



Ecoline
International

ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT (ESIA)
SISIAN-KAJARAN
(NORTH-SOUTH CORRIDOR)
ROAD PROJECT,
ARMENIA

SCOPING REPORT

February 2022

**ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT (ESIA)
SISIAN-KAJARAN
(NORTH-SOUTH CORRIDOR)
ROAD PROJECT,
ARMENIA**

SCOPING REPORT

Prepared by:



Ecoline
International

**Ecoline International Ltd.
(Sofia, Bulgaria)**



SE SOLUTIONS
Advancing Environmental Sustainability

**SE Solutions (Pty) Ltd.
(South Africa)**

Director: Sean O'Beirne
Tel: +27 (0)12 643 0190
Mobile: +27 (0)82 903 9751
E-mail:
sobeirne@tiscali.co.za



ATMS Solutions

**ATMS Solutions Ltd.
(Yerevan, Armenia)**

Director: Artak Ter-Torosyan
Tel.: +37410 58 36 43
Mobile: +37499 10 94 95
E-mail:
artak.ter-torosyan@atms.am

Director: Dr. Maia
Gachechiladze-Bozhesku
Mobile: +38095 11 00 727
E-mail:
mgachechiladze@ecoline-int.org

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LIST OF ABBREVIATIONS

ADB	Asian Development Plan
amsl	above mean sea level
BAP	Biodiversity Action Plan
CITES	Convention on International Trade in Endangered Species
DD	Detailed Design
E&S	Environmental and social
EBRD	European Bank for Reconstruction and Development
EAAAs	Ecologically appropriate areas of analysis
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy (of EBRD)
ESS	Environmental and Social Standard (of EIB)
FFS	flora and faunal survey
GIP	good international practice
ha	hectare
IFC	International Finance Corporation
IFI	International Financial Institution
ILO	International Labour Organization
KBA	Key Biodiversity Area
kph	kilometre per hour
LARP	Land Acquisition and Resettlement Plan
m	metre
MTAI	Ministry of Territorial Administration and Infrastructure of Armenia
MoE	Ministry of Environment of Armenia
NGO	Non-governmental organization
NSRC	North-South Road Corridor
NSRCIP	North-South Road Corridor Investment Project
NTS	Non-Technical Summary
OHS	Occupational Health and Safety
PR	Performance Requirement (of EBRD)
RA	Republic of Armenia
RF	Restoration Framework
RD	Road Department
SEP	Stakeholder Engagement Plan
SHPP	small hydro power plant
SNCO	State Non-Commercial Organization
SPA	Special Protected Area
TPIO	Transport Project Implementation Organization

TABLE OF CONTENTS

1	INTRODUCTION	8
2	THE PROPOSED PROJECT	10
2.1	Overview	10
2.2	Regional Transport Corridor Developments.....	10
2.3	The Armenian North South Road Corridor (NSRC)	10
2.4	Tranche 4.2: The Sisian-Kajaran Road Section	12
2.5	Key Components of the Road	18
2.6	Alternatives.....	25
2.7	Associated Facilities.....	28
2.8	Potential for Cumulative Impacts: Concurrent Road Projects	28
3	LEGAL AND REGULATORY FRAMEWORK	29
3.1	Armenian Legal Requirements.....	29
3.2	Applicable International Lenders’ Requirements.....	33
3.3	Good International Practice (GIP) Guidelines and European Union Directives	35
4	ESIA METHODOLOGY	36
4.1	ESIA Process	36
4.2	Screening	36
4.3	Scoping	36
4.4	Baseline Study Areas and Baseline Analysis.....	37
4.5	Assessment of Impacts/Risks	40
4.6	E&S Management and Monitoring	42
4.7	Stakeholder Engagement and Public Consultations	42
4.8	Data Availability, Assumptions and Limitations	42
5	ENVIRONMENTAL AND SOCIAL BASELINE	43
5.1	Environmental Baseline.....	43
5.2	Socio-Economic Baseline.....	63
5.3	Cultural Heritage	69
6	PRELIMINARY IDENTIFICATION AND SCOPING OF POTENTIAL E&S IMPACTS.....	77
6.1	Potential Impact on Air Quality	77
6.2	Potential Impact on Geology, Soil and Geo-hazards	78
6.3	Potential Impacts on Water Resources	78
6.4	Potential Noise and Vibration Impacts	79
6.5	Potential Impact on Biodiversity	80
6.6	Potential Impact on Landscape and Visual Amenity	81
6.7	Potential Impacts on Economy.....	82
6.8	Potential Impacts Associated with Job Creation and Labour Management	83
6.9	Potential Impacts on Land Use, Land-based and Non-land-based Livelihoods.....	84
6.10	Potential Impacts on Public Utilities, Services and Transport Infrastructure	86

