved population by WSSC is supplied with water from individual wells. Urban area of the municipality is better-off than rural. The quality of drining water is mostly good. Sometime water is polluted due to lack of buffer zones and hygienic-sanitary protection.

Sewage service is provided to city of Fier and in limited rural areas. It is low quality service as sewage system is blocked or damaged. Treatment of these waters is not done. Polluted waters are collected into septic tanks, out of technical sanitary standards and discharged in open drainage channels.

Section 9A2

Water supply and sewerage sector operates through the regional Fier UK sh.a. and Mallakaster UK sh.a. For the first part of this section (till km 22+000 Fier municipality) about 95% of the population is served.. Remaining, uncovered population, is supplied by drilling wells. The settlements from km 22+000 to km 26+000 are supplied with drinking water from Pocemi springs. Sewerage network covers about 21 % of the population. Along this section there is a lack of a waste water treatment plant.

Section 9B2

Two WSSC operate within this section Mallakaster UK.sh.a and Tepelene UK sh.a. For the first part of the section till km 16+000 under administration of Mallakaster municipality the territory is supplied with drinking water from Pocemi springs, while the territory of Memaliaj is supplied from the water source in Bence. The water quality is good. Unserved population uses drinking water from individual wells. Sewerage network is existent only in the urban areas city town of Ballsh and city of Memaliaj, but is amortized. Most of the population collect polluted waters in septic tanks, while in some villages the population discharge polluted waters in nature, opened channels or streams etc.

There isn't a waste water treatment plant along this section.

Section 10

Along this section, the water supply and sewerage service is provided from WSSC Tepelene UK sh.a. The urban area of the municipality is fully covered with this service, and also the situation in rural area appears in good conditions. Families not covered with water supply provide drinking water through wells or natural resources. The sewerage system appears in a very good situation in the urban area.

Along this section there is a lack of a waste water treatment plant.

Section 11 & Section 12

The Water Supply and Sewerage Enterprise Gjirokaster UK SH.a exploit the water from the pumping station in Buduk, as well as from karst springs. The population is completely covered with drinking water supply. In the city of Gjirokaster, the water pipelines are amortized. Also, Gjirokaster is supplied with drinking water from the water source of Hosi. Sewerage network exist only in the city of Gjirokaster (Section 12). Because of the lack of wastewater treatment plant, the polluted waters end up without treatment in the Drino River. In rural area polluted waters are collected into septic tanks and then discharged in the nearest streams, causing negative effects on environment.

Section 13

Water Supply and Sewerage Company Dropull UK.sha was established in December 2017. The main water sources exploited are Nepravishta, Vris and Karstic cave of Skotini.

83.5% of the dwellings are connected to the water supply system, 14.8% are supplied by other water sources, while 1.8% of the dwellings do not have any type of water supply system[55] . The sewerage system does not exist. Polluted waters are discharged into septic tank and end up untreated into the Drino River, channels or streams.

4.3.9.3. Waste administration and collection

The waste collection service has shown an increase trend compared with the year 2016, marking an increase by 0.2%. In 2017, this service is offered for about 68.9% of the population (2017) in Albania[56].

The total amount of generated waste during the year 2017 is 1,817,266-ton waste in the entire territory, of which 1,253,913 ton are urban managed waste and 162,330 tons (industrial or possibly inert). According to this data in 2017, it was produced about 386 kg waste/year/resident.

The total amount of waste accumulated to the landfill sites is about 791,572-ton urban waste, 218,181 are treated by recycling, 22,864 ton are combusted for energy, 19,816 combusted for elimination and 21,480 ton are deposited outside landfills.

The collection and removal of USW (Urban Solid Waste) is legal responsibility of municipalities.

For about 50 % of the municipalities, this service is managed by private operators. In Albania, only three sanitary landfills are in operation, respectively in Bajkaj (Sarande), Bushat (Shkoder) and Sharre (Tirane). There are also some other facilities, which can be considered as controlled landfills.

Waste collection and administration in municipalities crossed by AIC Sections

As shown in the following table, the territory of the municipalities affected by the project is covered more than 50% with the waste collection and management services. In large urban areas such as Tirana, Fier and Shkoder, on average is generated from 1.1 kg waste/person/day to 1.5 Kg/person/day, while in rural areas is generated on average 0.4 Kg waste/person/day.

In the area affected by the project operate following sanitary landfills; Landfill of Bushat in Vau i Dejes Municipality[57] (Section 1 of AIC) and the landfill of Sharre[58] (Section 5B). Other municipalities deposit the waste at non sanitary disposal sites. In urban areas, waste collection and transportation is offered every day, and in large cities even more than once a day, while in rural areas this service ranges from 1 time/week to 5.8 time/week. In general, the waste management and collection service are performed by private companies contracted by the municipality. There are cases in rural areas that this service is provided by persons employed in the administrative units. In the table below is shown also the tariffs that the residents pay for waste collection and administration service.

[55]Population and Hosing Census, 2011

[56]http://instat.gov.al/media/4759/urban-solid-waste-statistics-2017.pdf

[57]where are deposited the waste of Shkoder, Vau i Dejes, Lezhe and Kurbin municipalities

[58]where are deposited the waste of Tirana Municipality and partly of Vore municipality

Table 4-129 Waste management collection indicators in affected municipalities, divided by AIC sections

AIC Sections	Municipality	Coverage of the territory with the service	Waste Management Operators	Waste generated in urban area kg/person/day	Waste generated in rural area Kg/person/day	Waste landfill/ deposite site	The frequency of waste collection	Tariff for waste collection Urban and Rural (Albanian Lek (ALL)/year/family)
Section 1	Shkoder	85%	Borshi shpk	1.1	0.1-0.7	Sanitary Landfill in Bushat	Urban area-7 day/week Rural area – on average 1-1.5/week, except adm.unit Rrethinat 5.8 time/week	Urban area-3000 Rural area-between 1000 to 1500 ALL
	Vau I dejes	70 %	Zadrima Inter-communal association	0.7	0.4	Sanitary Landfill in Bushat	Data not available	Data not available
	Partially Lezhe	60%	Private Company contracted by municipality	-	0.5	Sanitary Landfill in Bushat	2 times/week	Rural area-1800
Section 2	Partialy Lezhe	75%	Private Company contracted by municipality	0.7	0.5	Sanitary Landfill in Bushat	Urban area-7 times/week Rural area-2 times/week	Urban area-3000 Rural area-1800
Section 3	Kurbin	60 %	Bardhi shpk Leka 2007 shpk V.A.L.E Recycling Sh.p.k	0.7	0.4	1 deposit site in the eastern part of the city of Lac	3 times/week in remote areas and every day in other areas	Data not available
	Thumane (Kruje)	About 90%	Private company contracted by municipality	-	0.4	Deposit site in Dukagjin I Ri	4 times/week rural area	Rural area-200
Section 4	Kruje	96%[59]	Dien Shpk Rinia, shpk and person employed in rural area	0.6	0.4	Two deposit site; 1 in Kruje and 1 in Fushe Kruje	6-7 times/week rural area 4 times/week rural area	Urban area-300 Rural area-200
	Vore	Data not available	Fusha shpk	0.7	0.4	Sanitary Landfill of Sharre	7 days/week urban area 1 time/week rural area	4800 ALL on average
Section 5B	Tirane	80 %	6 private Companies	1.5	0.4	Landfill of Sharre	7 time/week (2-3 times per day in areas with high consumption) in Urban area	Tirana city-5000 Adm.units-1000-2000[60]

[59] Solid waste management analysis of Kruje Municipality, 2011

[60]General Directorate of Local Tariffs and Taxes, Tirane

	Lekaj (Rrogozhine)	85 %	Private company contracted by municipality	-	0.4	Deposit site designated by municipality	1 to 2 times per week, as needed	Data not available
Section 5C	Rrogozhine	Data not available	Private company	0.7	0.4	Deposit site-1 km west of Rrogozhina Bridge	Data not available	Data not available
	Dushk (Lushnje)	Data not available	Private company contracted by Lushnje municipality	-	0.4	Deposit site along the road Lushnje-Fier	1 time/week	Data not available
Section 6+7	Lushnje	86%	Leal shpk in urban area	1.0	0.4	Deposit site along the road Lushnje-Fier	Data not available	Rural area-1000
Section 8	Fier	72%	Data not available	1.1	0.4	Deposite site, 3 km far from the city of Fier	Data not available	Urban area-2400 Rural area-1200
Section 9A2	Cakran, Levan, Frakull (Fier) Hekal (Mallakaster)	Data not available	Private company contracted by municipalities	-	0.4	Deposit sites designated by municipality	2 times per week	1200 ALL adm.units of Fier 1000 ALL adm.units of Mallakaster
Section 9B2	Mallakater	Data not available	Data not available	0.7	0.4	Deposite site near Kashi catchment area	Urban area-every day	Urban area-2000 Rural area-1000
	Memaliaj	Data not available	Shza Kalemi SHPK	0.7	0.4	Deposit site-5.2 km in the east of Memaliaj town, close to the riverbank of Vjosa river	Urban area-7 time/week Rural area- in low frequencies	On average 300 ALL
Section 10	Tepelene	Data not available	Data not available	0.7	0.4	Deposit site near the riverbank of Vjosa river, in Tepelene	Urban area-7 time/week	Urban area-1000 Rural area-500
Section 11	Partially Gjirokastr	Data not available	Private company	-	0.4	Deposit site close to Hundekuq village	One every two days	Data not available
Section 12	Partially Gjirokastr	Data not available	Private company	0.7	0.4	Deposit site close to the city of Gjirokaster	Every day urban area 2-3 times per week rural area	Data not available
Section 13A	Dropull	Data not available	Data not available	Data not available	Data not available	deposit site is located in Taroine	1-2 times per week	1200 ALL/year/family

Section 1

Waste collection and administrations are provided by private companies, contracted by municipalities crossed from this section of AIC. The coverage with waste collection services varies from 60% (in some rural areas of Lezhe municipality) to 85% in the municipality of Shkoder.

This service for most of the territory of Vau I Dejes municipality (crossed by AIC section from km 14+500 to km 23+500 of AIC section) is provided by Zadrima Inter-communal Association.. In remote rural areas (Temal and Shllak administrative units) this service is not provided. 70% of the territory of the city provide this service, while 30% is realized according the needs under certain conditions. Problematic remain dumping of the waste into irrigation channels and in Drini River. There are evidenced 5 illegal urban waste deposit sites.

Along the km 23+500 to km 40+965 of AIC section (under jurisdiction of Lezhe municipality), there is one place for disposal of inert waste close to Dajç. There are two unauthorized waste disposal site in Blinisht.

Most of the waste collected along this section are deposited in the landfill of Bushat. The landfill has a total surface of 12 ha and a capacity of 1.000.000 m^3. Not all the waste generated are transported to the landfill of Bushat. In areas where waste collection points are missing, the waste are thrown in waterways or in open spaces.

Section 2

The waste management services along this section is offered regularly for approximately 75% of the population. The waste management service is provided by private entrepreneurs contracted by the municipality. Urban waste of the city of Lezha are accumulated to the deposit site in Berzane and from here the waste are transported to the sanitary landfill of Bushat. There is one place for disposal of inert waste close to marsh area in Lezhe. Waste disposal by burning is a common occurrence for almost all urban waste deposits site. In the city there are groups or informal collectors who collect the recyclable waste, such as; paper, metal and plastics.

Section 3

Waste collection and transportation service around the territory of Kurbin municipality crossed by this section of AIC is at low levels. With this service is more covered urban area. There are three private companies that offer the waste collection service in the territory. In the city of Lac is served 80% of the population. The amount of urban solid waste generated in the city of Laç is about 13 tons/day. In Mamurras with waste collection and transportation service is covered 70% of the territory. The amount of solid urban waste generated in Mamurras is about 10.2 ton/day. The waste collected in the territory of Milot administrative unit are deposited in landfill of Bushat. The service cover 60 % of the territory. The amount of urban solid waste generated in Milot is about 5 tons per day. Recycle process is practiced very few in the territory.

In Thumane, the waste collection and transportation is offered every day. The waste collected are deposited in the waste deposite site in the village Dukagjin I Ri.

Section 4

For the first part of this section which crosses the municipality of Kruje (from km0+000 to km 15+000) the waste management service is offered 80-100%. The disposal site in Kruje is out of sanitary standard and is located close to residential areas, along the road to Kraste. Sorting of waste is not yet applied. There is only one recycling company in the municipality that recycle oils and its by-products.

In the municipality of Vore (which territory is crossed from section 4 of AIC, starting from km 15+000 to km 21+000), the waste collection and transportation is performed by Fusha shpk (private company contracted by municipality). The phenomenon of illegal dumping of waste remains prevalent, mainly in the hilly areas, near the lakes or water basins. In rural areas the waste collection and transportation cover

between 50 to 80% of the population. The total amount of solid urban solid waste generated in Preze adm.unit is 2.86-ton waste/day[61]. Also, environmental contamination in this area is caused by the metal processing industry, foundries. There are about 2-3 such industry in the area. There are also businesses dealing with inert processing that throw the waste into the river.

Section 5B

For the first part of this section (starting from km 0+000 to km 26+000) which crosses the municipality of Tirane there are 6 companies[62] (in municipality of Tirane) and 1 in Lekaj (Rrogozhine municipality) which collect and transport the waste. The Municipality of Tirana is divided into 6 areas of urban solid waste collection. It is estimated that about 800 tons waste/day are deposited in Sharra landfill. In the landfill is established the enterprise for sorting the waste, where are employed 200 people of Roma community. Recycling of waste is applied by about 12 private recycling companies that collect, process different types of waste: scrap, paper, plastics, textiles, used tires.

In remote mountainous areas this service is not offered. The waste in this areas are thrown in open spaces or are disposed by burning.

Section 5C

Urban area of the municipality of Rrogozhine deposit the waste in a deposit site, located about 1 km west of Rrogozhina Bridge, on the right bank of the river.. Waste disposal occurs near water channels or roadside, causing environmental pollution. All the wastes end up into Shkumbini River. Waste management in rural areas is almost non-existent. Meanwhile, is approved a Local Solid Waste Management plan. In Dushk administrative unit (municipality Lushnje), crossed by Section 5C of AIC from km 5+500 to 10+085 the waste collection and transportation is offered from the municipality, 1-2 times per week.

Section 6+7

Along this section, which crosses the municipality of Lushnje the waste management service is offered for 86% of the population. The deposit site is located very close to residential areas and national road Lushnje-Fier, and over agricultural land. This deposit site is out of hygienic-sanitary conditions. During 2015, in the territory was produced about 14'600 tons of waste per year. There is a plan for waste management in the territory. In most of the cases, inert waste is deposited at the same site with urban waste. Hospital waste are managed by a private Medi-Tel company, which offers collection, differentiation and disposal waste services at least once a month. Industrial wastes are deposited at illegal sites or mixed with urban wastes. There is only one recycling company that recycles oils and their byproducts.

Section 8

The municipality of Fier, corssed by section 8 of AIC generates about 131 tons/waste per day or 919 tons/week. Landfill site has been in use for over 40 years and its condition is very bad. A part of the wastes is thrown in Semani River. Other administrative units use improvised, inappropriate dump sites, out of hygienic-sanitary conditions thus turned into hot environments points. In other cases, the wastes are deposited in open site, roadside, or in the riverbank (around 13 unauthorized dump sites have been identified). Currently there is no waste treatment plant in the territory.

Section 9A2

Along this section the waste collection and transportation is offered by 2 private companies, contracted from Municiplalities of Fier and Mallakaster, affected by this section of AIC. The service is offered 2 times per week. In Cakran and Frakull administrative units (Fier municipality), there is not a designated waste

[61]Report on urban waste management in some municipalities in Albania, September 2014, Institute of Urban Research

[62] "Alko-Impex"sh.p.k", Infinit, TTA Alba Lam, Korsel sh.pk, Fusha shpk, Shpresa shpk, Ecologic Albania sh.pk

site, and the waste are dumped along the sides of roads, riverbanks or in open areas, meanwhile in Levan the municipality has designated a waste deposit site.

Section 9B2

There are two waste deposit sites approved by the municipalities along this section; one near the catchment area of Kashi (Mallkaster) and the other close to the Vjosa riverbank (near Memaliaj). Existing urban waste deposit site do not meet the required standards in accordance with the environmental legislation in Albania. A good part of rural areas throws the waste in nature or destroy by burning.

In Memaliaj municipality (crossed from this section of AIC from km 16+000 to km 37+694), collection and transportation of waste is carried out by Shza Kalemi SHPK. Cleaning, collection and transportation service is performed every day for urban area, while in the rural area this service is performed in low frequencies.

Section 10

For the fisrt parat of this section (included km 0+000 to km 5+200) which crosses the territory of Memaliaj municipality, please refer to the section 9B2, under Memaliaj municipality. Regarding the other part of this section from km 5+200 to km 19+300, the waste collection service is under the jurisdiction of Tepelene municipality, which does not cover the entire territory of the municipality. Due to the lack of a landfill, the waste is deposited near the riverbank of Vjosa river, causing massive contamination with glass, plastics and other wastes. In many cases waste disposal is done by burning.

Section 11

Along this section, which cosses the territory of 4 adm.units of Gjirokaster municipality (from km 0+000 to km 10+260), the waste collection and transportation service is managed from the municipality of Gjirokaster. This service is offered 1-2 times per week. There is one waste dispoal site, near Hundekuq village.

Section 12

There is a disposal site (landfill site), non-sanitary and unorganized, located in the north of the city of Gjirokaster. On the territory of the Municipality are also found other uncontrolled disposal sites.

Section 13A

Along this section, which crosses the territory of Dropull municipality, the waste deposit site is located in Taroine. Waste collection is provided less than 1-2 times a week, which is even lower in the mountainous areas (one time in three weeks or months). There is a lack of a sanitary landfill site. During January and June 2017 are generated 5,665-ton waste in the Municipality of Dropull. There are three places approved by the municipality for collecting inert materials near the settlements of Dhuvjan, Jorgucat and Bodrishte.

4.3.9.4. Road Network and Transport

Albania has geographically strategic position as it is located in the center of the major transit corridors in Europe. The road network in Albania is about 18,000 km long and includes; 3,636 km of Main National Road, 10,500 to 11,000 km Regional and Local Roads and the remaining 4,000 km is under the jurisdiction of different units, enterprises or firms. In the territory of Albania passes the VIII Pan-European Corridor, approved in Crete in '94, and confirmed in Helsinki in '97. The North-South Corridor has a total length of 405 km and connects Montenegro border with the Greek border through Albania.

'Mother Teresa' Airport, is the only airport in the Republic of Albania and is located 18 kilometers from Tirane.

The railway network in Albania consists of 441 km-main railways and 230 km secondary railways.

Maritime transport is carried out through 4 ports: Durres, Vlore, Sarande and Shengjin. The largest and most important port is the port of Durres, which realizes 81.8% of the entire country's maritime transport.

Road Network and Transport in affected Municipalities by sections of AIC

Section 1

Along the territory of three municipalities affected by this section passes the most important national axis, part of the north-south corridor. Rail transport is functional only for freight transport, since it has been amortized over the years.

In the eastern part of Shkoder municipality (which is crossed from km 0+000 to km 14+500 of AIC section) passes the state road Sh5 connecting the municipality with Kosovo, in the western part passes the road E762 connecting it with Podgorica and the southern part the territory is connected by E853 road that ends in Kakavija. In the western part of the city of Shkoder is under construction the bypass of Shkoder. In general, the road infrastructure appears in good condition, except roads located in the northern part of the territory of municipality.

In the territory of Vau I Dejes municipality (from km 14+500 to km 23+500 of AIC section), the main national road is in good condition and equipped with the necessary road signs. Shkoder-Kukes road axis that passes into the territory is also the main artery by which some inner streets of the villages of the municipality are connected. Rural and local roads are in bad condition, in some cases unpaved and not easily accessed. From 120.3 km regional roads, 85.6 km are paved roads and from 141.1 km local roads, only 62.9 km local road are paved. In the following figure is shown the road transport network in the municipality of Vau I Dejes. Water transport by ferry or boat through the artificial lake of Vau i Dejes and the lake of Koman, serves also as connection between the settlements of Kukes, Tropoje, Has and Puke. The territory is also crossed by 11.82 km railway network.

Regarding the road network and transport for the municipality of Lezhe (crossed from km 23+500 to km 40+965 of Section 1 of AIC) please refer to the following decription of Section 2, for Lezha municipality.

Section 2

Along this section, which crosses the territory of Lezhe municipality passes the main road corridor connecting Tirana with Shkoder and beyond with Montenegro. All national roads are asphalted and in good condition. Problematic remains the entry and exit points from local roads to the national road, which constitute not only a source of traffic but also a source of accidents.

Regarding to public transport, there is a terminal for vehicles in the city of Lezhe. Transport from Lezha to other administrative units is carried out every half an hour or every one hour. The railway network is currently out of function. Within the boundaries of municipality there is also the port of Shengjin. It currently serves for freight and fishing transport.

Section 3

Along this section passes the State Road SH1, connecting Tirane with Shkoder and beyond with Montenegro. The territory of the municipality Kurbin along this section is crossed by 46.85 km national roads, 57 km regional rural roads and 68.4 regional local roads. National roads are in good condition. Rural roads are amortized.

In Thumane adm unit (municiplaity of Kruje) crossed by section 3 of AIC from km 11+000 to 13+455, the roads are mainly asphalted, and partially ballast road.

Section 4

In the first part of this section (from km0+000 to km 15+000), which crosses the territory of Kruje Municipality passes the State road Sh1 connecting Tirana with Shkoder and beyond with Montenegro. The territory of the municipality is covered by 102.45 km of national roads, 18.9 km of regional rural roads and the 171 regional local roads. All national roads are in good condition and administrated and maintained by the Albanian Road Authority. Mother Teresa Airport is located 18 km away from the city of Kruje.

In the territory of municipality of Vore (crossed by this section from km 15+000 to km 21+000) passes the Main Interurban Road SH2 (Tirana-Durres Highway), Second Interurban Road SH52 (Vore – Fushe Kruje) which connects Vore with Airport of Rinas and VIII Pan-European Corridor (railway system connecting Albania to Montenegro, Macedonia and Europe). It is crossed by about 10.2 km interurban road. Along the Durres-Vore-Tirane axis, there is a frequent transport service. The connection with the city of Tirane is carried out by urban lines every half an hour. Connection of the town of Vore with other villages of the municipality is performed once a day. Public transport has many deficiencies as it does not cover all areas of municipality.

Section 5B

The municipality of Tirane (crossed form section 5B of AIC from km 00+000 to km 26+000) have a favorable position from infrastructure point of view. The municipality is located 18 km from Rinas Airport; 32 km away the port of Durres through the Tirana-Durres highway; and 44 km from the city of Elbasan - via the Tirana-Elbasan highway. The total length of the road network in the territory is 2048 Km, out of which 1819 km are local roads. Regarding the freight traffic, in Tirane there are no terminals for freight trucks. There are about 10 city urban lines. There are also 9 other bus lines that connect the city with the other villages of the administrative units of municipality.

There is not yet an integrated terminal for intercity buses. Instead, there are several buses and vans stations that do not have toilets, no ticket counters or waiting rooms, etc. These stations are: South Bus Station, North and West Bus Station, South East Bus Station and International Bus Stations. The territory of the municipality is also crossed by the railway network. The railroad is amortized.

Regarding the territory of Lekaj adm.unit (crossed by section 5B of AIC from km 26+000 to km 33+573) in general the main road between the settlement are asphalted, meanwhile in remote mountainous areas (which include the connecting point between municipality of Tirane and Rrogozhine), the road are with gravel.

Section 5C

Along this section passes the SH4 and SH7 Main Interurban Roads (Durres-Vlore and Kavaje-Peqin), and also Corridor VIII Pan-European. The infrastructure system of the Municipality of Rrogozhine covers an area of 408 ha. The entire territory is connected through approximately 331.24 km local roads out of which 119.52 km are asphalted roads. Local roads across the territory are not all in good condition. In hilly areas dominate mostly unpaved roads. Road safety remains a problem. The main cause that serves as a source of accidents is the lack of overpasses in the main roads and also the entrance to the highway. There are interurban lines that provide transportation services towards major cities. Does not exist a bus terminal.

In the adm unit of Dushk (municipality Lushnje), starting form km 5+500 to 10+085 the roads are in general asphalted. The transportation is performed by private individuals.

Section 6+7

The territory of the municipality of Lushnje crossed by section 6+7 of AIC lies in a very favorable geographical and strategic position due to the location between the two most important ports (Vlora and Durres), and because through the territory passes the VIII Corridor and the Blue Corridor, which, together with the Durres-Nish Corridor are the most important corridors in Albania. Regarding the road infrastructure, the municipality of Lushnje is crossed by state roads SH4 and SH72.The municipality is crossed by about 2318.1 km roads, out of which 1793.7 km are local roads. About 50% of the road surface is occupied by agricultural roads. Only 307.6 km road are paved roads, while 2010.5 km are unpaved. Inter-city transport is carried out by licensed transport company. The main bus and minibus station are located close to the northern entrance of the city and another provisional in front of the central train station in Lushnjë. The railway network is amortized.

Section 8

Along Section 8, which crosses the territory of Fier Municipality pass the Corridor VIII and the Blue Corridor, which are two of the most important corridors of the country. In Fier pass the State Road SH4 and state road SH8, which starts in the city of Fier and ends in Saranda. Regarding the function of the road axis mostly dominates agricultural roads (56% of the total), followed by internal secondary roads (15%). Total length of paved roads is 320 km, while unpaved roads have a total length of 3302 km. The railway line operates only for freight transport. The total length of the roads in the territory by road category is shown in the following table.

Table 4-130 Road infrastructure categories in the municipality of Fier. Data source; General Local Plan of Fier Municipality

Existing Road by road infrastructure category	Length in km
Highway	47.9
Main Interurban road	29.3
Secondary Interurban road	18.9
Main Urban Road	11
Secondary urban Road	551
Local road	2964
Total	**3622**

In the territory operate 23 interurban lines connecting the city of Fier with the main cities of the country. Inter-city transport is carried out by legal persons, organized in a transport company and licensed. Interurban transport is carried out by juridical persons, organized in a licensed transport company. Currently there is a designated site, near the railway station which serves as terminal of interurban lines.

Section 9A2

Along this section (which crosses partially southern part of the territory of Fier municipality and south-western part of Mallakaster municipality passes the state road SH8 which starts in the city of Fier and ends in Saranda. In general the main road are in good conditions.

Section 9B2

Along this section, which crosses the territory of 2 municipalities; Mallakaster (from km 0+000 to km 16+000) and Memaliaj (from km 16+000 to km 37+694) passes SH4 highway. Mallakaster municipality has a total of about 150 km rural roads, out of which 88.7 km are regional-rural roads. In Memaliaj, about 80% of roads are still unpaved, especially in the rural area. Several streets have also been reconstructed within the city, while connecting roads with other administrative units are almost unpaved roads. State road axis SH74 crosses the territory of the municipality. Public intercity transport operates regularly for remote cities, but there is no permanent bus line and fixed timetable to the nearest town of Tepelene and transport is carried out by random vehicles without scheduled time.

Section 10

In the municipality of Tepelene, corssed by section 10 of AIC pass the state roads SH4, SH75 and SH76. The National Road (SH4), starting from Fier, continues through the municipality of Tepelene up to Gjirokaster. Road infrastructure in villages is amortized. Consequently, this situation limits the access of villages to the markets and other necessary services. Regarding public transport, the most frequented transport lines are the lines that connects the municipality with Tirane and the closer cities. Regular transportation with the town of Memaliaj is missing and transportation is carried out by random vehicles.

Section 11 and Section 12

Both this sections crosses the territory of Gjirokaster Municipality, which is not directly related to any other transport infrastructure, except the main national road network, namely the SH4 motorway, known as Lot 2 of the South East European Transport Network connecting Fier to Kakavija (Greek border). Asphalted roads are centered in the city of Gjirokaster and between the intersections of SH4 highway that lead to the periphery of other settlements. Interurban lines operate on round trips for the destinations Sofratike, Zagori, Kakavija, Libohova, Poliçan, Tirana and Kakavija. There are 6 urban lines within the city and its suburbs. Most of the frequent destinations form municipality are Tirana, Saranda and Janina in Greece. International itineraries exist and specifically 6 per day, provided by various private operators. Regarding to road safety,problematic remain the entrance and the exit of rural road to SH4 highway.

Section 13A

State Road SH4 is the main artery along this section of AIC, which connects the municipality of Dropull with Gjirokaster and Ioannina Region beyond the border. This axis is also the connection between the settlements located in three administrative units of the municipality. The Secondary Interurban Road that passes through the territory connect the villages of Vrahogoranxi, Glina, Jorgucat and with the municipality of Sarande. This axis connects Dropull economic zones with the port of Sarande. The connection between the main centers is done through Secondary Urban Roads, mostly located in Dropull i Poshtem and only in Jorgucat and Bularat villages of Dropull i Siperm administrative Unit.Road infrastructure occupies about 0.69% of the total area of the municipality or a total of 313.24 ha.

Table 4-131 Road infrastructure total area and length by road classification type

Road infrastructure classification	Area (ha) and % against to total area	Length (km)
Main Interurban road	52.07 ha 16.62%	49.61
Secondary Interurban road	27.62 ha 8.82%	62.08
Main Urban Road	4.55 ha 1.45%	7.23
Secondary urban Road	9.51 ha 3.05	21.06
Local road	206.69 ha 66.05%	726.27
Total	**300.44 ha**	**866.25**

Data source; General Local Plan, Municipality of Dropull

In total, 37.26% of the total road surface are asphalted roads, while 51.11% of the total surface of the roads are without asphalt. Based to the Road Categories the largest percentages occupy the Landscape Roads about 32.38% of total road surface and Agricultural Roads about 23.95% of total road surface.

Problematic and a source of accidents remain the entry and exit point from the villages to the main road Sh4. The transport is not very well developed. There is only one public transport line managed by the Municipality of Dropull: Poliçan - Zagori – Gjiroka Corridorster, with frequency twice a week. Other public transport activities are covered by 4 private operators. There are 5 stations in every village: Dervican, Vanister, Sofratike, Terihat and Grapsh.

A summarized table of length of regional and local road in affected municipalities and divided by sections of AIC is presented below.

Table 4-132 Length of regional and local roads in affected municipalities, divided by sections of AIC

AIC Sections	Municipality	Length of existing regional and local road in km	
		Regional/rural Road	Local Road
Seksioni 1	Shkoder	690.9	2,018.11

AIC Sections	Municipality	Length of existing regional and local road in km	
		Regional/rural Road	Local Road
	Vau I Dejes	37.7	176.3
	Lezhe	197.2	152.9
Seksioni 2	Lezhe	165.3	129.6
Section 3	Kurbin	126.4	Data not available
	Thumane	Data not available	Data not available
Section 4	Kruje	18.9	Data not available
	Vore	Data not available	Data not available
Section 5B	Tirane	Data not available	1819
	Rrogozhine (Lekaj)	Data not available	43.2
Section 5C	Rrogozhine	Data not available	288.04
	Lushnje (adm.unit Dushk)	9.41	75.4
Section 6+7	Lushnje	187.19	1,718.3
Section 8	Fier	79.67	1810.6
Section 9A2	Fier	55.3	1153.4
Section 9B2	Mallakaster	150	60.3
	Memaliaj	Data not available	Data not available
Section 10	Tepelene	81	Data not available
Section 11	Gjirokaster	115.7	Data not available
Section 12	Gjirokaster	91.3	Data not available
Section 13 A	Dropull	Data not available	726.27
Total		**2,006**	**10,171.42**

4.3.9.5. Electrical supply and Telecommunication

Albania has great potential for electricity generation through hydropower, wind, solar power and biomass. The Transmission System Operator (OST), public company, manages the transmission lines with voltage levels ranging from 110 kV to 400 kV, 220 kV and 400 kV substations, as well as other installations in use for power transmission. Two main 400/220 kV substations Tirana 2 and Elbasan 2 has an installed capacity of 600 MVA each. All transmission lines have capacity of 110 kV, 150 kV, 220 kV and 400 kV voltages. Electricity in Albania is currently produced 100% from hydropower plants[63].

Most of the country's electricity production is carried out by the Drin cascade: HPP Fierze, HPP Koman and HPP Vaui Dejes, which are connected to the 220-kV network. The rest belongs to the small hydropower stations connected to the kV 110 network and those connected to the distribution system network.

The postal service is provided by Albanian Post Company which operates through the post offices distributed around the territory, as well as 14 other operators certified by Electronic and Postal Communications Authority (AKEP) for the provision of postal services.

Telecommunication for most of the population is offered by Albtelecom company (fixed telephony and internet), and mobile phone by 3 private company (Eagle, Vodafone and Telecom). There are also private operators that offer fixed telephony service. The number of active mobile service users in 2018 amounted to about 2.7 million, which represents a decrease of 25% compared to 2017. The number of active mobile broadband access users from 3G / 4G networks at the end of 2018 reached 63% compared to 72% by the

[63] http://www.ere.gov.al/doc/VENDIM_NR.165_2016.pdf

end of 2017. The number of fixed telephony users in 2018 reached to about 247 thousand, which is a slight but steady increase.

Electrical supply and Telecommunication in the municipalities crossed by AIC corridor

The territory of affected municipalities is supplied with electricity from 110/220/400 kV substations, distributed around the territory of the municipalities. Regarding the postal service, this service is offered in 161 Postal offices, while in terms of telecommunication based on Census data, there are 109.317 household users of fixed telephony, 283.924 household users of mobile phone and 55.959 household are connected with internet.

In the following table are presented data regarding the stations of electrical supply in each municipality affected by the project divided by sections of AIC and also data regarding the telecommunication users.

Table 4-133 Electrical supply and Telecommunication data in affected municipalities

AIC Section	Municipality	Parameters related to Electrical supply and Telecommunication				
		Electrical supply sub-stations	Postal office distributed in the territory	Long term amenities use		
				Fix telephone	Mobile phone	Internet connections
Section 1	Shkoder	110 kV Shkodra 1 substation	16	12,803	30,352	6,157
	Vau i Dejes	220/110/6 kV substation	7	1,245	6,423	519
	Partially Lezhe	110 kV substation	4	26	4672	157
Section 2	Lezhe	110 kV substation	6	2,036	10,0037	1,434
Section 3	Kurbin	110/6kV substations and 110/35/6 kV substation	5	1,428	9,324	640
	Kruje (Thumane)	110/6 kV Fushe Kruje	2	10	2553	28
Section 4	Kruje	110/6 kV Fushe Kruje and 110 kV substation Kruje	5	2,753	11,974	757
	Vore	110 kV to 20/6kV substations	4	449	5,431	461
Section 5B	Tirane	110; 220 kV substation Tirana 1 and 400 kV Tirana 2 substation	42	66,947	134,110	40,232
	Rrogozhine (Lekaj)	110 35/10 kV substation	1	17	1226	3
Section 5C	Rrogozhine	110 35/10 kV substation	4	587	3,776	131
	Lushnje (Dushk)	110 kV substation Lushnje	1	16	1,773	30
Section 6+7	Lushnje	110 kV substation Lushnje	15	4,743	17,616	1,298
Section 8	Fier	110/35/20 kV substation 110/35/6 kV substation Fieri/2	11	8,508	27,894	2,347
Section 9A2		110/35/6 kV 110 kv substation Kafaraj And substation in Cakran	3	306	5,959	78
Section 9B2	Mallakaster	110 kV substation Ballsh	7	861	6,013	278
	Memaliaj	110 kV substation in Memaliaj	7	511	2,571	65
Section 10	Tepelene	110 kV substation in Tepelene	4	786	2,336	158
Section 11	Partially Gjirokaster	110 kV substation Gjirokastra 2	7	398	1,221	40
Section 12	Partially Gjirokaster	110 kV substation Gjirokastra 2 110 kV substation Gjirokaster 1	4	4,371	5,532	1,146

AIC Section	Municipality	Parameters related to Electrical supply and Telecommunication				
		Electrical supply sub-stations	Postal office distributed in the territory	Long term amenities use		
				Fix telephone	Mobile phone	Internet connections
Section 13 A	Dropull	110/35/6 kV substation in Gjirokaster	6	526	1,044	28
Total			**161**	**109,317**	**283,924**	**55,959**

Data source; General Local Plans of affected Municipalities; State Authority for Geospatial Information (ASIG Geoportal); Census 2011, Instat, Author's calculation

A short description regarding electrical supply and telecommunication for each municipality affected by the AIC sections is presented as follows:

Section 1

This section passes through the territories of municipalities that are among the most important areas in relation to energy production. There are two hydropower stations, Ashte and Koman (in Shkoder) and hydro power plant of Vau i Dejes. The largest concentration of electricity usage is in the city of Shkoder, as a consequence of the largest population.

The electricity is continuous during 24 hours in most of the cases. In peripheral areas have unstable supply due as low voltage electrical network is amortized and overloaded. Most of the neighborhoods of the city Vau I Dejes and Shkoder are lighted.

There is no public lighting almost is non-existent in rural areas, with exception in the settlement which are the center of administrative units, where only the center of the settlement is lighted. There are 3 private companies that offer internet access in the territory; Abissnet, Abcom and Tring.

Section 2

Part of the territory of Lezha municipality affected by Section 2 of AIC is supplied with electricity from the 110-kV transmission line. Lezhe substation consists of two 20MVA 110/10kV transformers, with a total capacity of 40 MVA. Often this substation is flooded, as it is built in the lowland area and in some cases the electricity is interrupted for safety reasons. The medium voltage power network is still in most of the cases comprised by air lines, damaged and in many parts of the city intersected with roads, residential buildings and other electric network lines. The power supply service is continuous during 24 hours.

Section 3

The territory along this section is supplied with electrical power from two substations; 110/6kV substations and 110/35/6 kV substation in Kurbin area and one 110/6kV substation in Fushe Kruje (which supply adm.unit Thumane). This service is provided 24 hours a day. High voltage supply network is amortized, while the medium voltage is overloaded. In most of the cases, airlines are physically damaged and in many parts of the city are intersected residential buildings and other electrical network lines.

Only urban areas of Lac, Milot and Mamurras are covered with public lighting, where most of the neighborhoods of the cities are lighted. Also, the center of adm.unit Thumane is covered with public lighting. The telecommunication network is comprised by telephone cable lines, inserted into the plumbing tubes, extending along the pavement.

Section 4

The territory of municipalities affected by this section is supplied with electric power from the 110-kV transmission line (Substation/Fushe Kruje 110/6kV) and 110/20 kV station in Kashar. Electrical supply service is continuous 24 hours per day, except in case of any power fault. The substation in Kruje is

composed of a 10 MVA 110/6kV transformer. Most of the neighborhoods of the city of Kruje are currently lighted, while in rural areas are lighted mainly the centers of the villages.

The electric power system in the municipality of Vore consists of air and cable lines, substations and other installations (electrical transformer cabins etc). In terms of telecommunication, the town of Vore has a good network distribution, but due to irregular infrastructure, the infrastructure in support of this network is not suitable.

Section 5B

Along this section, the electrical network consists of 110; 220 and 400 kV substations (in the municipality of Tirane (crossed by section 5B, from km 00+000 to km 26+000) and 110 35/10 kV substation in Kavaje (from which is supplied the territory of Lekaj administrative unit, crossed by section 5B from km 26+000 to 33+573).

In Tirane, the electrical network distriburtion of 35, 20, 10, 6 kV voltage includes about 1771 km network length and 18 distribution substations. There are problems with network overloading in some areas during the winter period. In the territory of the Municipality is produced electricity from Lanabregas and Murdhar Cascade hydropower plants.

The consumption of electricity per capita in Tirane district is about 35-40% higher than the average of the country. Most of consumers are connected to the low voltage network and about 85% of them are household consumers.

Table 4-134 Number of power consumers in the low voltage network

Total number of Low Voltage Consumers	Total number of Low voltage family subscribers	Total consumption for family subscribers Lv [MWh/v]	Total number of Low voltage businesses subscribers	Total consumption for businesses subscribers Lv [MWh/v]
309,164	262,095	938,714, 673	47,069	455,247,780

For part of this section affect the territory of Lekaj adm.unit (Rrogozhine), sometimes there are problems with power outage due to amortized electrical network.

Section 5C

In the territory of municipality of Rrogozhine affected by this section of AIC is under operation the sub-station in Ballaj with about 50-60 electric cabins. Distribution of energy is done through electric air lines. There are cases of power interruptions due to technical faults.

With public lighting is mainly covered the city of Rrogozhine and the settlement of Dushk where only 40% of lighting network is under operation, as the connecting cables of the poles and the lamps are damaged.

Section 6+7

The territory of the municipality of Lushnje crossed by section 6+7 has a good coverage with electrical supply service. Recently, is done the rehabilitation of the damaged electrical network, as well as the replacement of the damaged electric poles and the return of low voltage lines from aerial lines to underground cable. In the territory of Lushnje operates the hydropower plant of Thane, of 1.4 MW power. About 72 km of road network are lighted. Public lighting network is mainly functional in the city of Lushnje. Regarding the telecommunication network, underground cable lies only in the town of Lushnje.

Section 8

The territory of municipality of Fier crossed by section 8 of AIC is supplied with electricity from two substations 110/35/6 kV, located in the east and west of the city, as well as from 110/35/20 kV substation.With public lighting is covered the city of Fier, as well as most of administrative units, while in

Mbrostar administrative unit this service is not provided. In total there are about 75 km road network lighted in about 175 road axes.

Telecommunication is provided by some fixed and mobile telephony operators. Fixed telephony is offered by Albtelecom sh.a company and other private operators, such as; "Eden", "Iva Elektronik", "Rezart 1", "Rezart 2". Mobile telephony, as in the entire territory of Albania is run by operators: VODAFONE, EAGLE and T-Mobile.

Section 9A2

The territory affected by section 9A2 is supplied with energy from 110/35/6 kV substation Fieri/2 110 kV and 110/35/6 kV substation in Kafaraj and substation in Cakran which is supplied from Selenice. In general, only the centers of villages where is located administrative unit are covered with public lighting and postal service. There is internet penetration. Sometimes there are problems with energy supply.

Section 9B2

There are two power substations from which are supplied the territories of two municipalitlities affected by this section; 110-kV substation in Pocem, from which provide electrical power supply for the territory of Mallakaster and 110 kV substation of Memaliaj, from which provide electrical power supply for the territory of the municipality with the same name. Public lighting is functional only in urban areas of the municipalities and in centers of some settlements.

In Mallakaster, the lines are built from the 1970 and are amortized. In rainy seasons and with strong winds the population can stay about 2-3 days without energy. About 8937 consumers are connected to electrical network64.

In Memaliaj, the postal service is provided by the Albanian Post offices. About 2% of households have access to the internet. Internet service is provided by TEA-D Shpk Company.

Section 10

The territory of Tepelene municipality, crossed by Section 10 of AIC is supplied with electricity from110 kV substation of Tepelene. In Tepelene is planned the construction of the first wind park. The lighting of the streets exists only in the town of Tepelene.

Section 11 and 12

The territory of Gjirokaster municipality crossed by section 11 and 12 is supplied with energy from 110 kV substations Gjirokastra 1/Gjirokaster 2. There are 2 small hydropower plants (one in Picar and one in Caparjel). Here passes the 110-kV transmission line Bistrice-Gjirokaster. With public lighting is served the city of Gjirokaster (Section 12) and in some cases the centers of administrative units.

Fixed telephony is provided by a private company and the broadcast is made via optic fiber. From this company are supplied also rural areas.

Section 13A

The territory of municipality of Dropull, affected by Section 13A of AIC is supplied with electric power from 110/35/6 kV old substation of Gjirokaster. Electrical network was built since 1967 and last year Electrical Power Distribution Operator (OSHEE) started the works for reconstruction of old network, in order to avoid problems regarding the supply with electrical power of in Dropull i Poshtem adm.unit. Reconstruction has also been done for the medium voltage transmission lines, electric cables and the network finder in Dropull i Siperm.

[64] Regulatory Energy Authority, Annual Report 2016

Summary of Services and Facilities in the settlements affected by AIC

Based on information provided by representatives of adm.units/municipalitie, most of the settlements provide preschool and lower secondary education. To attend upper secondary school, students travel to a nearby town/village. In case the primary/lower secondary school is located 2 km or more from the settlement, the transport is provided the Educational Directorate. University education is not offered and some university institutions are in vicinity of the project area. During construction of the road, the access on educational facilities may be restricted for the population residing in the settlements where not all levels of educational are offered and they have to traverse the construction site,

The project area is well covered with health falicilties. The settlements provide primary health care service through health care centers (with three doctors or only one doctor) and ambulances (only one nurse). Secondary health care is provided in four setltlements throughout the settlement, in Hospital of Lezhe, Lushnje, Memaliaj and Tepelene. 10 settlements do not have facilities and receive health services in the nearest health care facilitiy. During project implementation overload of health services and delays for accessing health care service may take place considering their low capacities.

About 75% of the settlements have a water supply network, although not all households are supplied with this pipeline since in some cases it is amortized. The rest of the settlements are supplied by individual wells, only the settlement Ardenice (Section 6 + 7) is supplied with water from public taps outside the buildings or by water sources. Adverse impact may have during construction the settlements with limited water supply.

Most of the settlements are not connected with a sewerage network. Urban areas (Lezhe, Lushnje, Memaliaj and Tepelene) have access to sewerage network and about 15-20 % of settlements in rural areas (but not all the population is covered as in most of the cases the network is amortized). The waste water in most of the settlements are collected in septic tanks and then discharged in the nearest river or stream or in agricultural land, causing environmental pollution.

Waste collection and transportation is largely provided by private companies contracted by the municipality, with a frequency form every day (in urban areas) and 1-4 times a week in rural areas. Throughout the study area only for 6 settlements was reported that this service is not provided and the waste are thrown in opened space/channels or disposed by burning. Due to interruption of the local roads by the construction, waste collection services may be even further limited in rural areas (from the existing ones)

The electrical power supply covers all the settlements. With public lighting are covered mainly the cities and partially, only the centers of some settlements in rural areas. Problems in power supply have been reported mainly among the settlements in section 1 and that of first part of section 9B2 which come as result of amortized network and also because along first part of Section 9B2 the substation is at the same level with the Vjosa river and is often flooded. Communication and connectivity services cover entire area, which which is important for the stakeholder engagement throughout project implementation. During the construction phase there might be disruptions in supply with electricity taking into consideration already overloaded electricity supply network and the amortization of the network itself.

Regarding road network and transportation, all the settlements have road access. Mainly all the main roads of the settlements are asphalted, meanwhile in settlements located in remote/mountainous areas and far from national regional roads (especially where the AIC runs over new alignement), such as in settlements of Shtuf, Allgjate, Mushnik, Zambish, Menik, the main road that connect the settlement with other road axis is made of gravel or ballast. The construction of AIC Corridor will contribute to better accessibility especially to these settlements. In general, in rural settlements the neighbourhood streets for the most part are gravel or ballars. Better accessibility regarding public transportation have rural areas, especially that located along section 2, partially Section 5B (territory belonging to Tirana, municipality), and Section 6+7, where within and intercity public transportation is organized by and licensed transport companies. In

most of the settlements the transport is performed through individual privat operators, and in some cases by individual cars and when the settlements are close to national road axis the transport is carried out by random public vehicles passing across the road axis. It should be noted that along the existing roads where the AIC pass there is a significant number of uncontrolled housing/business developments, stretched in a ribbon-like pattern with a lot of uncontrolled entry/exits to the main highway, posing consequently a great risk to the safety of through traffic and local users alike -The project design foresees construction of interchanges, access and service roads to reinstate and improve the interrupted movement of local traffic and the split of economic activities on both sides of the new motorway/express road. Damage of the local roads due to increased used (re-direction of traffic and use of heavy machinery) may worsen the existing amortized road during the construction phase.

In the following table, is shown a summary of provision of services and facilities in affected settlements, divided by sections of AIC Corridor. More detailed information, per each settlement affected is presented in Annex XX Data on Services and Facilities in affected settlements.

AIC Sections	Settlements	Services and facilities in affected settlements (Educational and Health services, Water supply and Sanitation, Road and transport, Electricity Supply and Telecommunication, Waste collection)
Section 1	Shtuf, Muriqan, Obot, Oblike, Berdice e Madhe,Mali Hebaj, Beltoje, Ashte, Kosmac, Meglush, Bushat, Plezhe, Shkjeze, Mabe, Dajc, Gjader, Piraj, Blinisht, Rraboshte Merqi, Balldren, Balldren I Ri	There are 17 kindergarten, 2 education facilities where is offered only primary school, lower secondary education is offered in 14 9-years school, while upper secondary education is provided in 7 settlements. There is also 1 vocational high school in Bushat. In 3 settlements (Plezhe, Piraj and Balldren I Ri) is not offered any level of education. There are 7 health centers, 12 ambulances. In three settlements; Obot, Shtuf and Balldren I Ri is not offered the health service. The residents provide primary health care in the nearest residential center. Secondary health care service is offered outside the boundaries of settlements In 5 settlements (Beltoje, Ashte, Kosmac, Mabe Piraj) water supply network not exist. The other part pf the settlements are partially supplied from the water supply network and partially from individual wells. The % of population served from WSSC varies from 15% to 100 % In general, in all the settlements the sewerage system does not exist, the waste waters are discharged in septic tanks. Only in the settlement of Bushat, there is the a sewerage network, with a total length of 7.5 km, from which provide service about 1.100 families Almost all the main roads that connect the settlements between them and with the main national road are asphalted. Only in Shtuf the main road is with gavel. The neighborhood streets are with gravel of ballast. In general, public transportation is performed by a privat operator. The settlements are supplied with electricity form 110kV Shkodra 2 substation, 110kV Bushat 1 substation and 110kV Lezhe substation. There are problems with energy in bad weather. Only the center of the some settlements are covered with public lighting There are 7 postal offices in Oblike, Berdice, Ashte, Bushat Dajc, blinisht, Balldren. The internet penetrate across all settlements, but only a small part of the population is connected. Fixed telephony is used only in Berdice, Beltoje, Mali Hebaj, Bushat and Baldren Collection and transportation of waste is offered in all the settlements, except in Shtuf settlement. This service is offered 2 times per week by private operators contracted from municipalities.
Section 2	Lezha city, Ishull Shengjin, Ishull Lezhe Rrile, Shenkoll, Gajush	There are 7 public kindergarten and 7 private kindergarten, 6 public and 4 private 9-years schools, 3 public general high school, 1 vocational high school and 2 private high school. In only one settlements the education facilities does not exist. Primary health care is provided in two health centers and 4 ambulances. Secondary health service is offered Regional Hospital of Lezha and the Maternity. The pharmacy and dental service is mainly located in the city of Lezhe and near the central polyclinic and hospital. The settlements are connected to the water supply network. Only in Gajush the population is not served and are supplied with drinking water from individual wells. There is a sewerage network. Urban area is covered 100 %, rural area 25-30%. Only one settlement is not connected with the network. In urban area (city of Lezhe) the main road and neighborhood roads are asphalted. In other settlements the main roads are asphalted and in good shape, neighborhood streets are ballasted roads. There is a terminal for vehicles in the city of Lezha. There is a public transport from Lezha to the settlements. Electrical supply is provided from 110kV Lezhe substation /10 kV-2x3.6MVA substation of Rrile. The roads of the city of Lezhe are covered with public lighting, meanwhile in in rural area only the settlement of Shenkoll is partially covered. Fixed telephony is used only in the city of Lezhe. There are 3 postal offices. There is internet penetration. The cleaning, collection and transportation is provided every day in Lezhe city and 2-3 times per week in other settlements by a private operator contracted from municipality
Section 3	Fushe Milot, Prozhme, Shullaz, Fushe Mamuras, Bushnesh, Koder-Thumane, Fushe-Thumane	There are 4 kindergarten 4 lower secondary school and 1 upper secondary school. In two settlements (Prozhme and Bushnesh) there is a lack of education facilities There are 6 primary health care centers (3 health centers and 3 ambulances). The health care service is not offered in one settlement (Bushnesh). Secondary health care service is offered outside the boundaries of settlements Only two settlements are connected with water supply system (Fushe Milot and Koder Thumane), the other settlements are supplied with drinking water from individual wells. Only one settlement connected with sewerage network (Koder Thumane). The other settlements discharge the waste waters in septic tanks Only the main roads are asphalted, in some cases they are partially of gravel. Transportation service is provided by licensed private operator Electrical supply is provided from 110kV Lac 2- Lezhe 110kV Lac 1- Fushe Kruje transmission lines. Only one settlement is covered with public lighting (Koder Thumane). There are two postal offices and internet penetration. Regarding telecommunication, only mobile phones are used. Collection and transportation of waste is provided through all settlements by a private operator contracted by the municipality, every day
Section 4	Derven, Bilaj, Larushk 2, Arrameras,	Education is offered in 5 kindergarten, 5 lower secondary school, 2 private vocational high school and a private primary school. Three settlements does not have education facilities (Fushe Derven, Hasan, Breg Shkoze), also in Bilaj the school was destroyed from the earthquake.

	Hasan, Rinas, Breg Shkoze, Ndermjetes, Berxulle, Mukaj	Only primary health service is offered in 8 ambulances and 1 health care center. In one settlement (Mukaj) is not offered health care service. Secondary health care service is offered outside the boundaries of settlements 60-70% of population in two settlements (Fushe Derven and Berxulle) are connected to water supply system, the other settlements are supplied from individual wells Sewerage network is almost in existent. Only in Berxulle there is a sewerage network but only 10 % of the household are covered as the network is amortized. The other part collect waste waters in septic tanks In general, the main roads of the settlements are asphalted, but sometimes amortized. A part of them are made of gravel. Only in Berxulle there is a dedicated transport line. In Other settlements public transport is done individually or provided by private operator and in some cases the residents use the transport lines of the main road. There are two substation for power supply; 110 kV Fushe Kruje substation and 110 kV Vore substation. There is a lack of public lighting, except for the center of Berxulle settlement. Sometimes there are problems in power supply. Fixed telephony is not used. The internet penetrate. There isn't postal office The service is provided by a private operator, contracted by the municipality varying from every day to 3 times per week. In Bilaj the service is offered by employers of administrative unit.
Section 5B	Kashar, Mazrek, Kus, Allgjate, Lalm Menik, Peze Helmes, Peze e Vogel, Maknor, Peze e Madhe, Mushnik, Zambish, German, Lekaj	The education process is provided in 7 kindergarten, 4 primary school, 7 lower secondary school upper secondary school Only primary health care is provided within the settlements. There are 3 health care centers where is provided family doctor consult and checkup and 10 ambulances where provide health care a doctor and a nurse at each ambulance. Secondary health care service is offered outside the boundaries of settlements In most of the settlements there is a water supply network. In three settlements (Allgjate, Lalm, Menik) this system is not existent. The percentage of population covered with this service varies from 50 % in Kashar to 100 % in Lekaj. The population unserved exploit individual wells to supply with drinking water. Partially connected to sewerage network. The percentage of population covered with sewerage network varies from 15 % to 100% in Lalm. In 5 settlements the sewerage network is not existent (Allgjate, Menik, Mushnik, Zambish, German). Population unserved collect waste waters in septic tanks or discharge in agricultural land or channels. The roads are asphalted and in good shape for most of the settlements. In 5 settlements (Allgjate, Menik, Zambish, Mushnik, German) the main road is with gravel or ballast. In 5 settlements (Kashar, Peze-Helmes, Maknor, Peze e Vogel, Peze e Madhe) there is dedicated line for public transport. In other settlements the transport is provided by a private operator, while in the settlements of Mushnik, Zambish, German the transport is provided with private cars. The settlements are supplied with energy from 110 kV Tirana 2 substation, 110 kV Kavaja substation and 110 kV Rrogozhina substation. Public lighting is offered in Kashar and Peze e MAdhe. Sometimes there are problems in power supply and low voltage due to amortized electric line. Only in Kashar is used fixed telephony for 12% of the population, in other settlements fixed telephony is not used. The internet penetrate. There only 2 postal offices, one in Kashar and one in Peze e e Madhe. Collection and transportation of waste service is provided by private companies, contracted by the municipalities that have under jurisdiction the settlements. The service provision varies by the size of the settlements in Kashar this service is provided every day, while in other settlements from one three times per week. In two settlements (Allgjate, Menik) this service is not provided
Section 5C	Gose e Madhe (Kercukaj), Gose e vogel, Zhame Sektor, Zham Fshat, Gramsh, Konjat, Dushk I madh	The education process is provided through 6 kindergarten, 6 lower secondary school and two upper secondary school. In one settlement (Konjat) there is not offered any level of education. Only primary health care is provided through the settlements. There are two health care center where is provided service of family doctor consult and checkup and 5 ambulances where provide health service a nurse at each ambulance. Secondary health care service is offered outside the boundaries of settlements All the settlements are connected to water supply network. The percentage of population served from WSS varies from 70% to 100% Only two settlements are connected to sewerage network which cover 80 % of the population, the other part collect the waste in septic tanks. The main roads that connect the settlements are mainly asphalted, and in some cases with gravel Transport is done partially by private, cars, partially by licensed privat operator or in some cases by transport lines that pass in the main road Sh4. The settlements are supplied with electricity from 110kV Rrogozhine substation and 110kV Lushnje substation. Public lighting is provided only in two settlements; Kercukaj and in Dushk I Madh (40 % of the settlement is covered with public lighting). Fixed telephony is not used. The internet penetrate There are 2 postal office All the settlements are covered with waste collection and transportation service, which is provided by a private company, contracted from municipality 2 times per week

Section 6+7	Golem I madh, Lushnja city, Saver, Krujtje e Poshtme, Bishqethem, Lumth, Gorre, Rrapez Fshat, Rrapez Sektor, Ardenice,, Kolonje, Pirre, Vajkan	Education process is provided in 17 public kindergarten, 14 public 9-years schools, 6 public general high school and 1 vocational/mechanical high school (Lushnje). Only one settlement is not covered with education facility (Rrapez Sektor) Primary health care service is offered in on Central policlinic (in Lushnje), one health center and 10 ambulances. Secondary health service is offered in the hospital in Lushnje. Dental clinics and pharmacy are distributed around the city of Lushnje Almost all the settlements are connected to water supply system, except the settlement in Ardenice is supplied with drinking water from public taps outside the building and individual wells. They are supplied with water from water supply in Gogolas, Petove, gajde and Lushnje. All the population is served with drinking water supply. There is the sewerage network in the city of Lushnje and in Saver, in other settlements this system is not existent. In Lushnje is served about 63% of the population, as the sewerage system is partially amortized. The other settlements discharge the waste waters in septic tanks. There isn't a wastewater treatment plant. The roads of the settlements are asphalted and in good shape. In the city of Lushnje, intercity transport is carried out by legal persons, organized in a transport company and licensed. The main bus and minibus station is located close to the northern entrance of the city and another provisional in front of the central train station in Lushnje. There are 2 urban lines, Plug-Karburnare and the Saver-Cemetery line. In other settlements, the transport is mainly provided in the main road Sh4, where passes different transport line or by private operator and individual cars The settlements are supplied with electricity from 110kV Lushnje substation. Public lighting is offered for 70% of of the city of Lushnje and for a part of rural settlements. There are about 50 % users of fixed telephony in the city of Lushnje. The other settlements does not use fixed telephony. The internet penetrate There are four postal offices. Al the settlements are served with waste collection and transportation service, which is offered by a private company, contracted by the municipality. In urban area (city of Lushnje) this service is offered for 80 -100% of the population. Problem remain the deposit site located close to residential units causing not only environmental problems, but also for population
Section 9A2	Levan Frakull e Madhe, Kafaraj, Ade, Sheq Musalala, Kashisht, Varibop, Floq, Buzemadh, Gjonc	The education process is provided in; 12 kindergartens, two primary school, 16 9-years school and two high school. In one settlement (Floq) there isn't any education facility Only primary health care service is offered within the settlements in two health care center where offered family doctor consult, and checkup service and in 9 ambulances. Pharmaceutical service is offered in two settlements (Frakull e Madhe and Levan). Secondary health care service is offered outside the boundaries of settlements Only the settlement (Kashisht) is not connected to water supply system. In other settlement the population is covered with water supply at the level 90-100%. The sewerage network is present in three settlement (Levan, Frakull e Madhe and Kashisht), but not functional in its entire length, as it is amortized. Uncovered population collect the waste waters in septic tanks. The main roads of most of the settlements are asphalted, except in Floq and Vjose where the road are not in good shape. The neighborhood roads are partially asphalted in Levan, while in other settlements neighborhood roads are of sand bituminous. There is a dedicated public transport in Levan and Frakull e Madhe, while in other settlements transport is provided by private operators or individual cars. The settlements are supplied with electricity from 110 kV substation in Kafaraj and 110 kV substation in Cakran. Sometimes there are problems with energy supply. Public lighting is offered in Levan and Frakull e Madhe. Fixed telephony is not used. The internet penetrate There are two postal offices in Levan and Frakull e Madhe All the settlements provide the waste collection and transportation service by a private company, contracted by the municipality, In Levan this service is offered every day, while in other settlements 2-3 times per week
Section 9B2	Dames, Behaj, Malas, Zhulaj, Lulezim, Toc, Qesarat, Iliras, Memaliaj Fshat, Memaliaj	There are 10 kindergarten, 1 primary school, 8 lower secondary school and 4 high school. Primary health care service is offered in in one central policlinic (in the city of Memaliaj), 5 health centers and 4 ambulances. The secondary health care is offered in the hospital of Memaliaj. There is 3 pharmacy (one in the city of Memaliaj and in Dames and Lulezim). The water supply network is present in 5 settlements, where is covered over 90% of the population. While in 4 settlements this service in not existent, the population is supplied with drinking water from individual wells. The settlements are supplied with water from the water supply in Kute and water source in Bence. There is a sewerage network for most of the settlements. Coverage of the population from this service varies from 20% to 100%. Three settlements (Zhulaj, Behaj, Malas) are not connected to sewerage network. The population discharge the waste waters in septic tanks. In general, only the main roads are asphalted, other part of the roads are in poor condition, except the city of Memaliaj where most of the roads are asphalted and in good shape. Public intercity transport in the city of Memaliaj operates regularly for remote cities, but there is no permanent line and fixed timetable. In other settlements the transport is performed through private operators or individual cars.

		The settlements are supplied with electricity from 110 kV substation in Krahes, 110 kV substation in Memliaj and Substation in Pocem. There are many problems with power supply, especially for 3 settlements in first part of the section as the power supply lines are amortized and because the substation is at the same level with Vjosa river and often floods. Only the center Dames, Lulezim and the city of Memaliaj is equipped with public lighting. Fixed telephony is used only for about 50 % of the population in the city of Memaliaj. The internet penetrate throughout all settlements. There are 4 postal offices. Waste collection and transportation is offered in all the settlements by a private companies, contracted by the municipalities. The provision of service is performed every day (in the city of Memaliaj), while in other settlements varies from 1 to 2 times per week
Section 10	Tepelene city	Education service is offered in three main level; pre-school education, basic education and secondary education. There are 3 kindergarten, 2 9 years school and a high school In the city there is the central policlinic and the hospital center. The pharmacy service distributed in the territory of the city is in limited number. The population is connected 100 % to water supply system. The sewerage network cover all residential properties The roads are in good shape and asphalted. There isn't public transport within the city. Regarding intercity public transport, there are transport lines that connect the municipality with Tirane and the closer cities The settlements are supplied with electricity from 110 kV Tepelene substation. Almost all the city neighborhood have public lighting. About 90 % of the population use fixed telephony. The internet is offered by a private operator There is a postal office. Waste collection and transportation is offered by a private company, contracted by the municipality, every day
Section 11	Humelice, Cepun, Mashkullore	The education service is provided through 3 kindergartens, 1 lower secondary school and a upper secondary school Only primary Health care service is offered in 3 ambulances. Three nurses provide health care in the settlement. Secondary health care service is offered outside the boundaries of settlements The population is connected 100% with eater supply system There is a lack of sewerage network. Waste waters are discharged in septic tanks Only the main roads of the settlements are asphalted. The road within the settlement are made of ballast The settlements are supplied with electricity from 110 kV Gjirokaster 2 substation. Public lighting is not provided. A small percentage use fixed telephony Internet penetrate. There is only one postal office near the settlement, at Ura e Kardhiqit The three settlements are covered with waste collection and transportation service, which is offered by a private company, contracted by the municipality, 3-4 times per week
Section 12	Rshi Lengo, Kordhoce	The education process is provided in 2 kindergarten and a 9-year school There are two ambulances, where provide health service 2 nurses. The population is connected with water supply system at the level 80% to 100%. Other part exploit individual wells or buy the water. There is a lack of sewerage network. Waste waters are discharged in septic tanks and then end up in the nearest streams or channels. The roads are asphalted and in good condition. Settlement neighborhood's road are not asphalted. There is public transportation, three or four times per day with the city of Gjirokaster The settlements are supplied with electricity from 110 kV Gjirokaster 2 substation. Public lighting is provided only for the center of the settlement. A small percentage use fixed telephony Internet penetrate. No postal office Waste collection and transportation is offered in 2 settlements along this section by a private company, contracted by the municipality, 1 time per week
Section 13A	Dervican, Goranxi, Vanister, Haskove, Sofratike, Terihat, Gorice, Frashtan, Lugar, Grapsh, Jorgucat, Kakavie	The education process is provided in 5 kindergarten, 2 lower secondary school and 1 upper secondary school. There is a lack of educational facilities in 7 settlements, Vanister, Haskove, Terihat, Gorice, Lugar, Grapsh, Kakavie. Only primary health care service is provided through 2 health centers and in 6 ambulances All the settlements are connected to water supply system, and about 90 % of the population is covered. The sewerage network is not existent. Waste waters are discharged in septic tanks Main road is asphalted. Neighborhood roads are paved of ballast. There are private transportation lines that connect Kakavija with Gjirokaster and have stations to the settlement The settlements are supplied with electricity from 110 kV substation in Gjirokaster and Grapsh. There are many problems in power supply. About 80% of the population use fixed telephony. Internet penetrate. There are 4 postal offices Waste collection and transportation is offered in all settlements by a private company, contracted by the municipality, 2 to 3 times per week

Table 4-135 Summary of services and facilities in the settlements of the project area

4.3.10 Source of income, including households

The most important source of income in most of affected municipalities is paid work/self-employed. The second by the importance are the pensions[65]. In the municipalities of Kurbin (Section 3 of AIC) and Dropull (Section 13A of AIC) pension are the most important source of income. This is due to the fact that in Kurbin municipality unemployment rate is high, while in Dropull young population has migrated and 43.2% of the households in Dropull are pensioner household.

Third by the importance are social assistance and benefits. In the municipalities of Vore (Section 4), Rrogozhine (Section 5C), Lushnje (Section 6+7), Fier (Section 8), Mallakaster (Section 9B2) and Dropull (Section 13A) remittances are most important source of income than social assistance and benefits.

The following table indicate the main sources of incomes in the municipalities affected by the project.

Table 4-136 Main source of income in the municipalities crossed by Sections of AIC

AIC Section	Source of Income (%)				
	Municipality	Paid work or self-employment	Pensions	Remittances	Social assistance and benefits
Section 1	Shkoder, Vau I dejes, partially Lezhe	43.36	31.95	7.80	16.89
Section 2	Partially Lezhe	45.55	31.59	11.30	11.57
Section 3	Kurbin, Thumane (Kruje)	38.56	35.87	8.74	16.84
Section 4	Kruje, Vore	62.88	24.03	7.08	6.01
Section 5B	Tirane, Lekaj (Rrogozhine)	62.30	28.73	4.39	4.58
Section 5C	Rrogozhine, Dushk (Lushnje)	49.32	24.05	17.57	9.06
Section 6+7	Lushnje	59.13	26.45	8.92	5.50
Section 8	Fier	54.90	31.23	8.60	5.28
Section 9A2	Partially Fier	50.81	25.52	19.94	3.73
Section 9B2	Mallakaster, Memaliaj	50.42	28.35	11.95	9.27
Section 10	Tepelene	48.78	32.07	4.56	14.59
Section 11	Partially Gjirokaster	49.60	41.22	4.89	4.29
Section 12	Partially Gjirokaster	62.53	30.05	2.27	5.16
Section 13A	Dropull	29.52	57.37	9.87	3.26
Total %	**56.19**	**29.42**	**6.89**	**7.50**	**56.19**

Data source; Census 2011[66]

Summary of sources of incomes in the settlements affected by AIC

Along the entire length of the AIC Corridor, self-employment mainly in agriculture is the main sorurce of income for the population residing in rural settlements of the project area. Even in cases when the agriculture and livestock products are not marketed they are important source of livelihood as are used for their own consumption. Paid workers in rural areas are in small number and are mainly employed for the state, in administrative units offices, health centers and ecudation facilities or water supply and postal offices. Paid work is the main source of income in urban areas of Lezhe, Lushnje and Tepelene, except the

[65]Referred to data presented in Geo portal, Instat, Population indicators by municipalities

[66]https://instatgis.gov.al/#!/l/prefectures/population/prefpop1

city of Memlaiaj where the main soruces of income are the pension. Collection and trade of medicinal herbs is a seasonal source of income for settlements of Section 11 and Section 12.

Incomes from pensions for person over 65 years old are the second sources of incomes among the settlements. The highest percentage of households relying in pensions as the main sources of incomes is encounter in the southern part of AIC Corridor, and especially in the city of Memaliaj (Section 9B2) and settlements of Section 13A.

Incomes from remittances are classified as the third by the importance based on national statistics, although in some cases stakeholders[67] consulted have resported that remittances are the second by the importance, afer incomes from employment.

Incomes from social assistance and benefits are an important sources of incomes mainly in urban areas and in rural mountainous areas, where the availability of agricultural land is low. Incomes from social assistance and benefits are higher in urban areas of Memaliaj, Tepelene and in settlements of adm.unit Lekaj (Zambish, Mushnik, German).

In the following table, is shown a summary of main sources of income in affected settlements, divided by sections of AIC Corridor. More detailed information, per each settlement affected is presented in Annex XX Data Employment, main sources of income and main economic activities (refered in the employment sub-section)

Table 4-137 Summary of Main sources of incomes in the settlements crossed by Sections of AIC

AIC Sections	Settlements	Main Sources of Incomes
Section 1	Shtuf, Muriqan, Obot, Oblike, Berdice e Madhe,Mali Hebaj, Beltoje, Ashte, Kosmac, Meglush, Bushat, Plezhe, Shkjeze, Mabe, Dajc, Gjader, Piraj, Blinisht, Rraboshte Merqi, Balldren, Balldren I Ri	Self-employment mainly in agriculture/paid work is the main source of income for more than 50 % of the households along this section. Incomes mainly provided from agriculture. The second by the importance of source of incomes are the pension. Incomes from pensions varies between 18.9% to 34%.
Section 2	Lezha city, Ishull Shengjin, Ishull Lezhe Rrile, Shenkoll, Gajush	Self-employment/paid work is the main source of income for more than 50 % of the households along this section. The second by the importance of source of incomes are the pension. Incomes from pensions varies between 30% to 31%.
Section 3	Fushe Milot, Prozhme, Shullaz, Fushe Mamuras, Bushnesh, Koder-Thumane, Fushe-Thumane	Self-employment mainly in agriculture /paid work is the main sources of income and remittances from abroad are the second sources of income for the first part of the section till km 10+000. 50 % of the households along this section. Incomes from pensions varies between 32 % to 35%.
Section 4	Derven, Bilaj, Larushk 2, Arrameras, Hasan, Rinas, Breg Shkoze, Ndermjetes, Berxulle, Mukaj	Self-employment/paid work is the main sources of income for 40 to 60% of the population. The second by the importance are the pensions. Incomes from pensions varies between 14.2 % to 36 %.
Section 5B	Kashar, Mazrek, Kus, Allgjate, Lalm Menik, Peze Helmes, Peze e Vogel, Maknor, Peze e Madhe, Mushnik, Zambish, German, Lekaj	Self-employment mainly in agriculture/paid work is the main sources of income for 65 to 75% of the population. The second by the importance are the pensions. Incomes from pensions varies between 20% to 40%.

[67] Consultation with stakeholders in Cakran administrative units (Section 9A2), Cepo administrative units (Section 11) and Dropull municipality (Section 13A)

Section 5C	Gose e Madhe (Kercukaj), Gose e vogel, Zhame Sektor, Zham Fshat, Gramsh, Konjat, Dushk I madh	Self-employment mainly in agriculture is the main sources of income for more than 50% of the population. The second by the importance are the pensions. Incomes from pensions varies between 17% to 33%.
Section 6+7	Golem I madh, Lushnja city, Saver, Krujtje e Poshtme, Bishqethem, Lumth, Gorre, Rrapez Fshat, Rrapez Sektor, Ardenice,, Kolonje, Pirre, Vajkan	Self-employment (mainly agriculture) is the main sources of income for 50-70% of the population in rural areas along this section, while urban area (city of Lushnje) paid work is the main source of income. The second sources of income, by the importance are the pensions along the entire section. Incomes from pensions varies between 26% to 37%.
Section 9A2	Levan Frakull e Madhe, Kafaraj, Ade, Sheq Musalala, Kashisht, Varibop, Floq, Buzemadh, Gjonc	Self-employment (mainly agriculture)/paid work is the main sources of income for 50-70% of the population along this section. The second sources of income, by the importance are the pensions for the first part of the section till km 12+000, while from km 12+000 to km 26+901 which passes the territory of Cakran adm.unit remittances are the second sources of income and very important. Incomes from pensions varies between 22% to 35%.
Section 9B2	Dames, Behaj, Malas, Zhulaj, Lulezim, Toc, Qesarat, Iliras, Memaliaj Fshat, Memaliaj	Self-employment (mainly agriculture and livestock) is the main source of income for 40-60% of the population in rural area, meanwhile in urban are (Memaliaj city) the main source of income are the pension. This comes due to high migration of youth and low economic development, and low number of big businesses, which offer jobs for un employment people. Incomes from pensions varies between 23% to 49% (Memaliaj city).
Section 10	Tepelene city	Paid work/self-employment is the main source of income for about 55% of the households. Incomes from pensions is the second source of income for 37 % of the population.
Section 11	Humelice, Cepun, Mashkullore	Pensions are the main sources of income for about 40 % of the household in the settlements along the section 11, this comes due to high percentage of pensioner household (24.18% higher than the national level of 10.5%) and higher level of migration of population belonging to the age group of work force. The second by the importance of sources of income is Self-employment mainly agriculture and livestock for 35% of the pupulation
Section 12	Arshi Lengo, Kordhoce	Self-employment (mainly agriculture)/paid work is the main source of income for 60-80 % of the population along section 12. Pension and remittances are very important sources of income. Incomes from pensions varies between 13 % to 46%.
Section 13A	Dervican, Goranxi, Vanister, Haskove, Sofratike, Terihat, Gorice, Frashtan, Lugar, Grapsh, Jorgucat, Kakavie	Pensions are the main sources of income for 60% to 65 % of the household in the settlements along the section 13A, this comes due to high percentage of pensioner household (varies from 33.5% to 40 %, higher than the national level of 10.5%) and higher level of migration of population belonging to the age group of work force. The second by the importance of sources of income is Self-employment/paid work for 30-40% of the population

Data source; Consultation with stakeholders during field visits. National statistics (Census 2011)

4.3.11 Vulnerable groups and social exclusion

Social exclusion in Albania came as result of poverty, poor governance, slow decentralization, inadequate social policies, inadequate treatment of poor families, and poor enforcement of laws.

Population groups most at stake are the unemployed persons, people with low education achievements, persons living in the rural areas, and persons who use farming for personal needs. People who are working could also potentially be poor, if they are working for small wages[68].

There are big differences between residents living in urban areas with those in rural areas, between those living in the north and those living in other areas of the country, and especially between the Roma/Egyptians and the rest of the population.

Based on data of Word Bank[69] the rate of Povetry in Albania, in 2012 was estimated 14.3%. The higthest povetry rate was registred in northern part of the country (22%) and the lowest in south, in Gjirokaster (8%). Poverty in rural areas is higher than in urban areas. The poorest regions in Albania are located in the northern mountainous areas, followed by the Central region. In the study area the highest level of povetry is in Kurbin municipality (Section 3 of AIC), followed by Rogozhine municipality (section 5B (from km 26+000 to 33+573) and Section 5c of AIC). The lowest poverty rate along the study area is registred in the southern part of AIC section, in Gjirokaster municipality (Section 11 and section 12 of AIC), followed by Dropull municipality (Section 13A of AIC), where the povetry rate is 7.8 %. One of the main reason of low level of povetry along this section may be the incomes that a number of families provide from remitancces. Poverty rate is related to inadequate infrastructure, lack of economic activity and an inefficiently skilled workforce and low level of education. Albania's poverty reduction is a result of the number of families receiving incomes from remittances. The level of inequality seems to be higher in Gjirokaster municipality (Section 11 and 12 of AIC) of 27% and the lowest in Kurbin (Section 3 of AIC), of 24.3%. Municipalities with the higher number of poor people are that of Tirane (Section 5B), due to the higer number of population.

[68]National Strategy for Social Protection 2015-2020

[69] Report on Portraits of Povetry and Inequality in Albania, 2016

Municipality	Total population	Poverty headcount	s.e.	Gini	s.e.	Number of poor	Mean per capita consumption	s.e.
LEZHË	64,938	0.162	0.03	0.263	0.01	10,544	8,543	299
KURBIN	46,249	0.193	0.03	0.243	0.01	8,926	7,770	279
SHKODËR	134,069	0.133	0.01	0.267	0.01	17,850	9,270	210
VAU I DEJËS	30,379	0.143	0.02	0.261	0.01	4,346	8,906	310
KRUJË	59,294	0.135	0.02	0.252	0.01	7,994	8,849	319
TIRANË	550,163	0.101	..	..	..	55,561	10,328	..
VORË	26,630	0.154	..	..	..	4,091	8,685	..
RROGOZHINË	21,739	0.182	0.03	0.245	0.01	3,961	7,975	351
LUSHNJE	83,644	0.154	0.02	0.253	0.01	12,888	8,470	256
FIER	120,562	0.145	0.02	0.262	0.01	17,475	8,837	193
MALLAKASTËR	27,271	0.166	0.03	0.245	0.01	4,528	8,143	351
TEPELENË	8,889	0.103	0.03	0.256	0.01	917	9,710	526
MEMALIAJ	10,547	0.123	..	..	..	1,297	9,095	..
DROPULL	3,496	0.078	0.02	0.26	0.01	273	10,670	521
GJIROKASTËR	28,545	0.068	0.01	0.27	0.01	1,933	11,215	435

Figure 4-104. Data on povetry rate, inequality level, numer of poor people and average per capita consumption per each municipality included in the study area

Source; Report on Portraits of povetry and inequality in Albania, World Bank, 2016

According to law no. 7995, article 2/20 dated 20.9.1995, amended by the law no. 9570 date 3/7/2006 "On Promoting Employment" vulnerable groups in Albania are considered jobseekers of the following categories;

- Mothers with many children
- Persons aged over 50 years;
- Young people under the age of 18;
- Long-term unemployed jobseekers;
- Family below to the poverty line of Albania;
- Victims of trafficking;
- Person who benefit from income support programs;
- Person emerging from unemployment by enterprises and institutions in the process of reform, restructuring and privatization;
- Girls/mothers unemployed;
- Divorced women with social problems;
- Returners from economic migration;
- Newly graduated unemployed in the labor market; person who have served the sentence of imprisonment;
- Person with disabilities;
- Roma and Egyptian community;
- Orphans unemployed.

The main characteristics of vulnerable groups are described as follows;

Unemployed jobseekers; are categorized as long-term, if they have more than one year looking for a job. By the end of 2017, are registered 42,594 long-term unemployed jobseekers or 51%.

Children at risk; this group live in the most forgotten communities, the deeper areas and some others in the periphery of big cities. These are Roma children, children without parental care, children with disabilities, trafficked children and children working in the streets. Children of poor families in Albania works especially in the informal market by selling cigarettes, washing machines or begging. Because of the high poverty rate in Roma and Egyptian community, a big part of Roma children works in this market. Almost half of the children working in the street come from families who have migrated from other cities during the transition.

Roma and Egyptian communities; Roma and Egyptians are currently the poorest and the most marginalized ethno-linguistic groups. Both groups in general suffer from the same issues; lack of skills, low educational levels and discrimination. Nowadays, they have issues on access health care, sanitation, infrastructure, education and poor living conditions. Many Roma households cannot afford to purchase the necessary medicines. The unemployment rate is very high for Roma, where women have the highest unemployment rate compared to male. Egyptians also face more economic and social problems, mainly because of anthropological specifications, rites, customs, mentality, and lifestyles different from other groups. By the end of 2017, are recorded 2,270 people or 2.7% long-term jobseekers Roma people (48.4% are Women and 44.8% are heads of households) and 3,749 or 4.5% long-term jobseekers' Egyptian people (54.1% are Women and 44.8% Heads of households)

Persons with disabilities; in this group are included: People born with disabilities and occupationally disabled. By the end of 2017, are registered as long-term jobseekers 472 person with disabilities.

Elderly people; although Albania has the youngest population in Europe, the percentage of the population over the age of 60 years is gradually increasing. This group of the population is vulnerable due to high chronic disease and is not able to fulfill its needs and improve the quality of life.

Females; this group includes women belonging to the Roma community, abused women or single mothers with children (head of household) who have the highest probability to live in poverty, to be educated or employed.

Returning migrants; this group came in the focus of employment policies in 2010 when due to the economic crisis in different countries of the world, many Albanians living outside the country, began to return. Only in the municipality of Shkoder, according to the Census, until 2011, the number of returned emigrants was 5229 persons. This group faced difficulties in reintegrating into society and employment. Detailes on Vulnerable groups dissagregated for AIC sections are presented on Anex XXX

Social Protection

The Albanian Constitution guarantees equality before the law and freedom from discrimination on the basis of race, gender, ethnicity and language. Some groups need special care because of their tangible and vulnerability.

Social protection allows individuals or families to cope financially with the consequences of social risks. Social institutions contribute to social protection and support of disadvantaged persons and groups through employment and facilitating access to the labor market. Public social protection system in Albania offers limited coverage of social services by addressing the categories of persons in need: the elderly, families/person unemployed or beneficiaries of economic assistance, the orphans and the disabled.

Social Care Services are part of the Social protection Program funded by the state budget. Currently there are gaps in coverage of all needs for services of vulnerable groups at national level.

Social service is provided in reintegration and residential rehabilitation centers, in day care centers or in the family. Social assistance in payments includes; the beneficiaries of economic assistance and beneficiaries of disability payments70.

Beneficiaries of economic assistance: This type of assistance is provided on the several grounds

- Orphans living outside the institutions;
- Parents with more than 2 children born at once and are will lower incomes;
- Victims of trafficking and victims of domestic violence71 ;
- Persons who live in social care institutions until employment;

Beneficiaries of disability payment. This type of assistance is provided to a persons that are qualified under following categories:

- Paraplegics and tetraplegics;
- Persons with disabilities incapable to work72.
- Persons who are declared working invalids and benefit invalidity pension

Beneficiaries of social care services[73] are:

- Families and children that have a status of asylum seekers;
- People with disabilities;
- Adults with social problems, victims of violence, trafficking, drug addiction and alcohol addiction;
- Pregnant girls or single parents of a child up to the age of one year;
- Elderly people in need;
- Juvenile and young people in conflict with the law, who have completed the period of punishment and need social care services, in order to reintegrate into society

The categories that do not receive social assistance and services are; Albanian citizens living abroad as migrants; Asylum seekers, who have not yet received asylum status; Albanian citizens, foreign nationals or stateless persons, who need emergency assistance due to natural disasters and wars; persons serving prison sentence; Persons who are beneficiaries of public residential care facilities.

The social-medical care services are public and non-public. Public social care services are funded by the Central budget and from independent budgets of local government bodies. The State Social Service administers social services for individuals at the national level.

Municipalities or administrative units administer all social services for individuals who are residents of that city or administrative units. Non-public institutions are managed by Non-Governmental Organizations (NGOs) which are licensed by the Ministry of Health and Social Protection.

The total number of public social services in Albania is shown in the following;

- 29 Public Social Care Institutions
- 25 Residential Public Institutions
- 5 Orphanage 0-5 years old
- 4 Children's home for children 6-18 years old
- 6 Home for the elderly

[70] Law no.9355, amended in 2016 on 'Social Assistance and Services'

[71] for the period of validity of the protection order.

[72] As per the decision of the Medical Assignment Commission for Work Capability and persons who receive a disability pension and a monthly supplement on it, according to the Status of Invalidity Work

[73] Law No.121 / 2016 "Law on social care services in the Republic of Albania"

- 6 Residential development centers
- 2 Public Daycare Center for People with Disabilities
- 3 Public day care center for elderly
- 1 National Center for the Treatment of Victims of Domestic Violence
- 1 Center for victims of Trafficking
- 1 National Emergency Center for vulnerable categories

During 2018 the total number of families benefiting from social assistance is 53,982. Families with four members have the largest share in families receiving social assistance (34, 9%), followed by families with five members (25, 4 %).

In 2018, the number of families that benefit social assistance has decreased in 33.3 % compared with 2017. The annual average number of registered unemployed jobseekers receiving unemployment benefit for 2012-2016 has decreased from 9,772 to 5,141. During 2018 compared with previous years, the monthly unemployment benefit increased to 12,000 ALL from 6,850 ALL in 2015.

Social assistance average per family or the 4th quarter of 2019 is 5,154 ALL per month74.

Main vulnerable groups and social protection in 15 municipalities affected by the project, divided by sections of AIC

The main categories of vulnerable groups in the project area and the percentage or number of the population by these main vulnerable groups and divided by AIC sections are shown in the table below. Data regarding other categories of vulnerable group are not available.

Table 4-138 Distribution of the population in affected municipalities by the main categories of vulnerable groups and by section of AIC.

Municipality	Main categories of vulnerable groups						
	Young generation aged under the age 15 years (%)	The old generation (over 65 years old) %	Females household %	Returnees migrants (total number)	Person with disabilities %	Roma communities %	Egyptian communities %
Section 1	21.16	12.58	13.86	7651	7.2	0.21	0.37
Section 2	21.89	10.71	11.93	3112	7	0.22	0.37
Section 3	23.39	10.36	11.63	2551	6.2	0.13	0.05
Section 4	23.56	9.41	7.92	2208	5.5	0.65	0.01
Section 5B	18.55	10.60	18.73	32812	4.5	0.39	0.13
Section 5C	21.37	11.16	10.45	813	7.3	0.36	0.00
Section 6+7	18.53	12.28	14.78	3505	6.8	0.04	0.08
Section 8	18.99	13.00	11.15	5844	6.5	0.91	0.01
Section 9A2	21.68	11.86	9.26	1538	6.5	1.29	0.00
Section 9B2	20.77	12.58	12.20	1843	7.9	0.00	0.00
Section 10	18.95	14.17	8.00	364	8.8	0.00	0.00
Section 11	13.97	20.21	10.65	444	6.1	0.00	0.00
Section 12	17.36	12.65	13.52	1477	6.3	0.38	0.04
Section 13A	7.68	33.77	24.73	716	12.2	0.03	0.00

Data source: Census 2011, Instat

[74] Unemployment benefit and social assistance, Q.4.2015- Q.4.2018, Instat

Regarding the social care service in day and residential centers, main attention is given to three main categories of vulnerable groups; children, people with disabilities and elderly people.

This is due to the fact that most of social centers offer service for these categories of vulnerable groups and the largest number of beneficiaries from social services belong to these three main categories. In Shkoder municipality (Section 1 of AIC), Tirane municipality (Section 5B) and Fier municipality (Section 8) are concentrated the largest number of social care centers. In the following paragraph and figures are shown the distribution of social care facilities per each section of the project area.

Section 1

Along this section there 28 social care centers; 25 social care centers are distributed in the municipality of Shkoder, mainly in urban area and 4 social care centers in the territory of Municipality of Vau I Dejes, 3 in the city center and the Center for the Elderly in Barbullush houses 25 elderly people. The distribution of social care facilities, by the type of social service they offer are presented in the following figure.

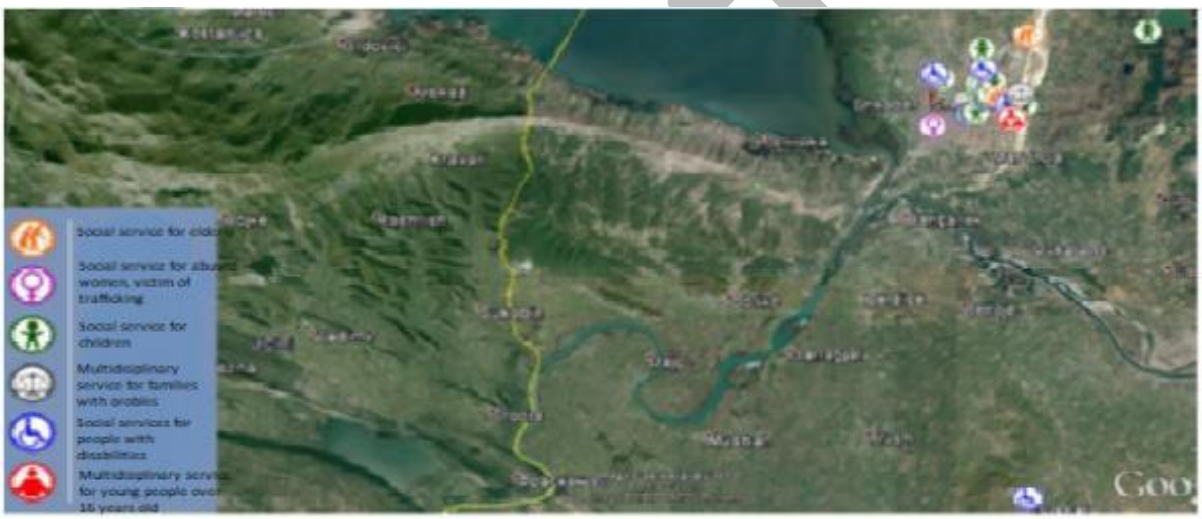

Figure 4-105 Distribution of social service in the territory of Shkoder municipality.

Data source; Social service map, 2016 published in the website of State Social Service.

Section 2

Along this section, which cross the municipality of Lezhe, the social care is provided in 9 social care centers, mainly located in the city of Lezha: The distribution of social services centers by the service they offer is presented in the following figure.

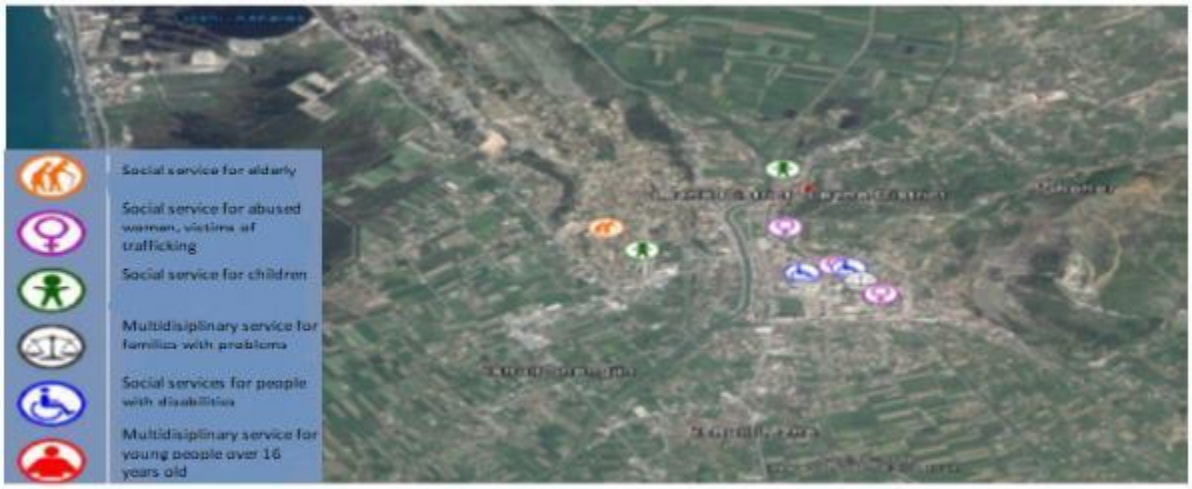

Figure 4-106 Distribution of social care centers in the municipality of Lezhe

Data source: Social service map 2016, published in the website of State Social Service.

Section 3

Along this section there are no segregated areas with marginalized or excluded population, both for social and economic level. The presence of different ethnic-cultural groups is also minimal75.

There are two social care centers, located in the city of Lac. This means that the other part of the territory is uncovered with this service.

Figure 4-107 Distribution of social care centers in the city of Lac

Data source: Social service map 2016, published in the website of State Social Service

Section 4

There are 4 social care services; one private center in Vore and 3 in municipality of Kruje. In Kruje one residential Center for Children was established in 1998. It offers considerable assistance in food and

[75]General Local Plan of Kurbin Municipality

clothing. The "Life in Development" center in Arrameras (Fushe-Kruje) is a multifunctional center that provide social services for 32 people with disabilities. For elderly people there is also the center in Fushe-Kruje which serves as a recreational facility for the elderly people. There is a lack of residential center for lonely and non-support elderly people who live in difficult socio-economic and health conditions, as well as home services. Meanwhile, in cooperation with the Child Support Foundation, steps are taken on the establishment of a center for Roma children in Fushe-Kruja area. The residential center in municipality of Vore offer social care for young people 14-18 years old, 'Hope for the World', in Marikaj.

Section 5B

Along this section are concentrated the highest number of social care centers, as shown in the following figure. There are also 4 Multidisciplinary Centers and other social care centers which provide services for certain categories in need, as following: Multidisciplinary Social Center, Multidisciplinary Social Center Shkozë, Social center "Stay together", Social Center "Joint House", Social Center "House of Colors", Day Center for Children. The capacities of the Social Centers are about 100 beneficiaries for each center. Near each administrative unit there is a social support specialist who ensures the involvement of: Treatment with economic aid; Disability allowance; Daily public services.

The following figure present the distribution of public and private social care institutions in Tirane.

Figure 4-108 Distribution of social care centers in the municipality of Tirane

Data source: Social service map 2016, published in the website of State Social Service

Section 5 C

There is not any social center for supporting vulnerable groups along section 5C.

Section 6+7

There are 4 public institutions that provide social services for vulnerable group in the municipality of Lushnje, crossed by section 6+7 of AIC. All institutions are located in the city of Lushnje. The distribution of social institutions is presented in the following figure.

Figure 4-109 Distribution of social care centers in the municipality of Lushnje.

Data source; Social service map 2016, published in the website of State Social Service

In Lushnje also operates non-public institutions/organizations that provide social services, from which; 2 institutions for elderly people; 1 institution for female; 9 institutions for children; 3 institutions for families in difficulties; 3 institutions for People with disabilities; 1 institution for youth with social problems

Section 8

There are 11 social care institutions in the municipality of Fier. Rural areas are not covered with social care service and the population have to travel to the city of Fier to provide this service. The figure below shows the distribution of social services in the municipality of Fier.

Figure 4-110 Distribution of social care centers in the municipality of Fier

The main burden for social service hold the NGOs, while service categories are limited and not necessarily influenced by the needs of the community they serve, but by the donor agendas that are their main supporters.

Section 9A2

There isn't any social care service along this section. The population located close to the road section have to trave in the city of Fier to provide service.

Section 9B2

There are only 3 centres of social care services, located in the municipality of Mallakaster. Social care service is provided by Non-Governmental Organization (NGOs), while the categories of services are limited

and influenced not necessarily by the needs of community to which it is served. In Memaliaj, there are no public institutions that provide social care for the resident of the municipality. The population of Memaliaj provide social service in the nearest urban center, in Tepelene or Gjirokaster.

The figure below shows the distribution of social services in the municipality of Mallakaster.

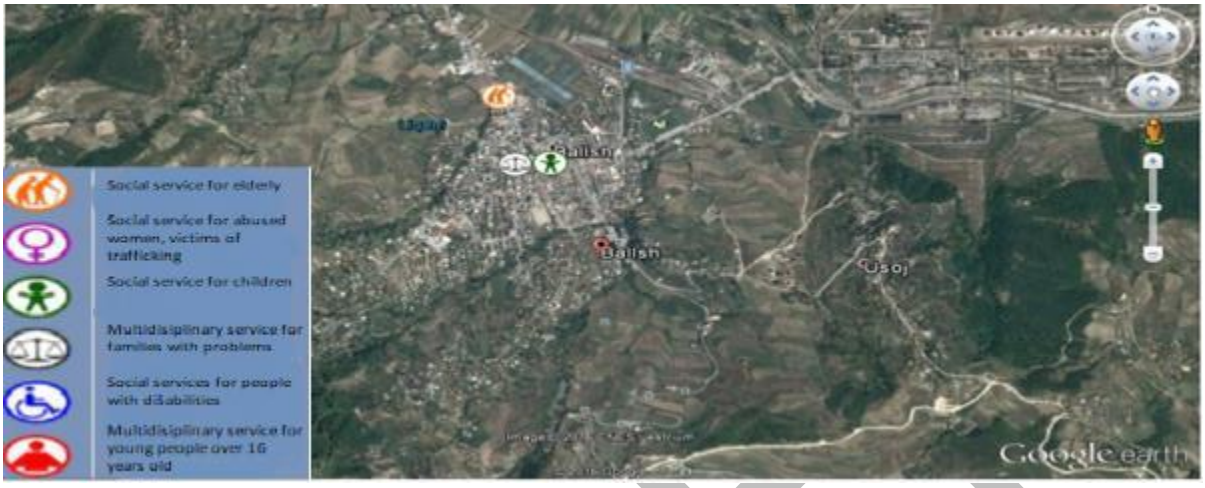

Figure 4-111 Distribution of social care centers in the municipality of Mallakaster

Data source: Social service map 2016, published in the website of State Social Service

In the municipality of Memaliaj, the number of poor people is 1297, while the average consumption per capita is 9,095 ALL[76].

Section 10

Along this section, which crosses the municipality of Tepelene there is one daily center for people with disabilities and 1 multidisciplinary center for families with problems.

Section 11 & Section 12

Along the two sections, wich crosses the territory of Gjirokaster municipality, there are 4 social service centers for vulnerable groups, and 5 non-public institution located in the city of Gjirokaster, as shown in the figure below.

[76] http://documents.worldbank.org/curated/en/510751480409557798/text/110582-REVISED-PUBLIC-report-ALB-complete.txt

Figure 4-112 Distribution of social care centers in the municipality of Gjirokaster

Data source: Social service map 2016, published in the website of State Social Service

Rural areas remain unprotected by these services and residents have to travel to the nearest urban center to receive them. From the regional point of view, Gjirokastra region has the highest percentage of persons with disabilities, with 8.0%. This indicator is influenced by the close relationship between disability and large population over the age of 65. Despite that, in Gjirokaster there is a lack of social institutions for elderly and person with disabilities.

Section 13 A

In Dropull, elderly people remain as the most important within the category of vulnerable group, as they account for 33.8% of the total population. This group of people is often the only one facing different difficulties. There is a lack of social care centers.

As shown in the following table, there are 3487 people in the project are that benefit from social services offered in residential or day care centers during the year 2016. The main categories that benefit from social services are children, followed by person with disabilities. Most of the social services beneficiaries are concentrated in the municipality of Shkoder (Section 1) and Tirane (Section 5B), where there is also concentrated the largest number of social centers.

Table 4-139 Number of beneficiaries of Social Care Services by sections of AIC

Municipality	Number of Beneficiaries from social care services year 2016					
	Other community service	Social service for abused women and victims of trafficking	Social service for children	Social service for people for disabilities	Social service for elderly people	Total
Section 1	502	1	420	315	123	1361
Section 2	0	0	261	43	45	349
Section 3	0	0	29	2	17	48
Section 4	0	0	51	26	165	242
Section 5B	98	105	521	233	212	1,169
Section 5C	0	0	0	0	0	0
Section 6+7	0	0	0	0	0	0
Section 8	0	0	0	152	0	152
Section 9A2	0	0	0	0	0	0

Section 9B2	0	0	0	0	0	0
Section 10	0	0	0	35	0	35
Section 11	7	0	2	13	5	27
Section 12	38	0	6	21	39	104
Section 13A	0	0	0	0	0	0
Total	**645**	**106**	**1290**	**840**	**606**	**3487**

Data source: State Social Service, Distribution of Social Services in the Republic of Albania, year 2016

Regarding the monetary beneficiaries from public social services, in the wider area of the project there are 10.650 families which benefit from economic assistance. From this number, 629 household are with Roma composition and 1099 are families with female household. The total number of beneficiaries of disabled payments is 54.509 persons, out of which 27.336 person are people with disabilities and 27.173 person are beneficiaries considered as working invalids. The highest number of beneficiaries form social assistance are concentrated in Tirane (Section 5B) and Shkoder (Section 1) municipalities, due to the fact that these two municipalities have also higher number of the population.

The distribution of monetary beneficiaries in the project area, by sections of AIC and municipalities crossed by each section is presented in the following table.

Table 4-140 Number of households benefiting from economic aid for the period March-April 2018

AIC Sections	Municipality	Economic assistance beneficiaries				Disabled beneficiaries	
		Total Number of households benefiting economic assistance	Number of Household with roma composition	Number of Families with female head of household composition	Funds used (ALL) for economic assistance	Number of beneficiaries, 'People with disabilities'	Number of beneficiaries 'Working invalids'
Section 1	Shkoder Vau I Dejes Partially Lezhe	2,819	23	73	34,852,057	6,241	3,949
Section 2	Partially Lezhe	472	34	42	462,183	827	1,332
Section 3	Kurbin, Thumane (Kruje)	655	5	40	7,479,517	1,740	3,496
Section 4	Kruje, Vore	549	22	85	5,997,072	2,100	1,761
Section 5B	Tirane Lekaj (Rrogozhine)	2,751	318	494	29,095,420	10,706	12,716
Section 5C	Rrogozhine Dushk (Lushnje)	228	20	29	2,555,360	412	322
Section 6+7	Lushnje	308	7	32	3,134,160	1,036	1,158
Section 8	Fier	359	33	49	4,731,072	Data not available	Data not available
Section 9A2	Partially Fier	112	15	62	115,468	Data not available	Data not available
Section 9B2	Mallakaster Memaliaj	868	11	40	9,205,820	1,669	830
Section 10	Tepelene	116	0	9	1,309,220	771	N/A

Section 11	Partially Gjirokaster	17	13	4	178,891	152	343
Section 12	Partially Gjirokaster	23	13	8	242,029	444	438
Section 13A	Dropull	31	0	20	215,020	178	167
Total			9,308	514	987	99,573,289	26,276

Data source; State Social Service, Statistics on Economic assistance 2018; Decisions of Municipal Councils (for the municipalities affected by the project) on approving the disability payment for the period March-April 2018.

Vulnerable Groups and Social Protection in Affected Settlements

In general, the study area has very poor coverage in terms of social services institutions. Most of these centers are located in urban centers along the alignment, in Lezhe (Section 2 of AIC) and Lushnje (Section 6+7 of AIC), Tepelene (Section 10) and two other centers, one in Arrameras (Section 4 of AIC), a multifunctional center and one in Bushat (Section 1 of AIC) for people with physical/mental problems or poor people.

Social services in the city of Lezhe (Section 2) offer the service also for rural settlements along section 2. In these center is offered social service for children, elderly people, disabled persons, abused women and girls (in one center). 23 social care centers pubic and private operate in Lushnje city and 2 centers in Tepelene.

The following table give a summary of beneficiaries of social care services in the project area, based on main vulnerable groups that benefit from the system. More detailed information, per each settlement affected based on consultations with economic aid specialist in each administrative units of the project area is presented in Annex XX Data on vulnerable groups in settlements affected.

Table 4-141 Number of households benefiting from economic aid for the period January-February 2020 and other categories of vulnerable groups

AIC Sections	Settlement	Person with disabilities (including paraplegic and tetraplegia)	Working invalids	Household who receive economic assistance	Female head of household who receive economic assistance	Roma and Egyptian household who receive economic assistance
Section 1	Shtuf, Muriqan, Obot, Oblike, Berdice e Madhe,Mali Hebaj, Beltoje, Ashte, Kosmac, Meglush, Bushat, Plezhe, Shkjeze, Mabe, Dajc, Gjader, Piraj, Blinisht, Rraboshte Merqi, Balldren, Balldren I Ri	625	579	246	43	0
Section 2	Lezha city, Ishull Shengjin, Ishull Lezhe Rrile, Shenkoll, Gajush	958	1134	204	17	52
Section 3	Fushe Milot, Prozhme, Shullaz, Fushe Mamuras, Bushnesh, Koder-Thumane, Fushe-Thumane	298	169	143	21	2
Section 4	Derven, Bilaj, Larushk 2, Arrameras, Hasan, Rinas, Breg Shkoze, Ndermjetes, Berxulle, Mukaj	237	180	106	24	3
Section 5B	Kashar, Mazrek, Kus, Allgjate, Lalm Menik, Peze Helmes, Peze e Vogel, Maknor, Peze e Madhe, Mushnik, Zambish, German, Lekaj	172	156	111	19	0

AIC Sections	Settlement	Person with disabilities (including paraplegic and tetraplegia)	Working invalids	Household who receive economic assistance	Female head of household who receive economic assistance	Roma and Egyptian household who receive economic assistance
Section 5C	Gose e Madhe (Kercukaj), Gose e vogel, Zhame Sektor, Zham Fshat, Gramsh, Konjat, Dushk I madh	30	132	61	15	30
Section 6+7	Golem I madh, Lushnja city, Saver, Krujtje e Poshtme, Bishqethem, Lumth, Gorre, Rrapez Fshat, Rrapez Sektor, Ardenice,, Kolonje, Pirre, Vajkan	324	362	194	29	7
Section 9A2	Levan Frakull e Madhe, Kafaraj, Ade, Sheq Musalala, Kashisht, Varibop, Floq, Buzemadh, Gjonc	476	217	90	13	31
Section 9B2	Dames, Behaj, Malas, Zhulaj, Lulezim, Toc, Qesarat, Iliras, Memaliaj Fshat, Memaliaj	260	250	245	8	11
Section 10	Tepelene city	71	49	72	4	-
Section 11	Humelice, Cepun, Mashkullore	57	35	5	1	0
Section 12	Rshi Lengo, Kordhoce	38	18	9	2	-
Section 13A	Dervican, Goranxi, Vanister, Haskove, Sofratike, Terihat, Gorice, Frashtan, Lugar, Grapsh, Jorgucat, Kakavie	93	100	7	0	0

The percentage of group age over 65 years[77] exceeds the nationl profile especially in settlements that lies in the southern part of the AIC route. Taking into consideration high percentage of elderly (over 64 years old) and also person with disabilities in some of the settlements along the study area negative (temporary) impacts associated with risk on health and safety due to inability to easily and fast access health, emergency and other service are anticipated to take place during the construction phase.As result of high number of households receiving economic assistance along some sections of AIC the number of unemployed job seekers (young people, job-seekers and Roma/Egyptian community) may be higher. In this regard to, during the stage of preparation of ESIA the social survey should gather data on identification and qualification of unemployed job seekers and their willingness to be trained and/or engaged as a labour force during the construction.

Although not specified in the law 'On promoting employment', survival farmers may be one of the vulnerable groups that will be most affected, considering the big portion of AIC corridor lays over agricultural land and this land need to be expropriated. In this regard to, further investigation should be taken during Detailed Design and ESIA.

4.3.12 Cultural heritage

Albania is home to a number of landmarks with valuable cultural and historical importance. Several of these have been recognized by UNESCO as World Heritage Sites because of their uniqueness and importance to the collective interests of humanity. Albania is an attractive tourist destination, not only due to its varied landscapes, but also thanks to its rich cultural and historical treasures. An assortment of Byzantine and post-Byzantine churches, mosques, monasteries with valuable frescoes and icons, old Ottoman-style bridges and other monuments are found around the territory.

Albanians inherited a rich and diverse culture with Illyrian, Roman, Byzantine and Ottoman elements.

[77] Information on the number of vulnerable group corresponding to group age under 15 years and over 65 years are shown in the sub-chapter 'Demorgaphic data in affected settlements

The first excavations on the interest of the archaeological values of Albania began in 1924, in Apolloni, which continued until 1938.The earliest traces were discovered in Xare (Sarande) and Gajtan (Shkoder), which belong to the Paleolithic era (about 100,000 years ago). The later Paleolithic period (30,000-10,000) years, belong to a larger number of settlements (Xare, Konispol, St. Mary, Kryegjate, Shterde Dajti, Gajtan etc.) covering the entire territory of today's Albania.

Protection and preservation of cultural heritage is ensured by the coordination of work between the State Central Authorities and Local Self-government Units. The responsible ministry for cultural heritage carries the functions for conservation, protection, assessment and management of cultural assets in accordance with the provisions of the law 'On Cultural Heritage and Museum'[78]. Local self-government units cooperate with the responsible ministry for cultural activities to carries out the functions of preservation and protection of cultural assets.

Other Specialized institutions in the field of cultural heritage are:

- National Institute of Cultural Heritage;
- National Institute for the Registration of Cultural Heritage;
- Regional Directorates of Cultural Heritage;
- The National Center for Traditional Activities;
- Institutions of National Archive Network;
- The National Library of Albania;
- Institute of Cultural Anthropology and Study of Art;
- Institute of Archaeology.

Cultural heritage in affected municipalities, by sections of AIC.

Cultural heritage sites considered in the PESIA baseline include:

• Archaeological sites, which includes ancient graves and ancient settlements;

• Monuments with historical or architectural significance such as historic churches, bridges, war memorials, etc;

• Sites with Intangible Cultural Heritage (ICH) value,

Information on cultural and archaeological heritage is provided from desk research on the database of the Institute of Cultural Monuments, Ministry of Culture in Albania, consultation with stakeholders at each municipalities included in the study area, as well as sources and suggestions from meetings with representatives of the Institute of Cultural Monuments.

The area of the project is very rich in cultural, historical and archaeological monuments. This is testified by the large number of monuments distributed in the territory. There are 337 monuments of Category I [79]and 689 monuments of Category II[80]. In the following table is shown the number of cultural monuments in 16 municipalities affected by the project, by their status of protection and sub-category.

[78] Law No. 27/2018

[79]By the law 27/2018 on Cultural Heritage and Museum, Cultural Monument of Category I is considered 'any construction with distinguished values and of special importance for the cultural heritage, which is preserved in its entirety architectonic and technique components. The composition of volumes, architectural treatment of exterior and interior view, as well as the planimetric and functional solution of these monuments can not be changed.

[80]By the law 27/2018, Cultural monument of Category II is considered 'the construction with significant values mainly for its external view, which is preservedfor these external view in its volumes and architectural composition.

Table 4-142 Number of Cultural Monuments in 16 municipalities

AIC Sections	Municipality	Status of protection	Sub-category				
			Historical/ Archaeological Monuments	Heritage Monuments	Other Cultural monuments	Cult object	Heritage/ Architectural Monuments
Section 1	Shkoder	119 Monuments of Category I 8 Monument of Category II	11	2	1	3	110
	Vau I Dejes	11 Monuments of Category I 1 Monument of II Category	8	1	1	1	1
	Partially Lezhe	3 Monuments of Category I	1				2
Seksioni 2	Partially Lezhe	13 Monuments of Category I	3	1		5	4
Seksioni 3	Kurbin	7 Monuments of I Category	3	1	2	1	1
Seksioni 4	Kruje	27 Monuments of Category II	8	6	1	3	8
	Vore	2 Monuments of Category I	1		1		
Seksioni 5B	Tirane	43 Monuments of Category I 232 Monuments of Category II	12	105	3	8	147
Seksioni 5C	Rrogozhine	2 Monuments of Category I	2				
Seksioni 6+7	Lushnje	9 Monuments of Category I		2	1	5	1
Seksioni 8	Fier	13 Monuments of Category I	4	1	2	6	2
Seksioni 9A2	Fier	6 Monuments of Category I	1				3
Seksioni 9B2	Mallakaster	9 Monuments of Category I	5			1	3
	Memaliaj	3 Monuments of Category I	2			1	
Seksioni 10	Tepelene	16 Monuments of Category I 4 Monuments of Category II	10	2	2	4	2
Seksioni 11	Partially Gjirokaster	24 Monuments of Category I	2	2	4	4	12
Seksioni 12	Gjirokaster	10 Monuments of Category I 417 Monuments of Category II	5	2	3	4	425
Seksioni 13A	Dropull	39 Monuments of Category I	6	4	4	20	5

Data Source: Cultural monuments database 2017; Regional Directorates of National Culture

The earliest traces of human activity in the Municipality of Shkoder (Section 1 of AIC) can be traced back to the Bronze Age. Here are found traces of the middle Paleolithic. Artifacts and inscriptions discovered in Rozafa Castle are assumed to be the earliest examples of symbolic behavior of humans in the city. The city of Shkoder is also declared as historic center. The most important archaeological sites are; Kalaja e Beltojes (The Castle of Beltoje) which dates from Century XII-X B.C. The archeological site is located 1420 m from Section 1 of the AIC Corridor; Kalaja e Shkodres (The Castle of Shkoder) a typical medieval castle, etc.

The municipality of Vau I Dejes is inhabited since The Middle Age, due to the favorable geographic position around the artificial lake of Vau i Dejes and the location between the old roads connecting the West with the east made it possible for the territory to be inhabited since the Medieval Ages. The history of Vau i Dejes dates back with the creation of the old town of Deja, founded around 1127. Archaeological excavations in Koman were held in 1898 and have continued until today. Here are found cemeteries of the early Middle Ages (century. VI-VIII). The medieval town of Sarda, today the fortress of Shurdhah is located is one of the most important archaeological and historical heritage sites. Here is also the ancient settlement of Gajtan (Cave of Gajtanit), the Gajtan town, the fortress of Deja and the castle of Dalmace.