6.11	Potential Risks to Public Health, Safety, and Security	86
6.12	Potential Impacts on Occupational Health and Safety	87
6.13	Potential Impacts on Cultural, Archaeological and Historical Environment.....	88
6.14	Potential for Cumulative Impacts.....	89
6.15	Potential for Transboundary Impacts	89
6.16	Paris Alignment	89
7	STAKEHOLDER ENGAGEMENT	91
7.1	Summary of Project Stakeholder Engagement Completed in 2016-2018.....	91
7.2	Results of the Inception Stage Stakeholder Engagement (2021)	91
7.3	Initial Stakeholder Identification.....	93
7.4	Further Stakeholder Engagement Steps	96
7.5	Grievance Mechanism.....	97
8	RECOMMENDATIONS RELATED TO PROJECT DESIGN	99
8.1	Intermediate Spoil Disposal.....	99
8.2	Characterisation of Tunnel Spoil and Risk of ARD.....	99
8.3	Choice of Road Pavement	99
8.4	Siting of Facilities Needed during Construction.....	99
9	ESIA WORK PROGRAMME AND TIMELINE	100
Annex 1.	International E&S conventions and agreements pertinent to the Project	101
Annex 2.	Proposed Air, Noise, Vibration, Water and Soil Sampling and Measurement Locations	102
Annex 3.	Additionally Identified Bird Species That Can Be Encountered in the Project Area	111
Annex 4.	Additionally Identified Amphibians, Reptiles and Fish That Can Be Encountered in the Project Area	111
Annex 5.	Invertebrates Registered in the RA Red Book of Animals and their IUCN Status...	111
Annex 6.	Preliminary Stakeholder Engagement Programme for the ESIA period.....	113

LIST OF TABLES AND FIGURES

Table 1.	Five Individual Tranches that Make up the NSRC together with Their Length and Current Status.....	11
Table 2.	Components of the Sisian-Kajaran Road Section from km 0+000 to km 10+000.....	14
Table 3.	Components of the Sisian-Kajaran Road Section from km 10+000 to km 20+000.....	15
Table 4.	Components of the Sisian-Kajaran Road Section from km 20+000 to km 35+770.....	16
Table 5.	Components of the Sisian-Kajaran Road Section from km 35+770 to km 50+000.....	17
Table 6.	Components of the Sisian-Kajaran Road Section from km 50+000 to end of the Project	18
Table 7.	Cut-to-fill Ratio for the Project.....	22
Table 8.	Comparison of Technical Parameters for the Three Alternative Alignments for the Sisian-Kajaran Road Section	26
Table 9.	Definitions for Sensitivity of Receptors	40