The first organized settlement in the territory of Lezhe municipality was the Illyrian city named LISS (current Lezha) created by the end of the IV Century B.C. The first inhabitants of the region were Pirusts and Abrejt (lirian autochthones tribes) famous as navigators and masters in metal works. The memorial of Skanderbeg has now become a pilgrimage center visited every year by many tourists, both domestic and foreign. Nimfeus, current Shengjini, has been created approximately at the same time as Lissus was. The most important archaeological sites are; Muret e Qyetit Antik Lis (The Walls of Ancient Civilization of Liss), located 2.09 km from the road track, Germadhat E Malit Te Shelbuem, Akrolis (The Ruins of the mountain of Shelbuem, Akrolis), located more than 5 km away, etc.

The territory of the municipality of Kurbin is mentioned as a province since the 15th century. During the middle Age, Kurbin has been an important communication link for Central and Northern region, known as Arberia and beyond the Adriatic Sea.

The territory of Kruje municipality is rich with historic and cultural monuments. Archaeological excavations in Kruje Castle testify for establishment of Illyrian settlement since the 3rd century BC. The settlement of Zgerdhesh is thought to have been founded in the 7th and 6th century BC. Near the city of Fushe Kruje is also thought to be found the ruins of the ancient civilization of Pistuli.

Since antiquity, the territory of Vore municipality was passed by the road connecting Durres, Tirane and Diber. The important geographical position of the area is also evidenced with the establishment of the Medieval Castle of Preza, at the beginning of the 15th century. The castle of Preze is the only archeological site in the territory. It belonged to the feudal family Topias.

Archaeological remains discovered in Tirane municipality such as: Petrela Castle, archaeological finds of Dajt, Basilica etc., testify that it has been inhabited by small settlements since antiquity. The development of Tirane as an urban center began in the XVII century. Some of the main archaeological discoveries are: The Cave of Pellumbas, Roman Basilika of the 2th an 3th century, Castles around Tirane (Dajti, Peza etc) of the 5th and 4th century, etc. The Caste of Lalm is an archaeological site which belongs to the Byzantine period. A tomb epitaph that was devoted to a free slave testifies that the hill has been inhabited since the first centuries AD. The castle is located 1200 meter from the road trajectory.

The territory of Rrogozhine municipality (has been inhabited since the 2nd century AD. Meanwhile, the main boulevard of the city of Rrogozhina follows the track of Egnatia Street. 'The Castle of Bashtove' is a medieval castle of the XV century, with archaeological value. Bashtove Castle is known as the only castle in Balkan built on a flat terrain. In the territory are also discovered monumental tombs dating back from the 4th and 5th centuries.

The earliest artifact discovered in the territory of Lushnje municipality dates back to the Neolithic period. The city of Lushnje is thought to be inhabited since the 15th century and was known as Lusme. As an important historical site, it is mentioning the center of Karbunare. Another important center has been the Ardenica Monastery, which has served as an important religious center.

Fier municipality is located in the junction of antic and modern road. The foundation of the city of Fier is related with the fall of Voskopoje urban center. Archaeological Park of Apolloni is one of the most important archaeological sites of the municipality and of Albania. The establishment of this ancient urban center is thought to be around 558 BC. After the Roman-Macedonian Battles, the ancient city was conquered by the

Romans. The first research in Apolloni was made during the First World War by Austrian archaeologists around the year 1918. Systematic discoveries began in 1924 by the French Archaeological Mission. Other prehistoric settlements in the territory of Fier are Nemfeumis, Kolkondas, Cakran, Margellic, Portėz, Petove etc. In 2014, during the construction phases of Fier bypass was discovered an ancient tomb in the village of Havaleas, which belong to the 3th and 4th century81.

The territory of Mallakaster municipality dates back since 280 BC. The main archaeological sites in the territory are; The ruins of Klos (Nikaia)was founded as a settlement about the 8th-7th centuries BC during the archaic period. This city is surrounded by a wall 1850m long, covering an area of about 18 ha. Life in Nikaia ended in 167 BC. Archaeological site is located 1533 m away from the road trajectory. The Illyrian Civilization of Bylis (Archaeological park of Bylis) is one of the largest Illyrian cities developed in the 4th century BC as the capital of the Illyrian tribe of Bylines. It had a surface of 30 ha. This archaeological site is located 1620 m away from road track.

The earliest traces of the territory of Memaliaj municipality date back to the IV century BC with the fortress of Kalivac, situated in the southern part of Kalivac settlement. The ancient settlement of Qesarat is another important archaeological site that dates back since in the II century B.C. The city of Memaliaj created in 1947-48, after tracing and geological exploration and the operation of the coal mining.

In ancient times, the territory of Tepelene municipality was part of the region of Chaonia. The town of Tepelene is an early settlement related with the construction of the castle of Tepelene in IV-VI century at the most strategic point of the intersection of Vjosa, Kelcyre, Drinos and Mallakaster roads. The territory has a rich cultural heritage.

The earliest settlement in Gjirokaster territory is the medieval fortress. The beginnings of the city of Gjirokaster are thought to be in the 13th century, after the fall of Hadrianopoli and the city was known as 'Argyrokastron'. The territory of the municipality is rich in cultural, historical value of regional and national significance. The historical and cultural heritage of the site is widely known around the world. The old town of Gjirokaster was declared a "city-museum" in 1968 in order to protect its cultural heritage and special architecture, and in 2005 it was included in the list of "World Heritage Sites" (UNESCO). The most important archaeological site is; The ancient city of Antigonea (Archaeological Park), founded at the beginning of the 3rd century BC; The fortress of Paleokaster, the most important monumental ruins belong to a fortification that dates back to Roman period, about the 4th century AC. The castle is located 912 meter away from the road track.

The territory of Dropull municipality has been inhabited since antiquity by the tribe of Chaonians. The most important archaeological sites are those of Derviçan, Jorgucat, Goranxi and Sofatrike. The most important archaeological sites are;

- Rrenojat e teatrit antik 'The ruins of the ancient theatre'
- Varri Monumental dhe Ujembledhesi ne Jorgucat 'Monumental tomb and the catchment in Jorgucat'
- Varrezat antike ne Sofratike 'Ancient cemetery in the village Sofratike'

The Minister Order no. 297, date 31.07,2015 'on Proclamation of Buffer Zone of Cultural Monuments 'condition the development of construction initiatives at distances more than 100 from cultural monuments, considering this distance as buffer zone of the monument, in cases when buffer zone is not defined.

[81]http://top-channel.tv/2014/10/04/zbulim-arkeologjik-ne-fier/

Cultural heritage baseline of the project area of interest (in settlement level) includes a description of cultural heritage sites in a 1.5 km wide corridor (750 m both sides of the road corridor). This study area has been selected as an important unit to address the potential impacts on cultural heritage sites and mitigation measures. The description of cultural heritage sites is presented per each section of AIC (from Section 1 to Section 13A) on the table below.

According to desktop analysis and information provided from consultation with representatives of Institute of Cultural Monuments there are identified 21 cultural monuments in the vicinity of the road corridor (considering 750 meters, each side of the road).

No monuments are located in the project focus area of 100 meters each side of the road while the closest distance that the corridor approaches to a monument is 141 m, on the section 13A to the monument named "Pusi Karakteristik (The characteristic well)", followed by the distance of 144m, within the same section 13A, for the monument "Ura prane rruges kombetare (The bridge close to national road)".

It is possible that archaeological and cultural assets can be encountered along the corridor during the construction phase, especially in the southern part of the corridor, starting from section 9B2 in Qesarat to Section 13 in Dropull, as this area contain heritage sites not yet revealed/registered. This conclusion is derived not only from literature but also from field consultations with stakeholders. In this case the project developer considering the legislation in force[82], have to get the approval for the project form National Council of Material Cultural Heritage and to follow procedures for "chance finds" according to the requirements of the law.

Some photo logs (including graphic and cartocraphic view) of the Cultural Monuments along the AIC Corridor taken during field visits and shared by ICM and also photos of approval documentation of Protected Area for two Monuments (as provided from Institute of Cultural Monuments) are presented in the ANEXX XX. Photo of Cultural Monuments located in close to AIC Coridor and photo of the Protected Areas approval documentation.

[82] Law on Cultural Heritage and Museum

Table 4-143 Cultural heritage sites in the project area

Monument name	Date	Category	Type of Monument	Genre	Location	Municipality	Near Distance (meter)	Section	Latitude	Longitude
Rrenojat e Urres te Plakagjonit (Ruins of the bridge in of Plakagjon in Rraboshte)	Century. XII	I	Architecture	Engineering object	Rraboshte	Lezhe	355	1	41.837222°	19.646903°
Ura e Shkines (Shkine bridge)	Year 1292	I	Architecture	Engineering object	Piraj	Lezhe	422	1	41.859425°	19.635875°
Kisha e Shen e Premtes (Church of Saint Friday and buffer zone)	Century. XIV	I	Architecture	Cult object	Balldren i Ri	Lezhe	368	1	41.818286°	19.640304°
Banesa Shtetrore Ish Ndue Zefi (State residential structure (Ex Ndue Zefi)	Century. XX Year.1920	I	Architecture	Residential building	Ishull Shengjin	Lezhe	246	2	41.768611°	19.628997°
Banesa rezidenciale e Ndue Frokut (Residential building of Ndue Frroku)	Century. XX /1920	I	Architecture	Residential building	Ishull Shengjin	Lezhe	315	2	41.757375°	19.635467°
Kisha e Gjon Pagezorit (The Church of John the Baptist and protected area)	Century. XIV-XV	I	Archaeology	Cult object	Derven	Kruje	301	4	41.518167°	19.680889°
Vendbanimi antic ne Qesarat (Ancient settlement in Qesarat)	Century. II	I	Archaeology	Ancient Settlement	Qesarat	Memaliaj	253	9B2	40.391840°	19.880918°
Ura Metalike e Leklit dhe zona e mbrojtur (Metalic bridge in Lekel and protected area)	Century. XX	II	Architecture	Engineering work	Lekel	Tepelene	238	10	40.259172°	20.055628°
Rrenojat e Ures Antiko-Mesjetare ne lumen Vjosa (Anctic-medieval bridge ruins in Vjosa river)	Century. I reconstructed during cen. XVIII	I	Architecture	Bridge	Bemisht	Tepelene	391	10	40.297711°	20.024297°
Kalaja e Tepelenes dhe zona e mbrojtur (The fortress in Tepelene and protected area)	Century.15	I	Architecture	Fortress	Tepelene	Tepelene	601	10	40.298670°	20.021472°
Ura e Subashit mbi lumin Drino(Subashi Bridge over the river Drinos)	Year 1830	I	Architecture	Bridge	Road Gjirokaster -Tepelene	Gjirokaster	205	10	40.209201°	20.090857°
Ura e Kollorces (The bridge in Kollorce)	-	I	Architecture	Bridge	Lazarat	Gjirokaster	377	12	40.060181°	20.172875°
Rrenojat e Teatrit Antik (The antique theater ruins)	Roman Period	I	Architecture	Theater	Sofratike	Dropull	589	13A	39.996278°	20.224769°

Monument name	Date	Category	Type of Monument	Genre	Location	Municipality	Near Distance (meter)	Section	Latitude	Longitude
				Social building						
Varri Monumental dhe Ujesjellesi (Monumental Tombs and the water supply in Jorgucat, and its protected Area)	Roman Period	I	Architecture	Cult object (basilica)	Jorgucat	Dropull	148	13A	39.943551°	20.264303°
Ura ne fshatin Haskove (Bridge in the village Haskove)	-	I	Architecture	Bridge	Haskove	Dropull	155	13A	40.008398°	20.203875°
Ura prane rruges kombetare (The bridge close to national road)	1897	I	Architecture	Bridge	Grapsh	Dropull	144	13A	39.949003°	20.258417°
Pusi Karakteristik (The characteristic well)	-	I	Architecture	Hydraulic works	Sofratike	Dropull	141	13A	39.994947°	20.216365°
Kisha e Shen Merise (Church of Saint Mary)	Century XVII	I	Architecture	Cult Object	Dervician	Dropull	440	13 A	40.033596°	20.175532°
Kulla e Vango Dules (The tower of Vango Dule)	Before 1900	I	Architecture	Tower	Goranxi	Dropull	397	13A	40.00551°	20.11306°
Rrenojat e bazilikes Paleokristiane (The Ruins of the Paleochristian Basilica)	Before 1900	I	Archaeology	Cult Object	Gorice	Dropull	199	13A	39.974964°	20.234264°
Varrezat Antike ne Sofratike (Ancient Cemetry in Sofratike)	Roman Period, century I-IV	I	Archaeology	Cemetery	Sofratike	Dropull	162	13A	39.993452°	20.216434°

5. Evaluation of Alternatives

5.1 Introduction

Based on all collected data/information, site visits, initial findings, the study team's experience, as well as feedback received during the early meetings with the Beneficiary (MIE) and other key stakeholders, the entire AIC in Albania has been divided into thirteen road sections. For each one of these sections, a similar approach has been followed, looking at the different characteristics of the area, the existing road network, the maturity status of each section, as well as the environmental and social constraints. An overview of the proposed alternatives per section is presented in the Table and Figure below.

Table 5-1 Proposed AIC alternatives in Albania, respective lengths and design standards

Sec.	Alt.	From	To	Length	Motorway/ express road	Proposed design category (ARDM, 2015[83])	Type of proposed intervention
1		Murriqan	Lezhe (Balldren)	38.832	Motorway	Category A	New alignment + Doubling of existing hwy.
2		Lezhe (Balldren)	Milot	16.407	Motorway	Category A	New alignment + doubling of exist 1x2 lanes hwy.
3		Milot	Thumane	13.117	Motorway	Category A	Improvement of exist. 2x2-lane hwy.
4		Thumane	Kashar	21.048	Motorway	Category A	New alignment
5	A	Kashar	Konjat	47.465	Motorway	Category A	New alignment
	B	Kashar	Lekaj	33.814	Motorway	Category A	New alignment
	C	Lekaj	Konjat	14.168	Motorway	Category A	Widening/improvement of exist. 2x2-lane hwy.
6		Konjat	Lushnje	10.372	Motorway	Category A	Widening/improvement of exist. 2x2-lane hwy.
7		Lushnje	Fier	17.689	Motorway	Category A	Widening/improvement of exist. 2x2-lane hwy.
8		Fier Bypass	Fier Bypass	22.185	Express Road (Primary Rural Road)	Category B	New alignment
9a	A	Levan	Pocem	26.620	Motorway	Category A	Doubling of existing 1x2 lanes hwy.
	B	Levan	Pocem	26.670	Express Road (Primary Rural Road)	Category B	Doubling of exist 1x2 lanes hwy.
9b	A	Pocem	Memaliaj	36.031	Motorway	Category A	New alignment
	B	Pocem	Memaliaj	37.597	Express Road (Primary Rural Road)	Category B	New alignment + Doubling of existing 1x2 lanes hwy.
10		Memaliaj	Subashi Bridge	20.063	Motorway	Category A	New alignment
11		Subashi Bridge	Gj/By-pass	10.261	Motorway	Category A	Doubling of existing 1x2 lanes hwy
12		Gjirokaster Bypass	Gjirokaster Bypass	9.700	Motorway	Category A	New alignment
13	A	Gj/By-pass	Kakavije	23.617	Motorway	Category A	Doubling of existing 1x2 lanes hwy.
	B	Gj/By-pass	Kakavije	22.633	Motorway	Category A	New alignment

[83] Albanian Road Design Manuals (ARDM, 2015)

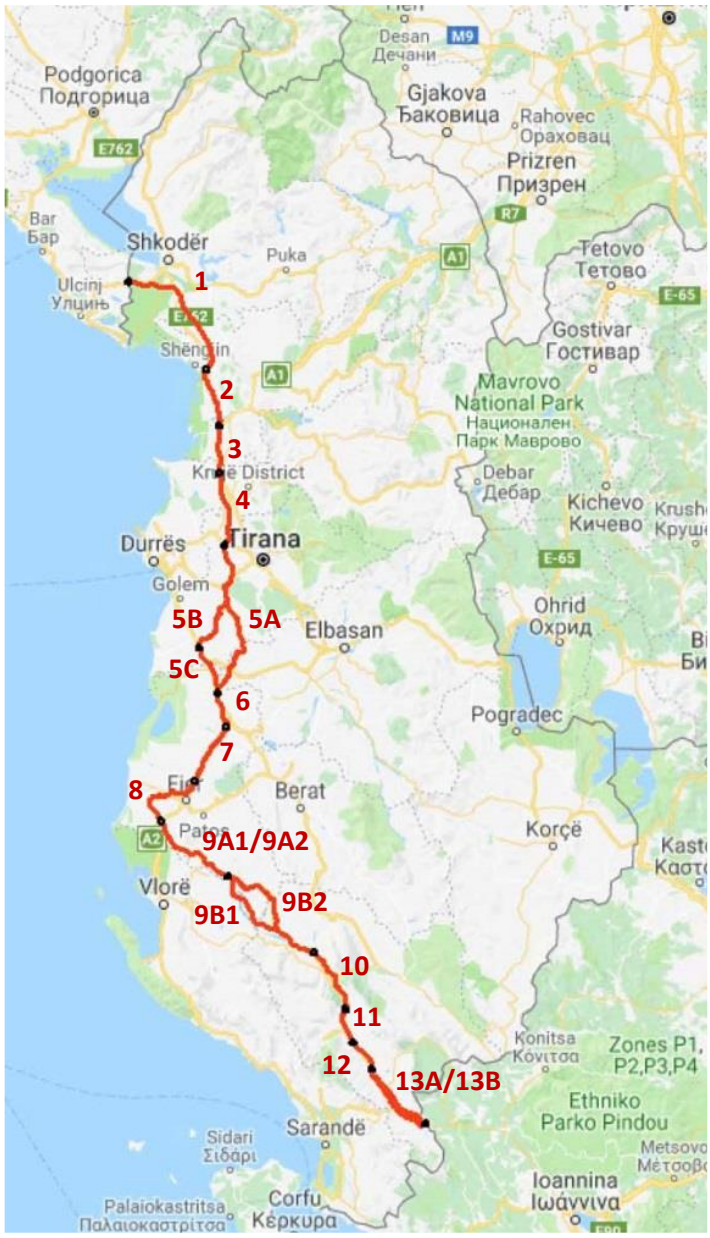

Figure 5-1 AIC alternatives through Albania

The alternative route options for Albania can be broadly categorised into the following main groups:

- Complete new AIC sections;
- Doubling of existing single carriageway highways;
- Widening and/or improvement of existing double carriageway highways;
- Combinations of above.

The study team has identified different alternative route options for about 45% of the corridor length in Albania, namely for sections 5, 9A, 9B and 13, which have been assessed by the Consultant during Phase 4 of this assignment (Assessment of AIC alternatives and selection of preferred route).

By taking into consideration the feedback received from the beneficiary and other stakeholders in Albania during the above Workshop, the study team has considered the use of lower design standard, i.e. interurban primary road, category B ('express road'), according to the Albanian road design standards (ARDM 2015, Vol.2), for the three (3) following AIC sections:

a) Section 8 (Fier bypass; L=22.185 km) – This section is under construction (ca. 22.2 km) and, therefore, it cannot be changed; it is consequently not considered in the design and analysis of this study;

b) Section 9B (Pocem-Memaliaj) – Taking into consideration the low level of traffic and high construction costs for a motorway standard category A, another alternative option for a lower design standard - interurban primary road, category B ('express road') – has been also developed. As a result, these two alternatives were analysed for this section (alternative 9B-1 as motorway, category A and alternative 9B-2 as interurban primary road, category B);

c) Section 9A (Levan-Pocem) – Since this section lies in between the above two sections, the re-designing of it for a lower design category B ('express road') will:

- firstly, unify the cross-section of the three sections; and,
- secondly, result in a lower construction cost estimate as compared to design for a Category A motorway.

5.2 Methodology of alternatives assessment

Alternatives assessment has been based on Multi Criteria Decision Analysis (MCDA) methodology evaluating the performance of each alternative against a set of criteria.

The following Table includes the summary of the environmental and social criteria and the scoring method for each option.

The scores allotted to each option will be on a relative preference scale, which is easier to understand and more objective; the better the performance, the highest the score. Regarding the quantitative assessment, Grade 1 always refers to the lower score. The overall score for each option is the weighted average of its scores on all the criteria (multiplication of the score on each criterion by the weight of that criterion and addition of those weighted scores).

Table 5-2 Appraisal matrix: MCA Criteria and option assessment

Criteria category	No.	Criteria	Assessment
Environmental and Social criteria	1	Air and Noise pollution	Grade 1: Very high (relative) increase Grade 2: High (relative) increase Grade 3: Low (relative) increase Grade 4: Very low (relative) increase
	2	Water pollution	Grade 1: Very high (relative) increase Grade 2: High (relative) increase Grade 3: Low (relative) increase Grade 4: Very low (relative) increase
	3	Biodiversity, protected areas and landscape	Grade 1: Very close to protected and sensitive areas Grade 2: Close to protected and sensitive areas Grade 3: Far from protected and sensitive areas Grade 4: Very far from protected and sensitive areas
	4	Soils	Grade 1: Highly unstable and high erosion level Grade 2: Unstable and high erosion level Grade 3: Stable and low erosion level Grade 4: Highly stable and very low erosion level
	5	Agricultural land acquisition	Km2 of land / road km
	6	Demolition of buildings	Nr of buildings to be demolished / road km
	7	Separation of settlements	Number of settlements that will be separated
	8	Archaeological and cultural heritage	Number of archaeological and cultural heritage sites, which could be affected

The following table presents the weights for each category of criteria as well as for the specific environmental and social criteria.

Table 5-3 Criteria weights for the MCA of the AIC

A/A	Criteria	Category weights	Criteria weights	Final weights
1	Engineering - Technical Criteria	35,07%		
2	Economic Feasibility criteria	35,07%		
3	Transport and regional integration criteria	18,92%		
4	Environmental and Social Criteria	10,93%		
4.1	Air and Noise pollution		10,64%	1,16%
4.2	Water pollution		14,34%	1,57%
4.3	Biodiversity, protected areas and landscape		17,12%	1,87%
4.4	Soils		7,39%	0,81%
4.5	Agricultural land acquisition		14,51%	1,59%
4.6	Demolition of buildings		20,90%	2,29%
4.7	Separation of settlements		6,34%	0,69%
4.8	Archaeological and cultural heritage		8,76%	0,96%

Regarding criteria categories, economic feasibility and engineering and technical criteria categories are deemed as equally important, transport and regional integration category comes third, while environmental and social criteria come fourth.

Conclusions about the importance of criteria within the categories are summarized as follows:

- Engineering – technical criteria: Technical standards, followed by access controls, major structures and bridges, earthworks and drainage (almost equal) are deemed as the most important criteria.
- Economic feasibility criteria: The more important criterion is the economic indicators, followed by road safety and wider economic impacts.
- Transport and regional integration criteria: The most important criterion would be the capacity meeting traffic demand, second being traffic volumes, while decongestion of the urban environment is the third one, followed by integration with other regional network and completion of SEETO corridor.
- Environmental and social criteria: The most important criterion is the demolition of buildings, followed by biodiversity, protected areas and landscape, agricultural land acquisition, water pollution, air and noise pollution, archaeological and cultural heritage, soils and separation of settlements.

5.3 Findings of the Alternatives Assessment

5.3.3 Environmental assessment

The evaluation of the criteria is based on the overall assessment considering the main natural environmental criteria, air and noise, waters, biodiversity, protected areas and landscape as well as soils.

Table 5-4 Overview of geological, engineering-geological and soil characteristics

Alternatives	Geological and engineering characteristics					Soil cover differences			
	Tectonic Zone	Geological composition	Possibility of occurrence of landslides	Possibility of occurrence of escarpments	Possibility of occurrence of groundwater in tunnels (if any)	From – To	Soil types	Dominant soil types	Soil evaluation sites
1	++++	Alluvial soils - silty clays flysch and limestone	-	-	-	Murriqan-Balldre	Fluvisols, Luvisols, Phaeozems. Leptosol, and Cambisols	The flat part of this section, Fluvisols, Luvisols, Phaeozems. The hilly area, Leptosol, Cambisols and Luvisols	Lowlands of Lower Shkodra, Rrenci mountain, Merxhani marshland, Balldre
2	-	Limestone and silty clays	-	-	+	Balldre-Milot	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and vertisols	Lowlands of and marshlands of Lezha, Lezha Mountain and hills, Milot fields
3	-	Silty clays	-	-	-	Milot - Thumane	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and Vertisols	Alluvial lowlands of and marshlands of Lezha, Lezha Mountain and hills, Milot fields
4	-	silty clays	-	-	-	Thumane-Kashar	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and Vertisols	Alluvial lands of Thumana, Rinas, Preze, Kashar
5A	-	Molasses, Weathering products, Alluviums	++++	+++	-	Bypass Kashar-Konjat	Fluvisols, Luvisols, Phaeozems. Leptosol, and Cambisols	The flat part of this section, Fluvisols, Luvisols, Phaeozems. The hilly area, Leptosol, Cambisols and Luvisols	Kashar, Yzberisht, Peze Helmes, Peze, Konjat
5B+5C	-	Molasses, Weathering products, Alluviums	+++++	+++	-	Bypass Kashar-Lekaj Konjat	Fluvisols, Luvisols, Phaeozems. Leptosol, and Cambisols	The flat part of this section, Fluvisols, Luvisols, Phaeozems. The hilly area, Leptosol, Cambisols and Luvisols	Kashar, Yzberisht, Peze Helmes, Peze, Lekaj

Alternatives	Geological and engineering characteristics					Soil cover differences			
	Tectonic Zone	Geological composition	Possibility of occurrence of landslides	Possibility of occurrence of escarpments	Possibility of occurrence of groundwater in tunnels (if any)	From – To	Soil types	Dominant soil types	Soil evaluation sites
6	-	Alluvial proluvial deposits Silty clay Peaty silty clay layer	-	-	-	Konjat Lushnje	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and Vertisols	Konjat, Dushk, Golem, Lushnje agricultural sites
7	-	Alluvial proluvial deposits	-	-	-	Lushnje-Fier	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and Vertisols	Lushnje agricultural sites, Savra, Pire, Lumth, Krutje e poshtme, Ardenice, Vajkan
8	++	Alluvial proluvial deposits	++	++	-	Fier Bypass	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols and Vertisols	Lushnje agricultural sites, Savra, Pire, Lumth, Krutje e poshtme, Ardenice, Vajkan
9A	+/-	Alluviums, Weathering products (colluviums) Molasses,	+++	+++	-	Levan Pocem	Fluvisoil, Luvisols, Phaeozems and vertisols	Fluvisols, Luvisols and Vertisols	Kafaraj, Ade, Varribob, Floq, Romes
9B1	++	Limestones, Flysch, Premolases ,Molasses, Alluviums, Weathering products (colluviums)	+++++	+++++	+++++	Pocem-Memaliaj	Leptosol, Cambisols and Luvisols	Leptosols, Cambisols and Luvisols	Kraste, Kalivac
9B2	++	Alluviums, Weathering products (colluviums)	+++++	+++++	+++++	Pocem-Memaliaj	Fluvisols, Luvisols, Phaeozems, and Vertisols	Fluvisols, Luvisols Vertisols	Pocem, Dams

Alternatives	Geological and engineering characteristics					Soil cover differences			
	Tectonic Zone	Geological composition	Possibility of occurrence of landslides	Possibility of occurrence of escarpments	Possibility of occurrence of groundwater in tunnels (if any)	From – To	Soil types	Dominant soil types	Soil evaluation sites
		Limestones, Flysch, Premolases, Molasses,							
10	++	Alluvial - proluvial deposits, Premolases,	+++	+++	-	Memaliaj-Subashi Bridge	In lowlands: Fluvisols, Luvisols, Phaeozems, and Vertisols In hills: Leptosol, Cambisols and Luvisols	Lowlands: Fluvisols, Luvisols and Vertisols Hills: Leptosol, Cambisols and Luvisols	Memaliaj village, Dames, Lekel
11	++	Alluvial - proluvial deposits	++	++	-	Subashi Bridge-Gjirokastra bypass	Leptosol, Cambisols and Luvisols	Leptosol, Cambisols and Luvisols	Picare, Humelic, Cepune.
12	-	Alluviums	-	-	-	Gjirokastra bypass	Leptosol, Cambisols and Luvisols	Leptosol and Cambisols	Kordhoc, Arshilengo
13A	-	Alluviums	-	-	-	Kordhose-Kakavije	Leptosol, Luvisol, Cambisol	Cambisol	Kordhose, Dropull i Poshtem, Dropull i Siperm, Kakavije
13B	-	Alluviums	-	-	-	Kordhose-Kakavije	Leptosol, Luvisol, Cambisol	Cambisol	Kordhose, Dropull i Poshtem, Dropull i Siperm, Kakavije

Table 5-5 Overview of the alternatives towards the water parameter

Alternatives	Quality of surface waters	Monitoring points (surface water & water sources)	Flood risks/events	Groundwater
1	Drini Buna River: Good quality class II (Buna River): good quality, Drini of Lezha River class V (Very bad quality)	Bridge of Bahcallek Bridge of Drini Lezha River	Extremely high	Ground waters of Drini Buna aquifer (very good to good quality)
2	Drini of Lezha: Very bad quality, Class V Mati River: Moderate quality, class III	Bridge of Drini Lezha River Bridge of Mati River	Extremely high in Drini Lezha Moderate at Mati River	Ground waters of Drini and Mati aquifer (moderate quality)
3	-	-	-	Ground waters of Drini and Mati aquifer (moderate quality)
4	Ishmi/Erzeni river: Bad quality class V	Bridge of Gjole Beshiri bridge	Moderate floods	Ground waters of Ishmi Erzeni river aquifer (moderate to good quality)
5A	Ishmi/Erzeni river: Bad quality class V	Er2. Beshiri Bridge	Moderate floods	Tirane aquifer Lushnje aquifer
5B+5C	Shkumbini River – Moderate Quality, Class III	Sh3-Paper Sh4-Rrogozhine	Moderate floods	Tirane aquifer Lushnje aquifer
6	-	-	-	Ground waters of Lushnja aquifer
7	-	-	-	Ground waters of Lushnja aquifer
8	Semani River: Bad quality class V	Mbrostari Bridge	Moderate floods	Ground waters of Kafaraj aquifer

Alternatives	Quality of surface waters	Monitoring points (surface water & water sources)	Flood risks/events	Groundwater
9A	Vjosa River goes in the vicinity, but it is not crossed Vjosa River – Good quality, Class II	-	Floods caused by intensive rains	Ground waters of Kafaraj aquifer Pocem water sources Both good quality
9B1	Vjosa River – Good quality, Class II	Mifol Bridge Memaliaj Bridge	N/A	Pocem karstic water source
9B2	Vjosa River – Good quality, Class II	Mifol Bridge Memaliaj Bridge	Occasional floods on the last 10 years	Pocem karstic water source
10	Vjosa River – Good quality, Class II	Memaliaj Bridge Lekli Bridge	-	Free discharge water sources – very good quality in "Uji I Ftohte Tepelene"
11	Drinos River :Supposed Good quality	N.A	-	Vjosa aquifer (very good quality, in Buduk sampling station)
12	Drinos River :Supposed Good quality	N.A	Moderate to high	Vjosa aquifer (very good quality, in Buduk sampling station)
13A	Drinos River :Supposed Good quality	NA	Extensive floods on the last 10 years	Drinos Aquifer
13B	Drinos River :Supposed Good quality	NA	Extensive floods on the last 10 years	Drinos Aquifer

Table 5-6 Land use-vegetation types categories and dominant land use categories - Landscape and visual issues

Alternatives	From – To	Dominant land use categories	
1	Muriqan-Balldre	Complex cultivation patterns, land principally occupied by agriculture (cereals, vegetables, fodder, fruit trees, vineyards), broad leaved forests, coniferous forests, forest vegetation in the form of shrubs, sparsely vegetated area	High to moderate
2	Balldre-Milot	Agriculture with complex cultivation patterns (cereals, vegetables, fodder, fruit trees, and vineyards).	High to moderate
3	Milot-Thumane	Agriculture with complex cultivation patterns (cereals, vegetables, fodder, fruit trees, and vineyards).	Moderate
4	Thumane-Kashar	Agriculture with complex cultivation patterns (cereals, vegetables, fodder, fruit trees, and vineyards).	Moderate

Alternatives	From – To	Dominant land use categories	
5A	Bypass Kashar-Konjat	Complex cultivation patterns, land principally occupied by agriculture (cereals, vegetables, fodder, fruit trees, vineyards), broad leaved forests, coniferous forests, forest vegetation in the form of shrubs, sparsely vegetated area	High
5B+5C	Bypass Kashar-Lekaj Konjat	Complex cultivation patterns, land principally occupied by agriculture (cereals, vegetables, fodder, fruit trees, vineyards, olives), broad leaved forests, coniferous forests, forest vegetation in the form of shrubs, sparsely vegetated area	Moderate to High
6	Konjat Lushnje	Existing motorway.	Moderate to Low
7	Lushnje to Fier	Existing motorway.	Moderate to Low
8	Fier Bypass	Agriculture, but planned for highway construction and operation	Moderate
9A	Levan-Pocem	Existing road	Moderate
9B1	Pocem Memaliaj	Natural forests and pastures, agricultural land (fruit trees)	High
9B2	Pocem Memaliaj	Complex cultivation patterns, land principally occupied by agriculture, Natural vegetation	High
10	Memaliaj-Subashi Bridge	Natural vegetation, agricultural lands and pastures	Moderate to High
11	Subashi Bridge-Gjirokastra bypass	Agricultural lands and shrubs	Moderate
12	Gjirokaster Bypass	Agricultural lands and shrubs to be transformed in Gjirokastra bypass	Moderate
13A	Kordhose-Kakavije	Land occupied by agriculture, sparsely vegetated area	Moderate to Low
13B	Kordhose-Kakavije	Land occupied by agriculture, sparsely vegetated area	Moderate

Table 5-7 Biodiversity, main landscapes and protected areas along the Alternatives

Alternative	From-To	Name of the PA	Biodiversity	Main types of landscapes
1	Murriqan Balldre	Buna River Protected Landscape Category V (IUCN)	Rich in water birds and small mammals Rich in specific species of fishes	Natural wetlands and related biodiversity, riverine habitats, Agricultural lands Alluvial and Mediterranean shrubs and forests. Beautiful and diverse landscapes

Alternative	From-To	Name of the PA	Biodiversity	Main types of landscapes
2	Balldre-Milot		Biodiversity typical for agricultural habitats. Specific biodiversity related to wetlands in the northern part of the Section	Natural wetlands and related biodiversity, riverine habitats, Agricultural lands Alluvial and Mediterranean shrubs and forests. Landscapes characterized by agricultural lands and scarce natural, and spontaneous constructions.
3	Balldre-Milot	-	Common biodiversity typical for agricultural habitats	Agricultural lands Alluvial and Mediterranean shrubs and forests. Landscapes characterized by agricultural lands and scarce natural, and spontaneous constructions.
4	Thumane - Kashar	-	Common biodiversity typical for riverine habitats and agricultural habitats	Agricultural lands, riverine habitats etc. Alluvial and Mediterranean shrubs and forests. Landscapes characterized by agricultural lands and scarce natural, and spontaneous constructions.
5A	Bypass Kashar-Konjat	Arra e Bab Myslymit	Rich in common birds and small mammals	Agricultural lands Alluvial and Mediterranean shrubs and forests. Beautiful and diverse landscapes
5B+5C	Bypass Kashar-Lekaj Konjat		Very rich in specific birds, rodents, small and medium predators	Alluvial and Mediterranean shrubs and forests. Beautiful landscapes
6	Konjat Lushnje	-	Scarce biodiversity Common biodiversity typical for agricultural habitats	Intensive managed habitats (infrastructure-existing road), Agricultural lands
7	Lushnje-Fier	-	Scarce biodiversity Common biodiversity typical for agricultural habitats	Intensive managed habitats (infrastructure-existing road), Agricultural lands

Alternative	From-To	Name of the PA	Biodiversity	Main types of landscapes
8	Fier Bypass	-	Common biodiversity typical for agricultural habitats in surroundings	Planned for intensive managed habitats (infrastructure), Agricultural lands
9A	Fier Bypass	-	Common biodiversity typical for agricultural habitats in surroundings of the existing road	Existing road surrounded by agricultural lands
9B1	Pocem Memaliaj	Rrepet e Pocemit Natural Monument Category III of Protection	Rich in natural deciduous and evergreen forest. Very rich in wildlife	Agricultural lands Mediterranean and central European forests. beautiful and diverse landscapes
9B2	Pocem Memaliaj	Rrepet e Pocemit Natural Monument Category III of Protection	Rich in deciduous forests and woodlands. Rich in fishes, birds and small mammals	Alluvial and Mediterranean shrubs and forests. Attractive landscapes
10	Memaliaj-Subashi Bridge	Rrepet e Dervenit, Protected Landscape, category III IUCN	Natural specific broadleaf forest and deciduous vegetation. Important wildlife and carnivores	Natural Mediterranean/continental vegetation
11	Subashi Bridge-Gjirokastra bypass	-	Natural specific forest and deciduous vegetation. Important wildlife and carnivores	Agricultural habitats and landscapes
12	Gjirokastra bypass	-	Agricultural lands and natural woodlands.	Agricultural habitats and landscapes to be transformed in motorway (Gjirokastra bypass)
13A	Gjirokaster Bypass-Kakavije	NA	Scarce biodiversity	Intensive managed habitats (existing road)
13B	Gjirokaster Bypass Kakavije	NA	Very rich biodiversity represented by specific wildlife	Alluvial and Mediterranean shrubs and forests. Beautiful landscapes

The following table gives an overview of the scoping per section and per criterion.

Table 5-8 Summary of environmental criteria and their scoring per Section

Criteria	Section 1	Section 2	Section 3	Section 4	Section 5A	Section 5B + 5C	Section 6	Section 7
Air and noise pollution	2	3	4	2	1	2	3	3
Water pollution	1	2	4	3	2	2	4	4
Biodiversity, protected areas and landscape	1	1	4	3	1	2	3	3
Soils	1	2	3	2	2	2	3	3

Criteria	Section 9A1	Section 9A2	Section 9B1	Section 9B2	Section 10	Section 11	Section 12	Section 13A	Section 13B
Air and noise pollution	4	4	1	2	1	2	3	3	2
Water pollution	3	3	1	1	1	2	3	3	2
Biodiversity, protected areas and landscape	4	4	1	1	1	1	3	3	2
Soils	3	3	1	2	1	2	3	3	2

Four social criteria have been considered: agricultural land to be acquired, demolition of buildings, separation of settlements and impacts on archaeological and cultural heritage. The following table presents the scoring for each variant. Scoring is based on quantitative actual data.

Table 5-9 Social Criteria – Scoring

Social criteria	Assessment method	ALB 1	ALB 2	ALB 3	ALB 4	ALB 5A	ALB 5B+5C	ALB 6	ALB 7
Agricultural land acquisition	Km2 of land per road km	0.042	0.042	0.034	0.06	0.06	0.052	0.06	0.034
Demolition of buildings	Nr of buildings to be demolished per road km	2.01	6.33	1.98	3.56	2.46	3.93	3.28	1.92
Separation of settlements	Number of settlements that will be separated	7	5	2	5	12	12	2	5
Impact on archaeological and cultural heritage	Number of archaeological and cultural heritage sites, which could be affected	3	2	0	1	0	0	0	0

Social criteria	ALB 9A1	ALB 9A2	ALB 9B1	ALB 9B2	ALB 10	ALB 11	ALB 7	ALB 9A1	ALB 9A2	ALB 10	ALB 12	ALB 13A	ALB 13B
Agricultural land acquisition	0.042	0.042	0.06	0.042	0.042	0.04	0.06	0.042	0.06	0.042	0.042	0.06	0.042
Demolition of buildings	0.63	0.63	1	1.14	0.1	1.51	0.41	0.76	0.39	0.63	0.63	1	1.14
Separation of settlements	1	1	1	1	1	1	1	0	0	1	1	1	1

Social criteria	ALB 9A1	ALB 9A2	ALB 9B1	ALB 9B2	ALB 10	ALB 11	ALB 7	ALB 9A1	ALB 9A2	ALB 10	ALB 12	ALB 13A	ALB 13B
Impact on archaeological and cultural heritage	0	0	2	0	4	0	1	8	2	0	0	2	0

Four **social criteria** have been considered: agricultural land to be acquired, demolition of buildings, separation of settlements and impacts on archaeological and cultural heritage. The following table presents the scoring for each variant. Scoring is based on quantitative actual data.

Table 5-10 Social Criteria – Scoring

Social criteria	Assessment method	ALB 1	ALB 2	ALB 3	ALB 4	ALB 5A	ALB 5B+5C	ALB 6	ALB 7
Agricultural land acquisition	Km2 of land per road km	0.042	0.042	0.034	0.06	0.06	0.052	0.06	0.034
Demolition of buildings	Nr of buildings to be demolished per road km	2.01	6.33	1.98	3.56	2.46	3.93	3.28	1.92
Separation of settlements	Number of settlements that will be separated	7	5	2	5	12	12	2	5
Impact on archaeological and cultural heritage	Number of archaeological and cultural heritage sites, which could be affected	3	2	0	1	0	0	0	0

Social criteria	ALB 9A1	ALB 9A2	ALB 9B1	ALB 9B2	ALB 10	ALB 11	ALB 7	ALB 9A1	ALB 9A2	ALB 10	ALB 12	ALB 13A	ALB 13B
Agricultural land acquisition	0.042	0.042	0.06	0.042	0.042	0.04	0.06	0.042	0.06	0.042	0.042	0.06	0.042
Demolition of buildings	0.63	0.63	1	1.14	0.1	1.51	0.41	0.76	0.39	0.63	0.63	1	1.14
Separation of settlements	1	1	1	1	1	1	1	0	0	1	1	1	1
Impact on archaeological and cultural heritage	0	0	2	0	4	0	1	8	2	0	0	2	0

5.4 Selection of the Preferred Road Corridor

More details on criteria categories used in the MCA analysis, their relative weighting and relevant scoring applied for the assessment of alternative options, are provided in the Option Analysis Report.

The final draft of Option Analysis Report was submitted for comments and/or approval to the Beneficiary (MIE/ARA) and the Bank (EBRD) on December 21st, 2018. Relevant approval by the Beneficiary was provided on May 29th, 2019 in follow-up to Consultant's presentation in ARA's Technical Council (on April 17th, 2019).

Based on the results of the options analysis, recommendations provided by the Consultant and subsequent approval from Beneficiary (MIE/ARA), the resulting preferred option for the AIC in Albania is summarized in the following Table:

Table 5-11 Preferred Option of the A-I Corridor in Albania

Section	Length	From	To
1	38.8	Murriqan	Balldren (Lezhe)
2	16.4	Balldren (Lezhe)	Milot
3	13.1	Milot	Thumane
4	21.0	Thumane	Kashar
5B+5C	48.0	Kashar	Konjat (Lushnje)
6+7	28.1	Konjat	Fier
(8)	(22.2)	Fier Bypass	
9A-2	26.7	Fier Bypass (Levan)	Pocem

Section	Length	From	To
9B-2	37.6	Pocem	Memaliaj
10	20.1	Memaliaj	Subashi Bridge
11	10.3	Subashi Bridge	Gjirokaster Bypass
12	9.7	Gjirokaster Bypass	
13A	23.6	Gjirokaster Bypass	Kakavije
TOTAL	**315.6**		

5.5 The no-project scenario

This route constitutes one of the main links to the neighbouring capital cities and to the regional transport network in South East Europe, while it connects some of the main cities and economic centres within Albania.

The proposed Project is expected to provide a number of significant benefits to both the region and the country, including accommodating the increasing traffic growth and minimizing congestion, fostering economic development of Western Balkans through improved connections in the region, improving traffic safety and achieving cost efficiency regarding environmental protection, accidents and congestions, improving mobility of citizens and reduction of travel times. More detailed analysis of these benefits is provided in the Feasibility Study for the Project.

In the absence of the proposed Project, Albanian roads will not be integrated within the Core Transport Network and in SEETO which in return may lead to isolation of the country from the key regional routes hence decreased and slower economic development due to insufficient connectivity.

The non-implementation of the Project implies that traffic flow will most likely continue to be directed through the existing roads which cannot absorb further traffic growth and will result in continuous and long lasting traffic congestions.

Additionally, since existing coastal roads and other current network do not comply with the standards of a modern highway in terms of traffic loads, safety and environment, something which will lead during time to high traffic loads, poor safety and low performance regarding the environmental and social standards and norms.

It can be concluded that no project scenario means lack of advantages identified from the construction and operation.

6. Potential impacts and mitigation measures

6.1 Introduction

6.1.1 Generic methodology

For the current Project, the methodology that was chosen for the evaluation of environmental impacts took into consideration rated qualitative criteria. The selection of a quantitative evaluation was avoided, since it is more sensitive to subjectivity and it does not give a holistic overview of the entire situation.

The following sections describe some of the general principles that underpin the assessment approach, while physical, biological, socio economic and cultural environment will be assessed related with the project development.

The methodology that will be used to predict and assess potential environmental impacts includes:

- Collection of baseline environmental and social data by research and survey
- Review of existing literature, documents and reports from various organizations (governmental agencies, universities, institutes) and other similar projects
- Interviews with individuals and representatives of interest groups
- Consultation meetings with relevant Project stakeholders to identify key concerns and to obtain further data where necessary
- Review of relevant statistical and cartographic databases and various census data
- Site visits and field investigations along the corridor of the proposed highway
- Identification of receptors
- Characterization of the potential impacts and evaluation of their significance.

6.1.2 Characterization of impacts

By EBRD definition[84], environmental impacts include (i) landscape and morphology, (ii) geology (iii) soils, (iv) seismicity, (v) climate change, (vi) air, (vii) noise, (viii) surface waters, (ix) groundwaters and (x) biodiversity and protected areas, while social impacts include (i) labor standards and terms of employment (ii) community impacts such as public health, safety, security, gender equality, impacts on indigenous peoples and cultural heritage, land acquisition or potential reduction in people's livelihoods as a result of project activities (iii) occupational Health and Safety. It also includes disproportionate impacts on vulnerable groups/gender, involuntary resettlement, and affordability of basic services.

In determining the type of social impact, the PESIA report will be guided by the following indicators:

- The nature of impact. Identification what changes the impact brings, are they an improvement or degradation to the benchmark conditions. In this respect they are classified as: Positive or Negative.
- Vulnerability of receptors assess the recipient of impact itself, its rarity, vulnerability and adaptability to impact and change. In this respect, they can be low, moderate and high.
- The spatial dimension and geographic 'reach' of the impact. This considers the proportion of communities potentially affected by the change. By this virtue impacts are categorized as local, regional, national and trans-boundary.
- Time dimension. This is the timeframe over which an impact will be experienced; this may include temporary, short-term, long-term and permanent impacts.
- Reversibility (long term reversible, short term reversible or irreversible);

[84]Source: EBRD Environmental and Social Risk Categorisation List – Revised 2014

- Magnitude. This is the degree of change at a household or community level to livelihoods and quality of life i.e. extent of impact. In this respect they can be major, moderate, minor, negligible and none.

During the planning phase, all potential impacts should be assessed by its probability. In the respect of the likelihood of occurrence, potential impacts should be determined as: very unlikely (the impact is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances), unlikely (the impact in unlikely but may occur at some time under normal operating conditions), likely (likely to occur under normal operating conditions), very likely (the impact will almost certainly occur) and certain (impact will occur).

The significance of environmental and social impacts is evaluated taking into account the magnitude of the impact and the vulnerability of affected receptors as well as all other above-mentioned dimensions. In order to assess the significance of the impacts, the impact is reflected within the local setting as articulated in the view of the local population and the environment. Socioeconomic and environmental impacts, significance of the impact is evaluated by the consideration of the impact magnitude and the importance placed on the impact by stakeholders.

The criteria for assessment of impacts are based on generic environmental criteria, magnitude of impact and its descriptors, which in relation with sites sensitivity gives the significance of the impacts and indicators of significance of impact categories.

Table 6-1 Generic Environmental Criteria

Value (sensitivity)	Typical descriptors
High	High importance and rarity, national scale, and limited potential for substitution
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low (or Lower) or Negligible	Low or medium importance and rarity, local scale.

Table 6-2 Magnitude of Impact and Typical Descriptors

Magnitude of impact	Typical criteria descriptors
Major	• *Adverse:* Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements • *Beneficial:* Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality
Moderate	• *Adverse:* Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements • *Beneficial:* Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	• *Adverse:* Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. • *Beneficial:* Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	• *Adverse:* Very minor loss or detrimental alteration to one or more characteristics, features or elements. • *Beneficial:* Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	• No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 6-3 Indicators of the Impact Significance of Impact Categories

Significance category	Typical indicators of effect
Very Large	• Only adverse impacts are normally assigned this level of significance. They represent key factors in the decision-making process. These impacts are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	• These beneficial or adverse impacts are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	• These beneficial or adverse impacts may be important, but are not likely to be key decision-making factors. The cumulative impacts of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
Slight	• These beneficial or adverse impacts may be raised as local factors. hey are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.
Neutral	• No impacts or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Significance of Impact: Five significance categories (very large, large, moderate, slight and neutral) have been used to assess significance of each impact. No impact with very large or neutral significance was defined under the PESIA preparation.

The figure below depicts the process the assessment should follow.

Figure 6-1 Process of impacts identification and management

The table below shows how the significance of impacts should be designated and determined according to mentioned characterization indicators of impacts.

Table 6-4 Identification of significance of impacts

NATURE OF IMPACT NEGATIVE /POSITIVE					
			Vulnerability of Receptors		
			Low: Minimal areas of vulnerabilities; consequently, with a high ability to adapt to changes brought by the project.	Moderate: Few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the project.	High: Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the project
Magnitude of Impact	Negligible	Change remains within the range commonly environments or experienced within the households or community.	Negligible to Minor	Negligible	Negligible
	Minor	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.	Negligible to minor	Minor to Moderate	Moderate
	Moderate	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of Moderate duration. Frequency may be occasional, and impact may be regional in scale	Minor	Moderate	Moderate
	Major	Change dominates over baseline conditions. Affects the majority of the environment or population in the area of influence and/or persists over many years. The impact may be experienced often and national in scale.	Moderate	Major	Major

During the impact characterization given below, in some cases, despite the natural environmental threshold values, the impact cumulativeness or significance represents also a qualitative assessment (ex. existence of a specific species with international importance may increase the impact significance, although the magnitude of the section for biodiversity threshold (ex. habitats and P.As) may be minor or medium).

Pre-construction, construction and operational/maintenance phases were taken into account for the impact assessment. The significance of each impact is evaluated according to the Sections' sensitivity of impact receptors and impact magnitude. The magnitude of an impact is based on assessment of main thresholds like; Reversibility, Spatial extent, Duration and Likelihood.

6.1.3 Cumulative impacts

Cumulative impacts are those that result from the incremental impact of a project when added to other existing, planned, and/or reasonably predictable future projects and developments". Cumulative impacts are limited to those impacts generally recognized as important on the basis of scientific concerns and/or concerns from Affected Communities and Stakeholders. Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, projects, or activity when added to other existing, planned, and/or reasonably anticipated projects and activities. Areas and communities can be potentially impacted by cumulative impacts from further planned development of the project or other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that can realistically be expected. However, the assessment does not include potential impacts that would occur without the Project or independently of the Project.

The assessment of cumulative impacts considers the combination of multiple impacts that may result when the Project is considered alongside other existing or proposed projects in the same geographic area or similar development timetable. However, considering the nature and magnitude of the Project Ionian-Adriatic highway, the extend of the impacts it will have on both social and environmental component and the necessary mitigation measures it will include, it is likely that all possible cumulative impacts will be merged, examined and assessed in the PESIA process.

6.1.4 Mitigation

Impact assessment is designed to ensure that decisions on projects are made in full knowledge of their likely impacts on the environment and society. A very important step within the process is the identification of measures that will be taken by a project to mitigate its impacts. Where a significant negative impact is identified, a hierarchy of options for mitigation was typically explored as follows.

- Avoid at source – remove the source of the impact.
- Abate at source – reduce the source of the impact.
- Attenuate – reduce the impact between the source and the receptor.
- Abate at the receptor – reduce the impact at the receptor.
- Remedy – repair the damage after it has occurred.
- Compensate / Offset – replace in kind or with a different resource of equal value.

Compensation/offset is typically seen as a last resort but may be required in terms of local legislation (sometimes independent of the significance of an impact). Taking into account the project stage (Conceptual Design), indicative mitigation measures are proposed which will be further elaborated under the Preliminary Design and ESIA preparation.

6.1.5 Residual Impacts

Residual impacts are impacts that remain in the case where proposed mitigation measures are implemented. It should be noted that effectiveness of mitigation measures could vary for different impact subjects and receptors. Negative residual impacts overall assessed as being either of minor or negligible significance will be considered to be environmentally and/or socially acceptable. For negative residual impacts assessed as being either major or moderate significance measures will be planned and implemented that compensate/offset for residual risks and impacts (these measures do not eliminate the

identified adverse risks and impacts, but they seek to offset it with an -at least- comparable positive one). Evaluation of the significance of residual impacts will be done based on expert judgment and separately for each type of impact. There has been done evaluation of residual impacts at the PESIA level, however more precise and satisfactory conclusions may come up at the ESIA level.

6.1.6 Uncertainties

Any uncertainties related with impact prediction or the sensitivity of receptors due to the absence and inconclusiveness of data or due to other limitations are explicitly stated. Where applicable, the PESIA report will make recommendations concerning measures that should be put in place with monitoring or environmental or social management plans to deal with the uncertainty so that they may be addressed.

6.2 Impacts on natural environments

As it is expressed in the impact characterization methodology, the impact significance is variable of the environmental receptors' sensitivity, namely impacts are much more significant in sensitive environments than in others. So, in case of doubling existing roads, the impacts during construction phase, from the environmental point of view, seems to be lower than those expected to be caused by the construction of new alignments in natural or semi natural/agricultural sites. However, in some cases, the existing roads to be doubled/upgraded run very close to specific habitats (case of Sections 9A2, 11 and 13). Additionally, the impacts have different significance in natural environments due to the variety of the values/assets and the conditions in such environments. The sensitivity of the natural environments per Section of the AIC is summarized below.

6.2.1 Natural Environments Sensitivity

The Environmental Sensitivity Matrix is based on data deriving from secondary data, specific field surveys, consultation and analyses carried out during the preparation of the PESIA.

Sections 2 and 4 are already approved alignment by the Albanian Government. The construction of Section 8 (Fier Bypass) is almost finished, while Section 12 is already studied by the Albanian Road Authorities (ARA).

The sensitivity; **high** (large/very large), **medium** (moderate), **low** (slight/neutral), is explained per environmental parameter as follows:

- Landscape. The magnitude and sensitivity of change will depend on the loss, change or addition of any feature, or any change in the environment, from a landscape point of view that affects its character and asset.
- Geology, geomorphology, seismicity and soils. There are considered possibilities or risk of slides and erosion, changes in slopes of mountains and hills, river body geo-morphology, and seismic magnitude of per each of the Sections.
- Waste, although it is not a receptor, constitutes an important factor, which will be involved in all Sections.
- Air quality and noise. The sensitivity of each Section towards air and noise pollution is based also on empiric evaluation, considering existing roads, with low sensitivity, anthropogenic habitats with low to medium sensitivity and natural or semi natural sites with high sensitivity.
- Climate change is a global factor which may be affected at a local scale by the AIC or may affect the AIC. The climate change indicator considers among others GHGs, fires, floods, temperature increase etc.
- Surface waters. The sensitivity of the surface waters per Section is based on results of existing monitoring points close to the AIC and their analyses, as presented in the Annual Environmental Status Reports, prepared by the National Environmental Agency, while additional information is collected by field visits and consultations. For Sections 3, 6 and 7, which are not crossing any important river, an empiric way has been used to assess the quality of streams and draining

channels, which in most cases are subject of waste water discharges or illegal dumping of solid wastes.

- Groundwater. The sensitivity of groundwater per Section is based on existing information for points monitored on groundwater quality at a national level close to the AIC, as presented in the Annual Environmental Status Reports, prepared by the National Environmental Agency. The overall identification permeability of geo-layers helps to identify the most exposed groundwater due to the penetration of pollution from the surface to the aquifers. Hydro-geological maps and data collected via consultations have been another source for sensitivity evaluation.
- Biodiversity. The biodiversity sensitivity is based on the overall evaluation of the main habitats and their related biodiversity. Some of the habitats, with high values from the vegetation point of view, have very small surface and do not support their functions as an efficient shelter for the related flora and fauna. In the evaluation of habitat sensitivity, the habitat capability to shelter related wildlife with specific status has been also been assessed.

The sensitivity of Sections 5B and 5C and 9A2 and 9B2 are assessed and considered as 5 (B+C) and 9 (A2+B2) in the matrix below, and their sensitivity is given as:

Sections 5 and 9 as the average of respectively; 5= 5B+5C and 9= 9A2+9B2.

The matrix below gives the main characteristics per Section and per environmental parameter while the level of sensitivity is defined by the color as it is given below.

- Sensitivity high
- Sensitivity medium
- Sensitivity low

The same presentation of sensitivity with colors is carried out for all environmental parameters that will be described below.

Table 6-5 Summarized Sensitivity of Natural Environmental Parameters per each AIC Section.

Parameters	Landscape	Geology, geomorphology, seismicity and soils	Waste	Air quality and noise	Climate change	Surface water quality	Groundwater quality	Biodiversity
Section 1 - New alignment + doubling of existing 1x2 lane highway. New alignment goes over agricultural land and over Buna River (natural site). 12.6 km – existing road. It lies almost 100% over flat terrains. Crosses Buna river and goes close to Gjadri and Drini of Lezha rivers.								
Sensitivity of Section 1								
Section 2 - New alignment + doubling of existing 1x2 lane highway. 13.19 km existing road. Existing project. Crosses Drini of Lezha and Mati River								
Sensitivity of Section 2								
Section 3 - (Existing road) Improvement of existing 2x2-lane highway.								
Sensitivity of Section 3								
Section 4 - New alignment. Existing PPP project. Goes almost in agricultural lands and channels. Crosses Ishmi River.								
Sensitivity of Section 4								
Section 5B - Almost New alignment. Runs over agricultural lands, hills with Mediterranean shrubs and existing tertiary roads. Crosses Erzeni River								
Sensitivity of Section 5B								
Section 5C - Passes mainly in a flat terrain in the west side and an upgraded to a hilly terrain in the east side, almost entirely over agricultural areas. Crosses Shkumbini River								
Sensitivity of Section 5C								
Sections 6+7 – Existing Road								
Sensitivity of Sections 6 + 7								

Parameters	Landscape	Geology, geomorphology, seismicity and soils	Waste	Air quality and noise	Climate change	Surface water quality	Groundwater quality	Biodiversity
Section 8	**Already under construction**							
Section 9 A2 - Existing Road. Runs close to Vjosa River								
Sensitivity of Section 9A2								
Section 9B2 - New alignment + doubling of existing 1x2 lanes highway. Crosses Vjosa River and its branches.								
Sensitivity of Section 9B2								
Section 10 - New Alignment. Agricultural areas, forests and crosses Vjosa River and its branches								
Sensitivity of Section 10								
Section 11 - Existing Road. Goes over Kardhiqi and Drinos Rivers (Vjosa river branches)								
Sensitivity of Section 11								
Section 12 - New alignment, already studied by ARA. Section 12 runs over Gjirokastra Bypass, already studied								
Section 13A - Existing road. Goes over Drinos and Suha Rivers (Vjosa branches)								
Sensitivity of Section 13A								

According to the table above, the most sensitive parameters per each Section are as below:

Section 1 – very sensitive on Landscape, climate change, waste, groundwater quality, river ecology and biodiversity are of high sensitivity parameter. The average of sensitivity on the group of indicators such as geology, geo-morphology, and soils is moderate, nevertheless the seismic sensitivity, is of high significance. Although the road goes over a flat area, the sensitivity of Buna river basin morphology, is very important for the ecosystem. The surface water quality results with a moderate sensitivity.

Section 2 –Mati and Drini of Lezha geo-morphology as well as the other parameters have an average of moderate sensitivity, apart from air and noise and surface waters which have a slight sensitivity.

Section 3 – Groundwater quality is of high sensitivity parameter, while the landscape parameter has a moderate sensitivity. Although this Section does not cross any important river, the supposed quality of agricultural channels in surroundings is medium to low, which results to a low sensitivity. Other parameters such as geology, geo-morphology, soils and seismicity, air quality and noise, climate change and biodiversity are of low sensitivity.

Section 4 – There has not been identified any high sensitivity parameter, although it is a new alignment. It runs between agricultural lands and settlements, with developed infrastructure and the quality of environmental parameters lead to the evaluation of this Section with low or slight sensitivity. Surface water quality is related to the Ishmi River, which has a low quality. Therefore, the sensitivity of this Section regarding surface water quality is slight. The landscape and biodiversity parameters are considered of slight sensitivity. With a moderate sensitivity are assessed other parameters such as geology, geo-morphology, seismicity and soils, air and noise, waste, and climate change.

Section 5B – Landscape, geology, geology, geomorphology, seismicity and soils and groundwater quality are assessed as of high sensitivity. The sensitivity of geology and geomorphology is conditioned by the characterization of site morphology with very diverse topography and sensitive slopes on slide and erosion. The good groundwater quality leads to a sensitive parameter. Waste, air and noise, climate change, surface water quality and biodiversity are assessed as of moderate sensitivity.

Section 5C – Most of the parameters are of moderate sensitivity, except for ground water quality. The ground water quality of Shkumbini aquifer, an aquifer which is crossed by this Section does not have good qulity and therefore the sensitivity is low. This Section is running almost over existing road.

Section 6 and 7 – There has not been identified any high sensitivity parameter. Both sub-sections run over the existing road.

Section 8 (Fier bypass) is under construction so it will not assessed regarding impacts and mitigation mesayres.

Section 9A2 – Geology, geomorphology, seismicity and soils, surface water quality and biodiversity are parameters of high sensitivity. Landscape, climate change and groundwater quality of this Section are assessed as of a moderate sensitivity and air and noise of slight sensitivity.

Section 9B2 – Landscape, geology, geomorphology and soils and soils, air and noise, waste, surface water quality, groundwater quality and biodiversity are parameters of high sensitivity. Despite the bad quality of Kafaraj aquifer, this Section is sensitive on groundwater at Pocemi source (beginning of the Section), which has a great quality and is used for production of drinking water. The climate change parameter results in a moderate sensitivity. None of the environmental parameters of this Section results to a slight sensitivity.

Section 10 – This Section is a new road, which crosses natural and agricultural sites. All environmental parameters of this Section are of high sensitivity. The impacts to landscape and from climate change results in moderate sensitivity, except for fires that are assessed as of high sensitivity.

Section 11 – Surface and groundwater quality are of high sensitivity parameters on this Section. Because of its diverse morphology and topography, the Section is characterized by moderate sensitivity for landscape, geology, geo-morphology, seismicity and soils. Although it is an existing road, the site is sensitive due to erosion and slides. The biodiversity parameter is of low sensitivity.

Section 13 - Surface and groundwater quality are of high sensitivity parameters. Drino aquifer as well as Drino River (Vjosa Branch) are of a high sensitivity. Climate change (risk of floods) is of moderate sensitivity while the other parameters are of slight sensitivity.

According to this evaluation, the Sections with more sensitive parameters regarding natural environments are Section 1, Section 9B2 and Section 10.

6.2.2 Environmental aspects

The impacts are assessed by evaluation of selected thresholds, which result in the impact magnitude. The ratio between impact magnitude and Section sensitivity gives the impact significance. Sometimes, nevertheless the small surface that will be directly impacted by risk of landslides and erosion, their magnitude may be moderate or major. The assessment of impacts has considered three project phases, pre-construction, construction and operation/maintenance phase. The impacts from the Pre-construction phase are very crucial for the following phases, since define the progress of the successive phases. Therefore, they will be not included in the tables of assessment of impacts significance in order to avoid repetitions.

After the characterization of impacts per parameter, a summary of impacts is given for the construction and operation phase in a table format, giving a general view of impact significance per parameter and Section. In the following subchapters, the Sections 8 and 12 have not been considered, because their studies have already been approved.

6.2.2.1 Natural Environment Positive Impacts

The nature and significance of positive impacts of AIC in natural environments, is **relatively minor**. Such impacts are not evident during the construction phase. A summary of the positive impacts on the natural environments expected during the operation phase of AIC is presented below. More specifically:

- Reduction of traffic in the secondary and tertiary roads, which have been used till now for national and international transport.
- The accidental kill of wildlife by the lack of existing road barriers in the existing roads, which will be part of the AIC Sections, will be reduced, due to the artificial corridors (overpasses, underpasses) expected to be opened to avoid full habitat fragmentation and to the effective barriers proposed to be built to control wildlife running over the road and risking their life and the life of the travelers.
- Mitigation measures such as increase of vegetation or restoring of damaged habitats can serve as oases for wildlife (i.e. birds), saving as such the food change and improving the biodiversity in the existing scarce habitats.

6.2.2.2 Natural Environment Negative impacts

The pre-construction phase considers impacts that may be caused by neglecting the preparation of the relevant studies and the lack of profound studies for sensitivity and weight of impacts in soils, geology, geomorphology, landscape, surface and groundwater, biodiversity etc. The impacts for construction phase are related mostly to construction works. Their cumulativeness and significance are different from those of operation phase, due to different weight of the impacts, although in some cases, the sources maybe the same.

6.2.2.3 Topography and landscape

Impacts

TO BE COMPLETED

Mitigation measures

<u>Pre-construction – ESIA phase</u>

During Conceptual Design, the design team tried to improve as much as possible the road alignment according to the required design standards, minimizing as much as possible the landscape impacts. This

was particularly done for the Sections 5B, 9B2 and 10 due to the rugged topography and the high terrain slopes. The use of structures such as tunnels and cut and cover was applied for cuts higher than 25m and fills higher than 16-20m (viaducts-bridges). Additionally, the slope rations 1:2 in cuts and 1.5:1 in fills was applied. The slope inclination and stability will be however more accurately defined in subsequent design stages (preliminary/design).

The design team (preliminary design/detailed design) should take into account some recommendations of the ESIA Consultant so as less landscape and aesthetics impacts are provoked. There should be a close cooperation between the biodiversity expert and the landscape expert of the ESiA team.

The ESIA consultant should include in his study the following inter alia:

- Proposal of the ESIA for site specific measures for revegetation, lighting issues, noise barriers, road structures and retaining walls aesthetics
- Assessment of landscape sensitivity values (visual quality and fragility) and of landscape vulnerability (visual vulnerability (visibility), evaluated by the location and number of viewers and intensity of impacting actions, evaluated by the size and exposure to sight of local residents, visitors and passengers)
- Identification of different landscape categories (hills, valleys, meadows, protected areas etc) and proposal of specific measures per category
- Identification of impacts regarding the proposed structures (bridges, viaducts, interchanges, tunnels, drainage etc.) and proposal of specific measures per category
- Categorization of viewers affected, and specific mitigation measures proposed per category in the ESIA
- Use of 3D landscape modelling to present the major structures that will take place such as bridges and viaducts in order to assess with more accuracy the visual impacts
- Identification of lighting impacts and assessment of exposure of humans and fauna species, and of impacts' magnitude and significance
- Proposal of the ESIA that the Contractor should prepare a Landscape Management Plan. The ESIA should include the contents of such a plan, while depending on the outcome of the scoping report of each section the ESIA Consultant may prepare a Landscape Framework. The Landscape Management Plan will include species proposed to be planted, method and timing of planting while it will implement the measures
    - to design planting in accordance with road safety requirements, including safety of ongoing maintenance, maintaining safe intersection sight distances, sight lines around curves and clear zone requirements
    - to avoid removal of mature trees and other woodland features that screen views to facilities,
    - to minimize the disturbance footprint and vegetation clearing,
    - when vegetation clearing to avoid creating gaps in stands or patches and isolating parcels of remnant vegetation.
    - to use matt and low-glare finishes two shades darker than the prevalent shading of the site
    - to consider camouflage paints/finishes in highly sensitive landscapes.
    - to choose colors of above ground sections of technical buildings at tunnel exits so to merge with environment.
    - to use irregular shape stones for riprap.
    - to avoid use of white concrete.

Preliminary/detailed design should also consider:

- Design infrastructure layouts to minimize the footprint (taking into consideration the elements that contribute to landscape character) to reduce visibility of the facilities.
- Choose the location of temporary accesses and camps away from sensitive landscape locations
- Hide or screen the facility using natural landscape features or planted native vegetation barriers, where appropriate to the landscape sensitivity.
- Establish screening barriers using endemic species in advance of construction of the facilities.
- Integrate facilities into the landscape setting considering building and structure color, texture and lines, where screening is not practical. The design applied to structures will reflect a combination of naturally coloured surfaces and surfaces that are textured to appear as natural materials (e.g., rock or cobble) or that incorporates a design theme (e.g., wildlife and plants of local, native oak woodlands; traditional architectural elements such as inset panels; or other design reflecting local heritage or environment) using form liners.
- Regarding retaining walls:
  - A plantable wall surface, such as a retaining wall structure that allows interstices for planting shall be evaluated for use as a possible best management practice to help introduce more landscaping.
  - The shade of the wall has to be carefully considered. In general, very light buff/tan, brown, or grey colours stand out more than darker colours such as deep browns, deep red-browns, and deep warm gays that have the ability to complement the surrounding vegetation.
  - Avoid plain surfaces for retaining walls, exterior facing barriers and girders on bridges that would be visible to traffic passing under the overcrossing, decking, abutments and side supports, and columns.
  - Provide roughened retaining wall surfaces will soften the verticality of the wall faces by providing visual texture and reducing the amount of smooth surface that can reflect light.
- Structures such as bridges and viaducts should provide correct geometric relationships in the overall structural arrangement and display visual integration of the beams, piers and abutments, display visual integration of the structure with the road and landform, ensure lines that delineate elements of the structure are smooth and unbroken in both the horizontal and vertical planes , have a colour that will provide appropriate contrast with the landscape tones and provide maximum open, light spaces beneath the structure and

For proposing specific mitigation measures, morphological characteristics of the affected area were taken into account and have to be further described in the detailed design referring to the operational phase. More specifically:

- Regarding hilly areas, slope lines as well as ridges of the surrounding hills should follow as much as possible the configuration of the existing field. The upper edges of slopes should be rounded with smooth transitions into the existing terrain. Where areas are in cut or fill, a grass or meadow sward will generally be established over the entire slope except in areas of cutting through stable rock. Stable rock slopes will be retained as an exposed face for natural colonisation and as a local landscape feature.
- Slopes of embankments and cuts should be protected from weathering by planting of a mixture of grass species, species of bushes and appropriate species of trees. In order to provide permanent and deep consolidation of areas prone to slides, on important slopes and on the cuts at the heads of tunnels, it is necessary to have recourse to reforestation techniques using tree species; besides serving to stabilize the slope surfaces, these will also serve to restore the landscape altered by construction operations.
- Regarding the river valley and the river crossings, mitigation measures could include reinforcing the indigenous riparian forest tree planting in the new open space corridor, maintaining important recognisable views of the rivers and retaining physical continuity of natural systems.

- Lowland areas are the least affected areas, since the road will be at equal level with the existing terrain and the embankments and cuts will have a very mild and gradual change compared with the existing flat terrain.
- Regarding agricultural farmland, operation of the Project will slightly affect this character area, introducing more hard-surfacing and traffic into the wider agricultural landscape. The creation of slopes should follow the basic characteristics of the tillage nearby, in order to make the bridges and viaducts less prominent in the landscape, trees and shrubs shall be planted and the affected areas where typical small groups of shrubs and trees will be planted may also serve as river belts (where there are intersections with rivers or streams) and also as protective barriers against noise.
- As for the forest area, to prevent harmful erosion, any deforestation must be compensated by replanting trees, suitably seeding grasses along the sides of the embankments (or cuts), and suitable provision for channeling off rainwater. Forest restoration includes planting of appropriate species with quick establishment of an appropriate ground cover around the trees in order to stabilize the soil and prevent colonization of invasive species.
- The Designer/Contractor should target at providing good transparency on the interchange areas and visibility of vertical traffic signalization. Landscaping within interchange loops will improve the visual quality of the roadway corridor by improving corridor aesthetics and helping to reduce the apparent scale of new and reconfigured aerial connectors. This landscaping will also serve as a buffer and screen against nuisance lighting resulting from oncoming vehicle headlights and roadway.
- Material deposition areas shall be seeded to species-rich grasslands and allowed to develop naturally. Between 15% and 25% of the area shall be planted to a mosaic mix of species. Subsoil maybe mixed into the final surface to improve surface rigidity.
- Measures for the mitigation of potential noise impact will be required at a number of locations along the proposed road development, especially where residential properties are in close proximity to the alignment. While initially these features may increase the visual presence of the proposed road development, they also provide for immediate visual screening of the proposed road development and its associated traffic. The design of noise walls and earth bunds mounds will reflect the existing landform and character. The local setting for the barrier should determine whether it is appropriate to add a splash of colour to an otherwise drab scene. The use of bright colours to create a feature should be careful. They are most effective when restricted to key parts of the barrier, for example, to emphasise its structural form. Large areas of strong colour on a barrier can result in an unpleasantly bright rather than attractive appearance. Transparent panels should be considered for locations within close proximity to residential or community properties where noise may walls interfere with the aspect or view.

  Noise barriers have been proposed in Bill of Wuantities of Conceptual Design in a very general manner, while they will be more precisely defined under ESIA (after noise modelling) and detailed design. The estimated length of noise barriers per Section at this phase is given below in the noise Section, while the Bill of Quantities are presented in Annex 4.

Light pollution is something that can be mitigated during design (preliminary/detailed), by using

- colour-corrected halide lights. Lights shall provide good colour rendering with natural light qualities with the minimum intensity feasible for security, safety, and personnel access. Technologies to reduce light pollution evolve over time and design measures that are presently available may help but may not be the most effective means of controlling light pollution once the project is designed. Therefore, all design measures used to reduce light pollution shall employ the technologies available at the time of project design to allow for the highest potential reduction in light pollution.
- specifically designed lighting equipment that minimises the upward spread of light or glare towards receptors. Lights must be installed at the lowest allowable height and cast low-angle illumination while minimizing incidental light spill onto adjacent properties, open spaces, or backscatter into the nighttime sky.

- vegetation screening to assist in providing a perception of light while also contributing to a visual and landscape response.

The lighting design concept for the landscaped areas should be designed to contribute to the quality of the development within internal nocturnal views with the highlighting of focal points and key landscape elements. In general, the residential development landscape will not require 24 hour lighting except for the lighting of access roads and emergency access. The intensity, luminance and lighting level generated from residential properties is predicted to be relatively low in the views available from outside the development. Glare control measures should be considered for the aesthetic design of architectural and road lighting within the development to minimise the visual impact caused by light spillage and glare in views for the identified Visual Sensitive Receptors.

The ESIA Consultant in cooperation with the design team should take into consideration:

- Light trespass. Designers must take care to use luminaires with distributions suitable to the roadway, to carry out the calculations properly to ensure the most efficient placement and design and to make use of full-cut-off luminaires that will greatly increase the control of the stray light.
- Glare. Glare to residential windows can be controlled by altering the lamp position within the luminaires or the fitting of back shields. Both these measures reduce the amount of lamp that is seen by the resident, but also can radically alter the luminaires photometric performance. Even in the areas not directly related to driver safety, glare is reported as the most annoying aspect of roadway lighting. Glare caused by poorly directed security and flood lighting, will be minimised by positioning lights to <70 degrees. Particular attention will be needed regarding the potential for glare distraction to motorists.
- Sky glow. It manifests itself as a glow above a road when humidity is high. This effect is difficult to mitigate, as it is light that reflects either directly or indirectly off the road surface and illuminates water particles suspended in the air, giving a glow effect. Sky glow can be reduced by using darker coloured surfaces, i.e. black asphalt, rather than a light coloured chipping, and dark painted or coloured concrete, rather than white. and of modern flood lights with appropriate shields to avoid light spilling upwards.

The ESIA Consultant should identify the settlements and residential areas that will be in close vicinity to the structures that will be lit in order to better define the impacts.

Construction phase

Mitigation measures during construction phase will include inter alia:

- Footprint should be minimized as much as possible (e.g. narrower working strip).
- Organizing the site and setting up facilities ensures that these facilities are concentrated mainly in places where planned bridges, viaducts and tunnels along the route are.
- Earthworks must consider landscape and visual amenity, bank stabilisation, erosion, water quality and tie into existing contours.
- All earthworks upon completion will be hydroseeded or protected by some other means to stabilise the surface and reduce runoff and erosion and dust. Areas to be planted will be sprayed with herbicide to kill grass and any weeds well in advance of planting. Permanent above ground structures (e.g. signage, fencing, gates) would be designed and located to be as visually unobtrusive as can be technically achieved. Where possible, provision of high quality engineering / architecture would reinforce landscape character and distinctiveness
- Plan the movement of equipment and materials during times of least visual impact (i.e., work day start and end) where practicable.
- Target dry weather periods when undertaking construction in sensitive landscape areas (e.g., waterway crossings), where feasible to minimize visual impacts due to sedimentation and erosion.

- Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities.
- Regarding topsoil
  - To ensure proper rooting of the different varieties, the creation on the slopes of a layer of topsoil of the following thickness is recommended 15-20 cm for grass, 30-40 cm for special cases (where, for example, part of the embankment is given over to farming) and 50-60 cm for shrubs. This topsoil should be chemically neutral in nature, and sufficiently end owed with organic matter and nutrients; the beds should be free of stones, debris, roots and weeds.
  - On the slopes of cuts, where it is difficult to apply a new layer of top soil, the surface can be rendered suitable for plantations by having recourse to certain techniques to correct their chemical-physical-organic nature such as the seeding of leguminous plants (these species have nitrogen-fixing properties and can transfer nitrates to the soil, thus rendering it suitable for subsequent crops), the application of organic and chemical fertilizers (the chemical fertilizers used should be double or triple complex chemical fertilizers) and the usage of geotextiles or other aids in order to keep fertile topsoil in place until the plants themselves take over this role.
- Locate topsoil and spoil embankments in visually discreet locations, where possible.
- Utilize landscape features and contours, where applied,
- Maintain the integrity of private roads and tracks and minimize dust generation, where appropriate, in consultation with relevant owners and interest groups.
- Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
- Construction machinery and vehicles will primarily move within the land allotment. The visual impact of the vehicles and machinery will only be possible on parts of regional and local motor roads that are adjacent to populated areas and will be associated with a higher density of traffic flow caused by vehicles transporting construction materials from quarries to the asphalt and concrete plants and to parts of AIC in the immediate vicinity of populated areas.
- All lights will be screened and directed downward toward work activities and away from the night sky and highway users and highway neighbours, particularly residential areas, to the maximum extent possible.
- Lighting to be switched off when not required specifically for construction activities or required for security or heath and safety;
- Shape the terrain around altered impacted areas so as to recreate the surrounding land morphology.
- Restore conditions to pre-period as much as possible by restoring vegetation of working strip.
- Minimise native vegetation removal and retain and protect remnant indigenous vegetation
- Avoid using 'alien' plant species.

<u>Operational phase</u>

The landscaping and highway layout are also of importance in terms of road safety. For this reason, the layout should be such that any dominant characteristics will reaffirm the driver's choice of directions without confusing him. The layout should offer a succession of varied and pleasing landscape motifs, avoiding visual monotony which gives rise to boredom. When inserting the motorway into the surrounding context, any possible disturbance of the historical, landscape, social and cultural fabric of the region must be avoided. Where possible, the highway components (cuts, embankments, bridges, viaducts and overpasses) should be architecturally designed so as to be integrated into the surrounding environment. The proposed measures will mainly focus on maximizing landscape restoration area by planting native vegetation. More specifically:

- Appropriate revegetation of the Project Area as soon as possible after construction in order to improve the amenity of the road alignment. All open cuts should be planted right after finishing to prevent soil erosion, while specific cuts to be necessarily planted are mentioned in the biodiversity section. As a result, less degradation and fragmentation will be realized, while the landscape will not lose its character. All degraded areas should be rehabilitated with new elements of greenery, so that land, and with it the landscape, returned to its original state. Forming the green landscapes made of trees and shrubs of interesting shapes and colours, where trees stand alone or as a group of trees followed by glades and meadows along the road, contributes to the landscape revival, thus eliminating monotony.
- Revegetation may need to be conducted in accordance with a weed management plan for the corridor.
- Aim to provide tall shrub or low planting within centre medians and outer separators to improve the amenity of the corridor
- Planting vegetation with autochthonous species in areas such as watercourses and banks underneath the constructed bridges, as well as in the abutment areas, affected areas underneath the viaducts as weel as interchanges and areas between cuttings and fills
- Additional planting proposals will address specific landscape, ecology and visual amenity aspects such as to screen views of highway and specific elements such noise walls and fences and to provide scale and to enhance visual amenity at interchange areas, or to provide shade/shelter in open interchange areas

Maintenance will include regular checks for problem weeds, especially those that are aggressive and invasive, and to deal with these in the early stages of infestation when control is relatively easy, observation to detect damage from pests and diseases, waterlogging, and vandalism, modification to planting around barriers, signage and other structures to ensure setbacks are maintained. Often, long-term maintenance problems can be directly attributed to poor construction practices, such as compaction of soils and sometimes these do not manifest until a year or more after construction has been completed. Maintenance of planting is very reliant on the work that has gone in previously in terms of removal and control of weeds, plant species selection, quality and hardening off of plant stock, and mulching.

Visual

Regarding the mitigation measures for visual impacts, residents will have direct, clear views of the Project. New planting will, over time, help to provide some screening for properties. However, this will not alleviate all of the visual impacts associated with the elevated bridges and cut slopes stabilized with anchored concrete, rock walls, other. New access roads onto the highway would aid access and integration, along with additional underpasses. The visual effect from new infrastructure can be mitigated by surface/color treatment of piers, road barriers, using transparent noise barriers whether appropriate and maintenance of vegetation. Users of the highway will have enhanced journeys, accessibility and movement and therefore no mitigation is necessary. Users of the surrounding landscape will have clear views of the Project although proposed planting will, over time, provide some screening. Accessibility across the road will be reduced and the Project will be more visually intrusive than previously.

Lighting

Regarding lighting, the following mitigation measures are proposed to be followed:

- Special attention should be paid to plant choices near residences to ensure that species chosen are of an appropriate height and rely on evergreen species to provide year-round light screening from nuisance light.
- Minimization of glare by ensuring the correct luminaire is selected and installed correctly. To keep glare to a minimum, ensure that the main beam angle of all lights directed towards any potential observer is kept below 70 degrees. It should be noted that the higher the mounting height, the lower can be the main beam angle;

- The use of full horizontal cut off luminaires installed at 0° uplift will, in addition to reducing sky glow, also help to minimise visual intrusion within the open landscape.
- Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit
- The use of sodium light bulbs is prohibited and that LED lights are installed with a "neutral" color temperature of 4000K.

Headlight sweep, the requirement is for the lights to be directed downwards and slightly to the left of centre. Where headlights are visible from 'side on' i.e. passing traffic with headlights oriented at right angles to the view, the effects would be less than if headlights were directed toward the viewpoint or dwelling. It is not anticipated that light from headlights will be a significant issue for residents. The visual screening provided by earth bunding and the proposed vegetation, together with the buffer zone distances will obscure and minimise light from headlights beyond the proposed highway. Light from headlights may be visible or partially visible but is unlikely to be visually intrusive.

Regarding lighting impacts and biodiversity, the abovementioned mitigation measures can be applied as well as shining lights away from the rivers during construction at dusk and in the mornings.

Residual impacts

The implementation of mitigation measures will minimize the initially provoked impacts to a great extent. The new road elements, intersection treatments, underpasses and overpasses, bridges, viaducts, access roads and landscaping at key sites would have an impact upon the viewing experience of visual receptors, while tunnels and cut and covers will contribute positively to the landcape. Regarding visual impacts, residents, tourists, farmers and road users alongside would experience the most significant changes due to their respective viewing opportunities and proximity to the Project. The change in view would be permanent and initially prominent. However, it would become less dominant over time as the scheme would become part of the landscape and views as vegetation naturally regenerates, or screening matures. The use of well located, modern light fittings will minimise glare, light spill and reduce skyglow contributions. Vehicles will not be adversely impacted following mitigation, as glare will be minimised through design, and lighting levels will be sufficient to provide safe transport routes. Taking into account the nature of the land uses and landscaping treatment, residual impacts are presented in the tables above per phase. Similar approach for presenting residual impacts is implemented for all parameters.

6.2.2.4 Geology, geomorphology, seismicity and soils

Impacts

The replacement of natural or agricultural soils by pavements of the new alignments, by doubling or upgrading of existing roads and by the construction of structures such as the interchanges, over and underpasses, bridges, viaducts etc, i.e. soil loss is one of the main impacts regarding soils. Impacts in geology and soils are also related to the rock slides and soil erosion during both construction and operation phases. Additionally, a high risk of slides is expected in most of the sections where tunnels will be opened. Dredging and interventions to construct bridges and viaducts will create also negative impacts in the river body, river bank and rivers valley geo-morphology. Another important impact is the soil contamination by the pollutants generated during the construction and operation phase. The construction works and traffic during operation will include a heavy traffic of vehicles and machinery and accidental leakages of oil and lubricants may occur, while spillages in hazardous materials` storage areas could cause even more serious impact. The impacts are analysed in more details below.

Pre-construction phase

If preliminary design or ESIA neglects or analyses certain issues superficially related to geology and soils, this may affect the environment during the construction and operation phase. The gaps on technical design and ESIA may lead to underestimate:

- Soil erosion and landslides.
- Changes in river morphology and sediment flow.
- Erosion in sites that can be used for exploitation of raw materials with the risk of overexploitation.
- Transferred pollution and contamination in agricultural sites and running waters, by natural flowing waters
- Earthquake events.

Construction phase

The material balance in cuts and fills is presented in the following table, while the bill of quantities are more analytically presented in the bill of quantities of Annex 4.

Table 6-6 Material Balance of cuts and fills

SECTION		FROM	TO	CUT (m3)	FILL (m3)	BALANCE C-F (m3)
1		Murriqan	Balldren (Lezhe)	122,495	8,204,180	-8,081,685
2		Balldren (Lezhe)	Milot	9,550	2,583,800	-2,574,250
3		Milot	Thumane	0	0	0
4		Thumane	Kashar	10,970	2,907,765	-2,896,795
5	B	Kashar	Lekaj	5,464,905	5,486,151	-21,246
5	C	Lekaj	Konjat	159,760	345,399	-185,639
6+7		Konjat	Fier	68,000	3,179,224	-3,111,224
8		Fier (Bypass)		Under construction		
9A	2	Levan	Pocem	118,955	3,726,657	-3,607,702
9B	2	Pocem	Memaliaj	3,743,784	4,327,571	-583,787
10		Memaliaj	Subashi Bridge	4,393,580	2,520,530	1,873,050
11		Subashi Bridge	Gj/Bypass	131,075	348,465	-217,390
12		Gjirokaster Bypass		N/A	N/A	N/A
13	A	Gj/Bypass	Kakavije	49,481	2,266,882	-2,217,401
Total				14,272,555	35,896,624	-21,624,069

Table 6-7 Topsoil excavations

SECTION		FROM	TO	Excavation of topsoil (30cm) (m3)
1		Murriqan	Balldren (Lezhe)	556,336
2		Balldren (Lezhe)	Milot	142,769
3		Milot	Thumane	0
4		Thumane	Kashar	249,194
5	B	Kashar	Lekaj	326,216
5	C	Lekaj	Konjat	159,760
6+7		Konjat	Fier	27,500
8		Fier (Bypass) Under construction		
9A	2	Levan	Pocem	136,103
9B	2	Pocem	Memaliaj	76,626
10		Memaliaj	Subashi Bridge	131,747
11		Subashi Bridge	Gj/Bypass	57,343
12		Gjirokaster Bypass		N/A
13	A	Gj/Bypass	Kakavije	111,507
				1,975,101

The impacts on geology and soils during the construction phase can be summarized below.

- Soil loss. Loss of soils and earth by pavements of AIC corridor and other works or infrastructure conditioned by its construction activities is a very significant impact on earth and rocks. Such removal of soils or changes on land cover, are considered as irreversible impacts, which will happen in any of the Sections. The significance of such impacts is different on several Sections, i.e this impact in existing roads is lower than in new alignments. Therefore, the most affected Sections are Section 1, 9B2 and 10.
- Topsoil. An important factor in this phase is the inevitable requirement for top-soiling of large areas. The top-soiling process is characterized by significant mechanical stabilization in the roadbed and on locations where temporary access roads are constructed, which may have impact (at particularly sensitive locations) on a whole range of soil parameters, primarily on soil permeability, air content etc. The destruction of topsoil will be distinguishable and measurable, will affect most of the alignment, but be restricted to a strip of land defined by the footprint of the highway and it will not affect the integrity of the soil resource in the area. Along the whole AIC, a quantity of 1,975,101 m3 of topsoil (Section 1 with the highest quantity and Section 6+7 with the lowest quantity) will be excavated and will be placed on the adcacent slopes.
- Degradation. There are two aspects of degradation caused by road construction: soil pollution and soil degradation. In this phase, soil pollution may occur due to improper handling of oil and oil derivatives used for construction machines and other plants during road construction, cleaning of vehicles and mechanization outside envisaged and equipped areas, poor site development and other activities not executed in accordance with recommendations for technical protection during construction such as the construction of the bridge and viaducts pylons. Any leakage or spillage of diesel, oil or any other chemical will contaminate the soil which may in turn impact the water sources, nearby communities or dwellings and/or productive land. The contamination of soil and water resources may affect the communities and biodiversity of the area. There maybe minor spills/leakages (defined as leaks from vehicles, machinery, equipment or storage containers, moderate spills (defined as spills of volumes less than or equal to 200 litres is to be contained and controlled using shovels, sands and native soil) and major spills (defined as spills of volume much greater than 200 litres which requires initiation of Emergency Response Procedures and Oil Spill Contingency Plan). Non-displacement piling methods involve the extraction of soil prior to the placing of the pile. The soils arising consist of a heterogeneous mixture of all soil types encountered in the boring, and usually have a high moisture content (both from groundwater and from water added to maintain a positive hydrostatic pressure in the bore). They may also contain cementitious grout and concrete from the pile installation works.

  Soil degradation with regard to its impact on the environment includes several occurrences, most important of which are landslides and rockfalls, erosion, changes in soil permeability, potential degradation of soil properties in the wider area. Soil pollution may affect the rivers by the natural draining by rainfalls or floods, agricultural areas, stagnant water bodies (irrigation reservoirs), and groundwaters in case of hydro-geological windows (Sections 2, 5B and 5C, 9A2 and 9B2, 10 to 13A), while Sections characterized by soils with high fertility (Sections 1, 2, 3, 6+7, 9A2, 11 and 13A) will be also under risk.
- Soil erosion. Stability of soils upon higher cuts can be compromised and erosion/slides may occur. The highest volumes of earth-cut and other earth movement and pavements are planned to be done in Sections 5B, 9B2, 10 and the least in 5C. By their geo-morphological and topographic characteristics and rock structure, the same Sections represent the higher risk of erosion and slides. It is anticipated that for these Sections at which more intensive earthworks will take place, a risk of erosion exists, particularly during rainy days. One of the main impacts in soils remains the cleaning of the soil surface from vegetation. Lack of vegetation cover also intensifies soil detachment by raindrops and proliferates susceptibility to erosion as a result of reduced cohesion and shear strength of the soil. Similarly, steep gradients increase erosion on these slopes due to reduced water infiltration and increased runoff accumulation. Demolition, slide or collapse of rocks may happen in sites where tunnels will be opened such as Sections 2, 5B, 9B2 and 10, and blowout

of waters from calcareous pocket in rocks may happen. Some of the construction works will take place on hilly terrains. Erosion will mainly occur in the areas where the highway will run on the side of the hills and where the cuts will expose large surfaces of soil. The rivers valleys of Sections 1 (Buna), 2 (Mati), 4 (Ishmi), 5B (Erzeni) and 5C (Shkumbini), 9B2 -13A (Vjosa) seem to be exposed to erosion, while slides may happen in the hilly slopes of Section 5B, 5C, 9A2, 9B2, 10 and 11. During cuts or soil compaction, existing infrastructure (drinking and wastewater network, electricity network etc) may be damaged.

Regarding tunnels of Sections 2, 5B, 9B2 and 10, the opening of underground works can lead to a deformation of the soils and rocks around the excavation area in some instances. Such deformations may trigger sudden collapses, subsidence and sinking that can damage both the work under construction and pre-existing nearby structures.

Exploitation of the river basins for extraction of the raw construction material, damaging the river natural characteristics may incite vertical and horizontal erosion, opening depressions in the river body, which can serve as trap for coming sediments from upstream and control sedimentation in the sea coast which is fed by Buna River (Section 1), Drini and Mati River (Section 2), Ishmi River (Section 4), Erzeni River (Section 5B), Shkumbini River (Section 5C), Vjosa River and its branches (Sections 9A2-13A). Sections 3, 6 and 7 are not crossed by large rivers, while the need for construction material may be realized by taking materials from other rivers in the vicinity, respectively; Mati River (Section 2), Shkumbini river (Section 5) and Semani River. This impact may have large significance. Interventions on the river bottom and slopes for the construction of the bridges. This activity may be joined by the increase of solid matter in the low flows of the river, enhancing sedimentation in the lower and flat parts of the rivers, reducing the river depth and causing floods during atmospheric event. The solid matter, generated by works in the river valley and river body (bridges) will be transferred by surface water in the different river sides. The heaviest grain of sands will be disposed in the sites where the running water has a low velocity and in the meanders. Such agglomerations of the sediments, will stop/catch smaller grains of sands and gravels. This phenomenon can happen in all AIC Sections, except for Sections 3, 6 and 7 and 13A. Especially for Section 1 and the international river of Buna, the surface to be affected the by interventions is small and does not seem that impacts will be transferred at a regional or international level (at the river part, shared by Montenegro and Albania). Regarding Sections 2 and 5C, changes on sedimentation patterns may affect wetlands (Protected Areas of Divjake/Karavasta (west of Milot) and Kune Vain Tale) and Patoku wetland (west of Lusnje), where littorals are created by sediments transferred from Shkumbini, Drini of Lezha and Mati Rivers respectively.

- Changes in river basins morphology by construction of bridges/viaducts. The release of significant volumes of sediments to the water bodies by storm water runoff or direct disposal, can lead to changes in water courses` flow patterns and rivers morphology. The viaducts and bridge pillars will change water speed and turbulence which will affect river bottom sedimentation (vertical erosion) and by such changes, new meanders can be created (horizontal changes), inciting river side erosion. Considering the number of bridges and viaducts, the most sensitive Sections due to slides of valley slopes will be Sections 1 (8 bridges) 2 (4 bridges), 4 (12 bridges), 5B (17 bridges), 9A2 (13 bridges), 9B2 (19 bridges). Changes in the river morphology by bridges and viaducts in Buna river are considered as important, due to the river importance at international, regional and local level. No big rivers run close to Sections 3, 6 and 7.
- Soil compaction. Compaction of soils to create appropriate site for operational activities (working campus etc.) during construction may be considered also as important negative impact.
- Landslides. Possibility to induce new landslides across the flysch and molasses rocks that compose the hilly terrain, especially in the Sections 1 (19.7-20.1 km and 21.8-22.2km), 5B (9.9-10.0km, 11.7-12.45km, 13.5-14.4km, 15.75-16.25km, 17.20-21.65km and 23.0-24.70km), 5C (9.15-10.35km, 11.2-11.55km and 12.1-12.55km), 9B2 (1.2-3.65 km,12.80-17.0km, 22.80-23.40km, 26.80-28.10km and 33.8-34.6 km), 10 (8.12-8.32km, 11.3-11.75km, 12.3-13.1 km, 14.45-14.75km, 15.1-15.85 km and 16.2-16.70km), 11 (2.75-2.95km) and 13A (23.2-23.8 km)

- Quarries/borrow pits for construction material and disposal sites. Opening of new quarries will ensure the construction material for the AIC construction. In such cases, sites relatively close to the construction areas with appropriate raw material may be in risk of overexploitation. Such indirect impacts may be significant at a regional scale and include the landscape degradation (quarries), soil removal and changes in the soil ecological functions due to compaction and contamination. The use of the existing quarries minimizes the environmental and social impacts, while they can potentially meet the demand for construction material, to be defined at the later stage of the design process. Operation of the quarries above the approved limits may cause change of floodplain hydrology and trigger erosion and landscape degradation.
- Seismic events. There is a risk of workers life on site or in working campus and risk of structures, facilities and related infrastructure caused by seismic events. All Sections lie in some areas with high seismic activities (Magnitude 7.0), while Sections 1 and 2 have the highest risk (Magnitude 7.2). The risk from damages by earthquakes is higher in areas with diverse topography, steep slopes and the presence of mountains and hills such as Sections 5C, 9B2, 10 and 11. Some very sensitive parts of the Sections regarding seismic risks are the bridges.

The most important impacts in geology, geomorphology, seismicity and soils during construction phase are summarized below. Most of the impacts on Geology, geomorphology, seismic and soils may affect directly human life and biodiversity. The assessment of significance is based on the magnitude matrix presented above and receptors sensitivity assessment.

Table 6-8 Assessment of Impact magnitude and significance on Geology, geo-morphology, soils and seismic events, during construction phase.

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Soil loss	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Major	**Large**
	Degradation	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Soil erosion	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct and transferred	Irreversible	Local	Long term	High	Major	**Large**
	Landslides	Direct	Irreversible	Local	Short term	Medium	Minor	**Slight**
	Quarries/borrow pits for construction material and disposal sites.	Direct and Indirect	Irreversible	Local/Regional	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	High	Moderate	**Moderate**
Section 2 New Alignment + existing road	Soil loss	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Moderate	**Moderate**
	Degradation	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Soil erosion	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct and transferred	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Quarries/borrow pits for construction material and disposal sites.	Direct and Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Seismic events	Direct	Reversible	Local	Short term	High	Moderate	**Moderate**
Section 3 Existing road	Soil loss	Direct	Irreversible	Local	Long term	High	Minor	**Slight**
	Topsoil	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Degradation	Direct	Long term reversible	Local	Long term	Medium	Minor	**Slight**
	Soil erosion	Direct	Short term reversible	Local	Short term	Low	Minor	**Slight**
	Changes in river basins morphology by construction of bridges/viaducts	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Soil compaction	Direct and transferred	Irreversible	Local	Short term	Low	Minor	**Slight**
	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Quarries/borrow pits for construction material and disposal sites.	Direct and Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 4 New Alignment	Soil loss	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Major	**Large**
	Degradation	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Soil erosion	Direct	Short term reversible	Local	Short term	Low	Minor	**Slight**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct	Short term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Quarries/borrow pits for construction material and disposal sites.	Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Minor	**Moderate**
Section 5B New alignment	Soil loss	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Topsoil	Direct	Irreversible	Local	Short term	High	Major	**Large**

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Degradation	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Landslides	Direct	Irreversible	Local	Short term	High	Major	**Large**
	Quarries/borrow pits for construction material and disposal sites.	Direct and Indirect	Irreversible	Local	Long Term	High	Moderate	**Large**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Major	**Large**
Section 5C Existing road	Soil loss	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Moderate	**Moderate**
	Degradation	Direct	Long term reversible	Local	Long term	High	Moderate	**Moderate**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	International/Regional/ Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Landslides	Direct	Irreversible	Local	Short term	Medium	Moderate	**Moderate**
	Quarries/borrow pits for construction material and disposal sites.	Indirect and indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 6 +7 Existing Road	Soil loss	Direct	Irreversible	Local	Long term	High	Minor	**Slight**
	Topsoil	Direct	Irreversible	Local	Short term	High	Minor	**Slight**
	Degradation	Direct	Long term reversible	Local	Long term	High	Minor	**Slight**

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Minor	**Slight**
	Changes in river basins morphology by construction of bridges/viaducts	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Soil compaction	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Quarries/borrow pits for construction material and disposal sites.	Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Low	Minor	**Slight**
Section 8	**Under construction**							
Section 9A2 Existing road	Soil loss	Direct	Irreversible	Local	Long Term	High	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Moderate	**Moderate**
	Degradation	Direct	Irreversible	Local	Long term	Medium	Major	**Large**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Major	**Large**
	Soil compaction	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Landslides	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
	Quarries/borrow pits for construction material and disposal sites.	Direct and indirect	Irreversible	Local	Long Term	High	Large	**Large**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Soil loss	Direct	Irreversible	Local	Long Term	High	Major	**Large**
	Topsoil	Direct	Irreversible	Local	Short term	High	Minor	**Slight**
	Degradation	Direct	Irreversible	Local	Long term	Medium	Major	**Large**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Large	**Large**

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Soil compaction	Direct	Irreversible	Local	Long term	Medium	Major	**Large**
	Landslides	Direct	Irreversible	Local	Short term	High	Major	**Large**
	Quarries/borrow pits for construction material and disposal sites.	Direct and Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Major	**Large**
Section 10 New alignement	Soil loss	Direct	Irreversible	Local	Long Term	High	Major	**Large**
	Topsoil	Direct	Irreversible	Local	Short term	High	Moderate	**Moderate**
	Degradation	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Landslides	Direct	Irreversible	Local	Short term	Moderate	Moderate	**Moderate**
	Quarries/borrow pits for construction material and disposal sites.	Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Medium	Major	**Large**
Section 11 Existing road	Soil loss	Direct	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Minor	**Slight**
	Degradation	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Soil erosion	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**
	Soil compaction	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Geology-Geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Landslides	Direct	Irreversible	Local	Short term	Medium	Minor	**Slight**
	Quarries/borrow pits for construction material and disposal sites.	Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Direct	Reversible	Local	Short term	Low	Minor	**Slight**
Section 12	**Already Planned and approved**							
Section 13A Existing road	Soil loss	Direct	Irreversible	Local	Long Term	High	Moderate	**Moderate**
	Topsoil	Direct	Irreversible	Local	Short term	High	Moderate	**Moderate**
	Degradation	Direct	Irreversible	Local	Long term	High	Minor	**Slight**
	Soil erosion	Direct	Irreversible	Local	Long term	High	Minor	**Slight**
	Changes in river basins morphology by construction of bridges/viaducts	Direct	Irreversible	Local	Long term	Medium	Minor	**Moderate**
	Soil compaction	Direct	Irreversible	Local	Long term	Medium	Minor	**Slight**
	Landslides	Direct	Irreversible	Local	Short term	Medium	Minor	**Slight**
	Quarries/borrow pits for construction material and disposal sites.	Indirect	Irreversible	Local	Long Term	Medium	Moderate	**Moderate**
	Seismic events	Indirect	Long term reversible	Local	Long Term	Medium	Moderate	**Moderate**

Operational/Maintenance phase

The impacts in geology, geomorphology and soils during operational/maintenance phase are described below.

- Soil contamination. Soil contamination can occur during the operation of the AIC by the airborne substances (exhaust emissions and dust) and polluted run-off from the road surface. Additionally, chemicals used for winter road maintenance constitute considerable source of contamination, while use of salt in large quantities might cause the release of chloride ions to the melt waters and soil salinity. Resistant soils, with high soil reaction and absorption complex capacity are less sensitive to pollution, while at this stage the existence or distribution of resistant soils is not known. Pollutants settling in road-side soil can impair the growth of vegetation and the life of soil organisms, thus increasing the likelihood of erosion. These impacts are usually much localized, affecting only a narrow strip on both sides of the road. Accidental pollution by leakages of oils of motor vehicles is also an important impact that will be considered, which is likely to be provoked in all AIC sections.
- Soil erosion. The main risks are associated with the mobilization of unconsolidated materials if disturbed surfaces are not stabilized or successfully vegetated. The effects of extreme temperatures by climate change will increase the risk of the slides and erosion in steep slopes, poor in green cover. In addition, some post-construction erosion process in the form of gullies could be expected around the abutments and pillars of the bridges and viaducts. This impact is expected in most of the Sections, but it can be considered with a major magnitude and large significance in the Sections 5B, 9A2 and 9B2. During this phase, such impacts seem to have high importance, because they may control the function of the corridor and jeopardize the transport at a regional and national level, or in the worst case cause dramatic accidents.

Maintenance works will be carried out during the whole road operation, which will lead to the same impacts as in construction phase, but in smaller surfaces and of less duration. Because of the reduced surfaces and territories where such maintenance activities maybe carried out, the magnitude and significance of such impacts during operation phase will be relatively minor/slight.

The most important impacts in geology, geomorphology, seismicity and soils in operation phase are summarized below.

Table 6-9 Assessment of Impacts in Geology, geo-morphology, soils and seismic events during operational phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase on Geology, geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Medium	Minor	**Slight**
Section 2 New alignment + existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Medium	Minor	**Slight**
Section 3 Existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Low	Minor	**Slight**
Section 4 New Alignment	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Medium	Moderate	**Moderate**
Section 5B New alignment	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	High	Major	**Large**
Section 5C	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase on Geology, geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Existing road	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Medium	Moderate	**Moderate**
Section 6+7 Existing Road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Low	Minor	**Slight**
Section 8	**Under construction**							
Section 9A2 Existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	High	Major	**Large**
Section 9B2 New alignment + existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	High	Major	**Large**
Section 10 New alignement	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	High	Major	**Large**
Section 11 Existing road	Soil Contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Medium	Moderate	**Moderate**
Section 12	**Already Planned and approved**							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase on Geology, geomorphology, Soils and by seismic events								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 13A Existing road	Soil contamination	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Soil erosion and landslides	Direct/Transferred	Short term reversible	Regional/national	Medium term	Low	Minor	**Slight**

Conclusions

By the assessment during the construction phase, based on the average of each impact significance, it can be mentioned that:

- Sections 5B, 9A2, 9B2 and 10 face impacts of large impact significance. Some of these Sections (5B, 9A2 and 10) are characterized by a diverse topography with steep slopes and geo-features that lead to risk of erosion and slides. Section 9B2 with a flat morphology has a high number of bridges and viaducts to be constructed and may temporarily provoke changes in the river morphology. These Sections are close to quarries in mountains and river bodies, something which raises the risk of over-exploitation for raw material needed during the construction phase.
- Sections 1, 2, 4, 5C and 11 are of moderate impact significance. Section 1, with Buna River, a protected area and international river, has a long bridge and viaducts, which may impact on the river body morphology. A lot of earth filling will be implemented in this Section which will change the site natural topography. Regarding Section 2, Mati River and Drini of Lezha river flood their respective down flow sites, and any change on the river bathymetry by sedimentation may increase the flood events frequency and effects. Additionally, the other Sections are close to quarries in surrounding calcareous mountains or close to river body for sand and gravel, which are used for extraction of raw material and exploitation,
- Sections 3, 6 and 7 and 13A result to a slight to moderate impact significance and slight sensitivity.

As far as the assessment during the operation phase is concerned, based on the average of impact significance, the expected impacts are quite lower than those during the construction phase. Impacts from seismic activities have a moderate significance for all Sections, considering the Albanian engineering practice on respecting the seismic norms for construction of motorways and bridges. During this phase, the impacts have the following average significance:

- Impacts in Section 5B, 9A2, 9B2 and 10, have large significance due to possible impacts by soil pollution, risk of slides and soil erosion and to the broken geomorphological features characterizing their topograp.
- Impacts in Sections 1, 2, 4, 5C and 11 have a moderate significance. Although Section 11 lies over an existing road, the road doubling will be carried out on a broken relief, which is characterized by steep slopes, and if the slope of cuts is not appropriate, landslides may be incited.
- Impacts in Sections 3, 6 and 7 and 13A have an overall slight significance, because these Sections will lie over existing roads, running almost over flat areas.

Mitigation measures

Preconstruction phase

In order to mitigate the abovementioned impacts, the ESIA Consultant under the preparation of the study should:

- Identify the geologically sensitive areas, prone to erosion and landslides in the ESIA to be prepared
- Propose site specific mitigation measures regarding soil pollution, topsoil management, borrow pits management, leakages in the ESIA
- Define appropriate sites to ensure the raw material for construction (borrow pits, quarries), risks of exploitation of sensitive natural sources or overexploitation of exploited raw material sources and the materials disposal
- Include the proposals of the Preliminary design/Detailed design for the proposed disposal sites
- Apply the best international practices with regard to the geotechnical assessment of the planned road corridor and especially of the bridges and other road infrastructure. The project activities should take the geological settings and the soil category into consideration to avoid any associated adverse impact such as soil liquefaction, subsidence, erosion and sedimentation, etc. Additional studies should be conducted for the identification of characteristics of the regime of channel and

floodplain deformations of rivers, marginal erosion, water erosion (types of processes, their orientation, intensity and impact boundaries), of possible mudflow occurrence areas (the boundaries of mudflow distribution, the duration, the frequency, the maximum flow) and of slope processes manifestation areas (area, soil characteristics, sustainability factors, degree of activity and hazard for the Project area).

- Design and build an appropriate drainage system in order to avoid eventual damages from erosion and sedimentation to the planned road and its concrete structures (bridges, viaducts, tunnels, overpasses, and retaining walls), minimizing the quantity of uncontaminated stormwater entering cleared areas;
- Propose via the ESMP and the ESAP that the Contractor should prepare an Erosion Control and Sedimentation Management Plan, a Topsoil Management Plan as well as a Borrow pit Management plan for the construction phase and a Spills and Emergency Response Plan for both phases. The ESIA should propose some indicative issues to be included in these Plans.

Construction phase

A set of proposed mitigation measures regarding geology and soils will include:

- Construction of retaining walls to avoid induced landslides, mudflows, rock falls and erosion. Such walls are planned to be built in all Sections apart from Section 3 as indicated in the table below.

Table 6-10 Retaining walls

SECTION		FROM	TO	Reinforced concrete retaiing wall (m3)	Reinforced earth retaining wall (m2)
1		Murriqan	Balldren (Lezhe)	2,100.00	0.00
2		Balldren (Lezhe)	Milot	1,680.00	0.00
3		Milot	Thumane	0.00	0.00
4		Thumane	Kashar	1,680.00	3,600.00
5	B	Kashar	Lekaj	16,800.00	18,000.0
5	C	Lekaj	Konjat	840.00	0.00
6+7		Konjat	Fier	840.00	0.00
8		Fier (Bypass)			
9A	2	Levan	Pocem	420.00	0.00
9B	2	Pocem	Memaliaj	17,640.00	27,000.00
10		Memaliaj	Subashi Bridge	5,040.00	16,200.00
11		Subashi Bridge	Gj/Bypass	336.00	0.00
12		Gjirokaster Bypass			
13	A	Gj/Bypass	Kakavije	336.00	0.00

- Minimizing the spatial extent of the working strip, especially in the steep areas where retaining walls are planned.
- Avoiding river/stream erosion by ensuring that construction works do not disturb any existing gravelly embankments at the water course crossings;
- Protecting the river/stream beds against erosion downstream and upstream the concrete structures (bridges, viaducts, overpasses) in order to ensure the foundations of these structures to be robust and to resist to the water erosion in case of maximal water discharge;
- Prohibiting the exploitation of gravels and sand within the river/stream bed close to concrete structures (bridges, viaducts) in order for water erosion to not weaken their foundations;
- Placing geotextile and geogrid for soil stabilization (Section 1 for 19,2 km, Section 2 for 6 km, Section 4 for 6km, Section 5B for 7.2 km, Section 5C for 2.4km, Section 6+7 for 7.2km, Section

9A2 for 9,6km, Section 9B2 for 6km, Section 10 for 6km, Section 11 for 3.6km and Section 13A for 3.6km)

- Minimizing the clearing of vegetation, especially in steep terrain, to avoid the soil erosion and any potential induced small landslide;
- Programming construction activities so that the area of exposed soil is minimised during times of the year when the potential for erosion is high, for example during summer when intense rainstorms are common.
- Re-vegetating and mulching progressively as each section of works is completed. The interval between clearing and re-vegetation should be kept to an absolute minimum.
- Embankments and slopes with disturbed vegetation must be replanted immediately after the construction/disturbance stops – if not covered with gabion baskets and whether the season allows. For replanting native species must be used, placement of fiber mats to encourage vegetation growth and temporary fencing to protect plants from being grazed by cattle.
- Applying nets for vegetation fixing in order to avoid rock falls and erosion. This measure should be applied wherever earthworks for road construction are needed in steep terrain;
- In conformity with Euro codes 7 and 8, it is recommended to take into consideration the results of the seismological survey prior to construction stage, as well as the geotechnical parameters resulting from the geotechnical study and the data/information provided by the boreholes logs that will be planned under the Preliminary Design.

In order to avoid or mitigate impact on topsoil, the operation ground must be established with consideration of environmental safety measures, as presented below:

- Ground clearance must be minimized;
- Topsoil must be removed from all areas required for permanent and temporary needs of the Project in order not to get mixed with the subsoil. It will be used for highway side slopes and would be the best to embed the humus material without previous storage. This way of reuse of excavated soil is useful for fast vegetation development, which prevents erosion and lowers potential maintenance costs. If the storage is necessary, it must be provided on regulated dumps and based upon principles of humus material conservation.
- To avoid loss of the productive soil layer, all suitable topsoil and other material shall be saved and stockpiled separately for the future recultivation of the area;
- To ensure stability, stability of the stockpile will be achieved through preservation of 'safe' slope inclination and diversion of runoff from the area. the soil piles shall not be higher than 2 metres. The piles must be placed and managed so as to avoid erosion and washing off. Drainage trenches around the piles must be provided.
- Soil compaction may be reduced by strictly keeping to temporary roads, camp/operation ground boundaries;
- Reduce water velocities by minimizing continuous slopes where flowing water can scour, and to prevent scouring, drainage lines may need to be lined or velocity-reducing structures, such as crushed rock or geotextile, to be placed in the drainage line.

Table 6-11 Topsoil management

SECTION		FROM	TO	Placing top soil and applying grass seed on the slopes and rolling (km)
1		Murriqan	Balldren (Lezhe)	45,05
2		Balldren (Lezhe)	Milot	17,81
3		Milot	Thumane	0
4		Thumane	Kashar	23,16
5	B	Kashar	Lekaj	36,93
5	C	Lekaj	Konjat	15,59
6+7		Konjat	Fier	30,84
8		Fier (Bypass) Under construction		
9A	2	Levan	Pocem	29,59
9B	2	Pocem	Memaliaj	41,46
10		Memaliaj	Subashi Bridge	22,15
11		Subashi Bridge	Gj/Bypass	11,29
12		Gjirokaster Bypass		N/A
13	A	Gj/Bypass	Kakavije	26,17

In order to avoid or mitigate impacts caused by accidental fuel/oil spills and poor management of polluted runoff, the following mitigation measures will be proposed:

- Any temporary fuel tank shall be placed in a covered area with berms or dikes to contain any spills. Any spill shall be immediately contained and cleaned up with absorbent materials;
- On-site repairs /maintenance/fuelling activities shall be limited. Priority shall be given to off-site commercial facilities. If impossible, a designated area and/or secondary containment for the on-site repair or maintenance activities must be provided;
- On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired.
- Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment. Drip pans or absorbent materials shall be provided. On small spills absorbent materials shall be used;
- Use of off-site vehicle wash racks (commercial washing facilities) is preferable. If on-site cleaning is necessary, bermed wash areas for cleaning activities shall be established. The wash area will be sloped to facilitate collection of wash water and evaporative drying;
- In case of the fuel/oil spills risk, oil traps shall be additionally provided;
- Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, shall be stored on open ground;

A part of the dredged material for cuts during road construction will be used for backfilling, reducing thus the quantity of the material extracted at the quarries for the road embankments. In case material will be needed for construction, there are existing quarries located in the proximity of each of the Sections. A major part of such quarries is under the process of re-evaluation by the Ministry of Tourism and Environment, because their impacts in tourism and visual assets, in community by the way of exploitation and in habitats and biodiversity are very significant. The use of quarries should be done only after obtaining the necessary Environmental Permit by the Environmental Authorities. In case new borrow bits will be used, borrow pit areas will be graded to ensure drainage and visual uniformity or to create permanent tanks/dams, while they cannot be opened deeper than maximum level of groundwater, to avoid the occurrence of open phreatic level. The Contractor will develop a borrow pit management plan at the time

of construction works completion. Pits management, (including restoration if it will follow the completion of certain works) shall be in full compliance with all applicable environmental standards and specifications.

Operational phase

A set of mitigation measures will be applied:

- Protect the rivers/streams beds against erosion downstream and upstream the concrete structures (bridges, viaducts, overpasses) in order to ensure the foundations of these structures to be robust and to resist to the water erosion in case of maximal water discharge;
- Prohibit the exploitation of gravels and sand within the river/stream bed close to concrete structures (bridges, viaducts, overpasses) in order the water erosion to not weak their foundations;
- Maintenance of nets for vegetation fixing and ensuring at the rehabilitation of the vegetation in steep terrain, to avoid the soil erosion and any potential induced small landslide
- Maintenance of retaining walls to avoid induced landslides, mudflows, rock falls and erosion;
- Maintenance of the drainage system in order to avoid eventual damages from erosion and sedimentation to the planned road and its concrete structures or flooding (bridges, viaducts, overpasses, and retaining walls).
- Measures for the case of lorry spills, fire involving hazardous/polluting substances along the route to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water.
- Analysis of soil for identification of the impact caused by ice breaking salt (after the snow melt – in spring) with subsequent organic amendment and/or amendments to adjust pH or nutrient deficiencies.

Residual impacts

There are expected to be minor/slight residual construction phase impacts within the project area. However, this needs to be confirmed once detailed construction related plans and measures are prepared. Regarding the operational phase, there are expected to be slight/minor residual impacts.

6.2.2.5 Waste

Impacts

Pre-construction phase

Lack of appropriate guidance in the ESMP of the ESIA and of the obligation to the Contractor that he would have to prepare a Waste Management Plan, may lead to:

- Irregular solid wastes collection, selection and separation, transport, and reuse, incinerate or discharge/disposal.
- Contamination or disturbance of inhabitants and wildlife from waste distribution.
- Contamination of surface waters, ground waters, soils and air by bad management of wastes
- Damage of landscape and tourism/recreational potential

Construction phase

Construction waste can also be grouped based on different phases of project life cycle. The primary forms of solid waste, which will be generated during construction phase, will be excess excavated soil and sand, packaging waste, debris and construction waste, waste tires (from construction machinery), waste oils and greases (from construction machinery) and communal waste of working site camps (construction sites). More specifically, the types of waste expected to be produced are presented in the following table. This is a categorization according to the EU legal framework.

Table 6-12 Categories of waste according to groups, expected in all stages of construction and exploitation of highway

No.	Group	CATEGORY OF WASTE
	13	WASTE OF OIL AND REMAINS OF LIQUID FUELS (EXCEPT CONSUMABLE OILS AND THOSE IN CHAPTERS 05)
	13 01	Waste hydraulic oils
1.	13 01 11*	Synthetic hydraulic oils
2.	13 01 13*	Other hydraulic oils
	13 02	Waste motor oils, transmission oils and lubricants
3.	13 02 08*	Other motor oils, transmission oils and lubricants
	13 05	Content of separation of oil / water
4.	13 05 02*	Sediment (mud) from oil/water separator
	13 07	Waste from liquid fuels
5.	13 08 01*	Engine fuel and diesel
6.	13 08 02*	Petrol
7.	13 08 03*	Other fuels (including mixtures)
	15	PACKAGING WASTE, ABSORBENTS, CLOTHES, MATERIAL FOR FILTRATION AND PROTECTING CLOTHES, IF NOT SPECIFIED OTHERWISE
	15 02	Absorbents, filtering materials, wiping clothes and protection clothes
8.	15 02 03	Absorbents, filtering materials, wiping clothes and protection clothes other than those under 15 02 02
	16	WASTE NOT SPECIFIED OTHERWISE IN CATALOGUE
	16 01	Old vehicles from different transportation means (including machinery working besides the road) and waste originated from disposing of old vehicles and from vehicle maintenance
9.	16 01 03	Wasted tyres
10.	16 01 07*	Oil filters
11.	16 01 13*	Braking fluids
12.	16 01 14*	Anti-freeze containing hazardous substances
13.	16 01 19	Plastics
14.	16 01 20	glass
	16 06	Batteries
15.	16 06 01*	Lead batteries
	17	CONSTRUCTION WASTE AND WASTE FROM DEMOLITION
	17 01	Concrete, bricks, tiles and ceramics
16.	17 01 01	Concrete
17.	17 01 02	Bricks
18.	17 01 03	Tiles and ceramics
	17 02	Wood, glass and plastics
19.	17 02 01	Wood
20.	17 02 02	Glass
21.	17 02 03	Plastics
	17 03	Bitumen-like mixes, tar and tar containing products
22.	17 03 03	Tar from coal and products with tar
	17 05	Land (including land dug out from contaminated locations), stones and muddy waste dug out by machinery
23.	17 05 03*	Land and stones containing hazardous substances
24.	17 05 04	Land and stones other than those listed under 17 05 03
25.	17 05 05*	Muddy waste dug out by machinery, containing hazardous substances
26.	17 05 06	Muddy waste dug out by machinery other than the one under 17 05 05
27.	17 05 07*	Waste coming off the caterpillar containing hazardous substances
28.	17 05 08	Waste coming off the caterpillar other than the one under 15 05 07
	17 09	Other waste from construction and demolition
29.	17 09 04	Mixed waste from construction and demolition other than those under 17

No.	Group	CATEGORY OF WASTE
		09 01 and 17 09 02 and 17 09 03
	20	MUNICIPAL WASTE (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL AND INDUSTRIAL WASTE), INCLUDING SEPARATELY COLLECTED FRACTIONS
	20 01	Separately collected fractions
30.	20 01 01	Paper and cardboard
31.	20 01 02	Glass
32.	20 01 39	Plastics

(*) – Mark of hazardous waste

Construction phase remains the most important phase, during which the major part of waste is expected to be produced. The impacts by waste generation is defined by the sites and surrounding characteristics, quality of environment (sensitivity), magnitude (defined by selected thresholds) and by their average, the impact significance occurs. The spatial extent (spread) of the impact refers mostly to wastes transferred by waters (presence of rivers, streams and channels) and hydro-geological windows (permeability of geo-layers).

More specifically:

- Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works. The impacts from waste may be generated by different activities during construction works such as cutting/filling of soils and rock, lack of temporary disposal sites, material handling on site and inappropriate use of materials. Illegal disposal of wastes in rivers and streams in the vicinity of the corridor can generate impacts in the down flow area. Additionally, the infiltration of contamination by waste in groundwater has a high significance. Debris, irons, cement, organic and inorganic colors, leakages from equipment, wood and plastic, remains of batteries, etc. will impact on soils, waters and air (bad odors) if not appropriate management will be applied. Such waste may impact on landscape by degradation, restrain wildlife and damage flora and habitats. Medical waste that can be generated by medical services in working campus in case of accidents, may be very harmful and contagious and its bad management may be joined by transferred impacts to other sites.

  In case of heavy rains or intensive winds, waste can be transferred in other sites by the free movement of waters or flying by wind and by infiltration (liquids and leakages) through geo-layers. Indirect impacts from waste transferred in lowlands, natural sites or agricultural sites, areas used for recreation or tourism (seaside and beaches) for more than one region (Section 2, Section 9A2, Section 9B2, 10 and 11) may occur. Such waste may impact at a large scale on the habitats and biodiversity as well as human's health or their drinking water sources. Therefore, such contamination is considered as of major magnitude. In case of Section 1, Buna River, the spatial extent and effect are at an international level.

- Waste generated by workers

  The waste generated by workers have the same nature as the municipal waste and is composed of organic compound (food remains, papers), plastic and glass. Such waste may end up illegally directly to the natural rivers and streams or draining channels. The areas under risk seem to be Sections close to river bodies such as Sections 1, 2, 4, 5B, 5C, 9A2, 9B2, 10, 11 and 13A.

The most important impacts are summarized below for each of the Sections from waste generation during the construction phase.

Table 6-13 Assessment of Impacts of waste during construction phase.

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase by waste generation								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local/Regional/International	Medium term	High	Major	**Large**
	Waste generated by workers	Direct	Short term reversible	Local/Regional/International	Short term	Medium	Major	**Large**
Section 2 New alignment + existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local	Medium term	High	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 3 Existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local	Short term	Low	Minor	**Slight**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Minor	**Slight**
Section 4 New Alignment	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 5B New alignment	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local	Medium term	High	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 5C Existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local	Medium term	Moderate	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 6 +7 Existing Road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Minor	**Slight**
Section 8	**Under construction**							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase by waste generation								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 9A2 Existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local/Regional	Medium term	High	Major	**Large**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
thttSection 9B2 New alignment + existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local/Regional	Medium term	High	Major	**Large**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 10 New alignement	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local/Regional	Medium term	High	Major	**Large**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Moderate	**Moderate**
Section 11 Existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Short term reversible	Local	Short term	Low	Moderate	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Minor	**Slight**
Section 12	**Already Planned and approved**							
Section 13A Existing road	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works	Direct	Medium term reversible	Local/Regional	Medium term	Medium	Medium	**Moderate**
	Waste generated by workers	Direct	Short term reversible	Local	Short term	Medium	Minor	**Slight**

Operational/maintenance phase

The operation phase is supposed to have less negative impacts regarding waste generation than the construction phase. All of the impacts mentioned below usually have not large significance, since small amount of waste is generated, except for the waste generated during accidents of big vehicles which carry hazardous materials or oil. More specifically:

- Waste can be generated as a result of inappropriate behaviour of drivers and passengers (illegal accidental disposal)
- Solid waste generation during operation and maintenance activities will include road resurfacing waste (e.g. removal of the old road surface material), road litter, illegally dumped waste, general solid waste from rest areas, wildlife carcasses, vegetation waste from right-of-way maintenance and sediment and sludge from stormwater drainage system maintenance.
- Waste maybe generated by services that will be developed in both sides of the roads such as motor car services, washing car services, rest areas, oil stations etc., which are considered as part of the secondary road infrastructure. In such cases, waste will include both waste waters and solid wastes.

For the assessment of the impacts from waste during the operation phase, there are not considered major accidents, which may create large amount of wastes. The following table refers to impacts per Section that may be generated from wastes by random activities.

Table 6-14 Assessment of Impacts of waste during operational phase.

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operational phase by waste generation								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 2 New alignment + existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 3 Existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 4 New Alignment	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 5B New alignment	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 5C Existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 6+7 Existing Road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 8	**Under construction**							
	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operational phase by waste generation								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 9A2 Existing road	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	Slight
Section 9B2 New alignment + existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	Slight
Section 10 New alignement	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 11 Existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	**Slight**
Section 12	**Already Planned and approved**							
Section 13 Existing road	Accidental waste of travelers	Direct	Short term Reversible	Local	Short term	Low	Minor	**Slight**
	Solid waste generation during operation and maintenance activities	Direct	Reversible	Local	Short term	Medium	Minor	**Slight**
	Wastes generated by services	Indirect	Reversible	Local	Short term	Medium	Minor	Slight

Conclusion

The impacts of wastes during construction phase have different magnitudes. Waste pollution for Section 1 has a large significance and sensitivity. Impacts for the sections 9A2, 9B2, and 10 have an average of moderate to large significance and large sensitivity.

The average significance and sensitivity for Sections 2, 4, 5B and 5C is of moderate level. One of the impacts, i.e. transferring of washed solid waste contamination, in other sites, groundwater etc. has a large significance due to the presence of "hydro-geological windows" in close distance (Sections 2, 5B and 5C).

Sections 3, 6, 7, 11 and 13A (existing roads) have a slight to moderate impact significance and moderate sensitivity. Some of the impacts, such as pollution/contamination of soils, surface waters, air and specific sites and transferring of waste waters or washed solid waste contamination, in other sites, groundwater etc are classified as with moderate significance due to the sensitivity of natural waters (Section 11) or presence of hydrogeological windows in close distance. Major accidents are not taken into account for the assessment of impacts by waste generation during the construction phase, since they are very rare.

Regarding accidental waste during the operation phase, impacts have in general a minor magnitude and slight significance. Mitigation measures will be proposed to reduce as much as possible the negative impacts.

Mitigation measures

Pre-construction phase

The ESIA Consultant should give proposals for the areas that waste will be disposed such as landfills for municipal solid waste, following the national legislation on waste, and for waste management for the different streams such as hazardous and construction and demolition waste. He should include in the ESMP and ESAP that the Contractor has to prepare a Spill Response Plan and Waste Management Plan which will describe waste streams and amounts, describe recycling/reuse methods for each material ,identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling, specify responsibilities for managing and disposal of waste, describe special measures for material use and handling and describe communication and training to support and encourage participation from everyone on site.

Construction phase

The management of all waste fractions will be conducted according to the national legislation on waste and individual waste streams, having in mind that some of the fractions will be recycled (metals, paper, glass), reused (earth, rope cuts). Waste management measures will be enforced that facilitate the re-use and recovery of excavated material and diversion of waste from landfilling in line with the waste hierarchy (prevention, re-use, recycling, recovery, and disposal) that is adopted by the Albanian legislation which is line with the EU legislation. More specifically:

- Where generated, waste will be classified in accordance with the Albanian regulatory requirements on inert, non-hazardous and hazardous waste;
- Exact position of landfills will be determined in later phases, by examining locations "in situ".
- The communal waste and the other non-dangerous waste could be transported to landfills close to the AIC.
- Regarding hazardous waste, there are going to be followed practices that are already established in Albania for these types of waste, namely collection by authorised companies and exporting. Short term keeping of hazardous waste should be realized by using and marking suitable containers for each type of waste
- The sites for the disposal of inert material (construction and demolition waste) will be identified in consultation with the authorities.

- The majority of excavated material that will be generated will be reused, if suitable, either as engineering fill material or in the environmental mitigation earthworks of the project;
- Mixing of inert, hazardous and non-hazardous waste, either during collection or storage will not be permitted;
- Waste will be segregated and stored in containers (skips) and other storage vessels, clearly labelled, sheeted or closed when waste is not disposed in them

Operational phase

In order to keep the highway right-of-way looking presentable, regular clean- up of articles large enough to be seen from the highway is necessary throughout the season. More specifically, waste management strategies will include:

- During resurfacing, maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base;
- Regarding miscellaneous waste:
  - Collecting road litter or illegally dumped waste and managing it
  - Provision of bottle and can recycling, where appropriate and trash disposal receptacles at parking lots to avoid littering along the road;
  - Manage herbicide and paint inventories to avoid having to dispose of large quantities of unused product.
  - Use garbage bins fitted with lids to avoid scattering around and attraction of scavengers.
  - Manage and dispose hazardous waste according to the type and the class of hazard. Note: for hazardous waste removal licensed company must be contracted.
  - Until removal (temporarily) waste must be stored within secure facilities with weatherproof flooring and roofing.
  - The communal waste and the other non-dangerous waste will be transported to landfills close to each AIC Section.
  - Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardous or non-hazardous waste based on an assessment of its characteristics.

Residual impacts

Regarding the construction phase, if the mitigation measures suggested are implemented residual impacts will be minor. As far as the operational phase is concerned, implementing the operational measures outlined above will eliminate significant waste impacts (insignificant).

6.2.2.6 Climate change

Regarding climate change, the impacts can be classified into impacts of the AIC on the environment considering climate change effects and impacts of Climate change on the AIC.

The first group includes the GHG emissions and particle matters. The discharge of gases by motor vehicles and other equipment that use oil seem to be present in both construction and operation phases in all Sections, while more sensitive seem to be the new alignments. One of the main issues of transport in Albania is the use of old or "second hand" motor vehicles, while PMs, generated during construction works and/or from the traffic on unpaved/not maintained or old/damaged roads may serve as a greenhouse factor.

Another group of climate change impact are those that may affect the AIC. The change in extreme temperatures may affect the instability of rock, construction material or pavement due to hot or very cold atmospheric conditions. Accidental fires, during the warmest season, may cause damage to air quality, soil

and biodiversity. Additionally, floods may damage the construction activities or roads and structures during the operation phase.

Impacts

Pre-construction phase

The most important impacts that can come up at this phase are those that will derive from the lack of examination of climate change issues under the ESIA preparation and will be passed to the other phases (construction and operation). Among the main impacts, catastrophic impacts by floods to structures by the underestimation of their dimensions, pavement damage due to increase of the extreme temperatures flux by the proposal of a non suitable type of pavement, CO_2 emissions' underestimation maybe included.

Construction phase

During the construction phase, the following impacts can be identified.

- Increase of GHGs

CO_2 emissions and hydrocarbons do not seem to impact on the large scale territories during the construction phase. Any GHG emissions at this phase are mainly expected by the transport of materials to site, plant and equipment use and transport of waste. Gases will be a transferred impact in service/access roads that will be used instead of those under reconstruction (case of doubling/upgrade of existing roads). Sections either on existing roads or new alignments surrounded by existing road network (1, 2, 3, 6 and 7, 9A2 and 11) which have currently a moderate level of GHG emissions will end up to being less sensitive towards GHGs than the new alignments.

- Floods

Floods remain a risk for all Sections which lie in flat areas and land depressions. Section 1 lies in an area, which is very prone to floods. If not appropriate measures, during heavy precipitation, floods may damage the works in the central part of Section 1 (Buna river) and Section 9A2 (Vjosa river). Working sites in Sections 2, 3, 4, 5B, 5C, 6 and 9B2, 11 and 13A, during heavy rainfalls, are exposed to floods, but at a less extent than Section 1.

- Fires

During the dry season, extreme temperatures will incite accidental fires. Accidental fires may be provoked in any of the Sections during the construction phase and may cause damage to human life and assets, deteriorate or damage habitats and biodiversity and degrade the air and soil quality. Sections 9B2 and 10, with natural woodlands in their surroundings are very exposed to fires with more severe impacts. Destruction of habitats by fires may cause habitat fragmentation at the best scenario or destruction of green cover and other catastrophic impacts to biodiversity (worst scenario), something which needs a long time to be rehabilitated and obtain its natural ecological features. Wildlife under stress will have to move to other areas, untouched by fires, provoking ecological stress (overpopulation) in the sites where they will be relocated.

- Increase of temperatures by the removal of topsoil and vegetation clearance

Vegetation clearance and pavements will increase air temperatures in the road itself and its surroundings. The shadows created by trees and the tree crown as an umbrella due to the solar radiation will be disappeared. This impact will be significant in new alignments such as Section 9B2 and 10, while important impacts will be provoked in the Sections 4 and 5B.

The most important direct and indirect impacts for each of the Sections from/by Climate change in construction phase are summarized in the table below.

Table 6-15 Assessment of Impacts of climate change during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	High	Major	**Large**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 2 New alignment + existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 3 Existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Low	Minor	**Slight**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 4 New Alignment	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 5B New alignment	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 5C Existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 6+7 Existing Road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Minor	**Slight**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 8	**Under construction**							
Section 9A2 Existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Major	**Large**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Major	**Large**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 10 New alignment	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Major	**Large**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 11 Existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Low	Minor	**Slight**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
Section 12	**Already Planned and approved**							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 13A Existing road	Increase of GHGs	Direct	Reversible	Local	Short term	High	Minor	**Slight**
	Floods	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Fires	Direct/Transferred	Reversible	Local	Medium term	Medium	Minor	**Slight**
	Increase of temperatures by topsoil removal and vegetation clearance	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**

Operational/maintenance phase

Very similar sources to construction phase seem to generate impacts during the operational phase, while their level of magnitude and significance may change.

Vulnerability of the Project to climate change: climate change resilience and adaptation assessment.

These are the climate variables which roads are typically sensitive to:

- Precipitation:
  - Roads are sensitive to high rainfall. An average increase in winter rainfall may cause roads to become flooded due to flooding of local watercourses (fluvial flooding) or surface water flooding (pluvial flooding). Flooding may mean that roads are impassable and cause loss of amenity and of traffic hindrance and safety. Flooding may also cause damage to paved surfaces (leading to increased maintenance requirements). Sections 1, 2, 3, 4, 5C and 9A2 have a high exposure to floods.
  - Roads and bridges are also sensitive to extreme rainfall events which, in addition to flooding, may also lead to destabilisation of soils and earthworks, potentially leading to temporary or permanent loss of amenity. Heavy showers may cause soil erosion, landslide or rock fall, increase ground subsidence and endanger embankments. Excess water on the highway may impact on the traffic safety.
  - Roads are also sensitive to low rainfall or drought. Prolonged dry periods may lead to drying out and cracking of earthworks and soils, while there is susceptibility to wildfires that threaten the transportation infrastructure directly and mudslides in areas deforested by wildfires
- Temperature
  - Roads and bridges are sensitive to extreme temperatures. It is almost certain that annual and seasonal mean temperatures will continue to grow by the end of the century, as well as the intensity and frequency of days with high maximum temperatures. High temperatures may cause damage to paved surfaces, including potential melting and deformation. An increase in solar radiation can also cause more rapid deterioration of materials and associated infrastructure such as signage;
  - Bridges are sensitive to high temperatures which affect thermal expansion joints and increase earth pressures.
- Wind:
  - Bridges are sensitive to high winds which increase wind loading on the structure. High winds and storms can affect the stability of above-ground infrastructure and hasten material degradation. High winds can also cause wind-driven rain infiltration into building materials and surfaces which can increase maintenance costs and operational disruption. High winds also increase risk to bridge users (particularly high sided vehicles) and may lead to temporary closure. Associated infrastructure such as signage or signals could also be damaged by high winds; and
  - Bridges are also sensitive to storms, particularly the risk of lightning strike. Electronic control equipment associated with bridges is likely to be highly sensitive to lightning strike.
- Soils:
  - Roads and bridges are all sensitive to soil stability. Soil stability can be reduced as a result of extreme rainfall or prolonged periods of rainfall which can lead to waterlogging, as well as extreme temperatures and drought which can causes soils to dry out and crack. Earthworks and embankments associated with roads and bridges are particularly sensitive to changes in soil stability; and

- Water availability can cause a number of impacts to water quality and soils. For example, greater water volumes can increase the mobilisation of pollutants in soils whilst water scarcity can increase the accumulation of chemicals and pollutants which may cause increased salinity and acidification.

In conclusion, the abovementioned may impact on geotechnics (erosion, stability of earthworks and compaction, earthworks construction across existing landslip, scour and erosion of earthworks, stability of slopes, change in water levels/pore pressure, drainage ditches, on pavements (design of foundations, materials integrity, specification and construction details, construction - laying surface dressing, microsurfacing, temperature susceptible materials, skid resistance and maintenance and on structures (thermal and wind actions (loads) applied to superstructure, earth pressures used in design affected by change in ground water level, foundation settlement affected by change in ground water level, design for increased scour risk for foundations, design of structure drainage, design, management and maintenance of bearings and expansion joints, climatic constraints on construction and maintenance activities and optimum timing of maintenance interventions, in response to changes in deterioration rates).

Current contribution of the traffic to GHG emissions and climate change;

- GHGs (Discharge of CO2 and hydrocarbons). The potential impacts of GHG on the Project may affect the receptors and aspects such as natural systems (alterations to geographic ranges of protected species through climate change) and human systems (alterations to winds, flood, drought regimes affecting crop viability, flood risk for housing farms and infrastructure).

  GHGs seem to have higher significance during the operation phase (traffic) in comparison with the construction phase. Such impacts seem to be generated by the road operation, maintenance, repair and replacement at all Sections, while the most cumulative impacts seem to be provoked in the new alignments of Sections 9B2 and 10 and the least in the second part of Section 5B, which is surrounded by natural woodlands. Generally, all surroundings of the Sections are prone to this risk.

The most important impacts for each of the sections from/by Climate change during the operational phase are summarized below.

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Moderate	**Moderate**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	High	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local/regional	Medium term	High	Major	**Large**
Section 2 New alignment + existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 3 Existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Low	Minor	**Slight**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 4 New Alignment	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 5B New alignment	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Moderate	**Moderate**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
Section 5C Existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Floods	Direct/Transferred	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 6+7 Existing Road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Minor	**Slight**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
Section 8	**Under construction**							
Section 9A2 Existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Moderate	**Moderate**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 9B2 New alignment + existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Moderate	**Moderate**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
Section 10 New alignment	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Moderate	**Moderate**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
Section 11 Existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Low	Minor	**Slight**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**
Section 12	**Already Planned and approved**							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase in/by climate change								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 13A Existing road	GHGs (Discharge of CO2 and hydrocarbons)	Direct/indirect	Reversible	Local	Short term	High	Minor	**Slight**
	Extreme temperatures and intensive precipitation resulting in pavement changes and soil erosion	Direct/Transferred	Reversible	Local	Short term	Medium	Moderate	**Moderate**
	Floods and landslides	Direct/Transferred	Reversible	Local	Medium term	Medium	Moderate	**Moderate**

For each element of the vulnerability assessment (i.e. sensitivity and exposure), a vulnerability categorisation is assigned to each climate variable in relation to each receptor based on the following scale:

- High: High climate sensitivity or exposure.
- Medium: Moderate climate sensitivity or exposure.
- Low: Not significant climate sensitivity or exposure.

Vulnerability is classified as high if both, sensitivity and exposure, or at least one of them are classified as high.

Table 6-16 Vulnerability matrix

Sensitivity	Likelihood - Exposure		
	Low	Medium	High
Low	Low	Low	Low
Medium	Low	Medium	Medium
High	Low	Medium	High

Vulnerability assessment presented in the following table is carried out only for the threats that are rated as of medium sensitivity. Most of the road segments are highly exposed to flooding. Since they are elevated from the ground and all the lowlands will be first flooded, the road's sensitivity is medium.

Table 6-17: Vulnerability assessment matrix for the present (green) and future (red) climate

Section 1

	EXPOSURE			
Sensitivity		Low	Medium	High
	Low			
	Medium			
	High			Extreme temperatures Extreme Precipitation Flood

Sections 2, 3, 4, 5C and 9A2

	EXPOSURE			
Sensitivity		Low	Medium	High
	Low			
	Medium			Extreme Precipitation Floods
	High			Extreme temperatures

Section 5B and 6&7

	EXPOSURE			
Sensitivity		Low	Medium	High
	Low			
	Medium		Floods	Extreme Precipitation
	High			Extreme temperatures

Section 9B2, 10, 11

	EXPOSURE			
Sensitivity		Low	Medium	High
	Low		Floods	
	Medium		Extreme temperatures Extreme Precipitation	
	High			

Section 13A

	EXPOSURE			
Sensitivity		**Low**	**Medium**	**High**
	Low			
	Medium		Extreme temperatures Floods	Extreme Precipitation
	High			

Conclusions

Taking into account the assessment above, it can be mentioned that the most significant impacts of climate change in AIC are those generated by floods and fires. The sources of the impacts of construction and operation phases are very similar, but their magnitude changes according the weight of the impacts.

According to the impact assessment on climate change, during the construction phase, the majority of the Sections (1, 2, 4, 5B, 5C, 9A2, 9B2, 10 and 13A) have an average moderate significance. Most of the impacts for all Sections are related to floods, fires and temperature extremes, while the generation of CO2 emissions has lower significance in the construction phase than in the operation phase. The highest magnitude of impacts by/from Climate change is related with the risk of floods for Sections 1 and 9A2 (although it is an existing road) and with fires for Sections 9A2 and 10. The impacts in Sections 3, 6&7 and 11 as existing roads have an average slight significance.

During the operation/maintenance phase, the most significant impacts remain those from floods and fires. The generation of GHGs has a smaller significance in existing roads than the one in new alignments. Another important impact is the erosion in slopes, affected by extreme hot and cold temperatures in different seasons. Such impacts are higher in alignments characterized by steep slopes (Section 9B2, 10 and parts of Sections 5B and 9A2).

Regarding the average of impact significance per each of the climate change impacts and the operation/maintenance phase, Section 1 has a large significance of impacts from floods and moderate from GHGs discharge, extreme temperatures and changes on temperatures. All other Sections have impacts of a moderate and sometimes slight (almost existing roads) significance and sensitivity.

The impacts of AIC on global climate change are considered as negligible.

Mitigation measures

Pre-construction phase

The ESIA Consultant should be in close cooperation with the Design team (Hydraulic and Road Design Experts) and may include in the ESIA the following in order to minimize the magnitude of the impacts:

- Identification of potential emission sources for GHGs
- Calculations of the CO2 emissions provoked for the project's operation phase using EBRD & EIB calculation methods and comparing the emissions calculated to certain thresholds. Data will be needed for the number of vehicles per day and the types of the vehicles, while specific transmission emission factors will be defined. Values should be reported as tonnes of carbon dioxide equivalents (tCO2e).
- Proposal of mitigation measures for the drainage system, water pathways and collectors etc., to avoid floods, caused by climate change effects
- Drainage and collection system planning to avoid distribution of pollutants during floods
- Proposal of a climate resilience management plan (Green Economy Transition Approach) which will consider all the extreme events such as floods, landslides, temperature increase, heavy precipitation, examine their sensitivity, prepare a vulnerability assessment matrix and will present what the Design team foresaw to make the Project resilient (culverts, bridges, pavement characteristic towards heat and frost). The Climate Resilience Management Plan will ensure appropriate design measures, materials specification and mechanisms for management of climate resilience risks, particularly those associated with adverse impacts of temporary works on permanent works during construction. It should ensure that

the temporary works (e.g. access roads) do not decrease climate resilience of permanent works as contained in the tender specification, that surfacing materials are adequately specified accounting for anticipated climate change. that the drainage system has sufficient capacity for intense rainfall events, that the Road is protected against slope instabilities, that substructures and foundations have sufficient resistance to changes in ground parameters, that expansion joints have sufficient margin for anticipated climate change, that bearings have sufficient margin for anticipated climate change, that surfacing materials are adequately specified, that elements can be replaced at a later date but more resilience components and that the bridges allow for high wind loading

The mitigation measures for climate change should be planned and finalized under Preliminary Design/Detailed Design, while they refer more to this phase and find implementation during the other two phases.

Regarding the vulnerability of the Project to climate change, appropriate structural designs and surfaces and the use of different binders in asphalt (asphalt melting, frost) should be proposed. Additionally, the preliminary design/detailed design should be more precise for the ditch and culvert capacity. The Conceptual Design has proposed that the culvert span should not be less than 2x2m as dimensions while the analytical tables lie in the drainage subchapter of the technical description chapter of the PESIA.

A number of simple measures can be taken to ensure that in the short term that extreme precipitation events do not result in significant impacts to the Project, they include:

- Maintain positive cross slope to facilitate flow of water from surface;
- Increase resistance to rutting;
- Reduce splashing/spray through porous surface mixtures;
- More frequent use of elevated pavement section;
- Improve visibility and pavement marking demarcation; and
- Ensure that all embankments are seeded to help increase stability.

Construction phase

The magnitude of greenhouse gas emissions associated with the construction phase of the Project can be minimised using the following methods:

- Maximising the use of construction materials and products with recycled or secondary and low carbon content, from renewable sources, and offering sustainability benefit;
- Using locally-sourced materials where available and practicable to minimise the distance materials are transported from source to site; and
- Using more efficient construction plant and delivery vehicles, and/or those powered by electricity from alternative/lower carbon fuels.

Operational phase

The mitigation measures for this phase should include inter alia:

- Ensure all agreements on the natural hazards response and damage management are in place; Operational procedures should include policies and processes identified for responding to disasters;
- Establish a monitoring program which will ensure that monitoring of climatic data is embedded into the monitoring program; and that will include collection of data on the state of road pavement, with consideration of the parameters that can be a result of the climate change impact;

Residual impacts

Levels of GHGs emitted during the construction phase are not considered to significantly impact regional or global GHG levels. No significant residual impacts are therefore anticipated during the construction phase. Regarding operational phase, residual impacts from the generation of GHGs will remain throughout the lifecycle of the Project. This is an unavoidable consequence of the Project, but more fuel-efficient cars may, in the future lead to a decrease in the emissions generated on the Project road. Proper maintenance related to road and drainage structures in order to have proper protection against extreme temperatures, landslides, soil erosion, extreme precipitation. There maybe a residual impact due to flood risk due to the construction of new bridges especially for Sections …….

6.2.2.7 Air and Noise

Impacts

Impacts in air quality will be assessed together with noise, since the Sections have the same level of sensitivity to both air and noise pollution, which is emitted by similar sources. The AIC construction is expected to have short-term impacts on the air and noise quality during construction phase and long-term impacts during the operation phase. The emissions in air and noise and vibrations will be generated by the construction works, the outdoor machineries, equipment and vehicles, use of construction material, etc. During the operation phase, the main impact source in the air and noise will be traffic.

Since data on air and noise quality in the AIC surroundings is not available, the existing air and noise quality is defined in an empiric way, based on field observations, distances from the cities, existing roads, services etc. The part of the Sections which run over natural habitats or agricultural lands with low density of settlements and services, low traffic etc are supposed to have higher sensitivity than those Sections or part of Sections which run over existing roads with moderate or high traffic. The most sensitive areas, according to the air quality and noise current assessment are considered Sections 9B2 and 10.

Pre-construction phase

The pre-construction phase is considered as a very important phase for planning the effective mitigation of impacts of the following phases. Lack of calculations and predictions on air emissions but mainly of noise pollution levels during the operation phase may underestimate the mitigation measures that maybe proposed and high noise impacts may affect the population that surrounds the AIC Sections, provoking disturbances during day and night (sleep) and health problems. Additionally, if air and noise monitoring during the construction phase is not foreseen/imposed to the Contractor, serious complaints and grievances may come up during the construction activities by the population nearby.

Construction phase

The air and noise impacts during the construction phase are listed below, while the Sections that will mostly affected are presented in the tables below and in the conclusions of the parameter.

- Gas emissions. Air quality degradation can be caused during earthwork (excavations, levelling, drilling, blasting, tunneling, material haulage and stockpiling), from loading, transportation and unloading of soil and other friable materials, from the demolition of the houses subject to acquisition, from operation of construction machinery (grading, compaction, bulldozing), asphalt plant, concrete batching plant and from onsite and offsite traffic, vehicles moving across unpaved or dusty surfaces. Each of these operations has its own duration and potential for generation of dust and exhaust gases (PMs, CO, CO2, NOx, PAH, HC, Pb, SO2). Therefore, exhaust gas emissions are expected to occur, at different levels, from all work sites /construction areas throughout the duration of the construction period, although this will be strongly dependant on the particular activity / equipment used (emission source), namely whether or not emissions will be diffuse or more localised and on the time-scale (temporary or longer-term).

  Site equipment with diesel internal combustion engines (trucks, excavators, loaders etc.) and concrete batching and asphalt plants generate particulate matter (PM10 and PM2.5), which can provoke asthma, cause heart disease, and lead to premature death. Nitrogen oxides can cause increased sensitivity to allergens. When nitrogen oxides are combined with VOCs in the presence of sunlight,

they form ground-level ozone. This ozone can cause difficulty in breathing, exacerbate asthma and cause lung inflammation. Over time, untreated inflammation can result in permanent damage to the lungs. Carbon monoxide can cause chest pain in people with heart problems, headaches, nausea, decreased mental alertness, and death at very high level. VOCs from vehicles include formaldehyde, acetaldehyde, acrolein, 1,3-butadiene, and benzene, which may cause cancer. People who live close to the AIC may be at higher risk for exposure to traffic pollutants. All the abovementioned impacts refer also to wildlife.

- Dust. High levels of dust emissions may occur during transportation of materials, equipment and personnel to and from the worksite, due to the movement of the trucks on dirt roads and also, under windy conditions, from dry, bare soil surfaces that have been cleared of vegetation for the construction of the road.

  Emissions of dust are dependent of the amount of relocated (filling and excavated) earth, the quantities of expected surplus earth materials to be disposed, the construction work progress per day, the total construction surface, the blasting patterns and the emission factors of combustion emissions from vehicles, equipment and machinery.

  Dust is a major air quality problem at and around construction sites. Dust is problematic for a variety of reasons, as outlined below:

  - Inconvenience to local people. For example, people may have to re-wash laundry that has been put outdoors to dry, and wash windows, curtains and vehicles. Dust can contaminate meat hanging up in open-air butchers and other food that is exposed to it in homes, shops and open-air restaurants, giving food a gritty texture.
  - Health and safety problems. Dust might affect health by irritating eyes and worsening the health of people with asthma. Dust can reduce visibility for drivers on roads. It can also be blown for long distances by the wind.
  - Crop damage. Even low concentrations of dust can affect plant and fruit growth as far away as one kilometre from a construction site. Plant growth is particularly susceptible to dusts that are highly alkaline, for example limestone and cement dust. Dust deposited during light rainfall can cause the soil surface to form a crust increasing run-off. These constitute social/economic impacts. One of the mitigation measures implemented by the Contractor will be a grievance mechanism with potential to compensation for damage to crops.
  - Impact on ecology. Dust blowing onto watercourses may damage the ecological conditions by increasing sedimentation, reducing sunlight and suffocating fish. It may also affect plant growth and change the species of plants growing in an area. Dust may also damage trees and other vegetation planted as part of the construction contract.
  - Damage to batching and asphalt plants and equipment. Within the construction site, dust can cause mechanical or electrical problems in sensitive equipment such as computers. It can also increase abrasion of moving parts in equipment and clogging of air filters.
  - The demolition of objects (buildings, residential Properties, fences, structures etc.) located on the path of the highway route. In the case of buildings and Residential Properties, their demolition implies the risk of finding asbestos containing materials that might have been used for their construction. If this happened a highly dangerous asbestos air contamination could occur. At the construction site, the possible impacts are expected across the axis of the highway (at a distance of ± 100 m). The highest demolition is observed in Sections 1, 2, 5B and 6 and 7, as indicated in the table below, the data of which are included in the Bill of Quantities.

Table 6-18 Demolition of buildings and structures

SECTION		FROM	TO	Demolition of existing buildings (m3)	Demolition of existing structures (m3)
1		Murriqan	Balldren (Lezhe)	7,020	1,320
2		Balldren (Lezhe)	Milot	9,360	1,860
3		Milot	Thumane	2,340	0
4		Thumane	Kashar	6,756	0
5	B	Kashar	Lekaj	10,536	0
5	C	Lekaj	Konjat	4,416	2,040
6+7		Konjat	Fier	6,300	3,216
8		Fier (Bypass)			
9A	2	Levan	Pocem	1,536	3,660
9B	2	Pocem	Memaliaj	3,876	0
10		Memaliaj	Subashi Bridge	96	0
11		Subashi Bridge	Gj/Bypass	1,536	1,476
12		Gjirokaster Bypass		N/A	N/A
13	A	Gj/Bypass	Kakavije	1,536	0

Additional impacts, indirect and transferred ones may be generated during the transport of raw material, wastes and/or discharging of waste waters. The transport of raw material from the source (borrow pit, quarry) to the working site, if not well managed, will generate dust. This pollution may be caused in all roads where the vehicles may pass. The Contractor should ensure that the vehicles traffic routes do not pass within residential areas to the extent possible, and if not possible to achieve, the necessary mitigation measures to be taken.

Also, during the transport, waste can accidentally may slide from the track trailers, and cause pollution in the roads far from working site. Such accidental wastes, may be neglected and during time may generate unwanted odors. New alignments seem to be more affected by this type of impact.

- Noise pollution. Increased noise levels will be created on and around the construction site due to land clearing, earthworks, road surfacing, movement of vehicles, etc. The impact is variable depending on the extent and character of construction activities, the location of the activities and the hours that they take place. Potential noise sources during construction are site equipment and vehicles carrying equipment and materials. The main construction related sources of noise are the construction camp establishment, including the site offices, workshops, excavation and earthworks, rolling and compaction, piling, construction material and equipment delivery vehicles and concrete batching plant and asphalt batching plant on site.

  Several health impacts have been associated with exposure to high noise levels such as sleep disturbances, cardiovascular and physiological effects and psychological disturbances of various kinds. Noise will affect the wildlife (more than gases), may cause disturbance to fauna, which will search quiet and appropriate areas for living, standing, feeding and breeding.

Table 6-19 Sound power levels of construction activities and related equipment, with necessary average of distance to dwellings. (ref. to "Construction noise: overview of regulations of different countries", Jan H. Granneman, Noise Control for quality of Life, INTERNOISE, Innsbruck, September 2013.

Building phase; equipment/activity	Soundpower [PWL in dB(A)]	Distance [m] at which day limit [$L_{Ar,LT}$ in dB(A)] is met				
		60 dB(A)	65 dB(A)	70 dB(A)	75 dB(A)	80 dB(A)
Demolition						
Demolition crane with scissors	108	45	25	15	10	5
Demolition crane with hydraulic breaker	125	80 - 200	55 - 125	30 - 80	20 - 55	10 - 30
Hydraulic breaker (hand-held)	112	60	40	25	15	5
Shovel 20 tons	107	40	25	15	5	5
Mobile crusher	115	85	60	30	20	10
Mobile crusher	120	130	85	60	30	20
Site preparation						
Crawler crane 20 tons	107	40	25	15	5	5
Dumper/truck	106	35	20	10	5	5
Foundation work						
Hydraulic pile driver prefab concrete piles	120 - 126	240 - 415	160 - 260	100 - 175	60 - 115	30 - 65
Pile driver steel piles	130	650	400	265	185	105
Pile driver prefab concrete piles	130	650	400	265	185	105
Bored piles (Tubex of Terr-Econ)	102	25	15	5	5	<5
Sheet piles with vibrating hammer	125	225	145	105	60	30
Sheet piles with vibrating hammer (quiet)	118	130	80	45	25	15
Completion						
Concrete mixer	107	40	25	15	5	5
Concrete pump	110	50	30	20	10	5
Concrete pump +2 trucks	111	55	35	20	10	5

Referring to the table above, the level of noises expected to be generated by equipment reaches bigger distance from the working site in case of foundation works (bridges, interchanges, overpasses etc) than in site preparation and completion.

The table for evaluation of impacts from construction works in air and noise per Section.

Table 6-20 Assessment of Impacts of air and noise during construction phase.

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in air and noise								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 2 New alignment + existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 3 Existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 4 New Alignment	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 5B New alignment	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 5C Existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 6+7 Existing Road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 8								
Section 9A2	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in air and noise								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Existing road	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 9B2 New alignment + existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 10 New alignement	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 11 Existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		
Section 12								
Section 13A Existing road	Air pollution (Gas emissions and dust)	Direct	Irreversible	Local	Short-term	High		
	Noise pollution	Direct	Irreversible	Local	Short-term	High		

Operational/Maintenance Phase

The most significant impacts during the operational/maintenance phase are considered those generated by the traffic. The impacts during maintenance phase are similar with those during construction phase, but with smaller weight, because of the small territories of intervention and lower volume of works. More specifically:

- Air pollution. Air pollution by traffic is considered the most important impact expected in air quality during the operation phase. The most significant p[ollution will derive from the generation of particle matters - PMs, and gases, such as CO, CO2, NOx, PAH, HC, Pb, SO2. CO affects humans as well as all fauna species, binding to haemoglobin and thereby displacing oxygen. The consequences are disturbances in balance, eye disorders, weakening of concentration, difficulty breathing and headaches.

  The effect of carbon monoxide on the plants can be considered insignificant. The effect of nitric oxide on humans is similar to the effects of carbon monoxide. Displaces oxygen from the blood, which threatened the supply of tissues. High concentration of nitric oxide in the blood causing death.

  Nitric oxide as air pollutant is essential for the creation of nitrogen dioxide (NO_2), which is toxic and particularly harmful to the respiratory system. Its harmful effect on the plants is reflected in the appearance of wax leaf necrosis and premature decline.

  The hydrocarbons that influence human health may be divided in five groups: paraffins, naphthene, olefins and alkynes, aromatics, oxidized hydrocarbons. Polycyclic aromatic hydrocarbons have carcinogenic effects cancerous lung disease. The content of hydrocarbons in plants is quite complex and is reflected at large number of faults. High concentrations cause necrosis of flowers and leaves and they negatively affect the process of falling of leaves, and cause difficulties in the process of flowering. Very sensitive plants react at very low concentrations of hydrocarbons. The impact of hydrocarbons on building materials is not reliably proven.

  Sulphur dioxide, combined with fine dust particles, has harmful effects on mucous membranes (eyes) and airways. Impacts of Sulphur dioxide on the plant life are reflected in degradation of chlorophyll and withering away of certain tissues. Out of all the air pollutants, Sulphur Dioxide has the most prominent effect on structures. In combination with moisture, Sulphur Dioxide acts as sulfuric acid, and it thus destroys organic compounds. This is particularly important for the historical and artistic value of the objects. Any damage caused in this way increases with temperature, humidity and light intensity. The amounts of lead and its compounds that people consume through food on a daily basis are much higher the amounts that they receive through respiratory organs, i.e. from the atmosphere. Permanent exposure to pollution from lead poisoning leads to chronic, which is primarily manifested in the form of loss of appetite, stomach problems, fatigue, dizziness, kidney damage and unconsciousness. However, there is still the dilemma regarding acceptable concentrations limits of lead in the atmosphere. In terms of vegetation, toxicity of lead is low. Concentrations of lead in plants are highly correlated with the content of lead in the soil. Otherwise the presence of lead in plants reduces their ability to grow and their enzyme activity. Dust will mainly be generated from traffic during dry seasons. The interaction of people with some gases may impact on their health, while wildlife will be also affected.

- Noise pollution. In general, the noise caused by traffic flow is of variable intensity and with intermittent pulses. It can have a negative impact on the quality of life of the surrounding population of the Sections of the AIC and its health, as well as a potential negative impact on biodiversity. The noise levels will be defined with better accuracy via noise modelling under the ESIA preparation.

The table for evaluation of impacts during the operation phase in air and noise per AIC Section is presented below.

Table 6-21 Assessment of Impacts of air and noise during the operational phase.

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the operational phase in air								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Moderate**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 2 New alignment + existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 3 Existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 4 New Alignment	Air pollution	Direct	Irreversible as for the road operation	Local	Long term	High	Moderate	**Moderate**
	Noise pollution					High		
Section 5B New alignment	Air pollution	Direct	Irreversible as for the road operation	Local	Long term	High	Moderate	**Moderate**
	Noise pollution					High		
Section 5C Existing road	Air pollution	Direct	Irreversible as for the road operation	Local	Long term	High	Moderate	**Moderate**
	Noise pollution					High		
Section 6+7 Existing Road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 8								
Section 9A2 Existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the operational phase in air								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 9B2 New alignment + existing road	Air pollution	Direct	Irreversible as for the road operation	Local	Long term	High	Moderate	**Large**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 10 New alignemen t	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Large**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 11 Existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		
Section 13A Existing road	Air pollution	Direct	Irreversible	Local	Long term	High	Moderate	**Slight**
	Noise pollution	Direct	Irreversible	Local	Long term	High		

Conclusions

Impacts of AIC sections on air and noise during construction phase have a large significance at natural sites (Sections 9B2 and 10). The significance of impacts in air and noise for the Sections 1, 4, 5B and 5C, is considered on average as moderate, since they lie partially over existing roads. The other parts of these Sections run over agricultural or natural/semi natural sites with good air quality. The significance of impacts in air and noise for the Sections 2, 3, 6, 7, 9A2, 11 and 13A is assessed as slight, because they are not supposed to have a good quality of air and noise (low sensitivity).

By the assessment of the impacts in air and noise of the AIC sections, the most significant impacts during the operation phase are identified in Sections 9B2 and 10, which are characterized by a very good air quality and natural noise. The magnitude of the impacts in air and noise in such Sections is assessed as moderate, but the Sections' sensitivity is high. Pollution by gases is considered higher during operation phase due to the traffic.

Mitigation measures

Preconstruction phase

Regarding the design phase, correct siting of construction camps and timing of activities along the route will reduce the risk for elevated air and noise levels to affect sensitive receptors. Locating these facilities more than 500 meters downwind of sensitive receptors will limit potential noise impacts.

Before the initiation of construction and operation phases, air (SO2, NO2, CO, PM10, PM2.5 etc.) and noise (Lday, Levening, Lnight etc.) measurements should be carried out during the preparation of the ESIAs per Section and identification of the sensitive areas (houses, businesses, hospitals, schools etc.) should be carried out in order measurement points to be defined. The air measurements results should be compared with the national, EU and WHO limits and guidelines and the noise measurements with the national and IFIs guidelines.

The measurements should be focused in existing roads or AIC alignments close to the existing network namely close to the second half of the Section 1, the second half of Section 2, Section 3, first half of Section 5B, Section 5C, Sections 6 and 7, Sections 9A2, 11 and 13A. Regarding the other Sections, they are supposed to have low level of air pollution and noise, because they lie mostly over agricultural lands or natural habitats.

Specific proposals should be done by the ESIA regarding noise mitigation measures, after the realization of noise modelling. Indicative mitigation measures should be the implementation of noise and natural barriers, low noise pavements etc. for the operation phase. Air modelling should also be carried out for the operation phase to predict the air pollution in certain time horizons, based on calculated traffic loads.

The ESIA Consultant should propose in the ESMP and the ESAP that the Contractor should prepare Air quality and dust and noise management plans, while he will have to be precise on the locations that the Contractor should have to monitor during the construction period in order to minimize any impacts at the local population and biodiversity. The Contractor is also responsible for the preparation of a Health and Safety Plan and the ESIA should include this requirement as well.

The Air and Dust Management plan will detail the actions to be taken to minimize dust generation (e.g. spraying un-surfaced roads with water (including the types of equipment, sources of water, locations for watering and schedule), covering stock-piles, etc) and will identify the type, age and standard of equipment to be used and will also provide details of the air quality monitoring program for baseline and routine monitoring. The Plan will also include contingencies for the accidental release of toxic air pollutants. Provision in this Plan should be made for air quality in tunnels.

The Noise Management Plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Additionally, it should identify sensitive receptors, schedule monitoring frequency and refer to action/response plan, responsibilities and reporting and communication plan.

Construction phase

Air

The Contractor will be responsible for the following regarding dust:

- Dust generated from haul roads, unpaved roads, material stock piles, etc:
- All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins, or other acceptable type cover (which will be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s).
- Hard surfaces will be required in construction areas with regular movements of vehicles.
- Regular wetting of dusty areas when the weather is dry (and predictions made in advance of the weather for the coming week to avoid situations where equipment is not available for wetting);
- Earthwork operation to be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community.
- Speed limitation of the construction vehicles on the construction site and in the populated areas
- Locate support facilities and spoil disposal sites so to reduce trip numbers and distance –as far as feasible.
- Provide truck-washing facilities at tunnel portal and bridge construction sites to prevent truck-out of mud and dust. Above ground option is deemed to be the priority.

Finally, regarding the emissions from on-road and off-road vehicles, the following mitigation measures should be considered:

- Air quality monitoring throughout the construction period
- Exhaust emissions - No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. Construction equipment will be maintained to a good standard and fitted with pollution control devices regularly monitored by the Contractor and Engineer.
- Open burning of waste materials - No burning of debris or other materials will occur on the Site without permission of the Engineer.
- Do not burn solid construction waste (including felling residue)
- Regardless of the size or type of vehicle, owners / operators should implement the manufacturer recommended engine maintenance programmes.
- Drivers should be instructed on the benefits of driving practices that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits.
- Implement a regular vehicle maintenance and repair program.
- Provide vegetation planting along roadsides to limit air quality impacts.

The Contractor should develop and implement an awareness raising programme for the affected community, especially social infrastructure facilities that could be helpful in reduction of adverse health impacts from traffic related air emissions. Such programme shall aim to inform the affected community about the measures they can take to minimise their exposure to air pollution.

Noise

During the construction phase, the Contractor will be responsible for the following:

- Carry out noise quality monitoring throughout the construction period
- Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive periods.

Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas (within 250 meters) such as residential, nursery, or medical facilities, the Contractor's hours of working shall be limited to 8 AM to 6 PM; The weekend/evening periods are important for community rest and recreation and provide respite when noisy work has been conducted throughout the week. Accordingly, work should not usually be scheduled during these times.

- Give notice as early as possible to sensitive receptors for periods of noisier works such as crushing concrete or stones, vibrating or hammering metal to the ground. Describe the activities and the expected duration. Keep affected sensitive receptors informed of progress.
- All mechanical installations are to be silenced by the best practical means using current technology. Mechanical installations, including noise-suppression devices, should be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with a suitable muffler in good condition.
- Required maintenance of tools, machines and equipment so that they are in good conditions.
- Install less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive receptors. Occupational health and safety requirements for use of warning systems must be followed.
- Keep good conditions of trucks that is used to transport construction materials so they cause no loud noise and control the truck speed, to be not exceeded 40 km/h when driving through communities, and not exceeded 80 km/h, when driving on highways.
- Where possible, no truck associated with the work should be left standing with its engine operating in a street adjacent to a residential area.
- Provision of noise protection kits such as ear plugs, earmuffs, for workers who are working in the area where the noise level is higher than 85 dB(A). It is designated as a regulation that workers must wear protection kits in case of working in a noisy area. Informing the local population for the period of execution of the construction works
- The implementation of noise reduction measures, such as proper coordination of the machinery operation time and the use of mobile noise barriers (which can achieve noise reduction by 5 dB), can further reduce the sound level that will be emitted to the surrounding environment.
- Where appropriate, haul routes for construction material will avoid additional nuisance in residential areas or at sensitive sites;

<u>Operational phase</u>

Air

After the air noise modelling that the ESIA will carry out, more precise mitigation measures could be proposed. However, it is recommended to plant a vegetation barrier along the road (in particular in the sensitive areas such as settlements). Roadside vegetation can help reduce air pollutant concentrations near roads.

Noise

Noise modelling should be carried out in order to define with accuracy the kind and efficiency of mitigation measures. The final design of any mitigation should only be completed with the proper assessment of the noise climate currently prevailing at the receptor points, and confirmation of the predicted impact. Should additional measures need to be implemented, this could be done either through the project design (further reducing the noise levels at fence), or by providing additional acoustic insulation at the receptor. There has been a general estimation of noise barriers under the Conceptual Design which are going to be finalized and become more precise in the next stages.

Table 6-22 Noise barrier estimations

SECTION		FROM	TO	Noise barriers length (lm = liner meter)
1		Murriqan	Balldren (Lezhe)	5,201.90
2		Balldren (Lezhe)	Milot	9,004.60
3		Milot	Thumane	7,104.90
4		Thumane	Kashar	6,592.30
5	B	Kashar	Lekaj	4,554.00
5	C	Lekaj	Konjat	8,132.30
6+7		Konjat	Fier	11,231.00
8		Fier (Bypass)		
9A	2	Levan	Pocem	511.50
9B	2	Pocem	Memaliaj	3,405.60
10		Memaliaj	Subashi Bridge	432,30
11		Subashi Bridge	Gj/Bypass	799.70
12		Gjirokaster Bypass		N/A
13	A	Gj/Bypass	Kakavije	799.70

Proposed noise mitigation measures leading to the decrease of noise exposure include measures implemented at the source of noise and measures that intercept the noise between the source and the receptor:

- Appropriately high/laterally extensive acoustic fencing (noise barriers) or earth bunds installed around the perimeter of the site
- Insulation of house windows and facade with noise reduction potential
- Speed Limits
- Noise Proof Windows
- Low Noise Asphalt
- Green belt

Residual impacts

Through the use of the mitigation hierarchy, the project is not expected to have any significant residual impact on air quality during the construction and operational phases. Moderate or minor residual noise impacts are considered likely during the construction phase depending on the Section, while the noise modelling under the ESIA preparation will show any noise exceedances in both day and night time scenarios. Where necessary, more concrete noise mitigation measures will be required. In the absence of the mitigation outlined above, the residual impact would likely be high.

6.2.2.8 Surface waters

The impact of AIC in surface waters is considered as one of the most important impact in construction and operation phases due to the running waters capability to transfer the impacts in other sites and in sea coast. The AIC crosses all big rivers of Albania, such as Buna, Drini of Lezha, Mati, Ishmi, Erzeni, Shkumbini, Semani and Vjosa rivers. Among these rivers, the highest river water quality belongs to Vjosa River. Buna, Drini of Lezha, Erzeni and Shkumbini Rivers have a medium quality, while Drini of Lezha has a low quality of waters. Semani river, alhough it has a low quality, has not been considered in the assessment, because it is crossed by Section 8 (Fier Bypass), which is already under construction.

Impacts

Surface water bodies are vulnerable to impacts on their physical dynamics. Their flow characteristics can

be changed as a result of project activities during construction phase, while their water quality is prone to pollution during both construction and operation phases.

The most sensitive areas seem to be Section 1 with Buna River and Sections 9A2-13A with Vjosa River and its branches. Buna River is an international river and transboudary Protected Area, shared between Albania and Montenegro. Vjosa River is also an international River, shared between Greece and Albania (downstream of the river and river mouth, part of Albania). Considering the Albanian priorities on environmental protection, all rivers and streams are managed better during the last years with an attempt to reduce pollution/contamination sources that affect them.

Pre-construction phase

The preconstruction phase remains the crucial phase to identify the exact quality of the environment, to prevent or reduce the impacts and their magnitude for the later phases and to define the best measures and mechanisms to control as much as possible negative impacts in surface waters (natural rivers/streams, artificial irrigation and draining channels) for the construction and operation phases.

Construction phase

The most important expected impacts are those in natural rivers and streams. In case of pollution in the higher elevations (small hills etc) and in the vicinity of channels, the pollution/contamination may be transferred to other sites by free gravity movements, washing the polluted soils and during the atmospheric events such as heavy rains and snow melting. More specifically:

- Change of the hydrological regime of the watercourses. The Project envisages the construction of bridges across the watercourses and culverts across the seasonal streams/irrigation network. Structures used for crossing of rivers and other water courses may create obstacles for natural hydraulic flow as well if they are not properly scaled. The impact will be associated with temporary redistribution of surface run-offs by earthworks before and during construction activities. Interception and disposal of run-offs from construction sites, as well as changes in the run-off direction and rate caused by over consolidation of soils and construction of artificial structures in the project area may influence the hydrological regime of surface water bodies. The water level upstream the hydraulic structure may increase which can result in increased risk of flooding of areas located upstream highway during high water levels. This impact may occur only when bridges, box culverts and other structures are undersized comparing to the local hydrology. The river crossings for all Sections are listed below.

Table 6-23 River crossings (Sections 8 and 12 are not included)

Km Position Section 1	River/Stream	Km Position Section 5C	River/Stream	Km Position Section 9A2	Stream
0+719	Muriqan	0+085	Channel Peqin Kavaje	21+800	Shkozes
3+910	Carrines	2+400	Gosa e Madhe	26+620	Shehajt& I Madh
6+310	Oblika	4+430	Gosa e Vogel	Km Position Section 9B2	River/Stream
8+450	Buna	5+180	Aliaj	4+800	Povla
25+930	Gjadri Branch	6+500	Shkumbini	22+560	Kasri
38+830	Drini i Lezhes	8+350	Zhuri	28+600	Zagoni
Km Position Section 2	**River/Stream**	8+880	Zhames	35+010	Luftinja
4+245	Drini i Lezhes	9+980	Vidhasit	35+550	Vjosa

Km Position Section 1	River/Stream	Km Position Section 5C	River/Stream	Km Position Section 9A2	Stream
14+000	Mat	10+250	Curgjes	**Km Position Section 10**	**River/Stream**
Km Position Section 3	**River/Stream**	11+980	Gramshit	2+780	I Madh
10+900	Droja	12+950	Kembes se Dushkut	10+000	Vjosa
Km Position Section 4	**River**	32+700-33+200	Channel Peqin-Kavaje	19+120	Drinos
3+300	Ishmi	**Km Position Section 6&7**	**Streams**	**Km Position Section 11**	**River/Stream**
8+675	Gjola	0+020	Dushkut	6+365	Kardhiqi
12+400	Terkuza	6+650	Lushnja	9+775	Zalli
15+450	Tirana	8+450	Lunja	**Km Position Section 13A**	**River/Stream**
16+900	Tirana	Km Position Section 9A2	Stream	1+125	Dervicani
Km Position Section 5B	**River/Stream**	4+600	Fiku	4+120	Kserpotamos
0+330	Limuthi	5+720	Kafaraj	10+580	Gorica
7+500	Lalmi	7+030	Kalinores	11+100	Frashtani
10+100	Erzeni River	9+575	Fragus	12+650	Grapshi
11+300	Ravaxheshi	12+010	Kreshpanj	13+600	Palokastra
16+700	Peza	15+350	Turbullit	15+450	Jergucati
30+700	Darci	20+800	I Thelle	20+100	Populit
32+700-33+200	Channel Peqin-Kavaje	21+800	Shkozes	22+550	Drinos

One of the potentially significant impacts may be caused by the realignment of the rivers. Both temporary and permanent realignment of rivers may cause increased flow velocity and downstream sedimentation. Consequently, these impacts will cause the disruption of fish migration upstream and decrease the food availability.

Water abstraction for construction needs rivers. At the time of the report, no final decision is made on the use of surface water for the Project. The option is not preferable one, but still possible. However possible volumes of water intake for technical needs is unknown. Therefore, the impact of the water intake on the change in surface water flow cannot be assessed at this stage.

- Increase of turbidity. Uncontrolled sediment erosion, excavation work (planning, formation of road embankment and digging of trenches), including interception and redirection of watercourses and contaminated silt runoff caused by removal of vegetation and destruction of soil (for instance in areas in cut) and gravel rocks into small fractions, which could cause water turbidity and inevitable impacts on aquatic fauna, sediment deposition on stream beds and banks, and accumulation on the slopes of

rivers and ravine gorges. Suspended particles, depending on their size and geochemical characteristics, can settle and form a thick layer of sediment in the bottom of a stream as well and disrupt the flow of the river. High concentrations of suspended particles can lead to proliferation of anaerobic bacteria transforming biodegradable substances with the use of oxygen. This can lead to oxygen depletion of the waters. The construction of the highway will cause the destruction of the soil and the rocks to smaller fractions, which will accumulate on the slopes, i.e., near riverbeds. During intensive rainfalls, these fractions shall be transported to the riverbeds. The rocks and the soil that have been removed or dissolved during the construction of the highway will result in increased turbidity, i.e. increased amount of hard-suspended particles. On the other hand, this will increase the content of the heavy metals, and thus the toxic effects on the environment.

- Sewage effluent produced by the on-site workforce. The workers' camps can be a source of pollution with sewage, but also solid waste. It is expected that the camps of the construction sites would generate sanitary wastewater. Wastewaters will appear on locations where there will be water sprinkling in order to reduce the emissions of dust during the excavations; wastewaters will be drained in zones at the crossing of the highway through a river via bridges. It is unlikely that sewage generated from the site would have a significant water quality impact, provided that sewage is not discharged directly into stormwater drains or streams adjacent to the construction site and temporary sanitary facilities, such as portable chemical toilets, are used on-site and properly maintained.
- Leaks and accidental spills from the use of concrete during the construction of bridges and of fuel, lubricants and other hazardous substances at product and waste storage areas as well as from construction machinery and vehicles at construction site. Spillages of liquids stored on-site, such as hydrocarbons lubricants, paints, solvents, resins, acids, or uncured concrete, which are released upon accidental leaks and spills from machinery and material storage sites, are likely to result in water quality impacts if they enter adjacent streams or drains. The impact, if occurs, is limited to crossings with rivers and streams. The washout from concrete batching and asphalt plants is particularly harmful. Medical waste may be very harmful for humans and wildlife, in case of contamination of surface waters used for fishing, irrigation or recreation and and of groundwaters. This impact may affect all Sections, but its effects have a specific significance in good quality natural waters such as Vjosa river (Sections 9-13A) or in waters with international importance such as Buna river (Section 1). As the pollution will be transported by the water courses, agricultural reservoirs or irrigation channels and spread along the water course, its negative effects may affect the environment, agricultural lands and populations downstream. Release of these substances to water has fatal consequences on aquatic fauna and human health and causes pollution that can be transported over many kilometres with the water flow.

The table for evaluation of impacts in surface waters per Section during the construction phase is presented below.

Table 6-24 Assessment of Impacts of surface waters during the construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Construction phase in surface waters								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	International/Regional/local	Short to medium term	Medium	Major	**Large**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 2 New alignment + existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 3 Existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 4 New Alignment	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 5B	Change of the hydrological regime of the watercourses.							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Construction phase in surface waters								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
New alignment	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 5C Existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 6+7 Existing Roadin	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Moderate**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 8	**Under construction**							
Section 9A2 Existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Major	**Large**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 9B2 New alignment + existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Major	**Large**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 10	Construction run-off and drainage							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Construction phase in surface waters								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
New alignement	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Moderate	**Large**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**
Section 11 Existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Major	**Large**
	Sewage effluent							
Section 12	**Already Planned and approved**							
Section 13A Existing road	Change of the hydrological regime of the watercourses.							
	Increased turbidity							
	Leaks and accidental spills	Direct	Short and medium time reversible	Local/regional	Short to medium term	Medium	Major	**Large**
	Sewage effluent	Direct	Reversible	Local/Regional	Short term	Medium	Minor	**Slight**

Operational phase

Impacts during the operational phase on surface waters, are direct, but can easily be transferred, in case of running waters, irrigation reservoirs, favorable topography for the movement of solids and liquids by free gravity etc. More specifically:

- Deterioration of surface water quality due to pollution risk. During the operation phase, it maybe expected that pollution of water shall result primarily from settling of exhaust fumes, tire wear, leaking of loads, load spilling, discarding of organic and inorganic waste, precipitation, pollution brought by wind, dispelling through passage of vehicles. Pollution resulting from the aforementioned occurrences may be temporary, seasonal or accidental. Permanent pollution is primarily related to scope, structure and characteristics of the traffic flow. Permanent sedimentation of dangerous substances on road surface and service elements of the cross sections results from traffic flow, and are washed away with precipitation. Typical example of this kind of seasonal pollution is the usage of industrial salt during winter months. This type of pollution is characterized by large concentration of sodium and calcium salts which occur in a very short period of time (spreading of salt on road surface and consequences of melting) based on the meteorological data for the project area.

  The AIC Sections will have an impact on the quality of the surface waters under raining conditions where the washing out waters from the road surfaces will be drained in the surrounding field. The washing out waters from the road (especially the first inflows of rainfalls that contain high concentration of polluting material) traces of petrol, fuel, heavy metals that may endanger the aquatic environment and scenery. The concentration of harmful materials in the washing out waters of the roads, induced by traffic come from the combustion of motor fuel (particles and gases), abrasion i.e. wearing off of tires, from brakes and vehicle leakages (oil etc.). Indicators of pollutants which occur either in diluted or undiluted forms are as follows: pH, electrical conductivity, suspended and residual substances, grease, oil, etc. and the changed levels of heavy metals, salinity, blurring of the waters and dissolved oxygen. On the other hand, these changes in the water quality, even in regions with high humidity, are often temporary and localized as a consequence of the variations of the water quantity.

  Accidental pollution generally occurs during transportation of hazardous materials. The main problem in these cases is that usually they are in very high concentration, and cannot be predicted neither in time or location.

- Altering the water flow regimes due to increased volumes of rain water directed to surface water receivers and therefore altered flow regimes (particularly in the month of heavy rains).

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The table for evaluation of impacts from the operation phase in surface waters per Section is presented below.

Table 6-25 Assessment of Impacts of surface waters during the operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase in surface waters								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local/regional/International	Short to medium term	Medium	Major	**Large**
Section 2 New alignment + existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local	Short to medium term	Medium	Moderate	**Moderate**
Section 3 Existing road	Altering the flow water regimes							
	Risk of pollution	Direct Transferred	Reversible	Local	Short to medium term	Low	Minor	**Slight**
Section 4 New Alignment	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local	Short to medium term	Medium	Minor	**Slight**
Section 5B New alignment	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local	Short to medium term	Medium	Moderate	**Moderate**
Section 5C Existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local	Short to medium term	Medium	Moderate	**Moderate**
Section 6 +7 Existing Road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local	Short to medium term	Medium	Minor	**Moderate**
Section 8	**Under construction**							
Section 9A2 Existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local/regional	Short to medium term	Medium	Major	**Large**
Section 9B2	Altering the flow water regimes							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase in surface waters								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
New alignment + existing road	Risk of pollution	Direct/Transferred	Reversible	Local/regional	Short to medium term	Medium	Major	**Large**
Section 10 New alignement	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local/regional	Short to medium term	Medium	Major	**Large**
Section 11 Existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local/regional	Short to medium term	Medium	Major	**Large**
Section 12	**Already Planned and approved**							
Section 13A Existing road	Altering the flow water regimes							
	Risk of pollution	Direct/Transferred	Reversible	Local/regional	Short to medium term	Medium	Major	**Large**

Conclusions

The most significant impacts expected by water pollution during construction and operation phases can be viewed in Section 1 (Buna river, international river and PA) and Sections 9A2-13A that run over Vjosa River or its branches. Pollution of Buna River waters (Section 1), although it has a medium sensitivity, has a major magnitude and large significance, because it is an international river, represents the core area of the Buna Protected Landscape and is very rich on specific biodiversity.

Additionally:

- Section 3 has a slight impact significance and low sensitivity due to the presence of the net of irrigation channels in the vicinity, while it does not cross any important natural water body.
- Sections 5B and 5C have a moderate magnitude and significance as well as medium sensitivity
- Sections 2 and 4 have a slight to moderate significance with a low sensitivity (existing roads and bad quality of Drini of Lezha River) due to the possibility of indirect/transferred impacts in river downstream or agricultural lands.
- Section 6 and 7 has not any important natural surface water body in their vicinity, but both of them, are surrounded by irrigation channels, which can transfer their pollution in agricultural areas and products. Both of them have a slight to moderate significance.

The significance of impacts in surface waters during operation phase is similar but not the same with construction phase. Considering the quality of surface waters and their sensitivity as well as their impact magnitude, the impacts can be summarized as below:

- Section 1 and Sections 9A2-13A will have a large significance. Section 1 runs over Buna River, an international River and a Protected Area. Vjosa River which is crossed by Sections 9A2-13A, has also a national and regional importance. Impacts at Sections 1, 9A2, 9B2, 10, 11 and 13A are assessed as of moderate to high significance. This assessment relies on the high quality of waters of Vjosa river (sections 9A2-13A) and the importance of Buna river at a regional and international level.
- Impacts at Sections 5B and 5C have a slight to moderate significance and medium sensitivity.
- Although the sensitivity of Section 2 is relatively low because of the bad water quality of Drini of Lezha river, the presence of Mati river with the implementation of protection measures to ameliorate its quality, increases the significance of impacts in this river.
- Sections 3, 6 and 7, despite the absence of important natural running waters, have a slight ro moderate significance on impacts in surface waters, because the vicinity with irrigation channels.
- Section 4, which runs over Ishmi River, has a low impact sensitivity, slight significance and minor magnitude due to the bad quality of waters of this river.

Mitigation measures

Pre-construction phase

Surface water measurements should be carried out under the ESIA preparation and samples should be taken in all possible pollution sources and in their downstream. The measurements should consist of chemical parameters (organic and inorganic indicators), physical and microbiological parameters of the water quality. The sensitivity of the rivers and streams crossed will have to be identified, while it has to be further examined whether the streams and gullies crossed have a constant or temporary flow. High sensitivity refers to natural streams and rivers with constant water flow and which are crossed by the corridor, medium sensitivity to natural streams and rivers with non permanent water flow and low sensitivity to unnatural water channels with periodic water flow. Defining the surface water quality of the running waters that may be affected by the AIC will help to prepare a detailed plan on monitoring points during the construction and operation phases. Measures how to reduce water pollution and a proper design of proper drainage and collection systems for stormwaters will be also proposed (culverts, ditches, oil separators, dry detention basins etc), while the Contractor via the ESMP and the ESAP of the ESIA should be obliged to prepare a detailed Water Management Plan. This Plan must provide details on waste water

(sewage) volume, disposal scheme, information on capacity and type of waste water treatment facility, location of the discharge point/points with indication of coordinates. The ESIA will mention that the Contractor should deal with water issues in the Emergency Response and Spills Management Plan as well as in the Tunnel Management Plan.

Construction phase

No construction camp, permanent or temporary, will be located within 500 meters of any river, or irrigation channel, while their locations will be defined at a later stage. Regarding the construction phase, mitigation measures are proposed for the construction run-off and drainage, sewage effluent and general construction activities. More specifically, regarding construction run-off and drainage:

- Culverts will be designed to maintain the natural riverbed width and the natural riverbed level. If it is not feasible to use bottomless culverts then the culvert base will be buried to restore the riverbed. An acceptable hydraulic performance should be maintained to avoid channel overflow during heavy rainfall.

Table 6-26 Proposed culverts

Sec.	From – To	Status / Items	Type	Quantity
1	Murriqan – Balldren	Drainage and Irrigation Culvert	2x2	188
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
2	Balldren – Milot	Drainage and Irrigation Culvert	2x2	81
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
3	Milot – Thumane	Drainage and Irrigation Culvert	2x2	34
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
4	Thumane – Kashar	Drainage and Irrigation Culvert	2x2	114
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
5B	Kashar – Lekaj	Drainage and Irrigation Culvert	2x2	89
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
5C	Lekaj – Konjat	Drainage and Irrigation Culvert	2x2	30
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
6+7	Konjat – Lushnje – Fier	Drainage and Irrigation Culvert	2x2	77
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
9A-2	Levan - Pocem	Drainage and Irrigation Culvert	2x2	57
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
9B-2	Pocem - Memaliaj	Drainage and Irrigation Culvert	2x2	86
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
10	Memaliaj - Subashi Bridge	Drainage and Irrigation Culvert	2x2	43
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
11	Subashi Bridge-Gjirokaster Bypass	Drainage and Irrigation Culvert	2x2	27
		Drainage Culvert	3x3	
		Drainage Culvert	4x4	
13A		Drainage and Irrigation Culvert	2x2	48

Sec.	From – To	Status / Items	Type	Quantity
	Gjirokaster Bypass - Kakavije	Drainage Culvert	3x3	
		Drainage Culvert	4x4	

- Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained
- Where an increased discharge of surface water endangers the stability of the water outlet, erosion protection measures such as bioengineering measures, ripraps, and check dams are incorporated.
- Runoff control measures can be installed at the time of road/highway and bridge construction to reduce runoff pollution. To prevent runoff contamination, paving should be performed only in dry weather. Due to the design solution direct discharge of the runoff in surface water is reduced to minimum;

Regarding sewage effluent, domestic type wastewater generated in the construction camps will not be allowed to be discharged untreated into natural water courses. The camps will be provided with a wastewater treatment system to treat effluents to admissible levels for discharge in the water body and with chemical portable toilets and the waste adequately managed. Stormwater and wastewater arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system of drainage pipes, ditches and side channels to accommodate forecast discharges, to collect run-off from the carriageway, convey, store run-off water to reduce peak flows and remove coarse sediment and oil related pollutants and to dispose of in the dry detention basins. This drainage system should be constructed in advance of site formation works and earthworks. Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby streams and stormwater drains. The culverts near the works areas will be covered to block the entrance of large debris and refuse.

Good construction practices and site management should be observed to ensure that litter, fuels and solvents do not enter nearby streams and stormwater drains. To prevent water courses from accidental pollution and to avoid discharge of solid materials into the river body, the following measures shall be applied:

General

- Earth works in river /stream beds should be planned preferably during lowest water period (during summer months). Periods of high water (October to April) should be avoided.
- Prevent the movement of machines in the rivers and streams and on their embankments, unless it is unavoidable due to the construction process
- During recalibration and relocation of river bed, necessary technical measures will be carried out in order to minimize earthworks in direct contact with water;
- All materials should be stored above flood level.
- Ensure that workers are provided with correct PPE including harnesses.

Liquids, fuels, leakages

- Spill kits should be provided to clean up any polluted soils resulting from minor spills of fuel, lubricants, oils or chemicals.
- Secondary containment devices (drop cloths, drain pans) should be used to catch leaks or spills while removing or changing oils from vehicles or equipment. For small spills, absorbent materials must be used.
- Fuel, oil or hazardous materials required to be stored, should be stored within secondary containment (designed to contain at least 110% of the total capacity of the storage containers) located greater

than 100m from a watercourse or waterbody. Walls and floors should be constructed of concrete or other suitably impermeable material. No drains from the storage area should be installed.

- Drip trays should be placed beneath all high risk equipment to contain spills/leaks of fuels/oils.
- Onsite repairs /maintenance and fueling activities should be limited. Priority should be given to offsite commercial facilities. If impossible, a designated area with secondary containment for possible spills for on-site repair or maintenance activities must be provided. These areas shall be located away from drainage channels and surface water bodies. (distance between the maintenance site and the river should be at least 100m).
- On-site vehicles and equipment should be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment should be checked for leaks. Leaking vehicles/equipment should not be allowed on-site.
- Construction of oil separators in order to pre-treat stormwater in order to ensure that clean water under the accepted standards goes back to the water recipient
- The discharge of any untreated wastewater into a surface water body should be prohibited.
- Treated wastewater discharges should comply with specified water quality standards (including Project and national standards).
- Concrete and asphalt plants, construction sites (viaduct, river covering), camps etc. will be properly isolated by installing of fencing in all sites located close to rivers and water courses to prevent any discharge of construction materials, hazardous materials in particular, to the water course.
- Discharge of cement contaminated water to water bodies should be avoided as cement pollution results in high alkalinity and raises the pH, which can be toxic to aquatic life.
- Provide septic tanks for the camp. Keep contract with authorized company responsible for removal of the liquid waste active. If for waste water management, the camp is equipped with a package treatment plant ensure clean-up/sanitation according to manufacturer's instructions and that discharge standards are met for waste water.
- Arrange settling basins to manage tunnel drainage water. Check quality of drainage water (including pH) from the settling basins prior to discharge into environment.

The following measures shall be applied specifically relating to bridges, where river crossings as mentioned in the impacts sub-section:

- Bridge construction activities should be undertaken when rivers or streams are dry (i.e. in case they have a non continuous flow during the summer months) to avoid silt pollution.
- Provide spill kits in worksites around rivers.
- Ensure no vehicle refueling occurs within 100 meters of any surface water course.
- Divert the water flow near the bridge piers.
- Provide silt fences, sediment barriers or other devic 1es to prevent migration of silt during construction within streams.
- Carry out bridge construction works without interrupting the traffic on existing roads with the provision of suitable diversions.
- Ensure no waste materials are dumped in the river, including re-enforced concrete debris.
- Place generators more than 20 meters from the river.
- Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond at each bridge site. Drivers will be informed of these locations and the requirements to use these settling ponds on a routine basis by the Engineer. Dried waste from the settling ponds can be used as backfill for culverts, etc.

- Ensure that no hazardous liquids are placed within 10 meters of the river.
- Provide portable toilets at bridge construction sites to prevent defecation by workers into the river.
- In addition, the Contractor will be responsible to establish the fish spawning period in relation to the bridge construction works to ensure that all works are undertaken in periods least likely to affect the fish spawning period.

As for the influence of soils and waste to surface waters, relevant mitigation measures have been mentioned in the relevant subsections above.

The Contractor should train construction personnel in soil and water protection measures, handling of fuels, spill control and response procedures and requirements.

Operational phase

In order to protect surface waters from potential contamination from polluted run- offs and storm waters,

- Use of concrete gutter and ditches to minimize the risk of pollution of the aquifer
- The entire volume of the road runoff is collected and transferred by the established drainage system to the settling basins along the highway
- Settling basins will be used to remove silt, pollutants, and debris from road runoff water before it is discharged to adjacent streams or rivers.
- Ensure clean up and waste removal from carriageway and roadsides.
- Water quality in wastewater recipient watercourses should be monitored at least monthly during periods of river flows.
- Ensure maintenance and timely clean-up/removal of sediments accumulated in bridge deck runoff treatment facility and tunnel water drainage systems. Disposal of these sediments following the same procedure as set for the management of sediments from treatment unit (settling basin).
- Perform maintenance paving of the road sections and bridge decks only in dry weather to prevent runoff contamination.
- Monitor condition of culverts and drainage canals etc.;
- Regularly check operability of stationary erosion and run-off monitoring equipment;
- Where possible, limit the use of de-icing chemicals, give preference to mechanical means like scrubbers and snow ploughs. If de-icing chemicals are used; monitor quality of surface water for concentrations of chlorides and ammonium ions, train personnel to use de-icing chemicals in an efficient and timely manner, regularly check de-icing equipment;
- Control water quality (list of parameters to control include: pH; Suspended Solids; BOD5; COD; Coliforms; Nitrate (NO3); Phosphate (PO4); Oil and Grease) in recipient watercourses seasonally. Collect water samples from upstream and downstream sections of the stream in 50m and 250m distance of the crossing area. The distance may change depending on accessibility of the river for sampling.
- Check quality of the sediments (list of parameters to control include: heavy metals, petroleum products) prior to making decision on the method of disposal. If contamination detected – use licensed contractor to deal with the waste.
- Maintain contracts with hazardous waste removal companies to ensure timely and safe removal of skimmed oil, other hazardous waste generated at technical buildings.
- Upgrade settling pits with more efficient modules like mechanical devices (sand trap, oil trap) and activated carbon module;
- Silt traps should be installed into the storm water drainage system to capture suspended sediments.

- Maintain integrity and permeability of storm water drainage system to avoid blockage, overflow and direct discharge of untreated runoff into the rivers.
- Remove sludge from roadside treatment facilities in a timely manner;
- Measures in the case of lorry spills, fire, etc. involving hazardous/polluting substances to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water.

Residual impacts

If the relevant mitigation measures outlined above are implemented during the construction phase, especially that no untreated wastewater or water contaminated with cement should be discharged into a surface water body, insignificant/minor residual impacts are expected to surface water quality from the Project. If the relevant mitigation measures outlined above are implemented during the operational phase, minor to insignificant residual impacts are expected on surface quality or quantity from the Project.

6.2.2.9 Groundwater

The AIC will impact on the groundwater resources during construction phase, while less significant impacts are expected in the operation phase. Pollution of groundwater during construction phase may occur as a consequence of leakages or accidental spills at the construction site and storage areas, working campus waste waters etc., which will reach groundwater by infiltration.

The impacts of the maintenance activities during the operation phase are similar to those mentioned in the surface waters impact analysis.

Impacts

The sensitivity of the AIC sections regarding groundwater pollution is defined by the existing groundwater quality and the presence of recharge areas. Impacts in groundwater, regarding recharge areas, can be identified in Sections 1, 2, 5B, 5C, 6, 9A2, 9B2, 10, 11 and 13A. Protection measures should be taken in these Sections to avoid groundwater pollution. Usually, in Albania, groundwaters are the main source of drinking water for towns and cities. All impacts in groundwaters are indirect. No groundwater aquifer around the AIC has a direct contact with the upper level of soils.

Pre-construction phase

The pollution from leakages or waste waters in groundwater depends on the permeability of geo-layers that isolate groundwater from the surface soils. The vertical movement period, namely the time needed for pollutants to reach the groundwater is also linked to the hydro-geological features of the terrain. The sites with high or medium permeability layers are identified as hydro-geological windows. All risks for groundwater pollution are related to infiltration of polluted liquids and leakages in hydro-geological windows which consistute recharge areas for groundwater. Therefore, the Sections, which are close to such "recharge areas" are considered as the most prone to groundwater contamination/pollution (Section 1 close to Kakariqi and Renci mountains, Section 2 close to Mati bridge, Section 5B – Peze Helmes site, Section 5B and 6 (eastern of Rrogozhina), Sections 9A2 and 9B2 (along Vjosa river valley and Kremenara massif Pocem), Sections 10, 11, 13A along Drino valley). If these areas are not weil studied during the ESIA preparation, then groundwater pollution will be at high risk.

The transformation of river valleys can lead to serious consequences: when underground flow is blocked, flooding areas, artificial shallow groundwater increase, subsidence under load and other negative exogenous processes can occur.

Construction phase

The evaluation of the potential impacts on the ground waters needs to take into consideration the depth of the earthworks for Project's construction purposes, the lithology and other characteristics of the water bearing rocks and of the overlaid geological formations, flow direction of the groundwater, the quality of the ground waters, and the ground water use. The impacts on groundwaters during the construction phase will include, inter alia:

- Pollution/contamination of groundwater from construction materials and activities. Impacts on ground water quality and quantity maybe provoked from pre-construction and construction works (earthworks, road layers, and other associated earth works, bridges and other associated concrete works). Several liquids or waste water from washing or cleaning of cars, construction surfaces etc, may generate in groundwater several pollutants, which are very difficult to be chemically decomposed or destroyed such as lubricants, oils etc. Construction machinery and transport trucks may bring pollution risk from fuel and oil spillage. This pollution may overall occur in the road sections crossing permeable water bearing formations (sandy gravelly river beds and limestone formations). The pollution, if massive, may lead to contamination of the drinking water, if groundwaters are used for this purpose. Free discharge of chemicals, colors/paints, etc, represents a risk for groundwaters in the Sections 1, 2, 5B, 6, 9A2, 9B2, 10, 11 and 13A.

  Regarding tunnels of Sections 2, 5B, 9B2 and 10, a key aspect of dewatering systems for tunnel and shaft construction is that they will generate water from pumped wells or from sumps and drains within the tunnel. Some of this water, particularly from sumps, will be 'dirty water' and will require some form of treatment (most commonly to remove suspended solids) before it can be disposed of. Some of the water may be 'clean water' (particularly from dewatering wells or tunnel drains) that may require little or no treatment.

- Pollution of groundwaters by waste waters generated from workers in working campus. This kind of waste is not considered of high risk to groundwater due to its small amounts and organic characteristics. This pollution may precipitate easily in small ground pockets, which contain waters which have an appropriate quality to be used for agricultural purposes. Such pockets have a seasonal regime, while during the summer, some of them are dry.
- Exploitation of ground water sources for working purposes. Reducing of groundwater capability may happen by exploitation of small groundwater pockets, usually used for agriculture purposes, but in some cases, as potable water. This impact, may create conflicts with inhabitants, using this water for their demands.

The table for evaluation of impacts from the construction phase in groundwater per Section is presented below.

Table 6-27 Assessment of Impacts of ground waters during the operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in groundwater								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
Section 2 New alignment + existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
Section 3 Existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
Section 4 New Alignment	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
Section 5B New alignment	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
Section 5C Existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Local	Long term	low	Minor	**Slight**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Local	Long term	low	Minor	**Slight**
Section 6+7 Existing Road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Local	Long term	low	Minor	**Slight**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Local	Long term	low	Minor	**Slight**
Section 8	**Under construction**							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in groundwater								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 9A2 Existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Large	**Large**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
Section 10 New alignement	Exploitation of ground water sources for drinking or working purposes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
Section 11 Existing road	Exploitation of ground water sources for drinking or working purposes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
Section 12	**Already Planned and approved**							
Section 13A Existing road	Exploitation of ground water sources for drinking or working purposes	Direct	Long term reversible	Local	Long term	Medium	Minor	**Slight**
	Pollution of groundwater by construction materials	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**
	Pollution of groundwater by waste waters produced in working campus	Indirect	Long term reversible	Regional	Long term	low	Major	**Large**

Operational Phase

During the operational phase, the following impacts maybe identified.

- Pollution of stormwater ruoff. Pollution of stormwater runoff from the road surface may take place due to spillages from the engine and lubrication system (gasoline, oil, motor oils, coolant and brake liquid), rubber residue and products of wear of the wearing course (asphalt and bitumen residues) and emission of fuel combustion products (lead and lead compounds, unburned hydrocarbons, nitrogen oxides, soot and tar).
- Traffic accidents. In the case of traffic accidents, especially of accidents involving vehicles carrying hazardous materials, spillage and dispersion of harmful and hazardous materials may occur along the road and a narrow area next to it if there are no barriers or concrete blocks that physically prevent vehicle rollover. The most common accidents are those in which oil, oil derivatives and liquid chemicals from trucks are spilled, and these substances have a great capacity for diffusion into soil and underground. The probability of the mentioned impacts is small, but if an accident occurs, the consequences may be very severe and long lasting. This impact is especially expressed in areas where the road runs over aquifers with high levels, zones of influence of local springs and the border limits of water protection areas.

The maintenance impacts have the same sources and nature as those of the construction phase, however a minor magnitude and negligible significance. Additionally, the following can be noted as an impact.

- Use of salt. The use of salts and other agents for initiating melting of ice and the snow cover may also endanger groundwater. The primary agent for defrosting, NaCl, causes corrosion of vehicles and bridges, it contaminates the sources of drinking water and it is toxic for many plants, as well as fish and other water organisms. Due to the effect of dissolving, the chemical impact of the chemical deposits from the roads has the biggest influence on small streams, especially in areas where they come close to or intersect with the road. However, the AIC lies in an area with limited snowfalls per year and therefore not extensive or frequent use of salt maybe required.

Since the impacts are similar to surface waters, there has been not prepared a separate table for the characterization of impacts

Conclusions

Taking into account the assessment of impacts in ground water as they are presented in the table above, the following can be mentioned:

- Sections 1, 9B2, 10, 11 and 13A have an average of sub-indicators with a large impact significance. Regarding Sections 10 and 11, there are not identified shallow groundwater pockets, so there are no possibilities to exploit groundwater for construction purposes. Pocemi source, exploited for drinking waters, is in the beginning of Section 9B2.
- Sections 3, 4 and 5B have a moderate to large impact significance. Despite their appropriate quality of groundwater, the hydro-geological windows are not supposed to be very close to alignment.
- Sections 2 and 9A2 have a moderate impact significance. Although there are existing hydro-geological windows in these areas, these Sections do not have a good quality of groundwater.
- Sections 5C, 6 and 7 have a slight impacts significance. Sections 5C and sub-section 7 are not characterized by hydro-geological windows and sub-section 6 has not an appropriate groundwater quality.

Mitigation measures

Pre-construction phase

The identification of sensitive sites can be confirmed by specific hydro-geological studies on "Hydro-geological" windows. After defining the sensitive areas, the types of geological formations and the depth of aquifer by drillings in boreholes' logs and geotechnical investigations, physicochemical and

mictobiological measurements should be done for the groundwater quality of the sensitive aquifers. Additionally, measurements are needed for the shallow groundwater pockets, which are not part of aquifers, but are used for agricultural water by farmers. Measurements and data on these groundwater pockets should indicate their capacity and recharge capability. The ESIA, based on such results, may propose appropriate management and action plan for project implementation.

Further analysis and research should be made for the areas where the tunnels will be constructed, since it has to be examined whether the groundwaters of theses areas are used for drinking purposes.

To assess the significance of impacts on the groundwater discharge at the construction stage from the riverbed migration, it is necessary to conduct a detailed hydrogeological study of the river valleys where straightening is planned. Based on the analysis of the data obtained, decision should be made on the feasibility of the straightening.

Finally, the ESIA will provide some guidance and the Contractor will have to prepare a Water Management and Tunnel Construction and Management Plans prior to start of the tunneling works. The plan shall include a map of all ground water wells within the Project area that maybe affected by each tunnel, routine monitoring of the groundwater levels in wells against baseline water levels in the Project area which will be undertaken on a weekly basis by the Contractor within the vicinity of each tunnel he is excavating. If drawdown levels in wells are significant the Contractor will provide a temporary source of potable water to the affected persons until the construction works are finished. The Contractor shall continue to monitor the water levels in the affected wells for a period of 12 months after construction is completed at the tunnel sites. If the wells begin to recharge to their pre-construction levels no further actions will be necessary. However, if the water fails to re-charge to pre-construction levels alternative water supply will be provided to the affected parties, this may include for example, increasing the depth of their wells, or piped water from another location, which, as noted above, appears to be a fairly effective option.

Construction phase

Earthworks consist mainly of top soil removal, cuts, and embankments. These impacts consist of increase of suspended matters in ground water from surface waters which can penetrate into the soil and reaches the ground waters. They can affect the ground waters located to the working strip up to some hundreds of metres. It should be stressed that every aquifer has a self-depuration capability, the speed of which depends mainly on the lithology of the crossed water bearing formations and on the characteristics of the pollutant. This impact can be evaluated as negative, reversible, of local extension, and of low to medium probability. Based on the geological and hydrogeological maps, it will further be examined at the next phase (ESIA) whether the type of soils serve as very good depurators. The mitigation measures should include the minimization of the working strip, the performance of works in dry period, the minimization of waste generation, the use of portable toilets, the collecting of the used oils, etc. As it is understood, pollution risk from fuel and oil spillage by construction machinery and transport trucks will be mitigated with measures proposed in soils, waste and surface waters.

Depending on whether the bridges' pylons will be cast in place or not, there is a potential for the leaching of wet concrete, cement paste or grout into fast flowing groundwater. The construction of cast pylons on gravel deposits should take into consideration overall the avoidance of ground water pollution from hazardous waste such as oils released by construction machinery.

Regarding the tunnels of Sections 2, 5B, 9B2 and 10, the Contractor will pass all drainage water from the tunnel through a settlement tank. If the drainage water meets drinking water standards it can be considered for re-use in any potentially depleted wells during the construction phase. In addition, the Contract shall use non-toxic slurry and additives and minimize impact of these materials to reduce risk of impact on ground water quality and ensure that pressure applied to tunneling and ground treatment is controlled to prevent excessive pressure that will drive the slurry out of the desired range increasing the risk of water pollution.

Operational phase

The related mitigation measures are linked to those of the surface waters and waste. During the operational phase, there could be applied the same measures mentioned in the section of surface waters

and soils regarding the same phase. Indicative measures are related to using less toxic deicing materials such as calcium chloride, phosphate inhibited or calcium magnesium acetate, which do not cause irreversible changes in photosynthesis and subsequent destruction of tissues of plants and animal deaths, control of application of deicing agents and monitoring of the chlorides content in soil, while the rest areas along the AIC must incllude appropriate treatment of liquid and solid wastes to avoid contamination of local soils/ecology near these facilities.

Residual impacts

Regarding construction phase, until more details of the hydro-geological baseline and the proposed construction methodology are understood, it is not possible to state that there will be no significant residual impacts on receptors of groundwater quality or yield. Regarding the areas where tunnels will be constructed, the groundwaters' use has to be examined. It is possible that the construction of tunnels could deplete groundwater and affect groundwater users, something which will maintain the residual impacts to a low to moderate level after the implementation of mitigation measures. The series of mitigation measures outlined in surface waters should be sufficient to avert or minimize any potential groundwater contamination from accidents and spills. If the relevant mitigation measures outlined above are implemented during the operational phase, insignificant/low residual impacts are expected on groundwater quality or quantity from the Project.

6.2.2.10 Biodiversity

The sensitivity of AIC sections regarding biodiversity is based on three sub parameters, i.e. habitats and flora, fauna and protected areas.

Only one protected area, namely the Buna River Protected Landscape, will be directly affected by the AIC Section 1 (Buna Bridge). This Protected Area lies in the international River of Buna, which is shared by Albania and Montenegro and includes very important flora and vegetation. Additionally, Vjosa River (Sections 9A2-13) is an international river, shared between Greece and Albania. Although, this river is not yet declared as a Protected Area, it is very rich in aquatic and terrestrial fauna with specific interest. The AIC runs over the buffer zone of Kune Vain Tale (Section 2), crossing inhabited areas, with plenty of infrastructure, while this Section is poor on biodiversity features. Any terrestrial habitats lie in a distance of at least 2 km.

The main sensitive habitats which give shelter to various species of flora and fauna lie in Sections 1, 9A2, 9B2 and 10. Section 1, although it runs over the existing road in its second half, will affect the Buna River Protected Landscape, at the territory of the new bridge sites and at river body/valley. Section 9A2, although it is aligned over an existing road, goes very close for a long distance to the Vjosa river body. Section 9B2 has a big part of the alignment which goes over the natural aquatic and terrestrial specific habitats and biodiversity. Section 10 is a new alignment which runs over natural habitats and agricultural sites, very rich on biodiversity, especially on wildlife.

Impacts regarding habitats

As it is mentioned above, the most important habitats, affected by the AIC construction are those of Sections 1, 9A2, 9B2 and 10, where a large number of structures will be constructed. Some of the habitats, listed in the Annex 1 of EU Habitat Directive, such as Salix alba and Populus alba galleries, Lowland hay meadows (*Alopecurus pratensis, Sanguisorba officinalis*), *Quercus trojana wood*, Pseudo-steppe with grasses and annuals of the *Thero Brachypodietea*, Orientalis and Liquidambar orientalis woods (*Platanion orientalis*) etc, are encountered in some peripheral areas in very small surfaces and at a very fragmented situation and therefore cannot support their role and their characteristics as sensitive habitats. More specifically:

Table 6-28 Annex I EU Habitats per Section

Section	Annex I EU Habitats

1	***Large rivers. Permanent slow flowing water courses,*** 3260: Water courses of plain to montane levels, Bern Convention Resolution No.4 (1998): C 2.34. Eutrophic vegetation of slow-flowing rivers This habitat can be considered as a potential Critical Habitat for migratory birds Annex I EU Habitat*: 92A0 Salix alba and Populus alba galleries)
2	***Permanent slow flowing water courses,*** EU HD Annex 1 – 3260: Water courses of plain to montane levels 1110 Sublittoral sediment,(degraded habitats, not touched by the AIC corridor) The Section goes over Drini of Lezha which is highly polluted, represents a scarce habitat, very poor on sub-habitats and biodiversity. The AIC crosses also the Mati River via an existing bridge.
3	92A0 Salix alba and Populus alba galleries, is a degraded habitat No important habitat will be directly affected, since the AIC passes over the existing road.
4	6220; Pseudo-steppe with grasses and annuals of the Thero Brachypodietea. Such habitats are degraded and very fragmented.
5B	92C0 orientalis and Liquidambar orientalis woods (Platanion orientalis), is a degraded and fragmented habitat.
5C	92C0 orientalis and Liquidambar orientalis woods (Platanion orientalis), covers very small fragmented surface with degraded vegetation.
6+7	No Annex I EU habitat
9A2	No Annex I EU Habitat
9B2	6220 Pseudo-steppe with grasses and annuals of the Thero Brachypodietea 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) 9250 –Quercus trojana wood 92A0 Salix alba and Populus alba galleries
10	6220 Pseudo-steppe with grasses and annuals of the TheroBrachypodietea 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) 9250 –Quercus trojana wood 92A0 Salix alba and Populus alba galleries
11	(degraded status): 6220 Pseudo-steppe with grasses and annuals of the Thero Brachypodietea. 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) 9250 –Quercus trojana wood There can be found in the surroundings habitats such as 92A0 Salix alba and Populus alba galleries which are considered degraded.
13A	6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)

The CH/PBF screening process has involved a combination of initial consultations and desk-based study. The following potential CH/PBF triggers are considered for further analysis:

- Designated sites and other nature conservation areas of recognised importance nationally or internationally, together with the ecological features and species that they support.
- Species and habitats of global, national and/or regional conservation importance including nationally rare, restricted-range and threatened species, globally Critically Endangered or Endangered species (IUCN Red List)

- Species included within Annex II and IV of the EU Habitats Directive and Annex I of the Birds Directive.
- Other species based on feedback provided by local and international biodiversity experts during the ESIA.

Based on the ecological baseline assessment studies (as reported in the ESIA) the following potential CH Triggers are considered applicable for the Project (see Table 2 of EBRD PR6 Guidance Note):

Table 6-29 Screening of Critical Habitat Triggers

Critical Habitat Trigger		Potential Tirgger Features/Species
Highly threatened or unique ecosystems	Ecosystems that are: • at risk of significantly decreasing in area or quality; • have a small spatial extent; and/or • contain concentrations of biome restricted species	
	i) Ecosystems listed as, or meeting criteria for, Endangered or Critically Endangered by the IUCN Red List of Ecosystems	
	ii) Areas recognised as priorities in official regional or national plans, such as National Biodiversity Strategy and Action Plans	
	iii) Areas determined to be of high as under the species triggers below priority/significance based on systematic conservation planning carried out by government bodies, recognised academic institutions and/or other relevantqualified organisations (including internationally-recognised NGOs).	
Habitats of significant importance to endangered or critically endangered species	IUCN Red List CR or EN Species; National Red List CR or EN Species	
	Alliance for Zero Extinction sites;	
	Animal and plant species of community interest in need of strict protection as listed in EU Habitats Directive (Annex IV).	
Habitats of Significant importance to endemic or geographically restricted species. .	Areas holding a **significant proportion** of the global range or population of species qualifying as **restricted-range** under Birdlife or IUCN criteria. For example: Alliance for Zero Extinction sites or **Global-level** Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for **restricted-range** species	
Habitats supporting globally significant concentrations of migratory or congregatory species	Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem),	
	Areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis.	
	Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for congregatory species	

Critical Habitat Trigger		Potential Tirgger Features/Species
	Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.	
Areas associated with Key evolutionary processes	Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example Isolated lakes or mountaintops or Populations of species listed as priorities by the Edge of Existence programme.	
Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	Ecological functions without which critical biodiversity features could not persist. For example where essential for critical biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.	

The following potential PBF Triggers have been identified based on Table 2 of the EBRD PR6 Guidance Note:

Table 6-30 Screening of PBF triggers

Priority biodiversity features trigger as per EBRD PR6 (2014)		
Threatened habitats	Habitats considered under pressure by national, regional or international assessments. These include natural and priority habitats identified under the EU Habitats Directive (Annex I).	
Vulnerable species	IUCN Red List VU Species National Red List VU Species	
	Animal and plant species of community interest identified under the EU Habitats Directive (Annex II)	
Significant biodiversity features identified by a broad set of stakeholders or governments:	Eg. Key Biodiversity Areas and Important Bird and Biodiversity Areas; nationally and internationally important species or sites for conservation of biodiversity; many areas meeting natural habitat definitions of other international financial institutions.	
Ecological structure and functions needed to maintain the viability of priority biodiversity features.	Where essential for priority biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat forming species.	

…

Further assessment for a habitat to be characterized as critical will be done under the ESIA stage, where EBRD PR6 criteria will be taken into account leading to the preparation of Critical Habitat Assessments.

Pre-construction phase

The ESIA Consultant will have to identify the impacts on habitats and flora and propose specific mitigation measures, management and monitoring plan. The examined under the Conceptual Design stage habitats constitute an outcome of a first evaluation of the PESIA. The preliminary/detailed design should be joined by an ESIA per Section, which will examine the habitats affected more thoroughly. Habitat fragmentation, habitat loss and habitat destruction and degradation may occur at a great extent, if ESIA will not examine correctly these impacts, while the importance of sensitive habitats maybe underestimated.

Construction phase

Important impacts to natural habitats are caused during this phase, while the most sensitive areas seem to be the habitats and flora in Buna and Vjosa River Valleys, which are composed of important features at a local/regional and national level.

- Habitat loss Site preparation (construction campus, laydown areas etc.), soil and rock excavations as well the opening of service/access roads and borrow pits and quarries accompanied with the road and service/access roads construction will lead to vegetation clearance. The vegetation clearance will typically result in the direct loss of the existing habitats in case of natural habitats and agricultural lands. The clearance of vegetation will remove habitat but more significantly increase fragmentation of existing corridors, this could lead to disturbance of faunal species; and could cause direct mortality, as well as potential loss of notable plant species. In the case of rock excavations, borrow pits and quarries, the habitat may not be directly lost, but lead to a degradation of the habitat.

  As for the aquatic habitats, the permanent or temporary realignment of river beds and the construction of culverts and bridges may lead to an increase of water stream velocity at straightened locations, as well as at places underlined by concrete beds, loss of habitats, spawning grounds and food reserve locations due to introduction of artificial structures and to washing out the diverted channels of Sections 1 and 5B at new location and high concentration of particle matter in water, as well as derived bottom sediments.

  Some of the construction activities may provoke accidental fires. Fires maybe spread in woodlands, shrubs or forests, causing loss of entire territories of green areas and distruction of very important habitats and related flora. Fires may have more severe impacts in Sections 9B2 and 10 and in some parts of Section 5B and Section 11, which are surrounded by forests, bushes and woodlands. Damage may happen also by tree/wood cutting for fire or construction purposes, which will fragmentize the habitats, and may destroy their vegetation floors by cleaning of large surfaces from green cover.

  The receptors of the impact will be terrestrial and riparian habitats, breeding birds; migrant birds; roosting bats; mammals (small and large) (breeding and sheltering); reptiles (breeding and hibernating); invertebrates, fish and plants.

  The field surveys and habitat maps prepared under the ESIA per Section at a later stage will better define the habitats that will be crossed and lost in order the 'no net loss' approach to be more efficiently applied.

- Habitat degradation. Habitat degradation may primarily be caused by the vehicles' movements (including transport of people and equipment) and use of machinery and equipment, from working compounds and camps (including production of wastes and indirect worker pressure) as well as water crossing construction.

  Terrestrial habitats

  Regarding terrestrial habitats, degradation can be caused by vegetation clearance (increase in noise and vibration), soil and rock excavations (increase in noise and vibration and change in air and water quality), opening of borrow pits and quarries (increase in noise and vibration and change in air and water quality), roads and concrete structures (increase in noise and vibration and change in air quality), traffic of the construction machinery and transport (increase in noise and vibration) as well as by the generation of wastes. All the abovementioned may also provoke illumination pollution and impact on migration routes.

Change in the air quality, as a result of the fuel combustion emissions creation of dust by the earthworks can lead to pollutants penetrating into plant cells. This may result in the disruption of biochemical processes and plant diseases.

The pollution of soil, groundwater and surface runoff results in penetration of pollutants into the plants' tissues. Pollution may be caused by spills and leaks of fuel, lubricants and other oil products, release of polluted water to the terrain and inappropriate maintenance of waste accumulation and storage areas.

Additionally, earth fillings and the construction of drainage channels may change the status of habitats in lower areas, may create barriers to the natural draining of waters and increase artificially the draining time of the flooded lands. This phenomenon may have larger significance in Sections 1 and 9A2.

Aquatic habitats

Regarding the aquatic habitats, the use of chemicals, fuels, lubricants may lead to high concentrartions of particle matter at significant distance from the construction site and permanent or temporary realignment of river beds as well as construction of culverts and bridges may lead to increased turbidity, increase of flow velocity and prevention of fish migration from downstream to upstream due to high velocity.

Realignment of the river beds (it does not matter whether it is permanent or temporary) and subsequent increase of the flow velocity and downstream sedimentation will cause to prevention fish migration from downstream to upstream due to high velocity. Realignment will also cause long-term (however not permanent) effect of increase of particle matter in the water (turbidity) due to washing out by the stream flow while developing a new channel and this effect can be distributed for a quite significant distance from the construction site. During the construction of the bridge and culverts, the increased turbidity may occur, which will lead to a deterioration of the habitat conditions of aquatic species.

Moreover, degradation of freshwater ecosystems can be a result of a change in the water quality. This can be produced by an accidental spill of fuel or hazardous wastes affecting a water feature: river, lake, creek, by surface runoff containing pollutants and by destruction (erosion) of slopes of the diverted river channels.

Nitrogen deposition from vehicles can affect sensitive habitats (woodland, grasslands and riparian areas). Dust can impact on vegetation and affect productivity and/or change local soil PH levels. Pollution (including salt) from road run off and deicing may affect habitats and can create surface water films. Pollution by organic wastes, colors/paints, leakages and oil spills and by car and equipment washing will damage terrestrial and aquatic habitats. Pollution from solid wastes and wastewaters (colors/paints, oil spillages, leakages etc.) that occurs in terrestrial habitats of higher topographic points may be transferred in low areas by the soil erosion or soils washed by rains and transferred in agricultural channels, rivers and streams downstream to certain habitats, provoking their deterioration. Very sensitive due to such pollution are Section 1 with Buna River, Section 9A2, which is in the vicinity of Vjosa River for a great part, although as a Section lies on an existing road, Section 9B2, where Vjosa river and its valley are quite undisturbed and Section 10, which lies almost over natural and semi natural habitats. The pollution may be accumulated in several river banks or transferred in river mouth, and in both cases, may damage seriously the characteristics of aquatic habitats, although such habitats may be far away from the working territories.

Overexploitation of existing open quarries, of river beds and river banks for construction material will damage hardly aquatic and terrestrial habitats and their related flora/vegetation. Degradation and fragmentation may happen in sites in the vicinity of the AIC corridor, which lie in calcareous rocks in and large river bodies. The aquatic habitats under such risk are located in the Sections 1 (Buna river), 2 (Mati river), 4 (Ishmi river), 5B (Erzeni river), 5C (Shkumbini river), 9A2-13A (Vjosa river). Calcareous rocks lie in the vicinity of the Sections 1, 2, 5B and 5C, while habitats close to the Sections 9A2-13 will be threatened by the risk of opening of new quarries or overexploitation of the existing ones. This

impact, is evaluated as with large significance due to the impacts from overexploitation for raw material.

Last but not least, most of the Sections are characterized by a large number of bridges, the construction of which may impact on the rivers/streams crossed, their banks and their vegetation, on ecological populations, on species with specific status. The significance of such impacts is strongly related with the habitat sensitivity. Considering the aquatic habitats and the habitats of agricultural channels sensitivity, such interventions may cause significant impacts mainly on the biodiversity of Sections 1 and 2, 5B (17 bridges), 9A2 (13 bridges) and 9B2 (19 bridges). The other Sections are surrounded by agricultural channels, or small streams, which serve as shelter and food source of fauna populations. Damaging of canebrakes in the existing channels will reduce the natural water filtering of organic pollutant and light solids such as paper and plastic, deteriorating the water quality and affecting directly vegetation and wildlife. The pollution from suspended matters will impact on the river bank. The pollution from other solids in water bodies will change the river morphology and affect hardly the natural aquatic habitats and their related flora, mostly referring to Buna River (Section 1) and Vjosa River and its branches (Section 9A2-13).

Anthropogenic habitats

Regarding the Sections running in agricultural sites and close to settlements, a degradation in crops, orchards and groves is expected. All Sections are exposed to this impact, but Sections 4, 5B, 5C, 6 and 7, 9A2, 9B2 and 13 will be more sensitive and affected.

- Introduction of alien species of flora. Vegetation clearance will be mitigated by revegetation. Road improvements may facilitate the accessibility and subsequent deliberate introduction (i.e. planting alien trees for landscaping or forestry purpose) or accidental spread (e.g. seeds in the soil attached to vehicle tires) of exotic plants. Alien species are usually very resistant to pollution and have the ability for adaptation and growth in different habitats. They can easily spread in surrounding areas in the soil attached to the vehicles' tires and replace native species in their natural habitats. Such alien species may create new associations, which are not appropriate for the native flora and fauna. This impact may happen in all Sections and its significance is large due to the ability of the alien species to adapt, and reproduce in different habitats. The introduction of alien species is a risk rather than an expected impact.
- Impacts in sensitive habitats. Habitats listed in the Annex 1 of EU Habitat Directive such as 92A0 Salix alba and Populus alba galleries (Sections 1, 3, 9B2, 10 and 11), 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis), (Sections 9B2, 10, 11) , 9250 –Quercus trojana wood (Sections 9B2, 10, 11), 6220; Pseudo-steppe with grasses and annuals of the Thero Brachypodietea (Sections 4, 9B2, 10, 11, 13A) and 92C0 orientalis and Liquidambar orientalis woods (Platanion orientalis) (Section 5B, 5C) are encountered in some peripheral areas in very small surfaces and are very fragmented. Further assessment should be done at the next phase (ESIA preparation per Section) in order to be defined whether they could be considered as critical habitats and whether they have characteristics of priority biodiversity features. Very few flora species, found in vicinity of the AIC alignment, have specific status at a national and international level, while some of the flora plants have their importance and according to their specific characteristics, are used in medical field, with aromatic and/or decorative characteristics and are under risk of destruction by construction activities.

The table for evaluation of impacts from the construction phase in flora and habitats per Section is presented below.