Table 10. Definitions for Impact Magnitude	40
Table 11. Definitions for Impact Significance	41
Table 12. Impact Significance Matrix	41
Table 13. Ground Level SO ₂ and NO ₂ Concentrations (2016).....	44
Table 14. Main Rivers in the Project Area	49
Table 15. Water Streams to be Crossed by the Project Road	49
Table 16. Groundwater Resources	50
Table 17. The IUCN Management Categories, Subjects of Protection and Areas of the SPAs Included into the Zangezur Biosphere Complex	51
Table 18. Names, Locations and IBA Criteria of IBAs in Armenia	54
Table 19. Populations of Zangezoor IBA Trigger Species	55
Table 20. Synthesis of Protected Areas and Areas of Biodiversity Importance Relative to the Project Area	57
Table 21. The Main Taxonomy Units within the 2017 and 2021 Study Areas	58
Table 22. Synthesis of the Main Biodiversity Values along the Project Road.....	61
Table 23. Settlements Located in the Vicinity of the Proposed Road	66
Table 24. Cultural Heritage Units and Sites Identified around the Project Road Alignment	71
Table 25. Air Quality: Further Work for the ESIA	77
Table 26. Geology, Soil and Geo-hazards: Further Work for the ESIA	78
Table 27. Water Resources: Further Work for the ESIA.....	79
Table 28. Noise and Vibration: Further Work for the ESIA	79
Table 29. Biodiversity: Further Work for the ESIA	80
Table 30. Landscape: Further Work for the ESIA	82
Table 31. Economy: Further Work for the ESIA.....	82
Table 32. Impacts Associated with Job Creation: Further Work for the ESIA.....	84
Table 33. Land Use, Land-based and Non-land-based Livelihoods: Further Work for the ESIA....	85
Table 34. Public Utilities, Services and Transport: Further Work for the ESIA	86
Table 35. Public Health, Safety, and Security Risks: Further Work for the ESIA.....	87
Table 36. OHS Risks: Further Work for the ESIA	88
Table 37. Cultural and Historical Environment: Further Work for the ESIA	89
Table 38. Tentatively Identified External Stakeholders and Their Relation to / Interests in the Project	93
Figure 1. Location of the Sisian-Kajaran Road Project (Syunik Region, Armenia)	8
Figure 2. Schematic View of the NSRC, Armenia.....	11
Figure 3. Typical Road Cross Section Showing the Two Lanes and a Passing Lane on uphill sections	12
Figure 4. The Proposed Sisian-Kajaran Road together with the Positions of Tunnels and Bridges	13

Figure 5. The Alignment Proposed for the Sisian-Kajaran Road Section from km 0+000 to km 10+000 14

Figure 6. The Alignment Proposed for the Sisian-Kajaran Road Section from km 10+000 to km 20+000 15

Figure 7. The Alignment Proposed for the Sisian-Kajaran Road Section from km 20+000 to km 35+770 16

Figure 8. The Alignment Proposed for the Sisian-Kajaran Road Section from km 35+770 to km 50+000 17

Figure 9. The Alignment Proposed for the Sisian-Kajaran Road Section from km 50+000 to the end of the Project 18

Figure 10. Schematic Typical Cross-Section of the Bargushat Tunnel 20

Figure 11. Schematic Typical Cross-section of the Other Tunnels 20

Figure 12. Location of five Spoil Disposal Areas along the Sisian-Shenatagh Road Section 23

Figure 13. Location of three Spoil Disposal Areas along the Qirs-Kajaran Road Section 24

Figure 14. The Original Alternative Alignments Proposed for the Sisian-Kajaran Road 27

Figure 15. Proposed Biodiversity Study Area 38

Figure 16. Proposed Socio-economic Study Areas (Areas of Influence) 39

Figure 17. Climatic Map of Syunik Region 43

Figure 18. Map of Soil Types in Syunik Region and Project Area 46

Figure 19. Map of Seismic and Mudflow Risks Areas in Syunik Marz 47

Figure 20. Hydrological Map of Syunik Marz 48

Figure 21. Location of the Nearest SPAs Relative to the Project Road 51

Figure 22. The Location of the Nearest Nominated Emerald Network Sites Relative to the Project Road 53

Figure 23. Location of the Nearest KBAs and IBAs Relative to the Project Road 55

Figure 24. Structure of Syunik Region Economy (2019) 64

Figure 25. Residential or Social Structures Adjacent to the Project Road 69

Figure 26. Famous historical and cultural heritage sites and nature monuments of Syunik Region 70

Figure 27. Distribution of Main Cultural Heritage Sites along the Sisian-Shenatagh (a)) and Qirs-Kajaran (b)) Sections of the proposed road 75

1 INTRODUCTION

Under Tranche 4 of the Armenian North-South Road Corridor (NSRC) on the extended core Trans-European Transport Network (TEN-T) network, European Bank for Reconstruction and Development (EBRD or the Bank) is considering providing finance to the Republic of Armenia (the Borrower or the RA), to be co-financed by a sovereign loan from European Investment Bank (EIB) and an investment grant from the European Union Neighbourhood Investment Platform. The Implementing agency will be the **Road Department Fund** (the RD or the Client) under the RA Ministry of Territorial Administration and Infrastructure (the MTAI).