Table 6-31 Assessment of Impacts of flora and habitats during the construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Habitat loss							
Section 1 New alignment + existing road	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Low	Moderate	**Moderate**
	Degration of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional/International	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long Term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 2 New alignment + existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Moderate	**Moderate**
	Senstive habitats	Direct	Irreversible – Long Term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 3 Existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Low	Minor	**Slight**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Local	Medium term	Low	Minor	**Slight**
	Sensitive habitats	Direct	Irreversible – Long term reversible	International	Long term	Low	Minor	**Slight**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 4 New Alignment	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Local	Medium term	Low	Minor	**Slight**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Sensitive habitats	Direct	Irreversible – Long term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 5B New alignment	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 5C Existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Low	Minor	**Slight**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Moderate	**Moderate**
	Sensitive habitats	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 6+7 Existing Road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Local	Long term	Low	Minor	**Slight**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	Low	Minor	**Slight**
	Sensitive habitats	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	Moderate
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 8								
Section 9A2	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Regional	Long term	Medium	Major	**Large**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Existing road	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long Term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora	Direct	Irreversible – Long term reversible	Regional	Long term	Medium	Major	**Large**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long Term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 10 New alignement	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats	Direct	Irreversible – Long term reversible	Regional	Long term	Medium	Major	**Large**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Regional	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long Term reversible	International	Long term	High	Major	**Large**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 11 Existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora by construction works and operation of facilities, habitat fragmentation etc.	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Local	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long term reversible	International	Long term	Medium	Moderate	**Moderate**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 12								

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 13A Existing road	Habitat loss							
	Degradation of natural and semi-natural terrestrial habitats and related flora by construction works and operation of facilities, habitat fragmentation etc.	Direct	Irreversible – Long term reversible	Local	Long term	Medium	Moderate	**Moderate**
	Degradation of aquatic habitats and flora, in rivers and irrigation/draining channels.	Direct	Medium term reversible	Local	Medium term	High	Major	**Large**
	Sensitive habitats	Direct	Irreversible – Long term reversible	International	Long term	Medium	Moderate	**Moderate**
	Introduction of alien species of flora	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**

Operational phase

Impacts in flora and habitats during operational phase are lower than those in the construction phase. This is explained, by the irreversibility of the main impacts, caused during the construction phase, such as land cover change, totally destruction of flora and of parts of habitats in the new alignments of the AIC sections and partial destruction of those in case of existing road upgrade/doubling. Impacts in aquatic habitats will be similarly lower than those during the construction phase.

- Degradation of habitats and disturbance of flora

  Terrestrial habitats

  Key activities that lead to degradation are the operational traffic, chemicals use (regular maintenance of vegetation within road rights-of-way using of pesticides and herbicides) and illumination of the road which may impact on air and water quality, increase the noise and vibration as well as the illumination pollution, while the barrier effect could be provoked and migration routes maybe impacted. Some of these impacts will be further analyzed in the fauna section.

  At the operational stage, the main sources of impact on vegetation cover will be emissions from motor vehicles. Such pollution may damage/degrade terrestrial flora, which is exposed to PMs, generated by traffic. The PMs may be attached to plants and reduce their capability for respiration and for filtering the CO2. Such impacts may be transferred by wind in sites in the vicinity and in extreme cases may lead to changes on the structure of associations/vegetation and of soil.

  The dispersion of anti-icing reagents outside the roadway can lead to soil salinization. The increase in total salinity leads to slower plant growth and morphological changes. However, it is expected that most of the reagents will drain with the surface runoff in wastewater storage pits. In addition, the Project provides for a limited use of reagents depending on weather conditions.

  Accumulation of harmful and toxic substances in the plants can result in a number of additional consequences: concentration and transmission of these substances via food chains to animals and their health impairment. Such processes in the long term may result in lower population levels of some animal species. In addition, the disturbance of flora can lead to a reduction in food supply.

  Impacts of soil pollution on flora in the highway area are also spatially limited along the highway edge and in drainage canals. Here, what was already stated under soil impacts is repeated; notably, that a change in pH value of surrounding soil can occur due to the emission of certain substances, and this can significantly violate the existing vegetation therein. Certain impacts, in the areas directly along the highway, can also be expected in effects of soil salinization as a consequence of winter road maintenance. Pollutants washed off from the road can impair growth of vegetation and affect soil organisms. The operation of drainage systems may lead to changes in the soil humidity, structure and fertility compared with the conditions during the pre-construction phase and may impact on natural habitats and vegetation in the vicinity of the sections.

  Regular maintenance of vegetation within the road may involve the use of pesticides and herbicides that have the potential of causing disturbance to fauna species as well as surface water bodies in the vicinity of the areas where herbicides are used (herbicides washed up by rain runoff).

  Impacts of artificial lighting in interchanges, tunnels, bridges, underpasses, rest areas, service areas, vehicle headlights, vary in intensity, duration and spatial distribution. Illuminance is a useful proxy for the biological effects of light when information on the spectral power distribution of light is also available. Artificial light sources may interrupt the natural cycle and disrupt both the plants and the ecology they support. Plants have different behavioural responses to different wavelengths of light — with flowering, germination and photosynthesis being associated with exposure to different parts of the visible light spectrum. Photoreceptors in plants use light to sense information about the season and even the time of day, which controls germination, growth and shade avoidance.

Aquatic habitats

Key activities that lead to degradation are traffic, accidental spill of fuel or hazardous wastes affecting a water feature: river, creek, surface runoff containing pollutants and destruction of slopes stability of the diverted river channels and will impact on air and water quality.

Pollution may happen in aquatic habitats by the pollution/contamination from oils, generated accidentally by oil stations or accidents of oil tank vehicles in roads. This contamination may be transferred by running waters. This impact has higher significance in natural habitats and flora and as it is mentioned above, in case of pollution of running waters, the impact may be transferred in other sites. The main significant impacts seem to happen in Sections 1, 2, 4, 5B, 5C, 9A2 – 13A, while, in other Sections, where no big rivers exist, the pollution may be transferred by irrigation draining channels.

- Introduction of alien species. The risk of introduction of alien species remains at the operational stage. The linear infrastructures (such as roads), are one of the sources of the spread of alien plants (especially along uncultivated lands or where vegetation clearance has occurred). Furthermore, road improvements may facilitate the accessibility and subsequent deliberate introduction (i.e. planting alien trees for landscaping or forestry purpose) or accidental spread (e.g. seeds in the soil attached to vehicle tires) of exotic plants. At the moment there is no data on the species composition of plants and their origin, which will be used in the "greenbelt". Thus, the issue of the alien species introduction should be considered in designing the greenbelt.

The table for assessment of impacts on habitats and flora during the operational phase is presented below.

Table 6-32 Assessment of Impacts of flora and habitats during the operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Habitat degradation and disturbance of flora	Direct/indirect	Short to medium term reversible	International	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 2 New alignment + existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 3 Existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Minor	**Slight**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 4 New Alignment	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 5B New alignment	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 5C Existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during the Operational phase in flora and habitats								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 6+7 Existing Road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Minor	**Slight**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 8								
Section 9A2 Existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 10 New alignement	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Local	Long term	Medium	Moderate	**Moderate**
Section 11 Existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**
Section 12								
Section 13A Existing road	Habitat degradation	Direct/indirect	Short to medium term reversible	Regional	Medium term	Low	Moderate	**Moderate**
	Introduction of alien species	Indirect	Irreversible to long term reversible	Regional	Long term	Medium	Major	**Large**

Conclusion

During the construction phase, no Section of the AIC has a poor/slight significance of impacts on flora and habitats. The assessment of these impacts per AIC section is as follows:

- Sections 9B2 and 10 have a high impact significance while Sections 1 and 9A2 high to moderate impact significance.
- Sections 2, 5B and 5C, which have a medium sensitivity, have a moderate to high significance due to the potential impacts of aquatic habitats destruction and flora degradation in rivers and irrigation/draining channels, on calcareous rocks and at river banks, of territories that will be exploited for raw material (rocks, sand and gravel) and of the introduction of alien species of flora.
- Sections 4, 6 and 7, 11 and 13A, despite their low sensitivity, have a large significance of impacts in flora and habitats
- Section 3 is assessed with slight to moderate impact significance.

Despite high sensitivity of Section 1, the impacts in flora and habitats during construction has an average of moderate to large significance, while Sections 9A2, 9B2 and 10, which have also high sensitivity, have a high to moderate significance. I

Section 5C, with a medium sensitivity, has a moderate impact significance

Sections 2 and 5B, with medium sensitivity, the significance is moderate.

Sections 3 and 7, of low sensitivity, has a slight to moderate significance of impacts in flora and habitats, during construction phase. Sections 4, 6, 11 and 13, with low sensitivity, has a moderate with light large tendency of significance. Such changes of significance, in compares to sensitivity, is conditioned by the magnitude of impacts.

The highest impact significance in habitats and flora, during the operational phase is moderate and characterizes Sections 1, 9A2, 9B2 and 10, although the sensitivity of these Sections is high. The impact significance in Sections 2, 5B and 5C is moderate to slight, while in Sections 4, 11 and 13 is slight to moderate (low sensitivity). Finally, the significance in Sections 3, 6 and 7 is assessed as slight (low sensitivity).

Mitigation measures regarding habitats

Pre-construction phase

The ESIA should include, among others:

- Analytical biodiversity site surveys so as to give a detailed overview of the Project area affected
- Identification of critical habitats along the highway and preparation if needed of Critical Habitat Assessments in order to be precise in the mitigation measures
- Identification and calculation of areas for habitat loss and estimation of the sensitivity level per habitat for fragmentation
- Fulfilment of the "No net loss" requirement" of EBRD and consultation with Forest Agencies
- Proposal of mitigation measures for protection of important habitats and biodiversity features such as awareness activities, fencing and isolation of working sites and road, etc., considering also habitat fragmentation.
- Proposal of the ESIA that the Contractor should prepare a Landscape Management Plan and a Biodiversity Management Plan and other relevant plans that may come up as a result of the relevant Scoping reports
- Identification of species with specific status in sites that seem to be affected by the AIC and propose measures for their protection, especially those that endangered, threatened or vulnerable and evaluation if they can be considered as priority biodiversity features

- Identification on species of plants to be used for reforestation/landscaping with focus on native plants and identification of characteristics of the site where they will be planted.

Additionally, the preliminary design/detailed design should try to minimize as possible the land withdrawal.

The PESIA has ended up in the conclusion that the majority of the habitats listed in Annex I of EU Habitat Directive cover small surfaces and are degraded since other activities and infrastructure take place, apart from the aquatic Buna river habitat in Section 1 which could be considered as a potential critical habitat. The ESIA will further examine whether the habitats crossed are critical habitats and propose specific measures via critical habitat assessments and biodiversity action and management plans.

Construction phase

The mitigation measures for the minimization of impacts for habitats are presented below.

- Habitat loss. Regarding the loss of terrestrial habitats, the following can be proposed:
  - Delimitation of areas to be cleared prior the start of the construction activities in order to reduce the area of vegetation to be cleared
  - Storage of construction materials and structures at designated specially equipped sites
  - Use of temporary or existing roads for delivery of construction materials
  - To achieve no net loss of biodiversity in areas of natural habitats restoring habitats during operations and/or after operations will be carried out. Namely disturbed land plots within both natural and modified habitats will undergo mechanical and biological rehabilitation/reclamation upon completion of construction works or following the closure of the Project.

  A set of mitigation measures regarding flora caused by vegetation removal:

  - Delimitation of areas to be cleared before the start of the construction activities in order to limit as much as possible the area of vegetation to be cleared
  - Adherence to allocated land boundaries during implementation of the Project
  - Storage of construction materials and structures at designated specially equipped sites
  - Use of temporary or existing roads for delivery of construction materials
  - Access roads will be defined before the beginning of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles taking part of the construction activities will not be allowed.
  - Land restoration of temporary land allotment and temporary roads with a set of technical and biological remediation measures according national legislation.
  - Compensatory vegetation planting for tree losses according national legislation.
  - After the completion of construction work, temporarily disturbed areas are subject to reclamation with sowing of perennial grasses.
  - Limitation of speed, in order to limit the risk of accidents with fauna.
  - Introduction of a ban on unauthorised gathering of plants near construction sites and worker camps.
  - In case of loss of flora due to fire, stockpiling of felling residue at designated areas followed by its removal should be done while burning of felling residue is prohibited.

  Compensatory tree planting will be performed within the highway corridor. Fenced areas will be vegetated with native plant species that are attractive to local fauna and with plantation patterns designed to lead the animals towards the wild life crossings. Habitats which are temporarily lost, will be subject to a separate revegetation and management plan, as their loss can be mitigated for; post construction, as the land will still be available for revegetating.

The rehabilitation program should start with a good understanding of the biodiversity baseline, e.g. vegetation types present, species composition etc. and understand the topography and hydrology of the reforestation sties, as ground conditions may be key to targeting specific tree species to increase establishment success rates. The reforestation programme should be progressive, and areas should be reforested and managed as they become available. Ongoing monitoring will also be required in order to monitor success, or the need for remediation.

The costs regarding reforestation will be determined by the area of forest to be replanted, the area of forest which will undergo natural regeneration but which may require fencing, and the length of time over which the reforestation management plan will be implemented which in turn will affect the outcome of the habitat-hectare calculations.

As for the loss of freshwater aquatic habitats caused by the construction of bridges and laying culverts across the rivers and streams, it can be proposed:

- Carry out construction works strictly in accordance with the work plan.
- Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained. Where technically applicable dredging will be used positively, e.g. for landscaping or habitat creation.
- Culverts will be designed to maintain the natural riverbed width and the natural riverbed level.

- Habitat degradation

Regarding terrestrial habitats and their degradation, the disturbance of flora caused by the changes in air maybe mitigated by the:

- Use of technically appropriate construction equipment.
- Timely repair of road machinery and equipment to minimize air pollution by exhaust gases.
- Watering of the road to prevent dusting.
- Limitation of speed, in order to limit emission of dust on non paved access roads.

As for the minimization of impacts of disturbance of flora caused by the changes in soil and ground water quality can be achieved by:

- Collection of wastewater from vehicle washing into a treatment station to trap suspended particles and petroleum products.
- Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip trays will be used for fuelling mobile equipment. No USTs will be used during construction stage.
- The soil contaminated due to spillages during handling of fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal.
- Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Avoidance of any spill affecting to the freshwater ecosystems.
- Store appropriately by following good hazardous materials storage and handling management practices.

Appropriate pollution prevention measures will be put in place at each crossing and vegetation cover will be retained on the banks where possible to retain habitat and minimize soil exposure. Silt fences will be used to prevent silt from travelling downstream, and banks will be restored to pre-construction contours to the extent practical using temporary erosion control measures (such as straw bales, silt fence, etc.). Pre-clearance site surveys will map sensitive vegetation for restoration and reinstatement of banks will use mid-term soil stabilization measures (if required) such as willow revetments, gabions and/or geo textiles membranes to retain soil until the vegetation has established.

- Sensitive habitats

Besides the general mitigation measures that apply on the whole length of the proposed highway, certain measures will be followed for designated areas and high sensitive habitats such as the following:

- No construction camps or machinery parks would be located high sensitive habitats or on alluvial terrains (in the river and stream valleys) in order to avoid adverse impacts on valuable riparian habitats and surface and ground waters.
- Establish a pre and post construction biodiversity baseline from which all mitigation, restoration, and loss / degradation can be measured
- Enabling and construction works should be carried out in the access road corridor (service road) so that the natural morphology of habitats is degraded to the smallest possible degree and in order to ensure preservation of autochthonous flora and vegetation.
- Clear vegetation cover in the areas around bridges carefully, ideally during the dormant period (from 1st October until 15th March).
- Water levels. Carry out works in watercourses during the time of the year when water levels are minimal, while making sure that the riverbed is preserved in its natural relief. Avoid destruction of riverbed and divert streams to minimise negative impact on aquatic flora and fauna.
- Management of soil. Material generated during excavation should be used for construction of the necessary infrastructure and for landscaping the areas along the road. Excess earth material should be deposited in line with the regulations at pre-designated locations
- Specific Methodologies. During the process of carrying out excavations along rivers, drilling the riverbed for the purpose of placing piers, blasting the surrounding hills and building reinforcement walls, the physical parameters (turbidity) and chemical parameters (PH, O2 saturation) should be regularly checked in specialised laboratories.
- Invasive species. In case of identifying invasive species, they should be immediately removed.
- Vegetation Restoration. Areas from which vegetation is going to be cleared for the purpose of enabling works and using access roads should be restored into their original condition.

In order to be more efficient, specific mitigation measures should be proposed after the ESIA, critical habitats will have been defined.

- Introduction of Alien Species
  - Pre-clearance site surveys combined with the demarcation and treatment of non-native species will prevent their spread.
  - Minimizing removal of native plant species, and replanting of native plant species in disturbed areas. No planting of alien species will occur in the camps or any areas within the route, including landscaping of re-vegetated areas.
  - Revegetation (i.e. the sowing of native herbaceous species on top soils and/or the planting of native shrubs/trees) will be undertaken as soon as possible after clearance and construction.

<u>Operational phase</u>

Regarding the operational phase and the mitigation of impacts for habitats the following can be mentioned.

- Reforestation Management and Monitoring. A monitoring strategy will need to be devised so that the overall success of the reforestation can be assessed. The monitoring will aim, not only at determining success, but also the need for remediation where replanting or management has not worked. Monitoring frequency will need to be determined, though it is suggested that each area subject to replanting or management should be monitored annually for the first five years post intervention, then once every 3-5 years after that.

- Disturbance of flora. Disturbance of flora caused by the changes in air quality can be mitigated by the timely repair of road machinery and equipment to minimize air pollution by exhaust gases and the watering of the road to prevent dusting. Disturbance of flora caused by the changes in soil and ground water quality have been mentioned in the waste section. Regarding degradation to freshwater of aquatic habitats, the mitigation measures have been mentioned in the surface waters section. Lighting Works will not be lit where this is practical. Where lighting is required it will be directional and the lighting strategy will be designed with the input of the design team. Only non-UV lighting sources will be employed. The proposed illumination system is based on LED technology and provided through a set of lighting poles of different heights that are mounted safely behind the road structures and other elements (e.g. guardrails).
- Introduction of Alien Species

  A monitoring plan should be carried out to record alien species populations in the project area of influence and aimed at removing new populations and preventing them from spreading throughout the route. In addition, prompt revegetation (i.e. sowing of native herbaceous species and/or planting native shrubs/trees) on bare soil with natural or semi-natural vegetation will reduce the spread of alien species.

Residual impacts

Once this mitigation as outlined above, has been implemented, project construction will only have a limited number of residual impacts including habitat loss, temporary disturbance impacts to a number of notable species, temporary loss of foraging, resting nesting and hibernating habitat and impacts during construction to streams and rivers and associated habitats. Should any of the above impacts be deemed to be more significant than initially anticipated further mitigation will be implemented as required. As a result these residual impacts are expected to be of **……..** Following implementation of the proposed mitigation, the operational project will still have a limited number of residual impacts, primarily associated with disturbance, habitat severance, roadkill, and pollution run-off. The use of mitigation such as cut-off lighting, animal underpasses amphibian fencing and stormwater run-off treatment means that these residual impacts are expected to be of only **……..**

Impacts in Fauna

Species with International Significance for Critical Habitats (VU-Vulnerable; EN-Endangered; CR-Critically endangered; EW-Extinct in the wild; EX-Extinct) encountered at this project stage have been examined for their presence along the AIC. Some of the fauna species with specific importance, with their status, referring to IUCN and Albanian Red List are presented in the Annex 3.

Regarding Section 1, there have been registered fourteen migratory species of fish in Buna River, among which two critical endangered species of surgeon Atlantic Sturgeon (*Acipenser sturio*) and Adriatic sturgeon (*Acipenser naccari),* IUCN Red list, critically endangered species could be considered as potential priority biodiversity features (they have been not seen in the river for about 20 years). Several migratory birds are noticed in the Buna valley and the surrounding wetlands, such as wild ducks (Anas acuta, Anas clypeata etc) which may be considered as potential priority biodiversity features.
No species listed in the five first categories (*EW, ER, ET, CR, VU*) of IUCN list are observed in the rest of the Sections. Further assessment will be done under the ESIA of each Section in order to determine via field surveys if certain species maybe considered as priority biodiversity features.

Although some of the Sections, such as Section 9A2 run over the existing roads, their vicinity with undisturbed or little disturbed river valleys represents a risk for significant impacts to wildlife.

Pre-construction phase

As it is explained in other sub-chapters, this phase may define the development of all project phases and the efficiency of measures proposed will reduce the magnitude of impacts. If not specific provision is made in the ESIA, then habitats for specific species maybe lost without being restored, other habitats maybe totally fragmented while several types of fauna maybe disturbed at great extent or killed.

Construction phase

Impacts from vehicle movements (including transport of people and equipment) and use of machinery and equipment will be more important for mammals including bats migrating and breeding birds, impacts from working compounds and camps (including production of wastes and indirect worker pressure), will be more important for breeding & migrating birds, small and large mammals; reptiles; amphibians; fish and invertebrates, while water crossing construction may impact more on riparian habitats and associated birds; mammals; amphibians; fish; and invertebrates and other aquatic receptors .

The construction of a highway may cause multiple negative impacts to the wildlife. These impacts may be direct and/or indirect and thus identified in the course of construction and further in operation. Although intensity and consequences of negative impacts are specific for every particular animal species, general effects may be manifested as stated below:

- Habitat loss. Habitat loss will condition an enforceable migration of terrestrial wildlife or death of animals unable to migrate. The impacts depend on the species of fauna or the period when the impact occurs. The reproduction period is in springtime and the young age of fauna will be in higher risk since they will be unable to move. This impact may occur in all Sections, but most significant may be in Sections 1, 4, 5B, 5C, 9B2-13A. The obligatory movements from enforceable migration, usually are joined by impacts in other sites, from overpopulation and lack of food. In most of the cases, due to the small territories and fragmentation of habitats, the high terrestrial herbivores and carnivores will try to find food at vicinity of farms, which may lead to the massive hunting of them from the farmers. Sections 1, 4, 5B, parts of section 5C, 9A2-13, are rich in such wildlife.

  As a result of vegetation clearance works, parking and operation of mechanisation, as well as storage of material on the ground, outside of the zone of the existing roads and the urban area, amphibians and reptiles will be affected since their habitat will be lost that they used for breeding, resting and hibernation (as well as habitats for prey). Habitat loss may affect also birds, since their habitat for nesting and breeding maybe lost as well as insects, something which will impact indirectly whole food chain, reducing food for birds and small reptiles and amphibians. Temporary and permanent loss of aquatic habitats, including river banks will impact also on fish populations.

- Accidental killing of wildlife. Direct mortality may affect small mammals and reptiles (e.g. tortoise) and amphibian individuals by vegetation clearance, construction activities along the road or traffic on the access routes and machinery movement. This impact is severe for several fauna species of natural river bodies, forests, woodlands or agricultural lands, which are less disturbed by human activities. A good part of wildlife will be exposed to illegal hunting for recreation, sell or food in the terrestrial habitats of Sections 4, 5B and 10. Not only wild ducks, hair, foxes, martin, roe, wolf, wild boar, bear etc., in Sections 9A2-13, but also decorative and singing birds, weasels, polecats, etc., are in risk, as far as they are moving or feeding in agricultural areas. Although the alignment is running partially or totally over existing roads regarding Sections 1, 2, 5B, 5C, 9A2-13, fish living in rivers, which are crossed by these Sections, or in vicinity of them, may be exposed to illegal fishing (not appropriate nets, out of the fishing season, fishing with explosives etc.). Regarding bats, they maybe affected by collisions with vehicles, habitat clearance, hunting and other sources of direct mortality, something that may happen in Sections 5B, 5C and 9B2, where bats have been noted. As for amphibians and reptiles, increased mortality of adult and juvenile fauna when crossing the road.

- Habitat fragmentation. During construction, impacts to mammals and amphibians and reptiles will result from loss and fragmentation of habitat, cutting down old trees potential shelters for bats), removing a part of the wetland vegetation (feeding source), mortality and injuries during execution of works caused by mechanization and harassment. Fragmentation of habitats already occurs on existing road parts of the AIC, and the current lack of underpasses has created a barrier and has led to significant mortality of certain species.

  The cleared land strip along the highway will be permanently occupied by the carriageway and the associated structures. This will cause the fragmentation of habitats. Over time, the populations become divided into a number of subpopulations, and if they are too small, they may be prone to local extinction. Also, fragmentation of habitats can lead to a reduction in genetic diversity within

populations at both sides of the highway, which can make the populations susceptible to extinction as well. Taking into account the types and sensitivities of the habitats that will be separated by the highway as well as the species that will have to cross the highway, it maybe concluded that the impacts of fragmentation will be generally more important in those areas where high sensitivity habitats are predominant at both sides of the highway alignment, followed by habitats of medium sensitivity and importance. Fragmentation or loss of anthropogenic habitats has a low impact on biodiversity because plant species that grow in these habitats, except for cultivated species after a short time, recover these spaces.

To sustain viable populations, mammals need relatively large habitats. Their primary and relatively homogenous habitats are divided into smaller segments as a result of construction of traffic infrastructure. Such fragmentation leads to small isolated local populations something which results in negative effect for their life capability. In separated small populations, adequate social and sexual structure cannot be developed which further increases the possibility for extinction of certain species. Obstacles disable movement of species which result in overpopulation in certain areas while other areas remain unpopulated. Mating between animals in closer relationship (inbreeding) is also increased among isolated populations. Inbreeding has negative impact to genetic structure and increases the chances of offspring being affected by recessive genes of both parents. Therefore, the second generation is mostly affected by losing of genetic potential which may further result in significant loss of genetic diversity. Important impacts maybe considered for Sections 5C and 9B2. The ESIA will define the magnitude of fragmentation of habitats per Section so as the impacts will be better defined and mitigated.

- Habitat degradation. The uncontrolled waste disposal or leakages to running waters or undisturbed areas in the vicinity of the AIC, may infect, and sometime kill due to poisoning several species of aquatic and terrestrial fauna. The most affected part of wildlife by poisoning are fish and aquatic fauna, mostly in Sections 1 (Buna river), 2 (Mati river), 4 (Ishmi river), 5B (Erzeni river) and 5C (Shkumbini river). Terrestrial small mammals, such as squirrel, rats and mice along Sections 9A2-13A may be exposed to poisoning, if they are fed in/around the garbage, generated in working campus, or selected sites for temporary solid waste disposal. Additionally, degradation of the aquatic habitats will be a result of changes in hydrodynamic conditions, increased water turbidity (river crossings), spillage of harmful chemical substances into the environment, e.g. petroleum products) and loss of connectivity between the upstream and downstream habitats. Erosion during and after construction of roads, highways and bridges can contribute sediment and silt to runoff waters, which can deteriorate water quality and lead to impact on macroinvertebrates, fish kills, siltation. Heavy metals, oils, other toxic substances and debris from construction, traffic and spillage can be absorbed by soil at construction sites and carried with runoff water to the river. As for amphibians and reptiles, pollution of habitats maybe done through emission of dust, waste, excavated soil or other material along the river banks, creeks, or directly into the aquatic habitats. Fauna of all Sections is exposed to this impact.

  The disturbance factor may variably affect the population in total and separate species. Disturbance of fauna may occur particularly while breeding, degradation of habitats and direct and indirect pollution of habitats.

  Disturbance factors for the animals are noise, vibration, light exposure due to the work of construction equipment and vehicles within the construction site, access roads, and the presence of people on construction sites. The disturbance factor may variably affect the population in total and separate species. Flashes of light due to the work of construction equipment and vehicles within the construction site, access roads, the presence of people on construction sites, loud sounds, degradation of habitats due to compaction dust and vegetation destruction or the ingress of non-native invasive species and other unusual phenomena disturb and scare animals. Frequent scaring inevitably disrupts the daily activity rhythm interrupting rest, feeding, mating and hatching. This results in weight loss and smaller number of offspring. Besides, some animals leave their feeding grounds and migrate to other areas.

  Noise from construction machinery and heavy traffic on construction and operational stages will have immediate impact on animal world in the area. Animals respond to noise pollution by altering activity patterns with an increase in heartbeat and production of stress hormones. Most of the carnivores, do

not support the human presence in their territories. Typical ones are the wild boar, wolf, roe and bear, as well as large and prey birds (such as vultures in Vjosa River Valley – Sections 9A2-13A). Artificial lighting, during the night, will impact on fauna abilities to sunlight, and damage their instinct for breeding, feeding etc. Dust deposited on the plants in the road impact zone may affect food base of the vertebrate and invertebrate species. Such impacts may happen to any of the AIC sections.

Substitution of native plants with alien ones, for decorative or protection purposes, will lead to fauna stress due to lack of food, while new predators may come. This will lead to a change in ecological equilibrium of sub-habitats.

More specifically, disturbance will affect:

- Birds for nesting, feeding and resting, while communication, by auditory signals may be confused near the road construction sites.
- Amphibians and reptiles, especially during construction of bridges across the rivers and where the road route runs across streams and channels and as a result of noise and vibrations during the construction phase.
- Fish. Fish stock can be disturbed by changes to water velocity, oxygen levels, and temperature with shallower watercourses being warmer. This can pose a problem in areas supporting salmonid species. Under such conditions, premature hatching may occur at the time when other conditions, primarily conditions related to feeding, are not satisfactory. Inadvertent introduction of invasive alien plant and animal species may also affect fish.
- Mammals. Road construction has the potential to result in impacts to bats as a result of habitat loss and disturbance and direct mortality amongst others (Sections 5B, 5C and 9B2). Operational roads can also have a number of significant effects on bat populations including those outlined further in the table below. Many effects of roads on bats are species-specific. Larger, fastflying species, adapted to foraging in the open, appear to be less affected by roads since they typically fly high above the ground and their greater flight efficiency and speed mean that even if diverted, the consequences are less likely to be important. Smaller, slower flying, woodland adapted species are more maneuverable but less efficient flyers. Woodland species are also more reluctant to fly in the open and tend to commute along linear features in the landscape such as tree lines, waterways, and woodland edges. These features provide protection from weather and predators, are sources of insect prey, and provide conspicuous acoustic and visual landmarks for orientation. The species most likely to be affected by roads are the slow-flying, woodland-adapted bats, such as the *Rhinolophus sp. and Myotis sp.*, and these are also those that have suffered most from habitat loss.

  The detrimental effects of artificial lighting will be reduced where practical by limiting unnecessary installations and using cut-off lighting. This is considered particularly important in areas commonly used by light-averse bats to forage, commute or roost during key times such as reproduction. Bats are also particularly faithful to maternity roosts due to the specific conditions they provide, and so conserving them is important for maintaining bat populations.

The table for assessment of AIC impacts on fauna during construction phase is given below.

Table 6-33 Assessment of Impacts of fauna during the construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in fauna								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Accidental killing of wildlife	Direct	Irreversible	International	Long term	High	Major	**Large**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local/Regional	Medium term	Low	Large	**Moderate**
Section 2 New alignment + existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Long term	Medium	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Regional	Medium term	High	Moderate	**Moderate**
Section 3 Existing road	Accidental killing of wildlife	Direct	Irreversible	Local	Long term	Low	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local	Medium term	medium	Minor	**Slight**
Section 4 New Alignment	Accidental killing of wildlife	Direct	Irreversible	Local	Long term	Low	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local	Medium term	High	Moderate	**Moderate**
Section 5B New alignment	Accidental killing of wildlife	Direct	Irreversible	Regional	Long term	Medium	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Regional	Medium term	High	Moderate	**Moderate**
Section 5C Existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Long term	Medium	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Regional	Medium term	High	Moderate	**Moderate**
Section 6+7 Existing Road	Accidental killing of wildlife	Direct	Irreversible	Local	Long term	Low	Moderate	**Moderate**

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in fauna								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local	Medium term	Low	Minor	**Slight**
Section 8								
Section 9A2 Existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Short term	High	Major	**Large**
	Habital loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local/Regional	Medium term	Medium	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Short term	High	Major	**Large**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local/Regional	Medium term	High	Major	**Large**
Section 10 New alignement	Accidental killing of wildlife	Direct	Reversible	Regional	Short to medium term	High		**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Local/Regional	Medium term	High	Major	**Large**
Section 11 Existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Long term	High	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Regional	Medium term	High	Moderate	**Slight**
Section 12								
Section 13A Existing road	Accidental killing of wildlife	Direct	Irreversible	Regional	Long term	High	Moderate	**Moderate**
	Habitat loss							
	Habitat fragmentation							
	Habitat degradation	Direct/Indirect	Reversible	Regional	Medium term	High	Moderate	**Moderate**

Operational phase

Impacts on fauna during the operation is listed below.

- Accidental roadkill. The presence of a motorway can result in the loss of some fauna, as a result of accidents when crossing the motorway, getting run over by the vehicles. This can impact all groups of fauna. Mammals can be killed by crossing the road. Although most birds comparing to other animal species have no significant difficulties in crossing the traffic infrastructure, they may also be faced with certain severe obstacles. Collisions between birds and vehicles are frequent as well as bird deaths resulting from collisions with man-made structures such as safety barriers and noise suppression walls. Particular problems are with transparent noise suppression panels placed in certain areas to provide drivers and passengers sightseeing of landscape. Since traffic infrastructure usually cuts the natural movement corridors of amphibians, these animals are often killed trying to cross the road. Reptiles maybe run over and killed when they attempt to cross the road especially in warmer areas where these animals mostly live. The increased death of reptiles on road is often the result of their thermo-regulation considering the fact that they depend on environmental temperature. These animals use open spaces without vegetation (including road surface) to catch the sun for warmth especially in spring and morning. Some lizards and snakes also come to road to feed on insects. This impact has large significance mainly in Sections 1, 9B2 and 10.
- Wildlife disturbance. Most of the wildlife (small mammals, reptiles, amphibians and birds), which may live in the vicinity of the AIC Sections, will be disturbed by air, soil and water pollution (contamination from car discharges, PMs and leakages, accidental pollution/contamination).

  The increased levels of noise and vibration from the traffic can disturb the fauna. Taking into account the noise and vibration attenuation levels with the distance, the disturbance is expected to mostly occur in the direct proximity of the highway.

  Artificial challenge for food, shelter and space, in areas where wildlife has migrated, may create changes on population ratio in the habitats where wildlife has migrated. Usually, such challenges are joined by the reduction of some populations and increase of some others, which damage the natural ecological equilibrium. Such impacts are related only to terrestrial wildlife. This impact may happen to all AIC sections.

  During operation, fish may suffer from decreases in water quality associated with road run-off downstream from the bridges, as well as loss of connectivity between the upstream and downstream habitats. Any of the issues that could impact upon water quality could also affect fish stock. This includes impacts affecting places for hatching and laying eggs as a result in changes to the riverbed following bridge construction. Increased water turbidity can adversely affect both light levels, oxygen dissolution, water temperature, and availability of food, and can led to suffocation of fish eggs and fry. Increased PH value leads can also lead to a more pronounced toxicity of many metals, aluminium, cadmium, zinc, iron and copper etc which can lead to morphological changes on gills, whereby this causes reduction of their respiratory and osmoregulation efficiency, slows down the spawning process and development of fertilized eggs, while it also increases the mortality of embryos and fish larvae.

  During the operational stage the road will be illuminated at the interchanges, tunnels, bridges, underpasses, rest and service areas, frontier plazas and toll plazas. Light pollution could potentially impact on fauna species with consequences that might be significant for the spatial and temporal distributions of populations. The four main types of effect are:

  - Attraction to light. Many species of invertebrates and vertebrates will move towards a light source. One advantage of this sort of response is that it can enhance foraging behaviour. Light also acts as a directional navigational signal used to guide animals.
  - Avoidance of light. Many species show the opposite behaviour. Thus, when there is bright moonlight, small nocturnal mammals tend to move about less, restrict their foraging range and feed for a shorter time than when the sky is overcast. The main advantage of keeping out of the light is generally thought to be the avoidance of predation.

- Photoperiodism. As it was noted earlier, many aspects of physiology and behaviour are influenced by day–night or circadian rhythms. Where species show seasonality in their behaviour, such as annual migrations or periods of dormancy, day length is a mediating factor. These changes enable the individual concerned to avoid unfavourable conditions.
- Spectral quality. Species have evolved to function under particular light regimes and both their ability to receive light stimuli and respond to them are finely tuned to particular qualities of the visual spectrum. This is particularly apparent in plants, where different photoreceptors are stimulated by different wavelengths of light.

Birds also may be disturbed by vehicle head lights. Light spill can disrupt feeding patterns and force ecological receptors to leave their habitat.

- Habitat fragmentation - Barrier effect. The linear infrastructures will contribute towards the habitat fragmentation by creating barriers to migration of the fauna representatives and isolation of their populations. The barrier effect created by such linear infrastructures can affect the dispersion and movement capacity of the fauna. This affects indirectly to their capacity for searching food, shelter or other individuals of their same species during the breeding season. These factors are linked with the species populations dynamic and can influence in the survival of threaten species.

The table for assessment of the AIC impacts on fauna during operational phase is given below.

Table 6-34 Assessment of Impacts of fauna during the operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operational phase in fauna								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
Section 2 New alignment + existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 3 Existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 4 New Alignment	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 5B New alignment	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 5C Existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 6+7 Existing Road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Low	Minor	**Minor**
	Habitat fragmentation – barrier effect							

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operational phase in fauna								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 8								
Section 9A2 Existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance by air, soil and water pollution	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
Section 9B2 New alignment + existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
Section 10 New alignement	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	High	Major	**Large**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Medium	Moderate	**Moderate**
Section 11 Existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
Section 12								
Section 13A Existing road	Accidental killing by traffic.	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**
	Habitat fragmentation – barrier effect							
	Wildlife disturbance	Direct	Irreversible	Local	Long term	Low	Minor	**Slight**

Conclusions

The most significant impacts are related to habitats rich in fauna and can be seen in Sections 1, 9A2, 9B2 and 10. Impacts in Sections which run over important and sensitive rivers are higher than those in Sections which do not affect any important aquatic habitat and its related fauna.

Regarding the construction phase, the impact significance of AIC at fauna is moderate to large at Sections 1 and 9A2, which are related almost to the high values of the aquatic and wetland fauna. The impact significance of section 9B2 and 10 is also moderate to large, however the impacts for these Sections are high also in terrestrial fauna. As for Sections 2, 5B and 5C, the impact significance and sensitivity is moderate. Sections 11 and 13A have slight to moderate significance. The other Sections are of slight significance and low sensitivity.

Regarding the operational phase, Sections 1 and 9A2 have a moderate significance impact on fauna. Sections 9B2 and 10 have also an average of indicators which corresponds to moderate significance, while accidental killing of wildlife is of large impact significance. Sections 2, 5B and 5C have a slight to moderate significance and Sections 3, 4, 6 and 7, and 11 have a slight significance.

Mitigation measures for Fauna

Pre-construction phase

Considering the protection of habitats and their quality characteristics regarding fauna, as a priority of the ESMP and ESAP of the ESIA, the ESIA Consultant should include inter alia:

- Detailed inventory of fauna
- Identification of species with specific status in sites that seem to be affected by the AIC and propose measures for their protection, especially those that endangered, threatened or vulnerable and evaluation if they can be considered as priority biodiversity features
- Defining the areas where animal crossings will be placed
- Measures to control animal disturbance, where possible
- Consultation with stakeholders, farmers, fishers, hunters etc., on their information about the presence of wildlife in surrounding of the road alignment and their expectations regarding mitigation measures during road construction, operation and maintenance.
- Identification of priority biodiversity features

As for the preliminary design/detailed design, minimization of land withdrawal should be targeted and to avoid traffic mortality and allow crossing of animals from one to the other side of the road underpasses, box culverts, bridges and tube culverts can be used. Habitat fragmentation for each category of animal is also related to the distance between suitable crossings. The smaller the distance the smaller are the consequences related to habitat fragmentation. For the small mammals and reptiles, the recommended criteria are the following: Underpasses for small animals such as amphibians and reptiles consist of pipes or rectangular tunnels with a diameter/width of usually 0,4-2 m. The distance between two appropriate and available passages must not exceed the 200 meters in natural areas or 500 in agricultural areas according to expert judgment. The longer the length of the road fulfils the above-mentioned criteria the less impacts are caused to the biotope fragmentation.

The ESIA of each Section should propose specific mitigation with its biodiversity action plan, management plan and other supplementary deliverables such as Critical Habitat Assessment and be very specific for dealing with impacts for priority biodiversity features.

Construction phase

Regarding mitigation measures for fauna species protection during the construction phase, it will be proposed the following:

- Habitat loss, conversion, degradation and simplification. Permanent land-take will affect habitats used for breeding, feeding and other activities by several species. For areas of temporary land-take, pre-works surveys will be used to confirm baseline conditions to which habitats should be restored post construction. Whilst this will minimize long term impacts, some short-term degradation and disturbance will be inevitable whilst mid-term loss will occur in areas that, once replanted, take time to mature (e.g. forest).

  Regarding birds, care will be taken to avoid nesting birds during construction. Habitats of greater importance will be marked out for particularly sensitive works.

  Regarding bats and Sections 5B, 5C and 9B2, before cutting down the trees, old trees will be checked for the presence of bat roosts and hibernaculae (used from March to November). To facilitate the transition period (i.e. the period were the bats will find new resting places) for bats, bat boxes can be installed in forest areas near the project area. These bat boxes will be installed before the trees are cut down, to secure alternative resting places, when removing the original. Alternatively, new suitable holes/gaps can /cut in some of the largest trees in the remaining forest. Both if installing bat boxes and/or holes/gaps in trees it is important to protect the selected trees against future cutting and it is also important to maintain the surrounding with trees, i.e. as forest.

  As for mammals and vegetation management, vegetation along the road will be cut down and cleared (in the zone from 3 to 10 m) to reduce the attractiveness of the habitat for certain mammals, and to increase the transparency of the terrain and visibility for drivers. This is also for the operational phase.

- Habitat fragmentation. Regarding fragmentation, the following mitigation measures are proposed.
  - Access roads will be defined before the start of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles will not be allowed
  - Use of temporary or existing roads for delivery of construction materials
  - Remediation of temporary land allotment and temporary roads with a set of technical and biological remediation measures according national legislation.
  - Adherence to allocated land boundaries during implementation of the Project
  - Delimitation of areas to be cleared prior the start of the construction activities in order to reduce the area of vegetation to be cleared

  Regarding birds, fragmentation of grassland habitats will be avoided to prevent impacts to ground-nesting species. Access roads will be clearly defined before commencement of works.

  As for mammals, culverts are planned for passages for animals using expert recommendations in places that have been determined as important in terms of habitat conservation and increased mortality due to collision. During the construction of passages, it is necessary to preserve the surrounding flora in order to enable the natural movement of animals towards passage. On bridges and under bridges ledges will be provided for movement of small mammals and otters (during high water levels as well). Last but not least, there should be installed a temporary fence around the construction site in places that the study has defined as important for mammals, in order to prevent their entry during the night.

  Regarding the amphibians and reptiles, culverts will be constructed in the way to enable passage for terrestrial animals, while the use of heavy machinery will be strictly limited to the Project route to avoid additional fragmentation and degradation of habitats, as well as subsidence of soil.

- Direct mortality. Pre-clearance site surveys will map sensitive areas and bio-corridors and apply additional mitigation where required. Construction camps will be located away from sensitive areas. A hunting ban will be in force for construction workers. Speed limits on vehicles and restriction to existing and/or dedicated haul routes will prevent direct mortality and disturbance from vehicles during construction. Pre-clearance site surveys and the movement of animals out of the working corridor, combined with timing of works in sensitive areas will prevent direct mortality. Some low level

unavoidable direct mortality may still happen but this would not be significant in the short or long term. The use of fences in the construction sites will also avoid the entrance of fauna in them, avoiding accidents.

As for birds, it can be proposed to build a decorative bird silhouette on a stained-glass surface along the bridges that pass over the aquatic habitats. It will prevent birds to be hit by fast moving vehicles and in the same time serves as a noise barrier.

Regarding mammals, traffic signs and signalling for the drivers (blinking mark) with animal signs should be placed at locations which have been determined as important for mammals through the study.

- Disturbance of fauna. As for the terrestrial habitats and the changes in air, the use of technically appropriate construction equipment, the timely repair of road machinery and equipment to minimize air pollution by exhaust gases, the watering of the road to prevent dusting and the limitation of speed, in order to limit emission of dust on non paved access roads can be proposed. Construction noise and visual disturbance will result in short term, localised effects, although many animals will become habituated to the noise. The increase in noise, vibration and illumination pollution maybe mitigated by the use of technically appropriate construction equipment, while the noise emission will be limited as much as possible: speed limit for vehicles, maintenance programs of machinery, control emission of noise during the night, etc. Impacts to the most sensitive habitats and species will be reduced by confining works to the least sensitive timeframes. Monitoring by the Contractor will also ensure that should valuable species be breeding in an area, works do not take place during these sensitive times.

  Regarding lighting, it will be minimised as far as practical whilst taking account of safety requirements. Cut-off lighting will be used and mercury and halogen lamps will not be used.

  Works will be planned during the period of reduced activity of birds, or in the period outside the reproductive season. The optimal period is after the reproductive season, from the end of August, or before the beginning of the reproductive season in April. Works related to changes in the riverbed will be undertaken where practical at the period of the lowest water level, i.e. after the nesting period which occurs during the end of July. Where possible, vegetation clearance would not be undertaken during the breeding bird season. All site staff would be informed on procedures to be implemented if any nesting birds are found within the construction area.

  As for the realignment of rivers (all Sections apart from Section 10), in order to prevent/ mitigate increase of flow velocity and downstream sedimentation that will cause impacts on aquatic habitat and fish, new channels should be constructed sinuous (and not straight) with asymmetrical cross sections, while the river flow should be let to elaborate the new river channel at the new place, rather than use of concrete bed – this will allow to stabilize the stream velocity in several years after the establishing of the new structure. In order to mitigate the increased turbidity, construction works should be carried out strictly in accordance with the work plan. The change of the water quality mitigation measures which refer mainly to fish and amphibians and reptiles should be dealt with as recommended in the surface waters sub-chapter.

<u>Operational phase</u>

The following mitigation for fauna can be proposed.

- Disturbance to fauna. The implementation of mitigation measures regarding soils and surface waters will deal with any impacts to fauna during this phase. In case of use of pesticides and herbicides which will cause change of water quality, the following can be proposed:
  - Training of personnel to apply herbicides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required.
  - Compliance with international restrictions on pesticide use.
  - Review of manufacturer's directions on maximum recommended dosage or treatment, as well as published reports on reduced rate of herbicide application without loss of effect, and application of the minimum effective dose.

- Application of herbicides based on criteria (e.g. field observations, weather data, time of treatment, and dosage) and maintenance of a pesticide logbook to record such information.

Regarding lighting, the mitigation measures mentioned for the operational phase of the landscape parameter will assist in dealing with impacts provoked, although as it is described above the impacts will be negligible.

- Barrier effect. The mitigation measures to minimize the effect of fragmentation mainly consist of the establishment of wildlife crossings (culverts, underpasses, overpasses etc.) to increase the movement activity vertically to the highway. Regular maintenance activities will also include protective fence maintenance, removal of food, waste, animal carcasses, etc. from roads, in order to reduce the attraction of scavengers, as well as maintenance in a good and functional status the fauna crossing points constructed. The use of tunnelling means that fragmentation effects (Sections 2, 5B, 9B2, 10) are likely to be largely temporary and restricted in area and are therefore unlikely to result in a significant effect on populations.
- Accidental roadkill. Regarding the accidental loss of fauna, there should be a limitation of speed especially where wildlife corridors and passages have been identified, in order to limit the risk of accidents with fauna, a safety barrier will be installed on both sides of the road and along the median strip, while on slopes and depressed terrain locations, a screen mesh will be installed to restrict access of animals. The amphibians and mammals should be provided with sufficient possibilities to cross under the motoway. The function of these underpasses can be evaluated and optimized through identification of so-called black spots short sections of road where many individual animals are killed.
- Fauna monitoring plan. There should be developed and implemented a Monitoring Plan of terrestrial and aquatic fauna in order to timely recognise negative impacts and trends related to the motoway operation and define additional and appropriate mitigation measures (e.g. additional or different fauna crossing points). In order to reduce the risk of collision accidents and road mortality, there should be planned the timely removal of excess salt after winter in order to reduce the risk of collision accidents and road mortality. As far as bird fauna, it is necessary to organize at least one-year monitoring in the operational phase, and based on the results of research prescribe measures to mitigate the effects. For this purpose, it is necessary to organise a consultation process with key stakeholders (institutions or organizations) to assess the capacity to implement monitoring on the motorway and confirm the main elements of the monitoring plan. Monitoring should be undertaken of fish populations. Regarding mammals and amphibians and reptiles, monitoring of the mitigation measures is mandatory in order to assess their effectiveness. Condition of the wildlife crossings and unimpeded access needs to be periodically monitored during road use.

Residual impacts

Given the above, residual impacts on fauna species are expected to be moderate to slight. Direct impacts will be associated with habitat loss, disturbance and accidental mortality. Indirect impacts could also arise from fragmentation and introduction of people to the valley. The implementation of the proposed mitigation and the preparation and implementation of appropriate Biodiversity Action Plans (BAPs) for key species, means that such impacts are, however, expected to be reduced to an acceptable level, although they remain as moderate. The operation of the road will result in direct impacts to notable species from road traffic accidents as well as indirect impacts associated with disturbance, habitat fragmentation, pollution and increased access to habitats. Given the proposed mitigation, including the used of species-specific BAPs, such impacts are expected to be reduced to an acceptable level.

Impacts in Natural Protected Areas

During the preparation of the Conceptual Design, the environmental, social and technical teams collaborated strongly with each other and with the national/regional stakeholders to reduce as much as possible the parts of the Protected Areas affected.

Buna river as a Protected Landscape territory (IUCN Category V) is directly impacted by Section 1 of the AIC. The bridge over Buna River impacts directly on its Core area, zones 1A and 1B. The other part of the

road from Buna River till the end of the Buna River Protected Landscape border runs over 2A zone (traditional use area).

Section 2 of the AIC touches the buffer zone of Kune Vain Tale Nature Reserve (IUCN Category IV). By the new Law on Protected Areas, the Nature Managed Reserves will not have a buffer zone. However, the zoning of Kune Vain Tale (KVT), Managed Reserve, which is done taking into account the old Law on Protected Areas, is not yet revised. At present, it is not clear if the buffer zone of Kune Vain Tale will be part of the protected area or not. In any case, the part of the current buffer zone, where Section 2 passes, is quite disturbed by the human presence and infrastructure. Therefore, Section 2 will not affect any of the natural values of the Protected Area.

Sections 9B2 and 10 go close to two Natural Monuments (Category III IUCN), i.e. "Rrepet e Pocemit" and "Rrepet e Dervenit". Both of these Natural Monuments and/or their buffer zones are not touched by the abovementioned Sections, while the minimum distance of 200m that the by new Law on Protected Areas requires has been taken into account in the conceptual design.

Pre-construction phase

Most of the negative impacts on Protected Areas may be avoided by well-planning and design of the Sections. During the conceptual design there has been an effort to minimize to a great extent the parts of the Protected Areas (PAs) crossed. Lack of supported justification of the impacts and mitigation measures during the ESIA preparation may lead the Protected Areas to be further degraded during the construction and operational phase. Appropriate assessments should be carried out under the ESIA stage.

Construction phase

Since some of the impacts have been already analyzed, limited and targeted impacts to the different characteristics of the Protected Areas will be analyzed below. More specifically:

- Pollution of Protected Areas Territory (soils, air and noise, waters). Construction and municipal waste not only may damage the visual and landscape characteristics of the PAs, but may lead to water, soil and air pollution. This impact seems to occur mainly in Sections 1 and 2. Section 1 runs over Buna River Protected Landscape, so the impacts are direct and may be transferred in the river downstream. Buna river plays a channel role and runs against its natural direction (from the sea to the Shkodra Lake) in case of atmospheric events. So, in such a case, waters of Buna river may affect Shkodra Lake, damaging Shkodra Lake Managed Reserve. Additionally, pollution of Drini of Lezha River may be transferred to Kune Vain Tale PA, which is well related to the river and its sediments quality. The Natural Monuments of Sections 9B2 and 10 are in higher altitude than the alignment and no natural transfer of impacts is expected by washing from rainfalls (natural gravity) or running waters. Winds may affect such Natural Monuments, transferring air pollution and unpleased odors.
- Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna. All natural PAs are related to their potentials such as habitats, flora and fauna, landscapes or natural monuments which can be seriously damaged by habitat destruction/degradation. Fragmentation of PAs territories will have the same effects as habitat degradation and will cause loss on wildlife and recreational potentials. This impact may affect all PAs under the study. Changes in river geo-morphology from the viaducts' and bridges' pillars or from extraction of raw material, dumping of solid matter or debris, etc, will generate important impacts to the Buna River PA (Section 1) and Kune Vain Tale PA (Section 2). Such changes may lead to changes in flora and vegetation. Erosion and/or sedimentation in river body will cause increase of suspended matters in water, damaging river waters visual characteristics and impact on the related flora and fauna. Cuts, in the river valley, may incite slides and erosion, which also will damage PAs potentials, reduce their vegetation cover and recreational potentials (Section 1 and 2). Illegal fishing, poaching and other illegal hunting will damage directly and indirectly the PAs potentials, while in case of fishing with poison or explosive, the damage may be transferred in other downstream sites. Fires in the PA may risk the entire PA assets and cause drastic degradation of PAs. Both Nature Monuments in Sections 9B2 and 10 are very close or in the vicinity to woodlands, forests, arable lands and/or fruit trees. Possible fires maybe spread and burn the monuments, as it has happened with another nature monument which is close to the AIC which is already burnt.

- Changes on the morphology of nearby sites, which may cause floods in Pas. Changes in morphology of nearby sites, which may control the water flows and of the draining system by earth cutting/filling may cause floods in PAs territories. This impact seems to occur and is primarily related with Section 1. No other protected areas will be affected by this impact.

The table for assessment of AIC impacts on Protected Areas during the construction phase is presented below. It includes only the Sections which affect or may affect protected areas and more specifically Sections 1, 2, 9B2 and 10. The other Sections are far away from Protected Areas.

Table 6-35 Assessment of Impacts to Protected Areas during the construction phase

Assessment threshold and SIGNIFICANCE per Section, of AIC Impacts in Protected Areas during construction phase								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Pollution of Protected Areas Territory (soils, air and noise, waters), by construction activities	Direct/indirect	Reversible short to medium term	International	Short to medium	High	Major	**Large**
	Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna.	Direct	Medium to long term reversible	International	Long term	Medium	Moderate	**Moderate**
	Changes on the morphology of nearby sites	Indirect	Medium term reversible	Local/Regional	Medium term	High	Major	**Large**
Section 2 New alignment + existing road	Pollution of Protected Areas Territory (soils, air and noise, waters), by construction activities	Indirect	Reversible short to medium term	Local	Short to medium	Low	Moderate	**Moderate**
	Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna.	Indirect	Medium to long term reversible	Local	Long term	Low	Minor	**Slight**
	Changes on the morphology of nearby sites	Indirect	N/A	N/A	N/A	N/A	N/A	N/A
Section 9B2 New alignment + existing road	Pollution of Protected Areas Territory (soils, air and noise, waters), by construction activities	Indirect	Reversible short to medium term	Local	Short to medium	Low	Minor	**Slight**
	Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna.	Indirect	Medium to long term reversible	Local/regional	Long term	High	Major	**Large**
	Changes on the morphology of nearby sites	Indirect	N/A	N/A	N/A	N/A	N/A	N/A
Section 10 New alignement	Pollution of Protected Areas Territory (soils, air and noise, waters), by construction activities	Indirect	Reversible short to medium term	Local	Short to medium	Low	Minor	**Slight**
	Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna.	Indirect	Medium to long term reversible	Local/regional	Long term	High	Major	**Large**
	Changes on the morphology of nearby sites	Indirect	N/A	N/A	N/A	N/A	N/A	N/A

Operational phase

The impacts to Protected Areas during the operational phase are summarized below.

- Damage of the PAs potentials by generation of air pollution and noise, vibrations, etc. Gas emissions, dust, noise and vibration may impact on the biodiversity and visual characteristics of the Protected Areas. Air pollution may disturb the visitors in PAs and vibration by movements of heavy vehicles may be irreversible and permanent in Section 1. This impact may happen to all PAs in Sections 1, 2, 9B2 and 10.
- Pollution from leakage of oils and diesel, of motor cars or road facilities. This impact, may be direct at Section 1 and indirect at Section 2 regarding PAs. Pollution in Buna River may be transferred downstream, where the river is shared by Albania and Montenegro. Buna river plays a channel role and may affect Shkodra lake, degrading the Shkodra Lake Managed Reserve. The pollution of Drini of Lezha River will be transferred to the river mouth and then to the Kune Vain Tale Nature Reserve. The other PAs in Sections 9B2 and 10 will not be affected by this impact.
- Flooding of territories, where the PAs lie in. This impact may be provoked by changes in topography in close/related territories of PAs. Floods in Buna River Protected Landscape may happen, while the other PAs in the Sections 2, 9B2 and 10 will not be affected by this impact.
- Reduction of PA potentials by accidental kill of the wildlife. Road operation, may directly impact on wildlife by accidental road kill of mammals, birds, bats amphibians and reptiles, which may cross the road. This impact refers to Sections 1, 2, 9B2 and 10.

Table 6-36 Assessment of Impacts of fauna during the operation phase

Assessment threshold and SIGNIFICANCE per Section, of AIC Impacts in Protected Areas during operational phase								
Sections	**Overall Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Damage of PAs potentials	Direct	Variable	Local	Variable	Low	Moderate	**Moderate**
	Leakage of oils and diesel, of motor cars or road facilities (oil pumping stations services etc.).	Direct/Transferred	Reversible	International	Medium term	Medium	Major	**Large**
	Flooding of territories of the PAs or their access roads and surroundings.	Indirect	Short term reversible	Local	Short term	High	Major	**Large**
	Accidental kill of the wildlife	Indirect	Long term reversible	Local/regional	Long term	Medium	Moderate	**Moderate**
Section 2 New alignment + existing road	Damage the PAs potentials by generation of air pollution and noises, vibrations, etc.	Direct	Not defined	Local	Variable	Low	Moderate	**Moderate**
	Leakage of oils and diesel, of motor cars or road facilities (oil pumping stations services etc.).	Direct/Transferred	Variable	Local	Medium term	Medium	Moderate	**Moderate**
	Flooding of territories of the PAs or their access roads and surroundings.	Indirect	Short term reversible	Local	Short term	Low	Minor	**Slight**
	Accidental kill of the wildlife	Indirect	Long term reversible	Local/regional	Long term	Low	Minor	**Slight**
Section 9B2 New alignment + existing road	Damage of the PAs potentials	Direct	Variable	Local	Variable	Low	Minor	**Slight**
	Leakage of oils and diesel, of motor cars or road facilities (oil pumping stations services etc.).	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Flooding of territories of the PAs or their access roads and surroundings.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Accidental kill of the wildlife	Indirect	Long term reversible	Local/regional	Long term	Medium	Major	**Large**
Section 10 New alignement	Damage of the PAs potentials	Direct	Variable	Local	Variable	Low	Minor	**Slight**
	Leakage of oils and diesel, of motor cars or road facilities (oil pumping stations services etc.).	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Flooding of territories of the PAs or their access roads and surroundings.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Accidental kill of the wildlife	Indirect	Long term reversible	Local/regional	Long term	Medium	Major	**Large**

Conclusions

The most affected PA is Buna River Protected Landscape as a result of both tables of impact assessment of the Pas for the construction and operational phase. Indirect impacts may be transferred from road construction activities and operation to the protected areas of both Sections 1 and 2 by the free flow of the polluted Buna and Drini of Lezha rivers. The Natural Monuments of "Rrepet e Pocemit" in section 9A2, and Rrepet e Dervenit in section 10 seem to be very little affected.

More specifically, the most significant impacts of AIC construction are expected in the Section 1 (large to moderate significance). All impacts in other sections are indirect. Section 2 has a slight impact significance This significance is justified by the effects that can be generated by construction activities, in Drini of Lezha River, which is the major inland water body that may affect the Kune Vain Tale Protected Area. Regarding Sections 9A2 and 9B2, the AIC is far from the "Rrepet e Pocemit" and "Rrepet e Dervenit". Therefore, the average of parameters for impacts magnitude of alignment in those PAs is minor and the significance slight.

By the table above, the impact significance during the operational phase is per Section evaluated as below:

- moderate to large for Section 1 and Buna River Protected Landscape
- slight as an average for Section 2 and Kune Vain Tale Natural Managed Reserve
- slight for both Natural Monuments, "Rrepet e Pocemit" and "Rrepet e Dervenit, in Sections 9A2 and 10 respectively

Mitigation measures in Natural Protected Areas

Preconstruction phase

The ESIA should consider inter alia:

- Thorough research regarding the interpretation of the Law 81/2017 on protected areas via bylaws and management plans
- Detailed field surveys to define the current situation of habitats of these proposed protected areas potentially affected by the motoway
- If needed, consider minor changes in the preliminary design in respect with the Albanian Legislation on Protection of PAs
- Propose additional mitigation measures according to suggestions of national/regional/local territorial planning authorities.
- Orient the procedural steps for consultation with the relevant authorities on trans-boundary Protected Area (Buna River Protected Landscape etc), according to the Albanian Legislation and ESPOO Convention.
- Preparation under ESIA of Biodiversity Action Plans and other documents as supportive material for the identification of impacts to the Protected Areas

The ESIA should include specific mitigation measures to prevent as much as possible pollution and contamination of these areas and maintain its biodiversity, landscape and visual characteristics. The ESIA Consultant should mention the relevant permits that the Contractor should obtain for the realization of the construction activities needed that will take place in the protected areas. A joint agreement between Albania and Montenegro should be signed by both countries for interventions in Buna River (Section 1) during construction and operational phase. Appropriate assessments maybe also be required to be prepared and included in the ESIA package.

Construction phase and Operational Phase

All mitigation measures have been developed in the habitats, flora and fauna Sections. The ESIA findings as well as strong consultation with the relevant authorities will further target at the minimization of impacts.

Residual impacts

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6.2.2.11 The overall assessment of significance of AIC sections for natural environmental parameters

All indicators assessed per each environmental parameter for both construction and operational phases are presented below to summarize the overall impact significance of AIC project development on natural environments.

Table 6-37 Summarized significance of the natural environmental impacts parameters per each AIC sections.

Summary of impact significance per section	Landscape	Geology, Geomorphology, seismicity and soils	Wastes	Air quality and Noises	Climate change	Surface waters quality	Groundwater quality	Biodiversity
Section 1 The summary of impact significance is Moderate to Large								
Section 2 The summary of impact significance is Moderate								
Section 3 The summary of impact significance is Slight								
Section 4 The summary of impact significance is Moderate								
Section 5B The summary of impact significance is Moderate								
Section 5C The summary of impact significance is Moderate								
Section 6 The summary of impact significance is Slight								
Section 7 The summary of impact significance is Slight								
Section 9A2 The summary of impact significance is Moderate								
Section 9B2 The summary of impact significance is Major								
Section 10 The summary of impact significance is Major								
Section 11 The summary of impact significance is Moderate								
Section 13 The summary of impact significance is Moderate								

6.2.3 Socio-economic Impacts

This chapter assesses the impacts that project activities will have on the different socio-economic and land use receptors/resources which were identified in the social baseline conditions. The assessment considers effects on the following: Land and Property, Community Health and Safety, Community Tensions, Access & Severance, Economy, Employment, Education and Training, Vulnerable Groups and Workforce related effects.

Introduction to Social Impacts

Socio-economic characteristics of the project area is described in the Socio-Economic Baseline Chapter whereas findings from the stakeholder engagement and community consultation helped to understand the socio-economic context and, how those directly affected are likely to perceive, be affected by, and respond to, changes resulting from the Project.

Socio-economic impacts may arise from changes related to the Project that affects the livelihood of human receptors such as individuals, households, communities or societies.

Socio Economic Environment Sensitivity

Sensitivity matrix is done by assessing potentially impacted receptors along road sections of AIC Corridor and how potential changes of baseline conditions might result in effects to socio-economic receptors.

This evaluation of socio-economic receptors does not include sections 8 and 12 of the AIC. These sections are excluded since Section 8 (Fier Bypass) is already constructed and Section 12 is studied by ARA. Also, sections 2 and 4 are already approved alignments by Albanian Government and planned as PPP projects.

The degree of sensitivity of a socio-economic receptor is based on how of individuals, households, communities or societies abilities to adapt to changes and maintain their livelihood and health. In situations where an impact may result in a loss or reduction of access to a resource, then the sensitivity measures the ability of individuals, households and /or communities to access an alternative resource that provides the same service (e.g. a livelihood or employment, recreation, etc.). The degree of sensitivity is categorized as; Low, Medium and High per each of the socio-economic parameters.

The positive social parameters are considered of a high importance for all sections. Sensitivity of affected population on beneficial impacts is considered of a major level for all sections including the Section 10 which is characterized by a very low human presence.

To avoid long and encyclopedic description, the parameters a) Employment and Economy and b) Education and Training are not included on evaluation of sensitivity significance as they are assessed high for all AIC sections due to the following:

- **Employment and Economy** are assessed based on available data on employment and unemployment rate of the population and present businesses in the project area. This indicator can be considered among the most important of social parameters since economic development, hence overall increase of employment within the region and the country, was main rationale justifying the construction of the AIC. The sensitivity on employment will be high along all sections of the AIC both where unemployment rate is high, and where percentage of working age population is high. The population of Memalaiaj city (end of Section 9B2) where unemployment rate is high and the main sources of incomes for the population are the pensions will have very high sensitivity due to positive effects from employment opportunities during both phases, construction and operation of the motorway. Despite the scarce settlements presence along Section 10 (only the city of Tepelene included in the buffer zone of the study area, in a distance about 600 meter from this Section of AIC) the population of Tepelene city and those located in neighboring areas (not included in the buffer zone – 1.5 km both side of the road) of this section will also have high

sensitivity from employment opportunities during construction and operation of the motorway, considering the high unemployment rate in Tepelene city and areas in the vicinity of the city.

Overall, the sensitivity on economy will also be high positive, both during the construction and afterward during the operation phase of the AIC. Operation of the motorway will have also potential benefits as it will increase economic development due to faster exchange of goods (opening of new businesses), increased connectivity and more efficient transfer of ideas and knowledge. There are smaller number of businesses that will be negatively affected as they will need to reallocate, however in overall terms anticipated positive impacts are much higher than the negative ones.

- **Education and Training –** during the construction phase affected receptors will benefit from training on employment opportunities arising from the construction works and employment possibilities accompanying businesses that are related to the construction of AIC including specialized works in construction. During the operation phase receptors will adapt to changes and will benefit from educational opportunities resulting from better know-how, better access to exchange of working experience and similar. Overall, training and education, as an positive impact to all AIC sections, has beneficial importance for the communities involved in construction and affected by AIC operation.

For all other parameters, the assessment of sensitivity has considered the capacity of individuals, households, communities and/or resources used by communities to cope or adapt to change due to negative impacts caused from construction and operation activities of AIC Corridor. For this assessment are considered a range of indicators which are described in the following paragraphs, per each parameter.

- **Land and Property** considers available data on land uses, land property and ownership, soil productivity, surface of land to be expropriated, and physical structures to be destructed. Potentially affected receptors are the land users (affected by permanent land take or land fragmentation), households (house destruction) and businesses owners (affected by businesses destruction). Sensitivity value is determined on how the receptors will adapt from changes of their livelihood due to loss of land/house/commercial unit. Land/property owners and users are considered to have very high sensitivity/value due to impacts on their land/house/commercial unit.
- **Community Health, Safety and Security.** Sensitivity value is determined on potential (low/medium/high) of impacted receptors (communities in the vicinity of AIC and primary health care facilities and hospitals in the nearest cities) to change or adapt from impacts generated due to road traffic and trespass to construction sites, manifestation of communicable diseases, quality and capacity of health care centers.
- **Community Tensions** has taken into consideration influx of workers with different social and cultural differences, aspects in relation to expropriation and changes on environment from dust and noise. Where the presence of community in the vicinity of AIC is high, the degree of sensitivity to adapt to coexist with influx of workers will be low while the degree of sensitivity for community to adapt from impacts due to expropriation, changes on environment from dust and noise will be moderate.
- **Access and Severance** for evaluation of sensitivity is considered the potential of the a) community (variable considered; number, age, profession; farmers, businesses owners) in the vicinity of AIC and b) local services companies, to adapt to changes on access and severance to infrastructure, services/facilities and land/property. The decrease of accessibility (construction phase) due to disruption of infrastructure and local services, will have very high negative sensitivity. To the other side, the access to international road (operation phase), has a major beneficial significance (trade, services, exchange of knowledge, ideas and experience culture etc).

- **Vulnerable Groups –** Indicators considered to determine the sensitivity on vulnerable groups are: age, gender, ethnicity, living standard and health. Vulnerable groups identified along the project corridor will have very high sensitivity to adapt to changes of socio-economic parameters (loss of land/property, accessibility to health centers schools and other service providing facilities and employment opportunities) and to maintain their livelihood. Sections with high percentage of Roma and Egyptian community, elderly people, person with disabilities, female head of household and household with low income will have high sensitivity.
- **Workforce Related Impacts and Issues.** The evaluation of sensitivity on this parameter has taken into consideration the degree of workers capability, contracted for the project, to require their workers' rights and accidents at work. Considering that informality of employment has changed last years in Albania, the sensitivity for local work force in relation to violation to their rights will be low, except for Sections where employment rate and poverty are at high level and the population have low level of education, in these case the local work force will tend to agree in case of violation of their rights and the sensitivity will be moderate due to their living standard. Meanwhile the sensitivity due to accidents at work have high sensitivity.
- **Cultural Heritage** includes assessment of impacts caused by the Project on cultural heritage monuments and Archaeological sites. For evaluation of sensitivity is considered presence and importance of cultural monuments and archaeological sites. Where direct impacts on cultural monuments and archaeological sites are identified and where the possibility for chance finds is high, the sensitivity value will be high. This is since the scientific, cultural, or historical value can not be returned to their previous condition.

The matrix below presents the level of sensitivity, defined by the color as it is given below.

- Sensitivity High/very high
- Sensitivity moderate
- Sensitivity slight/neutral

Table 2-1. Summarized sensitivity of socio-economic parameters per AIC sections

Sensitivity of AIC Sections	Parameters						
	Land and Property	**Community Health, Safety and Security**	**Community Tension**	**Access and Severance**	**Vulnerable Groups**	**Workforce Related Issues**	**Cultural Heritage**
Section **1** - New alignment + doubling of existing 1x2 lane highway. New alignment goes over agricultural land.12.6 km – existing road. Most of the length of new alignment lays over the agricultural land. Section approaches 21 settlements. The construction will require acquisition of about 243 ha of agricultural land and about demolition of 78 structures							
Section 1							
Section 2 - New alignment + doubling of existing 1x2 lane highway. 13.19 km existing road. Existing project. Moslty lays over agricultural land and passes through scattered buildings. Section approaches 5 settlements. The construction will require acquisition of about 83.2 ha of agricultural land and about demolition of 104 structures							
Section 2							
Section 3 - (Existing road) Improvement of existing 2x2-lane highway. Most of the length of new alignment lays over the agricultural land and passes through scattered buildings. Section approaches 5 settlements. The construction will require acquisition of about 50.32 ha of agricultural land and demolition of about of 26 structures							
Section 3							
Section 4 - New alignment. Existing PPP project. Goes almost in agricultural lands and channels. Almost entire length of alignment lays over the agricultural land and scattered residential buildings. Section approaches 9 settlements. The construction will require acquisition of about 119.73 ha of agricultural land and demolition of about 75 structures.							
Section 4							
Section 5B - Almost New alignment. Runs over agricultural lands. First part of the section lays over the agricultural land. Section approaches 16 settlements. The construction will require acquisition of about 109.71 ha of agricultural land and about demolition of 117 structure							
Section 5B							
Section 5C - New alignment +upgrading of existing Most of the length of new alignment lays over the agricultural land. Section approaches 8 settlements. The construction will require acquisition of about 59.91 ha of agricultural land and about demolition of 49 structures							
Section 5C							
Sections 6+7 – Existing Road Most of the length of new alignment lays over the agricultural land over Myzeqe fileds. Section approaches 13 settlements. The construction will require acquisition of about 141.78 ha of agricultural land and demolition of about of 70 structures							
Sections 6 + 7							
Section 8	Already under construction						
Section 9 A2 - Existing Road. The length of the alignment lays over the agricultural land. Section approaches 9 settlements. The construction will require acquisition of about 143.32 ha of agricultural land and demolition of about of 17 structures							
Section 9A2							
Section 9B2 - New alignment + doubling of existing 1x2 lanes highway. The bigger portion of the length of the alignment lays over the agricultural land. Section approaches 10 settlements. The construction will require acquisition of about 72.3 ha of agricultural land and demolition of about of 43 structures							
Section 9B2							
Section 10 - New Alignment. partially lays over the agricultural land. Section approaches 1 settlement. The construction will require acquisition of about 72.1 ha of agricultural land and about demolition of 1 structures							
Section 10							
Section 11 - Existing Road. The length of the alignment lays over the agricultural land. Section approaches 3 settlements. The construction will require acquisition of about 45.46 ha of agricultural land and demolition of about of 17 structures							
Section 11							

Sensitivity of AIC Sections	Parameters						
	Land and Property	**Community Health, Safety and Security**	**Community Tension**	**Access and Severance**	**Vulnerable Groups**	**Workforce Related Issues**	**Cultural Heritage**
Section 12 - New alignment, already studied by ARA. Section 12 runs over Gjirokastra Bypass, already studied							
Section 13 - Existing road. The length of the alignment lays over the agricultural land. Section approaches 12 settlements. The construction will require acquisition of about 122.56 ha of agricultural land and demolition of about of 17 existing structures.							
Section 13							

As shown on the table above, the most vulnerable and sensitive Sections due to impacts caused on socio-economic parameters as a result of project development are Sections 1, 4, 5B and Section 9B2.

Less Sensitive is Section 10 considering the limited number of settlements in the vicinity of AIC. This section is more sensitive in terms of workforce related issues land take compared to other socio-economic parameters. This Section will also be sensitive from positive impacts of employment and economic growth during construction and operation of the motorway. The construction of the Corridor will bring economic development and economic opportunities for population residing in this area.

The most sensitive socio-economic parameter is the one related to **Land and Property.** Construction of the Project will result in a series of physical and economic displacement impacts over affected receptors (owners of and users of land, owners of residential buildings and commercial units, formal & informal tenants of residential properties and garden land owners. The sensitivity on this parameter is considered high for Section 1, 2, 4, 5B, 5C, 6+7, 9A2, 9B2 and 13A as the number of affected people will be high. The impacts on this parameter will be accompanied by a series of potential impacts on affected communities which are listed in the table below and presented for the Project construction and operation phases.

Category of Affected Communities	During Construction	During Operation
Physical Displacement		
Resident Owners of Assets	Loss of weekend or permanent Residential Properties and assets (that are not movable)	
Formal & Informal Tenants of residential properties	Temporary or permanent loss of residential properties	Increased disturbance to those returning to temporarily relocated residential structures
Economic Displacement		
Garden land owners	Temporary or permanent loss of garden area and any assets/improvements on the land owned by them	
Agricultural land owners	Temporary or permanent loss of land Loss of immovable assets/structures on the land (e.g. fences/barns/livestock sheds etc.). Permanent loss of income (from rent etc.)	Reduction in land value due to restrictions being placed on land which runs along the Project road right of way
Businesses	Loss of business structures (e.g. workshops, hotel, shops or similar etc.) and immovable assets; Loss of business from temporary disruption in access during construction	Potential loss of clients for Non-Residential Properties (businesses) servicing the passengers: hotels, restaurants, car workshops, petrol stations etc. due to the reduced traffic along the existing road.

Table 3-2 Involuntary Resettlement Issues

The present design is at conceptual stage and social impacts described in this section is indicative. During the next stages of the Project more detailed observation of the involuntary resettlement issues will be carried out and a tailored Social Survey will be designed and implemented.

More details related to the social impacts are provided in the sections below.

Potential Impacts on Socio-economic Parameters and Characterization of Impacts

6.2.3.1 Land and property

Impacts on land property and livelihood are related with temporary occupation and permanent take of land that will be needed for project implementation for both phases pre-construction and construction and are related also with land fragmentation. Land and Property owners and users are main potentially impacted receptors. A preliminary evaluation is done for the surface of land that will be required for the project and number of structures that will be expropriated. All sections of AIC will be affected by temporary and permanent land take and property expropriation. Sections 1, 2, 4, 5B, 5C, 6+7, 9A2, 9B2 and 13A are potentially most affected from land/property take. Considering the Conceptual Design Phase of the Project there is no precise information on temporary or permanent land take. Details should be gathered during the next stages of the Project.

Impacts

Pre- construction phase

All neglects during the pre-construction phase will be transferred in significant impacts during construction and operation phase, which will result in loss of livelihood and poverty. Thus, it is necessary at the detailed design stage of the Project to develop Profound ESIAs per each Section of the AIC which will include an update of Baseline conditions including Land Use and Land Property. Social surveys should be carried out for each section of AIC to define level of incomes and the number of households that relies only in incomes from land, number of subsistence farming and proportion of land they possess. These data will define the magnitude of impact on affected families and businesses. Implementation of the Census will record all individuals, households and businesses (formal and informal) who will be physically and/or economically displaced by a project. Along with ESIAs other Studies, Plans, Mechanism and Inventories should be developed and updated, such as; Update of LARF, preliminary RAP, SEP and grievance mechanisms; LRP and Development of Expropriation study.

The full process of RAP and compensatory measures should be finalized before starting the project implementation.

Construction Phase

Temporary and permanent impacts have been identified for impacts on Land and Property. The main sources of impacts on land and property during the construction phase are as follows:

- Construction of working camps, safety zones around construction sites and associated facilities, processing of row material, parking of working equipment, and dumping sites for waste materials in the land that will be temporary required for the project.
- Construction of new roads, or widening/doubling of the existing road in the land that will permanently required for the project.

Impacts on land and property will be take place throughout the study area, almost along the entire length of AIC Sections.

- **Temporary Loss of Land**

Establishing of working camps, safety zones around construction sites and associated facilities, land required for processing of row material, parking of working equipment, and dumping sites for waste materials will require temporary loss of land. The existing access roads will be used to the extent possible and new access roads will be constructed. Temporary loss of land may affect not only the livelihoods of farming land owners, but also those involved in rental of agricultural land. Rental of land is performing not only from farmers that want to expand their access to productive land and increase their income, but also from households that own land in non-productive areas and rent land in other areas in order to grow food for subsistence and sale. Temporary land take will cause loss of agricultural production and will affect the incomes of households. The placement of temporary facilities will meet legal requirements and agreements will be reached with affected landowners. Subsistence farming (owners or land tenants), will experience a greater level of impact than those with access to alternative resources. This impact will be conditioned only for the period of construction and after that the livelihood effects will be restored.

- **Temporary Loss of Livelihood**

Temporary land take will cause removal of livestock from grazing areas during periods of blasting or heavy equipment operations. In forest areas, construction activities could result in long- term loss of timber production due to need of removing trees. Movement in this area will be restricted during the construction phase.Considering the Conceptual design phase of the project, is not know the surface of forest and pasture areas that will be temporary required for the project.

- **Permanent Loss of Land**

The planned motorway will require approximately 1612.61 ha of land to be taken. Out of this the biggest portion is Agricultural land (1304.8 ha), followed by forest land (158.61 ha), pasture (124.44 ha), and urban land (24.81 ha).

One of the main issues/concern raised by stakeholders during individual meetings that should also be considered when assessing the level of impact from loss of agricultural land was on how the Project will deal with households that do not have land title documents and whether or not they will be part of the expropriation procedures.

Local stakeholders in Peze administrative unit suggested to change the alignment from km 13 to km 18 of Section 5B, considering that in this area are found the most fertile agricultural land of Peze, with high potential for agricultural development.

- **Permanent Loss of Housing/Business structures (Physical Displacement)**

The AIC road track avoids densely populated areas, bypassing the towns and most of the villages, however a surface of 15.32 ha of constructions (approximate 614 residential structures/businesses) will be required for the project.

The preliminary assessment indicates that several residential properties and business structures may be affected along the AIC sections, as shown on the following table.

AIC Sections	No. of residential properties	No. of business structures
Section 1	29	49
Section 2	36	68
Section 3	4	22

AIC Sections	No. of residential properties	No. of business structures
Section 4	66	9
Section 5B	82	35
Section 5C	27	22
Section 6+7	25	45
Section 9A2	5	12
Section 9B2	30	13
Section 10	1	
Section 11	1	16
Section 13A	-	17
Total	**306**	**308**

Table 3-3 Potentially Affected Residential Properties/Business Structures

The residents who will have to be resettled for the construction of the motorway may experience additional impacts such as: Changes in type and tenure of housing; Disconnection with their precious memories related with their homes which has high sentimental value; Disruption of social relationships and the need to establish new relationships in a different social environment. This may cause social and psychological impacts. Local stakeholders consulted during field visits (in Lekaj and Peze administrative unit) suggested to review carefully section 5B during next phase, in order to avoid as much as possible social negative impacts by resettlement process, especially in affected settlements in Peze and end of Section 5B (in Lekaj).

Most of Business structures are located in the vicinity of existing road sections that will be doubled/widened. Demolition of businesses structures will require identification of new location in local area or termination of the businesses in case new location is less favorable. However, considering the conceptual design phase changes may occur in this aspect. The exact number of Affected Residential Properties/Business Structures will be specified during the Detailed Design Phase. There are also 32 agriculture construction (mainly greenhouses), mostly located in Section 5B, 6+7 that will need to be removed. The significance of this impact in these areas may be moderate, considering the importance of agriculture activities in greenhouses. The level of potential impacts from the physical displacement of greenhouses will be specified during Profound ESIAs. In this case, the number of greenhouses owners and their employees which will face with loss of job, their access to alternative employment and to alternative income sources will be defined.

This impact may potentially affect households/businesses owners in case their property is informal and as consequence based on Albanian legislation in force, they have no right for compensation. In case next phase of the project is financed by EBRD than the requirements (PR 5) of EBRD will prevail over national legislation. Consequently, households may remain homeless and face difficulty for relocation. Although experiences with several other projects have shown that an agreement can be reached with the government to provide housing for a limited period of time for homeless families. Based on Social Baseline, along the AIC route section 4 and section 5B have informal areas that are crossed by the Corridor. More detailed information on informal building and individuals affected will be gathered on the next stages of the Project when the profound ESIAs per each Section of the AIC are prepared and social surveys will be implemented.

- **Loss of Livelihood from Land Fragmentation**

Land take will cause fragmentation of agricultural land resulting in small farms with decreased potential for commercial agriculture. The use of small fragmented land might cause difficulties to grow certain crops, and may change use of land. It may prevent farmers from raising high profit crops. More profitable crops, like for example fruit crops, require larger plot areas, so if

the farmers only possess small and fragmented plots they may be forced to grow only less profitable crops. Small and scattered plots hamper the use of machinery and other large scale agricultural practices and this may require an excessive amount of handwork. These factors may cause decrease on productivity and the income of farmers. Consequently, the value of small parcel fragmented will also be decreased.

Estimation of Impacts on Land and Property Significance

The impacts from temporary loss of land will emerge during a short time period while the construction is taking place. After completion of construction activities, the majority of the land will be returned into its previous condition. Considering that only limited size of land will be required, a small number of local population will be affected. Following construction, livelihood effects will be restored. The magnitude of the impact is estimated as minor.

The magnitude of temporary loss of land will be minor, considering that small portion of population will be affected due to small surface of land required. Stockbreeding, fuelwood harvesting activities will be temporarily disturbed.

Permanent loss of land will bring negative impacts for farming activities. Land is important for subsistence farming in difficult economic situations. On AIC sections, where large surface of agricultural land will be taken and a large number of population will be affected, despite cash compensation of the owners for the value of the expropriated land, the magnitude of the impact is major.

Loss of housing/business structures will bring long term negative impacts for households which will face changes in type and tenure of property and may impose experiencing of social and psychological impacts due to disconnection with home and disruption of social relationship. Businesses owners, despite the compensation, may face difficulties after relocation, as the new location may be less favorable in terms of businesses purpose. The significance from this impact will be large.

The impacts on livelihood from clearance/occupation of forest and pasture land will emerge for a long period and livelihood effects (loss of timber production) will be permanent. Considering the population dependence from this livelihood, the magnitude of this impacts will be moderate.

Fragmentation of land will be permanent and irreversible. A large number of population may be affected, considering that AIC crosses mostly agricultural land. The magnitude from this impact will be large.

In the following table is summarized the assessment and significance of each impact related to land property and livelihood per 13 sections of AIC.

Table 3-4 Significance of the impacts on Land and Property during construction phase

6.2.3.2 Socio-economic Impacts

This chapter assesses the impacts that project activities will have on the different socio-economic and land use receptors/resources which were identified in the social baseline conditions. The assessment considers effects on the following: Land and Property, Community Health and Safety, Community Tensions, Access & Severance, Economy, Employment, Education and Training, Vulnerable Groups and Workforce related effects.

6.2.3.3 Introduction to Social Impacts

Socio-economic characteristics of the project area is described in the Socio-Economic Baseline Chapter whereas findings from the stakeholder engagement and community consultation helped to understand the socio-economic context and, how those directly affected are likely to perceive, be affected by, and respond to, changes resulting from the Project.

Socio-economic impacts may arise from changes related to the Project that affects the livelihood of human receptors such as individuals, households, communities or societies.

Socio Economic Environment Sensitivity

Sensitivity matrix is done by assessing potentially impacted receptors along road sections of AIC Corridor and how potential changes of baseline conditions might result in effects to socio-economic receptors.

This evaluation of socio-economic receptors does not include sections 8 and 12 of the AIC. These sections are excluded since Section 8 (Fier Bypass) is already constructed and Section 12 is studied by ARA. Also, sections 2 and 4 are already approved alignments by Albanian Government and planned as PPP projects.

The degree of sensitivity of a socio-economic receptor is based on how of individuals, households, communities or societies abilities to adapt to changes and maintain their livelihood and health. In situations where an impact may result in a loss or reduction of access to a resource, then the sensitivity measures the ability of individuals, households and /or communities to access an alternative resource that provides the same service (e.g. a livelihood or employment, recreation, etc.). The degree of sensitivity is categorized as; Low, Medium and High per each of the socio-economic parameters.

The positive social parameters are considered of a high importance for all sections. Sensitivity of affected population on beneficial impacts is considered of a major level for all sections including the Section 10 which is characterized by a very low human presence.

To avoid long and encyclopedic description, the parameters a) Employment and Economy and b) Education and Training are not included on evaluation of sensitivity significance as they are assessed high for all AIC sections due to the following:

- **Employment and Economy** are assessed based on available data on employment and unemployment rate of the population and present businesses in the project area. This indicator can be considered among the most important of social parameters since economic development, hence overall increase of employment within the region and the country, was main rationale justifying the construction of the AIC. The sensitivity on employment will be high along all sections of the AIC both where unemployment rate is high, and where percentage of working age population is high. The population of Memalaiaj city (end of Section 9B2) where unemployment rate is high and the main sources of incomes for the population are the pensions will have very high sensitivity due to positive effects from employment opportunities during both

phases, construction and operation of the motorway. Despite the scarce settlements presence along Section 10 (only the city of Tepelene included in the buffer zone of the study area, in a distance about 600 meter from this Section of AIC) the population of Tepelene city and those located in neighboring areas (not included in the buffer zone – 1.5 km both side of the road) of this section will also have high sensitivity from employment opportunities during construction and operation of the motorway, considering the high unemployment rate in Tepelene city and areas in the vicinity of the city.

Overall, the sensitivity on economy will also be high positive, both during the construction and afterward during the operation phase of the AIC. Operation of the motorway will have also potential benefits as it will increase economic development due to faster exchange of goods (opening of new businesses), increased connectivity and more efficient transfer of ideas and knowledge. There are smaller number of businesses that will be negatively affected as they will need to reallocate, however in overall terms anticipated positive impacts are much higher than the negative ones.

- **Education and Training –** during the construction phase affected receptors will benefit from training on employment opportunities arising from the construction works and employment possibilities accompanying businesses that are related to the construction of AIC including specialized works in construction. During the operation phase receptors will adapt to changes and will benefit from educational opportunities resulting from better know-how, better access to exchange of working experience and similar. Overall, training and education, as an positive impact to all AIC sections, has beneficial importance for the communities involved in construction and affected by AIC operation.

For all other parameters, the assessment of sensitivity has considered the capacity of individuals, households, communities and/or resources used by communities to cope or adapt to change due to negative impacts caused from construction and operation activities of AIC Corridor. For this assessment are considered a range of indicators which are described in the following paragraphs, per each parameter.

- **Land and Property** considers available data on land uses, land property and ownership, soil productivity, surface of land to be expropriated, and physical structures to be destructed. Potentially affected receptors are the land users (affected by permanent land take or land fragmentation), households (house destruction) and businesses owners (affected by businesses destruction). Sensitivity value is determined on how the receptors will adapt from changes of their livelihood due to loss of land/house/commercial unit. Land/property owners and users are considered to have very high sensitivity/value due to impacts on their land/house/commercial unit.
- **Community Health, Safety and Security.** Sensitivity value is determined on potential (low/medium/high) of impacted receptors (communities in the vicinity of AIC and primary health care facilities and hospitals in the nearest cities) to change or adapt from impacts generated due to road traffic and trespass to construction sites, manifestation of communicable diseases, quality and capacity of health care centers.
- **Community Tensions** has taken into consideration influx of workers with different social and cultural differences, aspects in relation to expropriation and changes on environment from dust and noise. Where the presence of community in the vicinity of AIC is high, the degree of sensitivity to adapt to coexist with influx of workers will be low while the degree of sensitivity for

community to adapt from impacts due to expropriation, changes on environment from dust and noise will be moderate.

- **Access and Severance** for evaluation of sensitivity is considered the potential of the a) community (variable considered; number, age, profession; farmers, businesses owners) in the vicinity of AIC and b) local services companies, to adapt to changes on access and severance to infrastructure, services/facilities and land/property. The decrease of accessibility (construction phase) due to disruption of infrastructure and local services, will have very high negative sensitivity. To the other side, the access to international road (operation phase), has a major beneficial significance (trade, services, exchange of knowledge, ideas and experience culture etc).
- **Vulnerable Groups –** Indicators considered to determine the sensitivity on vulnerable groups are: age, gender, ethnicity, living standard and health. Vulnerable groups identified along the project corridor will have very high sensitivity to adapt to changes of socio-economic parameters (loss of land/property, accessibility to health centers schools and other service providing facilities and employment opportunities) and to maintain their livelihood. Sections with high percentage of Roma and Egyptian community, elderly people, person with disabilities, female head of household and household with low income will have high sensitivity.
- **Workforce Related Impacts and Issues.** The evaluation of sensitivity on this parameter has taken into consideration the degree of workers capability, contracted for the project, to require their workers' rights and accidents at work. Considering that informality of employment has changed last years in Albania, the sensitivity for local work force in relation to violation to their rights will be low, except for Sections where employment rate and poverty are at high level and the population have low level of education, in these case the local work force will tend to agree in case of violation of their rights and the sensitivity will be moderate due to their living standard. Meanwhile the sensitivity due to accidents at work have high sensitivity.
- **Cultural Heritage** includes assessment of impacts caused by the Project on cultural heritage monuments and Archaeological sites. For evaluation of sensitivity is considered presence and importance of cultural monuments and archaeological sites. Where direct impacts on cultural monuments and archaeological sites are identified and where the possibility for chance finds is high, the sensitivity value will be high. This is since the scientific, cultural, or historical value can not be returned to their previous condition.

The matrix below presents the level of sensitivity, defined by the color as it is given below.

- Sensitivity High/very high
- Sensitivity moderate
- Sensitivity slight/neutral

Table 3-5. Summarized sensitivity of socio-economic parameters per AIC sections

Sensitivity of AIC Sections	Parameters						
	Land and Property	**Community Health, Safety and Security**	**Community Tension**	**Access and Severance**	**Vulnerable Groups**	**Workforce Related Issues**	**Cultural Heritage**
Section **1** - New alignment + doubling of existing 1x2 lane highway. New alignment goes over agricultural land.12.6 km – existing road. Most of the length of new alignment lays over the agricultural land. Section approaches 21 settlements. The construction will require acquisition of about 243 ha of agricultural land and about demolition of 78 structures							
Section 1							
Section 2 - New alignment + doubling of existing 1x2 lane highway. 13.19 km existing road. Existing project. Moslty lays over agricultural land and passes through scattered buildings. Section approaches 5 settlements. The construction will require acquisition of about 83.2 ha of agricultural land and about demolition of 104 structures							
Section 2							
Section 3 - (Existing road) Improvement of existing 2x2-lane highway. Most of the length of new alignment lays over the agricultural land and passes through scattered buildings. Section approaches 5 settlements. The construction will require acquisition of about 50.32 ha of agricultural land and demolition of about of 26 structures							
Section 3							
Section 4 - New alignment. Existing PPP project. Goes almost in agricultural lands and channels. Almost entire length of alignment lays over the agricultural land and scattered residential buildings. Section approaches 9 settlements. The construction will require acquisition of about 119.73 ha of agricultural land and demolition of about 75 structures.							
Section 4							
Section 5B - Almost New alignment. Runs over agricultural lands. First part of the section lays over the agricultural land. Section approaches 16 settlements. The construction will require acquisition of about 109.71 ha of agricultural land and about demolition of 117 structure							
Section 5B							
Section 5C - New alignment +upgrading of existing Most of the length of new alignment lays over the agricultural land. Section approaches 8 settlements. The construction will require acquisition of about 59.91 ha of agricultural land and about demolition of 49 structures							
Section 5C							
Sections 6+7 – Existing Road Most of the length of new alignment lays over the agricultural land over Myzeqe fileds. Section approaches 13 settlements. The construction will require acquisition of about 141.78 ha of agricultural land and demolition of about of 70 structures							
Sections 6 + 7							
Section 8	Already under construction						
Section 9 A2 - Existing Road. The length of the alignment lays over the agricultural land. Section approaches 9 settlements. The construction will require acquisition of about 143.32 ha of agricultural land and demolition of about of 17 structures							
Section 9A2							
Section 9B2 - New alignment + doubling of existing 1x2 lanes highway. The bigger portion of the length of the alignment lays over the agricultural land. Section approaches 10 settlements. The construction will require acquisition of about 72.3 ha of agricultural land and demolition of about of 43 structures							
Section 9B2							
Section 10 - New Alignment. partially lays over the agricultural land. Section approaches 1 settlement. The construction will require acquisition of about 72.1 ha of agricultural land and about demolition of 1 structures							
Section 10							

Sensitivity of AIC Sections	Parameters						
	Land and Property	**Community Health, Safety and Security**	**Community Tension**	**Access and Severance**	**Vulnerable Groups**	**Workforce Related Issues**	**Cultural Heritage**
Section 11 - Existing Road. The length of the alignment lays over the agricultural land. Section approaches 3 settlements. The construction will require acquisition of about 45.46 ha of agricultural land and demolition of about of 17 structures							
Section 11							
Section 12 - New alignment, already studied by ARA. Section 12 runs over Gjirokastra Bypass, already studied							
Section 13 - Existing road. The length of the alignment lays over the agricultural land. Section approaches 12 settlements. The construction will require acquisition of about 122.56 ha of agricultural land and demolition of about of 17 existing structures.							
Section 13							

As shown on the table above, the most vulnerable and sensitive Sections due to impacts caused on socio-economic parameters as a result of project development are Sections 1, 4, 5B and Section 9B2.

Less Sensitive is Section 10 considering the limited number of settlements in the vicinity of AIC. This section is more sensitive in terms of workforce related issues land take compared to other socio-economic parameters. This Section will also be sensitive from positive impacts of employment and economic growth during construction and operation of the motorway. The construction of the Corridor will bring economic development and economic opportunities for population residing in this area.

The most sensitive socio-economic parameter is the one related to **Land and Property.** Construction of the Project will result in a series of physical and economic displacement impacts over affected receptors (owners of and users of land, owners of residential buildings and commercial units, formal & informal tenants of residential properties and garden land owners. The sensitivity on this parameter is considered high for Section 1, 2, 4, 5B, 5C, 6+7, 9A2, 9B2 and 13A as the number of affected people will be high. The impacts on this parameter will be accompanied by a series of potential impacts on affected communities which are listed in the table below and presented for the Project construction and operation phases.

Category of Affected Communities	During Construction	During Operation
Physical Displacement		
Resident Owners of Assets	Loss of weekend or permanent Residential Properties and assets (that are not movable)	
Formal & Informal Tenants of residential properties	Temporary or permanent loss of residential properties	Increased disturbance to those returning to temporarily relocated residential structures
Economic Displacement		
Garden land owners	Temporary or permanent loss of garden area and any assets/improvements on the land owned by them	
Agricultural land owners	Temporary or permanent loss of land Loss of immovable assets/structures on the land (e.g. fences/barns/livestock sheds etc.). Permanent loss of income (from rent etc.)	Reduction in land value due to restrictions being placed on land which runs along the Project road right of way
Businesses	Loss of business structures (e.g. workshops, hotel, shops or similar etc.) and immovable assets; Loss of business from temporary disruption in access during construction	Potential loss of clients for Non-Residential Properties (businesses) servicing the passengers: hotels, restaurants, car workshops, petrol stations etc. due to the reduced traffic along the existing road.

Table 3-6 Involuntary Resettlement Issues

The present design is at conceptual stage and social impacts described in this section is indicative. During the next stages of the Project more detailed observation of the involuntary resettlement issues will be carried out and a tailored Social Survey will be designed and implemented.

More details related to the social impacts are provided in the sections below.

Potential Impacts on Socio-economic Parameters and Characterization of Impacts

6.2.3.4 Land and property

Impacts on land property and livelihood are related with temporary occupation and permanent take of land that will be needed for project implementation for both phases pre-construction and construction and are related also with land fragmentation. Land and Property owners and users are main potentially impacted receptors. A preliminary evaluation is done for the surface of land that will be required for the project and number of structures that will be expropriated. All sections of AIC will be affected by temporary and permanent land take and property expropriation. Sections 1, 2, 4, 5B, 5C, 6+7, 9A2, 9B2 and 13A are potentially most affected from land/property take. Considering the Conceptual Design Phase of the Project there is no precise information on temporary or permanent land take. Details should be gathered during the next stages of the Project.

Impacts

Pre- construction phase

All neglects during the pre-construction phase will be transferred in significant impacts during construction and operation phase, which will result in loss of livelihood and poverty. Thus, it is necessary at the detailed design stage of the Project to develop Profound ESIAs per each Section of the AIC which will include an update of Baseline conditions including Land Use and Land Property. Social surveys should be carried out for each section of AIC to define level of incomes and the number of households that relies only in incomes from land, number of subsistence farming and proportion of land they possess. These data will define the magnitude of impact on affected families and businesses. Implementation of the Census will record all individuals, households and businesses (formal and informal) who will be physically and/or economically displaced by a project. Along with ESIAs other Studies, Plans, Mechanism and Inventories should be developed and updated, such as; Update of LARF, preliminary RAP, SEP and grievance mechanisms; LRP and Development of Expropriation study.

The full process of RAP and compensatory measures should be finalized before starting the project implementation.

Construction Phase

Temporary and permanent impacts have been identified for impacts on Land and Property. The main sources of impacts on land and property during the construction phase are as follows:

- Construction of working camps, safety zones around construction sites and associated facilities, processing of row material, parking of working equipment, and dumping sites for waste materials in the land that will be temporary required for the project.
- Construction of new roads, or widening/doubling of the existing road in the land that will permanently required for the project.

Impacts on land and property will be take place throughout the study area, almost along the entire length of AIC Sections.

- **Temporary Loss of Land**

Establishing of working camps, safety zones around construction sites and associated facilities, land required for processing of row material, parking of working equipment, and dumping sites for waste materials will require temporary loss of land. The existing access roads will be used to the extent possible and new access roads will be constructed. Temporary loss of land may affect not only the livelihoods of farming land owners, but also those involved in rental of agricultural land. Rental of land is performing not only from farmers that want to expand their access to productive land and increase their income, but also from households that own land in non-productive areas and rent land in other areas in order to grow food for subsistence and sale. Temporary land take will cause loss of agricultural production and will affect the incomes of households. The placement of temporary facilities will meet legal requirements and agreements will be reached with affected landowners. Subsistence farming (owners or land tenants), will experience a greater level of impact than those with access to alternative resources. This impact will be conditioned only for the period of construction and after that the livelihood effects will be restored.

- **Temporary Loss of Livelihood**

Temporary land take will cause removal of livestock from grazing areas during periods of blasting or heavy equipment operations. In forest areas, construction activities could result in long- term loss of timber production due to need of removing trees. Movement in this area will be restricted during the construction phase.Considering the Conceptual design phase of the project, is not know the surface of forest and pasture areas that will be temporary required for the project.

- **Permanent Loss of Land**

The planned motorway will require approximately 1612.61 ha of land to be taken. Out of this the biggest portion is Agricultural land (1304.8 ha), followed by forest land (158.61 ha), pasture (124.44 ha), and urban land (24.81 ha).

One of the main issues/concern raised by stakeholders during individual meetings that should also be considered when assessing the level of impact from loss of agricultural land was on how the Project will deal with households that do not have land title documents and whether or not they will be part of the expropriation procedures.

Local stakeholders in Peze administrative unit suggested to change the alignment from km 13 to km 18 of Section 5B, considering that in this area are found the most fertile agricultural land of Peze, with high potential for agricultural development.

- **Permanent Loss of Housing/Business structures (Physical Displacement)**

The AIC road track avoids densely populated areas, bypassing the towns and most of the villages, however a surface of 15.32 ha of constructions (approximate 614 residential structures/businesses) will be required for the project.

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Section 10	1	
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Table 3-7 Potentially Affected Residential Properties/Business Structures

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Most of Business structures are located in the vicinity of existing road sections that will be doubled/widened. Demolition of businesses structures will require identification of new location in local area or termination of the businesses in case new location is less favorable. However, considering the conceptual design phase changes may occur in this aspect. The exact number of Affected Residential Properties/Business Structures will be specified during the Detailed Design Phase. There are also 32 agriculture construction (mainly greenhouses), mostly located in Section 5B, 6+7 that will need to be removed. The significance of this impact in these areas may be moderate, considering the importance of agriculture activities in greenhouses. The level of potential impacts from the physical displacement of greenhouses will be specified during Profound ESIAs. In this case, the number of greenhouses owners and their employees which will face with loss of job, their access to alternative employment and to alternative income sources will be defined.

This impact may potentially affect households/businesses owners in case their property is informal and as consequence based on Albanian legislation in force, they have no right for compensation. In case next phase of the project is financed by EBRD than the requirements (PR 5) of EBRD will prevail over national legislation. Consequently, households may remain homeless and face difficulty for relocation. Although experiences with several other projects have shown that an agreement can be reached with the government to provide housing for a limited period of time for homeless families. Based on Social Baseline, along the AIC route section 4 and section 5B have informal areas that are crossed by the Corridor. More detailed information on informal building and individuals affected will be gathered on the next stages of the Project when the profound ESIAs per each Section of the AIC are prepared and social surveys will be implemented.

- **Loss of Livelihood from Land Fragmentation**

Land take will cause fragmentation of agricultural land resulting in small farms with decreased potential for commercial agriculture. The use of small fragmented land might cause difficulties to grow certain crops, and may change use of land. It may prevent farmers from raising high profit crops. More profitable crops, like for example fruit crops, require larger plot areas, so if the farmers only possess small and fragmented plots they may be forced to grow only less profitable crops. Small and scattered plots hamper the use of machinery and other large scale agricultural practices and this may require an excessive amount of handwork. These factors may cause decrease on productivity and the income of farmers. Consequently, the value of small parcel fragmented will also be decreased.

Estimation of Impacts on Land and Property Significance

The impacts from temporary loss of land will emerge during a short time period while the construction is taking place. After completion of construction activities, the majority of the land will be returned into its previous condition. Considering that only limited size of land will be required, a small number of local population will be affected. Following construction, livelihood effects will be restored. The magnitude of the impact is estimated as minor.

The magnitude of temporary loss of land will be minor, considering that small portion of population will be affected due to small surface of land required. Stockbreeding, fuelwood harvesting activities will be temporarily disturbed.

Permanent loss of land will bring negative impacts for farming activities. Land is important for subsistence farming in difficult economic situations. On AIC sections, where large surface of agricultural land will be taken and a large number of population will be affected, despite cash compensation of the owners for the value of the expropriated land, the magnitude of the impact is major.

Loss of housing/business structures will bring long term negative impacts for households which will face changes in type and tenure of property and may impose experiencing of social and psychological impacts due to disconnection with home and disruption of social relationship. Businesses owners, despite the compensation, may face difficulties after relocation, as the new location may be less favorable in terms of businesses purpose. The significance from this impact will be large.

The impacts on livelihood from clearance/occupation of forest and pasture land will emerge for a long period and livelihood effects (loss of timber production) will be permanent. Considering the population dependence from this livelihood, the magnitude of this impacts will be moderate.

Fragmentation of land will be permanent and irreversible. A large number of population may be affected, considering that AIC crosses mostly agricultural land. The magnitude from this impact will be large.

In the following table is summarized the assessment and significance of each impact related to land property and livelihood per 13 sections of AIC.

Table 3-8 Significance of the impacts on Land and Property during construction phase

Sections	Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Land and Property								
	Overall Impacts	Characterization of impact	Type of the impact	Reversibility	Spatial extent	Duration	Likelihood	Magnitude	Significance
Section 1 New alignment + existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihood	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Likely	Moderate	Moderate
Section 3 Existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Short-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Likely	Moderate	Moderate
Section 4 New Alignment	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5B New alignment	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5C Existing road	Temporary Loss of Land	Negative	Direct	Rreversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate to Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 6+7 Existing Road	Temporary Loss of Land	Negative	Direct	Rreversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large

Sections	Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Land and Property								
	Overall Impacts	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 8- Under Construction									
Section 9A2 Existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 9B2 New alignment + existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate to Large
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 10 New alignement	Temporary Loss of Land	Negative	Direct	reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Minor	Slight
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 11 Existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 12									
Section 13 Existing road	Temporary Loss of Land	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Temporary Loss of Livelihoods	Negative	Indirect	Reversible	Local	Medium-term	Definite	Minor	Slight
	Permanent Loss of land	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Permanent Loss of Housing/Business structures	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Loss of Livelihood from Land Fragmentation	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate

Conclusion

According to the results in the table above, the impact significance from loss of land for a short time (only during construction phase) will be slight due to minor loss or alteration of the land along all sections of the AI Corridor. The same is for the impact 'Temporary loss of livelihood', the significance will be slight because of the very limited size of land required around the construction area where these activities can be relocated, a small number of local population will be affected.

Considering that AIC runs almost over agricultural land, the impact significance from permanent loss of land will be large along new sections and sections which will need to be widened (where large surface of agricultural land will be required for the project). Also impact significance is large along existing sections where agricultural activity is the main source of income for the local population, e.g; Section 1, 4, 5B, 5C, 6+7, 9A2, 9B2 and 13A as a large surface will be required for the project and large portion of population will be affected. Along Section 2 and 3, although the agricultural land is of medium to high productivity, impact significance from loss of land is considered as moderate due to lower surface of land required in comparison with sections with large significance. In sections 10 and 11 the impact significance is considered also moderate as beside the surface of land required is considered that the soils are of low production capacity.

The significance of impact 'loss of livelihood from land fragmentation is large along new Sections; 1,4,5B,9B2 and 10. Along other Sections of existing road 2, 3, 5C, 6+7, 9A2 11, 13A the impact significance is considered moderate.

Impact significance from loss of housing/businesses structure is considered large among section 1, 2, 4, 5B, 5C and 6+7 and is related to the large number of housing/commercial structures that will be expropriated and higher portion of population will be affected compared with other sections. Section 9B2 will have moderate to large significance, sections 3, 9B2 11 and 13A moderate significance and Section 10 slight significance (only 1 housing affected by the corridor).

Considering all impacts on land and property the significance will be large along Section 1, 4, 5B, and 9B2. The significance of impacts will be moderate in Sections 2,3, 5C, 10,11, and 13A and it will vary to moderate to large along Sections 9A2 and 6+7.

Operation phase

Most of the impacts on land property/livelihoods and physical displacement will affect the community during construction phase and will stop there. In this sense, population faced with loss of land, loss of housing and business structures will be compensated and relocated. Indirect impacts caused by the aforementioned direct impacts, related with livelihood of the community, may continue during operation and maintenance phase.

- **Permanent Loss of Livelihoods**

Occupation of agricultural land, forest and pasture areas will indirectly affect for a long period the livelihood of individual households. Permanent land take will cause loss of permanent crops with long-term impacts on livelihood and incomes of households along the Corridor. Agricultural land fragmentation may split land in small parcel and thus affect livelihood of households as raising of high profit crops may be impossible. The largest area of forest and pasture occupied for the project will be along Section 5B, 9B2, 10 and 13. The impacts significance along Section 10 will be slight considering small number of settlements along this

section. In forest areas, construction activities could result in long- term loss of timber production due to need of removing trees. Wood are the main source for heating and cooking in rural areas and an additional source of income for some households. Clearance of forest areas will affect small number of households that generate incomes from trade of medicinal plants collected in forest areas. This activity is mainly carried out along Section 10 and 11. On the other hand, occupation of pasture areas will limit livestock grazing activities which will be accompanied by decrease of livestock production and thus in loss of livelihood.

Estimation of Impacts on Land and Property Significance

The degree of change experienced by affected individuals from loss of livelihood due to permanent loss of land will emerge for a long time period. The magnitude of the impact will be major along sections where a) large surface of agricultural land will be taken; b) soil productivity is high and c) agricultural activity is the main source of livelihood for the population. Also, along the sections where timber production is the main source for heating and livelistock grazing activity is the main source of income the magnitude will be major.

In the following table is summarized the assessment and significance of impact related to land property and livelihood during operation phase for 13 sections of AIC.

Table 3-9 Significance of the impacts on Land and Property during Operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase on Land Property and Livelihood									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Moderate
Section 3 Existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Moderate
Section 4 New Alignment	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5B New alignment	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5C Existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 6+7 Existing Road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 8									
Section 9A2 Existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 9B2 New alignment + existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 10 New alignment	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 11 Existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Moderate
Section 12									
Section 13 A Existing road	Loss of Livelihoods	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate

Impact significance from loss of livelihood from land fragmentation will be large along sections 1, 4, 5B, 9B2. The significance of this impacts will be moderate along all other remaining sections of the AIC.

6.2.2.1 Community Health, Safety and Security

The project implementation may increase the potential for community exposure to health, safety and security. The main sources of impacts which may affect community health and safety are as follows;

- Interactions between workers and community;
- The entrance in construction site may lead to risk for injuries;
- Increase on the burden of health care centers;
- Decreases of air quality due to emissions and noises, vibrations will be generated during construction from outdoor machineries, equipment and transportation vehicles, construction material, etc, including impacts from air and noise pollution due to high traffic (during operation),

Impacts

Impacts during Pre-Construction

In order to avoid and mitigate the impacts that will be generated during construction and operational phase, plans, agreements and suggestive studies have to be implemented prior to construction activities.

Prior to construction and operation phases, well focused and realistic studies should be done on expected impacts in air. Most of those should be based, on relevant measurements of air quality, gases, noise and vibration, in a close period with construction phase. The measurements should be focused almost in existing roads or AIC alignments close to those, like second half of the section 1, second half of the section 2, section 3, first half of the section 5B, and sections 5C, 6+7, 9A2, 11 and 13A. Natural barriers should be planned for noise and air pollution, noise generation and for gases filtration.

Environmental and Social Management Plan will be developed prior to construction activities which will consider mitigation measures developed in profound ESIAs for each section of AIC.

An arrangement between the beneficiaries and contractor should be achieved in relation to the work-force that will be recruited. This agreement will be done to define employment of local workforce, in this way the likelihood for spreading of communicable diseases will be low since the workers will go home and not interact with local population. Training of work-force have to be done during pre-construction phase in regard to their interactions with community.

The contractor have to consider also to employ medical staff and to establish a suitable environment for dealing with worker healthy problems, thus in this way may avoid the additional burden in local health care centers and hospitals.

Plans should be drafted on how a pandemic situation will be treated in line with health protection and social distance protocols and guidance issued by the World Health Organization and EBRD briefing notes.

A grievance mechanism has to be established prior to construction in order that both community and people engaged in the project site concerns to be addressed in the right time.

Impacts during Construction

The following potential impacts on Community Health, Safety and Security have been identified for the construction phase of Project.

- **Increased community exposure to disease transmission**

The presence of an external workforce where interaction with nearby communities is possible could lead to the increased transmission of this disease within these communities. The impact from transmission of communicable diseases of concern include; such as, HIV/AIDS, TB, hepatitis and other respiratory diseases) between community and workers is minor considering the low level of communicable diseases in Albania. Considering the current situation in relation to the respiratory disease pandemic "Covid 19" and the fact that is not known when it will end up, the impact could occur during the construction phase of the AIC Project and may have large significance. Placing of work-force in camps, workers access in local markets, their movement along the route including to/ from their home, and workers access to health facilities to seek treatment, could create transmission pathways that may lead spread of the disease into communities. To a large extent the impact magnitude for Covid-19 will depend from the origin of the work-force. In case most of it will be recruited locally, spread of the virus /communicable diseases will be lower as the workers will go home. However even with engagement of local population the health protection measures such as face covering, gloves, social distancing and smaller number of team members should be applied throughout the construction phase and onwards.

Similar conditions apply for transmission of sexually transmitted diseases. In case the work force is engaged from within local population than presence of the worker camps will be minimized and so it will be the interaction of the workers with female members of local population. In this way the gender based violence will be minimized as well as due to decreased number of incoming workers' engaged in social contact, typically with female members of the local community.

- **Increased risk for injuries during trespass of construction site**

The risk of injuries during the construction phase resulting from the presence of heavy machinery on the roads and the need of community to move within the section area is considered high since most of the services are provided in the towns and population of the settlements will need to travel. This risk is higher especially along the sections that separate the settlements or when it comes in their vicinity. Between the communities, more exposure are farmers which agricultural land is fragmented and they have to trespass the construction site for assessing their land (workplace). Negative impacts may be expected in relation to young people safety during trespassing the construction site to access school located in the other side of the road.