The Sisian-Kajaran section (Tranche 4) is one of five tranches of the Armenian part of the NSRC in the southern part of the country. The current interstate road connecting Sisian and Kajaran via Tatev and Kapan is approximately 130 km long. Despite the maximum speed of 90 km/hour, the travel time takes about 3-4 hours due to difficult mountain terrain. The loans from EBRD and EIB will co-finance the proposed greenfield Sisian-Kajaran section of the NSRC, Tranche 4 (the Project) (Figure 1). In addition, the EBRD funding will be used to review and, if needed, subject to availability of funding and agreement among the EBRD, EIB, and the Borrower, potentially co-finance the update of the Project’s detailed design that was prepared in 2019.



Figure 1. Location of the Sisian-Kajaran Road Project (Syunik Region, Armenia)

The EBRD has categorised the Project as “A” in line with its Environmental and Social Policy (ESP) (2019) thereby requiring an environmental and social impact assessment (ESIA) on the proposed Project and associated infrastructure. A consortium of environmental and social (E&S) consulting companies (the Consultant)¹ has been commissioned to prepare the ESIA.

The first step in the process is known as *Scoping* and serves to define the scope of the assessment. **This Scoping Report** accordingly contains a description of the proposed Project and associated infrastructure, the receiving or affected environment and society and gaps in the baseline information, the anticipated E&S impacts/risks, the comments or issues raised in the initial consultation process, and the scope of work for further assessment.

The next step in the assessment process will be to implement the scope of work, which would then form the main body of the assessment documentation. The E&S assessment documentation that will be developed for the Project and disclosed to the public will include:

- ESIA report,
- Non-Technical Summary (NTS),
- Environmental and Social Management Plan (ESMP),
- Environmental and Social Action Plan (ESAP),
- Stakeholder Engagement Plan (SEP),
- Biodiversity Action Plan (BAP), and
- Resettlement Framework (RF).

¹ The consortium encompasses Ecoline International Ltd. (Bulgaria), SE Solutions Pty. (South Africa) and ATMS Solutions LLC (Armenia) and is supported by Biotope (France) and Biogeotech (Armenia) for biodiversity component.

2 THE PROPOSED PROJECT

2.1 Overview

There is currently a broad range of transport related initiatives across Europe and Asia that are aimed at improving country-to-country, region-to-region and continent-to-continent connectivity. These transport initiatives include the Trans-European Transport Network (TEN-T), the Transport Corridor Europe-Caucasus-Asia (TRACECA) and the Silk Roads Project. To capitalise on the trade and mobility benefits of these regional scale initiatives it is necessary to improve in-country connectivity too. For Armenia, the key to the improved in-country connectivity lies in the NSRC. The Sisian-Kajaran Road Project is a component of the NSRC. In the below sections the context of the Project is described together with its key elements.

2.2 Regional Transport Corridor Developments

2.2.1 The Trans-European Transport Network (TEN-T)

The TEN-T policy serves to promote a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. The objective is to close gaps, remove bottlenecks and technical barriers and to strengthen social, economic and territorial cohesion in the EU. The current TEN-T policy is based on Regulation (EU) No 1315/2013. In addition to the construction of new transport infrastructure, TEN-T promotes innovation, new technologies and digital solutions in all modes of transport. The policy objective is improved transport infrastructure use, reduced environmental impact, improved energy efficiency and increased safety.

2.2.2 Transport Corridor Europe-Caucasus-Asia (TRACECA)

The TRACECA is an international transport programme involving the European Union and 12 member States of the Eastern European, Caucasian and Central Asian region. TRACECA would serve to strengthen economic relations, trade and transport in the regions of the Black Sea basin, South Caucasus (Armenia, Azerbaijan and Georgia) and Central Asia.

2.2.3 The New Silk Road Project

First announced in 2013 by China the New Silk Road Project is a new double trade corridor set to re-establish transport channels between China and its western neighbours namely Central Asia, the Middle East and Europe. According to the Belt and Road Action Plan, the initiative will have east west land routes (the “Belt”) and maritime routes (the “Road”) with the goal of improving trade relationships in the region primarily through infrastructure investments. The land-based Silk Road Economic Belt is planned to extend throughout Eurasia in six corridors: from East Asia to Western Europe and South through Africa. Two vital corridors; the New Eurasian Land Bridge Economic Corridor and China-Central Asia-West Asia Economic Corridor pivot around Central Asia. Its other tranche - the Maritime Road – extends through the Western Pacific and Indian Ocean.