- **Increase on additional burden on health care facilities**

AIC will not directly affect existing facilities that provide health and emergency services. However, during the construction phase the burden on health services may be increased due to the needs for such services by the engaged work force. This can deteriorate quality of health services for population living in the area. In some cases, delays for providing the health service due to overload may lead to worsen health outcome and in case of emergencies it may cost life community.

- **Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration**

During construction, a series of activities will affect the state of environment such as; Air pollution by dusts, gases and noise caused from motor vehicles and blasts, and also pollution of air during transportation of raw material, disposal of solid wastes, debris remains, discharges of waste waters, and free waste burning etc. Dust will be generated from earth movements (blasting, excavation, levelling, dumping) and destruction of buildings. The aforementioned impacts on surrounding environment will negatively affect the health and wellbeing of community residing in vicinity of AI Corridor (closer than 150 meter from the site construction). The main effects that may be caused from pollution of air, noise and vibration can include: Asthma, heart disease which can lead to premature death, cancer, allergy, lung inflammation, headaches, nausea, decreased mental alertness, sleep disturbances, interference with communication like conversation, physiological disturbance, hearing damage, etc. Impacts caused from vibration will be more significant for the population located in/close the area where the tunnels will be opened such as in section 2 and section 9B2.

Considering that AIC passes in vicinity or cross inhabited area, with residential buildings scattered both side of road, the health and safety sensitivity is considered as high.

Estimation of impacts threshold and significance

Agreement for engaging of a local work-force to the contractor responsible for the construction work should be put forward. This will reduce unemployment in project area. However not all work-force can be engaged locally and an considerable number will be recruited from other regions. This is why the significance of the impact for community disease will be large in the area with high concentration of settlements in the vicinity of AIC.

The evaluation of the impact for increased risk for injuries during trespass of construction site is done considering the increased traffic of heavy mechanization, required for construction activities which will change normal traffic regime. As such, the possibility for this impact to occur is high along new sections and it will have large significance.

Although, provision of primary health care and first aid will be provided by the contractors at construction camp sites an additional burden may happen in primary and secondary health care facilities along AIC sections. The significance of the impact will be moderate along sections where the number of health centers/inhabitants is lower than the minimum standard for planning health centers and the medical staff is already overstreched.

The impact significance on health and wellbeing of community due to increased pollution of air, noise and vibration on surrounding environment will be large for community located in the vicinity of the road.

In the following table is summarized the assessment and significance of each impact related to Community Health, Safety and Security during construction phase per 13 sections of AIC.

Table 3-10 Significance of the impacts on Community Health, Safety and Security during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in Community health Safety and Security									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for injuries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Major	Large
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on surrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Major	Large
Section 2 New alignment + existing road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for injuries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on surrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Moderate	Moderate
Section 3 Existing road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for injuries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on surrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Moderate	Moderate
Section 4 New Alignment	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for injuries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Major	Large
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on surrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Major	Large
Section 5B	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Major	Large

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in Community health Safety and Security									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
New Alignment	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Major	Large
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Major	Large
Section 5C Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Moderate	Moderate
Section 6+7 Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Moderate	Moderate
Section 8									
Section 9A2 Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Moderate	Moderate
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Likely	Minor to Moderate	Slight to Moderate
Section 9B2 New Alignment + Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Major	Large
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Major	Large

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase in Community health Safety and Security									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Definite	Major	Large
Section 10 New Alignement	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Likely	Minor	Slight
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Moderate	Moderate
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Minor	Slight
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Likely	Minor	Slight
Section 11 Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Moderate	Moderate
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Likely	Minor	Slight
Section 12									
Section 13 A Existing Road	Increased community exposure to disease transmission	Negative	Direct	Irreversible	National	Medium-Term	Definite	Moderate	Moderate
	Increase on additional burden on health care facilities	Negative	Indirect	Reversible	Local/Regional	Medium-Term	Definite	Minor	Slight
	Increased risk for inguries during trespass of construction site	Negative	Direct	Irreversible	Local	Medium-Term	Likely	Major	Large
	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment	Negative	Indirect	Irreversible	Local	Medium-Term	Likely	Minor	Slight

Conclusion

According to the results in the table above, the most significant impacts on Community Health, Safety and Security (during construction phase) are expected along sections 1, 4, 5B and section 9B2.

Section 2, 3, 5C, 6+7, 9A2, 11 and 13A have a moderate significance. Section 10 has a slight significance considering that risk in relation to community health, safety and security are low due to low presence of community in the vicinity of the Corridor.

The most significant impacts on Community Health, Safety and Security are expected from community exposure to disease transmission and risks for accidents or injuries during trespassing construction site.

Impacts during operation/maintenance

The operational of the road will have also positive impacts for community safety due to reduction of traffic accidents as will not happen a uncontrolled entry-exit in the new motorway also the planned overpasses and underpasses will reduce the possibility of trespassing the motorway from pedestrian. Positive impacts on the health and quality of life of community are expected during operation phase resulting from the improved access to health centers and medical services.

Despite the positive impacts from the operational of the motorway there are still some negative impacts that mitigation measures should be proposed. These are:

- **Life risk from accidents**

Landslides and improper road maintenance and its components (landslides protection barriers on the side of the road can be a factor for accidents that may risk the life of road users). Life risk may be caused also during atmospheric events such as to heavy rainfall. The road may be flooded in case of non–maintenance/non-repair of the detective drainage system or in case of its blockage. Another impact on life risk during operation phase may be the seismic activity, considering that the AIC corridor lies over three seismic sources. Risks for accidents due to atmospheric events or natural disaster may happen along the entire length of the AI Corridor.

- **Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration**

During operational phase the main impacts on health and wellbeing of community will be from noise and air pollution generated from road traffic. The most significant pollution will come by generation of particle matters - PMs, gases and dust from traffic (mainly generated during dry seasons). Emissions of this pollutant in air may cause hard diseases leading to death of affected people. Noises generated by traffic, (include vehicle horns), etc. can cause disturbance for the inhabitants in the vicinity of the AIC. This impact will have major magnitude where large changes are expected from operation of the motorway along new Sections of AIC and large portion of population will be exposed to this impact.

In the following table is summarized the assessment and significance of each impact related to Community Health, Safety and Security during operation phase for all analyzed sections of AIC.

Table 3-11 Significance of the impacts on Community Health, Safety and Security during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase in Community Health, Safety and Security									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 2 New alignment + existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 3 Existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 4 New Alignment	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 5B New alignment	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 5C Existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Life risk from accidents caused	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 6+7 Existing Road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 8									
Section 9A2 Existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Slight
	Life risk from accidents	Negative	Indirect	Irreversible	Regional	Long-term	Likely	Major	Large

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase in Community Health, Safety and Security									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
					/National				
Section 9B2 New alignment + existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 10 New alignment	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Unlikely	Minor	Slght
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 11 Existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Slight
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large
Section 12									
Section 13 A Existing road	Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Slight
	Life risk from accidents	Negative	Indirect	Irreversible	Regional /National	Long-term	Likely	Major	Large

Conclusion

The impact significance on community health due to increased pollution of dust and noise from traffic movement is considered as large along Section 1, 4, 5B and 9B2 considering the changes that operation of new road will bring. The population residing in these areas will face increased noise generated by traffic and may face difficulties to adapt. Along existing sections and where large portion of affected population lives in the vicinity of the Corridor (Section 2, 3, 5C, 6+7) are assessed with moderate significance having in mind expected high movement of traffic resulting from AIC operation. In Sections 9A2, 11, 13A the settlements are located further than 100 m from the corridor. This is why the magnitude is moderate. The significance will be slight considering the level of sensitivity of community health. Section 10 will have slight significance as no settlements are located in the vicinity of AIC.

The significance of impacts for accidents during operation will be large for all Sections of the Corridor considering that the risk for accidents due to atmospheric events or natural disaster may happen along the entire length of the AIC.

6.2.3.5 Community Tensions

This section presents the potential impacts to community tensions due to interaction between members of community located in the vicinity of AIC and influx of workers and tensions related with project activities. Conflicts between local community members and newly arrived people may result due to their socio-cultural differences, changes on the socio-economic conditions of the area, and also competition for accessing different services and facilities.

Impacts

Impacts during Pre-construction

Between the main factors of the project which are potentially influencing impacts can be mentioned;

- Determining housing worker location and areas for recreational activities;
- Management of impacts in relation to land property compensation;
- Community interaction related to information disclosure and engagement with community.

One of the Impacts related to community tensions that is likely to happen prior to construction is related to not benefiting the compensation from land/property expropriation

- **Community tension due non-involvement in the expropriation process**

Although the compensation of land procedure should be done prior to construction activity, in most of the cases, the affected people receive their compensation in the course and/or at the end of project implementation. This is one of the main factors that can cause community tension. This issue was one of the main concerns raised by the stakeholders during field visits. In some sections along the AIC, such as Section 9A2, 9B2 and Section 11 expressed their concerns for not benefiting the compensation resulting from the construction of existing road. One of the main problems for this issue was the lack of clear ownership titles and mistakes of land boundaries. According to existing legal framework on expropriation, the affected subjects cannot be compensated if their properties are not duly registered in the Property Registration Office.

Tension may occur between the project developer and community owners of illegal construction and occupiers of land, which does not possess legal documentation for the property. In such case most of the lands are registered as agricultural lands but because of internal migration, said lands are used as inhabited areas. Most of them are in the focus of a major national project related to the legalization of illegal constructions and assets, but in general the assets are not yet legalized and new users are missing the formal document of ownerships. Therefore, their compensation by the state is not relevant. This impact can occur along all the AIC sections, but its significance may be higher especially along the sections where the Corridor crosses approved informal areas such as in section 4 and section 5B.

In order to minimize/prevent negative impacts in relation to community tensions that may happen during pre-construction, construction and operation phase, mechanisms, plans and strategies have to be developed and put in place before the start of construction. Along with ESIAs, for each section a detailed RAP and LRF should be developed. Training and guidance for workers should take place prior to construction activities. A grievance mechanism must be developed in order to receive and facilitate all complaints from community throughout entire Project life-cycle.

Impacts during Construction

- **Impact from the influx of temporary workers**

Although considerable number of the workforce will be mobilized locally, the skilled workforce will be permanent employees of the Contractor, hence, imported to the area of the construction and will reside in the area of construction camps.

It is expected that the increased number of workers and higher concentration of residents near construction sites will have impact on local communities. Due to this a limited regime of movement of workers in the area around the construction sites and mode of movement must be well organized and defined by agreement between the Employer and the Contractor(s). Conflicts between local community members and newly arrived people due to the socio-cultural differences and other issues are possible. Increase on competition for accessing services could also happen.

- **Community tensions to the disturbance arising from the construction works**

The construction of the new motorway/express road (AI Corridor) will fragment agricultural and pasture lands from the settlements. Impacts on community livelihoods from land fragmentation are addressed in the chapter related to Land Property and Livelihood. During construction activities, diversion of passageway to the other side of the road will increase the travel distance to reach the lands/other properties. A higher travel distance means cost in time and money and can cause dissatisfaction and increase community tensions.

Concerns due to increased pollution of air and noise from construction activities and traffic movements which can have consequences for human health, may cause also community tensions. Impacts on human health are addressed in the subchapter 'Community Health, Safety and Security. Without mitigation measures such as barriers against noise and air pollution this impact will be of large significance.

- **Demographic stress**

There is a possibility that people from other region could move towards the locations where the project will be implemented with the hope of finding a job directly with the Project or to gain benefit from the indirect economic opportunities that the Project may bring, such as selling goods or services offsite recruitment; etc). These impacts may continue also during operation phase. In such case host community may experience demographic stress in terms of decreases of employment opportunity as result of job competition, stress due to increases of traffic, and also competition for other services etc. Competition for services, trade markets and issues related to accessibility may cause community tension.

Evaluation of Impacts significance

Due to the low level of incomes in rural areas it will be a priority to hire local work force and the need for influx of temporary workers is expected to be low. The significance from this impact will be slight.

The proper evaluation for impact on community tensions due non-involvement in the expropriation process will be elaborated at the later stage of the project when detailed ESIAs preparation and RAP preparation are carried out. The magnitude of the impact is expected to be major for all AIC sections where large number of population will be affected.

The impact for Community tension due to disturbance arising from the construction works will have major magnitude along the new sections considering that the population will face difficulties to adapt to changes related to their livelihoods, quality of life and their health.

Impacts caused from demographic stress may bring annoyance and will not be accompanied by serious consequences.Measures can be proposed in order this impact not to cause long-term effects. The impact will have minor magnitude.

Table 3-12 Significance of the impacts on Community Tensions during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Pre-Construction/Construction phase on Community Tensions									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Rreversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Major	Large
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 2 New alignment + existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Rreversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 3 Existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 4 New Alignment	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 5B New alignment	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Major	Large
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 5C Existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Pre-Construction/Construction phase on Community Tensions									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 6+7 Existing Road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 8									
Section 9A2 Existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 9B2 New alignment + existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Major	Large
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Moderate	Moderate
Section 10 New alignement	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Minor	Slight
Section 11 Existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Reversible	Local	Medium-term	Likely	Minor	Moderate
	Demographic stress	Negative	Indirect	Reversible	Regional	Long-term	Likely	Minor	Slight

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Pre-Construction/Construction phase on Community Tensions									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 12									
Section 13 A Existing road	Impact due non-involvement in the expropriation process	Negative	Direct	Reversible	Local	Medium-term	Likely	Major	Large
	Impact from the influx of temporary workers	Negative	Direct	Reversible	Local	Medium-term	Definite	Minor	Slight
	Community tensions due to the disturbance arising from the construction works	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
	Demographic stress	Negative	Indirect	Reversible	Local	Medium-term	Likely	Moderate	Moderate

Conclusion

Impacts related to non-involvement in expropriation process will have large significance for all AIC sections considering problems related to agricultural land ownership titles are meet in the entire territory of country. Most sensitive will be sections 1, 2, 4, 5B, 9A2 where are found informal areas.

The impacts significance from influx of workers will be minor along all sections of AIC considering that the project will tend to engage local work-force.

The impacts significance for community tensions due to the disturbance arising from the construction works will be large along the sections 1, 4, 5B and 9B2 and will be moderate along other sections of the corridor.

Significance of the impact on Demographic stress will be moderate along all sections where large concentration of population can be found and in the vicinity of the corridor. These are sections 1, 2, 3, 4, 5B, 5C, 6+7, 9A2, 9B2, and 13A.

The significance of the impacts on community tensions is large along Section 1, 4, 5B and 9B2.

Impacts during Operation Phase

- **Community tensions due to disturbance arising from the operation of the motorway**

Despite the construction of foreseen 33 overpasses and 103 underpasses in the conceptual design phase, this number may not satisfy the requirements of community. In this sense, in the current situation the access of community at agricultural/pasture land is done directly. Trespassing the existing road is done without taking into account the risk for life. The construction of the new motorway will increase the time travel, cost for accessing land and increase risk to life. All of these can cause dissatisfaction and can bring community tensions.

Impacts on human health due to air and noise pollution from traffic movements and in case that mitigation measures are not properly implemented may cause also community tensions.

In the following table is presented the evaluation of impact on community tensions during operation phase per each of AIC Sections.

Table 3-13 Significance of the impacts on Community Tensions during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase on Community Tensions									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 3 Existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 4 New Alignment	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5B New alignment	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5C Existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 6+7 Existing Road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 8									
Section 9A2 Existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 9B2 New alignment + existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 10 New alignement	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Moderate	Moderate
Section 11 Existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight
Section 12									
Section 13 A Existing road	Community tensions due to disturbance arising from operation of the motorway	Negative	Indirect	Irreversible	Local	Long-term	Definite	Minor	Slight

Conclusion

Impact for Community tensions due to disturbance arising from operation of the motorway will have large significance along new Sections or that are in most of their length new sections, such as Section 1, 4, 5B and 9B2.

For the sections constructed in a form of widening of exiting road, the significance of this impact will be slight as in the current situation the population is adapted to the changes related to disturbance from road traffic and fragmentation of agricultural land due to existing road.

Section 10 will have a moderate significance and community tension will be in relation to the land fragmentation from operation of motorway.

6.2.3.6 Access and Severance

The construction and operation of the motorway will have effects of access and severance of the general public, the community services and the business sector in communities at or close to the motorway. The activities for construction of the motorway, opening of new access roads, blockage of irrigation and drainage channels and construction of working camps, water supply and related infrastructure will cause severance effects for the population in the vicinity of AIC. Potentially affected receptors from impacts on this parameter are; residential buildings along and the vicinity of the Corridor; Households that depend on local services and infrastructure (such as; electrical power, water supply and sanitation, waste disposal), local companies responsible for supplying with aforementioned services and local system for irrigation and flood management. Settlements along sections 1, 2, 3, 4, 5B, 5C, 6+7 and 9B2 which are bisected by the motorway, will be specifically exposed to potential impacts on access and severance effects. Also, some of the access routes will become non-functional during both construction and operational phase. Affected people must get used to new traffic solution and to utilize new safe access to their homes, neighborhood and towns.

Impacts

The following potential impacts on access, due to severance, have been identified for the construction and operational phases of the Project.

Pre Construction Phase

In order to minimize negative impacts that will occur in terms of access and severance, at both construction and operational phase, plans, mechanisms and specific measures need to be developed and put in place prior to start of the construction phase. Conduct of the Social Survey as part of ESIA should take place to provide information on irrigation system. Also, during the next phase of Project a Traffic Management Plan will be developed and the Grievance Mechanism put in place and be accessible to all affected stakeholders prior to construction activities.

Construction Phase

- **Disruption of access and damage to infrastructure and utilities**

Construction of the corridor and its access road will cause potential impacts on utilities and infrastructure. The main potential impacts on disruption of access, and damage of local infrastructure and utilities are: a) disruption to traffic and transportation due to road crossings, b) short-term planned and unplanned disruption to drinking water or electricity, and c) damage to local infrastructures. As a result of the interruption of the local roads by the construction, waste collection services may be even further limited in rural areas (from the existing ones). Damage of the local roads due to increased used (re-direction of traffic and use of heavy machinery) may take place during the construction phase. Severance effects in infrastructure and utilities will cause impacts on livelihoods or quality of life, and if left unmanaged, can lead to health consequences (such as: water restrictions, the inability to cross roads in an emergency situations, etc.). Due to disruption of access and damage to infrastructure, 213,316 people in the affected settlements will be imposed to access problems during the construction of the motorway by being limited in their mobility within the construction area. Access to community services will be affected by the required longer travel times as a result of construction activities on site. Along Sections with poor quality infrastructure the impact will have large significance. Indirectly business sector will suffer from changes in traffic (congestion due to transport of construction materials and workers by the existing road) and changed access (during the construction of the junctions with the local roads). Access will be restricted for farmers who use pastures along the alignment for stockbreeding; people who harvest forest wood; people who find recreation in this area, etc.

- **Impacts on access to agricultural land and disruption of Irrigation and Draining channels**

Bi-section of agricultural land by the road corridor will result into decreased access to land and farmers will have longer traveling distance to reach the fields. As consequence, the costs of moving machineries from one parcel to another will increase. Access of farmers to grazing land will also be restricted. This may disrupt existing farming practices and can cause decrease of livestock productivity. This impact will have the same significance due the operational and maintenance phase.

AI Corridor crosses mostly agricultural land which is almost all covered by dense irrigation and draining channels network. During construction activities potential impact may happen by crossing irrigation and draining system infrastructure. This may result in disruption or accidental damage to the infrastructure. This impact will affect communities which have livelihood depending from irrigation. As a result of temporary disruption of water supply for agricultural purposes, agriculture products may be damaged and thus negatively impact the livelihood. Disruption of draining channels might result in flooding, damage to crops and property, especially during atmospheric events (heavy rain) and in areas that are prone to floods. Section 1 and 9A2 are more sensitive in relation to impacts on draining channels. More vulnerable due to impacts form disruption of irrigation and draining channels are poor households as they do not have alternative incomes to compensate for occurred losses.

Evaluation of Impact significance

There will be high occurrence of access and severance effects in communities that are close to the construction sites and motorway. Access and severance effects will mainly occur during the construction period due to limited movement at construction sites.

The impacts on access to agricultural land and disruption of Irrigation and Draining channels will happen in most of the length of the Corridor concidering that AIC lays over agricultural land.
In the following table is presented the evaluation of impact on access and severance during construction phase for analyzed sections of AIC.

Table 3-14 Significance of the impacts on Access and Severance during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Access and Severance									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Disruption of access and damage to infrastructure and utilities	Negative	Direct	Reversible	Local	Medium-Term	Definite	Major	Large
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 2 New alignment + existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Major	Moderate to large
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 3 Existing road	Disruption of access and damage to infrastructure and utilities	Negative	Direct	Reversible	Local	Medium-Term	Definite	Moderate	Moderate
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 4 New Alignment	Disruption of access and damage to infrastructure and utilities	Negative	Direct	Reversible	Local	Medium-Term	Definite	Major	Large
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 5B New alignment	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Major	Large
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 5C Existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Moderate	Moderate
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 6+7 Existing Road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Moderate	Moderate
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 8									
Section 9A2 Existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Moderate	Moderate

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Access and Severance									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 9B2 New alignment + existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Major	Large
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 10 New alignement	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Likely	Minor	Slight
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 11 Existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Definite	Moderate	Moderate
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 12									
Section 13 A Existing road	Disruption of access and damage to infrastructure and utilities	Negative	Indirect	Reversible	Local	Medium-Term	Likely	Moderate	Moderate
	Impacts from disruption of Irrigation and draining channels	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large

Conclusion

The impacts on disruption of assess and damage to infrastructure/utilities have large significance along sections where settlements are located in the vicinity of the construction site and bisected from construction of the road and the impact may result in substantative changes in defined population/communities. This impact will have large significance along section 1, 2, 4, 5B, 9B2. Along sections 3, 5B, 6+7 (existing road) there might be some disruption on infrastructure and services (electricity, waste transportation, etc.) but the population will be less sensitive due to disruption/changes on access to land, services located on the other side of the road (in the current situation this is enabled by underpasses and overspasses, interchanges). These sections will have moderate significance. Section 9A2, 11 and 13A will have also moderate significance as the road does not bisect any settlement. Section 10 will have slight significance due to lower population density.

Regarding the impact on irrigation and draining channels, the significance will be large along section 1, 4, 5B, 5C 6+7, 9A2, 9B2 and 13A where large agricultural land will be used for construction of the Corridor. Section 2, 3, 10 and 11 will have moderate significance.**Operational Phase**

Once the section of AIC corridor is operational, local settlements/community will have positive impact resulting from better and faster road enabling easier access to other public services and amenities located in bigger towns, effective exchange of goods and knowledge which may result in development of local economy.

- **Impacts on Access and Severance**

Access will be limited to exits / entries at interchanges. Overpasses and underpasses will secure continuous traffic flow along roads crossed by the motorway. However, there will be a restricted movement of people, compared to the present situation along some section of the Corridor (in existing roads) where unlimited access to and from nearby properties is enabled. This will cause severance effects. Community residing along new sections of AI corridor will be more vulnerable from impacts on access and severence. During the operation of the motorway, the travel time of existing businesses vendors and clients may also increase slightly (depending on the location of particular business premises) due to the need to use junctions of the motorway to reach the location of existing businesses. The time lost in connecting to the existing roads from the motorway may be offset by the higher speed at the motorway. Farmers will face access and severnace effects, including time lost due to higher distances to access their land. Positive impacts are expected from better accessibility with other regions or international citizens, by operation of AIC. In case negative impacts from accessibility fragmentation and infrastructure malfunctioning, are well managed and mitigated, during the operation phase, it may lead to very important beneficial impact.

Evaluation of Impact Significance

This impact will result in substantative changes for communities along new sections of the Corridor or it may result in a large change in socio-economic conditions.
In the following table is presented the evaluation of impact on access and severance during operation phase per each of AIC sections.

Table 3-15 Significance of the impacts on Access and Severance during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation phase on Access and Severance									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Large
Section 2 New alignment + existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Moderate
Section 3 Existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Minor	Slight
Section 4 New Alignment	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Large
Section 5B New alignment	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Large
Section 5C Existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Minor	Slight
Section 6+7 Existing Road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Minor	Slight
Section 8									
Section 9A2 Existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Moderate
Section 9B2 New alignment + existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Large
Section 10 New alignement	Impact on access and severance effects	Negative	Direct	Reversible	Local	Medium-Term	Likely	Minor	Moderate
Section 11 Existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Moderate
Section 12									
Section 13 A Existing road	Impact on access and severance effects	Negative	Direct	Irreversible	Local	Long-Term	Likely	Moderate	Moderate

Conclusion

Impacts on Access and Severance will have large significance along new sections 1, 4, 5B, 9B2 as the communities will face large changes on access and severance. Section 2, 9A2, 11,13A will have moderate significance. Sections 3, 5C and 6+7 will have minor significance considering the actual condition of the road along these sections (installed guardrails both side of the road) and the access to cross the road is limited. The access to agricultural land, services and settlements located on the other side of the road along this sections is performed through overpasses and underpasses. Section 10 will have moderate significance considering the limited number of settlements along, and in vicinity, of this section of the corridor, however there will be restriction of access for farmers that own agricultural land which will be crossed by the Corridor.

6.2.3.7 Economy

This section assesses economic opportunity in relation to Project implementation. During the construction phase it is expected related construction works to have a positive significant impact especially on local economy and national economy. During operational phase, new markets will be opened as a result of better transfer of good and ideas; new transport alternatives will be available which will significantly impact development of local and national economy.

Assessment of Impacts on Economy

Between the main sources of impacts on Economy during pre-construction and construction phase are; increase of the influx of workers in the project area (which will spend money for personal needs) and purchase of goods and services.

Pre-Construction Phase

In order to maximize the positive impacts some strategies/plans should be developed and information would have to disseminate before construction activities. These are as follows:
People should be informed in a timely manner about the possible impacts on economic activity in surrounding areas and expected timings of impacts, which will enable them to plan and prepare. Local businesses should also be informed before construction phase on tendering opportunities. A purchasing strategy should be developed by contractors on how national and local purchase of goods will be optimized. Detailed social surveys should be undertaken for assessing affected businesses structures, incomes they generate and number of employees, and likelihood of their economic displacement as a result of the Project.

Construction Phase

- **Economic growth at local level**

Positive impacts are expected in term of local economy. Economic impacts during construction of motorway/express way will stem from procurement of goods and services by the Project, local employment, and induced economic effects of spending and by construction workers. The project will stimulate local economic activities by engaging local entrepreneurs. Local Sub-Contractors will use locally available community services. Between the main economic sectors (producers of goods and services) that will be positively affected during construction phase are: Transport, food supply, security services for camps, supply of construction vehicles and equipment, providers of construction materials, etc. Private spending by workers employed by the Project will bring benefits for local shops, bars, restaurants and other existing

formal businesses in the service sector. Part of increased revenue and taxes will be redirected to the local communities once collected at the central level. In the following table is presented the evaluation of impact on economy during construction phase per each of AIC sections.

Table 3-16 Significance of the impacts on Economy during Construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Pre-Construction/Construction Phase on Economy									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 2 New alignment + existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 3 Existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 4 New Alignment	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 5B New alignment	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 5C Existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 6+7 Existing Road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 8									
Section 9A2 Existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large
Section 9B2 New alignment + existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 10 New alignement	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 11 Existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
Section 12									
Section 13 A Existing road	Economic growth at local level	Positive	Direct	Reversible	Local	Medium-term	Definite	Major	Large

It is expected that the impacts will result in an improved local economy. It is estimated that the impact will have major magnitude along all sections of AIC where availability of goods and services is high and in the vicinity of the Corridor. Significance from economic growth at local level will be large along section 1, 2, 3, 4, 5B, 5C, 6+7, 9A2 and 13A. Section 9B2, 11 will have moderate significance, considering lower availability of goods and service in project area. Construction and operation of the Corridor will encourage opening of new business and economic development of the area.

Operational Phase

- **Effects on Local and National Economy**

Opening of new businesses along new sections of the corridor will increase incomes from tax revenue. The construction of the highway will bring economic growth as a result of the increase in the value of land in cases of conversion from agricultural land to urban land. New businesses will resettle in the vicinity of motorway or along it in the dedicated (resting) areas. During the operational phase, the local economy will benefit through engaging workforce for maintenance activities. Motorway associated services, such as gas stations, rest areas, restaurants etc. will provide employment opportunities. Better accessibility will boost development of local economic activities like agriculture, forestry, tourism, harvesting of forest foods which is expected to be intensified due to better access to newly opened markets local and nationally.

Operation of the motorway will promote economic growth by building, enhancing, managing and maintaining the transport service to the economy. Motorway transport will decrease transport time and with this the costs in final market price of the products which will lead to bigger competitiveness of national economy abroad.

Businesses which depend on the passengers communting along the existing state roads SH1 and SH41 (section 1), SH1 and SH60 (Section 4), SH56 (section 5B) and SH4 (section 9B2 and 10), will face reduced income due to the transfer of the major traffic to the new motorway. These will suffer some economic displacement and will have to be entitled to compensation. More detailed information on the magnitude of the impact will be obtained through a detailed Social Survey during the Preliminary Design stage, which will assess the affected businesses and the likelihood of their economic displacement as a result of the Project.

Estimation of impacts significance

It is expected that impact on the local and national economy from operation of the motorway will be of a large positive and result in improvement along all sections. During operational phase, section 10 will be more sensitive from benefits on economy. Considering this is a new section, and is characterized by natural sites, improvement of local economy may be favored by opening of new businesses along the motorway, thus increasing local taxes and revenue. The impact will have large significance.

In the following table is presented the evaluation of impact on economy during operation phase per each of AIC Sections.

Table 3-17 Significance of the impacts on Economy during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation Phase on Economy									
Sections	**Overall Impacts**	**Characterization of impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 3 Existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 4 New Alignment	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5B New alignment	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 5C Existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 6+7 Existing Road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 8									
Section 9A2 Existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 9B2 New alignment + existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 10 New alignement	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 11 Existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large
Section 12									
Section 13 A Existing road	Effects on Local and National Economy	Positive	Indirect	Irreversible	Local	Long-term	Definite	Major	Large

Conclusions

During operation phase are expected only positive impacts on economy along all sections of the Corridor. The impact significance of AIC on economy looks to be Large. In general, economic benefits are expected in local and national level from project operation as result of payment of taxes.

6.2.3.8 Employment

This section presents the impact of employment in relation to the AIC project. Potentially impacted receptors will be the workforce in the study area.

Impacts

Impacts during Pre-Construction

Impacts on employment that are expected to happen due to project implementation are positive. However, in order to maximize the positive impacts in terms of local employment during construction and operation phase, some strategies, plans, agreements and instruments should be undertaken prior to construction phase. In order to minimize community tensions that are related to marginalization from employment opportunities (as presented in impacts on Community Tension) an Employment Strategy should be developed and measures should be taken prior to construction activities in order that employment opportunities to be distributed equally.

Construction phase

- **Benefits from creation of local employment**

Jobs creation will happen during construction phase. The duration of employment for the workforce will be temporary. The construction sector is an important economic activity, which contribute approximately 23% of GDP in the country. Therefore, the possibility is high that a skilled workforce in the field of construction could be found throughout the project area. Increased demand for goods and services in businesses located in the project area will increase the opportunity for local employment. Due to availability of qualified work-force it is possible the employment opportunity to be available for head office of the contractors and sub-contractors company and not only manual/in site labour. In term of gender distribution of labour force, it can be expected that woman could engage mainly in the head office of contractors or with administration of supervisor (administrative or engineering staff), cleaning services of working camps or trade. It is important to emphasize equal opportunities during the employment for both genders.
Opportunities from job creation will have for unskilled labour that could be employed from local or regional labour market along the route.

Evaluation of impact significance

It is expected the construction phase will create employment opportunities and will have moderate tomajor magnitude and significance. Employment significance is expected to be large in all new Sections of AIC but the sensitivity will be high especially for areas where unemployment rate is at high level and the presence of working age population is at high level.

In the following table is presented the evaluation of impact on employment during construction phase per each of AIC Sections.

Table 3-18 Significance of the impacts on Employment during construction phase

	Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction Phase on Employment								
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Major	Large
Section 2 New alignment + existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 3 Existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 4 New Alignment	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Major	Large
Section 5B New alignment	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Major	Large
Section 5C Existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 6+7 Existing Road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 8									
Section 9A2 Existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 9B2 New alignment + existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Major	Large
Section 10 New alignement	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Major	Large
Section 11 Existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Moderate
Section 12									
Section 13 A Existing road	Benefits from Creation of Local Employment	Positive	Direct/Indirect	Irreversible	National	Medium-term	Definite	Moderate	Slight to Moderate

Conclusion

The Project construction activities will require both the specialized workforce and unskilled labour that could be engaged from local labour market. Also, the demand for supply with goods and service in the project area will incite local hiring. Thus, the significance of the impact from creation of local employment is large positive along all new sections and partially new sections. Considering the length of the sections and several construction activities will be performed in long period of time much more local work force will be engaged along these sections. Along sections 1, 4, 5B, 9B2 and 10 the presence of working age population is high therefore the possibility to benefit from employment opportunities, the magnitude is high. Section 13 A is considered to have a slight to moderate significance considering the presence of active working age population is lower compared to other sections. All other sections are considered to have moderate magnitude.

Operation Phase

- **Creation of employment opportunity**

During operation, the creation of permanent jobs will be possible, but in smaller number than during construction. Permanent and temporary jobs are linked with motorway maintenance works, operation of road tolls, other concessionary company jobs and jobs indirectly created as result of increased demand for goods and services such as: fuel, accommodation, catering, etc. It is expected that majority of these employees to be male, however equal employment opportunities for both genders should be emphasized in line with national requirements. Also, along the motorway, additional employment will be generated in the Project associated facilities. Opening of new businesses along the Corridor will also create new employment opportunities for local work-force.

Evaluation of Impact significance

Long-term incremental benefits are expected from employment opportunities during the operational phase; the magnitude and significance of the impact will be major/Large.

In the following table is presented the evaluation of impact on employment during operational phase per each of AIC Sections.

Table 3-19 Significance of the impacts on Employment during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation Phase on Employment									
Sections	**Overall Impacts**	**Characterization of impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/National	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 3 Existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 4 New Alignment	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 5B New alignment	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 5C Existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 6+7 Existing Road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 8									
Section 9A2 Existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 9B2 New alignment + existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 10 New alignement	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 11 Existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large
Section 12									
Section 13 A Existing road	Creation of Employment Opportunity	Positive	Direct/Indirect	Irreversible	Local/ National	Long-term	Definite	Major	Large

Conclusion

All impacts generated by the Project both for the construction and operation phase on employment will be large positive along all sections of AIC.

6.2.3.9 Education and Training

Impacts on education and training will start prior to construction and will continue during the operation of the motorway.

Impacts

Pre-construction

In order to broaden the employee skills and increase productivity for the next phases of project implementation, prior to start of the construction activities, the best training methods will be planned, organized and conducted for employees in the worksite.

Construction phase

- **Benefits from capacity building**

It is expected that during the construction phase some level of capacity building will be provided (organized and un-organized) through transfer of new technologies and new skills. This will happen mainly as on-the-job training but also as exposure to modern management and logistics procedures and by working with people having international expertise. Joint venture could contribute in transfer of skills which should result in strengthening of local capacities.

Evaluation of impact significance

It is expected this impact to create minor benefits on education and training. It is estimated that the impact will have a minor magnitude.

Table 3-20 Significance of the impacts on Education and Training during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction Phase on Education and Training									
Sections	**Overall Impacts**	**Chracterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 2 New alignment + existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 3 Existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 4 New Alignment	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 5B New alignment	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 5C Existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 6+7 Existing Road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 8									
Section 9A2 Existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 9B2 New alignment + existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 10 New alignement	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 11 Existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight
Section 12									
Section 13 A Existing road	Benefits from capacity buildings	Positive	Indirect	Irreversible	National	Short-term	Likely	Minor	Slight

Operational Phase

- **Education and training benefits from employment opportunities and better access**

Operation of the motorway will create possibilities for direct and indirect employment. Training will be provided for the workforce that will be employed for the maintenance works, operation of road tolls and other works that will be offered from concessionary companies. Infrastructure improvements will secure better access to universities in the country and can be expected an increase of the percentage both for males and females who will continue post -secondary education. especially for the population residing in the settlements along section 1, 3, 4, 5C, 9A2 which are characterized by a lower persentage in terms of attendance university studies coparing to the other sections.

Evaluation of impact significance

High improvement in the education and training due to employment opportunities are expected for community along the sections of the Corridor. Improvements are expected in terms of increasing accessibility for universities. It is estimated that the impact will have major magnitude and Large positive significance.

Table 3-21 Significance of the impacts on Education and Training during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation Phase on Education and Training									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 2 New alignment + existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 3 Existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 4 New Alignment	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 5B New alignment	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 5C Existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 6+7 Existing Road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 8									
Section 9A2 Existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 9B2 New alignment + existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 10 New alignement	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 11 Existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large
Section 12									
Section 13 A Existing road	Education and Training benefits from employment opportunities	Positive	Indirect	Irreversible	Regional/ National	Long-term	Definite	Major	Large

6.2.3.10 Vulnerable Groups

Vulnerable groups identified within the project area are likely to suffer more in economic and social terms from project activities than the general population as their ability to cope, resist and recover from impacts is low. Potentially impacted vulnerable groups identified along the AIC route are; children and young generation, elderly people, female head of household, poor households, survival famers and person with disabilities. In term of ethnic background representatives of Roma and Egyptian community may be included with a higher percentage within the identified vulnerable groups which calls for dedicated measures to specifically target these communities. It can be concluded that the sensitivity 'to change' of vulnerable groups is very high.

A big number of representatives of vulnerable groups may lose their property (house and business activity) land, forestry, pastures, fields and/or orchards.
It is not possible to determine which profile of vulnerable groups and how many people will be affected due to the early stage of the design. It is certain, however, that impacts that affect other population will be multiplied for vulnerable groups since they face difficulty to adopt and respond to impact effects.

Impacts

Potentially impacts on vulnerable groups are expected to happen during construction and operational phase.

Pre-Construction phase

In order to minimize negative impacts on vulnerable groups during of preparation of ESIAs per each section of the Corridor the social survey should gather data about identified vulnerable groups so far and potentially other unidentified vulnerable group. Also, information should be collected on long term unemployed job seekers, their qualification and willingness to be trained and/or engaged as a labour force for the project. Survival farmers information is also needed. They may be the most affected vulnerable group considering the size of agricultural land that will be expropriated.

All aspects in relation to vulnerable groups should also be considered during preparation of Employment Strategy, preparation and implementation of RAP. In addition, methods for communication with vulnerable groups should be determined prior to construction activities. After performing the survey, an update of Resettlement Compensation Framework should be undertaken. Another aspect that should be considered is on how additional assistance will be provided to the vulnerable groups representatives that has to resettled for restoring their standards of living.

Construction Phase

Main potential impacts on vulnerable groups during construction phase are;

- **Decreased accessibility to services**

The decreased accessibility to services due to construction of works and blockages of roads is negative impact for all representatives of vulnerable groups, but this impact will have a large significance especially when it comes to inability for easy and fast access of the health and emergency service. This will affect

mostly elderly people and persons with disabilities compared to other vulnerable groups. Impacts from disruption of access may face also children that have to reach school facility located in the other side of the road under the construction and have to travel long distances due to changed access.

- **Loss of land/property**

Effects on the vulnerable groups from temporary loss of gardens and community land and from permanent land take will have significant effects on livelihoods. This may cause permanent negative impacts for subsistence farmers, female head of households, poor families and Roma and Egyptian community. Vulnerable groups will face difficulties to adapt (due to scarce resources) and find other source of income/livelihoods. Elderly and people with disabilities will face negative impacts and difficulties during relocation given the lower capacity of this group to adapt and integrate.

- **Exclusion from employment opportunities**

Roma and Egyptian community representatives are more at risk for exclusion from employment opportunities during construction and operational phase. The reasons for the source of this influence are related to the low levels of education and in some cases the lack of spoken Albanian language. The Roma and Egyptian communities identified in the studied socio-economic area are located mainly along section 2, 5B and 9A2. It is expected that Roma and Egyptian communities will benefit less from the employment opportunities created by the Project than the majority of the population.

Evaluation of impacts significance

The sensitivity of impacts on vulnerable groups is considered as high along all sections of the Corriorr considering that their ability to change and adapt to the above mentioned impact is low Section 10 is exception to the above. It does not bisect any settlements and there is no possibility that vulnerable groups will be affected in relation to their access for services. Also along this section is not identified any representative of roma and egyptian community. The most affected vulenrable group along this section are owners of land with low income.

Considering "Conceptual Design Phase" of the Project, it was to early to determine all profile of vulnerable groups and the exact number of people will be directly affected. However the identified impacts applicable to non vulnerable population will be multiplied for vulnerable groups given their low ability to adopt and respond to impact effects.

Where presence of Roma and Egyptian community is high the magnitude of the impact for exclusion of employment opportunity will be major.

On the following table is presented the evaluation of impact on employment during construction phase per each of AIC Sections.

Table 3-22 Significance of the impacts on Vulnerable Groups during construction phase

Assessment threshold and SIGNIFICANCE per Section of Impacts during Construction phase on Vulnerable Groups									
Sections	**Overall Impacts**	**Chracterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Like	Minor	Slight
Section 2 New alignment + existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Definite	Major	Large
Section 3 Existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Likely	Moderate	Moderate
Section 4 New Alignment	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Unlikely	Minor	Slight
Section 5B New alignment	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Unlikely	Minor	Slight
Section 5C Existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Likely	Moderate	Moderate
Section 6+7 Existing Road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Major	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Reversible	Local	Long-term	Likely	Moderate	Moderate
Section 8									
Section 9A2 Existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Reversible	Local	Long-term	Likely	Major	Large
Section 9B2 New alignment + existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Large
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Likely	Minor	Slight
Section 10 New alignement	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Unlikely	Minor	Slight
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Unlikely	Minor	Slight
Section 11 Existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Moderate	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Unlikely	Minor	Slight
Section 12									
Section 13 A Existing road	Decreased accessibility to services	Negative	Direct	Reversible	Local	Medium-term	Definite	Moderate	Moderate
	Loss of Land/Property	Negative	Direct	Irreversible	Local	Long-term	Definite	Major	Large
	Exclusion from employment opportunities	Negative	Direct	Rreversible	Local	Long-term	Unlikely	Minor	Slight

Conclusion

Impact on vulnerable groups from decreased accessibility to services will be with large significance for the sections where settlements are bisected from the corridor. These are sections 1, 2, 3, 4, 5B, 5C, 6+7 and 9B2, moderate significance is expected for the sections 9A2, 11 and 13A, as no settlements are bisected along this section and some of the services and facilities are located within the settlement. However, in any emergency case vulnerable groups may face decreased accessibility for regional hospitals in Fier (Section 9A2) and Gjirokaster (Section 11 and 13A). Section 10 has a slight significance due to lower population density, hence lower presence of vulnerable groups.

Impacts from loss of Land and Property will have large significance along all sections, considering the size of surface of land and number of buildings that will be expropriated hence a high possibility for vulnerable groups to be affected. The magnitude of impact along sections 3, 10 and 11 will be moderate as lower surface of agricultural land and properties will be expropriated compared to other sections hence a lower number of vulnerable groups is expected to be exposed from this impact. However, the significance of the impact will be large considering low ability of these group to change. Impacts from exclusion from employment opportunities is High along section 2 and 9A2 where the highest number of Roma and Egyptian community is identified and the possibility they to be affected is high. Section 3, 5C and 6+7 has moderate significance as Roma and Egyptian community are present in the settlement of Fushe Milot and Fushe Mamuras (Section 3 of AIC), Gose e Madhe, Gose e Vogel, Zhame and Gramsh (Section 5C) and Lushnje and Savra (section 6+7 of AIC) but in a small persentage compared to section 2 and 9A2 of the Corridor.

Considering the results from above table the most significant effects on vulnerable groups will be from impact loss of land/property.

Operation Phase

- **Effects on livelihood and wellbeing**

Permanent land take will face negative impacts for subsistence farmers, female head of households, Roma and Egyptian community and households receiving economic assistance with consequences on livelihood for this groups. Vulnerable groups will face difficulties to adapt (due to scarce resources) and find new job and other source of income/livelihoods.

Split of settlements during operation of the motorway may cause negative impacts on wellbeing of vulnerable groups, resulting in difficulties to communicate with, and get support from, other members of community (social support network/family) as this support may be located in other side of the motorway.

Vulnerable groups will be very sensitive to the change and the magnitude is expected to be high along all Sections of the Corridor.

In the following table is presented the evaluation of impact on employment during construction phase per each Section of AIC.

Table 3-23 Significance of the impacts on Vulnerable Groups during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation Phase on Vulnerable Groups									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 2 New alignment + existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 3 Existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 4 New Alignment	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 5B New alignment	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 5C Existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 6+7 Existing Road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 8									
Section 9A2 Existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 9B2 New alignment + existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 10 New alignement	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 11 Existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large
Section 12									
Section 13 A Existing road	Effects on livelihood and wellbeing	Negative	Direct	Irreversible	Local	Long-term	Certain	Major	Large

Conclusion

The assessment of AIC impacts on vulnerable groups during operation phase, results with an average of a large significance, in all sections.

6.2.2.8 Workforce related impacts and Issues

Workforce related impacts address issues that are related with workers health and safety and also issues that are related to worker rights.

Impacts

The main sources of impacts on workforce during project implementation will come from non-compliance of measures determined by the Albanian legislation in force, which aim to guarantee health and safety at work and also non-compliance with legislation in force and international standards and practices in aspects of employment and work practices.

The main potential impacts from construction and operation of AIC that are identified in relation to workforce are described below

Construction Phase:

- Worker Health and Safety
- Worker rights

Operational Phase:

- Worker Health and Safety

Pre-Construction Phase

Although potential impacts on workers will take place during construction and operation phase, the pre-construction phase is very important. Required plans, policies, programs, clear arrangement for workers need to be in place during pre-construction phase. Non-implementation of standards prior to construction will affect worker safeguards against discrimination, workers' construction compounds, accommodation consultation and grievance mechanisms, security of workers' accommodation and similar issues. During this phase accommodation standards, occupational health and safety, worker's right, rules and obligations and employment standards should also be in place and communicated with incoming/recruited workforce. Also, all policies in relation to Human Resources, nondiscrimination and equal treatment in the workplace should be developed in clear and understandable language and be accessible to workers. Plans related to Emergency Preparedness and Construction Safety have to be developed prior to construction. A grievance mechanism for workers have to be developed.

Construction phase

- **Risk of health and safety of workers**

Construction activities may influence risks for worker health and safety which may result in injuries and fatalities. Risks may occur in a circumstances when engaged construction companies does not implement national and international standards related to worker health and safety. Among the most vulnerable for

accident at work are employees working informally and those with limited or without awareness of their rights. Exposure of workers involved in handling and management of waste is another risk associated with workers health and safety.

- **Violation of worker rights**

Impacts on worker rights are related to the non-implementation of safety measures in the workplace, the lack of a contract for the employees which clearly state the terms and conditions of their employment (informal employment), extended working hours, lack of health care, the right to annual holidays, non-full payment of social and health insurance, etc. Also, the practice in Albania shows that workplace grievance mechanisms are rarely used in practice. Despite some improvements on the Labor Code in 2015 this practice continues. In terms of informality, Labor Inspectorate data shows that employment market is less informal. However gray informality, or non-declaration of real salary, non-payment of work performed in late shifts, work during official holidays, not respecting weekly rest days, working overtime, are practices present in the labor market in Albania.

Therefore, there is a risk that some subcontractors / suppliers during AIC Project implementation may not be fully compliant with Albanian and international legal requirements related to labour conditions. Fear for losing the job and consequently deteriorating of living standards may influence workers decision so as not to require better working conditions. Among the most vulnerable to claim their rights will be the unqualified local workforce who find difficulties to find another job due to the lack of a qualification. Thus, a grievance mechanism must will be in place for workers, and the workers to be aware of its existence and encouraged to apply it throughout the period of project implementation.

Evaluation of Impacts Significance

The possibilities for injuries and fatalities during construction activities, as result of traffic movements, use of various work equipment, use of dynamite for opening tunnels, etc, will be of a major magnitude along all new sections of the corridor. This is due to exploitation of mountains and calcareous rocks, opening of tunnels along new sections and other activities of similar nature taking place on new sections.

Considering during the construction phase large number of employees will be unqualified work-force, the magnitude that workers may adapt to violation of their rights will be moderate. Community along the sections with high level of unemployment and low incomes, are more prone to be affected from this impact.

In the following table is presented the evaluation of impact on Workforce related impacts and issues during construction phase per each of AIC Sections.

Table 3-24 Significance of the impacts on Workforce during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction Phase on Workforce related Issues									
Sections	**Overall Impacts**	**Characterization Of Impacts**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Major	Large
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 2 New alignment + existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 3 Existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Moderate	Moderate
Section 4 New Alignment	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Major	Large
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 5B New alignment	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Major	Large
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 5C Existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 6+7 Existing Road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 8									
Section 9A2 Existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight
Section 9B2 New alignment + existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Major	Large
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Moderate	Moderate
Section 10 New alignement	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Major	Large
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Moderate	Moderate
Section 11 Existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Moderate	Moderate
Section 12									
Section 13 A Existing road	Risk for accidents of workers	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Violation of Worker Rights	Negative	Indirect	Reversible	Local	Long-term	Likely	Minor	Slight

Conclusion

Due to the construction works to be performed on steep slopes, opening of tunnels, viaducts and bridges along new sections of AIC (1, 4, 5B, 9B2 and 10) there is a higher risk for accidents of workers compared to the other section. The magnitude along new sections is estimated to be higher and the significance will be large without mitigation measures. The other sections (2, 3, 5C, 6+7, 9A2, 11 and 13A) will have moderate significance.

The impact significance from Violation of Workers rights will be moderate along Section 3, 9B2, Section 10 and Section 11. Due to the low level of incomes and high unemployment rate of the population along these sections there is a high possibility that individuals hired at local level may be unwilling to report issues that violate their rights, the sensitivity from this impact is high. Other sections will have a sligt significance.

Operational Phase

- **Motorway workers' safety during operation of motorway**

As result of traffic movement and the design speed of vehicle movement there is a possibility that safety workers to be affected. Here can be included safety of workers that are dealing with motorway operation and maintenance. However, the possibility for this impact to happen is reduced compared to construction phase, not only because of smaller number of temporary or permanent workers but also the activities that have to be undertaken (usage of less dangerous equipment tools).

Evaluation of Impact Significance

It was estimated that magnitude of impact that is related to motorway workers safety and worker rights without mitigation measures will be large negative.

In the following table is presented the evaluation of impact on employment during construction phase per each of AIC Section.

Table 3-25 Significance of the impacts on Workforce during operation phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Operation/Maintenance Phase on Workforce related Issues									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 2 New alignment + existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 3 Existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 4 New Alignment	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 5B New alignment	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 5C Existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 6+7 Existing Road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 8									
Section 9A2 Existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 9B2 New alignment + existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 10 New alignement	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 11 Existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
Section 12									
Section 13 A Existing road	Motorway workers safety	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large

Conclusion

The impact significance on Workers Health and Safety during operation of the motorway is considered as Large along all sections of the Corridor.

6.2.3.11 Cultural Heritage

Assessment of potential impacts caused by the project on cultural heritage assets has considered the impact on archaeological sites, impacts on monuments and, sites with intangible cultural heritage (ICH) value.

During the assessment of Project alternatives, the project tried to avoid as much as possible the direct impacts on cultural heritage sites by respecting a buffer zone of 100 meter from the monument (considering Minister Order no.297 'On Proclamation of Buffer Zones of Cultural Monuments).

There are 21 cultural monuments in the vicinity of the road corridor (considering 750 meters, each side of the road), but none of them is directly impacted by the Project. Sites with significant tourism potential in the focus area are: The Castle of Tepelena (Section 10, located 600 m far from the alignment) and Ruins of Antic Theatre 'Adrianopoli (Section 13A, located 590 m far from the alignment).

The minimum distance of monuments location from the road corridor is 141 m, in the section 13A. The identified cultural heritage sites, their location and importance within the established buffer zone of 2x750 meters along the road axis are described in this PESIA document; therefore, when changing the Alignment during next design phases, or during construction, when settling auxiliary facilities of temporary nature, these must be avoided.

However, it is possible that archaeological and cultural assets can be encountered along the corridor during the construction phase, especially in the southern part of the corridor, starting from section 9B2 in Qesarat to section 13A and this is testified by the abundance of cultural and historical artefacts and monuments, archaeological sites in the vicinity of the Corridor. Stakeholders consulted along this sections stated also the high possibility for chance finds along this sections.

Along Section 9B2 is found the Ancient settlement of Qesarat (approximately 250 m far from the section) which dates back since in the II century B.C, traces are found throughout the area of Qesarat village. This area contain heritage sites not yet revealed/registered.

The town of Tepelene along section 10 is an early settlement related with the construction of the castle of Tepelene which belong to IV-VI century. Here is found the Anctic-medieval bridge ruins in Vjosa river which belongs to the Century I. The territory has a rich cultural heritage, hence there is a possibility for chance finds along this section.

The area along section 13A has been inhabited since antiquity by the tribe of Chaonians. The most important archaeological sites along this section belong to the roman period. 6 cultural heritage sites along this section are located in a closer distance (up to 200 m) from the alignment. Artefacts testifies that there are still undiscovered graves in the settlement of Sofratike.

There was an issue raised during consultation with local stakeholders (representatives of adm.unit Balldren) in section 1 of the AIC, they stated that there is a risk that cemetery near the settlement of Balldren may

be directly affected from project implementation, In order to avoid community tensions they suggested to change the alignment during next phase of the project.

As with other impacts, the Sections 8 and 12 are not considered, because their studies are already approved.

Impacts

Impacts during Pre-construction

The lack of adequate information on Cultural Heritage sites may lead to impact on cultural heritage sites. Week or superficial studies on the next phase (profound ESIA), will lead to propose not effective measures to save case findings.

Thus, the following sources should be examined as part of profound ESIAs;

- Preconstruction surveys on cultural heritage sites located in the wider area of the AIC project in order to avoid known cultural heritage sites;
- Inventories of sites, classified according to applicable legislation;
- Revision of legislation restriction on certain cultural heritage categories;
- Implementation of a Chance Finds Procedure.

Construction Phase

The main sources which will contribute in impacts on cultural heritage sites, during the construction phase are: Site preparation activities associated with Project facilities (including vegetation and topsoil removal, grading, and excavation), construction of access roads with construction site, construction of temporary facilities such as working camps, pollution and vibration, movement of heavy vehicles, equipment and personnel.

Direct physical impacts are mainly anticipated to occur during the construction phase of the Project.

- **Damage or destroy of non-identified buried archaeological sites (chance finds)**

Non-identified archaeological sites are likely to exist, but their presence may only be revealed with ground-disturbing activities. Ground-disturbing activities have the potential to destroy archaeological resources, or crush and distort subsurface archaeological resources, which can cause loss of the scientific and historic value of the remains. Disturbance of, or damage to, cultural heritage sites may occur during construction of roads that connects with construction camps and other Project logistics. This impact may occur along the entire route of the Project, but especially from Section 9B2 up to section 13A, considering high potential of the area in terms of cultural heritage assets.

- **Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration**

Blasting, hammering, the operation of heavy machinery and the movement of vehicles along unpaved areas, are likely to produce vibration and pollution impacts, which will be more significant during construction phase. Ruins, national monuments, or historic buildings, may be at risk of degradation due to

vibration. Above-ground cultural heritage sites will be impacted from dust/emission and vibration due to operation of machinery, heavy vehicle traffic, and high-impacts activities such as blasting and hammering. Dust and soot concentration on cultural monuments may cause discoloration and corrosion of building material. These impacts will be most significant during the construction phase, particularly for the cemetery located close to the corridor, in village Balldren (section 1 of AIC) and for monuments which are located closer to the Corridor, such as these located along the section 13A, 5 monuments are located in a distance between 140 to 200 m far away from the construction site. Here are included also impacts on sanctuary monuments/cemetery

- **Disruption/Changes in Access of Users Accessibility to Cultural Heritage Sites (CHS)**

This type of indirect impact is most likely to occur during the construction phase and not anticipated to occur during the operations phase. Considering the importance of monuments identified in the project focus area of the AIC (all cultural heritage sites are included on the protected monument list and are of national importance) construction activities may affect researchers and ICH users. Section 13A has significant tourism potential (touristic sites that receive visitors) and with ICH value will be more sensitive from impacts on cultural heritage sites during construction. In some cases, Project construction activities may obstruct visitor access to the aforementioned cultural heritage sites which indirectly will temporarily impact local economy during construction phase. Disruption of access may lead to decrease on the number of tourists, which use local markets services and restaurants. This impact will have will be limited only for Section 13A considering location of Antic Theater along this section, which is an important cultural heritage site and which attract visitors. This impact considers also effect on sanctuary monuments/cemetery.

- **Plundering of the archeological sites**

Plundering of buried archaeological sites from workers during construction phase and also from community settled in proximity to the construction site may possible happen along the entire AIC road corridor, but has high potential to happen from Section 9B2 to 13A, as the area is known for high archaeological potential.

Evaluation of Impact Significance on Cultural Heritage Sites

The criteria for determining the value/importance of cultural heritage sites has considered the importance if the site is known by local community or in regional/national level and its value for research/scientific studies and identity, its inclusion on the protected monument list and potential possibility for chance finds.

In case of destruction/damage of archaeological sites, the magnitude of the impact would depend on the importance of the site and it will be assessed by an expert archaeologist. Along sections where there is a high possibility for chance finds and assuming they were destroyed by construction works, the magnitude of the impact would be major, as the integrity of the resource would be lost.

The significance of the impact from plundering of burried archaeological sites has been considered large along sections where there is a high possibility for chance finds, as the effect of poaching would result in a significant loss of the resource, and may affect the integrity of the site.

The significance of the impact Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration will be large in case the site is of high importance and its damage will loss its integrity.

The significance of the impact on disruption of users access to CHS impact will be moderate in case the acces in limited due to construction activities or changed access for important cultural heritage sites (known localy or in regional/national level).

In the following table is summarized the assessment and significance of each impact on cultural heritage sites per 13 sections of AIC. In case that any of abovementioned impacts may not occur in any section of AIC, in the table is presented as Not/Applied (N/A).

Table 3-26 Significance of the impacts on Cultural Heritage Sites during construction phase

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Cultural Heritage Sites									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 1 New alignment + existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Moderate
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Moderate	Moderate
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 2 New alignment + existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	High	Slight	Slight
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Slight	Slight
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 3 Existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 4 New Alignment	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	High	Minor	Slight
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Minor	Slight
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 5B New alignment	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 5C Existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Cultural Heritage Sites									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 6+7 Existing Road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 8									
Section 9A2 Existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Minor	Slight
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Impacts on Local Economy	Negative	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 9B2 New alignment + existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	Likely	Minor	Slight
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Minor	Moderate
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Major	Large
Section 10 New alignement	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Moderate	Moderate
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	Likely	Minor	Slight
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Minor	Slight
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Major	Moderate
Section 11 Existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Permanent	Likely	Moderate	Moderate
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Disruption of User Access to Cultural Heritage Sites (CHS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Minor	Slight
Section 12									

Assessment threshold and SIGNIFICANCE per Section, of Impacts during Construction phase on Cultural Heritage Sites									
Sections	**Overall Impacts**	**Characterization of Impact**	**Type of the impact**	**Reversibility**	**Spatial extent**	**Duration**	**Likelihood**	**Magnitude**	**Significance**
Section 13 Existing road	Damage or destroy of non-identified burried archaeological sites (chance finds)	Negative	Direct	Irreversible	National	Long-term	Likely	Major	Large
	Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration	Negative	Direct	Irreversible	Local	Long-term	Likely	Moderate	Slight
	Disruption of User Access to Cultural Heritage Sites (CHS)	Negative	Indirect	Rreversible	National	Medium-term	Likely	Moderate	Moderate
	Plundering of the archeological sites	Negative	Indirect	Irreversible	Local	Long-term	Likely	Major	Large

Conclusion

The significance of the impact 'damage or destroy of buried archaeological site' will be large considering the high potential value of the archaeological site along the Section 9B2 and 13A and the potential major magnitude of the impact**.** This impact will have moderate significance along Section 2 and 10 and slight significance along other sections of the Corridor A-I.

Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration will have slight significance along all section considering that the closure monument is far than 100 m form the corridor.

Disruption of User Access to Cultural Heritage Sites (CHS) will have moderate significance along section 13A as the impact will emerge for a short-time period. Section 2 will have also moderate significance although changes in access will be substantive as it will increase the time to access the cemetery, they will be for a short time period. In other sections the impacts significance on Cultural Heritage will be slight.

Operational/Maintenance Phase

The main sources which may contribute in impacts on cultural heritage sites, during the operation phase are: Pollution and vibration, movement of vehicles, equipment and personnel, excavation activities for maintenance and repair, etc.

During this phase no damage or physical disturbance is expected to occur to the cultural heritage sites. Considering the baseline data for known cultural heritage sites and the distance of sites location (the closer CH site is more than 140m and more far) from AIC corridor, vibration and pollution of sites from traffic will not be significant. However, the monitoring of cultural heritage sources will continue during operation. It is not anticipated the disruption of users access to the cultural heritage sites to take place during this phase of the Project.

Summary of Impacts on Cultural Heritage Sites

During the assessment of AIC road track, and from consultation with representatives from Institute of Cultural Monuments, all possible efforts took place to avoid the direct physical impacts on known cultural heritage sites. This was done by respecting the buffer zone of 100 meter from the monument (considering Minister Order no.297 'On Proclamation of Buffer Zones of Cultural Monuments). However, some monuments and archaeologic sites remain in the vicinity of the road track. Therefore, the possibility for chance finds during construction remain high, mainly in section 9B2 and 13A.

The significance on Cultural Heritage is considered large along section 9B2 and section 13A.

The overall assessment of significance for impacts on Socio-economic Parameter per each Section of the A-I Corridor

In the following table is shown the overall significance of impacts per each socio-economic parameter, in relation to AIC project

The significance level is expressed by colors as below:

- Significance large/very large
- Significance moderate
- Significance minor to moderate
- Significance slight

The average of the impact's significance of each parameter in any of sections, is expressed as the overall summarized impacts in the first column with the same indicator colors as those used per parameters.

- The average of Impacts in sections 1, 4, 5B and 9B2, results of a large significance,
- The average on impacts in sections 2, 3, 5C, 6, 7, 9A2, 10-13, results of a moderate significance.
- Not any impact on AIC sections has an average of minor to moderate or slight significance

Table 3-27 Overall impacts significance per Socio-economic parameters and AIC Sections

Summary of Impact Significance per AIC Section	Land and Property (negative significance)	Community Health, Safety and Security (negative significance)	Community Tensions (negative significance)	Access and Severance (Both beneficial or negative significance)	Economy (positive significance)	Employment (positive significance)	Education and training (positive significance)	Vulnerable Groups (negative significance)	Workforce related impacts and Issues (negative significance)	Cultural Heritage (negative significance)
Section 1										
Section 2										
Section 3										
Section 4										
Section 5B										
Section 5C										
Section 6+7										
Section 9A2										
Section 9B2										
Section 10										
Section 11										
Section 13A										

6.2.3.12 Socio-Cultural Mitigation measures

Land and Property

Avoiding as much as possible impacts on private assets, is the main and first step to be considered during preconstruction phase. Also, for successful AIC project implementation, it is necessary that during the next stages of the Project the detailed designs and profound ESIAs per sections, should be joined by Social Impact Assessments (SIAs) or Social Management Plans (SMPs). An update of Baseline conditions in relation to Land Use and Land Property, reflected in a detailed SAP and RAP, should be carried out. Social surveys per each section of AIC, will define the level of incomes and number of household that relies only in incomes from land and number of subsistence farming and proportion of land they possess, magnitude of impact on families and businesses should be defined as well.

Implementation of Census will record all individuals, households and businesses (formal and informal) who will be physically and/or economically displaced by the project. Along with profound ESIAs other Studies, Plans, Mechanism and Inventories should be developed and updated, such as: Update of LARF, RAP, SEP and grievance mechanisms, LARP and development of expropriation study should include also compensation for fragmented small parcel which can be used by the state for afforestration.

During operation phase implementation of a right and fair RAP, as well as implementation of Albanian legislation on temporary or definitive expropriation remains the most important mitigation measure for Grievance mechanisms. Additional assitance should be given to the affected people/entities, for restoring their standards on leaving and working, at least to same conditions as prior starting of the project implementation. If not possible to avoid, strict and correct restauration of the temporaty damaged/destroyed assets, is obligatory mitigation measure that needs to be applied.

During operation phase, impacts on land proprieties are lower and so are the mitigation measures. In cases of right greviances of owners with affected proprieties and not right compensed, the procedures will go on according the Albanian legislation (or International requirements if the project is financed by international funds). Affected people should be recompensed also for the time and expenditures they lost to require their rights.

Community Health, Safety and Security

In order to avoid and mitigate the impacts that will be generated during construction and operational phase, plans, agreements and procedural management plans for HSS, have to be finalized and approved. EPRP and TMPs, remains crucial documents, to be applied for each of the sections. Proposal and approval of temporary roads and access, in cases that existing ones will be affected by construction/operation, should be done, only after agreements with local community and their representatives. Training of guards and advisors etc., should be included in trainings program, before starting construction works.

During construction phase strict implementation of the plans developed in pre-construction phase related to HSS should take place. This need to be joined by useful information on changes of traffic or other available infrastructure used to inform the community. Both the community and the workers should be informed about the impacts that can be generated by AIC construction and operation. Also, correct implementation of training and information procedures and monitoring of the health and security conditions of workers and community is required to take place regularly and throughout project implementation

phases. Strict application of grievance mechanisms, will help the interested persons/entities to demand protection of their rights for good health, safety and security.

The safeguard measures due to possible impacts by road operation, public and users information on dangers for trespassing the road, traffic rules etc., should be joined by appropriate signage, during operation phase. Public and drivers "guides on safe performance", should be also implemented during this phase.

Frequent monitoring process should join all operation phase, focused on pollution and effects in community of air/soils/waters pollution, according to the approved monitoring program. Barriers, draining systems and collectors, frequent cleaning and disinfection of collectors etc., are some of the mitigation measures on health impacts, already described in Mitigation measures of Natural environments.

Community Tensions

The community tension, is a very important negative impact, that is quite dependent from the other impacts and result as the sum of the tensions create by several and different impacts counted in the social and environmental part.

Bad or inappropriate behave of workers, coming from other areas, may create community insults, which may lead to very extreme actions. Information of workers, coming from other sites/counties, on community habits and heritage, its religion etc, as well as informing they, on risk that can be faced in case of incidents. Resettlement and compensations, should be quite fair, "avoiding differences, between the identic". The community, should be clearly noticed and informed on the priority of vulnerable groups or persons, and the "parity between similar". During consultant field visits, the suspicion on delay of the compensations, till the roads have started operation, was a major disclaim of several community. An intensive public awareness, on clarification of boundaries, registering of ownership titles, defining of the share between families according the Albanian legislation etc., should be done before starting construction works. Way to temporary compensate or ensure the shelter for informal settlements/activities (almost sections 4 and 5B), are recommended to be proposed and possibly agreed before starting the construction works.

Awareness campaign, should be implemented prior starting the construction works to such affected groups. A Grievance Mechanism must be put in place in order to receive and facilitate all complaints from community throughout the Project life-cycle. During construction phase, well defined and announced measurs of the limited regime during works and in working campus must be implemented. Also, penallties to the workers that do not respect the rregulations on behavor with local community and their herritage and costums will be implemented. Community disturbance by noises, air pollution, soil and water pollution, impacts on infrastructure etc should be avoided to the extent possible.

Public awareness on rregulation for workers, and handling of raised greviances, will help to controll and relax of community tensions. Tensions by life risk, health issues, disturbance from traffic and related issues, will be mitigated, by stricti implementation of Albanian legislation on safety and health security, implement measures to reduce pollution/contamination by traffic, and improve frequently the infrastructure and its access if needed.

Access and Severance

Plans and designs should be well defined, to implement effective access in infrastructure, for all settlements/community, which infrastructure will be damaged by AIC project implementation. An inventory of existing infrastructure and its use, access to temporary new ones, in case of temporary damage, or

definitive one, if the impacts is residual, should be prepare before starting compensation and re-organization of new infrastructure.

All decisions should be done in collaboration with community, and compensation may be involved. In case of temporary accidents during construction, guides should be done to stop works till the damaged infrastructure is replaced or restored. Access roads, water and electricity net, telecommunication, irrigation and draining systems, access to agricultural lands, paths or sites for farm animals grazing etc. that will be affected or totally destroyed, should be constructed prior starting the construction works.

A traffic management plan, should be prepared in case of temporary roads or access roads for construction purposes. Applying of reporting and grievance procedures are crucial before starting construction works.

During construction phase, strict implementation of traffic management plan and risk assessment during construction woks will mitigate seriously impacts on accessibility and severance. Public notification for any infrastructure related concerns, will be part of the constructure rregulations during construction works. Minimization of impacts on infrastructure, and restore in a shorter possible time, such impacts, will join all construction phase. Immediate interruption of works in case of incidental damage of the infrastructure, and restauration of damaged infrastructure, may be joined also, by compensation measures. The maintenance of accessibility and infrastructure, related to impacts or effects of AIC operation, will join also the operation phase. Mitigation measures described below, will be implemented also during maintenance phase.

Economy

People should be aware on the expected positive impacts in economy, by AIC construction and operation. A detailed strategy, should be prepared to maximize the benefits of local and regional community, as well as in national level, by project implementation. All businesses and farmers, should be informed prior starting the construction, on opportunities for involvement (markets, bio-products etc) and chances to profit during construction and operation phase. A general strategy, should be prepared and approved, on involvement of local/regional business, as much as possible in construction/operation phases. Training to local/regional business, should be implemented on expected works, their qualities, market demands and challenges etc.

Chances should be given to the entities/persons affected negatively by the project development, to restart the activity on which they/he was based prior the construction works. Compensations in such cases should be joined by credits, till the activity of entity will be stabilized. Inviting local/regional/national entities/persons, to be involved in construction process, exploitation and furnish with the appropriate raw material, domestic furniture for workers, food etc., will help the local/regional and national interested parties to challenge foreign entities, in involvement on construction works and related activities.

Incite opening of the temporary services, which will serve for workers maintenance, relax, recreation, food and drinks. During operation phase, an open awareness and publicity to incite visits in different sites/regions along the AIC, will be implemented, to attract the foreign visitors. Inciting of local community and assisting with credits their initiatives to incest on facilities related to AIC, services, coffee/restaurants, oil stations etc., will be a priority of local/regional governments during operation phase

Employment

Employment is the major positive impact during project implementation and operation. An employment action plan, should be prepared, focused almost on local community etc. Trainings of such community remains crucial for successful implementation of such action plan. A recruitment plan, should clarify, how will be implemented a fair and "know how - based", the selection of training and employed individuals, considering the priority of women employment. During construction phase, involve firstly the affected people/entities, their vulnerable groups and local community on trainings and employment for construction works will be crucial. Strictly implement the local recruitment plan, and update it according to grievances may mitigate additional or not identified impacts. Engagement of women workforce, in appropriate jobs with their physical and know how capabilities, should be implemented from training season (pre-construction phase), till during of all implementation phases. During the operation phase, the employment will be reduced at services in both sides or related to AIC and maintenance services, monitoring process etc.

Education and Training

Detailed plans of training focus, methodologies, organization and for selection of the bests for employment, should be prepared prior starting the construction works. Such plans should be well published in different forms, to be appropriate with local community possibility to access the information. Awareness, should be part of all training phase, on HSS measures, working conditions and requirements, working hours and holidays, the rights of the workers and ways to complain etc. Training of trainers, before starting the training season for employments, will help supervisors and managers to be responsible to utilize available resources to train, qualify, and develop their employees. Training on the job, will join all first seasons, of construction phase activities. Training on environmental and social protection, should be part of the trainings seasons for trainers and employs. Trainings on contingency plan and reactions, will be developed also during operation phase. Also, trainings on environmental/social protection, should be in-separate part during this phase.

Vulnerable Groups

Identification of vulnerable groups, the indirect and direct impacts on them, their possibility on involvement on the process, their priority for compensation etc., should be part of the RAP. Also, all aspects in relation to vulnerable groups should also be considered during preparation of Employment Strategy. In addition, methods for communication with vulnerable groups should be determined prior to construction activities.

During construction phase, strict implementing of provisional measures to minimise any impacts of accessibility and infrastructure, health and safety, impacts on land and assets etc., to vulnerable groups/persons, is required. Employments in appropriate jobs of affected vulnerable goups or persons will join all seasons of construction works. Women households, disabled people, etc, will have priority on such employments. Compensation measures, should join their incidental impacts, overall edlers etc. Frequent observation, will be done on the evolution of vulnerable groups health, finance etc, during construction phase.

Workforce related impacts and Issues

Preconstruction phase, is very important regarding to human resources, non-discrimination and equal treatment in the workplace. Worker rights should be presented in clear form, appropriate form (understandable and accessible to workers) and a Plan related with workers accommodation and Occupational Health and Safety, Emergency Preparedness and Construction Safety have to be developed prior to construction. A grievance mechanism plan for workers have to be developed. During construction phase, the right and fair adaptation of human resource policies, implementation of non- discrimination and equal treatment, respecting of traditions and lifestyle of the community, avoiding their disturbance etc., will be applied. Promoting of appropriate and hospitality habits of community, and incite preferences for communication and join activities during holidays, between local community and workforce. Independent grievance mechanisms will be implemented for both local community and workers. The strict and correct implementation of Occupational HSS and Construction SP, will be implemented by contractor. The above mentioned mitigation measures, will be implemented also during operation phase, on AIC maintenance works and services relating AIC operation.

Cultural Heritage

A closed collaboration between contractor and Regional/national authority/local community for cultural monuments on preconstruction phase, that are close to AIC alignment. Researches should be developed by specialized national/regional institutions on heritage/cultural monuments that are buried and not yet discovered. A detailed Action Plan, should be prepared on sites, where important heritage monuments can be found, to avoid their un-voluntary destruction. Consultation with local community and their representatives, should be done during selection of alternatives (Profound ESIA), to avoid impacts on cultural heritage sites, cemeteries, religious settlements, traditional religious or recreational sites etc. Full implementation of the Cultural Heritage Management/Action Plan, will join all stages of construction phase. In case of unexpected discovery of heritage/cultural values, the works will be interrupted, and will not restart till the procedures required by Albanian legislation, to be implemented. For any discovery the contractor should record and notice Local/Regional or national authorities, and then follow their instructions. Information on cultural heritage and historical/religious monuments, recreational areas, and Natural PAS, on AIC users, will be promoted to any season, to attract the visitors, businessman etc, to visits sites in vicinity of the AIC sections, during operation phase.

In the following tables are summarized the socio-economic potential impacts and mitigation measures that will be taken prior to construction and during construction and operational phases.

Table 3-28. Impacts and Mitigation Measures on Socio Economic parameters during Pre-Construction Phase

PRE-CONSTRUCTION PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	Potential sources	Impacts	**Measure to address the impact**	**Significance of Mitigation measures according Sections**
Land and Property	▪ Not adequate data on RAP report ▪ Missing of adequate information ▪ Missing of appropriate studies and Development Plans	▪ Physical displacement and loss of shelter ▪ Loss of land ▪ Economic displacement and loss of income (loss of economic structures, loss of crops) ▪ Loss of livelihood ▪ Grievances and social tensions. ▪ Delay of project implementation	▪ Preparation of Profound ESIAs per each section of the AIC ▪ Update Baseline with focus on Land Use and Land Take; ▪ Update of the baseline socio-economic surveys to identify vulnerable groups that may be impacted by the Projects, changes to access, road safety, people potentially losing land, property, business premises or income due to the project; ▪ Update LARF, SEP and grievance mechanisms; ▪ Development of Expropriation study ▪ Undertake Census and record all individuals, households and businesses who will be physically and/or economically ▪ Conduct Valuation and Asset Inventory; ▪ Prepare preliminary Resettlement Action Plan and Livelihood Restoration Plan ▪ Ensure that the affected families are duly in accordance with the Resettlement Compensation Framework; ▪ Ensure housing of informal owners for a period until they find possibilities to relocate ▪ Providing assistance in mediation between the administration offices to speed up procedures and provide ownership documentation to be part of expropriation process	• **Large significance – Section 1,4,5B, 9B2** • **Moderate to large significance – Section 5C, 6+7, 9A2, 13A** • **Moderate Significance – Section 2,3, 10,11,13A**
Community Health, Safety and Security	▪ Affected Community ▪ Workers, during construction period and maintenance activities	▪ Damage on health, life risk and security, by missing or wright HHS regulations ▪ Lack of appropriate documentation and management plan of infrastructure, protection of cultural monuments,	▪ Obtain all necessary permits from responsible institutions responsible for urban planning, communal works, forestry management, water protection, electricity and telecommunication, natural gas supply network and cultural heritage protection; ▪ Involve communities, Public awareness campaign, ▪ Fence hazardous areas	• **Large significance – Section 1,4,5B,9B2** • **Moderate to large Significance – Section 2,3,5C,6+7,** • **Moderate significance – Section 9A2,11, 13A**

PRE-CONSTRUCTION PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	Potential sources	Impacts	**Measure to address the impact**	**Significance of Mitigation measures according Sections**
		contingency and traffic plans, SIA/SAP, may lead at wrong project implementation, grievances and project delay.	▪ Develop and endorse Health & Safety (H&S) Plan, Emergency Preparedness and Response Plan (EPRP) and Traffic Management Plan (TMP) ▪ Main Design studies for construction of the AIC Sections will be developed and revised according the national legislation on construction and best construction practice as well environmental requirements and pollution prevention principles; ▪ Development of pedestrian/vehicle crossings based on results from community consultation and update of the mitigation measures ▪ Development of Community health and safety educational programme. ▪ Information of Residents in relation to restricted activities (stockbreeding, hunting, harvesting of forest food and recreational activities) within the motorway belt area ▪ Training and guidance of workers and sign of a labour code of conduct ▪ Adequate selection of qualified security guards with appropriate training; ▪ Implementation of all proposed preventive, mitigation and compensation measures included within the ESIAs.	• **Slight Significance – Section 10**
Community Tensions	▪ Rumour induced conflicts and inadequacy of information ▪ Uncertainty about Project commencement and timelines ▪ Competition for employment opportunities, services	▪ Community and implementers conflicts ▪ Grievances ▪ Project delay or jeopardise,	▪ Preparation of an adequate RAP and compensation plan. ▪ Prepare and implement training and guidance for workers and sign a labour code of conduct ▪ Positioning of Worker camps outside the settlements area ▪ Development of a Local Workforce Recruitment ▪ Assistance for households without legal ownership documentation (mentioned as land and property parameter)	• **Large significance – Section 1,4,5B,9B2** • **Moderate Significance – Section 2,3,5C,6+7,9A2,11,13A** • **Slight to moderate Significance – Section 10**

PRE-CONSTRUCTION PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	Potential sources	Impacts	**Measure to address the impact**	**Significance of Mitigation measures according Sections**
Access and Severance	▪ Not adequate studies of Technical design and profound ESIA on accessibility, restoration of infrastructure damaged accidentally, etc. ▪ Lack of effective consultancy with local community and related Municipalities.	▪ Accessibility fragmentation, ▪ Risk for delays on health and safety actions. ▪ Local community insecurity. ▪ Damage of project implementation authorities on expected mitigation measures and positive impacts, during construction and operation phase.	▪ Development of Traffic Management Plan ▪ Assessment of Risks from the construction work ▪ Identification of all public roads and paths that will be affected and proposal for the travel routes during the construction period ▪ Prepare the plan for signing of the construction area, new directions, ring roads, access roads ▪ Preparing a Plan for assessing public utilities	• **Large significance – Section 1,4,5B,9B2** • **Moderate to Large Significance – Section, 5C, 6+7, 9A2, 13A** • **Moderate significance – section 3 and 11** • **Slight to Moderate Significance – Section 10**
Economy	▪ Construction and Operation of AIC	▪ Development of a not effective project, according expected benefits.	▪ Inform people in a timely manner about the possible impacts on economic activity in surrounding areas and expected timings of impacts ▪ Inform in a timely manner, the bussines and other interested parties, on possibilities of collaboration with the project during both; construction and operation phase.	• **Large Significance – Section 1,2,3,4,5B,5C,6+7,9A2 Moderate Significance – Section 9B2, 10, 11**
Employment	▪ Not appropriate communication strategies and recruitment plans on local employment ▪ Missing of adequate information and calls for trainings and job opportunities. ▪ Discrimination of local communities. ▪ Economical discrimination	▪ Damage on incomes and standard life level of local/regional community. ▪ Grievances. ▪ Disturbance and delays to project implementation	▪ Develop Local communication and information strategies and recruitment plan ▪ Respect the priority on employment, considering affected families and vulnerable groups, census outcomes, etc. ▪ Realize effective training seasons in respect with project needs and local community capacities. ▪ Development of an Employment Strategy which outline a fair and transparent requirement proccess.	• **Large Significance Section 1,4,5B, 9B2,10** • **Moderate Significance – Section 2,3,4,5,6+7,9A2,11,13A**

PRE-CONSTRUCTION PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	Potential sources	Impacts	**Measure to address the impact**	**Significance of Mitigation measures according Sections**
Education and Training	▪ Employment opportunities exposure to modern management and logistics procedures ▪ Transfer of new technologies and new skills	▪ Not adequate training technologies and methodologies.	▪ Use of available resources to train, qualify, and develop the employees. ▪ Planning and organization of On-the-job training ▪ Training of trainers for training capacities and related methodologies of local community	• **Slight Significance – All Sections**
Vulnerable Groups	▪ Construction works ▪ Lack of information ▪ Trespass of construction site	▪ Damage standard life levels of vulnerable groups. ▪ Grievances ▪ Project delay	▪ Clearly recording and correct focus on vulnerable groups/individuals ▪ Defining of appropriate method of Project communications with vulnerable group; ▪ Temporary land take from sensitive land uses will be avoided as far as possible. ▪ Compensation in accordance with the Resettlement Compensation Framework. Update of Mitigation Measures in light of findings of survey ▪ Additional assistance to be provided for vulnerable groups who will be resettled ▪ Where identified roma settlements/camps and presence of egyptian community to be included together wit local leaders on advertisement effert for new job opening. ▪ Put in place employment mechanism to ensure non discrimination o employes based on his his or her gender, ethnicityy, age,etc	▪ **Large Significance Section 1,2,3,4,5B, 5C, 6+7, 9A2, 9B2,** ▪ **Moderate Significance – Section 10, 11 and 13A**

PRE-CONSTRUCTION PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	Potential sources	Impacts	**Measure to address the impact**	**Significance of Mitigation measures according Sections**
Workforce related impacts and Issues	▪ Lack on information on local community behaviours, traditions, religions, habits etc. ▪ Missing of training for environmental and social protection etc.	▪ Health, safety and security issues on workforce. ▪ Insecurity of workforce on their work site or campus. ▪ Conflicts between workforce and local community ▪ Pollution of soils, air and water sources. ▪ Project delay	▪ Information plans and short training seasons on communication and behaviour with local community ▪ Design sites to be fenced hazardous areas ▪ Develop and endorse Health & Safety (H&S) Plan, Emergency Preparedness and Response Plan (EPRP) and Traffic Management Plan (TMP). ▪ Inform workforces on local community habits, traditions and expected concerns. ▪ Define proper place and fence work campus. ▪ Organize common parties with join workforce and local community	• **Large Significance Section 1,4,5B,9B2,10** • **Moderate Significance – Section 2,3,5C,6+7,9A2,11,13A**
Cultural Heritage	▪ Construction works ▪ Lack of adequate information on Cultural Heritage sites ▪ Not proper collaboration of consultant with National/Regional Cultural and historical authorities, ▪ Not proper collaboration of consultant with Affected Municipalities.	▪ Not appropriate surveys and definition of sites with possible uncovered cultural/traditional monuments. ▪ Preparation of an Archaeological Action Plan in Sections 9B2 and 13.	▪ Undertake an archaeological monitoring survey ▪ The construction works should not begin until all relevant permits are not provided by the responsible institution, Ministry of Culture. The archaeologists appointed to the monitoring survey shall hold a valid archaeological research license; ▪ Cultural Heritage Management Plan shall be developed before construction works start ▪ Training for construction workers to foster their awareness on the importance of protecting cultural heritage sites	• **Large Significance 13 9B2** • **Moderate Significance Section 1 and 10** • **Slight Significance – Section 2,3,4,5B,5C,6+7,9A2,11**

Table 3-29 Impacts and Mitigation Measures on Socio Economic and Cultural parameters during Construction Phase

CONSTRUCTION PHASE SOCIAL AND CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Land and Property	▪ Land take for Borrow Pits & Landfills ▪ Heavy equipment operations ▪ Removing trees ▪ Temporary occupation of pasture areas ▪ Temporary occupation on sensitive land uses	▪ Temporary Loss of Land ▪ Temporary Loss of Livelihood ▪ Permanent Loss of Land ▪ Permanent Loss of Housing/Commercial units (Pysical Displacement) ▪ Loss of Livelihood from Land Fragmentation	▪ Implementation of Grievance mechanisms ▪ Additional assistance for the people who will be resettled for restoring their standards of living and further improve them where possible; ▪ Activities to reinstated of land in its pre- construction conditions. Erosion control measures, re-contouring the land, replacing the topsoil, re-vegetation, restoration of habitats, regaining its previous use. ▪ Temporary land take from sensitive land uses will be avoided as far as possible.	• **Large significance – Section 1,4,5B, 9B2** • **Moderate to large significance – Section 5C, 6+7, 9A2, 13A** • **Moderate Significance – Section 2,3, 10,11,13A**
Community Health, Safety and Security	▪ Non carefully driving (low speed) near the working areas. ▪ Construction works and related activities ▪ Transport and communication	▪ Increased community exposure to disease transmission ▪ Increased risk for inguries during trespass of construction site ▪ Increase on additional burden on health care facilities Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	▪ Monitor implementation of the plans developed in pre-construction phase; ▪ Informative announcements on traffic control and safety through the local radio/TV. ▪ Keep informed on an open and transparent manner the affected residents for planned activities; ▪ Coordination of traffic flow through the site and within the urban areas ▪ Design of measures to avoid unauthorized entry into contractor's facilities ▪ Applying of health protective measures such as; face covering, gloves, social distancing and smaller number of team members is case of pandemic situation ▪ Monitor implementation of adopted preventive, mitigation and compensation measures reflected in ESIA	• **Large significance – Section 1,4,5B,9B2** • **Moderate to large Significance – Section 2,3,5C,6+7,** • **Moderate significance – Section 9A2,11, 13A** • **Slight Significance – Section 10**

CONSTRUCTION PHASE SOCIAL AND CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
			▪ Provision of primary health care and first aid at construction camp sites. ▪ Undertake of stakeholder engagement and grievance mechanism	
Community Tensions	▪ Community grievances ▪ Bad management of workforce ▪ Bad or un appropriate behaviour of workforce ▪ Pollution/contamination and local community disturbance	▪ Impact from the influx of temporary workers ▪ Community tensions to the disturbance arising from the construction works ▪ Demographic stress	▪ Limited regime and well organized of movement of workers in the area around the construction sites. ▪ Strengthening of public/administration awareness (Local Self Government, medias, NGO`s) ▪ Handling increased grievances ▪ Public information on disruptions from construction works ▪ Clear information from the project in relation to the number and duration of employment opportunities	• **Large significance – Section 1,4,5B,9B2** • **Moderate Significance – Section 2,3,5C,6+7,9A2,11,13A** • **Slight to moderate Significance – Section 10**
Access and Severance	▪ Fragmentation of communication and road access. ▪ Delay on response to emergency cases ▪ Difficulties to access daily the community to reach the working sites, educational/religious institutions etc.	▪ Disruption of access and damage to infrastructure and utilities ▪ Impacts on access to agricultural land and disruption of Irrigation and Draining channels	▪ Implementation of Traffic Management Plan ▪ Risk assessment from the construction work ▪ Minimization of the traffic disturbance; ▪ Signing of the construction area, ▪ Public notification of any traffic-related concerns ▪ Development of a flood controlling Plan ▪ Close collaboration with afected community in case of disruption of irrigation and draining channels	• **Large significance – Section 1,4,5B,9B2** • **Moderate to Large Significance – Section, 5C, 6+7, 9A2, 13A** • **Moderate significance – section 3 and 11** • **Slight to Moderate Significance – Section 10**

CONSTRUCTION PHASE SOCIAL AND CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
	▪ Interruption of telecom, internet, electricity and water net ▪ Interruption of functioning of irrigation/draining channels.		▪ Rehabilitiation of channels at pre-construction status ▪ Grievance mechanism	
Economy	▪ Good and active publicity on possibilities of business to collaborate with construction contractors (raw materials, services and recreational activities)	▪ Economic growth at local level	▪ Inform people in a timely manner about the possible impacts on economic activity in surrounding areas and expected timings of impacts	• **Large Significance – Section 1,2,3,4,5B,5C,6+7,9A2 Moderate Significance – Section 9B2, 10, 11**
Employment	▪ Training of local and regional communities on expected construction works ▪ Local and regional community employment ▪ Giving priority of employment to household women	▪ Benefits from creation of local employment	▪ Implement Local recruitment plan; ▪ Ensure employment of local workforce ▪ Engagement of woman workforce to be preferred where appropriate.	• **Large Significance Section 1,4,5B, 9B2,10 Moderate Significance – Section 2,3,4,5,6+7,9A2,11, 13A**
Education and Training	▪ Employment opportunities exposure to modern management and logistics procedures ▪ Working with people having international expertise ▪ transfer of new technologies and new skills ▪ Give priority on training of affected vulnerable groups.	▪ Not exploitation of possible benefits from capacity building	▪ Supervisors and managers will be responsible to utilize available resources to train, qualify, and develop their employees. ▪ On-the-job training (OJT) is one of the best training methods for employees' capacity development.	• **Sligh Significance – All Sections**
Vulnerable Groups	▪ Lack of collaboration with local community representatives ▪ No priority for compensation to the affected vulnerable groups	▪ Decreased accessibility to services ▪ Loss of land/property ▪ Exclusion from employment opportunities	▪ Land needs to be reinstated/restored in pre- construction conditions, based on measures proposed in ESIAs for erosion control, re-contouring the land, replacing the topsoil, re-vegetation, restoration of habitats, regaining its previous use.	• **Large Significance Section 1,2,3,4,5B, 5C, 6+7, 9A2, 9B2,** • **Moderate Significance – Section 10, 11 and 13A**

CONSTRUCTION PHASE SOCIAL AND CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
	▪ No priority for training and employment on affected vulnerable groups.		▪ Implement additional assistance provision to the vulnerable groups representatives who will be resettled;	
Workforce related impacts and Issues	▪ Not appropriate implementation of HSS and contingency Plans ▪ Not proper implementation of Work condition code of conduct. ▪ Not proper application of grievance mechanisms ▪ Bad behaviour on communication with local community and services ▪ Miss respect of local community behaviours, traditions, religions, habits etc. ▪ Missing of training for environmental and social protection etc.	▪ Risk of health and safety of workers ▪ Violation of Worker rights ▪ Conflicts between workers and local community and services	Adoption of appropriate Human Resources Policies ▪ Project developer should develop policies to promote non-discrimination and equal treatment and opportunities and to prevent harassment) and bullying in the workplace, ▪ Workers camps to be constructed outside the communities. ▪ Development of Social Facilities and Services Plan for workers ▪ A security plan including clear measures to protect workers against theft and attack is implemented ▪ Processes and grievance mechanisms for workers to articulate their grievances must be provided ▪ Development of Emergency Preparedness Plan for accidents, Occupational Health and Safety Plan and ▪ Construction Safety Plan will be developed by Contractor/s ▪ Provision that all working condition to be in compliance with Albanian legislation	• **Large Significance Section 1,4,5B,9B2,10** • **Moderate Significance – Section 2,3,5C,6+7,9A2,11,13A**

CONSTRUCTION PHASE SOCIAL AND CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Cultural Heritage	▪ Clearance of vegetation, buildings, and fences ▪ Earth movement operations ▪ Destruction of non-identified buried archaeological sites	▪ Damage or destroy of non-identified burried archaeological sites (chance finds) ▪ Degradation or Damage of Cultural Heritage Sites Due to Pollution or Vibration ▪ Disruption/Changes in Acces of Users Accessibility to Cultural Heritage Sites (CHS) ▪ Plundering of the archaeological sites	▪ Archaeological monitoring survey in undisturbed terrain conducted by a team of expert archaeologists on a permanent basis to check that no archaeological remains are unburied without control ▪ In accordance with legislation in force on Protection of Cultural Heritage, in case of unexpected discovery of archaeological objects the Contractor shall immediately inform Ministry of Culture and follow their instructions. The construction works will be temporary stopped. The Contractor shall follow the instructions provided by the authorities responsible for the protection of cultural heritage; ▪ Implementation of the Cultural Heritage Management Plan	• **Large Significance 13A 9B2** • **Moderate Significance Section 1 and 10** • **Slight Significance – Section 2,3,4,5B,5C,6+7,9A2,11**

Table 3-30 Impacts and Mitigation Measures on Socio Economic parameters during Operation/Maintenance Phase

OPERATION/MAINTENANCE PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Land and Property	▪ Not proper implementation of RAP	▪ Permanent Loss of Livelihoods	▪ Implementation of the ownership rights according to Albanian Legislation	• **Large significance – Section 1,4,5B,9B2** • **Moderate to Large Significance –Section 2,3,5C,6+7,9A2,13A** • **Moderate Significance – Section 10,11**

OPERATION/MAINTENANCE PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Community Health, Safety and Security	▪ Missing of information and signals on traffic rules, pedestrian roads, risks involved in case of not respecting of above mentioned information	▪ Life risk from accidents ▪ Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration	▪ Development and Implementation of Community health and Safety Educational Programme ▪ Public information on the dangers from trespassing of motorway during operation and on traffic rules and regulations to be obeyed ▪ Publication of Information on safety performance and other safety related data ▪ Development of a methodology for risk control ▪ Monitoring of air, water and soil quality as required in Environmental Monitoring Program ▪ Grievance Mechanism	• **Large significance – Section 1, 4,5B, 9B2** • **Moderate to Large Significance – Section 2, 3, 5C, 6+7,** • **Moderate Significance – Section 9A2,10,11,13A**
Community Tensions	▪ Traffic movement with higher/lower velocity that is required by traffic signals. ▪ Water, soil, and air (gases, dust and noise) pollution by car services, oil pumping stations, car crash etc.	▪ Risk for accidents ▪ Community tensions the disturbance arising from the construction works during maintenance ▪ Disturbance of community and health issues by intensive traffic (air, soil and water pollution)	▪ Apply penalties in cases of not respecting of traffic norms. ▪ Implementation of EMP/SMP, and conditions required on Environmental Permit Document ▪ Use of strong penalties in cases of intentional illegal discharge of wastes or polluted material ▪ Apply immediate cleaning interventions, in case of accidental pollution under surveillance of Regional Environmental, Forest and Tourism inspectorates	• **Large significance – Section 1,4,5B,9B2** • **Moderate Significance – Section 10** • **Slight Significance – Section 2,3,5C,6+7, 9A2, 11,13A**
Access and Severance	▪ Not proper solution to avoid fragmentation	▪ Residual Impacts on access and Severance	▪ Implement construction of underway to provide appropriate access of community where is it needed.	• **Large significance – Section 1,4,5B,9B2** • **Moderate Significance – Section 2, 9A2, 10, 11, 13A** • **Slight Significance – Section 3, 5C, 6+7**

OPERATION/MAINTENANCE PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Economy	▪ Improve of accessibility with other regions and/or states	▪ Effects on Local and National Economy	▪ undertake activities for attracting direct foreign investments ▪ undertake support activities for the businesses (avoided communities) ▪ Support setting advertising panel next to the planned motorway.	• **Large significance –All sections**
Employment	▪ Increase of employment by exchange on trade and market with other regions/state ▪ Increase of the employment on services for tourism and recreational activities ▪ Decrease of employment by disclosure of construction works	▪ Creation of employment opportunities	▪ Restructuring of Labour market ▪ Improving the overall employment rate and having fewer people dependent on state benefits; ▪ Support of active labour mobility; ▪ Good quality accessible and affordable childcare to be available assuring on that way active participation of female in employment opportunities; ▪ Inform the workers and disclosure of the projects, on other opportunities in similar works in the region.	• **Large significance – Section 1,4,5B,9B2,10** • **Moderate to Large Significanc – Section 2,3,5C,6+7,9A2,11,13A**
Education and Training	▪ Needs for contemporary know how on qualified works and technologies.	▪ Improvement of knowhow of workers and engineers	▪ Continuous Education and Training for other benefits from employment opportunities	• **Large Significance – All Sections**
Vulnerable Groups	▪ Changes on vulnerable groups health and incomes by road operation	▪ Effects on livelihood and wellbeing	▪ Public Information notices through different kind of media to ensure that residents from communities along the motorway are duly informed for operation of motorway and changes in movement in the area caused by its operations ▪ Public awareness initiatives through school visits, safety centres, diversionary activities and communications programmes ▪ Respect Environmental and Health Legislation and related penalties to control violation of norms and levels of environmental and health parameters by road users and maintenance activities.	• **Significance will be large in all Section**

OPERATION/MAINTENANCE PHASE SOCIAL CULTURAL IMPACTS AND MITIGATION MEASURES				
Impacted feature	**Potential sources**	**Impacts**	**Possible mitigation/prevention measures**	**Significance of Mitigation measures according Sections**
Workforce related impacts and Issues	▪ Please refer to construction works	▪ Negative impacts during maintenance activities	▪ Please refer to construction works	• **Significance will be large in all Section**
Cultural Heritage	▪ Discharges from traffic ▪ Maintenance works	▪ Damages of traditional and heritage/cultural/religious monuments by acid gases etc generated by traffic ▪ Damage of access roads to cultural heritage monuments during maintenance works	▪ Frequent evaluation of heritage monuments close to AIC alignment. ▪ Define pollution sources and restoration techniques ▪ Implement proper protective measures 9Barriers covers etc and report on damage at ARA, to require its collaboration on mitigation measures ▪ Implement mitigation measures proposed for construction works on cases of maintenance works	• **Large Significance 13A 9B2** • **Moderate Significance Section 1 and 10** • **Slight Significance – Section 2,3,4,5B,5C,6+7,9A2,11**

Assessment of Residual Impacts

Despite proposed mitigation measures, some of the impacts can not fully mitigated. The significance of all positive impacts will remain at the same level of significance.

An assesment of residual impacts per each of the socio-economic and cultural parameters is shown in the following paragraphs.

Land and Property

Temporary land loss and livelihood: The significance of this impact was evaluated to be low negative. The probable success of the mitigation measures is considered to be high, thus the significance of the residual effect is considered therefore to be **Slight**.
Loss of livelihood from land fragmentation; the change will affect households along new sections of the corridor. The significance of this impact is major negative. With proosed measures. i.e. compensation from the state for land fragmented in small parcel, the significance of this impact will remain **Slight**.

Loss of housing (including physical displacement) and Permanent Land Loss/livelihood: Loss of land/livelihood and housing has very high sensitivity. Magnitude of the impacts permanent loss of housing and land/livelihood evaluated as high negative with the proposed of the mitigation measures will becomes medium negative. The significance of impacts with proposed mitigation measures will remain **Slight**.

Community health and Safety

The mitigation measures proposed to avoid and/or minimaze impacts on community health and safety during pre-construction and construction on Increase on additional burden on health care facilities will be avoided as the project will provide basic health care for its workers and other measures to ensure no/minimal decreased access for communities to health facilities. The significance of this impacts evaluated as large/moderate will remain **Slight**.

The magnitude of the impact Increased risk for inguries from trespass of construction site evaluated as high negative with the implementation of mitigation measures becomes low negative. The impact significance will remain **Slight/Neutral** considering that probable success of the mitigation measures will be high.

Impacts on health and wellbeing of community due to increased pollution of air, noise and vibration on sorrounding environment during construction will be minimized due to mitigation measures developed to minimise environmental impacts. The significance of this impact will remain **Slight**.

Magnitude of the impact increased community exposure to disease evaluated as Major negative in Sections 1,2,3,4,5B,5C,6+7,9B2,11 will remain Moderate with probable success of the mitigation measures. The significance of the residual effect is then **Moderate**.

The significance of the impact related to health and wellbeing of community (residing in Section 1,4,5B,9B2) due to air pollition by traffic (increase of pollution from gases, dusts and hushs), will remain **Moderate** with the propable success of mitigation measures.

Significance of impact Life risk from accidents where evaluated as high negative, with the proposed mitigation measures will remain **Slight**.

Community Tensions

Predicted measures for asssitance of community without ownership titles documents will propable success. The significance of this impact will remain **Slight**. Impacts from influx of workforce into local communities will be managed through housing of workers in camps, the significance of this impact will remain slight. The continiuing and clear information on the number of jobs created will help to maintain a manageable influx of newcomers seeking employment and income opportunities. Thus the significance of demografic stress will remain **Slight**.

The significance of impact Community reactions due to the disturbance arising from the construction works estimated as Large negative in Sections 1,4,5B,9B2 with probable success of the mitigation measures (considered to be high) will remain moderate negative. The significance of the residual effect is then determined to be **Moderate**.

The significance of impact 'Community reactions due to the disturbance arising from the operation of motorway' evaluated as large negative in Section 1,4,5B,9B2 with the probable success of the mitigation measures is considered to be moderate. The significance of the residual effect is therefore considered to be **Moderate**.

Access and Severance

The magnitude of Impacts on access and severance effects, damage of infrastructure and utilities and from disruption of irrigation and draining channels during construction phase was estimated modrate/large. The success of mitigation measures will secure that access, damage to infrastructure and impacts on irrigation and draining channels to be minimized. In case of any potential for temporary disruptions that can be addressed through project grievance mechanism Access and severance effects will infrastructure/utilities during constuction this wil be addressed through the grievances. Thus, the significance of the residual effect will remain **Slight**.

The probable success of the mitigation measures on access and severance during operation is considered to be high. The magnitude of the impact evaluated as large along Sections 1,4,5B,9B2 with the implementation of mitigation measures will become medium. The significance of the residual effect is **Moderate**.

Economy and Employment

Measures proposed on this two parameters will help to improve and maximize the benefits from economic growth at local and national level and creation of employment opportunity during both construction and operation phase. The significance of the residual effect is considered to be **Large** positive along all Sections of the corridor with the success of mitigation measures.

Education and training

The magnitude of the impact 'Capacity building through training' during construction without enhancement measures was estimated to be low positive. The probable success of the enhancement measures is considered to be moderate. The magnitude of the impacts with the implementation of enhancement measures will be medium positive. The significance of the residual effect is therefore considered to be **Moderate**.

Impacts on Education and Training of community during operational phase has a large positive significance. The measures proposed to enhance education and training effects and for employment opportunities could success in a moderate scale. The magnitude of the impacts with the implementation of mitigation measures remains high positive. The significance of the residual effect is considered to be **Large**.

Vulnerable groups

The magnitude of the impact 'decreased accessibility to services due to construction of works and blockages of roads' is considered to be large scale along section 1,2,3,4,5B,5C,6+7,9B2 of the Corridor. With the probable success of the mitigation measures is considered to be moderate and the significance of the residual effect will remain **Moderate** Negative. In other sections this impact will remain Slight.
Effects on the vulnerable groups from temporary land loss have a major negative magnitude. The probable success of the mitigation measures is considered to be moderate and the magnitude of the impact will become medium negative. The significance of the residual effect is **Neutral/Slight**.

Implementation of Employment Strategy, a fair and transparent requirement process and using of appropriate methods for communication will reduce as much as possible impacts for Exclusion from employment opportunities of vulnerable groups. The significance of this impact evaluated as high (Section 2 and 9A2) will become **Slight** with the propable success of the mitigation measures.

The impacs on livelihood of vulnerable groups evaluated with a large significance during operational phase will remain Moderate Negative after the success of the mitigation measures (moderate). Vulnerable groups are considered to have a very high sensitivity to change. It is estimated that this impact without mitigation measures will have a high negative magnitude. The probable success of the mitigation measures is considered to be high; the proposed mitigation measures have been successful in the same circumstances with the same type of aim. The magnitude of the impacts with the implementation of mitigation measures becomes medium. The significance of the residual effect is then **Moderate**.

Workforce related Impacts and Issues

Accidents on work during construction phase was estimated to have a major negative magnitude along Sections 1,4,5B and 9B2. The proposed mitigation measures are considered to be high successful. The magnitude of the impacts with the implementation of mitigation measures becomes low negative. The significance of the residual effect remain **Slight**.

There is possible that Violation of Workers rights could happen along Sections with high unemployment and povetry rate, Section 3, 9B2,10,11. In case this issue arise, it can be addresed through the Workers Grievance Menchanism. With success of mitigation measures, the significance of this impacts from

moderate will become **Slight**.

Motorway workers' safety during operation of motorway was estimated to have a major negative magnitude. The probable success of the mitigation measures is considered to be high. The magnitude of the impacts with the implementation of mitigation measures becomes low negative. The significance of the residual effect is then **Slight** Negative.

Cultural Heritage

The mitigations described in the tables of mitigation measures for impacts on cultural heritage sites intends to avoid or minimize the impacts on cultural heritage sites during construction phase. With the proposed mitigation measuese and mitigation measures prescribed above and the mitigation measures of Administration on cultural heritage protection, the magnitude of the impact will remain low. Considering that the unwanted destruction of archaeological (and/or paleontological) sites and also in case of users access this will be temporary and restrictions will be minor, the significance of impacts will remain **Slight**.

7. Stakeholder Engagement

7.1 7.1. Introduction

Consultation and engagement with stakeholders an integral part of the Environmental and Social Impact Assessment (ESIA) process. To support the realization of the Project, **the Project Promoter will develop and implement** a Stakeholder Engagement Strategy, the overall aim of which is to ensure that a consistent, comprehensive, coordinated and culturally appropriate approach is taken for stakeholder consultation and disclosure. This approach is in full compliance with national and local legal provisions and EBRD Performance Requirements.

The Project Promoter will undertake a practice of stakeholder engagement throughout the project planning, construction and operational phases. The plan for this engagement, including identification of stakeholders (i.e. people and organisations who have a role in the Project or could be affected by the Project activities or who are interested in the Project) and disclosure of information, consultation, and handling of suggestions, comments and concerns, is to be documented in the Stakeholder Engagement Plan (SEP).

For the preliminary phase of the project the SEP is developed as a stend alone document, however it is a living document and it will be updated, when required, as the Project progresses. The purpose of the SEP is to provide a basis for a constructive relationship, between the Project Promoter and the affected stakeholders over time. It will ensure that relevant and understandable information is provided to all the Project Affected Persons (PaP). Also, SEC will provide opportunities for stakeholders to express their views and receive responses to raised issues and concernes.

The nature of and frequency of engagement is defined by the risks and impacts that the Project will have. The SEP also stipulates for stakeholders how their concerns are to be considered in compliance with a grievance procedure. According to EBRD Environmental and Social Policy – Performance Requirements - PR10 (revised 2014 version) the Project is classified in Category A project, that is likely to have adverse environmental or social impacts.

A stakeholders meeting log can be found in Annex 4.

7.2 7.2. Stakeholder engagement phase

To accomplish the objectives of stakeholder engagement, the Project Promoter has developed Stakeholders Engagement Plan that focuses on short- and long-term goals of stakeholder engagement, determine logistics and procedures for the stakeholder engagement. The main objectives of stakeholder engagements are to:

- Ensure that adequate and timely information is provided to persons affected or likely to be affected by the Projector that may have an interest in the Project or that have influence over the Project. Provide to these groups such forums and opportunities to voice their concerns and opinions;
- Ensure that comments and concerns are received in a timely manner so that they can be considered during the decision-making process;
- Establish effective communication and cooperation facilitating community support in general, and
- Establish an effective grievance and mediation mechanisms with the main goal to intervene in a dispute in order to resolve and close out and minimize the number of cases referred to judicial authorities.

This SEP describes the approach in engaging with stakeholders, to be maintained throughout the Project cycle i.e. for, pre-construction including land acquisition, construction/rehabilitation activities and operation. These stages are described in the following table.

Table 7-1 Stakeholder Engagement Approach

Phase	Objectives	Status
Alternatives assessment	To introduce the Project and identify environmental, social and cultural heritage sensitivities that should be taken into account in selecting the preferred route.	*Completed*
Scoping disclosure and consultation	To provide further detail on the Project and an opportunity for stakeholders to provide feedback on the scope, approach and key issues that will be addressed during the PESIA as well as the plans for future engagement activities.	*Completed*
PESIA disclosure	To present the draft PESIA report and invite stakeholders to comment on the document. Information on the project impacts will be presented along with the mitigation measures designed to minimize or enhance positive ones. This will allow the project to maintain the relationships developed during the previous stages; and ensure all stakeholder issues have been identified and taken on board by the Project.	*Planned*
Ongoing Project stakeholder engagement	During Project phases (construction, operation) to continue engaging with stakeholders throughout the project lifecycle. The methodology for this will be developed and finalised using the information compiled during the PESIA process.	*Planned*

Stakeholder engagement activities undertaken to-date included high level engagement with Ministry of Infrastructure and Energy (MIE), Ministry of Tourism and Environment (MTE), Ministry of Culture (MC), National Environmental Agency (NEA) and Regional Environmental Agencies (REAs), National Agency of Protected Areas (NAPA) and Regional Administration of Protected Areas (RAPA), Institute of Public Health (IPH), Institute of Statistics (INSTAT), Municipalities and administrative unit affected by the project, NGOs and community.

A variety of methods were used to communicate with stakeholders, for different stages of the project, which included:

- Workshops;
- One to one and small group meeting with government officials;
- Community/public meeting;
- Electronic and social media.

During preparation of the PESIA stakeholder engagement process was completed in three main phases to ensure that a consistent, comprehensive, coordinated and culturally appropriate approach was taken for project consultation and disclosure. These phases comprised the following activities:

- Inception phase –Consultation meetings aimed to introduce working approach and phases, timetable for submission of reports, input collection from decision-makers;
- Alternative route selection process – stakeholder engagement aimed to present alternatives for each section and collect views for best option; Elaborate the selection methodology.
- Scoping phase – Gathering relevant information on Baseline Conditions of environmental and social resources, identification of issues of concern for affected communities.

Engagement activities includes workshops with national stakeholders, meetings and consultation with national/regional government and consultation/meetings with community for a period from November 2017 to March 2020 and are related with the preparation of the PESIA for the Feasibility Study of Adriatic Ionian Corridor. During this process 94 different forms of engagement with the stakeholders took place in which their concerns, expectations and preferences about the AIC were discussed and taken into consideration during the process of PESIA preparation.

Table xx: Number and type of stakeholder engagement within AIC preparation phase

Stakeholder profile	Meeting	Focus group	Workshop	In written	Total
National Stakeholders	17	0	0	2	19
Regional and Local Stakeholders	56	1	2	0	59
NGOs and other interested parties	5	0	0	0	5
Community Consultation (Affected Population, Enterprises and Public Service Facilities)	11	0	0	0	11

7.3 7.3. Project Stakeholder Identification

The objective of stakeholder identification was to establish which individuals and organizations may be directly or indirectly, positively or negatively impacted by the project and to bring them forward to the first line of information.

The following aspects are taken into consideration for development of this SEP and for identification of stakeholders affected or with interest for the project;

- Potential impacts from the project during construction and operation
- Ways for involvement of stakeholders in accordance with Albanian laws and EBRD standards
- Defining of person who may be directly or indirectly affected by possible impacts in area influence from project implementation and vulnerable/marginalized groups that need special effort for inclusion
- Defining of persons who supports or oppose changes due to project activities

Classification was undertaken to identify appropriate engagement methods with the various stakeholder groups.

The Stakeholders identified can be grouped into the following categories:

Interested Party

- National Governmental Stakeholders
- Regional and Local Government Stakeholders
- Other Interested Parties (NGOs and other organisations)

Affected Party.

- Affected Population, Enterprises and Land users
- Vulnerable groups

Other affected Stakeholders

- Individuals,
- Users of the roads, who may be directly or indirectly affected by Project activities

7.4 7.4. Stakeholder Engagement Program

Stakeholder Engagement Program present the methods of consultation and information planned in the foreseeable future and how the views form this engagement will be taken account during the process. Stakeholder engagement process for AIC will be performed in coordination with the Beneficiary authorities (MIE/ARA), municipalities and administrative units and Technical and Environmental and Social Consultants. This process will be used to obtain comments and suggestions for the development of the Project, which may enhance the Project design and lead to extended local benefits.

Engagemen Program is consisted of the processes described below.

Project documentation disclosure and consultation activities-envisages disclose of the PESIA and accompanying documents (NTS, SEP, LARF, ESAP) to stakeholders through the established channels of communication.

Consultation with affected individuals and vulnerable groups-Meetings with individuals, households and businesses owners within the project area will take place regularly throughout the project lifetime. The project representatives with engaage with women, disabled people, elderly and poor people to ensure that their needs and concerns are addressed in relation to the Project impacts.

Consultation with project affected land owners, assets and users-will take place aiming to explain and discuss impact and compensation measures. Expropriation related matters will also be addressed during these meetings.

PESIA disclose of information and public hearing-will be organized for the affected communities and the possibility for review will be provided. A public hearing will take place 20 days after the project promoter has submitted the request to NEA. Public hearing will be held by the promoter and Regional Environmental Agency (REA) and Local administrative units

Formal Request for information- In case of any request for information regarding the project addressed to the beneficiaries institutions (in this case MIE and ARA) and also other relevant institutions (MTM, NEA) and municipalities the procedure set on the law no.119/2014 'On the right for information'85 will be applied and also the transparency program approved for each public authority

7.5 7.5. Grievance mechanism

In accordance with good international practice, a grievance mechanism will be established through which any person or organisation can contact the Project to submit a grievance, concerns and complaints particularly from affected stakeholders and communities, but also from other NGO's and general public. This grievance mechanism covers both internal public (employees of contractors, sub-contractors and sub-contractors) and external public (i.e. affected people and other relevant stakeholders). The grievance mechanism will be in detailed presented in Livelihood and Assets Restoration Framework and in the Stakeholder Engagement Plan for the Project and accords with EBRD standards and PR's.

The grievance mechanism will be planned as to uphold certain principles that are as follows:

[85] Official Gazette OF Republic of Albania no.160, year 2014

- to be open and accessible to all, to suit the varying cultural needs of all potential stakeholders;
- to addresses all grievances in a fair and transparent manner;
- grievance mechanism process or procedures should address concerns promptly and effectively, and at no cost for the complainant and without retribution;
- raised grievance cannot prevent access to legally defined judicial or administrative remedies;
- handling of grievances should be done in a discreet, objective, sensitive and responsive to the stakeholders' needs and concerns manner, protecting the privacy of affected individuals;
- the grievance mechanism should allow for anonymous complaints;
- the affected community and general public should be informed about the grievance process, including grievance forms, and leaflets and forms to be disseminated at appropriate local community meetings and available on the Project website;
- all grievances are recorded and responded to promptly before being closed.

8. Environmental and Social Management and Monitoring Plan

8.1 Environmental and Social Management Plan

8.1.1 General

The aim of this preliminary Environmental and Social Management Plan (pESMP) is to provide a road map to orient the separate ESIAs, per each of the AIC sections. The pESMP, which will be updated under the ESIA preparation and be based on more precise data that will derive from the Preliminary Design, will provide rational and practical environmental guidelines to:

- Orient the control and minimize the extent of environmental/social impacts, by their management, and where possible, to improve the condition of the natural and social environments;
- Guide the prevention of environmental degradation and social negative effects;
- Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
- Provide guidance regarding method statements which are required to be implemented to achieve appropriate environmental specifications;
- Describe all monitoring procedures required to identify impacts on the environment during construction and operational phases;
- Orient training of employees and Contractors with regard to environmental and social obligations

The measures that are specifically outlined in this pESMP are based upon the information gathered regarding the baseline conditions of the AIC sites and the impact characterization and mitigation measures that were described in the chapters above. It summarizes the organizational requirements, actions and monitoring plans during construction and operational phases, to ensure that the necessary measures, with respect to environmental, health and safety (H&S) and social aspects, will be taken in consideration by the Project actors. The pESMP covers a long-term process, while it will be required to be regularly reviewed and updated as the Project progresses in order to reflect any changes in the Project future phases, as well as in regulatory requirements.

8.1.2 Pre-Construction Phase

The pESMP integrates impacts and measures identified in this pESIA, which need to be further analyzed in the ESIA during the pre- construction phase. The environmental/social and technical teams under the preliminary and detailed phases should cooperate strongly with each other in all project future steps. The Contractor will further update the ESMP and the Environmental and Social Action Plan (ESAP) that will be provided by the ESIA.

The ESIA, as indicated in the impacts and mitigation measures chapter of the PESIA, will carry out:

- Soils and geology: make use of the results of the geotechnical investigations
- Air and noise: measurements after defining the sensitive receptors per Sections, air and noise calculations for the emissions during the construction phase, air and noise modelling to predict the impacts in the operation phase
- Climate change: assessment for the project's climate resilience
- Surface and groundwaters: measurements at the sensitive receptors
- Biodiversity: analytical field inventories (habitats and fauna categories), preparation of habitat maps, screening of potential critical habitats and priority biodiversity features, preparation of Critical Habitat Assessments, Appropriate Assessments for the Protected Areas, Biodiversity Action and Management Plans per Section.

The ESIA via its ESMP will provide certain guidance to the Contractor on his responsibilities. Those may be focused between others in ToR or tendering documents on:

CESMP, Plans and Method Statements

- Require realistic and well related baseline monitoring taking into account the Albanian water, air and noise quality standards
- Prepare Contingency and Construction Environmental and Social Management Plans' (CESMP) guidelines
- Prepare guidelines on Conservation Plans for protected species/priority biodiversity features/critical habitats that may be endangered, exterminated or permanently destroyed and Biodiversity Management Plans for all sections. This Management Plan will foresee the update of the Biodiversity Action Plans prepared under the ESIA by the Contractor and which will be related to Sections, 1, 9B2 and 10. The biodiversity surveys carried out during the ESIA will enlighten the potential loss of certain habitats and will focus on species that will be severely affected. The ESIA Consultant will further require from the Contractor appropriate baseline biodiversity survey within the affected area and search for additional data.
- Prepare the guidelines for Method Statements that the Contractor may have to provide, i.e. on execution of the works, on working campus. on spoil disposal, on siltation, on loss of archaeological findings, on potential health and safety hazards, land use and acquisition

The documentation that should be prepared before starting the construction phase, is crucial for a successful project implementation.

8.1.3 Construction Phase

The Construction ESMP consists of a management system and environmental guidelines which contain enough detailed specifications that need to be undertaken or adhered to, by the project developer (Contractor). Two types of specifications need to be complied with, by the ESIA and Preliminary/Detailed design phase, by the Contractor namely; standard and specifications. The Construction ESMP needs to be developed in parallel with the Final Design Stages, and constructive input should be invited from the selected Contractor. The objectives of the Construction ESMP are to:

- Define the requirements for compliance with the national and local regulations, permit/consent conditions, client/contract requirements, and all other applicable environmental documents including the Environmental and Social Impact Assessments (ESIA), Environment and Social Management Plan (ESMP), followed by Environmental and Social Action Plan.
- Clearly define the responsibilities and actions required by all parties during Project implementation and to maintain compliance with the environmental and social requirements.
- Provide necessary procedures for communication, documentation, and review of environmental and social compliance activities.

The Construction ESMP takes into account the following per each of the AIC Sections:

- The size and complexity of the Project scope of work;
- All applicable laws, statutes and regulations and international agreements and conventions, including the EBRD Performance Requirements on Social and Environmental fields.
- All mitigation measures and requirements as set out in the ESIA and related ESMP and ESAP, must be transferred to the implementation of Construction EMP as commitments;
- The risk factors that may be faced during the construction of the Project;
- The principle of continuous improvement in environmental and social performance.

The Construction ESMP, will condition the implementation of mitigation measures by developing specific plans, which will be further elaborated as guidelines under the ESIA preparation stage:

Topsoil Management Plan

The plan shall describe topsoil stripping procedures and rules, topsoil stripping depth and volumes, topsoil stripping supervision, transportation and stockpiling requirements, stockpile location, topsoil stockpile design, stockpile management, erosion hazard and erosion control, runoff drainage/diversion, soil protection measures at the storage area, maintenance of the stockpile and topsoil application procedure.

Emergency Response and Preparedness Management Plan

This Plan will refer to emergency preparedness and response as well as spill prevention. The Contractor should develop and implement an emergency preparedness and response plan. These should include measures for prevention, mitigation and response to emergency scenarios, at a minimum covering: road and traffic accidents, other accidents and injuries, spills of hazardous substances, fire, natural disasters (earthquake, landslip, flood, extreme weather events, etc.), accidents during tunnelling (e.g., tunnel collapse, tunnel fires, gas release, etc.), security and safety information, medical emergency Information, technological emergencies and occupational health and safety. This plan should describe roles and responsibilities for prevention and response, procedures for responding to different scenarios (fire, flood, traffic accident, etc.), the resources required (personnel and equipment) and how these will be provided and maintained. This must consider delays to emergency response services, due to the current condition of the road as well as competence and training requirements. Finally, it must be regularly reviewed and updated – as a minimum annually and after any emergencies or accidents.

Spill Prevention Management Plan

The principal objective of the Spill Prevention Management Plan is to provide an outline of the policies and procedures that will be employed to safely and effectively respond to spills of hazardous materials that may be encountered during construction, and operation activities. A SPMP is put in place to prevent leakages and spills, as well as to enable effective response to unplanned releases of liquids, such as fuels, oils and chemicals. This includes a description of the location and contents of spill kits; the appropriate use of each element of the spill kit; and the appropriate management of waste generated from a contained spill. The Spill Management Plan will include procedures, responsibilities, resources, documentation and reporting requirements, training provisions for relevant staff, etc. to avoid spills of hazardous substances and to effectively respond to such incidents.

Air quality and dust management plan

A specific site Construction Air Quality and Dust Management Plan must be developed. This Plan must include stakeholder engagement, to communicate with local residents who may be affected by dust before and during construction (may refer to wider Stakeholder Engagement Plan). The Contractor shall refer to the relevant requirements of the mitigation strategy when developing the Air Quality Management Plan. The works have the potential to affect air quality as a result of dust from construction activities and exhaust emissions from on and off site construction vehicle movements. The requirements that have to be incorporated in the Plan may refer to site management, site planning, construction traffic with major emphasis to traffic in residential areas and site activities.

The plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project related activities. Prior to commencement of works likely emissions from crushers, concrete production facilities and other emissions generating facilities must be calculated. Separate plan/schedule for air quality control in the tunnel must be provided.

Noise and vibration management plan

Noise and vibration from construction works impact potentially local residents and wildlife. The Contractor shall also be required to produce method statements to show how noise pollution will be controlled and mitigated. The plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project related activities. Apart from standard noise measures that will have to include, it should provide a detailed design of noise barriers and low noise surface.

Construction Traffic Management Plan

The plan shall be designed to ensure that traffic congestion and traffic safety impacts due to construction activities and movement of construction vehicles, haulage trucks, and equipment is minimized. The plan

shall be prepared in consultation with traffic officials. The plan shall identify traffic diversion and management issues, traffic schedules, traffic arrangements showing all detours/lane diversions, modifications to signaling at intersections, necessary barricades, warning/advisory signs, road signs, lighting, and other provisions to ensure that adequate and safe access is provided to motorists and other road users in the affected areas. Pre-construction access road surveys will also form part of the TMP. The plan shall also include locations for cattle crossings on access roads and conditions for the management of these crossings, including the use of flagmen. Construction site access roads and village access roads should by inspected regularly to identify any damage to verges, bridges, culverts, etc and any deterioration will be repaired as soon as practicable. Regularly monitor traffic conditions along construction site access roads and village access roads to ensure that project vehicles are not causing congestion or traffic hazards. As part of the Traffic Management Plan, the Contractor shall consult with local residents to establish processes and locations for safe livestock crossing of the proposed access roads.

Erosion Control and Sedimentation Management Plan

The Erosion Control and Sedimentation Management Plan outlines the required soil conservation management requirements for the construction phase of the Project, to ensure environment protection and compliance with all conditions, commitments and requirements. It will describe therefore the controls and measures required to minimize erosion and sedimentation with the disturbed area by proposing and establishing methods to manage stormwater and will environmental Training for Construction, implement sediment trap techniques in river bodies, construction sequence impacts identification, use as less as possible viaducts and bridge foods over river bodies, saving overall geomorphology of the river and working Strip Restoration and Final Clean-up.

Water Management Plan

The Water Management Plan will include both surface and groundwater and determine appropriate strategies to manage all forms of water taking into account site location and groundwater conditions so as to ensure environment protection and Project environmental impacts minimization. It defines the measures and water quality monitoring regime required to reduce this impact on the groundwater and surface water affected environment. The plan must provide details on waste water (sewage) volume, disposal scheme, information on capacity and type of waste water treatment facility, location of the discharge point/points with indication of coordinates.

The plan will include calculations of the predicted water demand for construction including water required for construction (e.g. concrete mixing), dust suppression, cleaning equipment, potable water for construction workers; and use in construction camps. It should include measures to minimise water usage in the first instance, and also opportunities for reuse of water where possible. The Contractor will undertake a capacity study of available water resources along the alignment, including the location and quality of water resources used by the villages, to identify suitable resources, with sufficient availability to avoid any impact on the availability of resource to communities and businesses along the alignment. If existing groundwater or surface water resources are not appropriate (quantity or quality), alternative sources of water will be identified by the Contractor. He will liaise with the community to understand seasonal water demand constraints, and periods of high water volumes / increased erosion. Water abstraction should be designed in accordance with the requirements of the Biodiversity Management Plan to minimize impacts to habitats reliant upon surface and ground water. It should document water sources and extraction locations: water sources to be used will be pre- agreed (Permits) with the relevant local authorities. Water sources will be identified and registered in the plan, together with the GPS coordinates and the maximum water volumes allowed from the source. Avoid, pollution on recharge sites by control of soil pollution in such sites, and good and isolated collection system of draining and temporary disposing facilities (channels, septic tanks etc.), Relevant irrigation systems will be mapped, and crossing designs and post-construction restoration proposals detailed in the plan. Finally, it will take into account stakeholder engagement, since procedures will be put in place to record all communications with stakeholders, such as countries (Albanian and Montenegro – Buna river) and PAs authorities, Water Boards, Agency of Management of Water sources, and local stakeholders and communities.

Waste Management Plan

Construction activities have the potential to use large amounts of raw materials and generate substantial quantities of waste. The consumption of material resources and the disposal or recycling of waste give rise to environmental impacts that need to be managed and mitigated. The Waste Management Plan will implement procedures for waste minimization, recycling, treatment and disposal in accordance with Albanian and EU requirements. The overall objective of the Plan is to minimize impact of waste generated during the construction phase through the following:

- Minimize the amount of waste that is generated;
- Maximize the amount of waste that is recovered for recycling including segregation of recyclable wastes at source;
- Minimize the amount of waste that is deposited at landfill;
- Ensure any hazardous wastes (e.g. used oils, lead-acid batteries) are securely stored and transferred to appropriate facilities;
- Avoid dust impacts from handling of construction wastes;
- Ensure all wastes are properly contained, labelled and disposed of in accordance with local regulations;
- Ensure waste is disposed of in accordance with the waste management hierarchy

The plan shall describe waste streams and amounts, describe recycling/reuse methods for each material, identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling, specify responsibilities for managing and disposal of waste, describe special measures for material use and handling and communication and training to support and encourage participation from everyone on site.

Biodiversity Management Plan

A Biodiversity Management Plan is a series of coordinated practical measures that respond to the strategic vision of ensuring the conservation of all species and the maintenance of all ecosystem functions. It will be directed to protect what exists and restore whatever of the local biodiversity that was degraded. The plan will set out the requirement to

- hire a suitable number of suitably qualified experts to both map and clear the route, and approve that the route is approved as clear of biodiversity constraints, in advance of construction works.
- include identification of areas of greatest ecological value, features/species needing translocation, bird nesting areas where schedules need to be altered, etc. Their responsibility will include both surveys to inform the development of additional mitigation (if required) such as bat surveys and other species-specific surveys, and surveys to help ensure that specific mitigation is applied within the project area in advance of vegetation clearance.

The Biodiversity Management Plan will also include:

- Priorities, to optimize the mitigation measures; pollution and disturbance control, fencing and protecting of specific sites, opening the temporary bio-corridors etc.
- Action plans for species (mammals, birds, reptiles, amphibians, fish) and habitats, to list and describe all actions to be implemented on natural components;
- Compensation measures, related to specific habitats and flora, affected by construction activity. Specific flora and vegetation to be planted should be native and defined by the relevant Ministry, the National Environmental Agency and the Regional Environmental Agency, the agency of the Protected Areas (if in their vicinity or where serves as bio-corridors for PAs specific biodiversity), forest agencies in cooperation with local biologists, NGOs etc.
- A Reforestation Management Plan that will target at the no net habitat loss. Specific reference to activities, species, locations and timing of the realization of activities has to be made. Monitoring and review arrangements, to keep track of how the targets are progressively met and to adapt the actions to changing conditions. Prior to the detailed Reforestation Management Plan being produced, responsibilities will have to be assigned. These will include assigning the positions of project manager, funding source, funds manager and a local representative for consultations. The appointment of these positions will form the basis of a framework for assigning responsibilities and

ultimately putting together a timetable for actions, so that the Reforestation Management Plan can be implemented in a times and measurable fashion, with milestones against which to measure success.

In order to prevent the introduction/spread of invasive species, robust biosecurity measures should be implemented. The Plan will also include specific actions to be implemented through the lifetime of the project to further enhancement of biodiversity in the area. These actions will have associated monitoring commitments to ensure long-term effectiveness/relevance.

Specific attention should be given by the Contractor to the preparation of Biodiversity Management Plans for Sections 1, 9A, 9B and 10.

The Biodiversity Management Plan will be linked to the Landscape Management Plan, with regards to land restoration and selection of suitable species.

Landscape Management Plan

The Landscape Management Plan will include all the procedures to follow during restoration works, including restoration and monitoring procedures. The plan must state necessity to prohibit the use alien or invasive plant species and need/method for control and removal of alien species.

The plan must be developed in association with biodiversity specialist and the state forestry authorities. Between others, plans for landscape rehabilitation should be prepared and supported by followings:

- Temporary Tree Nurseries - Temporary tree nurseries may be set up for the transplanted tree and proposed trees at an early stage to allow small trees to grow during the construction periods. By the time when planting area becomes available, trees mature and increase in trunk & spread size.
- No-intrusion Zone - To maximize protection to existing trees and ground vegetation, construction contracts may designate "No-intrusion Zone" to various areas within the site boundary with rigid and durable fencing for each individual no-intrusion zone. The contractor should close monitor and restrict the site working staff not to enter the "no-intrusion zone", even for non-direct construction activities and storage of equipment.
- Hoarding - Hoarding or boundary fencing for construction shall be considered. It should be sensitively designed, subtle, camouflaged and more 'permeable' so that they fit into the existing environment when looking from outside.
- Construction Light - The Contractor shall consider other security measures which shall minimize the visual impacts. To prevent future pollution issues, it is recommended that the use of sodium light bulbs is prohibited and that Light Emitting Diod (LED) lights are installed with a "neutral" colour temperature of 4000K.
- Re-use of Existing Soil and Formation of Planting Area in advance - Existing topsoil shall be re-used where possible for new planting areas within the project. Preparation of planting area and early implementation of the planting works in advance can minimize adverse impact on trees.

In addition to the topic specific plans, a number of site-specific plans will also be required, including construction plans and method statements (Borrow pit management plan, Bridge Construction Plan, Tunnel Construction Plan, Tunnel Handover Plan, Slope Stabilisation Plan, Method Statements for Temporary Activities including storage areas, river crossings, roads/ Access Roads), Blasting Management Plan providing the methodology for the management of control of tunnel blasting including methods for noise and air quality management and occupational and community health and safety, and Concrete and Asphalt Production Management Plans

Health and Safety Management Plan

This plan outlines the safety measures and procedures implemented in a workplace. It is also designed in accordance with the legislative requirements covering the roles and responsibilities of the staff, the emergency action plan, and so forth. Health and Safety Management Plan outlines requirements that project implementor needs to fulfil in order to establish and maintain a safe working environment. Health and Safety Plans cover all aspects of safety management including hazard management, accident and incident reporting, emergency readiness, and other relevant aspects. Health and Safety Planning will enable

progress to be mapped and performance of the plan requirement monitored. The Health and Safety Manual usually forms the basis of the planning process. The Plan will be developed following all the relevant EBRD PRs and will include, at a minimum, the following elements:

- Health and Safety (H&S) Organization: detailed organization chart and description of roles and responsibilities associated with managing H&S. The organization proposed in the plan will take into account the competency of the proposed professionals, and will provide mechanisms to ensure cooperation and communication between the H&S management team members;
- H&S Standards, including: Site safety inductions, Hazards identification and risk assessment (including task analysis and construction hazards), H&S targets, and a procedure for safety performance evaluation and review; Emergency procedures; Toolbox meeting procedure; Site visit registers and Material Safety Data Sheet (MSDS) register.
- Accidents and incidents including required definitions of what is considered accident and incident, reporting and registering procedures, and root-cause analysis.
- H&S Auditing, including the Auditing Plan, setting audit objectives and measuring of H&S performance, Site safety inspection checklists and first-aid equipment checklist.

The plan will include provisions for training all workers and will include procedures related to communication to stakeholders and community improvement opportunities.

Socio-cultural Management Plan (SCMP)

This plan is based on identification of cultural and social assets, traditions, religions etc, possible impacts of AIC on them and preparation of social mitigation measures and monitoring program that consists on a realistic cost/effective assessment. The Social Impact Management Plan (SIMP) Identifies the likely scale and nature of impacts in relation to land access, livelihoods and construction activities. It describes the integrated impact management programs which ensure consistent and effective management of social impacts throughout the project:

- Land and Easement Acquisition (LEA) program
- Livelihood Restoration Program (LRP)
- Social Management System (ESMS)
- Route Social Impact Plan (RSIP)
- Grievance Management Mechanism

The SCMP also identifies processes that address associated areas of social impact:

- Industrial Relations Management Plan (IRMP)
- Cultural Heritage Management Plan (CHMP)
- Stakeholder Engagement Plan (SEP)
- Social and Environmental Investment Program (SEIP)

The SCMP describes the AIC project's social performance monitoring and compliance assurance, including monitoring, audit and inspection programs; the establishment of constraints and mitigation measures; and the identification of non-conformances and required corrective actions.

This Social Cultural Management Plan (SIMP) describes the activities undertaken by the AIC project to identify and mitigate project-related social impacts. The SCMP, between others, provides a management tool to inform and guide MIE and Contactors for AIC construction staff, regarding the processes to be followed to mitigate social impacts. It supports the alignment and integration of AIC social performance functions to optimize the efficiency in the management of social impacts and ensure smooth project implementation. Provides clarity to stakeholders on the roles, responsibilities and actions undertaken by AIC implementer, on social performance functions and how these are aligned and executed.

The SCMP will be regularly updated as the project progresses. Updates may be triggered by, for example, finds of profound ESIA, changes in the construction program or schedule, changes in the broader social environment, or the changing nature of social impacts at various project stages. This current edition of the

Preliminary ESIA reflects the overall social mitigation activities, based on the Conceptual design. Basic changes, are expected after preparation of Profound ESIA per each of the AIC sections.

Social management programs address specific impacts, target populations and geographies. They are designed to be mutually reinforcing, particularly where impacts occur at different levels or affect different populations.

Some of the basics issues that needs to be reflected, during SCMP are:

- Temporary loss of land and impacts of inadequate physical and social management of camps and workforce

Temporary lost of lands, may happen by the use of new ways of transport, disposal of working materials and debris, working campus etc. Prior starting the project implementation the contractor, should agree on such temporary land use and compensate the affected persons/entities according to their agreement. In this agreement should be included the period of taking the assets/land, the way to be used, and the status in which should be returned to the owner. Usually, the last condition for giving back the used land, is at last as in such conditions on which this land was prior starting its use. The best practice should be applied for site management including social aspects. In case private land take is necessary, then Contractor must negotiate with affected persons (e.g. farmer) who has right to refuse to rent such land. After the removal of all temporary facilities the land must be restored land to original condition or better. Hand- over of any contractor's facilities shall be in good condition.

- Land acquisition and Resettlements

Land acquisition and resettlement, is one of the most important process that may guaranty a succefull project development and reduce in maximum the affected peoples/entities disclaims. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (access to resources for income generation or means of livelihood) due to land acquisition (including rights-of-way) associated with a client's/investee's operations. Resettlement is considered involuntary when affected individuals or communities do not have the right to refuse displacement. This occurs in cases of: i) lawful expropriation or restrictions on land use based on eminent domain; and ii) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail. Land acquisition and Resettlements process includes:

  - Preparation and implementation of RAP;
  - Provision of sufficient information to communities and ensuring the proactive participation of the affected population in the resettlement process.
  - Appropriate care and respect to the resettlement of affected people (many who may be infirmed or elderly) to reduce the traumatic experience of moving (if necessary).
  - Ensure the necessary institutional capacity of responsible authorities/stakeholders involved in the expropriation/compensation and resettlement affairs.

- Maximize/ prioritize employment opportunities for local people in the areas of AIC alignment

The benefits of local community from the employment, are quite important and one of the most important positive impacts during AIC construction and operation. Construction phase, is almost the most beneficial phase for the local community. The employments, may help not only on the community profits from economical point of view, but also on possible improvement of the infrastructure, rental and leasing services etc. Direct jobs, other incomes by trade, etc of local community, has a great significance for local standard life levels in all sections, but especially for sections 9B2-11. Increase of the state revenues from taxes etc will affect positively also regional/national levels. A very importanty activity, to prepare the bases for local community employment remains application of training programs for communities on works expected to be generated by AIC construction.

- Reduce Negative impacts in community assets and living resources

Information and awareness on disruptions and expropriations should be done, at last 2 or three years prior starting the construction activities. Some of the most important activities that should be strictly applied to reduce negative impacts in community assets and living resources are:

- Give Affected Persons/entities, early warning of potential disruption.
- Provide for compensation to affected persons/entities.
- Build all roads to all weather standard. Construct additional pedestrian, underpasses etc., and livestock crossings as needs become apparent.
- Apply restoration and rehabilitation of damaged infrastructure like electricity net, water net etc., by AIC activities.

- Work related accidents during construction.

Works related accidents is a very unpleased phenomenon which sometime may risk also the life of workers or community. Strict application of safety measurements, for both workers and community, should be applied by the constructor, from the beginning of the construction process. The most important guidelines to be implemented by contractor are as following:

- Maintain strict health and safety regulations in compliance with Albanian law and EBRD Health and Safety Guidelines;
- Provide regular information/signage on danger spots on site regarding mitigating safety and warning measures;
- Continued capacity building to emphasis need for safe working environment, good supervision, Careful planning and scheduling of work activities during construction phase.
- Maintain regular contact with communities,
- Implement and maintain effective speed control measures on traffic during construction works.
- Use non-intrusive lighting in operational areas as much as possible.

Cultural Heritage and Chance finds Management Plan

The Cultural Heritage Management (CHMP) will have the objective to avoid or minimize the potential damages to cultural resources. The Plan will be developed following all the relevant EBRD PRs. It will provide the appropriate guidance and requirements for meeting the Project's cultural heritage responsibilities. The Contractor shall refer to the relevant requirements of the mitigation strategy when developing the Archaeology and Cultural Heritage Management Plan. A watching brief shall be required to be in place during construction, to mitigate the discovery of any previously unidentified features. The Management of cultural heritage resources will include the following:

- Authority engagement strategy to: Further evaluation of sites and the use of intrusive and non-intrusive methods; development of a chance finds procedure; developing site-specific mitigation approaches for any archaeological sites found, and archaeological rescue.
- Community consultation strategy to: inform local stakeholders of Project activities; understand site boundaries, user access, timing of use, and schedule of special events; consider relocation of unavoidable evidences with cultural heritage value; provide feedback to Project about community concerns; plan alternative access if and when necessary; develop site-specific mitigation approaches.
- Structural recording and monitoring program, including: Pre-construction survey and recording of the condition and structural integrity of sites with above-ground components that lie within 100 m of the Project footprint; Follow-up protection or architectural reinforcement at sites found to be at risk from pollution or vibration; Vibration-minimizing techniques and low impact construction techniques implemented along roads near sites at risk from vibration; pre-construction preparation of conservators in the event of damage; and, periodic monitoring of site conditions throughout the life of the Project
- Project activity timing restrictions in the situations of very wet conditions over areas of high archaeological potential or near sites sensitive to vibration; and following a chance find.

Chance Finds Procedures to be implemented at construction fronts include following: arrangement of on-call archaeologists prior to contract to handle an archaeological rescue if required at a chance finding; monitoring of construction activities by a professional archaeologist; cessation of work in the vicinity of any new archaeological discovery and consultation with involved stakeholders

8.1.4 Operational Phase

The pESMP consists of environmental and social measures for the operation of the AIC, including the requirement to establish and implement an Operational Environmental and Social Management System (OESMS) and relevant Management Plan. The OESMS will be developed and implemented in-line with the international standards and include inter alia the organization, responsibilities and resources, the Operational Environmental & Social Management Plan, including supplementary plans e.g. Waste and Water Management Plans, Erosion Control Plans etc., the Operational Monitoring Plan; the Emergency Preparedness & Response Plan, the training program and the Auditing and reporting of Environmental & Social performance.
The MIE (Ministry of Infrastructure and Energy) and the ARA (Albanian Road Authorities) will develop and be responsible for the OESMS and the implementation of the measures of the OESMP that are proposed within it, as well as for ensuring that its Contractors (e.g. vegetation management Contractor, AIC section maintenance Contractor/s) understand the requirements contained within the ESMP (operational phase) and have contractual conditions in place to ensure that applicable elements of the ESMP are achieved.

8.2 Public Reporting

According to the Albanian Legislation, EBRD PRs and Arhus convention, the awareness, information and reporting will be part of any project development phases. A Stakeholder Consultation report, is delivered in the same time with this draft PESIA. In this report, between others, are summarized all activities according to public information and reporting in the preliminary ESIA phase. Public Reporting, as important part of Public Information Policy, approved of a new Access to Information Policy and Directive on Access to Information in April 2019, and being effective on 1 January 2020. Public Disclosure process, remains crucial for the public report process.

8.2.3 Pre-construction and Construction phase

The consultant discloses information and consults with project stakeholders, will endeavor to identify, raise awareness and engage with a broad range of stakeholders, including civil society groups, organizations, and members of the public, which are affected by or interested in the project, its operations and activities, taking into account the diverse nature and significance of specific interests and pursuits. The environmental and social implications of the Bank's proposed activities, as well as a gender data, including data on labor force participation, gender pay gap, entrepreneurship and access to finance, should be included in summarized format. The Public Reporting, will seek public opinion at an early stage of project development and will invite affected persons, civil society and members of the public to provide comments and amendments to the current project through consultations, meetings, workshops or other means. The consultant, will take into account comments received when drafting the Revised ESIA and other related reports like RALF, RAP, ESMP and ESAPs. A summary of public comments received and consultant reaction/responses, will be made available to the Final Report of ESIA, before final approval by the Albanian Authorities and EBRD. Between others the Public reporting requires:

Project summary documents

A Project Summary Document (PSD) will be prepared for each ESIA, and delivered at private and public interested parties. PSDs provide a factual summary of the main elements of AIC project and potential investment which includes the following information:

- The identity of the Consultant Consortium; Total AIC project cost (where applicable);
- The AIC alignment location;
- A brief description of the AIC project and its objective;

- The amount, sources and nature of investment for AIC;
- The target date for a decision on the project by the Albanian authorities and EBRD;
- The anticipated impacts, and expected impact rating;
- A summary of environmental and social impacts associated with the project and defined mitigation measures;
- Guidance on how and where information about the project can be obtained, including contact points for the project consultant, financing agency and Client.

Consultations

Frequent consultation meetings and two public hearings will join the Construction phase, according EBRD requirements. Media, leaflets, editions in newspapers etc, will be part of public information and reporting during construction phase. During this phase, the reporting activities, will be done in any phase of profound ESIA. This reporting, should be followed by getting of the public opinions, and reflecting the solution according to public suggestion, disclaims and requirements in preconstruction and construction phase. A number of issues should be raised during pre-construction and construction phases, to avoid future problems during operation phase. The public should be actively involved during preconstruction and construction phase, between others on a number of issues like:

- Eventual interference of AIC with existing infrastructure (road network, irrigation and drainage channels, network, etc.) and the residential, cultural, educational and commercial establishments.
- On the eventual disruption of agribusiness and other bussines operations (due to splitting of farm plots and worsened access to those plots, blocking of accessibilities of religious objects, monuments, services, recreational, educational and cultural sites).
- The compensation ways and time. *Inappropriate compensation in previous experiences (the most recent case being for the section 11 Gjirokaster (Cepo administrative unit), existing road Levan-Tepelena etc.), because issues on land ownership*.
- Agricultural land, which is formally registered as agricultural land while in real market, is sold as urban land for private purpose. The market price of such lands, sometime is ten (10) times higher than the compensation decided by the Albanian law for compensation of agricultural land.
- Needs for rural access roads to facilitate village's accessibility
- Disclaims on disturbance from noises, dust, gases, vibrations and other pollutions in water and soils,
- Reporting of all data, according air, water and soil pollution/status, during construction phase and comparison of those with the same parameters of the environment, before starting the project implementation.
- Reporting in all possible accidents, responsible for such accidents and responsible for damage repair, timeline to be restored and eventual solutions to facilitate community life, till the damages to be repaired.
- In addition, ARA and its Contractors will be required to publicly report, on the Environmental and Social performance of the Project on an yearly basis, and in the formats required as per national and EBRD or other international standards.

Integration of Environmental and Social considerations in the report

EBRD's appraisal requires clients to identify stakeholders potentially affected by or interested in AIC, disclose sufficient information about the risks and impacts arising from the project and engage with stakeholders in a meaningful and culturally appropriate manner. In particular, consultant, in collaboration with MIE and ARA will engage the people affected by AIC and relevant stakeholders, in proportion to the potential impacts associated with the project and the level of stakeholder interest. For AIC section1, that

have the potential to have significant environmental impacts across international boundaries, between Albanian and Montenegro, the consultant, in close collaboration with MTE, will encourage the approach of the UNECE Convention on Environmental Impact Assessment in a Trans boundary Context. The consultant may, in some cases, conduct its own public consultation activities to gauge stakeholder views.

Public Disclosure

The key reason for public disclosure activitieds is to protect consumers. This is the instrument that forces the client, to disclose several important information's like operating results, financial conditions, management compensation etc. The mean of Public Disclosure is "protecting the interest of the public".

- Public disclosure, with broad participation of stakeholders and interested parties, will join the pre-finalization of the Preliminary ESIA, and Profound ESIA per each of the AIC Sections, in the next project stage.
- Notification of the documents' availability will be posted on the EBRD website, MIE, MTE ARA, NEA and REA websites. A notification on the MTE/NEA, ESIA web page, will also list locations of full availability of ESIA documents locally/regionally/Nationally and link to the Client's website or other website as appropriate.
- The Project Summary Document will summarize in "non-technical language":
  - The rationale for categorization of the AIC sections;
  - A description of the main environmental and social issues associated with the project;
  - Key measures agreed to mitigate the risks and impacts; Where greater than 25,000t CO2 equivalent/year, the expected GHG emissions of the project;
  - A summary of any disclosure or consultation activities;
  - A link to the ESIA page for Category A projects.

According to EBRD PRs, the environmental and social appraisal of the project will include the assessment of the environmental and social risks and impacts of associated facilities. Client will be required to ensure that the environmental and/or social risks and impacts arising from associated facilities are managed and mitigated in accordance with applicable Albanian law and the objectives of the PRs. To the extent that the associated facilities cannot be structured to meet the objectives of the PRs, the project appraisal will identify the environmental and/or social risks and impacts that such associated facilities may present to the project.

8.2.4 Operation Maintenance Phase

Public Informing, during AIC operation, is related almost to the AIC administrative body, but not only. Also the Regional Local authorities and other national ones, related to the impacts that may cause the AIC operation, or AIC effectiveness, should be part of Public Informing.

- Public Informing during AIC operation is obligation of the related Governmental Agency, in AIC case;
- ARA (road maintenance and traffic),
- MTE (environmental effects and impacts in Protected Areas),
- NEA (specific effects on environmental quality)
- Agency for Water Resource Management (Effects of AIC operation in Water basins/Valleys),
- MARD (AIC effects on irrigation systems and related draining channels),
- National Institute of Cultural Heritage.

The public reporting may be obligation of other National and Regional/local Administrative units, related to the type, dimensions and significance of the issues. The Public disclaims, comments, suggestions etc., may be raised/directed also to the "Shqiperia qe Duam" portal. From this portal, the government follow the issue and give solutions.

8.3 Administration and Regulation of Environmental Obligations

8.3.1 Management Structure

The Contractor must compile an organogram illustrating the management structure for inclusion within the final EMP. This organogram should depict the organization structure of the Contractor, and must contain supporting documentation to demonstrate the environmental responsibilities, accountability and liability of the Contractor s employees. The Contractor should assign responsibilities for the following:

- Reporting structures.
- Actions to be taken to ensure compliance.
- Overall design, development and implementation of the ESMP.
- Documenting the environmental policy and strategy.
- Implementing the ESMP in all stages/phases of the Project.
- All the aspects which require action under the other core elements and sub-elements of the EMP.
- All official communication and reporting lines including instructions, directives and information shall be channeled according to the organization structure.

8.3.2 Roles and Responsibilities

The parties involved in the implementation of the ESMP are the following:

Ministry of Infrastructure and Energy (MIE)

MIE/ARA is the applicant and will therefore be the entity monitoring the implementation of the ESMP. However, if MIE appoints Contractor/s to prepare an ESIA per each section, which will prepare related detailed EMP per each of the AIC sections, then the successful Contractor responsibilities are summarized in the section that follows.

Contractor

The Contractor shall:

- prepare the ESMP documentation to ensure that all third parties who will carry out all or part of the Contractor obligations under the Contract will consider also with the requirements of this ESMP;
- be responsible for the overall planning of implementation of the ESMP in accordance with the requirements of MIE and the environmental permits requirements and for obtaining any environmental permits, which are required for the design, construction and operation of the AIC.

Environmental and Social Advisor

The Contractor shall define the roles for appoint a nominated representative of the Contractor as the Environmental and Social Advisor (ESA) for the contract. The ESA will be site-based and shall be the responsible person for implementing the environmental provisions of the construction contract.

Environmental and Social Expert

For the purposes of implementing the conditions contained herein, the MIE shall appoint an Environmental and Social Expert (ESE) for the contract. The ESE shall be the responsible person for ensuring that the provisions of the ESMP as well as the environmental authorization are complied with during the life of the contract. The ESE will be responsible for issuing instructions to the Contractor and where environmental considerations call for action to be taken. The ESE shall submit regular written reports to MIE, but not less frequently than once a month.

8.3.3 Implementation Schedule

The timing, frequency, duration of mitigation measures and monitoring should be included in an implementation schedule, showing phasing and coordination with procedures. Taking into account the ESIA and Technical Report/Designs, the maximum period planned for construction should be foreseen.

8.3.4 Reporting

Before the Contractor begins each construction activity, the Contractor shall give to the ESE a written

method statement setting out the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology and/or specifications for impact prevention for each activity or aspect.
- Methodology and/or specifications for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures.
- Treatment and continued maintenance of impacted environment.
- The progress reports to be prepared by the Consultant, will include data and information on health and safety (accidents and incidents), environmental protection (spill and non-compliance), labor (numbers, grades, problems), community relations (complaints, issues), and relevant training.

After reporting is done, the following steps have to be carried out, which will be analyzed more at ESIA stage:

- Good Housekeeping from the contractor's side
- Record Keeping from the ESE' s side
- Document Control procedure from the Contractor's side
- Environment and Health Training and Awareness from the ESE's side
- Emergency Preparedness from the Contractor' s side
- Performance Indicators and Targets (agreed upon by MIE, the EE and the Contractor, and included within the final ESMP)

8.3.5 Environment and Health Training and Awareness

A training needs analysis shall be conducted by the ESE to identify the appropriate environmental and health training programmes, and the appropriate target groups amongst the employees of the Contractor. The results of the environment and health training needs analysis shall be included in the final ESMP.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e., the executive, middle management and labour. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies.
- The significant environmental impacts, actual or potential, as a result of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures,
- The mitigation measures required to be implemented when carrying out their work activities.
- Details of, and encouragement to, minimise the production of waste and re-use, recover and recycle waste where possible.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.
- Details regarding fauna and flora of special concern, including protected/endangered plant and animal species, and the procedures to be followed, should these be encountered during the construction phase.
- Information within the EMP and related documents, including significant Project aspects, impacts and controls
- Health and safety issues

8.3.6 Emergency Preparedness

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause

environmental impacts, throughout the life cycle of the Project. The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements.

8.3.7 Checking and Corrective Action

Under the checking and corrective action, the following have to be taken into account or examined:

- Performance Indicators and Targets
- Non-Compliance
- Monitoring (Performance Audits: Compliance Audits). The following will assist with monitoring: Complaints Register, Inspections, Spot Fines, Penalty Fines, Internal Audits, External Audits, Incident Reporting and Remedy, Verbal instructions, Written instructions, Public Communication and Liaison with Interested and Affected Parties, information distribution

8.3.8 Communication and Grievance Procedure

The MIE/ARA will develop and implement a Public Communication Program to provide ongoing information to the affected Stakeholders and general public about the key relevant environmental and social aspects throughout the future AIC Project execution (including both the construction and operational stages). This Program will build upon the Stakeholder engagement process and Stakeholder Engagement Plan (SEP) already established as part of this preliminary ESIA Report.

The Grievance Form will be available in Albanian and English on the MIE website, https://www.infrastruktura.gov.al and the forms will be available to the public.

The grievance flow chart is provided in the following figure.

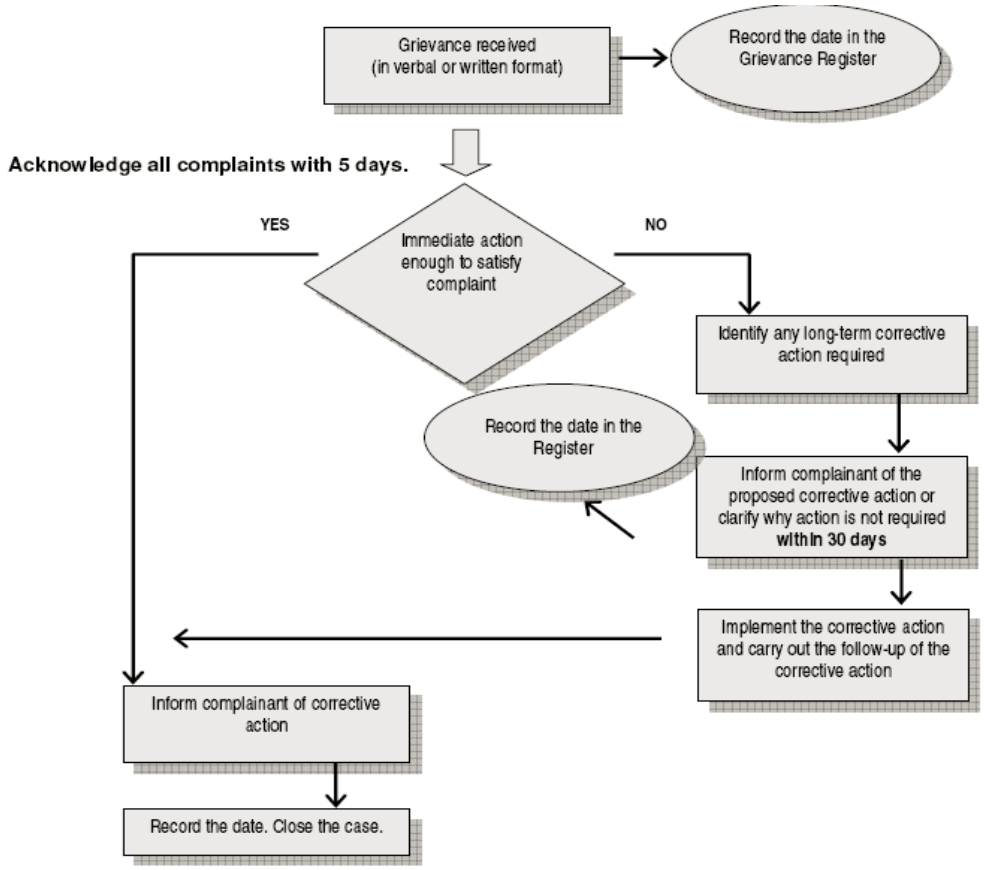


Figure 8-1 Grievance process

The Grievance Procedure will be free, open and accessible to all and comments and grievances will be addressed in a fair and transparent manner.

A Workers' Complaints Mechanism will be established for employees of construction company to raise workplace concerns (in compliance with EBRD PR2). Grievance Form for Workers is shown in Annex C. The Directorate of Project implementation will ensure that the responsible Directorates respond to complaints within 30 days from the date of their acceptance. If the Ministry is not able to address the particular issue raised through the grievance mechanism or if action is not required, the complainants have the opportunity to seek legal remedies in accordance with the laws and regulations of the Republic of Albania.

The basis for this Program will be outlined on the Project Company Project website, supplemented with the use of mass media, bulletins, brochures, emails, direct mailings and other communication forms to reach the affected Stakeholders. At a minimum, the MIE/ARA will provide information on an annual basis to the local neighborhoods to keep them updated on the Project schedule and when, where and which activities are planned. This provision of information will be coupled with the availability to the Stakeholders of the Grievance Procedure, as already begun to be implemented as part of the ESIA process (as described in the SEP).

The Grievance Procedure provides Stakeholders with a way to formally register any complaints/ grievances to the MIE/ARA about any part of the process of the Project implementation.

The Grievance Procedure will be updated as appropriate during the course of the AIC Project and subsequent operational stage. The Construction Contractor will also be required to give a "quick and realistic response" procedure, to react as efficiently as possible to stakeholder concerns, without necessarily having to first go through the formal grievance process with MIE/ARA.

8.3.9 Management Review

A formal management review needs to be conducted on a regular basis in which the monthly internal audit reports written by the ESE and based on frequent inspections and interactions with the ESA based on the latter's daily reports, audit reports by the independent external auditor will be reviewed. The purpose of the review is to critically examine the effectiveness of the ESMP and its implementation and to decide on potential modifications to the ESMP as and when necessary. The process of management review is in keeping with the principle of continual improvement.

8.4 Environmental and Social Monitoring Plan

Monitoring is a tool to assess environmental conditions and trends, support policy development and its implementation, and develop information for reporting to national policymakers, international forums and the public. The monitoring program refers to both construction and operational phase and deals with the natural and social parameters.

The characterization of impacts chapter defines how important is the evaluation of mitigation measures caused by the construction works or wrong implementation of mitigation measures as well as during the operational phase.

Taking into account the environmental parameters, it is a necessity to build an effective monitoring program on road-related to soil erosion in order to check the effects of armored roads on soil erosion by water, make use of related structural designs that facilitate soil erosion processes and use available approaches for assessing road-related soil erosion/slides and the available erosion/slides control techniques. Monitoring of road-cut and fill embankments with steep slopes and little vegetation cover, as well as the concentration of runoff from the road surface and intercepted subsurface flows may lead to additional monitoring of hydrologic and geomorphic processes. The monitoring parameters could assist in understanding the nature and severity of road-related erosion/slides and can help guide future development and erosion control efforts. Therefore, what still needs to be done during the pre-construction and construction stage is to fully understand the underlying determinants of soil erosion related to road design and construction to limit the

effect of embankments; to quantify road-related soil loss and to evaluate the effectiveness of erosion control methods on both road-cut and fill embankments. Monitoring of river bodies and banks changes during construction works and operational phase remains crucial to evaluate how mitigation measures have been effective, while monitoring of soil pollution has also an important significance, not only for soil itself, but also for possible transfer of the impacts in waters and air.

The main purpose of the waste indicator is to measure the pressure on the environment of the total amount of generated waste and waste by category. Soild and hazardous waste monitoring is weak in Albania. The waste intensity represents a driving force indicator and shows response to environmental footprint of construction activities.

Monitoring of motoway/road air and noise pollution is poor for many Albanian inhabited areas. Monitoring of transboundary air pollution also needs strengthening (Buna River Section 1). Information on pollutant emissions is necessary for the assessment of transboundary air pollution and for international cooperation to address this problem.

Pressures on freshwater resources are exerted by overexploitation and by pollution. Relating resources abstraction to renewal of stocks is a central issue in sustainable freshwater resource management. If a significant share of a country's water comes from transboundary rivers (Buna River – Section 1), tensions between countries can arise, especially if water availability in the upstream country is greater than in the downstream one. Monitoring of groundwater will be focused on possible contamination by pollution transfer to recharge areas, or overexploitation for construction purposes.

The biodiversity indicator provides a means to measure the response to the degradation of ecosystems and the loss of biodiversity by the construction/operation of AIC. It demonstrates the extent to which areas important for conserving biodiversity, scientific research, recreation, natural resource maintenance and other environmental values are protected from incompatible uses. The Buna Protected Landscape, remains a very important object for biodiversity monitoring, not only because it is a protected area with high landscape values, but because it is an international river, rich in regional significant species.

Social health and safety, Land and Property, Community Health, Safety and Security, Community Tensions, Access and Severance, Vulnerable Groups, Workforce related impacts and Issues, Cultural Heritage are considered as very important indicators for social assessment. By such indicators are evaluated how negative impacts are reduced or controlled and the efficiency of mitigation measures implemented. If such indicators shows a high level of impacts, public disclaims and protests are expected and road construction and operation may have adverse impacts in compares with its objectives and goal. Also with Economy/Employment (positive impact), Education and Training (positive Impacts), may be evaluated how are the positive impacts expected by AIC construction and operation.

Social health and safety, Land and Property, Community Health, Safety and Security, Community Tensions, Access and Severance, Vulnerable Groups, Workforce related impacts and Issues, Cultural Heritage are considered as very important indicators for social assessment. By such indicators are evaluated how negative impacts are reduced or controlled and the efficiency of mitigation measures implemented. If such indicators show a high level of impacts, public disclaims and protests are expected and road construction and operation may have adverse impacts in compares with its objectives and goal.

The purpose of monitoring of Land and Property indicators is to assess whether or not the resettlement process was carried out as per RALF/RAP and EBRD PR5 and the Grievances process and complaints are addressed properly.

Monitoring of Health and Safety parameters in the settlements, recreational areas, monuments etc, at least up to 200m., far from buffer of AIC alignment will be measured to ensure that all mitigation measure proposed to minimize and/or avoid impacts has been effective and will make sure that there is an adequate control. It will also enable early detection of harmful changes to health and safety.

Community tension is a state of community dynamics which may potentially lead to disorder, threaten the peace and stability of communities or raise the levels of fear and anxiety in the whole, or a part of the local community. Monitoring of Community tensions indicators will help to evaluate local community dynamics and identify potential or actual tensions, to take information on any accidental damage of assets,

accessibility etc. Data gathered from monitoring will be used to minimize the potential negative effects of tension, prevent escalation and reduce conflicts as well as to inform and support the management of critical incidents.

Data generated form monitoring of access an severance indicators will be used to evaluate the effectiveness of management measures applied mitigating the predicted impacts during phases of implementation of the project; i.e evaluation of temporary infrastructure, damage of infrastructure and installation of existing infrastructure at last in the same conditions as prior construction works and response of community due to impacts on access and severance.

Issues related to workforce during project implementation will come from non-compliance of measures determined by the Albanian legislation in force and also non-compliance with legislation in force and international standards and practices in aspects of health and safety at work, employment and work practices. Equitable access to fairly paid employment with reasonable and safe working conditions is an essential element of any poverty reduction strategy. Monitoring of workforce indicators will evaluate whether or not the worker health and safety measures, workers' rights and employment standards are implemented in respect with legislation in force and EBRD PRs during the construction/operation of AIC.

Monitoring of identified sites where vulnerable groups will be affected by construction and operation of the AIC will evaluate whether the project continues to be responsive to issues identified during the project planning phase. Monitoring of indicators before starting employment and trainings (during construction) and before operation of AIC will be focused on evaluation of measures taken for non-discrimination of vulnerable groups from employment opportunities during project phases and on how their concerns on these issues have been addressed.

Good management of cultural heritage sites is essential for conservation longevity, preservation of values and enjoyment by the public. Daily, frequent and seasonally monitoring of cultural heritage sites and indicators will focus on observation and reporting of the situation with regard to the threats and the impact of the corrective measure to any chance finds, impacts in cultural, religious, heritage sites, permanent accessibility, related management procedures according to national/local related legislation and approved procedures.

Also, with Economy/Employment (positive impact), Education and Training (positive Impacts), may be evaluated how are the positive impacts expected by AIC construction and operation and estimating these benefits. Economic/employment and education and trainings indicators are used as a means to assess the value of construction and operation of AIC, which

8.4.3 Monitoring during Construction

The Contractor environmental monitoring includes continuous and periodic observations, the recording, storage and treatment of data for environmental and social protection and the reporting of the results to the management and to the affected parties and the general public as sets of primary, calculated or aggregated data and general information in quarterly reports.

Monitoring costs are included in Annex 4 (Bill of quantities). Some of the additional approximate costs, calculated for environmental monitoring such as air, soil and water quality, planting with native species and reforestation/afforestation are included in contingencies costs. In these additional costs is included also the cost for monitoring and reporting the above indicators as a method for monitoring impacts on Community Health Safety and Security. The afforestation costs include also the cost for small plots of woodlands to be afforested for local community recreation areas. These costs can be considered during construction and operational phases. In case of PPPs or concessionary sections, the monitoring frequency, type of analyses, methodology, their costs etc., will be represented and covered by the interested entities and approved by the Ministry of Tourism and Environment (MTE) and the National Environmental Agency, which will be reflected related in Environmental Permit.

All costs proposed should be carefully revised during the preparation of the separate ESIAs, which will clearly define territories to be affected, final approved alignments, detailed mitigation measures and monitoring program, per Section. All sampling and analyses are calculated on an annual basis.

- Air and noise quality – 1000 EUR sampling and analyses of gas emissions and noise per sampling point. The number of sampling points will be defined under the ESIA, since each Section includes different frequency of sensitive receptors and is of different length. Then, the cost could be better estimated.
- Soil quality – 1200 EUR sampling and soil quality analyses (organic and inorganic compounds include pest/herbicides), vibration etc. The number of sampling points will be defined under the ESIA, , so the cost could be better estimated.
- Surface Water quality, in main rivers and natural streams, 1000 EUR per sampling point. The number of sampling points will be defined under the ESIA, so the cost could be better estimated.
- Groundwater quality, 1000 EUR per sampling point. The number of sampling points will be defined under the ESIA per Section, so the cost could be better estimated.
- Afforestation costs have been estimated as 1.000.000 Euros (afforestation in terms of biodiversity of main river valleys (Buna, Drini of Lezha, Mati, Ishmi, Erzeni, Shkumbini and Vjose and its main branches), in both sides of the bridges, that will be constructed for the AIC, as well as small plots of woodlands to be afforested for local community recreation). There are also included costs for the preparation of the sites for planting, growing of seeds/sapling of native species in appropriate sites or tree nurseries and planting costs.

Approximate Costs of SMP and SAP per Sections

Section	SIA, SMP and SAP costs on EURO
Section 1	100000
Section 2	70000
Section 3	70000
Section 5B	100000
Section 5C	70000
Section 6	50000
Section 7	50000
Section 9A2	70000
Section 9B2	100000
Section 10	30000
Section 11	50000
Section 13A	100000
Total	**860000**

8.4.4 Monitoring during Operational phase

During the operation of the AIC, monitoring will be implemented by the central and local government. The PPPs or concessionary Sections may be responsible for monitoring of road operation from the

environmental and social point of view. Still, this monitoring will be oriented and supervised by the environmental and social governmental bodies.

The preliminary Environmental Monitoring Plan describes:

- mitigation measures,
- monitoring method,
- location of points
- frequency of monitoring and
- responsibility (for both mitigation and monitoring).
- provisional cost

Many measures will be checked by simple observation, by records' check, or by interviews with residents or workers, while most of the mitigation measures outlined simply require the Contractor to adopt good site and construction practice. Costs of acquiring land and compensating businesses for loss of income during the construction period cannot be calculated until further studies are carried out; estimates will be provided in the final Resettlement Plan. Many actions in the Environmental Monitoring Plan are to be conducted by the Supervision Consultant, and will be included in the supervision contract. An outline of the monitoring programmes proposed for the construction and operational phases, is presented below in table format. Most of the costs, except for those mentioned above, are calculated and already included in Annex 4 (Bill of Quantities).

Table 8-1 Monitoring plan during construction

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Landscape	Construction sites, camps and ancillary areas, areas of the interchanges, bridges and viaducts and of high cuts	Visual assessment of landscape impact	At commencement date of the Project construction and then every three months	Contractor/ARA Environmental Audits	Included in Supervision Contract	…..
Changes in Geology, geomorphology, erosion/slides and seismicity	Rocks to be cut, soils to be dredged and used for fillings, agricultural, soils of semi managed and managed lands to be directly affected by construction activities	▪ Visual evaluation considering quality and soil/rock structure and proprieties, existence of calcareous water pockets, slope gradient, draining systems and vegetation cover. ▪ Geotechnical analyses for rock characteristics and possibility of transmit of vibrations, sensitivity to slides and collapse phenomenon in tunnel sites, sedimentation and permeability. ▪ Soil physical characteristics and structure in agricultural and managed lands, river/streams valley and channel slopes in sites that will be directly affected by construction works	▪ Once prior starting the construction works. ▪ Seasonally during construction works	▪ Contractor. ▪ DPDIT/ARA supervision ▪ Environmental audits by Regional Administration of Protected Areas (mainly of Shkodra), Environmental, forest and tourism, Regional inspectorate, Regional Environmental Directorates, Institute of GeoSciences, Energy, Water and	Included in the Technical Design, bill of quantities	All Sections, most focus on: Sections 1, 2, 4, 5B, 5C, 9A2, 9B2, 10 and 11
	▪ Cut/fill slopes, river valleys and Hill/mountain slopes to be affected directly by construction works ▪ Soil disposal in construction sites	▪ Volumetric Survey on loss of surface soils by erosion or by changes in topography (cut/fills).	Once prior starting construction works			

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
	▪ Slopes and valleys, upper soils level, green cover and soil stability ▪ Sites to be exploited for raw material (quarries, borrow pits) ▪ Topsoil stockpiles	▪ Site observations and visual inspection of works on sites prone to erosion and slide ▪ Volumetric Surveys and inspection of works for slope rehabilitation and erosion control ▪ Visual observation of works for extraction of raw material (gravel and pits) ▪ Visual evaluation of compatibility of quarries exploitation ▪ Site observations and visual inspection of disturbed areas for top soil erosion and of top soil stockpiles for erosion.	At the end of the works for slopes stabilization and re-vegetation Monthly with selected areas inspected after heavy rainfall events at the discretion of the environmental manager	Enviroment (IGEWE)		
	▪ River bodies and valley slopes, bridge and viaduct sites, channel slopes etc. ▪ Focused mostly on Drini of Lezha, Mati, Ishmi, Erzeni, Shkumbini, Vjosa and its branches Rivers ▪ -River bodies and valley slopes, defined as prone of erosion/sedimentation.	-Evaluation of expected changes in river morphology, areas prone to sedimentation and erosion, sites to be constructed viaducts and bridges, defining of monitoring sites etc. -Site observations and visual inspection Morphometric measurements	Once prior starting construction works. Daily during works in river/stream/channel bodies Monthly till the end of constructions in water bodies.			

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Soil pollution	▪ Soils to be dredged, cut/fill, work campus, and all sites directly affected by road construction and its facilities etc. ▪ Areas for spills and leaks which might impact top soil quality and ultimately groundwater recharge areas.	▪ Soil quality analysis ▪ Content of pesticides/herbicides, organic and inorganic elements (in accordance of land use and possible soil pollution sources), 2 sampling stations per sections, 4 times/year (seasonally), sampling and analyses ▪ Contractor records, site observations and visual inspection of unannounced sampling for particle size distribution, soil reaction, soil compaction etc.	One set of analyses, prior starting the construction Seasonally (4 times/year), sampling/analyzing and monitoring during construction phase.		▪ Included in the Technical Design, bill of quantities. ▪ Additional Soil quality analyses, 1200 Euros per measurement point	All Sections, mostly focused on Sections 1, 4, 5B, 9A2-13.
Seismicity	Along the whole corridor with focus on sensitive sites to earthquakes, slopes, unstable rocks, tunnels, interchanges, underpasses, viaducts, bridges etc.	▪ Evaluation of seismic norms of construction according seismicity parameters and map	Once before starting the construction works Seasonally during construction works			All sections
Wastes	▪ Waste storage areas ▪ Toilets and septic tanks in working campus ▪ Waste transport vehicles ▪ Accidental waste distribution	▪ Contractor observation and records, site observations and visual inspection of areas for draining and temporal collection of spills and leaks which might impact on soil quality, surface and ground waters. ▪ Visual observation of sites sensitive to leakage, or solid waste distribution by wind activity. ▪ Visual observation of cleaning, maintenance and disinfection of temporary toilets, septic tanks,	Daily	▪ Contractor. ▪ DPDIT/ARA supervision ▪ Environmental audits by Regional Administration of Protected Areas (Almost Shkodra ones), Environmental, forest and tourism		All Sections, focus mostly on Sections 1, 4, 5B, 9A2-13A

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		▪ Contractor observation and records, on temporary disposal sites of solid waste, their selection, charging in equipment for solid waste transfer ▪ Checking of vehicles for wastewaters and solid transfer, to be sure that no accidental leakages or solid waste fall down, during the transport. ▪ Observe and record of the cleaning and disinfection of waste sites.		Regional inspectorate Regional Environmental Directorates		
Air quality, dust and noise	▪ Territories close to inhabited, areas and settlements, natural habitats and woodlands, recreational areas and surrounding sites ▪ Crossings and interchanges ▪ All construction sites, camps and ancillary areas.	▪ Inspection and visual observation for disturbance of gases and dust emissions from construction sites. ▪ Air monitoring procedures will be implemented at sensitive receptors that will be defined in the baseline of the ESIA per Section along the motoway ▪ Monitor complaints of affected population ▪ Complaints register ▪ Air (NOx, SO2, PM10, CO2, CO, O3) etc., dust (PMs) and noises (dB) monitoring procedures will be implemented at sensitive receptors as will be defined by pollution sources that will come up in ESIA findings ▪ Visual checking of gas emissions for signs of not appropriate emissions from vehicles and equipment. Air monitoring	▪ Daily – supervisions and visual observations ▪ Regular monitoring of air and noise 4 times/year, ▪ Unannounced inspection during material delivery ▪ Quarterly during construction works for air ▪ Increased frequency during dry season for air ▪ In the beginning and	▪ Contractor. ▪ DPDIT/ARA supervision ▪ Environmental audits by Regional Administration of Protected Areas (mainly of Shkodra), Environmental, forest and tourism Regional inspectorate, Regional Environmental Directorates, Regional Directorates of Public Health,	▪ Included in Supervision Contract ▪ Air quality and noise analyses, 1000 Euros per measurement point ▪ Noise barrier estimation in the Bill of Quantities 23.107.920 Euros	All Sections, focus on Sections 1, 4, 5B, 9B2 and 10

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		procedures will be implemented if disturbance will be identified or by community or workers complaints. If it will be exceedance of gas discharges or dust and noise generation, from the levels provided by profound ESIA and Environmental Permit, the works should be stopped and restart only after restoring of situation described on above mentioned documentation. ▪ Noise monitoring with hand held analyser with application software	then bimonthly for noise			
Climate change	▪ Sites sensitive to floods, ▪ Erosion and slides in slopes by heavy rain ▪ Exposed lands without green cover, woodland and forests, agricultural lands, settlements	▪ Inspections and observations of draining channels, underpasses, earth cuts and fills, in respect of mitigation measures due to floods. ▪ Measure the flood level and assets affected, in case of floods, and if needed propose amelioration of flood control measures. ▪ Record of public disclaims on risk of floods. ▪ For monitoring of GHGs, please refer to the row above (air quality) ▪ Observe the resistance and/or erosion or risk to slides in slopes during construction etc. ▪ Visual evaluation of erosion and slides in the sensitive sites and record the soil resistance during heavy rains	▪ Days with heavy rain. ▪ Twice per year (Springtime and winter)	▪ Contractor ▪ DPDIT/ARA supervision ▪ Environmental audits by Regional Administration of Protected Areas (mainly of Shkodra), Environmental, forest and tourism Regional inspectorate, Regional Environmental Directorates, Regional Water Board	Included in Supervision Contract	Sections 1, 2, 4, 9A2, 9B2 on floods and pollution, Sections 5B, 5C, 9B2, 10 and 11 on fires and erosion/slides

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Surface waters	▪ As all construction sites 100m far from the bridges, downstream on the river and 20m far from the bridge, upstream of the river. ▪ 10-100m (to be defined by profound ESIA), far from the discharge sites (in case of atmospheric events), and 10m far from the discharge sites upstream of the running water body. ▪ Draining system collectors used during construction works	▪ Surface water monitoring of main rivers, through water analysis of water turbidity and suspended solids, pH, TSS, electrical conductivity, temperature, dissolved oxygen, oil and grease, heavy metals, chlorides, sulphates, ammonia, nitrites, nitrates, TOC. Such analyses will be done in at least two sampling stations per running water body, while this be more specified under the ESIA needs ▪ Visual checking of construction sites for drainage pipes, oil interceptors and bridges. ▪ Visual observation and record of emptying and cleaning of draining system collectors.	▪ Seasonal/ 4 times/year, regular monitoring ▪ Daily, visual observation of surface waters and possible leakages. ▪ Additional analyses in case of accidental pollution	▪ Contractor, ▪ Supervisor, ▪ Environmental audits by Regional Environmental Agencies, Regional Directorates of Public Health	Monitoring of surface water quality, 1000 Euros per sampling point	All Sections, more focus on Sections 1 and 9A2-13A (Vjosa river).
Groundwater	At all construction areas close to groundwater recharge areas (hydro-geological windows)	▪ Visual checking of groundwater discharges during excavation works for contamination and ensuring that these are sealed efficiently. ▪ Visual observation of leakages from solid wand wastewaters, used waters for washing cars and equipment etc. ▪ Site observation of the variation of groundwater level. ▪ In all sites, over recharge areas, monitoring of microbiological, heavy metals and organic parameters in existing wells for extraction of groundwater, should be analyzed. The	▪ Daily, visual observation ▪ Seasonal monitoring of groundwater and analyses ▪ Additional analyses in cases when leakages or other accidental pollution is observed.	▪ Contractor ▪ Supervisor, ▪ Environmental audits by Regional Environmental Agencies, Regional Directorates of Public Health	Included in Supervision Contract, 1000 Euros per measurement point	All Sections, but focused more on Sections 1, 3, 4, 5B, 5C, 9B2-13,

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		chemical parameters, to be analyzed should be referred to the possible pollution/contamination elements but in case that not any specific pollutants is defined they should be focused on: pH, Electrical Conductivity, TDS, Hardness, Ca-Hardness, MgHardness, Ammonia-N, Ca, Mg, Na, K, Cl, SO4, NO3-N, NO2-N, F, PO4, Al, Fe, Mn, B, Cr, Cr6+, Cu, Pb, Si, COD, SS, Oil/Grease, Turbidity, Bicarbonate, E.Coli, F. Coliform, T., Coliform, Streptococci and Enterococci Ion balances				
Biodiversity	All terrestrial natural sites and agricultural lands, natural running waters and streams, main irrigation/draining channels.	▪ Observe the implementation of the project in Protected Area territory (Buna River Protected Landscape), in compliance with findings of PA management plan. ▪ Field surveys, site observations and visual inspections of all sensitive habitats. Check of: ▪ Number of accidents with fauna ▪ Number of fauna (using testimonies, photos of species or their tracks etc) in surroundings of construction sites, -Identify wildlife species using wastes or water courses as food, or construction material etc., for shelter.	▪ Daily observation and record of construction woks in the territory of Buna River. ▪ Weekly observation for plants and wildlife, tracks of wildlife in bio-corridors left, status of fences etc, to protect nests, etc. ▪ Seasonal inventory of registered flora/vegetatio	▪ Contractor ▪ Supervisor ▪ Environmenetal audits by Regional Environmental Inspectorates	▪ Included in Construction and supervision costs. Technical Design, bill of quantities ▪ Biodiversity - Afforestation as environmental compensation measures, 1.000.000 EUR, as environmental Compensation,	▪ All Sections, more focus on sections 1, 9B2 and 10

Construction phase						
Environmental Indicators						
Environmental and Social parameters	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		▪ Number and species of plants cut ▪ Number of trees and bushes planted ▪ Registering of damaged species with specific status. ▪ Percentage of completion of required measures, including: passages, barriers, surveys for reptiles, amphibians and bird nests. ▪ Percentage of implementation of mitigation measures, such as delimitation of clearance area, use of existing road network, fencing for protection of river banks and other specific natural terrestrial habitats, timing of works, checking rocks and bunkers for bat nests/groups. ▪ Percentage of existing and new roads used for the Project to assess additional fragmentation ▪ Photographs to compare habitats before and after restoration activities, and evaluation of rehabilitation with definitions of BMP/BAP, Pre / During / Post Construction Survey	n and wildlife with specific status.		500.00O Euros maintenance	

The Social Monitoring Programm, should be focused on all project activities, which generate negative or positive impacts or risks for socio-cultural impacts.

The preliminary Social Monitoring Plan describes:

- Monitoring of social mitigation methodologies and measures,
- Sensitive sites, from the social point of view,
- Efficiency of monitoring methodologies,
- Sharing of responsibilities and duties (for both mitigation and monitoring).
- The cost of social monitoring plan, is included in Environmental management Plan (soil, air, water etc quality), as well as in bill of quantities (Annex 4, given in Conceptual Technical Design).

Supervision and monitoring of construction work and mitigation measures, remains crucial activities, to avoid as much as possible social negative impacts from AIC construction. The monitoring indicators and targets, the sites to be monitored etc, will be defined in next phase of the project by profound ESIAs.

Table 8-2. Monitoring plan during construction

Construction phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Land and Property	▪ Resettled household and all affected assets	▪ Audit to assess that resettlement was carried out as per LARF/RAP and EBRD PR5, Grievances / complaints ▪ Indicators specified in LARF/RAP	▪ Ones before starting the RAP. ▪ Another, after RAP is implemented	▪ State Agency of Expropriation	▪ Included in Construction and design/ supervision cost, Bill of quantities (Annex 2), of Technical Report	All sections, almost sections 5B, 1, 2, 6, 7, 4.
Community Health, Safety and Security	▪ Settlements, recreational areas, monuments etc, at least up to 200m., far from buffer of AIC alignment.	▪ Seasonally monitoring and reporting air quality, dusts and hush, beyond the borders of AIC buffer area, (please refer also to monitoring of air quality on natural environment monitoring program. ▪ Visual observation of safety barriers, barriers for going through the working	▪ Daily visual and olfactory observation, of pollution, and recording in cases of inconsistency with the status required by Environmental	▪ Contructor ▪ Supervisor ▪ Regional Environmental Inspectorates,	▪ Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections, except section 10

Construction phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		sites or campus of inhabitants, barriers on noises, dusts and gases, and signage. ▪ Monitoring of Community health and safety awareness activities. ▪ Consultation on changes of health conditions of the community close to the alignment and prone to health issues that may be generated from construction works. ▪ Monitoring accidents and near misses. ▪ Monitoring of cleaning and disinfection of portative toilets, bathrooms, drinking water quality, maintenance of septic tanks etc. ▪ Observing the compliance of respecting of health and safety working conditions, approved by permits and required by Albanian legislation. ▪ Record cases of risk for accidents in work, missing of safety closes etc. ▪ Record and evaluate complaints from residents through the grievance mechanism ▪ Monitoring of surface and groundwater quality as it is described in Monitoring Program of Natural Environment ▪ Visual observation of possible pollution or disturbance from air/water/soil contamination. ▪ Olfactory observation/evaluation and recording of not appropriate odors. ▪ Monitoring of solid waste and wastewater management, as it is	permit and national legislation. ▪ Seasonally measurements of air, soils and waters quality, as it is required by natural environments monitoring program.	▪ Regional Environmental Directorates ▪ Municipality Directorate of Hygiene ▪ Municipal public health services	▪ Additional cost related to air quality, noise, groundwater quality and surface water quality monitoring analyses included on environmental monitoring program are also relevant for this parameter of socia aspect. Air quality and noise analyses, 1000 Euros per measurement point Monitoring of surface water quality, 1000 Euros per sampling point Monitoring of groundwater quality Included in Supervision Contract, 1000 Euros per measurement point	

Construction phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		required in monitoring plan for natural environments ▪ Medical assistance for monitoring sensitive community health due to diseases transmission, viruses etc. ▪ Daily observation of post-telecom services, efficiency of accessibility, etc., in respect of contingency in case of emergency				
Community Tensions	▪ All sites where local population is affected (recreational areas, agricultural sites, cultural and heritage monuments, infrastructure and settlements	▪ Evaluation of employments of native and local working force and expertise in % in compares with total employment ▪ Monitor and record tensions and conflicts by unequal rights to temporary accessibility and services ▪ Record and inform on accidental damage of assets, accessibility etc. ▪ Inform on the time related to restore the damaged infrastructure and assets or/and for their compensation ▪ Record local population disclaims	▪ Daily ▪ Seasonally	▪ Construction contractor, ▪ Supervisor ▪ Municipalities	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections except section 10, almost focused in 1, 4, 5B, 6 and 7, 9B2
Access and Severance	▪ All sites where infrastructure and settlements/assets will be affected	▪ Observing and evaluation of infrastructure net (access roads, telecommunication, electrical net, irrigation draining systems, in relation with interventions during construction phase ▪ Recording issues and restoration time, for repairing of damaged infrastructure ▪ Observe and evaluate functioning of temporary infrastructure, till the end of works and install of existing infrastructure at last in the same conditions as prior construction works	▪ Daily	▪ Construction contractor, ▪ Supervisor ▪ Municipalities	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections, except section 10, focused almost sections 1, 4, 5B, 9B2

Construction phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		▪ Record local community compliance and represent it at contractor and local/national relevant authorities				
Economy Employment (positive impact)	▪ Working sites and campus ▪ Sites of influence to Local population	▪ Verification and records of employment ratio between local community and others. ▪ Evaluate how calls for trainings and employment are reachable to the local community. ▪ Evaluate how working experience and trainings are compatible with work conditions and requirements.	▪ Seasonally and before starting training sessions.	▪ Construction contractor ▪ Supervisor ▪ Regional/ Municipal work office	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All Sections, focused almost sections 1, 3, 4, 5B, second part of section 9B2 and section 10
Education and Training (positive Impacts)	▪ Working sites and campus ▪ Sites of influence to Local population	▪ Observing and evaluation of the trainings seasons of workers ▪ Observing and evaluating how training seasons are compatible with environmental/social specifications. ▪ Record community complains according to employment and trainings	▪ Ones before starting trainings ▪ Ones during training sessions.	▪ Construction contractor ▪ Supervisor ▪ Regional/ Municipal work office ▪ DPDIT/ARA	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections, focused almost in section 3 and second of 9B2
Vulnerable Groups	▪ Sites where vulnerable groups are affected by construction works	▪ Record and evaluate how % of the people from vulnerable groups are involved in construction works, their percentage in compares with affected vulnerable groups, trained persons from this groups etc. ▪ Record and present the concerns of vulnerable groups to trainings and employments.	▪ One before starting employment ▪ Ones before starting trainings	▪ Construction contractor ▪ Supervisor ▪ Regional/ Municipal work office	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections, almost focused in sections 1, 2, 4, 9A2 and 13.
Workforce related impacts and Issues	▪ Working sites and campus	▪ Evaluate how the working contracts, social and health insurance, are in respect with Albanian legislation and much with EBRD PRs.	▪ Daily	▪ Construction contractor ▪ Supervisor	Included in Construction and design/ supervison cost, Bill of quantities	All sections, almost section 1, 4, 5B, 9B2

Construction phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		▪ Observe and record any discrepancy on working hours, holidays, medical reports with working contracts and legislation		▪ Regional/ Municipal work office	(Annex 2), of Technical Report	
Cultural Heritage	▪ Any site when will be found cultural or heritage assets ▪ Religious objects and monuments, cemeteries, cult and historic areas, in vicinity of working territories. ▪ Cultural Monuments in vicinity of working sites.	▪ Observe and report any chance find, and monitor their related procedures according to national/local related legislation and approved procedures. ▪ Record any chance finds and report on its management procedures. ▪ Observe and report any accidental impact on religious, cultural and heritage monuments/sites. ▪ Observe the permanent or temporary accessibility to the Cultural Monuments, in case that such access is impacted by construction works. ▪ Record complains for impacts in cultural, religious, heritage sites	▪ Daily monitoring of impacts in cultural, religious and heritage sites or objects ▪ Frequent observing, recording and informing on chance finds and their management	▪ Construction contractor, ▪ Supervisor ▪ Regional Directorate of National Culture ▪ National Institute of Cultural Heritage.	Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All sections, almost focused in sections 9B2 and 13.

Table 8-3 Monitoring plan during operation

Operational phase						
Environmental Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility and third parties**	**Provisional cost**	**Sections**
Landscape		Visual inspection for signs of erosion, poor vegetation cover, poor maintenance conditions of highway elements.	At the end of construction activities Once a year during spring time	ARA/Subcontractor	General maintenance budget	
Geology, geo-morphology, soil pollution and seismicity	▪ River and stream valley, in surroundings of viaducts and bridge foods, reopened, rehabilitated or new draining/irrigation channels ▪ Slopes of cuttings, embankments, other areas prone to erosion	▪ Soil monitoring ▪ Visual observation of landslides, erosion and de-vegetation in slopes prone to erosion ▪ Observation of vegetation status planted for soil stabilization ▪ Visual observation on changes in river flows and morphology, by viaducts, food of the bridges. ▪ Monitoring on changes on river sedimentation in river body and banks. ▪ Observation of stability of agricultural channels reopened or opened because of the AIC construction and operation needs. ▪ Visual inspection of the motoway for spills and leaks which might impact soil quality (and ultimately potentially	▪ Seasonally (four times per year), 2 samples per sections for soil monitoring ▪ For the rest, at a quarterly basis ▪ Before operational activities and Periodically	▪ National Environmental Agency (NEA) ▪ Regional Environmental Directorates ▪ Ministry of Tourism and Energy ▪ DPDIT/ARA ▪ Affected Municipalities	Included costs for soil quality monitoring in the governmental budget for monitoring of roads	All Sections, with priority at Sections 1, 2, 4, 5B, 5C and 9A2-13A

Operational phase						
Environmental Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility and third parties**	**Provisional cost**	**Sections**
		groundwater), monitoring of particle size distribution, soil reaction, calcium carbonate content, organic matter content, EC (due to use of salt on roads), soil compaction	during operation: quarterly for the first year and then annually thereafter			
Waste	▪ Sites close to the waste collectors of road services, such as car repair machine shops, rest areas, fuel pumping stations etc. ▪ Sites of accidents, such as car accidents, leakages or explosions of pumping stations, and other services.	▪ Monitoring of waste management, waste vehicle routes and their frequency	▪ Daily for waste management	▪ Municipal Waste Service contracted for waste collection.	Included in the governmental budget for monitoring of roads	All sections, mostly focus on Sections 1, 5B, 9A2-13
Air quality, dust and noises	▪ Areas with sensitive residential receptors and passenger sensitive locations. These receptors will be identified in the baseline chapter of the ESIA per Section along the AIC ▪ Regarding noise, areas where Lday exceeds 55dB and Lnight exceeds 45 dB	▪ Monitoring of air quality (NOx, SO2, PM10, CO2, CO, O3) etc., dust (PMs) and noise (dB), ▪ Measurement of vibration at sensitive receptors	▪ Before operational activities and Periodically during operation: twice a year during year 1 and then once a year	▪ National Environmental Agency with Respective Regional Environmental Directorates	Included in the Environmental Monitoring budget of government	All Sections
Climate change	▪ Along the AIC ▪ Sites prone to floods and heavy rains such as river valleys	▪ Monitoring of pavement surface ▪ Observation and recording of effects during heavy intensive rains or floods, recording of maximal level of water	▪ Once per year for pavement monironing ▪ After every heavy rain or flood.	▪ DPDIT/ARA ▪ Affected Municipalities, ▪ Regional boards of emergencies	Included on Environmental Monitoring budget of government	All Sections, mostly for Section 1, 2, 9A2-13A
Surface waters	▪ Affected surface water body ▪ Collectors of road draining channels.	▪ Only in the event of accident ▪ Collect using pumps, buckets and tanks. For bigger watercourses use floating barriers and skimmers and absorption aids	▪ Monthly, observing the efficiency of services on maintenance of draining	▪ National Environmental Agencies with affected Regional	Included on Environmental Monitoring budget of government	All Sections, but mostly focus on Sections 1,

Operational phase						
Environmental Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility and third parties**	**Provisional cost**	**Sections**
		▪ Water quality of the main rivers, 2 sampling station, per each of the rivers, natural streams and channels in vicinity of the alignment, parameters may focus on water turbidity and suspended solids, pH, TSS, electrical conductivity, temperature, dissolved oxygen, oil and grease, heavy metals, chlorides, sulphates, ammonia, nitrites, nitrates, TOC ▪ Visual evaluation or analyses if needed of possible pollution/contamination of the natural rivers/streams by flashing of draining waters into the natural running water in atmospheric events. ▪ Evaluation and recording of frequency of emptying and cleaning of the collectors of draining system	system and related collectors. ▪ Seasonal (4 times per year), 2 sampling stations, for surface water monitoring and analyses.	Environmental Directorates ▪ Regional Agency of Protected Areas of Shkodra (Section 1, Buna river)		2, 4, 5B, 5C, 9A2-13.
Groundwater	▪ Aquifers close to the road's draining systems or close to the sites when happens incidental pollution/contamination ▪ Areas close to hydrogeological windows	▪ Physio-chemical and microbiological analysis of groundwater water, monitoring of ground water quality on pH, Electrical Conductivity, TDS, THardness, Ca-Hardness, Mg Hardness, Ammonia-N, Ca, Mg, Na, K, Cl, SO4, NO3-N, NO2-N, F, PO4, Al, Fe, Mn, B, Cr, Cr6+, Cu, Pb, Si, COD, SS, Oil/Grease, Turbidity, Bicarbonate, E.Coli, F. Coliform, T. Coliform, Streptococci and Enterococci Ion balances	▪ Just before commencement date of motoway operation and then periodically during the operation: once a year ▪ Immediately after incidents, in case of accidental	▪ National Environmental Agencies with affected Regional Environmental Directorates	Included on Environmental Monitoring budget of government	All Sections, mostly focus on Sections 1, 2, 4, 5B, 5C, 9A2-13.

Operational phase						
Environmental Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility and third parties**	**Provisional cost**	**Sections**
		▪ Weekly monitoring of the water quality from the tank will be undertaken to assess for any pollution.	pollution contamination.			
Biodiversity	▪ Buna River (Section 1), 100m far from each side of the Buna Bridge. ▪ All river and stream valleys. ▪ Natural barriers on air pollution, noises and dusts. ▪ All bio-corridors, underpasses, tombines, range of trees/bushes in agricultural channels, ▪ Reforestation/afforestation areas.	▪ Use of crossings/passages by wildlife, based on visual observation traces, food remains. ▪ Status of artificial bio-corridors (opened paths, vegetation, water levels, viaducts etc., obstacles ▪ Check growth of shrubs, trees and low vegetation, in natural barriers, reforestation/afforestation areas, river and stream valleys etc. ▪ Road mortality per species or species group	▪ Quarterly ▪ If hot-spots of road mortality are detected, modifications to passages and/or ecological corridors should be considered	▪ Regional Agency of PAs of Shkodra (Section 1) ▪ Regional Environmental, forests and tourism, inspectorates.	Included on Environmental Monitoring budget of government	All Sections, focused mostly on Section 1, 5B, 9B2 and 10.

Table 8-4. Monitoring plan during operation

Operation phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Land and Property	N/A	N/A	N/A	N/A	N/A	N/A
Community Health, Safety and Security	▪ Settlements, recreational areas, monuments etc., at least up to 200m., far from buffer of AIC alignment.	▪ Seasonally monitoring and reporting air quality, dusts and hush, beyond the borders of AIC buffer area, (please refer also to monitoring of air quality on natural environment monitoring program. ▪ Visual observation of safety barriers, barriers for going through the road, those to reduce the noises, dusts and gases, and signage. ▪ Consultation on changes of health conditions of the community close to the alignment and prone to health issues that may be generated from traffic or accidental pollution. ▪ Monitoring accidents and near misses. ▪ Record and evaluate complaints from residents through the grievance mechanism ▪ Monitoring of surface and groundwater quality as it is described in Monitoring Program of Natural Environment	▪ Seasonally measurements of air, soils and waters quality, as it is required by natural environments monitoring program (table below) ▪ Immediately after accidental pollutions.	▪ Municipality Directorate of Hygiene ▪ Municipal public health services ▪ Medical service of affected Municipalities ▪ Road maintenance service of affected municipalities ▪ Road Police	▪ Included in state budget for public health	All sections, except section 10

Operation phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		▪ Visual observation of possible pollution or disturbance from air/water/soil contamination. ▪ Olfactory observation/evaluation and recording of not appropriate odors. ▪ Monitoring of solid waste and wastewater management, as it is required in monitoring plan for natural environments during operation phase ▪ Medical assistance on monitoring for assessing sensitive community health due to disease transmit, viruses etc.				
Community Tensions	▪ Human settlements close to the AIC alignment, (recreational areas, agricultural sites, cultural and heritage monuments, infrastructure and settlements)	▪ Record and inform on accidental damage of assets, accessibility etc. ▪ Inform on the time related to restore the damaged infrastructure and assets or/and for their compensation ▪ Record local population disclaims	▪ Seasonally	▪ Municipality Directorate of Hygiene ▪ Municipal public health services ▪ Road maintenance service of affected municipalities ▪ Road Police ▪ DPDIT/ARA	▪ Included in the state budget	All sections, almost focused in section 1, 4, 5B, 9B2 and 10
Access and Severance	▪ All sites when infrastructure and settlements/assets will be affected	▪ Observing and evaluation of infrastructure net (access roads, telecommunication, irrigation draining systems, and comparison of it with the statement prior starting of construction works. ▪ Record local community compliance and represent it at	▪ Seasonally	▪ Road maintenance service of affected municipalities ▪ DPDIT/ARA ▪ INSTAT	▪ Included in the state budget	All sections, focused almost sections 1, 4, 5B, 9B2

Operation phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
		contractor and local/national relevant authorities ▪ Record the satisfactory level f local community, by operation of AIC				
Economy Employment	▪ All sites when Local population will be affected	▪ Verification and records of un-employment caused by closing of construction works ▪ Evaluate how workers from local community are employed in other works, or in AIC maintenance, after disclosure of the construction works. ▪ Recording and evaluation of changes in incomes of local communities by improved of the road infrastructure	▪ After disclosure of construction works	▪ Road maintenance service of affected municipalities ▪ DPDIT/ARA ▪ INSTAT	▪ Included in Construction and design/ supervison cost, Bill of quantities (Annex 2), of Technical Report	All Sections, focused almost sections 1, 4, 5B, second part of section 9B2 and Section 10
Education and Training (positive Impacts)	N/A	N/A	N/A	N/A	N/A	N/A
Vulnerable Groups	▪ Sites when vulnerable groups are prone to road operation	▪ Record and evaluate how % of the vulnerable groups employed in construction, are involved in other jobs, after construction works disclosure. ▪ Record and report, how of the persons from vulnerable groups are involved in road maintenance. ▪ Record and present the concerns of vulnerable groups to trainings and employments.	▪ Ones, after starting the AIC operation	▪ Regional/ Municipal work office ▪ INSTAT	State budget	All sections, almost focused in sections, 2 and 9A2

Operation phase						
Socio-cultural Indicators						
Environmental and Social receptors	**Sites**	**Monitoring Method and Parameters**	**Frequency of monitoring**	**Responsibility**	**Provisional cost**	**Sections**
Workforce related impacts and Issues	▪ AIC maintenance workers	▪ Evaluate how the working contracts, social and health insurance, are in respect with Albanian legislation and much with EBRD PRs. ▪ Observe and record any discrepancy on working hours, holidays, medical reports with working contracts and legislation	▪ Yearly	▪ Regional/ Municipal work office ▪ INSTAT	State budget	All sections
Cultural Heritage	▪ Religious objects and monuments, cemeteries, cult and historic areas, in vicinity of working territories. ▪ Cultural Monuments in vicinity of AIC alignment.	▪ Observe and report any accidental impact on religious, cultural and heritage monuments/sites. ▪ Observe the permanent accessibility to the Cultural Monuments, in case that such access is impacted by AIC operation. ▪ Record complains for impacts in cultural, religious, heritage sites ▪ Record impacts in cultural monuments caused by air pollutants, dusts, hushes etc.	▪ Seasonally (4 times per year)	▪ Regional Directorate of National Culture ▪ National Institute of Cultural Heritage.	State budget	All sections, almost focused in sections 9B2 and 13.

Below are given the summarized responsibilities for each of the socio-cultural parameters, and their respective costs. Most of the costs, except those mentioned above for the pre-construction phase, are calculated and already included in Technical Design, Annex 2, Bill of Quantities, that's why in the table below, those are referred to this document.

Mitigation measures per Socio-cultural receptor	Responsibility per phase			Cost per Phase		
	Pre-construction phase	Construction phase	Operation phase (Responsibility per all sections)	Pre-construction phase	Construction phase	Operation Phase
Land and Property	▪ Contractor for Technical Design and RAP ▪ Contractor for ESMP, SMP, SAP ▪ MTE/NEA/REAs	▪ Contractor, Social Supervisors, ▪ ARA/DPDIT, MIE ▪ Governmental Agency for Expropriation	▪ ARA/DPDIT ▪ MIE ▪ MHSP ▪ Possible PPP responsible and/or concessionaires ▪ Affected Municipalities and Administrative Units ▪ Regional/ Municipal work office ▪ Instat ▪ Regional Directorate of National Culture ▪ National Institute of Cultural Heritage.	▪ SMP and SAP, 860 000 000 EUR Not included in Technical Design, Annex 2, Bill of quantities ▪ Cost for RAP study – included in the Technical Design, Bill of quantities (Annex 2), of Technical Report	Included in Technical Design, Annex 2, Bill of quantities	National/Local Governmental Budget
Community Health, Safety and Security	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Contractor, Social Supervisors, ▪ ARA/DPDIT, MIE ▪ Regional Environmental Directorate ▪ Affected Municipality and related Administrative Units				
Community Tensions	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Contractor and Social Supervisors, ▪ ARA/DPDIT, MIE ▪ Regional Environmental Directorate ▪ Affected Municipality and related Administrative Units ▪ State police				
Access and Severance	▪ Contractor for Technical Design	▪ Contractor, Social Supervisors,				

	▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ ARA/DPDIT, MIE ▪ Affected Municipality and related Administrative Units				
Economy	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Ministry of Finance and Economy ▪ Affected Municipalities and related Administrative Units				
Employment	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Contractor and Supervisor ▪ Office of works in related Municipalities ▪ Inspectorate of Works in Affected Municipalities ▪ National Service of Employment				
Education and Training	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Contractor and Social Supervisor ▪ ARA/DPDIT				
Vulnerable Groups	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Construction contractor ▪ Supervisor ▪ Regional/ Municipal work office				
Workforce related impacts and Issues	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, SAP and RAP	▪ Contractor and Social supervisor, ▪ Inspectorate of Works in Affected Municipalities ▪ National Service of Employment				

Cultural Heritage	▪ Contractor for Technical Design ▪ Contractor for profound ESIA, SMP, Heritage Monuments Management Plan, SAP and RAP, Regional Cultural Directorate, National Institute of Cultural Heritage	▪ Contractor and Social supervisor, ▪ Regional Cultural Directorate, National Institute of Cultural Heritage	▪ Regional Cultural ▪ Directorate, National Institute of Cultural Heritage ▪ Related Municipalities			

9. Uncertainty and Difficulties Faced in Undertaking the PESIA

9.1 General Considerations

This Project has faced a number of challenges in terms of retrieving baseline information, the level of accuracy of predicting impacts, and developing appropriate mitigation due to the level of maturity of the design and the project length.

In order to facilitate decision-making, then areas of uncertainty, data gaps and deficiencies, and additional work required during further stages of the Project development have been highlighted within the PESIA report, i.e. in the description of impacts and mitigation measures during the pre-construction phase.

9.2 Difficulties and Uncertainties regarding Baseline Conditions

Due to the maturity stage of the project (conceptual design), no air, noise, surface and groundwater measurements were carried out. Field surveys were carried out mainly for biodiversity to define the habitats close to the AIC in a zone of 2km left and right as well as the main fauna species that were encountered. The information gathering exercise combined field surveys and consultations with secondary data sources, i.e. it researched the extensive body of information available in the scientific literature, NGO and government documents.

Despite the extensive effort put into baseline data collection, it is unavoidable that many gaps in knowledge remain since everything has been examined at a conceptual level. In such cases, use has been made of information on similar environments or expert judgment, together with the application of a conservative approach to evaluating impact significance where appropriate.

9.2.1 Environmental baseline

For the preparation of the baseline, the main difficulty that was dealt with was the scarcity of data - gaps in knowledge of the baseline, especially related to the air, noise and soils parameters, since there is no dense monitoring system in Albania, while the sources that refer to these parameters primarily are few. Groundwaters and surface waters are covered at a better level at the national monitoring system, however the density of the monitoring points is not satisfactory. Biodiversity analysis has been based on secondary data and field surveys, however analytical inventories of all fauna categories and habitat surveys will be carried at the ESIA phase, when the corridor will have been better defined and each Section will be examined separately.

Therefore, under the ESIA preparation, air, noise, surface and groundwaters measurements, GHG calculations and detailed biodiversity surveys should be carried out. The habitat, flora and fauna surveys will indicate the presence of critical habitats and of priority biodiversity features, which will be examined in Critical Habitat Assessments, while the interventions to Protected areas will be examined in Biodiversity Action Plans. Air and noise modelling will be carried out in order to predict the emissions and define detailed noise mitigation measures (noise barriers, low noise pavement, green belt etc.)

9.2.2 Social baseline

Presented social baseline data is almost sufficient considering the conceptual design stage of the project. However, there are some certain limitations and data gaps:

- Demographic data (ethnic groups, etc) in the settlements under the study area may have some flaws and inaccuracies. In this sense, data provided by Civil Registry office may be higher than the population figure from the last Census. This discrepancy is a result of population movements inside or outside the country after the years 89'. These people who moved did not necessarily changed their residence in Civil Register office and update it with current address;
- Number of people directly affected by the project and their employment status is not known as the instiutions do not collect this data at settlement level;
- The number of employed people in the businesses structures within project footprint is not known due to conceptual designed stage of the project. This should be obtained during ESIA preparation stage.
- While overall number of structures within project footprint is known, their detailed breakdown into residential, non-residential and bussinesses structures is not known. Their legal status is not known as well;
- Detailed information on level of poverty and average income of households within project area's settlements is not known. This should be obtained at ESIA preparation stage.
- Information on subsistence farming (which is likely to be higher) is not known. This is relevant considering the big portion of AIC corridor lays over agricultural land and this land need to be expropriated. Further investigation should be taken during Detailed Design and ESIA.
- The number of unemployed job seekers in the project area is not known. During the stage of preparation of ESIA the social survey should gather data on identification and qualification of these group.
- There are many archeological sites undiscovered throughout Albania, so it is quite possible that archaeological remains may be discovered during project implementation, construction works, high potenctial especially southern part of AIC Corridor. In these regard monitoring must be applied at Detailed Desing and ESIA stage.

9.3 Evolving Project Design

While PESIA is generally a process that interacts with design, it relies on design at a reasonably definitive level for certain data to provide the basis for impact assessment. In a Project of the scale and complexity of the AIC, there were inevitably issues that have yet to be fully resolved in terms of the precise nature of Project activities. The majority of these are construction related. The majority, if not all, of these are construction related and are therefore considered likely to be short-term in most instances.

9.4 Accuracy of Impact Prediction and Effectiveness of Mitigation

The accuracy of impact prediction is affected by both the issues discussed above, together with the prediction technique used. This is in part because PESIA predictions are made using mainly qualitative assessment at this project level. The accuracy of predictions depended on the assessment method and the quality of the input data on the Project and its environmental and social context. Where assumptions have been made, the nature of any uncertainties which stem from these have been presented in the topic specific sections of the ESIA Report. In general, the significance criteria have been applied conservatively to ensure that the effectiveness of mitigation is not overestimated.

9.5 Managing Uncertainty

In recognition of some existing unknown factors with regard to the Project, the PESIA has stressed the importance of the preliminary ESMP as a vehicle for delivering appropriate and effective measures for managing, controlling and mitigating environmental and social impacts. Where impacts are found to be unacceptably high and/or mitigation fails to achieve its objectives, corrective actions will be implemented.

Annexes

Annex 1 Maps

Environmental maps:

General Map (please see separate file)

Geological Map (please see separate file)

Geotechnical Maps (please see separate file)

Tectonics Map (please see separate file)

Hydrology Maps:

- Water basins Map (please see separate file)
- Hydrology Maps per section (please see below)

Hydrogeology Map (please see separate file)

Biodiversity maps (please see below):

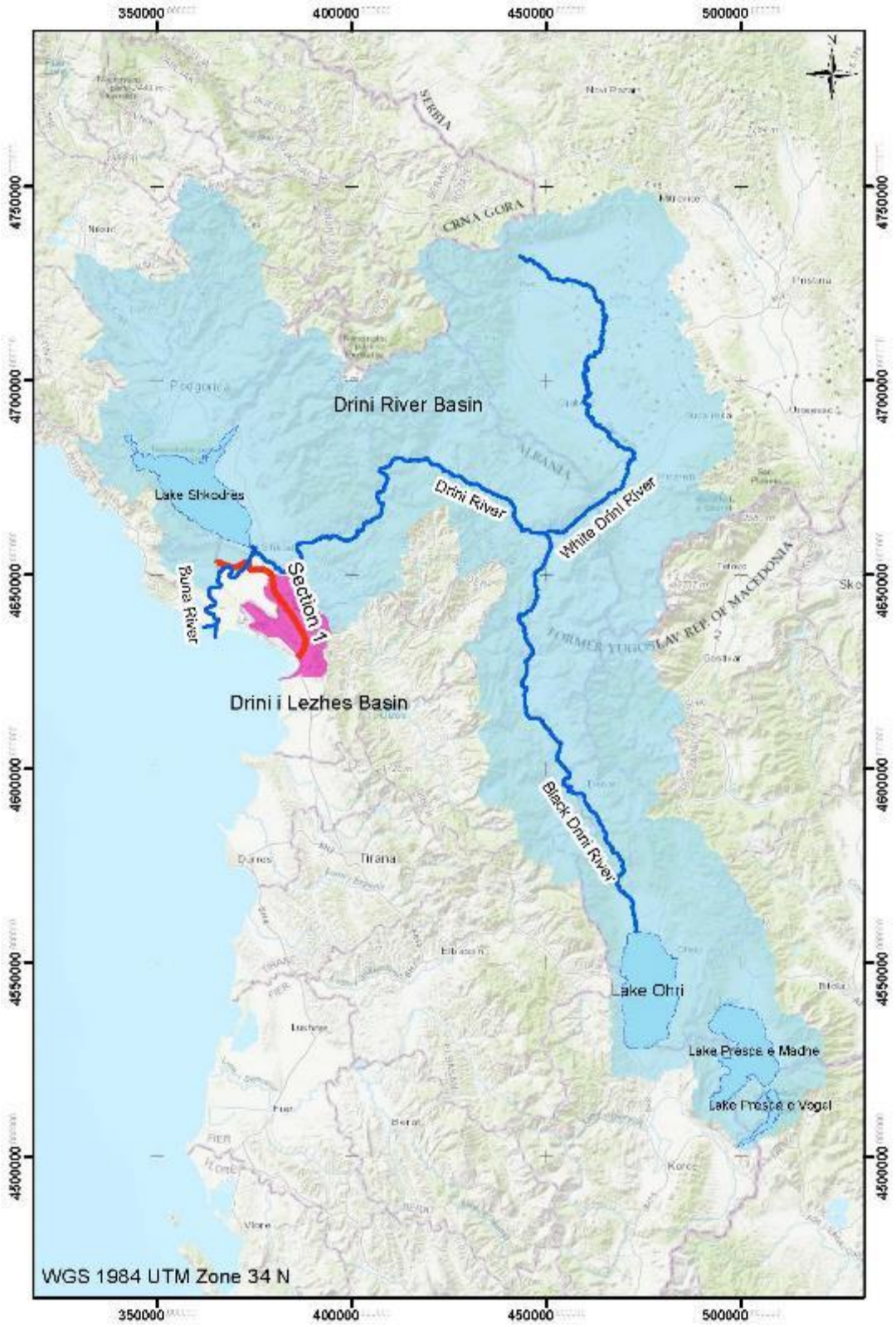
- Buna river - Protected Landscape
- Kune Vain - Natural Managed Reserve
- Rrepet e Pocemit - Natural monument
- Rrepet e Dervenit - Natural monument
- Habitat maps per section or more (please see in separate file)

Social maps:

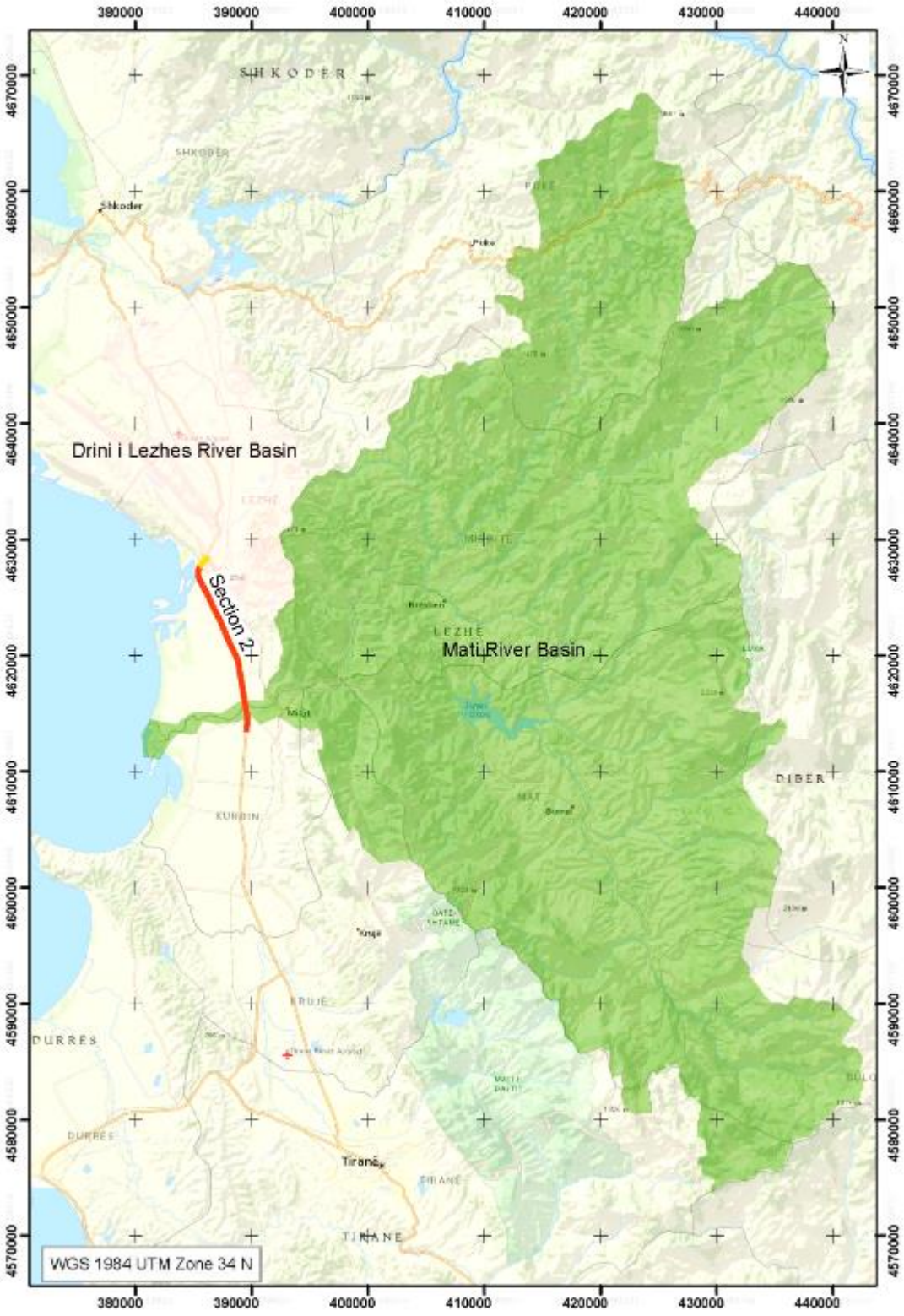
Settlements and road networks per section (please see below)

Land use per section (please see below)

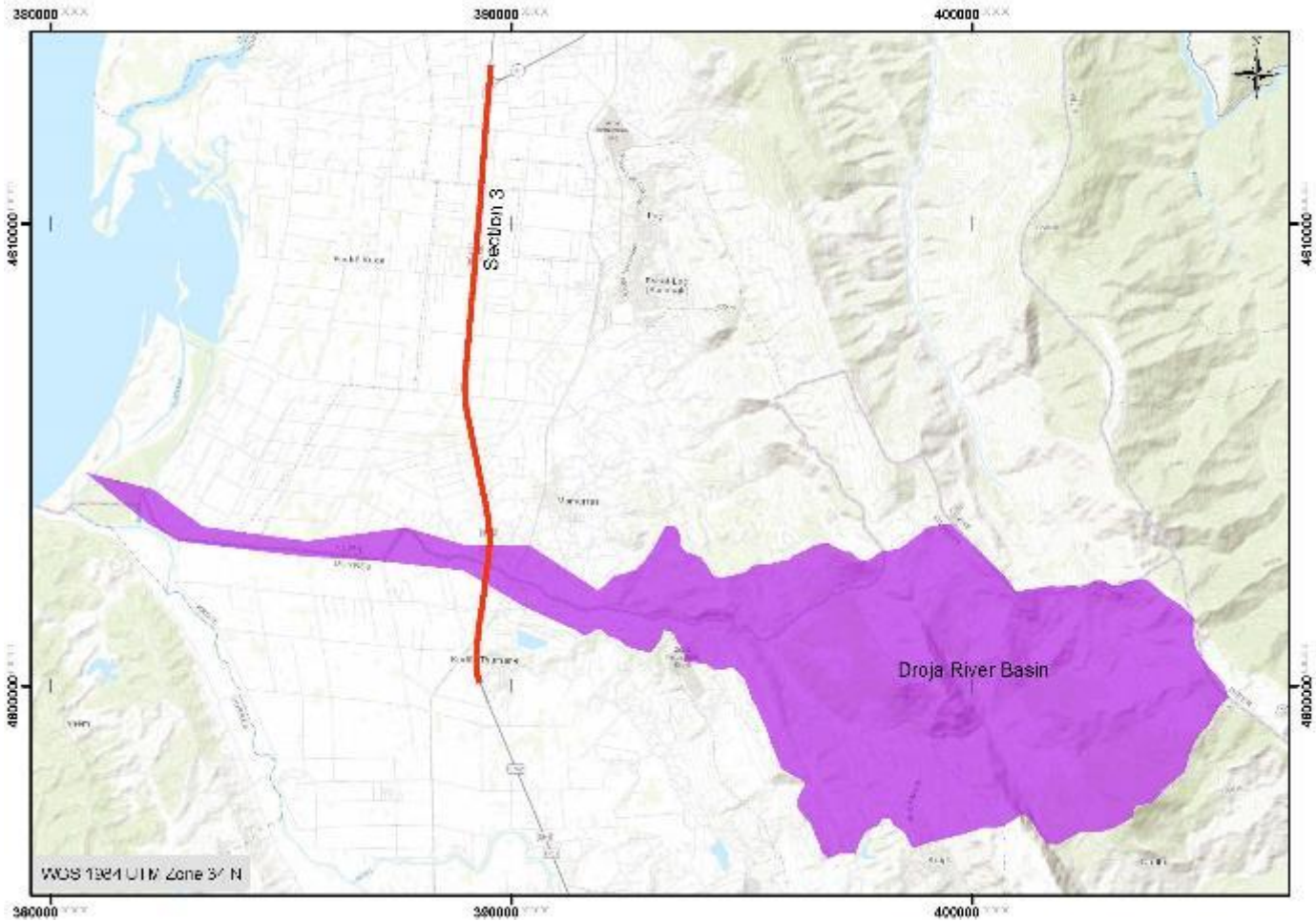
Hydrology Maps per Section:



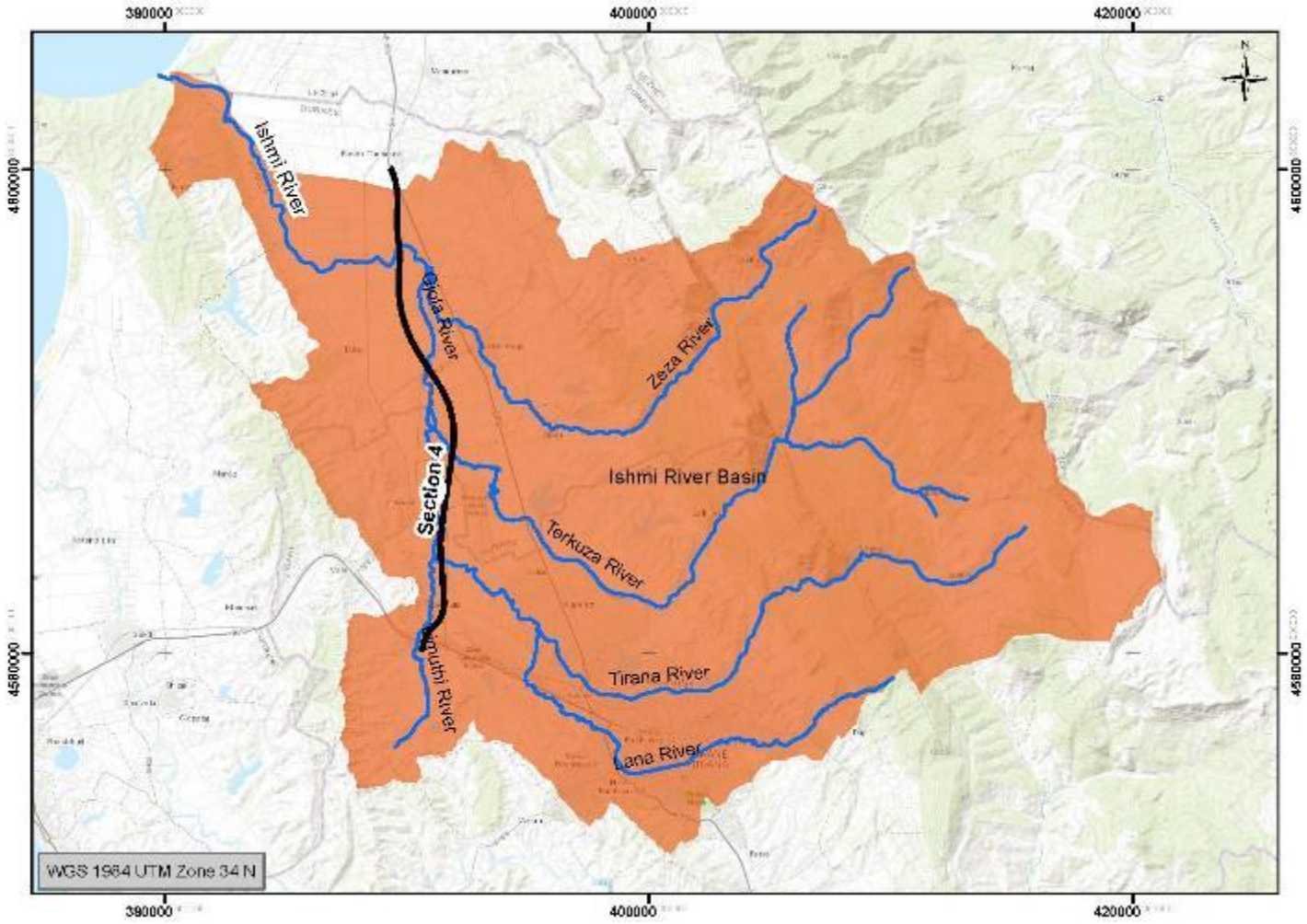
Annex 1. 1 River Watersheds which are crossed by Section 1



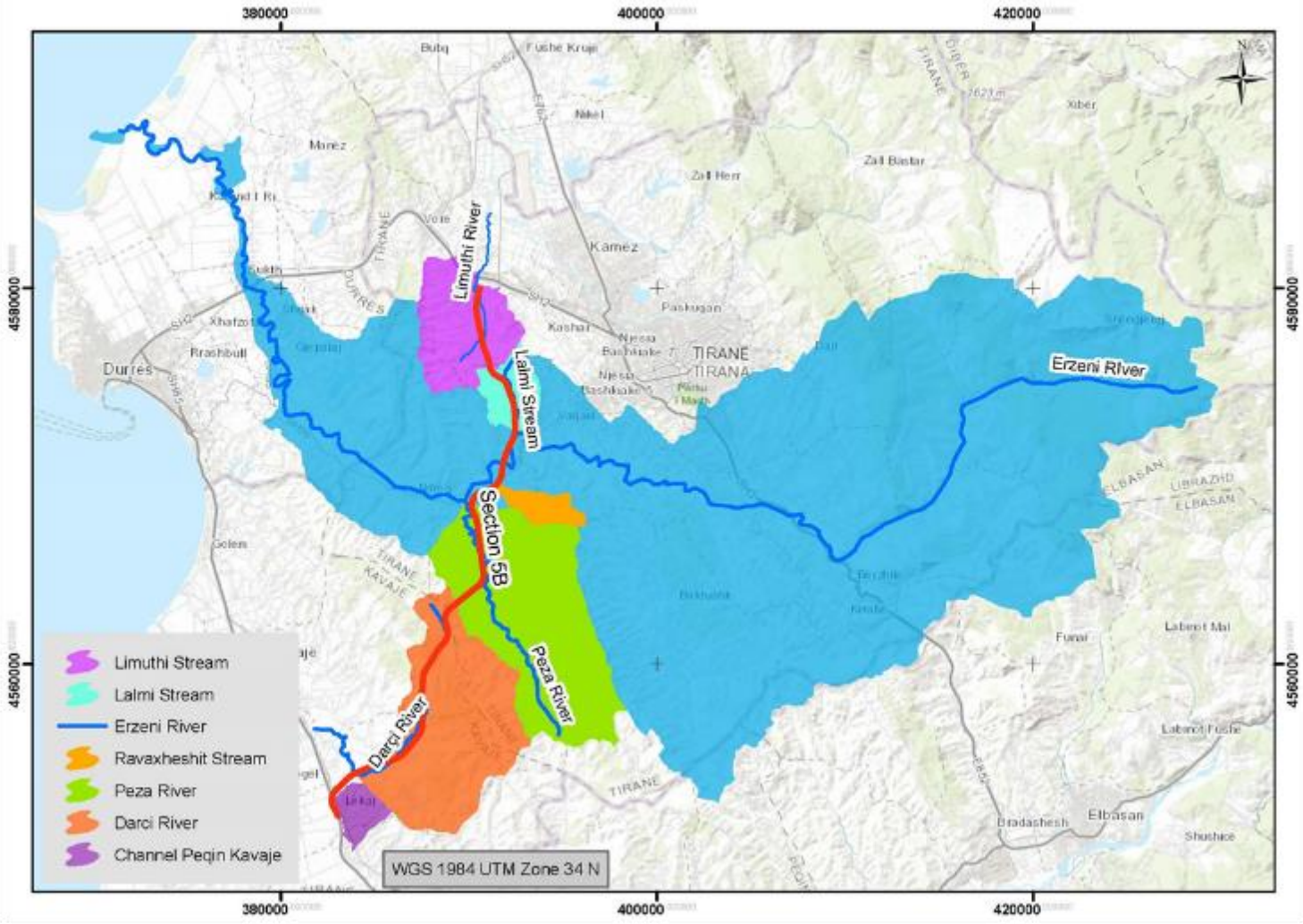
Annex 1. 2 Watersheds of Rivers which are crossed by Section 2



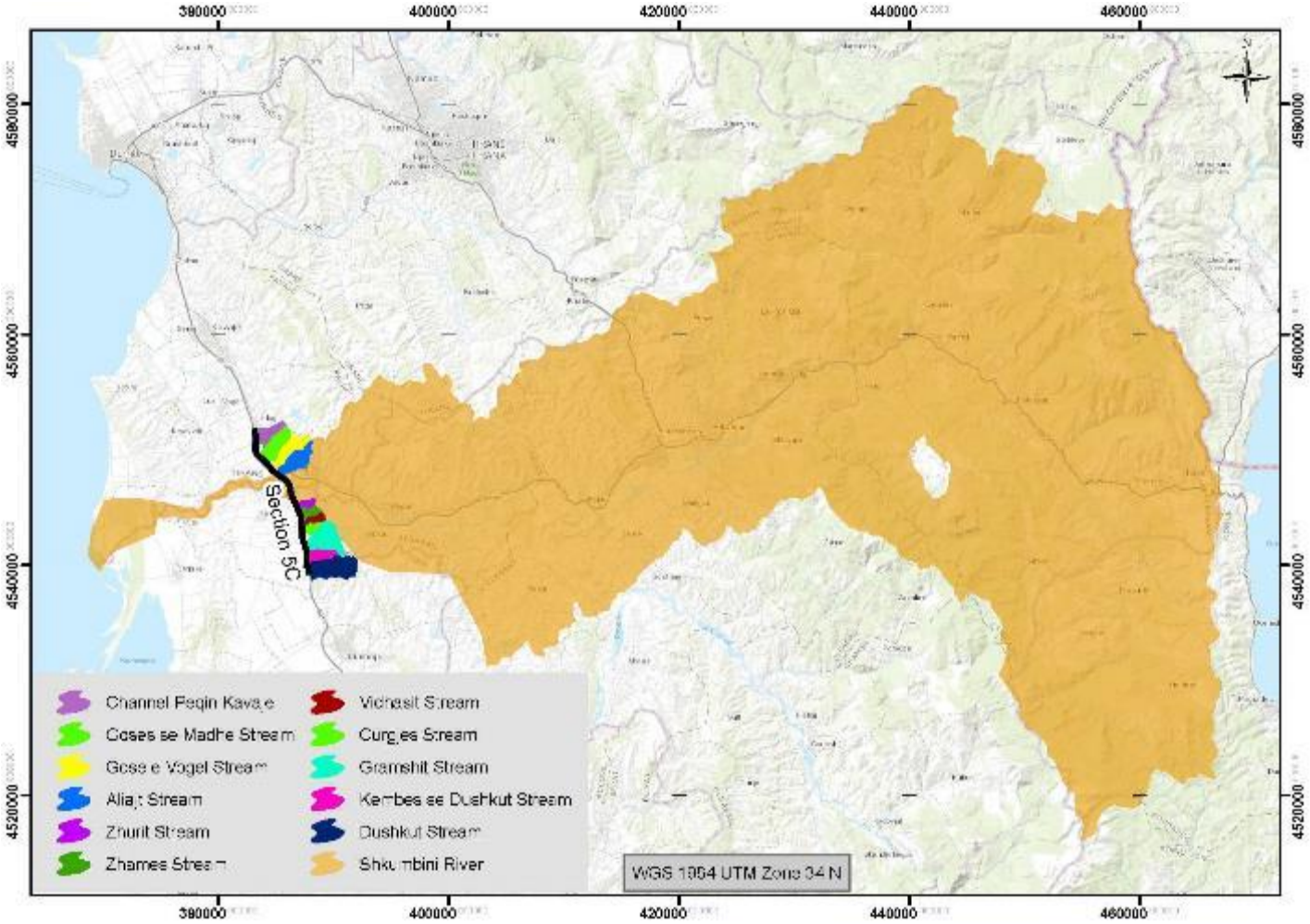
Annex 1. 3 Droja River basin in Section 3



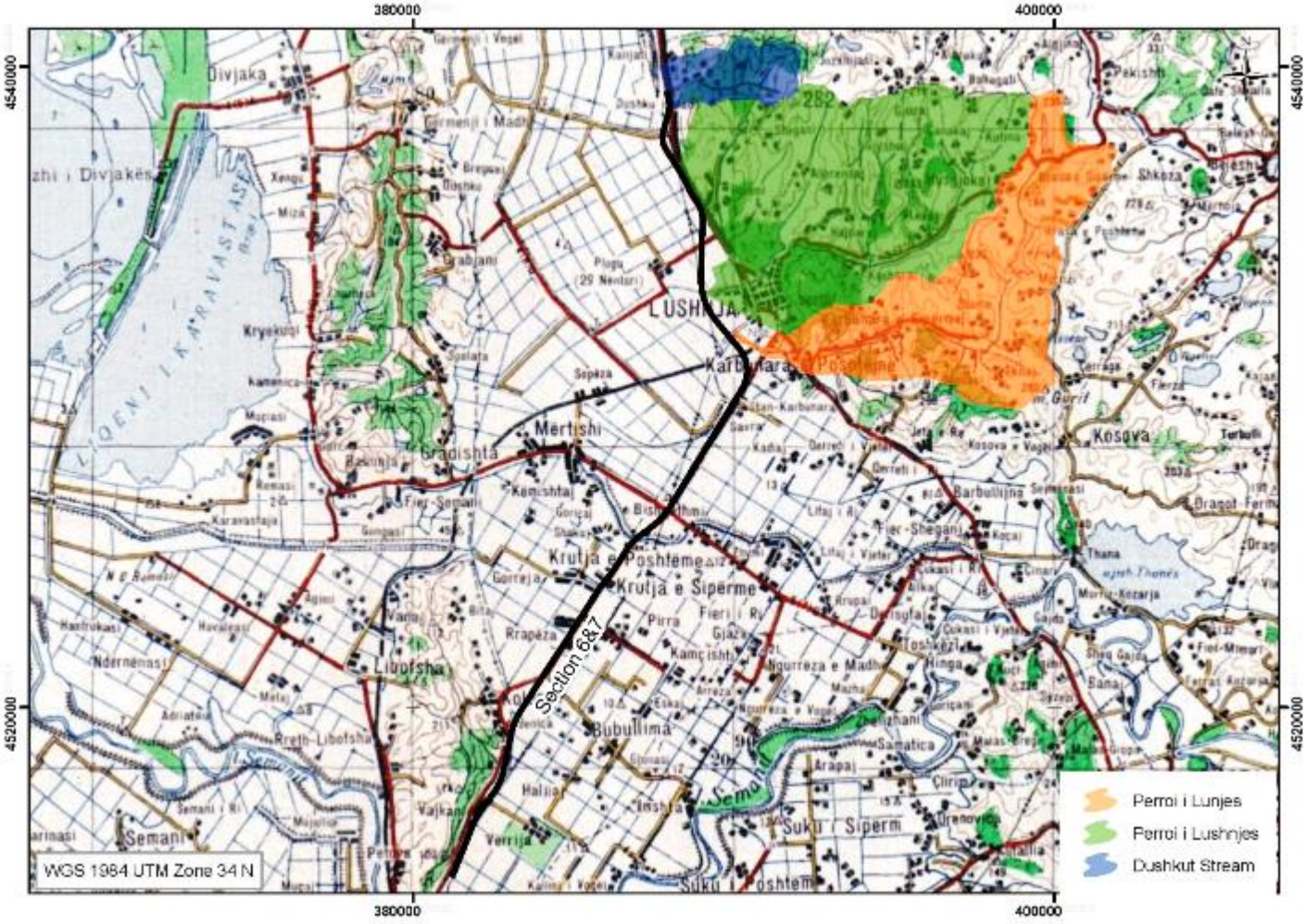
Annex 1. 4 Ishmi River basin in Section 4



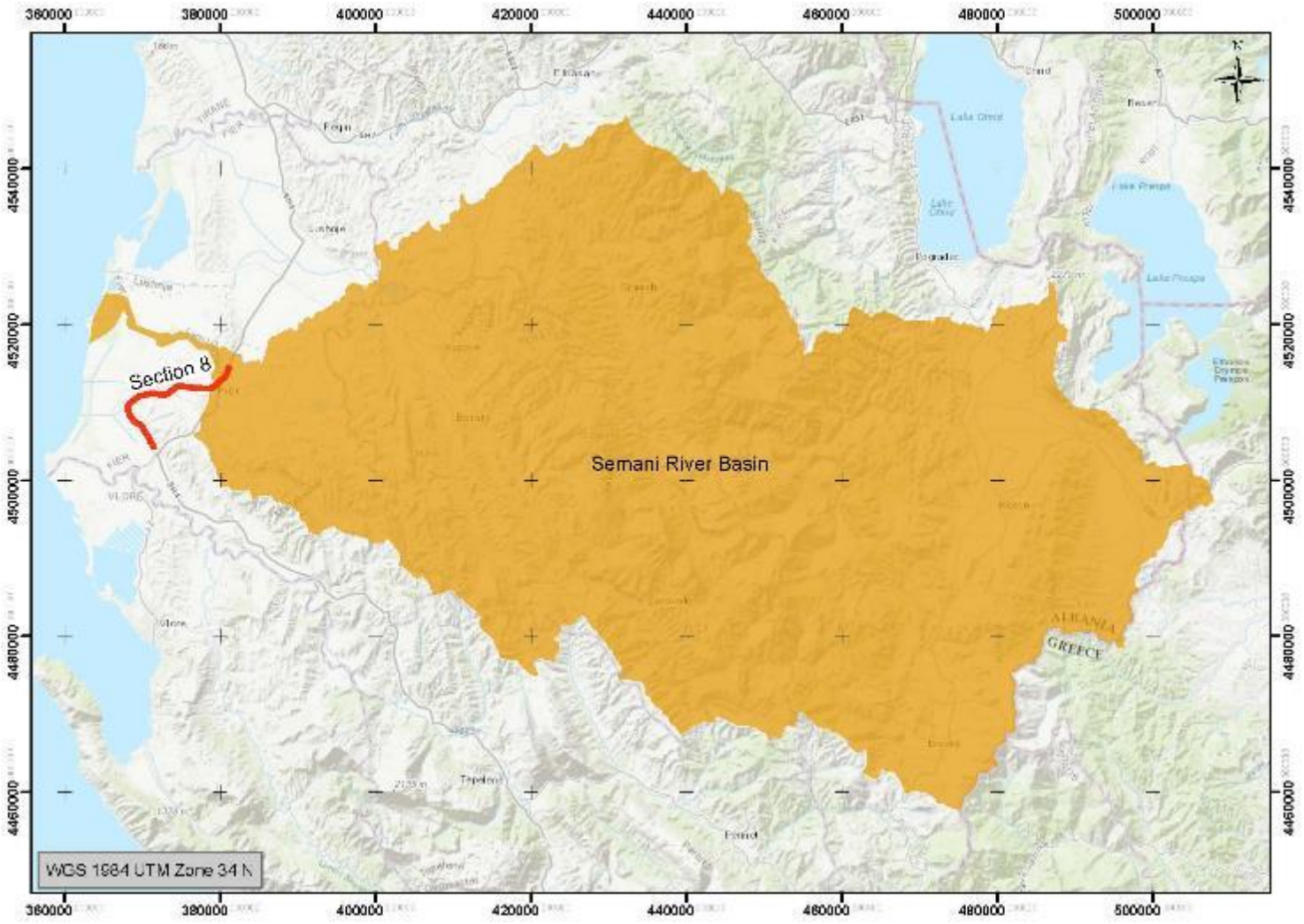
Annex 1. 5 Erzeni River Basin Section 5B



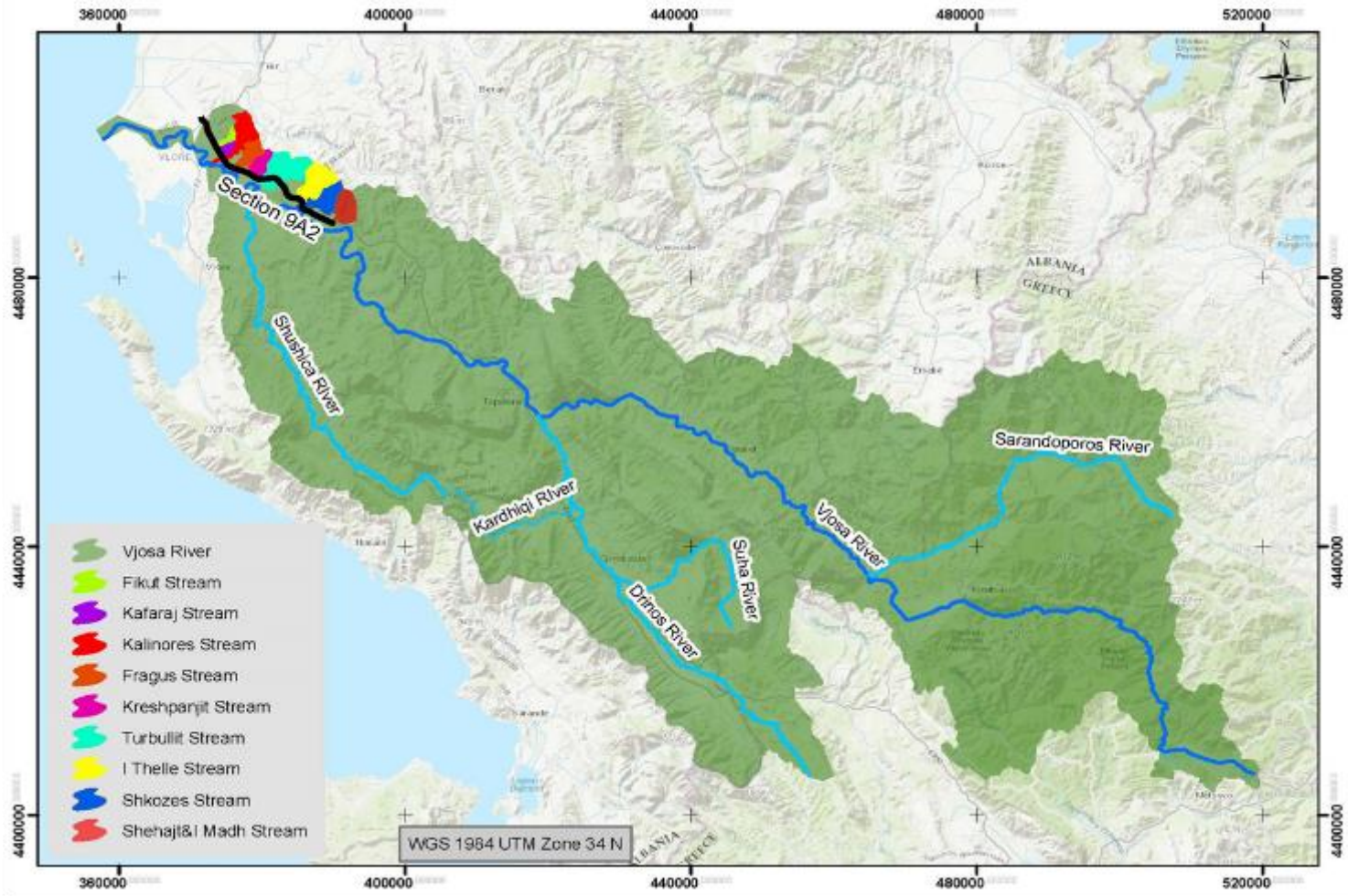
Annex 1. 6 Shkumbini River Basin Section 5C



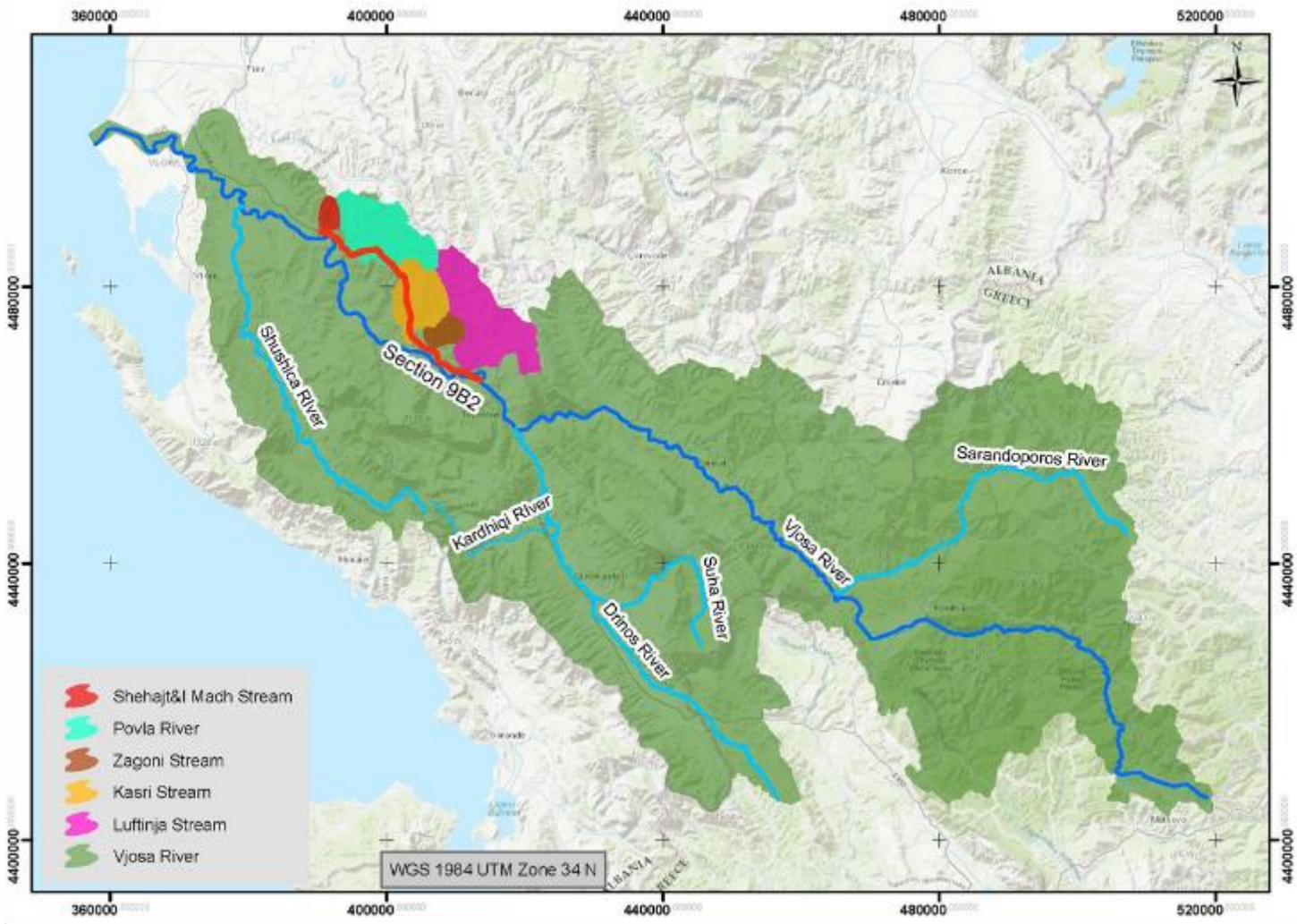
Annex 1. 7 Stream River basin in Section 6&7



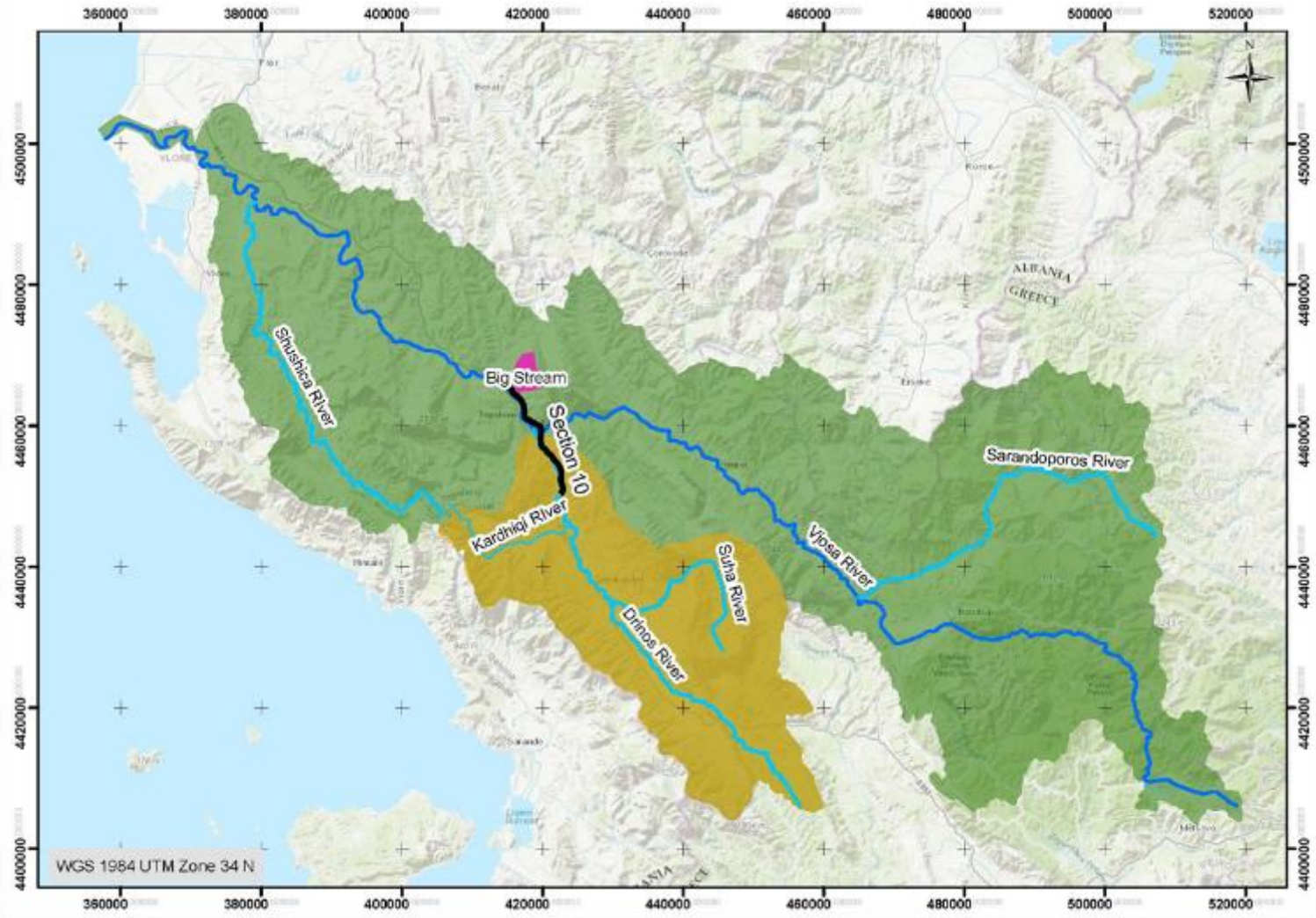
Annex 1. 8 Semani River Basin Section 8



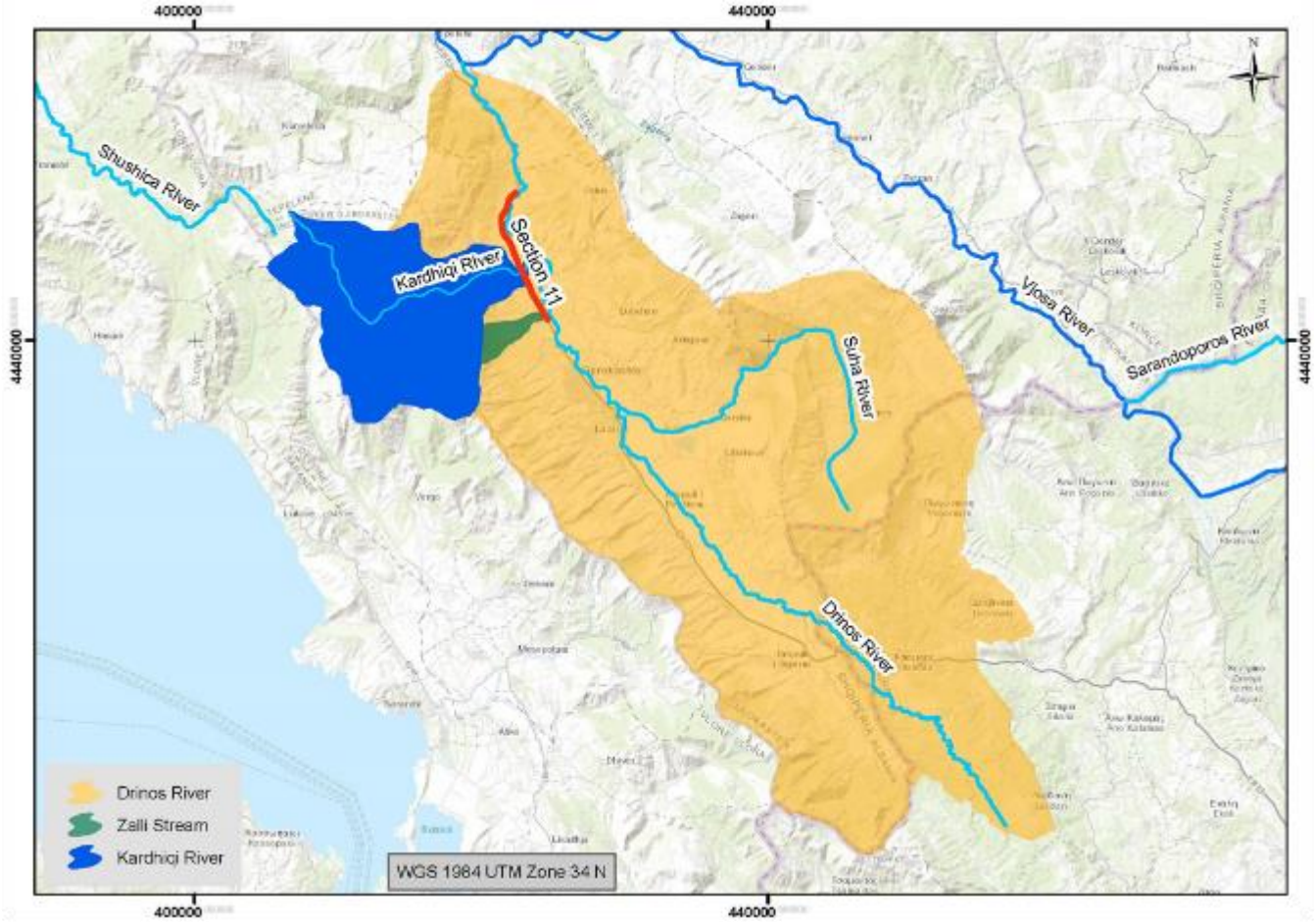
Annex 1. 9 Vjosa and Stream River Basin in Section 9A-2



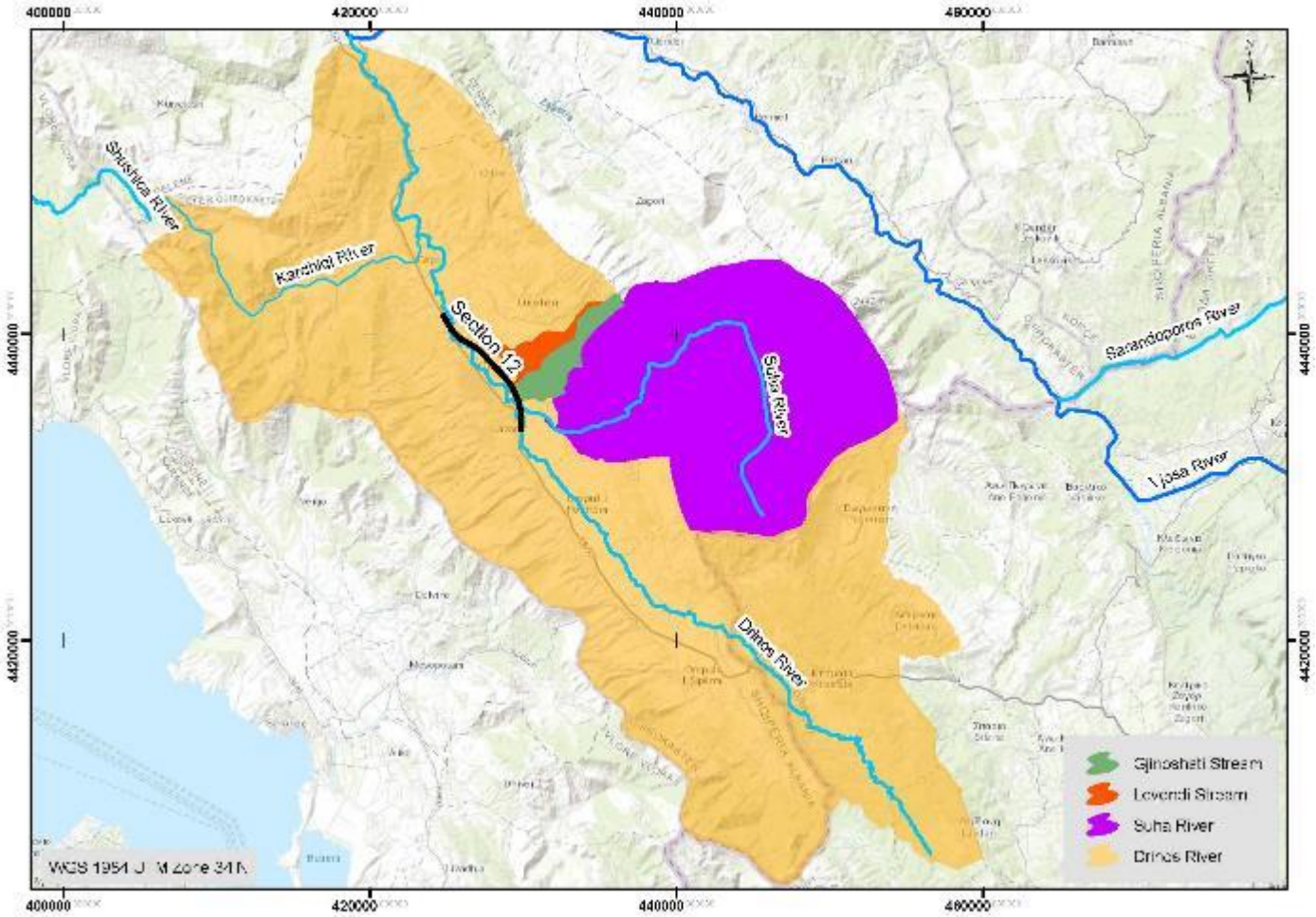
Annex 1. 10 Vjosa and Stream River Basin in Section 9B-2



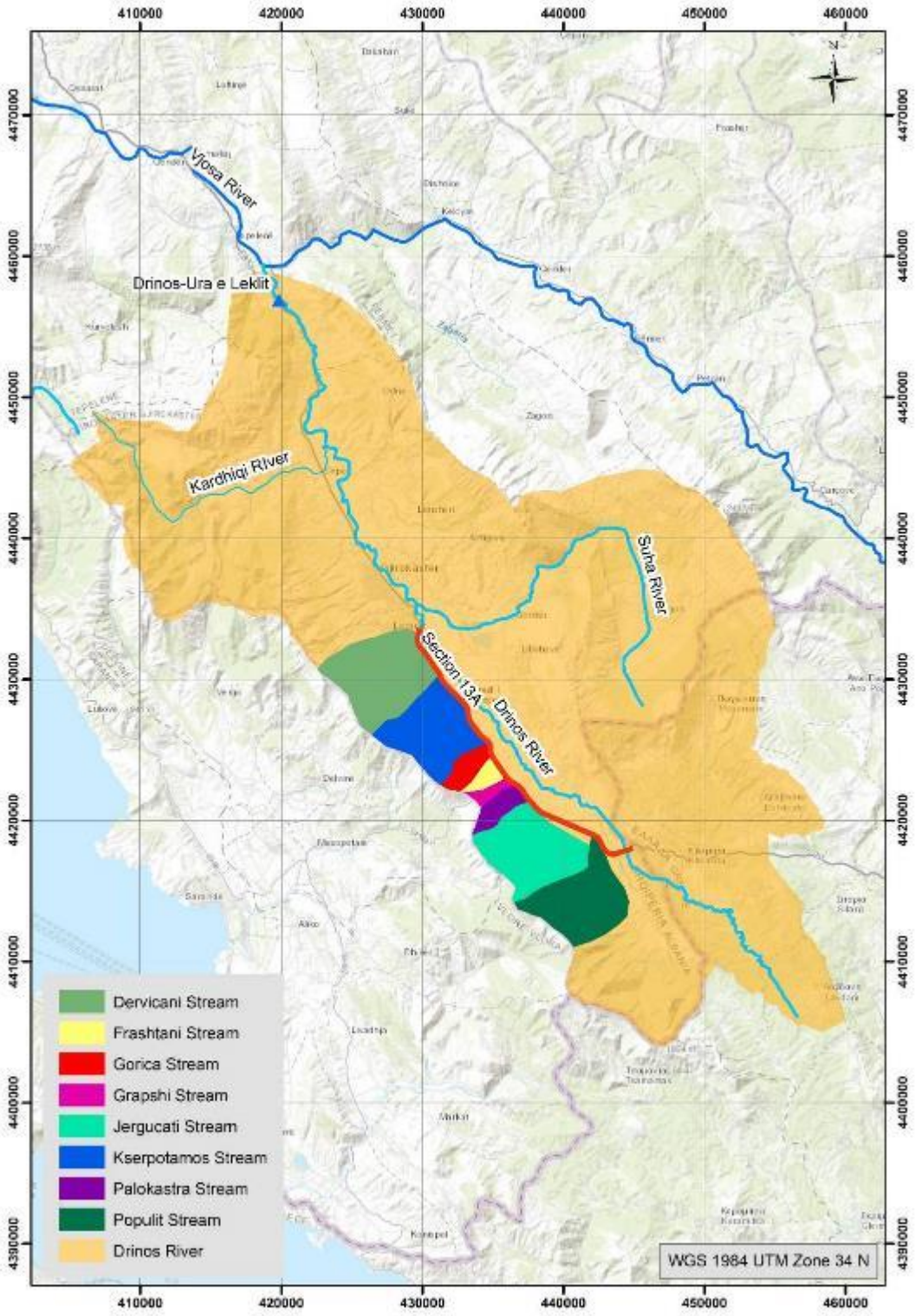
Annex 1. 11 Watersheds of Rivers which are crossed by Section 10



Annex 1. 12 Watersheds of Rivers which are crossed by Section 11

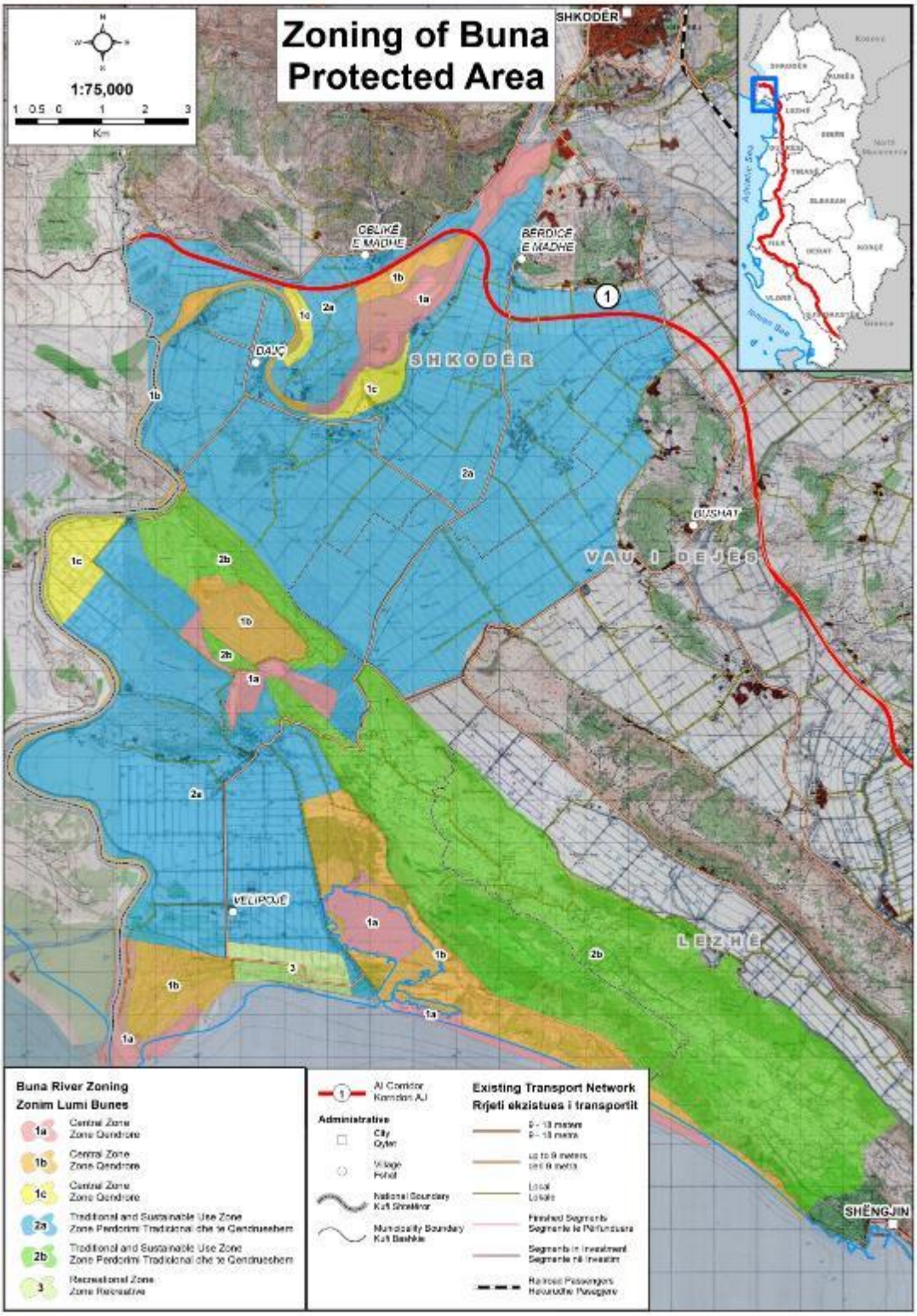


Annex 1. 13 Watersheds of Rivers which are crossed by Section 12

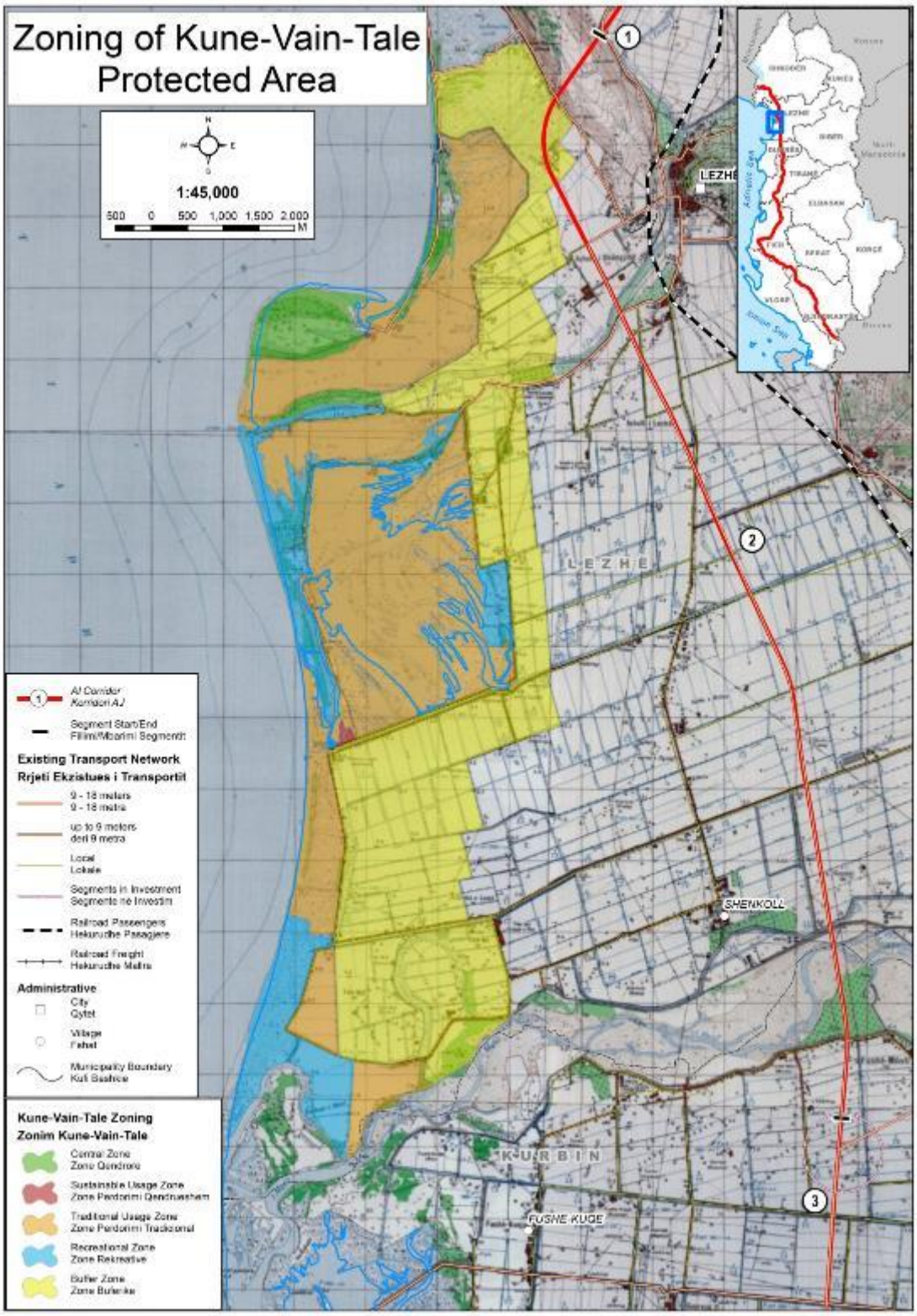


Annex 1. 14 Watersheds of Rivers which are crossed by Section 13A

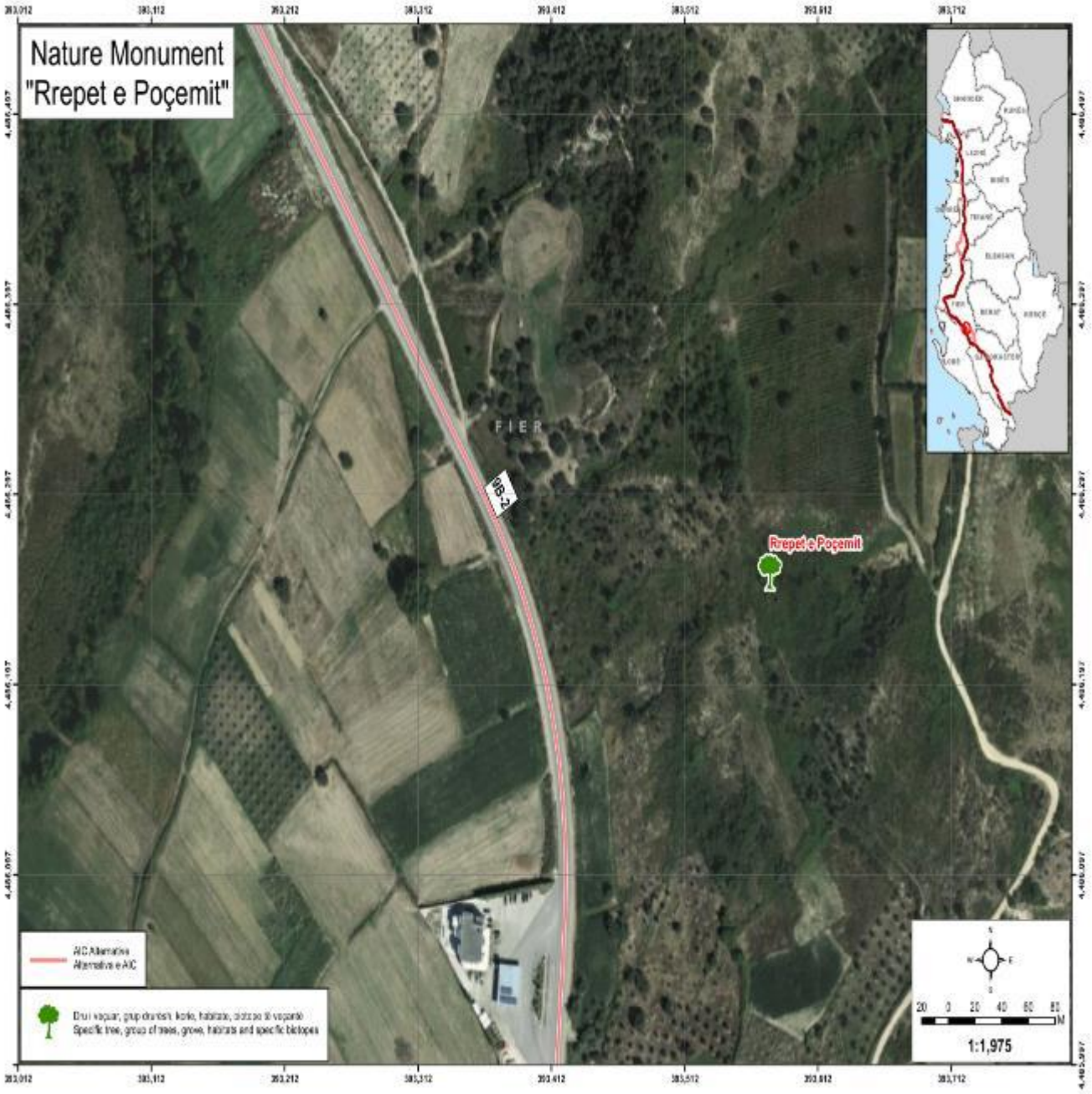
Biodiversity Maps:



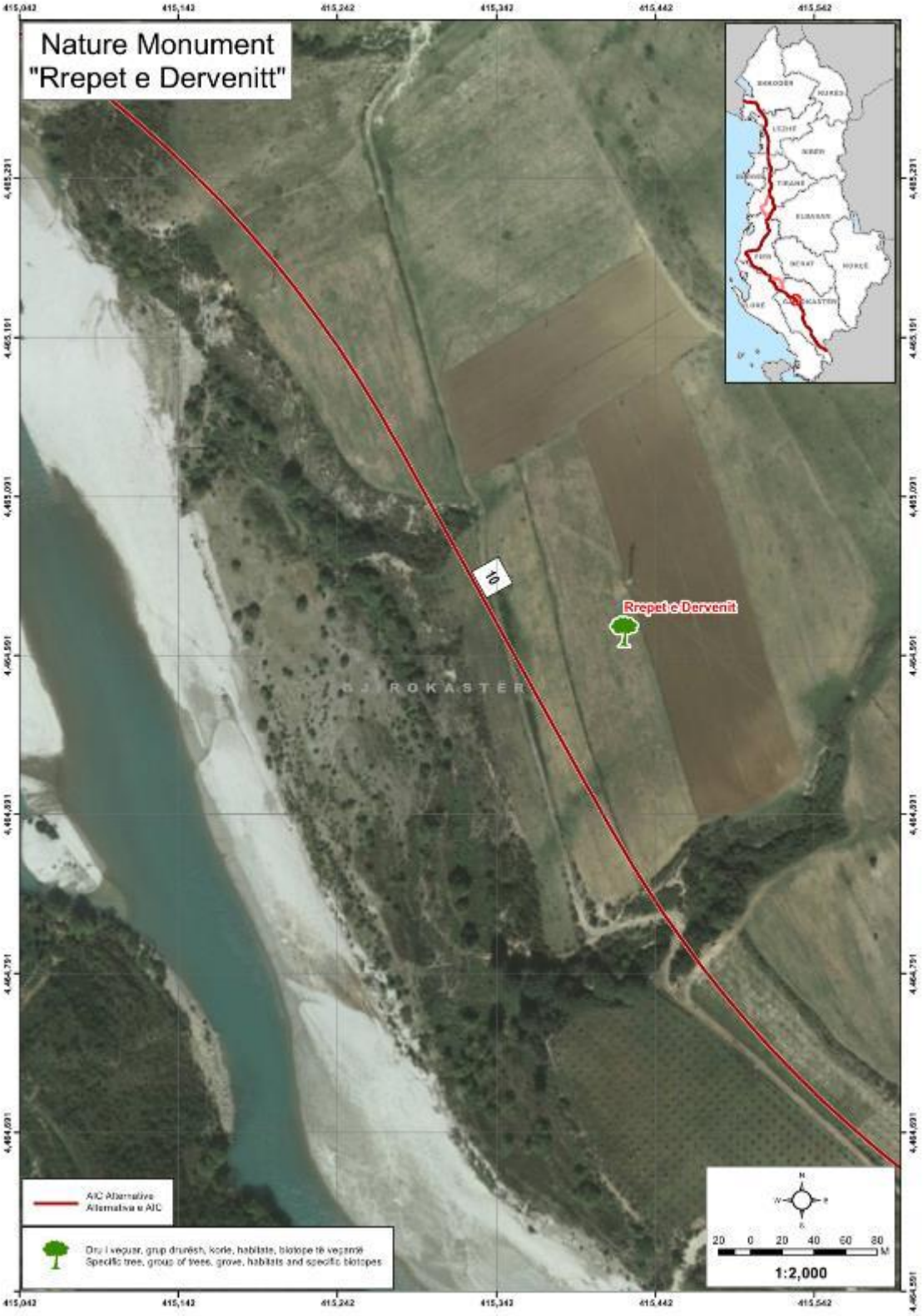
Annex 1. 15 Zoning of Buna River / Velipoja Protected Landscape (Zones 1 and 2 are Core Zones of the Protected Area, while Zone 1 (a and b) is a strict protected zone)



Annex 1. 16 Kune Vain Protected Area

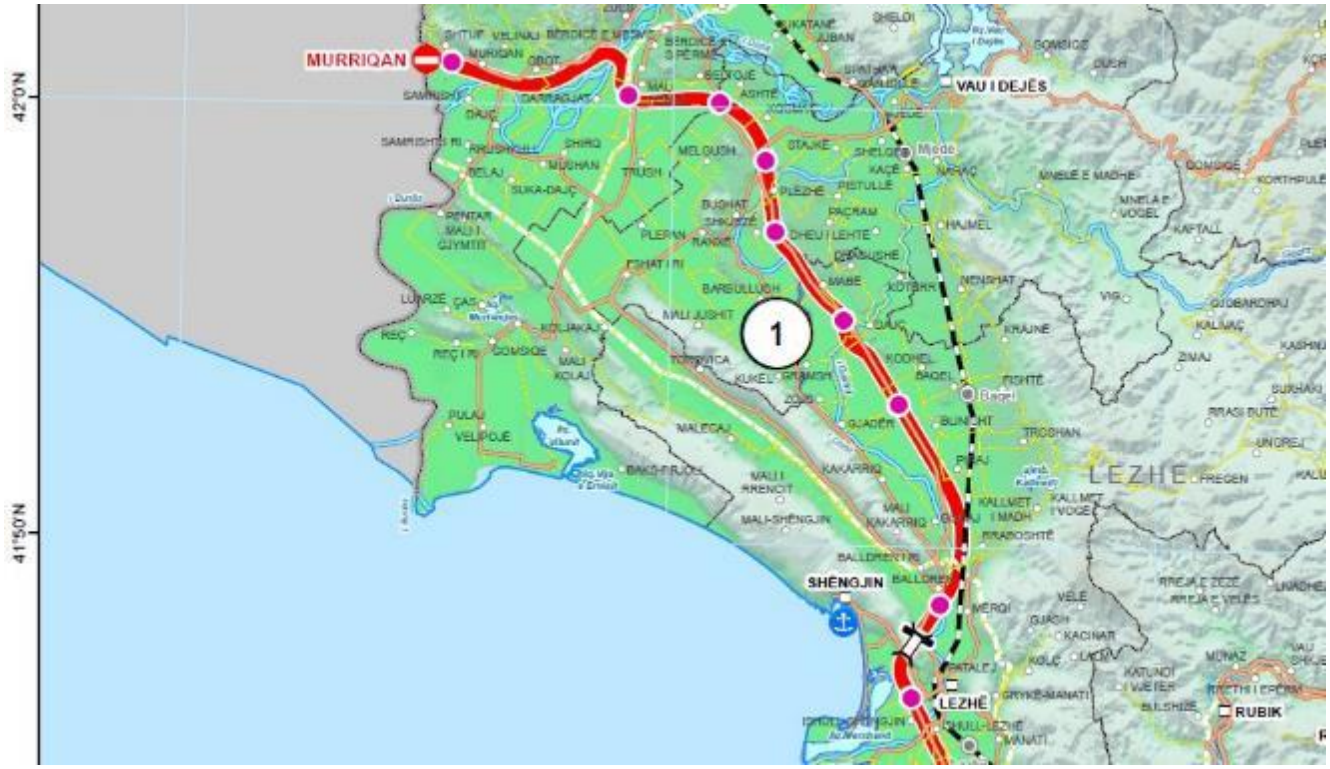


Annex 1. 17 Rrepet e Pocemit



Annex 1. 18 Rrepet e Dervenit

Social maps:



Annex 1. 19 Section 1-Settlements and road network

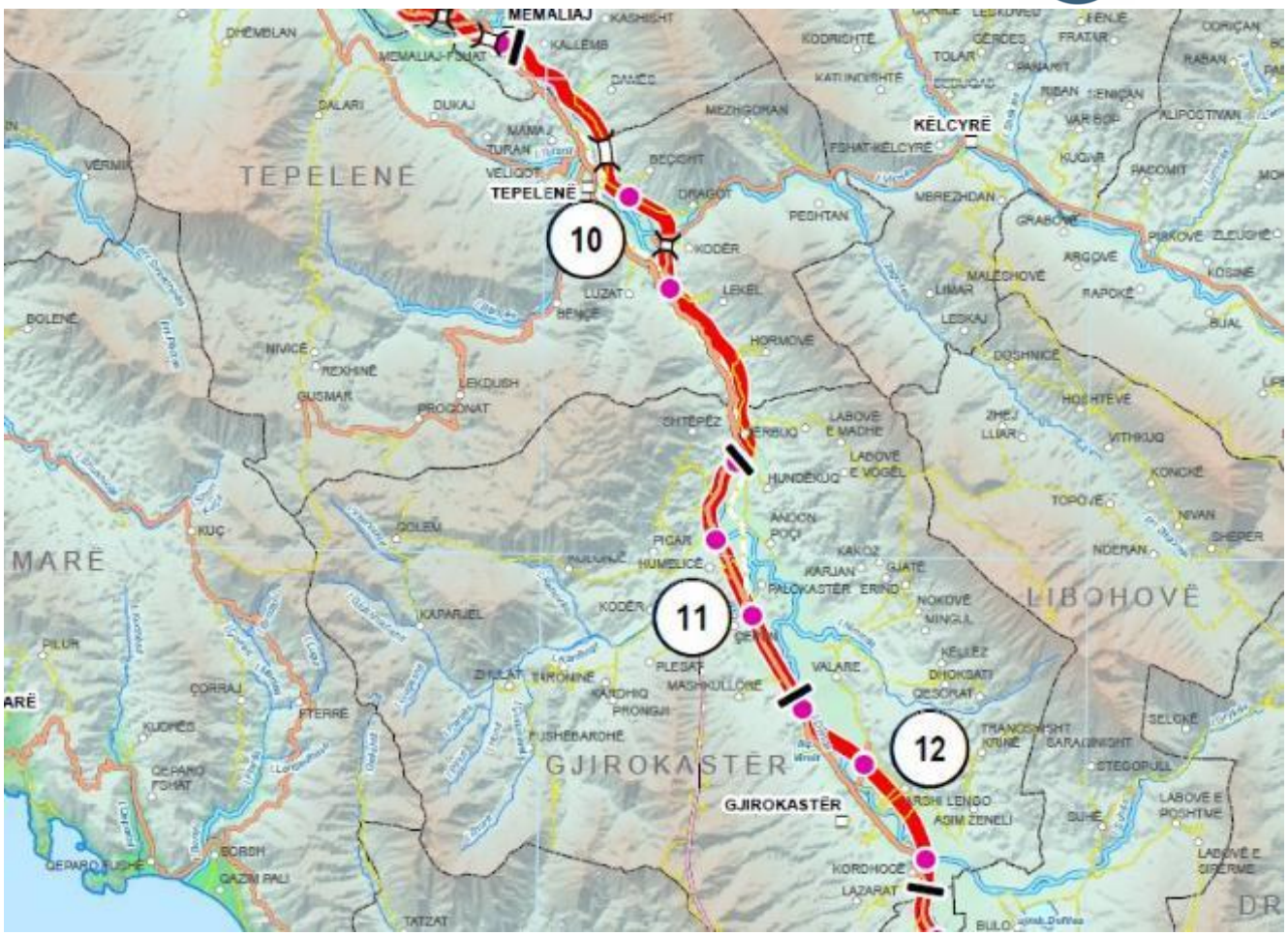
Annex 1. 20 Section 2-Affected Settlements and Road network

Annex 1. 21 Sections 3 and 4-Affected Settlements and Road network

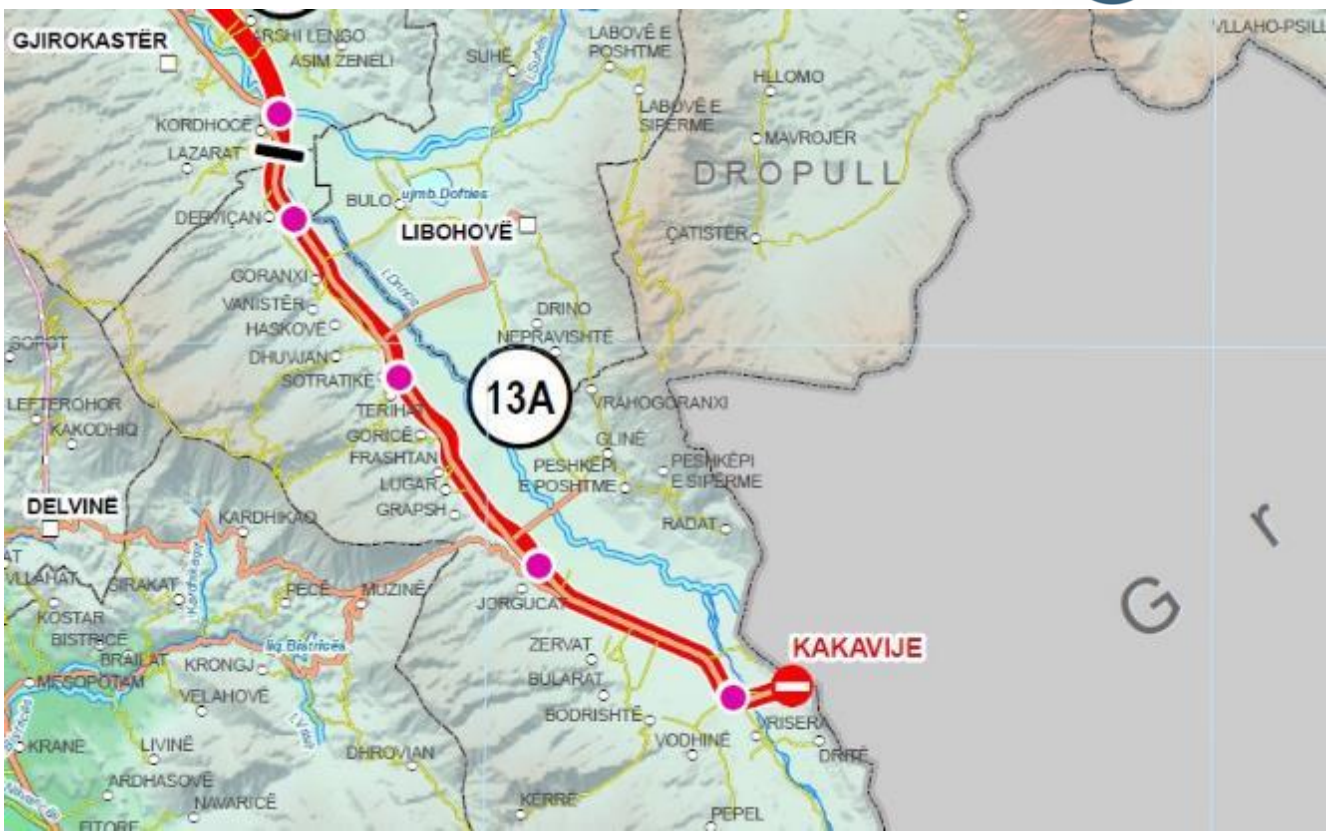
Annex 1. 22 Sections 5B and 5C-Affected Settlements and Road network

Annex 1. 23 Section 6+7 and 8-Affected Settlements and Road network

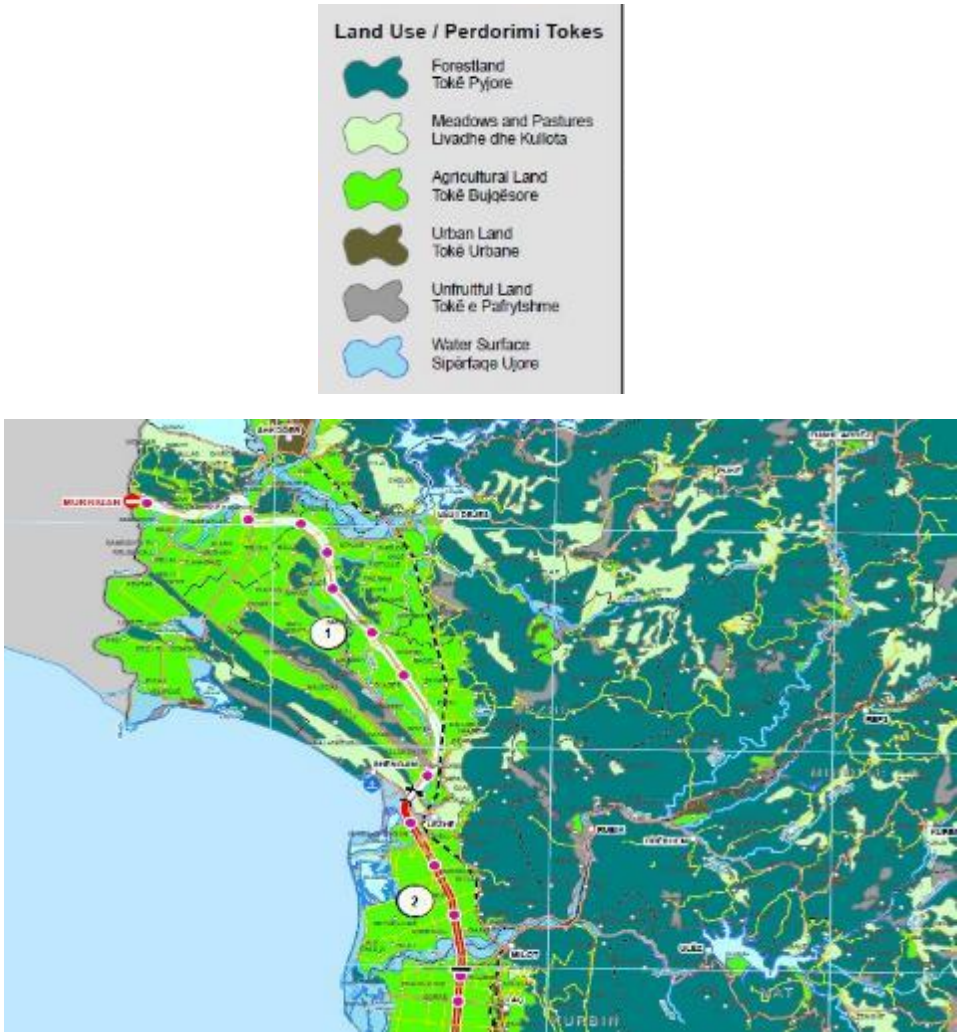
Annex 1. 24 Sections 9A2 and 9B2-Affected Settlements and Road network



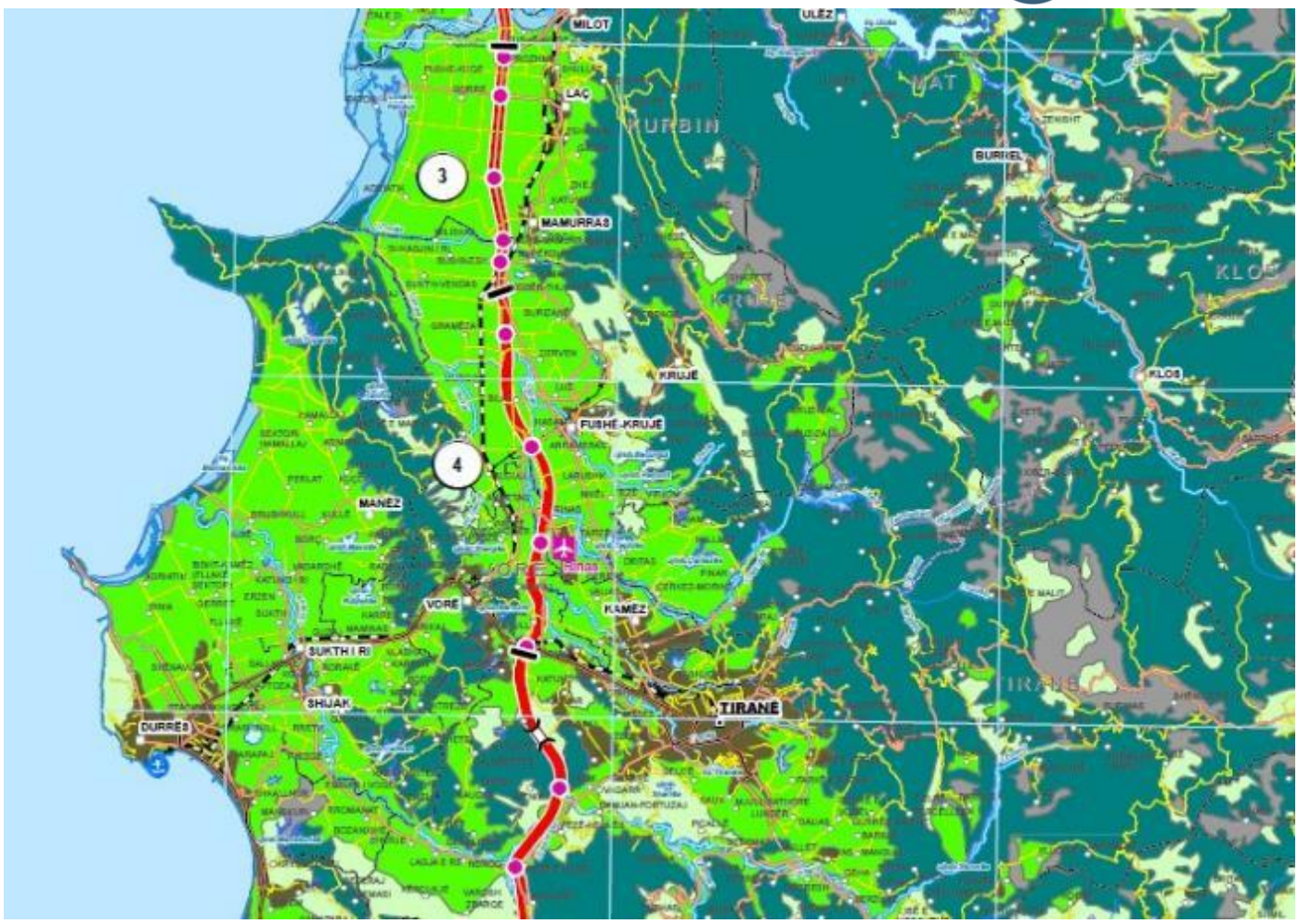
Annex 1. 25 Sections 10,11,12-Affected Settlements and Road network



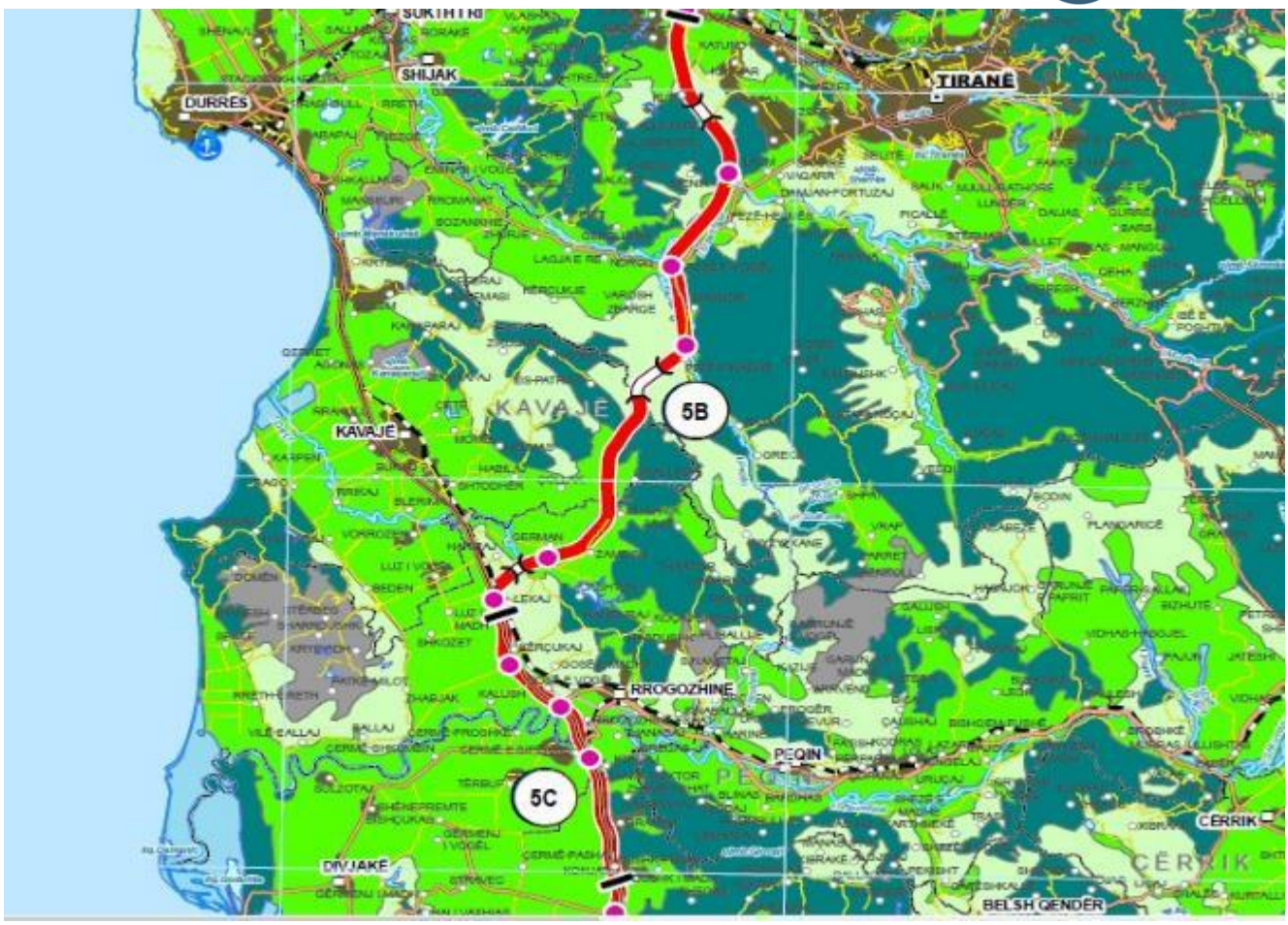
Annex 1. 26 Section 13A-Affected Settlements and Road network



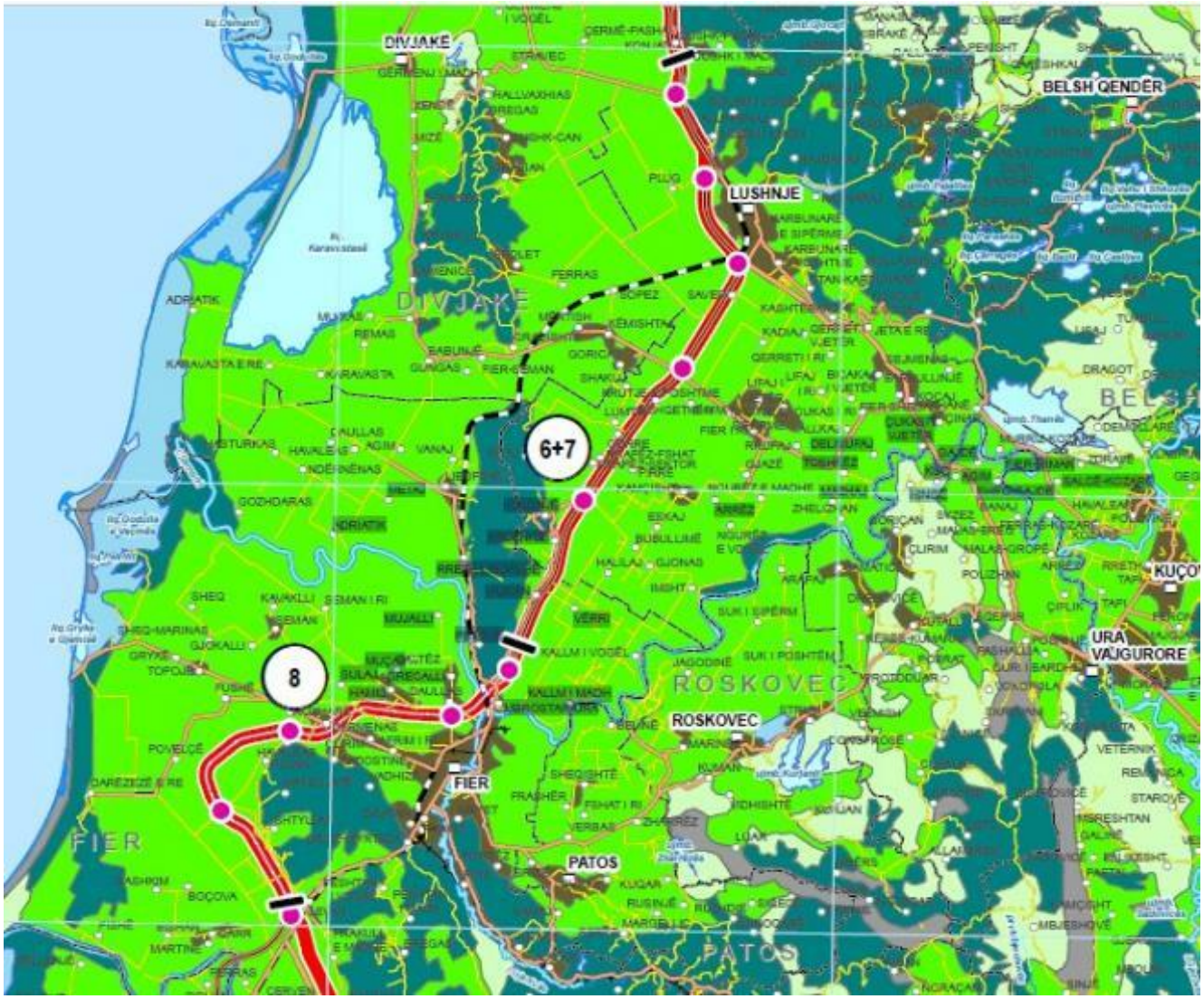
Annex 1. 27 Section 1 and 2-Land Use



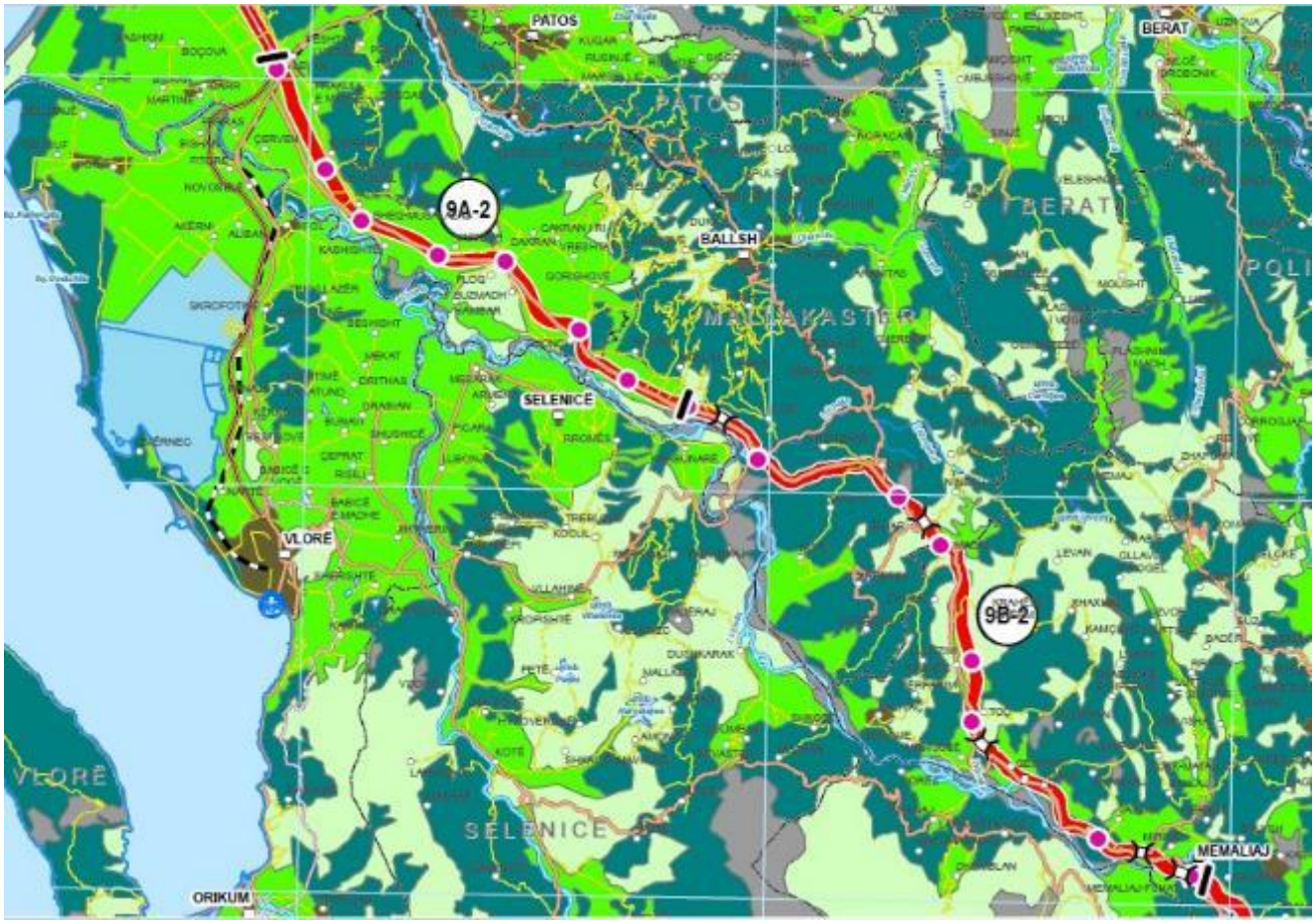
Annex 1. 28 Sections 3 and 4 Land Use



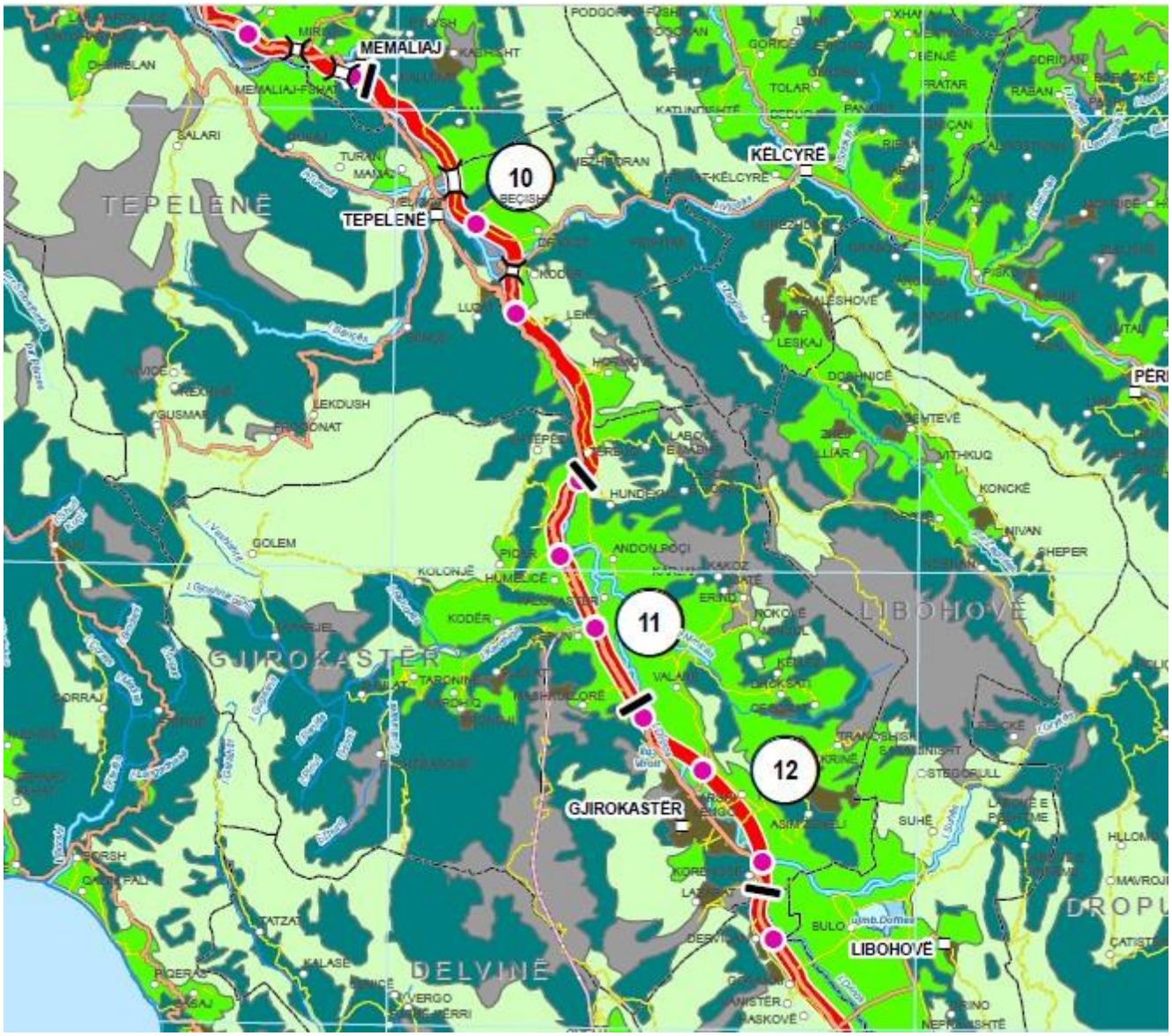
Annex 1. 29 Sections 5B and 5C-Land Unse



Annex 1. 30 Sections 6+7 and 8-Land Use



Annex 1. 31 Sections 9A2 and 9B2-Land Use



Annex 1. 32 Sections 10, 11, 12-Land Use

Annex 1. 33 Section 13A-Land Use

Annex 2 Photo log

Please see separate file

Annex 3 – Flora and fauna with specific status in habitats surrounding the AIC Sections

Flora

Regarding the AIC Sections 3, 6, 7 and 11, which run almost over existing roads, there were not found any plant with specific status. Sections 12 and 13A share very similar flora. The plants of Section 8 and 12, are presented to give a general view of specific flora for all AIC Sections, since both of these Sections have been examined in previous studies and EIAs (construction of bypasses of Fieri (Section 8) and Gjirokastra (Section 12)). Section 13A has limited flora, since most of the section, runs over the existing road.

Section 1								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Hydrocharis morsus-ranae	Lapagreth	European Frog bit	Hydrocharitaceae	I	Marshland	Keneta e Domnit	VU(A1b)	LC
Numphar lutea	Lekue I verdhe	Yellow Water-lily	Nymphaeaceae	I	Lakes	The bridge of Buna Shkoder	VU(A1b)	LC
Nymphoides peltata	Nimfoide shqytake	Fringed water lily	Menyanthaceae	I	Stagnant water	The field of Buna	VU(A1b)	LC
Trapa natans	Arre uji	Water caltrop	Trapaceae	I	Lakes and ponds	The bridge of Buna	EN (A1b)	NT

Section 2								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**

Dictamus albus	Bar uzo	Burning bush	Rutaceae	I		Renci Mountain Lezhe	VU (A1b)	LC
Juniperus communis	Dellinje e zeze	Common juniper	Cupressaceae	I	Various settlements	Renci mountain, settlements close to Kenalla Lagoon	VU(A1b)	LC
Salvia officinalis	Sherebele	Common sage	Lamiaceae	I	Dried rocky areas	Renci Mountain	VU(A1b)	LC
Alyssoides utriculata	Alisoid qeskor	Greek bladderpod	Brassicaceae	I	Stone and rocky place	Renci Mountain	LR(cd)	
Euphorbia dendroides	Rriell drungjashem	Tree spurge	Euphorbiaceae	I	Dry areas	Renci Mountain	LR(cd)	LC
Gladiolus palustris	Gladiole mocalesh	Marsh gladiolus	Iridaceae	I	Scrub and wet meadows	Renci Mountain	LR(nt)	DD

Section 3
Regarding Section 3, there is not found any plant species with specific status.

Section 4								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Agrimonia Eupatoria	Eupatoria	Common agrimony	Rosaceae	I	Forest and shrubs	Fushe-Preze	LR (cd)	LC

Juniperus communis	Dellinje e zeze	Common juniper	Cupressaceae	I	Various settlements	Valias	VU(A1b)	LC
Juniperus oxycedrus	Dellinje e kuqe	Prickly juniper	Cupressaceae	I	Various settlements	Valias	VU(A1b)	LC
Osmunda regalis	Osmunde mbreterore	Royal fern	Osmundaceae	I	wetlands	Vore	EN(A1b)	LC
Phyllitis scopendrium	Tjegullore	Hart's-tongue	Aspleniaceae	I	In the side of flowing waters	Vore	VU(A1b)	LC

Section 5								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Origanum vulgare	Rigon i rendomte	Wild marjoram	Lamiaceae	I	Various settlements	Peze e madhe	EN(A1b)	LC
Prunus Cerasifera	Kumbull qershimba jtese	Cherry plum	Rosaceae	I	Mountain areas	Kashar	VU(A1b)	DD
Osmunda regalis	Osmunde mbreterore	Royal fern	Osmundaceae	I	Wet areas	Tirane	EN(A1b)	LC

Sections 6,7
Regarding Section 6 and 7, there is not found any plant species with specific status.

Section 8								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Baldellia ranunculoides	Baldele zhabineng jashme	Lesser water-plantain	Alismataceae	I	Lakes and ponds	Mbrostar Fier	CR(A1c)	NT

Section 9 A2 / B2								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Juniperus oxycedrus	Dellinje e kuqe	Prickly juniper	Cupressaceae	I	Various settlements	Toc Tepelene	VU(A1b)	LC
Centaurea zuccariniana	Kokocel I Zukarinit		Compositae	I	Vende te thata dhe shkembore	Kalivac Tepelene	VU(A1b)	
Chamaecytisus tommasinii	Kamecitize e Tomazinit		Leguminosae	I	Fores and shrub	Vasjar, Tepelene	EN(B2c)	LC
Sinapis pubescens	Sinap pushlor		Cruciferae	I	Shkembinj	Frakull e Madhe Fier	VU(A1b)	LC

Section 10								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Quercus ilex	Ilqe	Holm oak	Fagaceae	I	Maquis and mediterranean scrub	Dragot Tepelene	EN(A1b)	LC
Centaurea graeca	Kokocel I Greqise		Compositae	I	Rocky areas	Lumi Vjose Tepelene	EN(A1b)	
Ramonda serbica	Ramonde e Serbise	Serbian ramonda	Gesneriaceae	I	Rocky rifts	Luzat tepelene	VU(A1b)	LC

Sections 12 – 13A								
Taxon Name	**Albanian Name**	**Engish Name**	**Family Name**	**Phytoclimatic Zone**	**Type of habitat where it is located**	**Location**	**Conservation Status by Albanian Red Book**	**Conservation Status by IUCN Red List of Threatened Species**
Juniperus oxycedrus	Dellinje e kuqe	Prickly juniper	Cupressaceae	I	Various settlements	Section 11 and 13 Gjirokaster	VU(A1b)	LC
Digitalis lanata	Luletogezi leshtak	Grecian fox glove	Scrophulariaceae	I	Forest and shrubs	Section 11, 12 and 13 Gjirokaster	LR (cd)	LC

Juniperus oxycedrus	Dellinje e kuqe	Prickly juniper	Cupressaceae	I	Various settlements	Section 11 Subash Gjirokaster	VU(A1b)	LC
Quercus ilex	Ilqe	Holm oak	Fagaceae	I	Maquis and mediterranean scrub	Section 12 Cepo Gjirokaster	EN(A1b)	LC
Satureja montana	Trumze	Winter savory	Lamiaceae	I	Rocky slopes	Section 11 Subash Gjirokaster	VU (A1c)	

Key for Conservation Status by IUCN Red List of Threatened Species: NE-Not evaluated; DD-Data deficient; LC or LR/lc-Least concern; NT or LR/nt -Near threatened; LR/cd-Lower risk; VU-Vulnerable; EN-Endangered; CR-Critically endangered; EW-Extinct in the wild; EX-Extinct

List of Endangered and Threatened fauna Species of the Study Area, according Albanian Red Book of Fauna

Key for Conservation Status by Albanian Red Book; *Ex- Extinct; E- at risk of extinction; V-Worsened; R-Rare; I-Unspecified status; K*-Under review; K- not known; T- Threatened; C-Candidate*

Key for Conservation Status by IUCN Red List of Threatened Species: NE-Not evaluated; DD-Data deficient; LC or LR/lc-Least concern; NT or LR/nt -Near threatened; LR/cd-Lower risk; VU-Vulnerable; EN-Endangered; CR-Critically endangered; EW-Extinct in the wild; EX-Extinct

Latin name	Family name	Albanian name	English name	Section and area along the AIC Corridor where is located	Conservation Status by Albanian Red Book	Conservation Status by IUCN Red List of Threatened Species	Habitat Directive	Barcelona Convention	Bern Convention (Annex)	Bonn Convention	Bird Directive
INSECTS											
Gomphus flavipes	Gomphidae		River clubtail	**Section 10**	K	LC					
Papilio makaon	Papilionidae	Flatrabishtori makaon	Old World swallowtail	**Section 2**	R	LC					
Iphiclides podaliris	Papilionidae	Flatrabishtori podalir	Scarce swallowtail	**Sections 1, 2**	R	LC					
Zerynthia polyxena	Papilinidae	Poliksena	Southern festoon	**Section 3**	V	LC			Appendix II		
Anthocaris cardamines	Peridae	Flutura aurore	Orange tip	**Section 1**	R	LC					
Gonepteryx farinose	Pieridae		Powdered Brimstone	**Section 1**	V	LC					
Gonepteryx rhammi	Pieridae		Common Brimstone	**Section 2**	R	LC					
Libethea celtis	Nymphalidae	Caracja	Nettle-tree butterfly	**Section 1, 2, 5**	R	LC					
Apatura Ilia	Nymphalidae		Lesser purple emperor	**Sections 2, 5**	V	LC					

Limenitis reducta	Nymphalidae		Southern White Admiral	**Section 8**	R	LC					
Nymphalis polychloros	Nymphalidae		Large Tortoiseshell	**Section 5 and 6+7**	R	LC					
Nymphalis xanthomelas	Nymphalidae		Yellow-legged tortoiseshell	**Section 1**	R	LC					
Nymphalis antiopa	Nymphalidae	Zimbajtesja	Camberwell Beauty	**Sections 5, 8**	V	LC					
Inachis io	Nymphalidae	Sypalloi I dites	Peacock butterfly	**Sections 1, 2, 6+7**	V	LC					
Vanesa atalanta	Nymphalidae	Atalanta	Red admiral	**Sections 1 2, 5, 6+7, 8, 9, 10, 11, 12, 13**	R	LC					
Cynthia cardui	Nymphalidae	Shtegetarja		**Sections 1, 2, 5, 6+7, 8**	R	LC					
Polygonia egea	Nymphalidae		Southern comma	**Section 2**	R	LC					
Polygonia C-alba	Nymphalidae	C bardha	Comma butterfly	**Sections 2, 6+7**	R	LC					
Argynnis paphia	Nymphalidae	Shirit argjenda	Silver-washed fritillary	**Section 5**	R	LC					
Melitaea phoebe	Nymphalidae		Knapweed fritillary	**Sections 1, 5**	I	LC					
Melitaea trivia	Nymphalidae			**Section 5**	I	LC					
Euphydryas aurinia	Nymphalidae		Marsh fritillary	**Section 2**	V	LC	Annex II		Appendix II Revised Annex I of Resolution 6 (1998)		

Callophrys rubi	Lycaenidae		Green hairstreak	**Sections 1, 5**	R	LC					
Lycaena phlaeas	Lycaenidae	Flokeroshja e arte	Common copper	**Sections 1, 5**	R	LC					
Thersamonia thersamon	Lycaenidae	Tersamonia	Lesser fiery copper	**Sections 1, 6+7**	R	LC					
Heodes tityrus	Lycaenidae	Flokeroshja e erret		**Section 5**	I	LC					
Heodes ottomanus	Lycaenidae	Flokeroshja e jugut		**Sections 1, 5**	R	LC					
Everes argiades	Lycaenidae		Short-tailed blue	**Sections 2, 4**	R						
Glaucopsych e alexis	Lycaenidae		Green-underside blue	**Sections 1, 2, 5**	R	LC					
Polyommatu s (Lysandra) bellargus	Lycaenidae		Adonis blue	**Section 4**	R	LC					
Hiparchia fagi	Nymphalidae		Woodland grayling	**Section 8**	R	NT					
Hipparchia semele	Nymphalidae		Rock Grayling	**Sections 5, 8**	R	LC					
Hipparchia statilinus	Nymphalidae		Tree grayling	**Sections 6+7, 8**	R	NT					
Paranthrene tabaniformes	Sesiidae	Flutura murjele	Dusky clearwing	**Section 5**	V						
FISH											
Lampetra Flaviatilis	Petromyzontidae	Kavalli I lumit	River lamprey	**Buna River Section 1**	E	LC	Annex II Annex V	Annex III	Appendix III Revised Annex I of Resolution 6 (1998)		
Acipenser sturio	Acipenseridae	Blini	Atlantic sturgeon	**Buna and Drini river Section 1**	E	CR	Annex II Annex IV	Annex 2	Appendix II Revised Annex I of Resolution 6 (1998)	Appendix I Appendix II	
Petromyzon marinus	Petromyzontidae	Kavalli I detit	Sea lamprey	**Mouth of Buna river**	V	LC	Annex II	Annex III	Appendix III		

				Section 1					Revised Annex I of Resolution 6 (1998)		
Acipenser naccari	Acipenseridae	Blini I bardhe	Adriatic sturgeon	**Buna and Drini river Section 1**	E	CR	Annex II Annex IV	Annex 2	Appendix II Revised Annex I of Resolution 6 (1998)	Appendix II	
Salmo trutta lacustris	Salmonidae	Trofte liqenore	Brown trout	**Buna river Section 1**	V	LC					
Barbus meridionalis petenyi	Cyprinidae	Mustaku I lumit		**Shkumbin , Mati and Vjosa river Sections 2, 5, 9,10,11, 12, 13**	R	LC	Annex II		Appendix III Revised Annex I of Resolution 6 (1998)		
Lichia amia	Carangidae	Lojbe	Leerfish	**Mouth of Buna river Section 1**	E	LC					
Argyrosomus regius	Sciaenidae	Ameja	Meagre	**Mouth of Buna river Section 1**	E	LC					
Blennius fluviatilis	Blenniidae	Barburiq lumi	Freshwater blenny	**Buna and Drin River Section 1**	R	LC			Appendix II		
Petromyzon marinus	Petromyzontidae		Sea lamprey	**Sections 9A, 9B**	R	LC			Appendix III		
Alosa fallax	Clupeidae		Twaite shad	**Sections 9A, 9B**	R	LC			Appendix III		
Pachychilon pictum	Clupeidae	Peshk gjeli	Albanian roach	**Sections 9A, 9B**	R	LC			Appendix III		
AMPHIBIANS											
Triturus cristatus	Salamandridae	Tritoni me kreshte	Great crested newt	**Sections 1, 5, 10, 11, 12 and 13**	K	LC	Annex II Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		

Triturus vulgaris	Salamandridae	Tritoni i zakonshem	Common newt	**Sections 1, 2, 5, 8, 9, 10, 11, 12, 13**	K	LC	Annex IV		Appendix III Revised Annex I of Resolution 6 (1998)		
Bombina variegata	Bombinatoridae	Bretkosa barkverdhe	Yellow-bellied toad	**Sections 1, 4, 5, 6+7, 8**	K	LC	Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		
Bufo bufo	Bufonidae	Thithlopa	Common toad	**Sections 1, 2, 5, 6+7, 8, 9, 10, 11, 12, 13**	C	LC			Appendix III		
Bufo viridis	Bufonidae	Thithlopa e gjelber	European green toad	**Sections 1, 2, 4, 5, 6+7, 8** , 9, **10, 11, 12, 13**	K	LC	Annex IV		Appendix II		
Hyla arborea	Hylidae	Bretkosa e drureve	European tree frog	**Sections 1, 2, 4, 5**, **6+7, 8, 9, 10, 11,12, 13**	K	LC	Annex IV		Appendix II		
Rana dalmatica	Ranidae	Bretkosa kercimtare	Agile frog	**Sections 1, 2, 4, 5**, **6+7, 8, 9, 10, 11,12, 13**	K	LC	Annex IV		Appendix II		
Rana graeca	Ranidae	Bretkosa e perrenjve	Greek frog	**Sections 3, 9, 10,11,12, 13**	K	LC	Annex IV		Appendix III		
Rana balcanica	Ranidae	Bretkosa e gjelber e zakonshme	Pelophylax kurtmuelleri	**Sections 2, 3 and 5. Sections 6+7, 8, 9, 10, 11,12, 13**	T	LC			Appendix III		

Rana lessonae	Ranidae	Bretkosa e leshterikut	Pool frog	**Sections 1, 2, 3, 4, 6+7, and 8**	T	LC	Annex IV		Appendix III		
REPTILES											
Emys orbicularis	Emydidae	Breshkujza	European pond turtle	**All Sections**	K	NT	Annex II Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		
Mauremys caspica	Geoemydida e	Breeshkeuj eze	Caspian turtle	**Sections 1, 2, 3, 4, 5, 6+7, 8**	K		Annex II Annex IV		Appendix II		
Testudo hermani	Testudinidae	Breshka e zakonshme	Hermann's tortoise	**Sections 1, 2, 3, 5, 6+7, 8, 9, 10, 11, 12, 13**	T	NT	Annex II Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		
Gymnodactilus kotschije	Gekkonidae	Hardhuca e murreve	Kotschy's gecko	**Sections 1, 2, 6+7, 8**	R				Appendix III		
Hemidactylus turcicus	Gekkonidae	Hardhuca me venduza e murreve	Mediterranean house gecko	**Sections 1, 2, 5, 6+7, 8, 9, 11, 12**	R	LC			Appendix III		
Algyroides nigropunctatus	Lacertidae	Hardhuca me luspa te medha	Blue-throated keeled lizard	**Section 2**	R	LC	Annex IV		Appendix II		
Lacerta trilineata	Lacertidae		Balkan green lizard	**Section 1, 2, 3, 4, 6+7, 8, 9, 10, 11, 12, 13**	R	LC	Annex IV		Appendix II		

Lacerta viridis	Lacertidae		European green lizard	**Sections 1, 2, 4, 5, 6+7, 8, 9 , 10, 11, 12, 13**	K	LC	Annex IV		Appendix II		
Podarcis muralis	Lacertidae		Common wall lizard	**Sections 2, 3, 4, 5, 6+7, 8, 9, 10, 11,12, 13**	K	LC	Annex IV		Appendix II		
Podarcis taurica	Lacertidae		Balkan wall lizard	**Sections 1, 2, 5, 11,12**	K	LC	Annex IV		Appendix II		
Ablepharus kitaibelii	Scincidae		European copper skink	**Section 2**	R	LC	Annex IV		Appendix II		
Anguis fragilis	Anguidae	Kakzoza	Anguis fragilis	**Sections 1, 2, 5, 8, 9 11,12, 13**	K	LC			Appendix III		
Ophisarus apodus	Anguidae	Bullari		**All Sections**	R		Annex IV		Appendix III		
Typhlops vermicularis	Typhlopidae	Gjarpri i verdhe krymbor	European blind snake	**Section 4**	R	LC			Appendix III		
Coluber jugularis	Colubridae	Shigjeta e gjate	Dolichophis jugularis,	**Sections 10 and 11**	K	LC	Annex IV		Appendix II		
Coluber gemonensis	Colubridae	Shigjeta e shkurter	Balkan whip snake	**Sections 10 and 11**	R	LC			Appendix II		
Coluber najadum	Colubridae	Shigjeta e holle		**Section 10, 11,**	R	LC	Annex IV		Appendix II		
Elaphe longissima	Colubridae	Bolla e shtepise	Aesculapian snake	**Sections 1, 2, 3, 4, 5, 6+7, 8, 11, 12**	K	LC	Annex IV		Appendix II		

Elaphe quatrolineata	Colubridae	Bolla me kater vija	Four-lined snake	**Sections 2, 3, 6+7, 8, 9, 10,11,12**	R	NT	Annex II Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		
Elaphe situla				**Sections 2 and 10**	R	LC	Annex IV		Appendix II		
Malpolon monspessulanus	Lamprophiidae		Montpellier snake	**Sections 5, 10, 11,12**	R	LC			Appendix III		
Natrix natrix	Colubridae	Gjarpri I madh I ujit	Green snake	**Section 1, 2, 5, 8, 9, 10,11,12, 13**	K	LC	Annex IV		Appendix II		
Natrix tessellate	Colubridae	Gjarpri I vogel I shiut	Dice snake	**Section 1, 2, 4, 5, 8, 9, 10, 11, 12, 13**	K	LC			Appendix II		
Telescopus fallax	Colubridae		European cat snake	**Sections 4, 6+7 and 10**	R	LC	Annex IV		Appendix II		
Vipera ammodytes	Viperidae	Neperka	Long-nosed viper	**Sections 9, 10,11,12**	K	LC	Annex IV		Appendix II		
BIRDS											
Phalacrocorax carbo	Phalacrocoracidae	Karabullaku I madh	Great cormorant	**Section 2**	K						
Phalacrocorax pygemus	Phalacrocoracidae	Karabullaku I vogel	Pygmy cormorant	**Section 2**	K	LC		Annex II	Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Botaurus stellaris	Ardeidae	Gakthi	Great bittern	**Section 2**	V	LC			Revised Annex I of Resolution 6 (1998)	Appendix II	Annex I

Ixobrychus minutus	Ardeidae	Gakthi I vogel	Common little bittern	**Section 2**	K	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Appendix II	Annex I
Nicticorax nicticorax	Ardeidae	Cafke nate	Black-crowned night heron	**Section 2**	K	LC			Appendix II		Annex I
Ardeola ralloides	Ardeidae	Cafka e verdhe	Squacco heron	**Section 2**	K	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Egretta garzetta	Ardeidae	Cafka e vogel e bardhe	Little egret	**Section 2**	K	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Platalea leucorodia	Threskiornithidae	Sqepluga	Eurasian spoonbill	**Section 2**	T	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Appendix II	
Plegadis falcinellus	Threskiornithidae	Kojliku I zi	Glossy ibis	**Section 2**	T	LC			Appendix II		Annex I
Milvus migrans	Accipitridae	Huta e zeze bishtgershere	The black kite	**Section 2**	R	LC			Revised Annex I of Resolution 6 (1998		Annex I
Circus pygargus	Accipitridae	Shqipja e balltaqeve	Montagu's harrier	**Section 1**	R	LC			Revised Annex I of Resolution 6 (1998)		Annex I
Circus macrourus	Accipitridae	Shqipja e stepave	Pallid harrier	**Section 2** **Section 3**	I	NT			Revised Annex I of Resolution 6 (1998)		Annex I

Accipiter gentilis	Accipitridae	Gjeraqina	Northern goshawk	**Section 2**	V	LC			Revised Annex I of Resolution 6 (1998)		Annex I
Buteo lagopus	Accipitridae	Huta me kalca	Rough-legged buzzard	**Section 2 Section 3**	V	LC					
Aquila clanga	Accipitridae	Shqiponja e madhe e rosave	Greater spotted eagle	**Section 2**	R	EN			Revised Annex I of Resolution 6 (1998)		Annex I
Neophron percnoterus	Accipitridae	Kalit të Qyqes	Egyptian volture	**Section 9A, 9B, 10, 11, 12 and 13**	T	E			Appendix II Revised Annex I of Resolution 6 (1998)	Annex I	Annex I
Falco vespertinus	Falconidae	Skifteri kembekuq	Red-footed falcon	**Section 1 Section 5**	R	NT			Appendix II Revised Annex I of Resolution 6 (1998)	Annex I	Annex I
Falco naumanni	Falconidae	Skifteri kthetraverdhe	Lesser kestrel	**Section 9A, 9B, 10, 11, 12 and 13**	R	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Annex I	Annex 1
Gallinago media	Scolopacidae	Shapka e madhe e ujit	Great Snipe	**Section 4**	R	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Annex I	Annex 1

Ciconia nigra	Ciconiidae	Lejleku I zi	Black stork	**Section 10**	LC	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Annex I	Annex 1
Crex crex	Rallidae	Mbreti I shkurtes	Corncrake	**Section 5**	I	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Appendix II	
Himantopus himantopus	Recurvirostridae	Kaloresi	Black-winged stilt	**Section 2**	I	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Gelochelidon nilotica	Laridae		Gull-billed tern	**Section 1 (Bune)**	V	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Appendix II	Annex I
Bubo bubo	Strigidae	Bufi	Eurasian eagle-owl	**Sections 5 and 8**	V	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Coracias garrullus	Coraciidae		European roller	**Sections 2 and 5**	R	LC			Appendix II Revised Annex I of Resolution 6 (1998)	Appendix I Appendix II	Annex I
Upupa epops	Upupidae	Pupeza	Hoopoes	**Section 2**	R	LC			Appendix II		
Jynx torquilla	Picidae	Qafedredhezi	Eurasian wryneck	**Sections 2 and 5**	R	LC			Appendix II		
Picus canus	Picidae	Qukapiku I perhime	Grey-headed woodpecker	**Sections 2 and 6+7**	R	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I

Phoenicurus phoenicurus	Muscicapidae	Bishtkuqi I mureve	Common redstart	**Sections 2, 4, 5, 8**	V	LC			Appendix II		
Saxicola rubetra	Muscicapidae	Ceku vetullbardhe	Whinchat	**Sections 2 and 5**	I	LC			Appendix II		
Turdus torquatus	Turdidae	Tusha gushebardhe	Ring ouzel	**Section 5**	R	LC			Appendix II		
Aerocephalus melanopogon	Acrocephalidae	Bilbilthi me mustaqe	Moustached warbler	**Sections 2 and 5**	K	LC			Revised Annex I of Resolution 6 (1998)		Annex I
Aerocephalus palustris	Acrocephalidae	Bilbilthi verdheme	Marsh warbler	**Section 2**	V	LC					
Aerocephalus scripaceus	Acrocephalidae	Acrocephalidae	Reed warbler	**Sections 1, 2, 5, 9, 10, 11, 12, 13**	V	LC					
Hippolais olivetorum	Acrocephalidae		Olive tree warbler	**Section 5**	R	LC			Revised Annex I of Resolution 6 (1998)		Annex I
Hippolais pallida	Acrocephalidae		Olivaceous warbler	**Section 2**	K	LC					
Sylvia cantillans	Sylviidae	Bilbilthi gushekuq	Subalpine warbler	**Section 2 and 5**	R	LC			Appendix II		
Sylvia nisoria	Sylviidae	Bilbilthi skifter	Barred warbler	**Section 2**	K	LC			Appendix II Revised Annex I of Resolution 6 (1998)		Annex I
Sylvia hortensis	Sylviidae	Bilbilthi kengetar	Western Orphean warber	**Section 8**	I	LC			Appendix II		
Ficedula albicollis	Muscicapidae	Mizakapesi qafebardhe	Collared flycatcher	**Section 2 and 5**	R	LC			Revised Annex I of		Annex I

									Resolution 6 (1998)		
Panurus biarmicus	Panuridae	Trishtili me mustaqe	Bearded Reedling	**Section 2**	K	LC			Appendix II		
Remis pendulinus	Remizidae	Kolovatesi		**Section 1 and 2**	R						
Parus palustris	Paridae	Trishtili I vogel I murme	Marsh tit	**Section 2**	R	LC					
Tichodroma muraria	Tichodromidae	Zvaritesi krahekuq	Wallcreeper	**Section 5**	R	LC					
Lanius excubitor	Laniidae	Larashi I madh I perhime	Great grey shrike	**Section 5**	V	LC					
Nucifraga caryocatactes	Corvidae	Arrathyes	Northern nutcracker	**Section 5**	R	LC			Appendix II		
Corvus frugilegus	Corvidae	Korbi sqep bardhe	Rook	**Sections 2, 5, 6+7, 9, 12, 12, 13**	R	LC			Appendix III		Annex II
Anthus campestris	Motacillidae	Drenja e fushes	Tawny pipit	**Section 2**	R				Revised Annex I of Resolution 6 (1998)		Annex I
MAMMALS											
Rinolophus Euryale	Rhinolophidae	Lakuriq nate hunde-patkua I Mesdheut	Horseshoe bat	**Section 4**	V	LR/nt					
Nyctalus leisleri	Vespertilionidae	Lakuriq nate I Leislerit		**Section 5**	K	LC					
Nyctalus noctula		Noktule	Noctule	**Sections 1 and 5**	K	LC					
Plecotus auritus	Vespertilionidae	Lakuriq nate veshgjate I zakonshem	Brown big eard bat	**Section 5**	K	LC					

Plecotus austriacus	Vespertilionidae	Lakuriq nate veshgjate I hirte		**Section 5**	K	LC					
Tadarida teniotis	Molossidae.	Lakuriq nate bisht-lire	European free tailed bat	**Section 8**	I	LC				Appendix II	
Canis lupus	Canidae	Ujku	Grey Wolf	**Sections 9,10,11,12**	R	LC	Annex IV Annex V		Appendix II Revised Annex I of Resolution 6 (1998)		
Lutra lutra	Mustelidae	Lundra	The Eurasian otter	**Section 1, 2, 9, 10, 11, 12, 13**	V	NT	Annex II Annex IV		Appendix II Revised Annex I of Resolution 6 (1998)		
Meles meles	Mustelidae	Baldosa	The European badger	**Sections 3, 4, 5, 6+7, 8, 9, 10, 11, 12, 13**	E	LC			Appendix III		
Rupicarpa rupicarpa	Bovidae	Dhia e eger	Chamois	**Sections 9 and 10**	V	LC	Annex II Annex IV Annex V		Appendix II Appendix III		

Annex 4 – Bill of Quantities

Annex 5 – Stakeholder Meeting Log

No	Name of participants on the meeting	Institution/ Organization	Place	Meeting date	Type of interaction /Meeting *(one to one, focus group, public hearing, etc)*	Objective of the meeting	Reference point (from our team) for this meeting
1	Pellumb Abeshi- General Director of Environmental Policies	Ministry of Tourism and Environment	Tirane	9.01.2018	One to one	Presentation of the project. Consultation on procedures to be followed related to the consultation with the National Environmental Authorities.	Spartak Sinojmeri
2	Ornela Shani- Specialist of employment office	Institute of Statistics in Tirana, central office	Tirane	10.02.2018	One to one	Presentation of the project, consultation on employment data for affected municipalities	Roxhensa Kreci
3	Blerta Haka- Specialist	Vore Municipality	Vore	21.02.2018	One to one	Presentation of the Project, request letter for obtaining the data needed for socio-economic assessment	Roxhensa Kreci Spartak Sinojmeri
4	Sadije Kurti- Social Insurance Inspector	Administrative Unit of Preza	Preze	22.02.2018	One to one	Presentation of the project and consultation on socio economic status of the area of Administrative Unit	Roxhensa Kreci
5	Dylbere Kamberi – Specialist of civil status office	Administrative Unit of Preza	Preze	22.02.2018	One to one	Presentation of the project. Obtaining demographic data on the settlements affected by the project	Roxhensa Kreci
5	Egert Spahiu- Responsible of Public Service Sector	Administrative Units of Peza	Peze	15.02.2018	One to one	Presentation of the project, opinion and suggestions on road track	Roxhensa Kreci, Spartak Sinojmeri,
6	Aleksander Toti - Coordinator of Municipality	Municipality of Tepelene	Tepelene	11.04.2018	One to one	Presentation of the project, opinion and suggestions on road track	Roxhensa Kreci, Spartak Sinojmeri,
7	Durim Oroshi - Head of Municipality	Municipality of Memaliaj	Memaliaj	12.04.2018	One to one	Presentation of the project, consultation related to socio-economic situation. Request from stakeholder met for presenting the	Spartak Sinojmeri,

No	Name of participants on the meeting	Institution/ Organization	Place	Meeting date	Type of interaction /Meeting *(one to one, focus group, public hearing, etc)*	Objective of the meeting	Reference point (from our team) for this meeting
						coordinates where the road alternatives passes	Roxhensa Kreci
8	Petrit Shaho - specialist of Regional Environmental Agency Tepelene	Regional Environmental Agency Tepelene	Tepelene	11.04.2018	One to one	Presentation of the Project, opinion and suggestions related to environment of the area	Spartak Sinojmeri, Roxhensa Kreci
9	Stefan Rrapi- Director of Regional Environmental Agency	Regional Environmental Agency - Gjirokaster	Gjirokaster	12.04.2018	One to one	Presentation of the project, Main environmental issues, suggestions on road section- Gjirokaster Bypass (flooded area), and underground waters in Tepelene	Spartak Sinojmeri, Roxhensa Kreci
10	Sokol Xhafa - Head of Administrative Unit of Fratar	Administrative Unit of Fratar	Fratar, Ballsh	13.04.2018	One to one	Presentation of the Project, concerns addressed about land compensation of the road-built years before, Levan Tepelene road axis. Getting information related to socio-economic status of the area	Roxhensa Kreci
11	Griselda Mana - Head of Administrative Unit	Administrative Unit of Thumane	Thumane	19.04.2018	One to one	Presentation of the project, suggestions on building secondary roads and other concerns of the residents	Spartak Sinojmeri, Roxhensa Kreci
12	Viktor Hilla- Forest specialist	Administrative Unit of Thumane	Thumane, Kruje	19.04.2018	One to one	Presentation of the project, discussions on biodiversity of the area, demographics, employment, facilities, agricultural land, underground water quality	Spartak Sinojmeri, Roxhensa Kreci
13	Jonida Rrepa- specialist of education office	Municipality of Lezha	Lezhe	09.05.2018	One to one	Presentation of the project, provide information on the number of educational institutions disaggregated by settlements, number of students etc	Roxhensa Kreci

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14	Bardhok Frroku - Director of Regional Environmental Directorate	Municipality of Lezha	Lezhe	09.05.2018	One to one	Presentation of the Project, consultation on Protected Area of the territory and if any of them are affected by the project in term	Spartak Sinojmeri, Geeorge Paraskevopulos, Roxhensa Kreci, Bardhyl Qilimi,
15	Zef Gjoka- Engineer	Water supply/Sanitation, Sewage treatment plant	Kune village, Shengjin	09.05.2018	One to one	Presentation of the project, getting explanation related to the operation of water treatment plant and other informative data	Spartak Sinojmeri, George Paraskevopulos, Roxhensa Kreci, Bardhyl Qilimi,
16	Jak Gjini- Environmental Inspector	Lezhe municipality	Lezhe	09.05.2018	One to one	Presentation of the project , consultation on Protected Area possibly affected by project development	Spartak Sinojmeri, Geeorge Paraskevopulos, Roxhensa Kreci, Bardhyl Qilimi,
17	Arben Luzati- Director of Hygiene and Environment	Institute of Public Health	Tirane	17.05.2018	One to one	Consultation on EU and Albanian standards in drinking waters	Spartak Sinojmeri

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	Department in The Institute of Public Health						
18	Joint workshop of Albanian and Montenegrin authorities	Ministries of both countries (Albania and Montenegro), EU Delegation, EBRD	Shkodra	11.07.2018	Joint workshop	Presentation of the project to all stakeholders of higher level of Albania and Montenegro	Whole ESIA team
19	Ervis Nika-Oil Engineer	Bankers Petroleum	Fier	07.09.2018	One to One	Consultation on main sources of pollution in Semani river and measures taken by oil extraction companies to avoid pollution	Spartak Sinojmeri
20	Arben Spaho-Chief of Historical Center Sector. (Tradition and Landscape Architecture)	Institute of Cultural Monuments	Tirane	13.11.2018	One to One	Obtaining Information for preliminary opinion on Cultural Monuments of section 1 and 13 (Located in a distance up to 100 m from the road alignment) that may be directly or indirectly affected by the road track	Spartak Sinojmeri, Roxhensa Kreci
21	Denisa Shehu-Responsible of the Technical Secretariat at Institute of Cultural Monuments	Institute of Cultural Monuments	Tirane	15.11.2018	One to One	Presentation of the Project. Obtaining general information about the cultural monuments and other cultural assets that may be affected by the AIC. Obtaining information on the law no.27/2018 for Cultural Heritage and procedures in case of affected monuments from major development, such as the project in term and also knowledge on latest Minister's Order on Proclamation of Buffer Zone of Cultural Monuments.	Spartak Sinojmeri, Roxhensa Kreci

No	Name of participants on the meeting	Institution/ Organization	Place	Meeting date	Type of interaction /Meeting *(one to one, focus group, public hearing, etc)*	Objective of the meeting	Reference point (from our team) for this meeting
22	Olsi Bulku-Architect specialist	Institute of Cultural Monuments	Tirane	20.11.2018	One to One	Obtaining coordinates for closer monuments along the road tack and category they belong to and also maps for protected areas of the monuments	Roxhensa Kreci
23	Pellumb Abeshi-General Director of Environmental Policies	Ministry of Tourism and Environment	Tirane	13.12.2018	One to one	Presentation of Environmental and Social problems of Sections 1, 5A and 5B and 13A. Taking opinion to avoid as much as possible displacement of the population and damage of areas with high tourist and environmental value (protected or proposed areas as such).	Spartak Sinojmeri
24	Zamir Dedej Director of National Agency of Protected Areas	National Agency of Protected Areas	Tirane	14.12.2018	One to one	Consultation on impacts of section 1 of AIC Corridor in Protected Landscape of Buna River. Consultation on the treatment of buffer zones according to the new law on protected areas	Spartak Sinojmeri
25	Blendi Klosi-Minister of Tourism and Environment	Ministry of Tourism and Environment	Tirane	21.12.2018	One to one	Presentation of the project, main principle, and team efforts to avoid adverse impacts on local and national tourist and environmental/natural assets	Spartak Sinojmeri
26	Ardita Dracini-Monitoring Specialist	Regional Environmental Specialist	Shkoder	12.02.2019	One to One	Consultation on environmental/social statement of areas close to section 1	Spartak Sinojmeri, Roxhensa Kreci
27	Neat Dragoti-Executive Director of INKA	The Institute for Nature Conservation in Albania	Tirane	19.02.2019	One to One	Consultation on the status of flora with specific status in relation to AIC section	Spartak Sinojmeri
28	Arben Luzati-Director of Hygiene and Environment	Institute of Public Health	Tirane	20.02.2019	One to One	Consultation on drinking water quality of settlements close to AIC sections	Spartak Sinojmeri, Roxhensa Kreci

No	Name of participants on the meeting	Institution/ Organization	Place	Meeting date	Type of interaction /Meeting *(one to one, focus group, public hearing, etc)*	Objective of the meeting	Reference point (from our team) for this meeting
	Department in Public Health Institution						
29	Pellumb Abeshi-General Director of Environmental Policies	Ministry of Tourism and Environment	Tirane	11.03.2019	One to One	Presentation of priority alternatives and measures to avoid damage to protected cultural and environmental areas	Spartak Sinojmeri, Roxhensa Kreci
30	Ermal Halimi-Expert on Wildlife Directorate of Nature Protection	Ministry of Tourism and Environment	Tirane	22.03.2019	One to One	Consultation on wildlife expected to be affected by AIC sections	Spartak Sinojmeri
31	Edison Konomi-Director of National Environmental Agency	National Environmental Agency	Tirane	03.04.2019	One to One	Consultation on air, water and soil quality, effects on humans, monitoring program and sampling points station etc.	Spartak Sinojmeri, Roxhensa Kreci
32	Roland Olli, Independent Consultant for Cultural Heritage Protection (Ex Director of Albanian Service Agency)	Independent Consultant	Tirane	02.05.2019	One to One	consultation on specific cultural protected areas close to section 13B	Spartak Sinojmeri, Roxhensa Kreci
33	Koco Kaskaviqi-Head of Ornithological	Ornithological Association of Albania	Tirane	08.05.2019	One to One	Consultation on birds with specific status in Albania, in relation to AIC section	Spartak Sinojmeri

No	Name of participants on the meeting	Institution/ Organization	Place	Meeting date	Type of interaction /Meeting *(one to one, focus group, public hearing, etc)*	Objective of the meeting	Reference point (from our team) for this meeting
	Association of Albania						
34	Armando Lamaj Chief Inspector of Environment	State Environment and Forestry Inspectorate	Tirane	20.05.2019	One to One	Consultation on environmental quality of sites around AIC, complaints and information collected by communities living/working on site close to AIC sections	Spartak Sinojmeri, Roxhensa Kreci
35	Zef Preci-Director of Albanian Center for Economic Research	Albanian Center for Economic Research	Tirane	30.05.2019	One to One	Consultation on gender status in areas close to AIC sections	Spartak Sinojmeri, Roxhensa Kreci
Community Consultation							
36	Kastriot Myftaraj-Farmer	Qyteze, Fratar Mallakaster	Qyteze	11.04.2018	One to one	Presentation of the project, opinion and interest on the project	Roxhensa Kreci, Spartak Sinojmeri
37	Joni Mehmetaj-Administrator of Aragosta Music	Bar-Music located on the side of Vjosa river	Hekal, Mallakaster	11.04.2018	One to One	Presentation of the Project, consultation on the importance of Vjosa River and Bylis Archaeological Park for tourism development	Roxhensa Kreci
38	Perparim Haderi-resident in Kalivac village	Kalivac, Tepelene	Kalivac	11.04.2018	One to One	Data sources on no. of families and population, services and facilities of the village	Roxhensa Kreci
39	Bujar Faruku-Farmer	Derven, Thumane	Derven, Thumane,	10.04.2018	One to one	Presentation of the project, consultation on main employment sector of the village, poverty, services and facilities	Roxhensa Kreci

Annex 6 – Preliminary Environmental and Social Management Plan

Parameter	Possible impact	Potential Mitigation Measures
Landscape and visual	During pre-construction phase	
	Landscape and visual aspects have a great importance in linear projects. Construction phase with machinery, vehicles, working camps, workers, borrow pits use and all types of construction activities as well as operation phase with the adjustment of the alignment and all relevant structures (bridges, viaducts, tunnels, overpasses, underpasses, interchanges, retaining walls, noise barriers etc) will provoke landscape impacts depending on the fragility of the landscape and of the interventions' adaptability to the landscape, visual impacts to several types of viewers such as residents, tourists, users of land, workers and busineses and lighting impacts to humans and biodiversity. If these impacts are not well estimated during the ESIA stage, then great disturbance will be caused to viewers in a permanent manner while landscape characteristics will lose their significance by the degradation of their values.	The ESIA consultant should include in his study the following inter alia: ▪ Proposal of the ESIA for site specific measures for revegetation, lighting issues, noise barriers, road structures and retaining walls aesthetics ▪ Assessment of landscape sensitivity values (visual quality and fragility) and of landscape vulnerability (visual vulnerability (visibility), evaluated by the location and number of viewers and intensity of impacting actions, evaluated by the size and exposure to sight of local residents, visitors and passengers) ▪ Identification of different landscape categories (hills, valleys, meadows, protected areas etc) and proposal of specific measures per category ▪ Identification of impacts regarding the proposed structures (bridges, viaducts, interchanges, tunnels, drainage etc.) and proposal of specific measures per category ▪ Categorization of viewers affected, and specific mitigation measures proposed per category in the ESIA ▪ Use of 3D landscape modelling to present the major structures that will take place such as bridges and viaducts in order to assess with more accuracy the visual impacts ▪ Identification of lighting impacts and assessment of exposure of humans and fauna species, and of impacts' magnitude and significance ▪ Proposal of the ESIA that the Contractor should prepare a Landscape Management Plan. The ESIA should include the contents of such a plan, while depending on the outcome of the scoping report of each section the ESIA Consultant may prepare a Landscape Framework. Preliminary/detailed design should also consider: ▪ Design infrastructure layouts to minimize the footprint (taking into consideration the elements that contribute to landscape character) to reduce visibility of the facilities. ▪ Choose the location of temporary accesses and camps away from sensitive landscape locations ▪ Hide or screen the facility using natural landscape features or planted native vegetation barriers, where appropriate to the landscape sensitivity.

Parameter	Possible impact	Potential Mitigation Measures

		▪ Establish screening barriers using endemic species in advance of construction of the facilities.
		▪ Integrate facilities into the landscape setting considering building and structure color, texture and lines, where screening is not practical.
		▪ Regarding retaining walls:
		  ▪ A plantable wall surface, such as a retaining wall structure that allows interstices for planting shall be evaluated for use as a possible best management practice to help introduce more landscaping.
		  ▪ The shade of the wall has to be carefully considered. In general, very light buff/tan, brown, or grey colours stand out more than darker colours such as deep browns, deep red-browns, and deep warm gays that have the ability to complement the surrounding vegetation.
		  ▪ Avoid plain surfaces for retaining walls, exterior facing barriers and girders on bridges that would be visible to traffic passing under the overcrossing, decking, abutments and side supports, and columns.
		  ▪ Provide roughened retaining wall surfaces will soften the verticality of the wall faces by providing visual texture and reducing the amount of smooth surface that can reflect light.
		▪ Structures such as bridges and viaducts should provide correct geometric relationships in the overall structural arrangement and display visual integration of the beams, piers and abutments, display visual integration of the structure with the road and landform, ensure lines that delineate elements of the structure are smooth and unbroken in both the horizontal and vertical planes , have a colour that will provide appropriate contrast with the landscape tones and provide maximum open, light spaces beneath the structure and
		For proposing specific mitigation measures, morphological characteristics of the affected area were taken into account and have to be further described in the detailed design referring to the operational phase. More specifically:
		▪ Regarding hilly areas, slope lines as well as ridges of the surrounding hills should follow as much as possible the configuration of the existing field.
		▪ Slopes of embankments and cuts should be protected from weathering by planting of a mixture of grass species, species of bushes and appropriate species of trees.
		▪ Regarding the river valley and the river crossings, mitigation measures could include reinforcing the indigenous riparian forest tree planting in the new open space corridor, maintaining important recognisable views of the rivers and retaining physical continuity of natural systems.

Parameter	Possible impact	Potential Mitigation Measures
		▪ Lowland areas are the least affected areas, since the road will be at equal level with the existing terrain and the embankments and cuts will have a very mild and gradual change compared with the existing flat terrain. ▪ Regarding agricultural farmland, operation of the Project will slightly affect this character area, introducing more hard-surfacing and traffic into the wider agricultural landscape. ▪ As for the forest area, to prevent harmful erosion, any deforestation must be compensated by replanting trees, suitably seeding grasses along the sides of the embankments (or cuts), and suitable provision for channeling off rainwater. ▪ The Designer/Contractor should target at providing good transparency on the interchange areas and visibility of vertical traffic signalization. Landscaping within interchange loops will improve the visual quality of the roadway corridor by improving corridor aesthetics and helping to reduce the apparent scale of new and reconfigured aerial connectors. ▪ Material deposition areas shall be seeded to species-rich grasslands and allowed to develop naturally. Between 15% and 25% of the area shall be planted to a mosaic mix of species. Subsoil maybe mixed into the final surface to improve surface rigidity. ▪ Measures for the mitigation of potential noise impact will be required at a number of locations along the proposed road development, especially where residential properties are in close proximity to the alignment. While initially these features may increase the visual presence of the proposed road development, they also provide for immediate visual screening of the proposed road development and its associated traffic. The design of noise walls and earth bunds mounds will reflect the existing landform and character. The local setting for the barrier should determine whether it is appropriate to add a splash of colour to an otherwise drab scene. The use of bright colours to create a feature should be careful.
Lighting	Light pollution	Light pollution is something that can be mitigated during design (preliminary/detailed), by using ▪ colour-corrected halide lights. Lights shall provide good colour rendering with natural light qualities with the minimum intensity feasible for security, safety, and personnel access. Technologies to reduce light pollution evolve over time and design measures that are presently available may help but may not be the most effective means of controlling light pollution once the project is designed. Therefore, all design measures used to reduce light pollution shall employ the technologies available at the time of project design to allow for the highest potential reduction in light pollution. ▪ specifically designed lighting equipment that minimises the upward spread of light or glare towards receptors. Lights must be installed at the lowest allowable height and cast low-angle illumination while minimizing incidental light spill onto adjacent properties, open spaces, or backscatter into the nighttime sky.

Parameter	Possible impact	Potential Mitigation Measures
		▪ vegetation screening to assist in providing a perception of light while also contributing to a visual and landscape response. The lighting design concept for the landscaped areas should be designed to contribute to the quality of the development within internal nocturnal views with the highlighting of focal points and key landscape elements. In general, the residential development landscape will not require 24 hour lighting except for the lighting of access roads and emergency access. The intensity, luminance and lighting level generated from residential properties is predicted to be relatively low in the views available from outside the development. Glare control measures should be considered for the aesthetic design of architectural and road lighting within the development to minimise the visual impact caused by light spillage and glare in views for the identified Visual Sensitive Receptors. The ESIA Consultant in cooperation with the design team should take into consideration light trespass, glare ▪ Sky glow. It manifests itself as a glow above a road when humidity is high. This effect is difficult to mitigate, as it is light that reflects either directly or indirectly off the road surface and illuminates water particles suspended in the air, giving a glow effect. Sky glow can be reduced by using darker coloured surfaces, i.e. black asphalt, rather than a light coloured chipping, and dark painted or coloured concrete, rather than white. and of modern flood lights with appropriate shields to avoid light spilling upwards. The ESIA Consultant should identify the settlements and residential areas that will be in close vicinity to the structures that will be lit in order to better define the impacts.
	During construction	
Landscape and visual	Construction phase includes construction activity during which the temporary facilities set up, therefore, the landscape will be temporarily changed. In addition to the landscape along the corridor, a large impact on the landscape have areas that are located in the immediate surroundings. While setting up a construction site, construction area will, although temporarily, lose its values in the form of floral cover, quality characteristics of the soil, as well as the image of the landscape and visual continuity. Some of the elements of the proposed road development that have potential for significant landscape and visual impact during the construction stage are the road construction corridor itself, temporary traffic management, earthworks fenced equipment storage compounds and the presence of	▪ Footprint should be minimized as much as possible (e.g. narrower working strip). ▪ Organizing the site and setting up facilities ensures that these facilities are concentrated mainly in places where planned bridges, viaducts and tunnels along the route are. ▪ Earthworks must consider landscape and visual amenity, bank stabilisation, erosion, water quality and tie into existing contours. ▪ All earthworks upon completion will be hydroseeded or protected by some other means to stabilise the surface and reduce runoff and erosion and dust. Areas to be planted will be sprayed with herbicide to kill grass and any weeds well in advance of planting. Permanent above ground structures (e.g. signage, fencing, gates) would be designed and located to be as visually unobtrusive as can be technically achieved. Where possible, provision of high quality engineering / architecture would reinforce landscape character and distinctiveness

Parameter	Possible impact	Potential Mitigation Measures

	major and minor site facilities such as temporary offices and washrooms; lay down areas and labour camps, temporary suspension and relocation of access to some public areas and private properties and off-route impacts (to the surrounding road network) utilised during construction such as traffic calming measures and additional vehicles.
	
	Degradation of the landscape is reflected primarily in the construction work, which adversely affects the landscape, through the creation of the site and its accompanying elements such as containers, camps for construction workers, machines, which have a significant impact on the landscape changing its character and aesthetic value, and adverse impacts that are inevitable during construction, such as changes in land use from agricultural to building and partially endangering visual aspects, change of colours
	
	The establishment of construction areas along the alignment (project, bridges, viaducts, interchanges, tunnels, overpasses, underpasses) will provoke a change to landscape to new temporary buildings, machinery, construction yards, a change in the landform while new buildings, fences and structures will be visible from the existing roads and residential areas. Regarding temporary stockpiling, the height of stockpiles will be greater than the final earthwork levels.
		▪ Plan the movement of equipment and materials during times of least visual impact (i.e., work day start and end) where practicable.
		▪ Target dry weather periods when undertaking construction in sensitive landscape areas (e.g., waterway crossings), where feasible to minimize visual impacts due to sedimentation and erosion.
		▪ Clear areas progressively and implement rehabilitation as soon as practicable following construction and decommissioning activities.
		▪ Regarding topsoil
		  ▪ To ensure proper rooting of the different varieties, the creation on the slopes of a layer of topsoil of the following thickness is recommended 15-20 cm for grass, 30-40 cm for special cases (where, for example, part of the embankment is given over to farming) and 50-60 cm for shrubs. This topsoil should be chemically neutral in nature, and sufficiently end owed with organic matter and nutrients; the beds should be free of stones, debris, roots and weeds.
		  ▪ On the slopes of cuts, where it is difficult to apply a new layer of top soil, the surface can be rendered suitable for plantations by having recourse to certain techniques to correct their chemical-physical-organic nature such as the seeding of leguminous plants (these species have nitrogen-fixing properties and can transfer nitrates to the soil, thus rendering it suitable for subsequent crops), the application of organic and chemical fertilizers (the chemical fertilizers used should be double or triple complex chemical fertilizers) and the usage of geotextiles or other aids in order to keep fertile topsoil in place until the plants themselves take over this role.
		▪ Locate topsoil and spoil embankments in visually discreet locations, where possible.
		▪ Utilize landscape features and contours, where applied,
		▪ Maintain the integrity of private roads and tracks and minimize dust generation, where appropriate, in consultation with relevant owners and interest groups.
		▪ Temporary hoardings, barriers, traffic management and signage would be removed when no longer required.
		▪ Construction machinery and vehicles will primarily move within the land allotment. The visual impact of the vehicles and machinery will only be possible on parts of regional and local motor roads that are adjacent to populated areas and will be associated with a higher density of traffic flow caused by vehicles transporting construction materials from quarries to the asphalt and concrete plants and to parts of AIC in the immediate vicinity of populated areas.
		▪ Shape the terrain around altered impacted areas so as to recreate the surrounding land morphology.

Parameter	Possible impact	Potential Mitigation Measures
		▪ Restore conditions to pre-period as much as possible by restoring vegetation of working strip. ▪ Minimise native vegetation removal and retain and protect remnant indigenous vegetation ▪ Avoid using 'alien' plant species.
Lighting	Lighting during the construction phase can potentially impact upon local residents and biodiversity with the use of floodlights to illuminate construction zones, e.g. in areas around rivers or at construction camps, temporary security lighting, lights at height associated with construction of structures, lights in the contractor's compound and car parking areas and light spill and glare towards surrounding residential receptors areas.	▪ All lights will be screened and directed downward toward work activities and away from the night sky and highway users and highway neighbours, particularly residential areas, to the maximum extent possible. ▪ Lighting to be switched off when not required specifically for construction activities or required for security or heath and safety;
Landscape, visual, lighting	During operational phase	
Landscape	The main elements that have potential for significant landscape and visual impact during the operational stage are the cuts and fills, the replacement / reinstatement landscape planting during the establishment period immediately post-construction, the permanent loss of some landscape elements/features, the presence of elevated structures such as the interchanges, viaducts, bridges etc, illumination and traffic and noise barriers. With the implementation of the road project, the landscape impacts that arise are due to the appearance of linear and geometric forms, which also introduce colour changes due to the removal of the vegetative cover, the use of construction materials (concrete, etc.) with textures and colours different from those of the nearby natural elements, and the creation of cuttings (the newly open substrate has a clearer and brighter coloration than the naturally altered substrate) and embankments. When in place, the new alignments will change the landscape substantially being new Sections where there are currently no asphalt roads.	The landscaping and highway layout are also of importance in terms of road safety. For this reason, the layout should be such that any dominant characteristics will reaffirm the driver's choice of directions without confusing him. When inserting the motorway into the surrounding context, any possible disturbance of the historical, landscape, social and cultural fabric of the region must be avoided. Where possible, the highway components (cuts, embankments, bridges, viaducts and overpasses) should be architecturally designed so as to be integrated into the surrounding environment. More specifically: ▪ Appropriate revegetation of the Project Area as soon as possible after construction in order to improve the amenity of the road alignment. All open cuts should be planted right after finishing to prevent soil erosion, while specific cuts to be necessarily planted are mentioned in the biodiversity section. ▪ Revegetation may need to be conducted in accordance with a weed management plan for the corridor. ▪ Aim to provide tall shrub or low planting within centre medians and outer separators to improve the amenity of the corridor ▪ Planting vegetation with autochthonous species in areas such as watercourses and banks underneath the constructed bridges, as well as in the abutment areas, affected areas underneath the viaducts as weel as interchanges and areas between cuttings and fills ▪ Additional planting proposals will address specific landscape, ecology and visual amenity aspects such as to screen views of highway and specific elements such noise walls and fences and to

Parameter	Possible impact	Potential Mitigation Measures
		provide scale and to enhance visual amenity at interchange areas, or to provide shade/shelter in open interchange areas Maintenance will include regular checks for problem weeds, especially those that are aggressive and invasive, and to deal with these in the early stages of infestation when control is relatively easy, observation to detect damage from pests and diseases, waterlogging, and vandalism, modification to planting around barriers, signage and other structures to ensure setbacks are maintained.
Visual	Regarding the groups of viewers, they can be categorised as visual receptors on surrounding settlements or conglomeration of houses and businesses, agricultural workers on the land and travellers, tourists and commuters Visual impacts will arise from the built physical presence of the proposed road development, including its structures, traffic usage and additional illumination both fixed and from vehicles, especially where the proposed road development is on embankment or at junctions and bridging locations. Depending on height, intervening topography and retained vegetation, embankments have the potential for visual obstruction and significant visual intrusion. Deep cuttings can also result in significant change to the visual nature of landscape continuity. Sloping ground may open up views of deep cut faces, especially where mitigation planting has not effectively established to join severed tree lines and hedgerow at the top of the cut slopes. The local community, with time, will get accustomed to the new infrastructure, visual discomfort related to the change will diminish. Therefore, the magnitude visual discomfort will become lower. It should be mentioned that perception of the viewers may differ, for some new infrastructure may be acceptable for other – less acceptable or non-acceptable change Some Sections will include tunnels and the visual impact will be limited to the areas above ground. Moreover, in some sections, cut and cover technique has been adopted to improve visual impact and possibility of crossing the infrastructure.	Regarding the mitigation measures for visual impacts, residents will have direct, clear views of the Project. New planting will, over time, help to provide some screening for properties. However, this will not alleviate all of the visual impacts associated with the elevated bridges and cut slopes stabilized with anchored concrete, rock walls, other. New access roads onto the highway would aid access and integration, along with additional underpasses. The visual effect from new infrastructure can be mitigated by surface/color treatment of piers, road barriers, using transparent noise barriers whether appropriate and maintenance of vegetation. Users of the highway will have enhanced journeys, accessibility and movement and therefore no mitigation is necessary. Users of the surrounding landscape will have clear views of the Project although proposed planting will, over time, provide some screening. Accessibility across the road will be reduced and the Project will be more visually intrusive than previously.

Parameter	Possible impact	Potential Mitigation Measures
Lighting	Lighting will be implemented in interchanges, tunnels, bridges, underpasses, rest areas, service and rest areas. The impacts of street lighting can be discussed in terms of impacts to landscape and local community. In terms of impacts on the landscape, large portions of the road would need to be lit for safety reasons and to meet design specifications, e.g. lighting of junctions, tunnels and bridges. Street lighting can also impact upon the local community and residential areas if the light is not shielded correctly and light 'spill' occurs. The main components of light pollution that will occur in the project area are light trespass and glare. *Light trespass* can be described as the effects of light or illuminance that strays from its intended purpose. *Glare* can be described as unwanted source luminance, can be categorized into three types, blinding, disability and discomfort glare, and is defined as the sensation produced by luminance in the visual field that is sufficiently greater than the luminance to which the eye has adapted to cause nuisance, discomfort, or loss of visual performance and visibility. Less important will be sky glow and headlight sweep. Impacts of lighting on biodiversity will be discussed in the biodiversity section below.	Regarding lighting, the following mitigation measures are proposed to be followed: ▪ Special attention should be paid to plant choices near residences to ensure that species chosen are of an appropriate height and rely on evergreen species to provide year-round light screening from nuisance light. ▪ Minimization of glare by ensuring the correct luminaire is selected and installed correctly. ▪ The use of full horizontal cut off luminaires installed at 0° uplift will, in addition to reducing sky glow, also help to minimise visual intrusion within the open landscape. ▪ Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit ▪ The use of sodium light bulbs is prohibited and that LED lights are installed with a "neutral" color temperature of 4000K. Headlight sweep, the requirement is for the lights to be directed downwards and slightly to the left of centre. Where headlights are visible from 'side on' i.e. passing traffic with headlights oriented at right angles to the view, the effects would be less than if headlights were directed toward the viewpoint or dwelling. It is not anticipated that light from headlights will be a significant issue for residents. Regarding lighting impacts and biodiversity, the abovementioned mitigation measures can be applied as well as shining lights away from the rivers during construction at dusk and in the mornings.
Waste	During pre-construction	
	Lack of appropriate guidance in the ESMP of the ESIA and of the obligation to the Contractor that he would have to prepare a Waste Management Plan, may lead to: ▪ Irregular solid wastes collection, selection and separation, transport, and reuse, incinerate or discharge/disposal. ▪ Contamination or disturbance of inhabitants and wildlife from waste distribution. ▪ Contamination of surface waters, ground waters, soils and air by bad management of wastes	The ESIA Consultant should give proposals for the areas that waste will be disposed such as landfills for municipal solid waste, following the national legislation on waste, and for waste management for the different streams such as hazardous and construction and demolition waste. He should include in the ESMP and ESAP that the Contractor has to prepare a Spill Response Plan and Waste Management Plan which will describe waste streams and amounts, describe recycling/reuse methods for each material, identify the waste destinations and transport modes, including what materials are being segregated on site for reuse or recycling, specify responsibilities for managing and disposal of waste, describe special measures for material use and handling and describe communication and training to support and encourage participation from everyone on site.

Parameter	Possible impact	Potential Mitigation Measures
	▪ Damage of landscape and tourism/recreational potential	
	During construction	
	Pollution/contamination of soils, surface waters, air and specific sites from waste generated from construction works. Debris, irons, cement, organic and inorganic colors, leakages from equipment, wood and plastic, remains of batteries, etc. will impact on soils, waters and air (bad odors) if not appropriate In case of heavy rains or intensive winds, waste can be transferred in other sites by the free movement of waters or flying by wind and by infiltration (liquids and leakages) through geo-layers. Indirect impacts from waste transferred in lowlands, natural sites or agricultural sites, areas used for recreation or tourism (seaside and beaches) etc., or in groundwater basins, which are used mainly as drinking water sources for more than one region may occur. The waste generated by workers have the same nature as the municipal waste and are composed of organic compound (food remains, papers), plastic and glass. Medical waste is waste that can be generated by medical services in working campus in case of accidents. Such wastes sometimes may be very harmful and contagious and their mismanagement may be joined by transferred impacts to other sites.	▪ Where generated, waste will be classified in accordance with the Albanian regulatory requirements on inert, non-hazardous and hazardous waste. ▪ Exact position of landfills will be determined in later phases, by examining locations "in situ". ▪ The communal waste and the other non-dangerous waste could be transported to landfills close to the AIC. ▪ Regarding hazardous waste, there are going to be followed practices that are already established in Albania for these types of waste, namely collection by authorised companies and exporting. Short term keeping of hazardous waste should be realized by using and marking suitable containers for each type of waste ▪ The sites for the disposal of inert material (construction and demolition waste) will be identified in consultation with the authorities. ▪ The majority of excavated material that will be generated will be reused, if suitable, either as engineering fill material or in the environmental mitigation earthworks of the project. Mixing of inert, hazardous and non-hazardous waste, either during collection or storage will not be permitted. ▪ Waste will be segregated and stored in containers (skips) and other storage vessels, clearly labelled, sheeted or closed when waste is not disposed in them ▪ In case of large-scale spills of hazardous liquids, follow the Spill Response Plan. ▪ Provide septic tanks for the camp sites servicing. Contract authorized company to remove the liquid waste regularly.
Waste	During operation	
	Waste can be generated as a result of inappropriate behaviour of drivers and passengers (illegal disposal). Solid waste generation during operation and maintenance activities will include road resurfacing waste (e.g. removal of the old road surface material), road litter, illegally dumped waste, general solid waste from rest areas, wildlife carcasses, vegetation	▪ During resurfacing, maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base; ▪ Collecting road litter or illegally dumped waste and managing it

Parameter	Possible impact	Potential Mitigation Measures
	waste from right-of-way maintenance and sediment and sludge from stormwater drainage system maintenance. Waste maybe generated by services that will be developed in both sides of the roads such as motor car services, washing car services, rest areas, oil stations etc	▪ Provision of bottle and can recycling, where appropriate and trash disposal receptacles at parking lots to avoid littering along the road; ▪ Manage herbicide and paint inventories to avoid having to dispose of large quantities of unused product. ▪ Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardouor non-hazardous waste based on an assessment of its characteristics. ▪ Use garbage bins fitted with lids to avoid scattering around and attraction of scavengers. ▪ Manage and dispose hazardous waste according to the type and the class of hazard. Note: for hazardous waste removal licensed company must be contracted. ▪ Until removal (temporarily) waste must be stored within secure facilities with weatherproof flooring and roofing. ▪ The communal waste and the other non-dangerous waste will be transported to landfills close to each AIC Section
Geology and soils	During Pre-Construction	
	If preliminary design or ESIA neglects or analyzes certain issues superficially related to geology and soils, this may affect the environment during the construction and operation phase. The gaps on technical design and ESIA may lead to underestimate: ▪ Soil erosion and landslides. ▪ Changes in river morphology and sediment flow. ▪ Erosion in sites that can be exploited for exploitation of raw materials or risk for overexploitation. ▪ Transferred pollution and contamination in agricultural sites and running waters, by natural flowing waters	▪ Identify the geologically sensitive areas, prone to erosion and landslides in the ESIA to be prepared ▪ Propose site specific mitigation measures regarding soil pollution, topsoil management, borrow pits management, leakages in the ESIA ▪ Define appropriate sites to ensure the raw material for construction (borrow pits, quarries), risks of exploitation of sensitive natural sources or overexploitation of exploited raw material sources and the materials disposal ▪ Include the proposals of the Preliminary design/Detailed design for the proposed disposal sites ▪ Apply the best international practices with regard to the geotechnical assessment of the planned road corridor and especially of the bridges and other road infrastructure. The project activities should take the geological settings and the soil category into consideration to avoid any associated adverse impact such as soil liquefaction, subsidence, erosion and sedimentation, etc. Additional studies should be conducted for the identification of characteristics of the regime of channel and floodplain deformations of rivers, marginal erosion, water erosion (types of processes, their orientation, intensity and impact boundaries), of possible mudflow occurrence areas (the boundaries of mudflow distribution, the duration, the frequency, the maximum flow) and of slope processes manifestation areas (area, soil characteristics, sustainability factors, degree of activity and hazard for the Project area).

Parameter	Possible impact	Potential Mitigation Measures
		▪ Design and build an appropriate drainage system in order to avoid eventual damages from erosion and sedimentation to the planned road and its concrete structures (bridges, viaducts, tunnels, overpasses, and retaining walls), minimizing the quantity of uncontaminated stormwater entering cleared areas; ▪ Propose via the ESMP and the ESAP that the Contractor should prepare an Erosion Control and Sedimentation Management Plan, a Topsoil Management Plan as well as a Borrow pit Management plan for the construction phase and a Spills and Emergency Response Plan for both phases. The ESIA should propose some indicative issues to be included in these Plans.
	During construction	
Soil loss Exploitation of river basins Changes in rivers morphology Soil compaction Landslides	Loss of soils and earth by pavements of AIC corridor and other works or infrastructure conditioned by its construction activities is a very significant impact on earth and rocks. The significance of such impacts is different on several Sections, i.e this impact in existing roads is lower than in new alignments. Exploitation of the river basins for extraction of the raw construction material, damaging the river natural characteristics may incite vertical and horizontal erosion, opening depressions in the river body, which can serve as trap for coming sediments from upstream and control sedimentation in the sea coast which is fed by several rivers. The viaducts and bridge pillars will change water speed and turbulence which will affect river bottom sedimentation (vertical erosion) and by such changes, new meanders can be created (horizontal changes), inciting river side erosion. Changes in the river morphology by bridges and viaducts in Buna river are considered as important, due to the river importance at international, regional and local level. Compaction of soils to create appropriate site for operational activities (working campus etc.) during construction may be considered also as important negative impact. Possibility to induce new landslides across the flysch and molasses rocks that compose the hilly terrain	▪ Construction of retaining walls to avoid induced landslides, mudflows, rock falls and erosion. Such walls are planned to be built in all Sections apart from Section 3 as indicated in the table below. Minimizing the spatial extent of the working strip, especially in the steep areas where retaining walls are planned. ▪ Avoiding river/stream erosion by ensuring that construction works do not disturb any existing gravelly embankments at the water course crossings; ▪ Protecting the river/stream beds against erosion downstream and upstream the concrete structures (bridges, viaducts, overpasses) in order to ensure the foundations of these structures to be robust and to resist to the water erosion in case of maximal water discharge; ▪ Prohibiting the exploitation of gravels and sand within the river/stream bed close to concrete structures (bridges, viaducts) in order for water erosion to not weaken their foundations; ▪ Minimizing the clearing of vegetation, especially in steep terrain, to avoid the soil erosion and any potential induced small landslide; ▪ Programming construction activities so that the area of exposed soil is minimised during times of the year when the potential for erosion is high, for example during summer when intense rainstorms are common. ▪ Re-vegetating and mulching progressively as each section of works is completed. The interval between clearing and re-vegetation should be kept to an absolute minimum. ▪ Embankments and slopes with disturbed vegetation must be replanted immediately after the construction/disturbance stops – if not covered with gabion baskets and whether the season allows. For replanting native species must be used, placement of fiber mats to encourage vegetation growth and temporary fencing to protect plants from being grazed by cattle.

Parameter	Possible impact	Potential Mitigation Measures
Soil stability	Stability of soils upon higher cuts can be compromised and erosion/slides may occur. The highest volumes of earth-cut and other earth movement and pavements are planned to be done in Sections 5B, 9B2, 10 and the least in 5C. By their geo-morphological and topographic characteristics and rock structure, the same Sections represent the higher risk of erosion and slides. Demolition, slide or collapse of rocks may happen in sites where tunnels will be opened such as Sections 2, 5B, 9B2 and 10, and blowout of waters from calcareous pocket in rocks may happen. Erosion will mainly occur in the areas where the motoway will run on the side of the hills and where the cuts will expose large surfaces of soil. The rivers valleys seem to be exposed to erosion, while slides may happen in the hilly slopes of Sections	▪ Placing geotextile and geogrid for soil stabilization (Section 1 for 19,2 km, Section 2 for 6 km, Section 4 for 6km, Section 5B for 7.2 km, Section 5C for 2.4km, Section 6+7 for 7.2km, Section 9A2 for 9,6km, Section 9B2 for 6km, Section 10 for 6km, Section 11 for 3.6km and Section 13A for 3.6km) ▪ Applying nets for vegetation fixing in order to avoid rock falls and erosion. This measure should be applied wherever earthworks for road construction are needed in steep terrain;
Topsoil	Along the whole AIC, a quantity of 1,975,101 m3 of topsoil (Section 1 with the highest quantity and Section 6+7 with the lowest quantity) will be excavated and will be placed on the adcajent slopes.	▪ Ground clearance must be minimized; ▪ Topsoil must be removed from all areas required for permanent and temporary needs of the Project in order not to get mixed with the subsoil. It will be used for motoway side slopes and would be the best to embed the humus material without previous storage. This way of reuse of excavated soil is useful for fast vegetation development, which prevents erosion and lowers potential maintenance costs. If the storage is necessary, it must be provided on regulated dumps and based upon principles of humus material conservation. ▪ To avoid loss of the productive soil layer, all suitable topsoil and other material shall be saved and stockpiled separately for the future recultivation of the area; ▪ To ensure stability, stability of the stockpile will be achieved through preservation of 'safe' slope inclination and diversion of runoff from the area. the soil piles shall not be higher than 2 metres. The piles must be placed and managed so as to avoid erosion and washing off. Drainage trenches around the piles must be provided. ▪ Soil compaction may be reduced by strictly keeping to temporary roads, camp/operation ground boundaries; ▪ Reduce water velocities by minimizing continuous slopes where flowing water can scour, and to prevent scouring, drainage lines may need to be lined or velocity-reducing structures, such as crushed rock or geotextile, to be placed in the drainage line.

Parameter	Possible impact	Potential Mitigation Measures
Soil degradation	Soil degradation with regard to its impact on the environment includes several occurrences, most important of which are landslides and rockfalls, erosion, changes in soil permeability, potential degradation of soil properties in the wider area. Soil pollution may affect the rivers by the natural draining by rainfalls or floods, agricultural areas, stagnant water bodies (irrigation reservoirs) and groundwaters in case of hydro-geological windows.	▪ Any temporary fuel tank shall be placed in a covered area with berms or dikes to contain any spills. Any spill shall be immediately contained and cleaned up with absorbent materials; ▪ On-site repairs /maintenance/fuelling activities shall be limited. Priority shall be given to off-site commercial facilities. If impossible, a designated area and/or secondary containment for the on-site repair or maintenance activities must be provided; ▪ On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired. ▪ Secondary containment devices (drop cloths, drain pans) shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment. Drip pans or absorbent materials shall be provided. On small spills absorbent materials shall be used; ▪ Use of off-site vehicle wash racks (commercial washing facilities) is preferable. If on-site cleaning is necessary, bermed wash areas for cleaning activities shall be established. The wash area will be sloped to facilitate collection of wash water and evaporative drying; ▪ In case of the fuel/oil spills risk, oil traps shall be additionally provided; ▪ Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils. No bitumen drums or containers, full or used, shall be stored on open ground;
Quarries/borrow pits	Quarries/borrow pits for construction material and disposal sites. Opening of new quarries will ensure the construction material for the AIC construction. In such cases, sites relatively close to the construction areas with appropriate raw material may be in risk of overexploitation. Such indirect impacts may be significant at a regional scale and include the landscape degradation (quarries), soil removal and changes in the soil ecological functions due to compaction and contamination	Regarding borrow pit management, a part of the dredged material for cuts during road construction will be used for backfilling, reducing thus the quantity of the material extracted at the quarries for the road embankments. In case material will be needed for construction, there are existing quarries located in the proximity of each of the Sections. In case new borrow bits will be used, borrow pit areas will be graded to ensure drainage and visual uniformity or to create permanent tanks/dams, while they cannot be opened deeper than maximum level of groundwater, to avoid the occurrence of open phreatic level. The Contractor will develop a borrow pit management plan at the time of construction works completion. Pits management, (including restoration if it will follow the completion of certain works) shall be in full compliance with all applicable environmental standards and specifications.
Geology and soils	During operation	
Soil contamination	Soil contamination can occur during the operation of the AIC by the airborne substances and polluted run-off from carriageway surface. The pollutants originate from exhaust emissions, dust generated by traffic, road surface etc. Accidental pollution by leakages of oils of motor vehicles is	▪ Measures for the case of lorry spills, fire involving hazardous/polluting substances along the route to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water.

Parameter	Possible impact	Potential Mitigation Measures
	also an important impact that will be considered. With the technological advancement of vehicles, the amount of pollutants released into the surface layer of the soils tends to decrease. The vehicle fleet in Albania is mostly obsolete and some soil pollution is expected. Such impacts seem likely to be provoked in all AIC sections.	▪ Analysis of soil for identification of the impact caused by ice breaking salt (after the snow melt – in spring) with subsequent organic amendment and/or amendments to adjust pH or nutrient deficiencies.
Soil erosion	Regarding soil erosion, the main risks are associated with the mobilization of unconsolidated materials if disturbed surfaces are not stabilized or successfully vegetated.	▪ Protect the rivers/streams beds against erosion downstream and upstream the concrete structures (bridges, viaducts, overpasses) in order to ensure the foundations of these structures to be robust and to resist to the water erosion in case of maximal water discharge; ▪ Prohibit the exploitation of gravels and sand within the river/stream bed close to concrete structures (bridges, viaducts, overpasses) in order the water erosion to not weak their foundations; ▪ Maintenance of nets for vegetation fixing and ensuring at the rehabilitation of the vegetation in steep terrain, to avoid the soil erosion and any potential induced small landslide ▪ Maintenance of retaining walls to avoid induced landslides, mudflows, rock falls and erosion; ▪ Maintenance of the drainage system in order to avoid eventual damages from erosion and sedimentation to the planned road and its concrete structures or flooding (bridges, viaducts, overpasses, and retaining walls).
Tectonics and seismicity	During pre-construction, construction	
	Based on the seismic activities, the AIC lies over three seismic sources. The maximum expected magnitude for the AIC varies from 7.0 to 7.2. The earthquake events can destroy the roads, bridges etc, if not constructed, taking into account these maximum magnitudes. During this phase, such impacts seem to have high magnitude, because they may control the function of the corridor and jeopardize the transport at a regional and national level.	Due to the high risk of seismic events in Albania over time, road design has respected during conceptual design and will further take into account during the preliminary design and detailed design the seismic norms of construction and the expected earthquake magnitudes. Apart from the expected seismic magnitude, in order to define the impact significance, the topography and geo-morphology of the Sections have been assessed and will further be taken into account. Although Sections 1 and 2 lie on an area with higher seismic magnitude than some other sections (Sections 5B, 5C, 10 and 11), they are characterized by a flat topography, which means less seismological risk by the stimulation of slides. In conformity with Euro codes 7 and 8, it is recommended to take into consideration the results of the seismological survey prior to construction stage, as well as the geotechnical parameters resulting from the geotechnical study and the data/information provided by the boreholes logs that will be planned under the Preliminary Design.

Parameter	Possible impact	Potential Mitigation Measures
Climate change	During pre- construction	
	The most important impacts that can come up at this phase are those that will derive from the lack of examination of climate change issues under the ESIA preparation and will be passed to the other phases (construction and operation). Among the main impacts, catastrophic impacts by floods to structures by the underestimation of their dimensions, pavement damage due to increase of the extreme temperatures flux by the proposal of a non suitable type of pavement, CO_2 emissions' underestimation maybe included.	▪ Identification of potential emission sources for GHGs ▪ Calculations of the CO2 emissions provoked for the project's operation phase using EBRD & EIB calculation methods and comparing the emissions calculated to certain thresholds. Data will be needed for the number of vehicles per day and the types of the vehicles, while specific transmission emission factors will be defined. Values should be reported as tonnes of carbon dioxide equivalents (tCO2e). ▪ Proposal of mitigation measures for the drainage system, water pathways and collectors etc., to avoid floods, caused by climate change effects ▪ Drainage and collection system planning to avoid distribution of pollutants during floods ▪ Proposal of a climate resilience management plan (Green Economy Transition Approach) which will consider all the extreme events such as floods, landslides, temperature increase, heavy precipitation, examine their sensitivity, prepare a vulnerability assessment matrix and will present what the Design team foresaw to make the Project resilient (culverts, bridges, pavement characteristic towards heat and frost). Regarding the vulnerability of the Project to climate change, appropriate structural designs and surfaces and the use of different binders in asphalt (asphalt melting, frost) should be proposed. Additionally, the preliminary design/detailed design should be more precise for the ditch and culvert capacity. A number of simple measures can be taken to ensure that in the short term that extreme precipitation events do not result in significant impacts to the Project, including maintainance of positive cross slope to facilitate flow of water from surface, increase resistance to rutting, reduction of splashing/spray through porous surface mixtures; more frequent use of elevated pavement section, improvement of visibility and pavement marking demarcation and ensuring that all embankments are seeded to help increase stability.
	During construction	
	CO_2 emissions and hydrocarbons do not seem to impact on the large scale territories during the construction phase. Any GHG emissions at this phase are mainly expected by the transport of materials to site, plant and equipment use and transport of waste. Gases will be a transferred impact in service/access roads that will be used instead of those under reconstruction (case of doubling/upgrade of existing roads).	▪ Precise calculations for dimensions regarding drainage structures, culverts as well proposal of pavement types which are resistant to extreme temperatures ▪ Maximising the use of construction materials and products with recycled or secondary and low carbon content, from renewable sources, and offering sustainability benefit; ▪ Using locally-sourced materials where available and practicable to minimise the distance materials are transported from source to site; and

Parameter	Possible impact	Potential Mitigation Measures
	Floods remain a risk for all Sections which lie in flat areas and land depressions. If not appropriate measures, during heavy precipitation, floods may damage the works. During the dry season, extreme temperatures will incite accidental fires. Accidental fires may be provoked in any of the Sections during the construction phase and may cause damage to human life and assets, deteriorate or damage habitats and biodiversity and degrade the air and soil quality. Destruction of habitats by fires may cause habitat fragmentation at the best scenario or destruction of green cover and other catastrophic impacts to biodiversity (worst scenario), something which needs a long time to be rehabilitated and obtain its natural ecological features. Wildlife under stress will have to move to other areas, untouched by fires, provoking ecological stress (overpopulation) in the sites where they will be relocated. Vegetation clearance and pavements will increase air temperatures in the road itself and its surroundings. The shadows created by trees and the tree crown as an umbrella due to the solar radiation will be disappeared.	▪ Using more efficient construction plant and delivery vehicles, and/or those powered by electricity from alternative/lower carbon fuels.
	During operation	
	Precipitation. Roads are sensitive to high rainfall. Flooding may mean that roads are impassable and cause loss of amenity and of traffic hindrance and safety. Flooding may also cause damage to paved surfaces (leading to increased maintenance requirements). Roads and bridges are also sensitive to extreme rainfall events which, in addition to flooding, may also lead to destabilisation of soils and earthworks, potentially leading to temporary or permanent loss of amenity. Roads are also sensitive to low rainfall or drought. Prolonged dry periods may lead to drying out and cracking of earthworks and soils Roads and bridges are sensitive to extreme temperatures. High temperatures may cause damage to paved surfaces, including potential melting and deformation. An increase in	▪ Ensure all agreements on the natural hazards response and damage management are in place; Operational procedures should include policies and processes identified for responding to disasters; ▪ Establish a monitoring program which will ensure that monitoring of climatic data is embedded into the monitoring program and that will include collection of data on the state of road pavement, with consideration of the parameters that can be a result of the climate change impact; ▪ Proper maintenance related to road and drainage structures in order to have proper protection against extreme temperatures, landslides, soil erosion, extreme precipitation

Parameter	Possible impact	Potential Mitigation Measures
	solar radiation can also cause more rapid deterioration of materials and associated infrastructure such as signage. Bridges are sensitive to high temperatures which affect thermal expansion joints and increase earth pressures. Roads and bridges are all sensitive to soil stability. Soil stability can be reduced as a result of extreme rainfall or prolonged periods of rainfall which can lead to waterlogging, as well as extreme temperatures and drought which can causes soils to dry out and crack. GHGs (Discharge of CO2 and hydrocarbons). GHGs seem to have higher significance during the operation phase (traffic) in comparison with the construction phase. Such impacts seem to be generated by the road operation, maintenance, repair and replacement at all Sections.	
Surface waters	During pre- construction	
	The preconstruction phase remains the crucial phase to identify the exact quality of the environment, to prevent or reduce the impacts and their magnitude for the later phases and to define the best measures and mechanisms to control as much as possible negative impacts in surface waters (natural rivers/streams, artificial irrigation and draining channels) for the construction and operation phases.	Surface water measurements should be carried out under the ESIA preparation and samples should be taken in all possible pollution sources and in their downstream. The measurements should consist of chemical parameters (organic and inorganic indicators), physical and microbiological parameters of the water quality. The sensitivity of the rivers and streams crossed will have to be identified, while it has to be further examined whether the streams and gullies crossed have a constant or temporary flow. Defining the surface water quality of the running waters that may be affected by the AIC will help to prepare a detailed plan on monitoring points during the construction and operation phases. Measures how to reduce water pollution and a proper design of proper drainage and collection systems for stormwaters will be also proposed (culverts, ditches, oil separators, dry detention basins etc), while the Contractor via the ESMP and the ESAP of the ESIA should be obliged to prepare a detailed Water Management Plan.
	During construction	
Change of the hydrological regime of the watercourses.	The Project envisages the construction of bridges across the watercourses and culverts across the seasonal streams/irrigation network. Structures used for crossing of rivers and other water courses may create obstacles for natural hydraulic flow as well if they are not properly scaled. The impact will be associated with temporary redistribution of surface run-offs by earthworks before and during construction activities. Interception and disposal of run-offs from	▪ Culverts will be designed to maintain the natural riverbed width and the natural riverbed level. If it is not feasible to use bottomless culverts then the culvert base will be buried to restore the riverbed. An acceptable hydraulic performance should be maintained to avoid channel overflow during heavy rainfall. ▪ Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained

Parameter	Possible impact	Potential Mitigation Measures
	construction sites, as well as changes in the run-off direction and rate caused by over consolidation of soils and construction of artificial structures in the project area may influence the hydrological regime of surface water bodies. The water level upstream the hydraulic structure may increase which can result in increased risk of flooding of areas located upstream motoway during high water levels. This impact may occur only when bridges, box culverts and other structures are undersized comparing to the local hydrology.	▪ Where an increased discharge of surface water endangers the stability of the water outlet, erosion protection measures such as bioengineering measures, ripraps, and check dams are incorporated. ▪ Runoff control measures can be installed at the time of road/motoway and bridge construction to reduce runoff pollution. To prevent runoff contamination, paving should be performed only in dry weather. Due to the design solution direct discharge of the runoff in surface water is reduced to minimum; The following measures shall be applied specifically relating to bridges, where river crossings as mentioned in the impacts sub-section: ▪ Bridge construction activities should be undertaken when rivers or streams are dry (i.e. in case they have a non continuous flow during the summer months) to avoid silt pollution. ▪ Provide spill kits in worksites around rivers. ▪ Ensure no vehicle refueling occurs within 100 meters of any surface water course. ▪ Divert the water flow near the bridge piers. ▪ Provide silt fences, sediment barriers or other devices to prevent migration of silt during construction within streams. ▪ Carry out bridge construction works without interrupting the traffic on existing roads with the provision of suitable diversions. ▪ Ensure no waste materials are dumped in the river, including re-enforced concrete debris. ▪ Place generators more than 20 meters from the river. ▪ Provide areas where concrete mixers can wash out leftover concrete without polluting the environment. This may be in the form of a lined settling pond at each bridge site. Drivers will be informed of these locations and the requirements to use these settling ponds on a routine basis by the Engineer. Dried waste from the settling ponds can be used as backfill for culverts, etc. ▪ Ensure that no hazardous liquids are placed within 10 meters of the river. ▪ Provide portable toilets at bridge construction sites to prevent defecation by workers into the river. ▪ In addition, the Contractor will be responsible to establish the fish spawning period in relation to the bridge construction works to ensure that all works are undertaken in periods least likely to affect the fish spawning period.

Parameter	Possible impact	Potential Mitigation Measures
Increase of turbidity Sewage effluent	Uncontrolled sediment erosion and contaminated silt runoff caused by removal of vegetation and destruction of soil (for instance in areas in cut) and gravel rocks into small fractions, which could cause water turbidity, sediment deposition on stream beds and banks, and accumulation on the slopes of rivers and ravine gorges. The construction works of the motoway Project are expected to have an impact on the surrounding water courses along the Alignment.	▪ Earth works in river /stream beds should be planned preferably during lowest water period (during summer months). Periods of high water (October to April) should be avoided. ▪ Prevent the movement of machines in the rivers and streams and on their embankments, unless it is unavoidable due to the construction process ▪ During recalibration and relocation of river bed, necessary technical measures will be carried out in order to minimize earthworks in direct contact with water;
Leaks and accidental spills	The workers' camps can be a source of pollution with sewage, but also solid waste. It is expected that the camps of the construction sites would generate sanitary wastewater. Wastewaters will appear on locations where there will be water sprinkling in order to reduce the emissions of dust during the excavations; wastewaters will be drained in zones at the crossing of the motoway through a river via bridges.	Regarding sewage effluent, domestic type wastewater generated in the construction camps will not be allowed to be discharged untreated into natural water courses. The camps will be provided with a wastewater treatment system to treat effluents to admissible levels for discharge in the water body and with chemical portable toilets and the waste adequately managed. Stormwater and wastewater arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system of drainage pipes, ditches and side channels to accommodate forecast discharges, to collect run-off from the carriageway, convey, store run-off water to reduce peak flows and remove coarse sediment and oil related pollutants and to dispose of in the dry detention basins. Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby streams and stormwater drains. The culverts near the works areas will be covered to block the entrance of large debris and refuse.
	Leaks and accidental spills from the use of concrete during the construction of bridges and viaducts and of fuel, lubricants and other hazardous substances at product and waste storage areas as well as from construction machinery and vehicles at construction site	▪ Spill kits should be provided to clean up any polluted soils resulting from minor spills of fuel, lubricants, oils or chemicals. ▪ Secondary containment devices (drop cloths, drain pans) should be used to catch leaks or spills while removing or changing oils from vehicles or equipment. For small spills, absorbent materials must be used. ▪ Fuel, oil or hazardous materials required to be stored, should be stored within secondary containment (designed to contain at least 110% of the total capacity of the storage containers) located greater than 100m from a watercourse or waterbody. Walls and floors should be constructed of concrete or other suitably impermeable material. No drains from the storage area should be installed. ▪ Drip trays should be placed beneath all high risk equipment to contain spills/leaks of fuels/oils. ▪ Onsite repairs /maintenance and fueling activities should be limited. Priority should be given to offsite commercial facilities. If impossible, a designated area with secondary containment for possible spills for on-site repair or maintenance activities must be provided. These areas shall be located away from

Parameter	Possible impact	Potential Mitigation Measures
		drainage channels and surface water bodies. (distance between the maintenance site and the river should be at least 100m). ▪ On-site vehicles and equipment should be inspected regularly for leaks and all leaks shall be immediately repaired. Incoming vehicles and equipment should be checked for leaks. Leaking vehicles/equipment should not be allowed on-site. ▪ Construction of oil separators in order to pre-treat stormwater in order to ensure that clean water under the accepted standards goes back to the water recipient ▪ The discharge of any untreated wastewater into a surface water body should be prohibited. ▪ Treated wastewater discharges should comply with specified water quality standards (including Project and national standards). ▪ Concrete and asphalt plants, construction sites (viaduct, river covering), camps etc. will be properly isolated by installing of fencing in all sites located close to rivers and water courses to prevent any discharge of construction materials, hazardous materials in particular, to the water course. ▪ Discharge of cement contaminated water to water bodies should be avoided as cement pollution results in high alkalinity and raises the pH, which can be toxic to aquatic life. ▪ Provide septic tanks for the camp. Keep contract with authorized company responsible for removal of the liquid waste active. If for waste water management, the camp is equipped with a package treatment plant ensure clean-up/sanitation according to manufacturer's instructions and that discharge standards are met for waste water. ▪ Arrange settling basins to manage tunnel drainage water. Check quality of drainage water (including pH) from the settling basins prior to discharge into environment.
	During operation	
	During the operation phase, it maybe expected that pollution of water shall result primarily from settling of exhaust fumes, tire wear, leaking of loads, load spilling, discarding of organic and inorganic waste, precipitation, pollution brought by wind, dispelling through passage of vehicles. Permanent pollution is primarily related to scope, structure and characteristics of the traffic flow. Permanent sedimentation of dangerous substances on road surface and service elements of the cross sections results from traffic flow, and are washed away with	▪ Use of concrete gutter and ditches to minimize the risk of pollution of the aquifer ▪ Settling basins will be used to remove silt, pollutants, and debris from road runoff water before it is discharged to adjacent streams or rivers. ▪ Ensure clean up and waste removal from carriageway and roadsides. ▪ Water quality in wastewater recipient watercourses should be monitored at least monthly during periods of river flows.

Parameter	Possible impact	Potential Mitigation Measures
	precipitation. Typical example of this kind of seasonal pollution is the usage of industrial salt during winter months. The AIC Sections will have an impact on the quality of the surface waters under raining conditions where the washing out waters from the road surfaces will be drained in the surrounding field. The washing out waters from the road (especially the first inflows of rainfalls that contain high concentration of polluting material) traces of petrol, fuel, heavy metals that may endanger the aquatic environment and scenery. The concentration of harmful materials in the washing out waters of the roads, induced by traffic come from the combustion of motor fuel (particles and gases), abrasion i.e. wearing off of tires, from brakes and vehicle leakages (oil etc.). On the other hand, these changes in the water quality, even in regions with high humidity, are often temporary and localized as a consequence of the variations of the water quantity. Accidental pollution generally occurs during transportation of hazardous materials. The main problem in these cases is that usually they are in very high concentration, and cannot be predicted neither in time or location.	▪ Ensure maintenance and timely clean-up/removal of sediments accumulated in bridge deck runoff treatment facility and tunnel water drainage systems. Disposal of these sediments following the same procedure as set for the management of sediments from treatment unit (settling basin). ▪ Perform maintenance paving of the road sections and bridge decks only in dry weather to prevent runoff contamination. ▪ Monitor condition of culverts and drainage canals etc.; ▪ Regularly check operability of stationary erosion and run-off monitoring equipment; ▪ Where possible, limit the use of de-icing chemicals, give preference to mechanical means like scrubbers and snow ploughs. If de-icing chemicals are used; monitor quality of surface water for concentrations of chlorides and ammonium ions, train personnel to use de-icing chemicals in an efficient and timely manner, regularly check de-icing equipment; ▪ Control water quality (list of parameters to control include: pH; Suspended Solids; BOD5; COD; Coliforms; Nitrate (NO3); Phosphate (PO4); Oil and Grease) in recipient watercourses seasonally. Collect water samples from upstream and downstream sections of the stream in 50m and 250m distance of the crossing area. The distance may change depending on accessibility of the river for sampling. ▪ Check quality of the sediments (list of parameters to control include: heavy metals, petroleum products) prior to making decision on the method of disposal. If contamination detected – use licensed contractor to deal with the waste. ▪ Maintain contracts with hazardous waste removal companies to ensure timely and safe removal of skimmed oil, other hazardous waste generated at technical buildings. ▪ Upgrade settling pits with more efficient modules like mechanical devices (sand trap, oil trap) and activated carbon module; ▪ Silt traps should be installed into the storm water drainage system to capture suspended sediments. ▪ Maintain integrity and permeability of storm water drainage system to avoid blockage, overflow and direct discharge of untreated runoff into the rivers. ▪ Remove sludge from roadside treatment facilities in a timely manner; Measures in the case of lorry spills, fire, etc. involving hazardous/polluting substances to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water.

Parameter	Possible impact	Potential Mitigation Measures
Groundwaters	During pre-construction	
	The pollution from leakages or waste waters in groundwater depends on the permeability of geo-layers that isolate groundwater from the surface soils. All risks for groundwater pollution are related to infiltration of polluted liquids and leakages in hydro-geological windows which constistute recharge areas for groundwater. Therefore, the Sections, which are close to such "recharge areas" are considered as the most prone to groundwater contamination/pollution. If these areas are not weil studied during the ESIA preparation, then groundwater pollution will be at high risk. The transformation of river valleys can lead to serious consequences: when underground flow is blocked, flooding areas, artificial shallow groundwater increase, subsidence under load and other negative exogenous processes can occur.	The identification of sensitive sites can be confirmed by specific hydro-geological studies on "Hydro-geological" windows. After defining the sensitive areas, the types of geological formations and the depth of aquifer by drillings in boreholes' logs and geotechnical investigations, physicochemical and mictobiological measurements should be done for the groundwater quality of the sensitive aquifers. Additionally, measurements are needed for the shallow groundwater pockets, which are not part of aquifers, but are used for agricultural water by farmers. Measurements and data on these groundwater pockets should indicate their capacity and recharge capability. The ESIA, based on such results, may propose appropriate management and action plan for project implementation. To assess the significance of impacts on the groundwater discharge at the construction stage from the riverbed migration, it is necessary to conduct a detailed hydrogeological study of the river valleys where straightening is planned. Based on the analysis of the data obtained, decision should be made on the feasibility of the straightening. Further research has to be made to the areas where tunnels will be constructed and assessment should be done whether these groundwaters feed the local population with drinking water.
	During construction	
Pollution/contamination of groundwater from construction materials and activities.	Impacts on ground water quality and quantity maybe provoked from pre-construction and construction works (earthworks, road layers, and other associated earth works, bridges and other associated concrete works). Several liquids or waste water from washing or cleaning of cars, construction surfaces etc, may generate in groundwater several pollutants, which are very difficult to be chemically decomposed or destroyed such as lubricants, oils etc. Construction machinery and transport trucks may bring pollution risk from fuel and oil spillage. This pollution may overall occur in the road sections crossing permeable water bearing formations (sandy gravelly river beds and limestone formations). The pollution, if massive, may lead to contamination of the drinking water, if groundwaters are used for this purpose.	The mitigation measures should include the minimization of the working strip, the performance of works in dry period, the minimization of waste generation, the use of portable toilets, the collecting of the used oils, etc.

Parameter	Possible impact	Potential Mitigation Measures
Pollution of groundwaters by waste waters generated from workers in working campus. Exploitation of ground water sources for working purposes.	This kind of waste is not considered of high risk to groundwater due to its small amounts and organic characteristics. This pollution may precipitate easily in small ground pockets, which contain waters which have an appropriate quality to be used for agricultural purposes. Such pockets have a seasonal regime, while during the summer, some of them are dry.	The mitigation measures consist overall of the avoidance/minimization of the groundwater pollution from fuel and oil spillage by construction machinery (please refer to the relevant section of surface waters above)
	Reducing of groundwater capability may happen by exploitation of small groundwater pockets, usually used for agriculture purposes, but in some cases, as potable water. This impact, may create conflicts with inhabitants, using this water for their demands.	No mitigation measures are needed since the quantities will be minimum.
	During operation	
Pollution of stormwater ruoff	Pollution of stormwater runoff from the road surface may take place due to spillages from the engine and lubrication system (gasoline, oil, motor oils, coolant and brake liquid), rubber residue and products of wear of the wearing course (asphalt and bitumen residues) and emission of fuel combustion products (lead and lead compounds, unburned hydrocarbons, nitrogen oxides, soot and tar).	The related mitigation measures are linked to those of the surface waters and waste. During the operational phase, there could be applied the same measures mentioned in the section of surface waters and soils regarding the same phase.
Traffic accidents	In the case of traffic accidents, especially of accidents involving vehicles carrying hazardous materials, spillage and dispersion of harmful and hazardous materials may occur along the road and a narrow area next to it if there are no barriers or concrete blocks that physically prevent vehicle rollover. The most common accidents are those in which oil, oil derivatives and liquid chemicals from trucks are spilled, and	

Parameter	Possible impact	Potential Mitigation Measures
	these substances have a great capacity for diffusion into soil and underground.	
Use of salt	The use of salts and other agents for initiating melting of ice and the snow cover may also endanger groundwater. However, the AIC lies in an area with limited snowfalls per year and therefore not extensive or frequent use of salt maybe required.	
Air	During pre-construction	
	Lack of calculations and predictions on air emissions during the operation phase may underestimate the mitigation measures that maybe proposed. Additionally, if air and dust monitoring during the construction phase is not foreseen/imposed to the Contractor, serious complaints and grievances may come up during the construction activities by the population nearby.	Regarding the design phase, correct siting of construction camps and timing of activities along the route will reduce the risk for elevated air levels to affect sensitive receptors. Locating these facilities more than 500 meters downwind of sensitive receptors will limit potential air impacts. In addition to the above, prior to the start of construction, and as part of his CESMP, the Contractor will develop a Air management plan that will include the mitigation measures outlined below for the construction phase. Before the initiation of construction and operation phases, air (SO2, NO2, CO, PM10, PM2.5 etc.) measurements should be carried out during the preparation of the ESIAs per Section and identification of the sensitive areas (houses, businesses, hospitals, schools etc.) should be carried out in order measurement points to be defined. The measurements should be focused in existing roads or AIC alignments close to the existing network namely close to the second half of the Section 1, the second half of Section 2, Section 3, first half of Section 5B, Section 5C, Sections 6 and 7, Sections 9A2, 11 and 13A. Regarding the other Sections, they are supposed to have low level of air pollution, because they lie mostly over agricultural lands or natural habitats. The ESIA Consultant should propose in the ESMP and the ESAP that the Contractor should prepare Air quality and dust management plans, while he will have to be precise on the locations that the Contractor should have to monitor during the construction period in order to minimize any impacts at the local population and biodiversity. The Contractor is also responsible for the preparation of a Health and Safety Plan and the ESIA should include this requirement as well. The Air and Dust Management plan will detail the actions to be taken to minimize dust generation (e.g. spraying un-surfaced roads with water (including the types of equipment, sources of water, locations for watering and schedule), covering stock-piles, etc) and will also provide details of the air quaity monitoring program for baseline and routine monitoring. The Plan will also include contingencies for the accidental release of toxic air pollutants. Provision in this Plan should be made for air quality in tunnels.
	During construction	

Parameter	Possible impact	Potential Mitigation Measures
Emissions	Site equipment with diesel internal combustion engines (trucks, excavators, loaders etc.) and from concrete batching and asphalt plants generate particulate matter (PM10 and PM2.5), which can exacerbate asthma, cause heart disease, and lead to premature death. Nitrogen oxides can cause increased sensitivity to allergens. When nitrogen oxides are combined with VOCs in the presence of sunlight, they form ground-level ozone. This ozone can cause difficulty in breathing, exacerbate asthma and cause lung inflammation. Over time, untreated inflammation can result in permanent damage to the lungs. Carbon monoxide can cause chest pain in people with heart problems, headaches, nausea, decreased mental alertness, and death at very high level. VOCs from vehicles include formaldehyde, acetaldehyde, acrolein, 1,3-butadiene, and benzene, which may cause cancer. People who live close to the AIC may be at higher risk for exposure to traffic pollutants. All the abovementioned impacts refer also to wildlife.	▪ Air quality monitoring throughout the construction period ▪ Exhaust emissions - No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. Construction equipment will be maintained to a good standard and fitted with pollution control devices regularly monitored by the Contractor and Engineer. ▪ Do not burn solid construction waste (including felling residue) ▪ Regardless of the size or type of vehicle, owners / operators should implement the manufacturer recommended engine maintenance programmes. ▪ Drivers should be instructed on the benefits of driving practices that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits. ▪ Implement a regular vehicle maintenance and repair program. ▪ Provide vegetation planting along roadsides to limit air quality impacts.
Dust	Dust may cause inconvenience to local people, health and safety problems, crop damage and impact on ecology.	▪ Open burning of waste materials - No burning of debris or other materials will occur on the Site without permission of the Engineer. ▪ Dust generated from haul roads, unpaved roads, material stock piles, etc: ▪ All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins, or other acceptable type cover (which will be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s). ▪ Hard surfaces will be required in construction areas with regular movements of vehicles. ▪ Regular wetting of dusty areas when the weather is dry (and predictions made in advance of the weather for the coming week to avoid situations where equipment is not available for wetting); ▪ Earthwork operation to be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community. ▪ Speed limitation of the construction vehicles on the construction site and in the populated areas ▪ Locate support facilities and spoil disposal sites so to reduce trip numbers and distance –as far as feasible.

Parameter	Possible impact	Potential Mitigation Measures
		▪ Provide truck-washing facilities at tunnel portal and bridge construction sites to prevent truck-out of mud and dust. Above ground option is deemed to be the priority.
Air	During operation	
	Air pollution by traffic is considered the most important impact expected in air quality during the operation phase. The most significant pollution will derive from the generation of particle matters - PMs, and gases, such as CO, CO2, NOx, PAH, HC, Pb, SO2. Dust will mainly be generated from traffic during dry seasons. The interaction of people with some gases may impact on their health, while wildlife will be also affected.	After the air noise modelling that the ESIA will carry out, more precise mitigation measures could be proposed. However, it is recommended to plant a vegetation barrier along the road (in particular in the sensitive areas such as settlements). Roadside vegetation can help reduce air pollutant concentrations near roads.
Noise	During pre-construction	
	Lack of calculations and predictions on noise pollution levels during the operation phase may underestimate the mitigation measures that maybe proposed and high noise impacts may affect the population that surrounds the AIC Sections, provoking disturbances during day and night (sleep) and health problems. Additionally, if noise monitoring during the construction phase is not foreseen/imposed to the Contractor, serious complaints and grievances may come up during the construction activities by the population nearby.	Regarding the design phase, correct siting of construction camps and timing of activities along the route will reduce the risk for elevated noise pollution levels to affect sensitive receptors. Locating these facilities more than 500 meters downwind of sensitive receptors will limit potential noise impacts. In addition to the above, prior to the start of construction, and as part of his CESMP, the Contractor will develop a Noise management plan that will include the mitigation measures outlined below for the construction phase. Before the initiation of construction and operation phases, noise (Lday, Levening, Lnight etc.) measurements should be carried out during the preparation of the ESIAs per Section and identification of the sensitive areas (houses, businesses, hospitals, schools etc.) should be carried out in order measurement points to be defined. The measurements should be focused in existing roads or AIC alignments close to the existing network namely close to the second half of the Section 1, the second half of Section 2, Section 3, first half of Section 5B, Section 5C, Sections 6 and 7, Sections 9A2, 11 and 13A. Regarding the other Sections, they are supposed to have low level of noise, because they lie mostly over agricultural lands or natural habitats. Specific proposals should be done by the ESIA regarding noise mitigation measures, after the realization of noise modelling. Indicative mitigation measures should be the implementation of noise and natural barriers, low noise pavements etc. for the operation phase. The Noise Management Plan shall provide details of mitigation measures, specific location and schedule where such measures shall be implemented to minimize impacts to sensitive receptors due to the presence of the camp, construction works, sourcing and transport of construction materials, and other project-related activities. Additionally, it should identify sensitive receptors, schedule monitoring frequency and refer to action/response plan, responsibilities and reporting and communication plan.

Parameter	Possible impact	Potential Mitigation Measures
	During construction	
	Increased noise levels will be created on and around the construction site due to land clearing, earthworks, road surfacing, movement of vehicles, etc. The impact is variable depending on the extent and character of construction activities, the location of the activities and the hours that they take place. Potential noise sources during construction are site equipment and trucks carrying equipment and materials. The main construction related sources of noise are the construction camp establishment, including the site offices, workshops, excavation and earthworks, rolling and compaction, piling, construction material and equipment delivery vehicles and concrete batching plant and asphalt batching plant on site.	▪ Carry out noise quality monitoring throughout the construction period ▪ Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive periods. Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the local residents or other activities. ▪ Give notice as early as possible to sensitive receptors for periods of noisier works such as crushing concrete or stones, vibrating or hammering metal to the ground. Describe the activities and the expected duration. Keep affected sensitive receptors informed of progress. ▪ All mechanical installations are to be silenced by the best practical means using current technology. Mechanical installations, including noise-suppression devices, should be maintained to the manufacturer's specifications. Internal combustion engines are to be fitted with a suitable muffler in good condition. ▪ Required maintenance of tools, machines and equipment so that they are in good conditions. ▪ Install less noisy movement/reversing warning systems for equipment and vehicles that will operate for extended periods, during sensitive times or in close proximity to sensitive receptors. Occupational health and safety requirements for use of warning systems must be followed. ▪ Keep good conditions of trucks that is used to transport construction materials so they cause no loud noise and control the truck speed, to be not exceeded 40 km/h when driving through communities, and not exceeded 80 km/h, when driving on motoways. ▪ Where possible, no truck associated with the work should be left standing with its engine operating in a street adjacent to a residential area. ▪ Provision of noise protection kits such as ear plugs, earmuffs, for workers who are working in the area where the noise level is higher than 85 dB(A). It is designated as a regulation that workers must wear protection kits in case of working in a noisy area. Informing the local population for the period of execution of the construction works ▪ The implementation of noise reduction measures, such as proper coordination of the machinery operation time and the use of mobile noise barriers (which can achieve noise reduction by 5 dB), can further reduce the sound level that will be emitted to the surrounding environment. ▪ Where appropriate, haul routes for construction material will avoid additional nuisance in residential areas or at sensitive sites;

Parameter	Possible impact	Potential Mitigation Measures
Noise	During operation	
	The noise caused by traffic flow is of variable intensity and with intermittent pulses. It can have a negative impact on the quality of life of the surrounding population of the Sections of the AIC and its health, as well as a potential negative impact on biodiversity.	▪ Noise modelling should be carried out in order to define with accuracy the kind and efficiency of mitigation measures. The final design of any mitigation should only be completed with the proper assessment of the noise climate currently prevailing at the receptor points, and confirmation of the predicted impact. Should additional measures need to be implemented, this could be done either through the project design (further reducing the noise levels at fence), or by providing additional acoustic insulation at the receptor. There has been a general estimation of noise barriers under the Conceptual Design which are going to be finalized (Section 1: 5,201.90m, Section 2: 9,004.60m, Section 3: 7,104.90m, Section 4: 6,592.30, Section 5B: 4,554.00m, Section 5C: 8,132.30m, Section 6+7: 11,231.00m, Section 9A2: 511.50m, Section 9B2: 3,405.60m, Section 10: 432,30m, Section 11: 799.70 and Section 13A: 799.70m). During the Design and Build stage, the Contractor should carry out a detailed design of the noise barriers including the height and length of noise barriers, taking into account maintenance and emergency access considerations, drainage (where appropriate), as well as aesthetics, land acquisition requirements and other mitigation measures as mentioned above. Proposed noise mitigation measures leading to the decrease of noise exposure include measures implemented at the source of noise and measures that intercept the noise between the source and the receptor such as appropriately high/laterally extensive acoustic fencing (noise barriers) or earth bunds installed around the perimeter of the site, insulation of house windows and facade with noise reduction potential, speed limits, noise proof windows, low noise asphalt and green belt
Biodiversity	During pre- construction	
Habitats	The ESIA Consultant will have to identify the impacts on habitats and flora and propose specific mitigation measures, management and monitoring plan. The examined under the Conceptual Design stage habitats constitute an outcome of a first evaluation of the PESIA. The preliminary/detailed design should be joined by an ESIA per Section, which will examine the habitats affected more thoroughly. Habitat fragmentation, habitat loss and habitat destruction and degradation may occur at a great extent, if ESIA will not examine correctly these impacts, while the importance of sensitive habitats maybe underestimated.	The ESIA should include, among others: ▪ Analytical biodiversity site surveys so as to give a detailed overview of the Project area affected ▪ Identification of critical habitats along the motoway and preparation if needed of Critical Habitat Assessments in order to be precise in the mitigation measures ▪ Identification and calculation of areas for habitat loss and estimation of the sensitivity level per habitat for fragmentation ▪ Fulfilment of the "No net loss" requirement" of EBRD and consultation with Forest Agencies ▪ Proposal of mitigation measures for protection of important habitats and biodiversity features such as awareness activities, fencing and isolation of working sites and road, etc., considering also habitat fragmentation.

Parameter	Possible impact	Potential Mitigation Measures
		▪ Preparation of biodiversity action plans, management plans, Critical Habitat Assessments (when needed) ▪ Proposal of the ESIA that the Contractor should prepare a Landscape Management Plan and a Biodiversity Management Plan and other relevant plans that may come up as a result of the relevant Scoping reports ▪ Identification of species with specific status in sites that seem to be affected by the AIC and propose measures for their protection, especially those that endangered, threatened or vulnerable and evaluation if they can be considered as priority biodiversity features ▪ Identification on species of plants to be used for reforestation/landscaping with focus on native plants and identification of characteristics of the site where they will be planted. Additionally, the preliminary design/detailed design should try to minimize as possible the land withdrawal.
Fauna	If no specific provision is made in the ESIA, then habitats for specific species maybe lost without being restored, other habitats maybe totally fragmented while several types of fauna maybe disturbed at great extent or killed.	The ESIA of each Section should propose specific mitigation with its biodiversity action plan, management plan and other supplementary deliverables such as Critical Habitat Assessment and be very specific for dealing with impacts for priority biodiversity features. Considering the protection of habitats and their quality characteristics regarding fauna, as a priority of the ESMP and ESAP of the ESIA, the ESIA Consultant should include inter alia: ▪ Detailed inventory of fauna ▪ Identification of species with specific status in sites that seem to be affected by the AIC and propose measures for their protection, especially those that endangered, threatened or vulnerable and evaluation if they can be considered as priority biodiversity features ▪ Defining the areas where animal crossings will be placed ▪ Measures to control animal disturbance, where possible ▪ Consultation with stakeholders, farmers, fishers, hunters etc., on their information about the presence of wildlife in surrounding of the road alignment and their expectations regarding mitigation measures during road construction, operation and maintenance. ▪ Identification of priority biodiversity features As for the preliminary design/detailed design, minimization of land withdrawal should be targeted and to avoid traffic mortality and allow crossing of animals from one to the other side of the road underpasses, box culverts, bridges and tube culverts can be used. Habitat fragmentation for each category of animal is also related to the distance between suitable crossings. The smaller the distance the smaller are the consequences related to habitat fragmentation. For the small mammals and reptiles, the recommended criteria are the following: Underpasses for small animals such as amphibians and reptiles consist of pipes or rectangular

Parameter	Possible impact	Potential Mitigation Measures
		tunnels with a diameter/width of usually 0,4-2 m. The distance between two appropriate and available passages must not exceed the 200 meters in natural areas or 500 in agricultural areas according to expert judgment. The longer the length of the road fulfils the above-mentioned criteria the less impacts are caused to the biotope fragmentation.
Protected areas	Most of the negative impacts on Protected Areas may be avoided by well-planning and design of the Sections. During the conceptual design there has been an effort to minimize to a great extent the parts of the Protected Areas (PAs) crossed. Lack of supported justification of the impacts and mitigation measures during the ESIA preparation may lead the Protected Areas to be further degraded during the construction and operational phase. Appropriate assessments should be carried out under the ESIA stage.	The ESIA should consider inter alia: ▪ Thorough research regarding the interpretation of the Law 81/2017 on protected areas via bylaws and management plans ▪ Detailed field surveys to define the current situation of habitats of these proposed protected areas potentially affected by the motoway ▪ If needed, consider minor changes in the preliminary design in respect with the Albanian Legislation on Protection of PAs ▪ Propose additional mitigation measures according to suggestions of national/regional/local territorial planning authorities. ▪ Orient the procedural steps for consultation with the relevant authorities on trans-boundary Protected Area (Buna River Protected Landscape etc), according to the Albanian Legislation and ESPOO Convention. ▪ Preparation under ESIA of Biodiversity Action Plans and other documents as supportive material for the identification of impacts to the Protected Areas such as Appropritate Assessment for Section 1 and Buna Protected Area. The ESIA should include specific mitigation measures to prevent as much as possible pollution and contamination of these areas and maintain its biodiversity, landscape and visual characteristics. The ESIA Consultant should mention the relevant permits that the Contractor should obtain for the realization of the construction activities needed that will take place in the protected areas. A joint agreement between Albania and Montenegro should be signed by both countries for interventions in Buna River (Section 1) during construction and operational phase.
	During construction	
Habitats Habitat loss	Site preparation (construction campus, laydown areas etc.), soil and rock excavations as well the opening of service/access roads and borrow pits and quarries accompanied with the road and service/access roads construction will lead to vegetation clearance. The vegetation clearance will typically result in the direct loss of the existing habitats in case of natural habitats and agricultural lands. As for the aquatic habitats, the permanent or temporary realignment of river beds and the	Regarding the loss of terrestrial habitats, the following can be proposed: ▪ Delimitation of areas to be cleared prior the start of the construction activities in order to reduce the area of vegetation to be cleared ▪ Storage of construction materials and structures at designated specially equipped sites ▪ Use of temporary or existing roads for delivery of construction materials

Parameter	Possible impact	Potential Mitigation Measures
	construction of culverts and bridges may lead to an increase of water stream velocity at straightened locations, as well as at places underlined by concrete beds, loss of habitats, spawning grounds and food reserve locations due to introduction of artificial structures and to washing out the diverted channels at new location and high concentration of particle matter in water, as well as derived bottom sediments. Some of the construction activities may provoke accidental fires. Fires maybe spread in woodlands, shrubs or forests, causing loss of entire territories of green areas and distruction of very important habitats and related flora.	▪ To achieve no net loss of biodiversity in areas of natural habitats restoring habitats during operations and/or after operations will be carried out. Namely disturbed land plots within both natural and modified habitats will undergo mechanical and biological rehabilitation/reclamation upon completion of construction works or following the closure of the Project. ▪ The use of tunnelling means that fragmentation effects (Sections 2, 5B, 9B2, 10) are likely to be largely temporary and restricted in area and are therefore unlikely to result in a significant effect on populations. As for the loss of freshwater aquatic habitats caused by the construction of bridges and laying culverts across the rivers and streams, it can be proposed: ▪ Carry out construction works strictly in accordance with the work plan. ▪ Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained. Where technically applicable dredging will be used positively, e.g. for landscaping or habitat creation. ▪ Culverts will be designed to maintain the natural riverbed width and the natural riverbed level. A set of mitigation measures regarding flora caused by vegetation removal: ▪ Delimitation of areas to be cleared before the start of the construction activities in order to limit as much as possible the area of vegetation to be cleared ▪ Adherence to allocated land boundaries during implementation of the Project ▪ Storage of construction materials and structures at designated specially equipped sites ▪ Use of teporary or existing roads for delivery of construction materials ▪ Access roads will be defined before the beginning of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles taking part of the construction activities will not be allowed. ▪ Land restoration of temporary land allotment and temporary roads with a set of technical and biological remediation measures according national legislation. ▪ Compensatory vegetation planting for tree losses according national legislation. ▪ After the completion of construction work, temporarily disturbed areas are subject to reclamation with sowing of perennial grasses. ▪ Limitation of speed, in order to limit the risk of accidents with fauna. ▪ Introduction of a ban on unauthorised gathering of plants near construction sites and worker camps.

Parameter	Possible impact	Potential Mitigation Measures
		▪ In case of loss of flora due to fire, stockpiling of felling residue at designated areas followed by its removal should be done while burning of felling residue is prohibited.
Habitat degradation	Habitat degradation may primarily be caused by the vehicles' movements (including transport of people and equipment) and use of machinery and equipment, from working compounds and camps (including production of wastes and indirect worker pressure) as well as water crossing construction. Regarding terrestrial habitats, degradation can be caused by vegetation clearance (increase in noise and vibration), soil and rock excavations (increase in noise and vibration and change in air and water quality), opening of borrow pits and quarries (increase in noise and vibration and change in air and water quality), roads and concrete structures (increase in noise and vibration and change in air quality), traffic of the construction machinery and transport (increase in noise and vibration) as well as by the generation of wastes. All the abovementioned may also provoke illumination pollution and impact on migration routes. Regarding the aquatic habitats, the use of chemicals, fuels, lubricants may lead to high concentrartions of particle matter at significant distance from the construction site and permanent or temporary realignment of river beds as well as construction of culverts and bridges may lead to increased turbidity, increase of flow velocity and prevention of fish migration from downstream to upstream due to high velocity, and by this in prospective significant deacreasing biodiversity at the river upstreams. Realignment of the river beds (it does not matter whether it is permanent or temporary) and subsequent increase of the flow velocity and downstream sedimentation will cause to prevention fish migration from downstream to upstream due to high velocity. Moreover, degradation of freshwater ecosystems can be a result of a change in the water quality. This can be produced by an accidental spill of fuel or hazardous wastes affecting a water feature: river, lake, creek, by surface runoff containing	Regarding terrestrial habitats and their degradation, the disturbance of flora caused by the changes in air maybe mitigated by the: ▪ Use of technically appropriate construction equipment. ▪ Timely repair of road machinery and equipment to minimize air pollution by exhaust gases. ▪ Watering of the road to prevent dusting. ▪ Limitation of speed, in order to limit emission of dust on non paved access roads. As for the minimization of impacts of disturbance of flora caused by the changes in soil and ground water quality can be achieved by: ▪ Collection of wastewater from vehicle washing into a treatment station to trap suspended particles and petroleum products. ▪ Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip trays will be used for fuelling mobile equipment. No USTs will be used during construction stage. ▪ The soil contaminated due to spillages during handling of fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal. ▪ Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Avoidance of any spill affecting to the freshwater ecosystems. ▪ Store appropriately by following good hazardous materials storage and handling management practices.

Parameter	Possible impact	Potential Mitigation Measures
	pollutants and by destruction (erosion) of slopes of the diverted river channels. Nitrogen deposition from vehicles can affect sensitive habitats (woodland, grasslands and riparian areas). Dust can impact on vegetation and affect productivity and/or change local soil PH levels. Pollution (including salt) from road run off and deicing may affect habitats and can create surface water films. Pollution by organic wastes, colors/paints, leakages and oil spills and by car and equipment washing will damage terrestrial and aquatic habitats. Pollution from solid wastes and wastewaters (colors/paints, oil spillages, leakages etc.) that occurs in terrestrial habitats of higher topographic points may be transferred in low areas by the soil erosion or soils washed by rains and transferred in agricultural channels, rivers and streams downstream to certain habitats, provoking their deterioration. Overexploitation of existing open quarries, of river beds and river banks for construction material will damage hardly aquatic and terrestrial habitats and their related flora/vegetation. Degradation and fragmentation may happen in sites in the vicinity of the AIC corridor, which lie in calcareous rocks in and large river bodies. Last but not least, most of the Sections are characterized by a large number of bridges, the construction of which may impact on the rivers/streams crossed, their banks and their vegetation, on ecological populations, on species with specific status. The significance of such impacts is strongly related with the habitat sensitivity. The pollution from other solids in water bodies will change the river morphology and affect hardly the natural aquatic habitats and their related flora. Regarding the Sections running in agricultural sites and close to settlements, a degradation in crops, orchards and groves is expected.	
Introduction of alien species	Vegetation clearance will be mitigated by revegetation. Road improvements may facilitate the accessibility and subsequent deliberate introduction (i.e. planting alien trees for	▪ Pre-clearance site surveys combined with the demarcation and treatment of non-native species will prevent their spread.

Parameter	Possible impact	Potential Mitigation Measures
	landscaping or forestry purpose) or accidental spread (e.g. seeds in the soil attached to vehicle tires) of exotic plants.	▪ Minimizing removal of native plant species, and replanting of native plant species in disturbed areas. No planting of alien species will occur in the camps or any areas within the route, including landscaping of re-vegetated areas. ▪ Revegetation (i.e. the sowing of native herbaceous species on top soils and/or the planting of native shrubs/trees) will be undertaken as soon as possible after clearance and construction.
Sensitive habitats	Habitats listed in the Annex 1 of EU Habitat Directive such as 92A0 Salix alba and Populus alba galleries (Sections 1, 3, 9B2, 10 and 11), 6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis), (Sections 9B2, 10, 11) , 9250 –Quercus trojana wood (Sections 9B2, 10, 11), 6220; Pseudo-steppe with grasses and annuals of the Thero Brachypodietea (Sections 4, 9B2, 10, 11, 13A) and 92C0 orientalis and Liquidambar orientalis woods (Platanion orientalis) (Section 5B, 5C) are encountered in some peripheral areas in very small surfaces and are very fragmented. Further assessment should be done at the next phase (ESIA preparation per Section) in order to be defined whether they could be considered as critical habitats and whether they have characteristics of priority biodiversity features.	▪ No construction camps or machinery parks would be located high sensitive habitats or on alluvial terrains (in the river and stream valleys) in order to avoid adverse impacts on valuable riparian habitats and surface and ground waters. ▪ Establish a pre and post construction biodiversity baseline from which all mitigation, restoration, and loss / degradation can be measured ▪ Enabling and construction works should be carried out in the access road corridor (service road) so that the natural morphology of habitats is degraded to the smallest possible degree and in order to ensure preservation of autochthonous flora and vegetation. ▪ Clear vegetation cover in the areas around bridges carefully, ideally during the dormant period (from 1st October until 15th March). ▪ Water levels. Carry out works in watercourses during the time of the year when water levels are minimal, while making sure that the riverbed is preserved in its natural relief. Avoid destruction of riverbed and divert streams to minimise negative impact on aquatic flora and fauna. ▪ Management of soil. Material generated during excavation should be used for construction of the necessary infrastructure and for landscaping the areas along the road. Excess earth material should be deposited in line with the regulations at pre-designated locations ▪ Specific Methodologies. During the process of carrying out excavations along rivers, drilling the riverbed for the purpose of placing piers, blasting the surrounding hills and building reinforcement walls, the physical parameters (turbidity) and chemical parameters (PH, O2 saturation) should be regularly checked in specialised laboratories. ▪ Invasive species. In case of identifying invasive species, they should be immediately removed. ▪ Vegetation Restoration. Areas from which vegetation is going to be cleared for the purpose of enabling works and using access roads should be restored into their original condition.
Fauna	Habitat loss will condition an enforceable migration of terrestrial wildlife or death of animals unable to migrate. The impacts depend on the species of fauna or the period when	Permanent land-take will affect habitats used for breeding, feeding and other activities by several species. For areas of temporary land-take, pre-works surveys will be used to confirm baseline conditions to which habitats should be restored post construction. Whilst this will minimize long term impacts, some short-term

Parameter	Possible impact	Potential Mitigation Measures
Habitat loss	the impact occurs. The obligatory movements from enforceable migration, usually are joined by impacts in other sites, from overpopulation and lack of food. In most of the cases, due to the small territories and fragmentation of habitats, the high terrestrial herbivores and carnivores will try to find food at vicinity of farms, which may lead to the massive hunting of them from the farmers. As a result of vegetation clearance works, parking and operation of mechanisation, as well as storage of material on the ground, outside of the zone of the existing roads and the urban area, amphibians and reptiles will be affected since their habitat will be lost that they used for breeding, resting and hibernation (as well as habitats for prey). Habitat loss may affect also birds, since their habitat for nesting and breeding maybe lost as well as insects, something which will impact indirectly whole food chain, reducing food for birds and small reptiles and amphibians. Temporary and permanent loss of aquatic habitats, including river banks will impact also on fish populations.	degradation and disturbance will be inevitable whilst mid-term loss will occur in areas that, once replanted, take time to mature (e.g. forest). Regarding birds, care will be taken to avoid nesting birds during construction. Habitats of greater importance will be marked out for particularly sensitive works. Regarding bats and Sections 5B, 5C and 9B2, before cutting down the trees, old trees will be checked for the presence of bat roosts and hibernaculae (used from March to November). To facilitate the transition period (i.e. the period were the bats will find new resting places) for bats, bat boxes can be installed in forest areas near the project area. These bat boxes will be installed before the trees are cut down, to secure alternative resting places, when removing the original. Alternatively, new suitable holes/gaps can /cut in some of the largest trees in the remaining forest. Both if installing bat boxes and/or holes/gaps in trees it is important to protect the selected trees against future cutting and it is also important to maintain the surrounding with trees, i.e. as forest. As for mammals and vegetation management, vegetation along the road will be cut down and cleared (in the zone from 3 to 10 m) to reduce the attractiveness of the habitat for certain mammals, and to increase the transparency of the terrain and visibility for drivers. This is also for the operational phase.
Accidental killing of wildlife	Direct mortality may affect small mammals and reptiles (e.g. tortoise) and amphibian individuals by vegetation clearance, construction activities along the road or traffic on the access routes and machinery movement. This impact is severe fot several fauna species of natural river bodies, forests, woodlands or agricultural lands, which are less disturbed by human activities. Although the alignment is running partially or totally over existing roads regarding Sections 1, 2, 5B, 5C, 9A2-13, fish living in rivers, which are crossed by these Sections, or in vicinity of them, may be exposed to illegal fishing (not appropriate nets, out of the fishing season, fishing with explosives etc.). Regarding bats, they maybe affected by collisions with vehicles, habitat clearance, hunting and other sources of direct mortality. As for amphibians and reptiles, increased mortality of adult and juvenile fauna when crossing the road.	Pre-clearance site surveys will map sensitive areas and bio-corridors and apply additional mitigation where required. Construction camps will be located away from sensitive areas. A hunting ban will be in force for construction workers. Speed limits on vehicles and restriction to existing and/or dedicated haul routes will prevent direct mortality and disturbance from vehicles during construction. Pre-clearance site surveys and the movement of animals out of the working corridor, combined with timing of works in sensitive areas will prevent direct mortality. Some low level unavoidable direct mortality may still happen but this would not be significant in the short or long term. The use of fences in the construction sites will also avoid the entrance of fauna in them, avoiding accidents. As for birds, it can be proposed to build a decorative bird silhouette on a stained-glass surface along the bridges that pass over the aquatic habitats. It will prevent birds to be hit by fast moving vehicles and in the same time serves as a noise barrier. Regarding mammals, traffic signs and signalling for the drivers (blinking mark) with animal signs should be placed at locations which have been determined as important for mammals through the study.

Parameter	Possible impact	Potential Mitigation Measures
Habitat fragmentation	During construction, impacts to mammals and amphibians and reptiles will result from loss and fragmentation of habitat, cutting down old trees potential shelters for bats), removing a part of the wetland vegetation (feeding source), mortality and injuries during execution of works caused by mechanization and harassment. Fragmentation of habitats already occurs on existing road parts of the AIC, and the current lack of underpasses has created a barrier and has led to significant mortality of certain species. The cleared land strip along the motoway will be permanently occupied by the carriageway and the associated structures. This will cause the fragmentation of habitats. Over time, the populations become divided into a number of subpopulations, and if they are too small, they may be prone to local extinction. Also, fragmentation of habitats can lead to a reduction in genetic diversity within populations at both sides of the motoway, which can make the populations susceptible to extinction as well. Taking into account the types and sensitivities of the habitats that will be separated by the motoway as well as the species that will have to cross the motoway, it maybe concluded that the impacts of fragmentation will be generally more important in those areas where high sensitivity habitats are predominant at both sides of the motoway alignment, followed by habitats of medium sensitivity and importance. Fragmentation or loss of anthropogenic habitats has a low impact on biodiversity because plant species that grow in these habitats, except for cultivated species after a short time, recover these spaces. To sustain viable populations, mammals need relatively large habitats. Their primary and relatively homogenous habitats are divided into smaller segments as a result of construction of traffic infrastructure. Such fragmentation leads to small isolated local populations something which results in negative effect for their life capability.	▪ Access roads will be defined before the start of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles will not be allowed ▪ Use of temporary or existing roads for delivery of construction materials ▪ Remediation of temporary land allotment and temporary roads with a set of technical and biological remediation measures according national legislation. ▪ Adherence to allocated land boundaries during implementation of the Project ▪ Delimitation of areas to be cleared prior the start of the construction activities in order to reduce the area of vegetation to be cleared Regarding birds, fragmentation of grassland habitats will be avoided to prevent impacts to ground-nesting species. Access roads will be clearly defined before commencement of works. As for mammals, culverts are planned for passages for animals using expert recommendations in places that have been determined as important in terms of habitat conservation and increased mortality due to collision. Regarding the amphibians and reptiles, culverts will be constructed in the way to enable passage for terrestrial animals, while the use of heavy machinery will be strictly limited to the Project route to avoid additional fragmentation and degradation of habitats, as well as subsidence of soil.
Habitat degradation	The uncontrolled waste disposal or leakages to running waters or undisturbed areas in the vicinity of the AIC, may infect, and sometime kill due to poisoning several species of aquatic and	As for the terrestrial habitats and the changes in air, the use of technically appropriate construction equipment, the timely repair of road machinery and equipment to minimize air pollution by exhaust gases, the watering of the road to prevent dusting and the limitation of speed, in order to limit emission of dust on

Parameter	Possible impact	Potential Mitigation Measures
	terrestrial fauna. The most affected part of wildlife by poisoning are fish and aquatic fauna. Terrestrial small mammals may be exposed to poisoning, if they are fed in/around the garbage, generated in working campus, or selected sites for temporary solid waste disposal. Additionally, degradation of the aquatic habitats will be a result of changes in hydrodynamic conditions, increased water turbidity (river crossings), spillage of harmful chemical substances into the environment, e.g. petroleum products) and loss of connectivity between the upstream and downstream habitats. Erosion during and after construction of roads, motoways and bridges can contribute sediment and silt to runoff waters, which can deteriorate water quality and lead to impact on macroinvertebrates, fish kills, siltation. Heavy metals, oils, other toxic substances and debris from construction, traffic and spillage can be absorbed by soil at construction sites and carried with runoff water to the river. As for amphibians and reptiles, pollution of habitats maybe done through emission of dust, waste, excavated soil or other material along the river banks, creeks, or directly into the aquatic habitats. Fauna of all Sections is exposed to this impact. Disturbance factors for the animals are noise, vibration, light exposure due to the work of construction equipment and vehicles within the construction site, access roads, and the presence of people on construction sites. The disturbance factor may variably affect the population in total and separate species. More specifically, disturbance will affect: ▪ Birds for nesting, feeding and resting, while communication, by auditory signals may be confused near the road construction sites. ▪ Amphibians and reptiles, especially during construction of bridges across the rivers and where the road route runs across streams and channels and as a result of noise and vibrations during the construction phase.	non paved access roads can be proposed. Construction noise and visual disturbance will result in short term, localised effects, although many animals will become habituated to the noise. The increase in noise, vibration and illumination pollution maybe mitigated by the use of technically appropriate construction equipment, while the noise emission will be limited as much as possible: speed limit for vehicles, maintenance programs of machinery, control emission of noise during the night, etc. Impacts to the most sensitive habitats and species will be reduced by confining works to the least sensitive timeframes. Monitoring by the Contractor will also ensure that should valuable species be breeding in an area, works do not take place during these sensitive times. Works will be planned during the period of reduced activity of birds, or in the period outside the reproductive season. The optimal period is after the reproductive season, from the end of August, or before the beginning of the reproductive season in April. Works related to changes in the riverbed will be undertaken where practical at the period of the lowest water level, i.e. after the nesting period which occurs during the end of July. Where possible, vegetation clearance would not be undertaken during the breeding bird season. All site staff would be informed on procedures to be implemented if any nesting birds are found within the construction area. As for the realignment of rivers (all Sections apart from Section 10), in order to prevent/ mitigate increace of flow velocity and downstream sedimentation that will cause impacts on aquatic habitat and fish, new channels should be constructed sinuous (and not straight) with asymmetrical cross sections, while the river flow should be let to elaborate the new river channel at the new place, rather than use of concrete bed – this will allow to stabilize the stream velocity in several years after the establishing of the new structure. In order to mitigate the increased turbidity, construction works should be carried out strictly in accordance with the work plan. The change of the water quality mitigation measures which refer mainly to fish and amphibians and reptiles should be dealt with as recommended in the surface waters sub-chapter.

Parameter	Possible impact	Potential Mitigation Measures
	▪ Fish. Fish stock can be disturbed by changes to water velocity, oxygen levels, and temperature with shallower watercourses being warmer. This can pose a problem in areas supporting salmonid species. ▪ Mammals. Road construction has the potential to result in impacts to bats as a result of habitat loss and disturbance and direct mortality amongst others. The detrimental effects of artificial lighting will be reduced where practical by limiting unnecessary installations and using cut-off lighting.	
Protected areas Pollution of Pas Loss of Pas	Pollution of Protected Areas Territory (soils, air and noise, waters). Construction and municipal waste not only may damage the visual and landscape characteristics of the PAs, but may lead to water, soil and air pollution. Section 1 runs over Buna River Protected Landscape, so the impacts are direct and may be transferred in the river downstream. Buna river plays a channel role and runs against its natural direction (from the sea to the Shkodra Lake) in case of atmospheric events. So, in such a case, waters of Buna river may affect Shkodra Lake, damaging Shkodra Lake Managed Reserve. Additionally, pollution of Drini of Lezha River may be transferred to Kune Vain Tale PA, which is well related to the river and its sediments quality. Loss of PA potentials by degradation/fragmentation of natural and semi-natural habitats and damage/kill related fauna. All natural PAs are related to their potentials such as habitats, flora and fauna, landscapes or natural monuments which can be seriously damaged by habitat destruction/degradation. Fragmentation of PAs territories will have the same effects as habitat degradation and will cause loss on wildlife and recreational potentials. This impact may affect all PAs under the study. Changes in river geo-morphology from the viaducts' and bridges' pillars or from extraction of raw material, dumping of solid matter or debris, etc, will generate important impacts to the Buna River PA (Section 1) and Kune Vain Tale PA (Section 2). Cuts, in the river valley, may incite slides and erosion, which also will damage PAs potentials, reduce their vegetation cover and recreational potentials. Illegal fishing,	All mitigation measures have been developed in the habitats, flora and fauna Sections. The ESIA findings as well as strong consultation with the relevant authorities will further target at the minimization of impacts.

Parameter	Possible impact	Potential Mitigation Measures
Changes on the morphology due to floods	poaching and other illegal hunting will damage directly and indirectly the PAs potentials, while in case of fishing with poison or explosive, the damage may be transferred in other downstream sites. Fires in the PA may risk the entire PA assets and cause drastic degradation of PAs. Changes on the morphology of nearby sites, which may cause floods in Pas. Changes in morphology of nearby sites, which may control the water flows and of the draining system by earth cutting/filling may cause floods in PAs territories. This impact seems to occur and is primarily related with Section 1. No other protected areas will be affected by this impact.	
Biodiversity	During operation	
Habitats Degradation of habitats and disturbance of flora	Key activities that lead to degradation are the operational traffic, chemicals use (regular maintenance of vegetation within road rights-of-way using of pesticides and herbicides) and illumination of the road which may impact on air and water quality, increase the noise and vibration as well as the illumination pollution, while the barrier effect could be provoked and migration routes maybe impacted. Key activities that lead to degradation of aquatic habitats are traffic, accidental spill of fuel or hazardous wastes affecting a water feature: river, creek, surface runoff containing pollutants and destruction of slopes stability of the diverted river channels and will impact on air and water quality. This contamination may be transferred by running waters.	A monitoring strategy will need to be devised so that the overall success of the reforestation can be assessed. The monitoring will aim, not only at determining success, but also the need for remediation where replanting or management has not worked. Monitoring frequency will need to be determined, though it is suggested that each area subject to replanting or management should be monitored annually for the first five years post intervention, then once every 3-5 years after that. Disturbance of flora caused by the changes in air quality can be mitigated by the timely repair of road machinery and equipment to minimize air pollution by exhaust gases and the watering of the road to prevent dusting. Disturbance of flora caused by the changes in soil and ground water quality have been mentioned in the waste section. Regarding degradation to freshwater of aquatic habitats, the mitigation measures have been mentioned in the surface waters section. Lighting Works will not be lit where this is practical. Where lighting is required it will be directional and the lighting strategy will be designed with the input of the design team. Only non-UV lighting sources will be employed. The proposed illumination system is based on LED technology and provided through a set of lighting poles of different heights that are mounted safely behind the road structures and other elements (e.g. guardrails).
Introduction of alien species	The risk of introduction of alien species remains at the operational stage. The linear infrastructures (such as roads), are one of the sources of the spread of alien plants (especially along uncultivated lands or where vegetation clearance has occurred).	A monitoring plan should be carried out to record alien species populations in the project area of influence and aimed at removing new populations and preventing them from spreading throughout the route. In addition, prompt revegetation (i.e. sowing of native herbaceous species and/or planting native shrubs/trees) on bare soil with natural or semi-natural vegetation will reduce the spread of alien species.

Parameter	Possible impact	Potential Mitigation Measures
Fauna Accidental kill	The presence of a motoway can result in the loss of some fauna, as a result of accidents when crossing the motorway, getting run over by the vehicles. This can impact all groups of fauna. Mammals, amphibians and reptiles can be killed by crossing the road. Although most birds comparing to other animal species have no significant difficulties in crossing the traffic infrastructure, they may also be faced with certain severe obstacles. Since traffic infrastructure usually cuts the natural movement corridors of amphibians, these animals are often killed trying to cross the road.	Regarding the accidental loss of fauna, there should be a limitation of speed especially where wildlife corridors and passages have been identified, in order to limit the risk of accidents with fauna, a safety barrier will be installed on both sides of the road and along the median strip, while on slopes and depressed terrain locations, a screen mesh will be installed to restrict access of animals. There should be developed and implemented a Monitoring Plan of terrestrial and aquatic fauna in order to timely recognise negative impacts and trends related to the motoway operation and define additional and appropriate mitigation measures (e.g. additional or different fauna crossing points). In order to reduce the risk of collision accidents and road mortality, there should be planned the timely removal of excess salt after winter in order to reduce the risk of collision accidents and road mortality. As far as bird fauna, it is necessary to organize at least one-year monitoring in the operational phase, and based on the results of research prescribe measures to mitigate the effects. For this purpose, it is necessary to organise a consultation process with key stakeholders (institutions or organizations) to assess the capacity to implement monitoring on the motorway and confirm the main elements of the monitoring plan. Monitoring should be undertaken of fish populations. Regarding mammals and amphibians and reptiles, monitoring of the mitigation measures is mandatory in order to assess their effectiveness. Condition of the wildlife crossings and unimpeded access needs to be periodically monitored during road use. The amphibians should be provided with sufficient possibilities to cross under the motoway. The function of these underpasses can be evaluated and optimized through identification of so-called black spots short sections of road where many individual animals are killed.
Wildlife disturbance	Most of the wildlife (small mammals, reptiles, amphibians and birds), which may live in the vicinity of the AIC Sections, will be disturbed by air, soil and water pollution (contamination from car discharges, PMs and leakages, accidental pollution/contamination). The increased levels of noise and vibration from the traffic can disturb the fauna. Taking into account the noise and vibration attenuation levels with the distance, the disturbance is expected to mostly occur in the direct proximity of the motoway. Artificial challenge for food, shelter and space, in areas where wildlife has migrated, may create changes on population ratio in the habitats where wildlife has migrated. This impact may happen to all AIC sections. During operation, fish may suffer from decreases in water quality associated with road run-off downstream from the	The implementation of mitigation measures regarding soils and surface waters will deal with any impacts to fauna during this phase. In case of use of pesticides and herbicides which will cause change of water quality, the following can be proposed: ▪ Training of personnel to apply herbicides and ensure that personnel have received applicable certifications or equivalent training where such certifications are not required. ▪ Compliance with international restrictions on pesticide use. ▪ Review of manufacturer's directions on maximum recommended dosage or treatment, as well as published reports on reduced rate of herbicide application without loss of effect, and application of the minimum effective dose. ▪ Application of herbicides based on criteria (e.g. field observations, weather data, time of treatment, and dosage) and maintenance of a pesticide logbook to record such information. Regarding lighting, the mitigation measures mentioned for the operational phase of the landscape parameter will assist in dealing with impacts provoked, although as it is described above the impacts will be negligible.

Parameter	Possible impact	Potential Mitigation Measures
	bridges, as well as loss of connectivity between the upstream and downstream habitats During the operational stage the road will be illuminated at the interchanges, tunnels, bridges, underpasses, rest and service areas, frontier plazas and toll plazas. Light pollution could potentially impact on fauna species with consequences that might be significant for the spatial and temporal distributions of populations	
Habitat fragmentation – Barrier effect	The linear infrastructures will contribute towards the habitat fragmentation by creating barriers to migration of the fauna representatives and isolation of their populations. The barrier effect created by such linear infrastructures can affect the dispersion and movement capacity of the fauna. This affects indirectly to their capacity for searching food, shelter or other individuals of their same species during the breeding season.	The mitigation measures to minimize the effect of fragmentation mainly consist of the establishment of wildlife crossings (culverts, underpasses, overpasses etc.) to increase the movement activity vertically to the motoway. Regular maintenance activities will also include protective fence maintenance, removal of food, waste, animal carcasses, etc. from roads, in order to reduce the attraction of scavengers, as well as maintenance in a good and functional status the fauna crossing points constructed.
Protected areas Damage of the Pas potentials Pollution from leakages Floods Accidental kills	Gas emissions, dust, noise and vibration may impact on the biodiversity and visual characteristics of the Protected Areas. Air pollution may disturb the visitors in PAs and vibration by movements of heavy vehicles may be irreversible and permanent in Section 1. Pollution from leakages may be direct at Section 1 and indirect at Section 2 regarding PAs. Pollution in Buna River may be transferred downstream, where the river is shared by Albania and Montenegro. Buna river plays a channel role and may affect Shkodra lake, degrading the Shkodra Lake Managed Reserve. The pollution of Drini of Lezha River will be transferred to the river mouth and then to the Kune Vain Tale Nature Reserve. Flooding of territories, where the PAs lie in, may be provoked by changes in topography in close/related territories of PAs. Road operation, may directly impact on wildlife by accidental road kill of mammals, birds, bats amphibians and reptiles, which may cross the road.	All mitigation measures have been developed in the habitats, flora and fauna Sections. The ESIA findings as well as strong consultation with the relevant authorities will further target at the minimization of impacts.