2.3 The Armenian North South Road Corridor (NSRC)

The NSRC crosses Armenia from South to North and includes the Agarak-Kapan-Yerevan-Gyumri-Bavra highways linking the road networks of two of the country’s neighbours, Iran and Georgia. The North-South Road Corridor Investment Project (NSRCIP) will serve to upgrade the current 3rd category road that runs for 560 km from the Armenian border with Georgia at Bavra to the border with Iran at Agarak. The planned upgrade to a 1st category road will reduce the overall length of the road to some 470 km and increase the speed limit from the current 30-90 kph to 100-110 kph. The upgrade will mean increased comfort and a decreased travel time for road users and vastly improve the function of the road in facilitating the movement of people and cargo. The NSRC is presented schematically in **Figure 2** and consists of five tranches as shown in **Table 1**.



Figure 2. Schematic View of the NSRC, Armenia

Table 1. Five Individual Tranches that Make up the NSRC together with Their Length and Current Status

Tranche No	Section	Length, km	Status ²
1	Yerevan-Ashtarak and Yerevan-Artashat	31	Completed
2	Ashtarak-Talin	42	Construction phase
3	Talin-Lanjik, Lanjik-Gyumri	46.2	Construction phase
4	1. Artashat-Sisian	175	Preliminary design
	2. Sisian-Kajaran	60	Detailed design
	3. Kajaran-Agarak	45	Feasibility study, stage of design procurement
5	Gyumri-Bavra	59	Detailed design
TOTAL DISTANCE		458.2	

² The various sections / Tranches of the NSRC projects are financed by Asian Development Bank (ADB), EIB and/or Eurasian Development Bank with financial contribution from the RA Government.

2.4 Tranche 4.2: The Sisian-Kajaran Road Section

Note: the information in this section is based on the “North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detailed Design, General Report, April 2019”.

2.4.1 Introduction

Tranche 4 of the NSRCIP connects the southern Armenian border with Iran with the town of Artashat in central Armenia. Tranche 4 is the longest section of the NSRCIP at some 340 km. Within that section, the current interstate road connecting Sisian and Kajaran via Tatev and Kapan is approximately 130 km long. Despite the maximum speed of 90 km/hour, the travel time takes about 3-4 hours due to difficult mountain terrain. The Armenian Ministry of Transport and Communications commissioned a study of the Sisian-Kajaran road section. The outcome of the feasibility study, which was conducted in 2015, was to recommend the so-called “C1” alignment for the Sisian-Kajaran section. C1 was seen to offer the greatest benefits namely improving connectivity to a very important part of the country, by replacing an extremely poor existing road and drastically reducing travel time, especially for freight traffic coming from Iran. It is also the least cost option. A preliminary design was completed and approved in 2016 with the road section designed as a single carriageway with climbing lanes on all uphill sections (**Figure 3**) and tunnels as single carriageways in both directions. The length of this alignment is approximately 60 km and has a design speed of 100 kph. The detailed design was then completed and approved in 2019³.

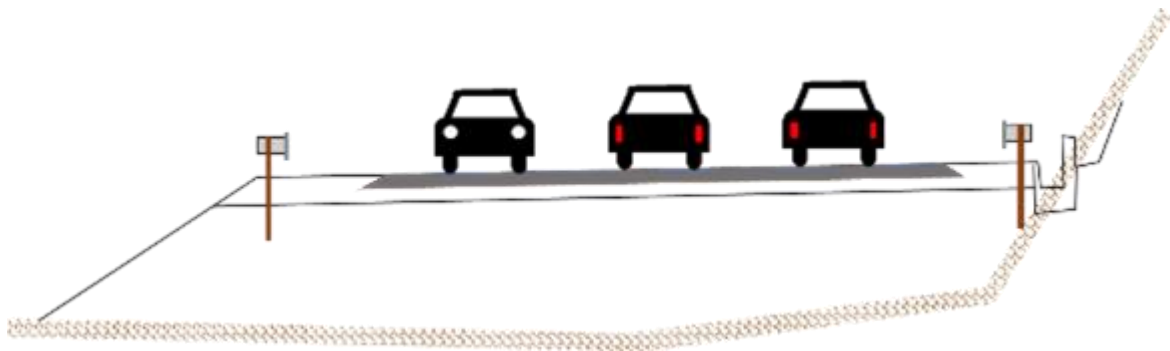


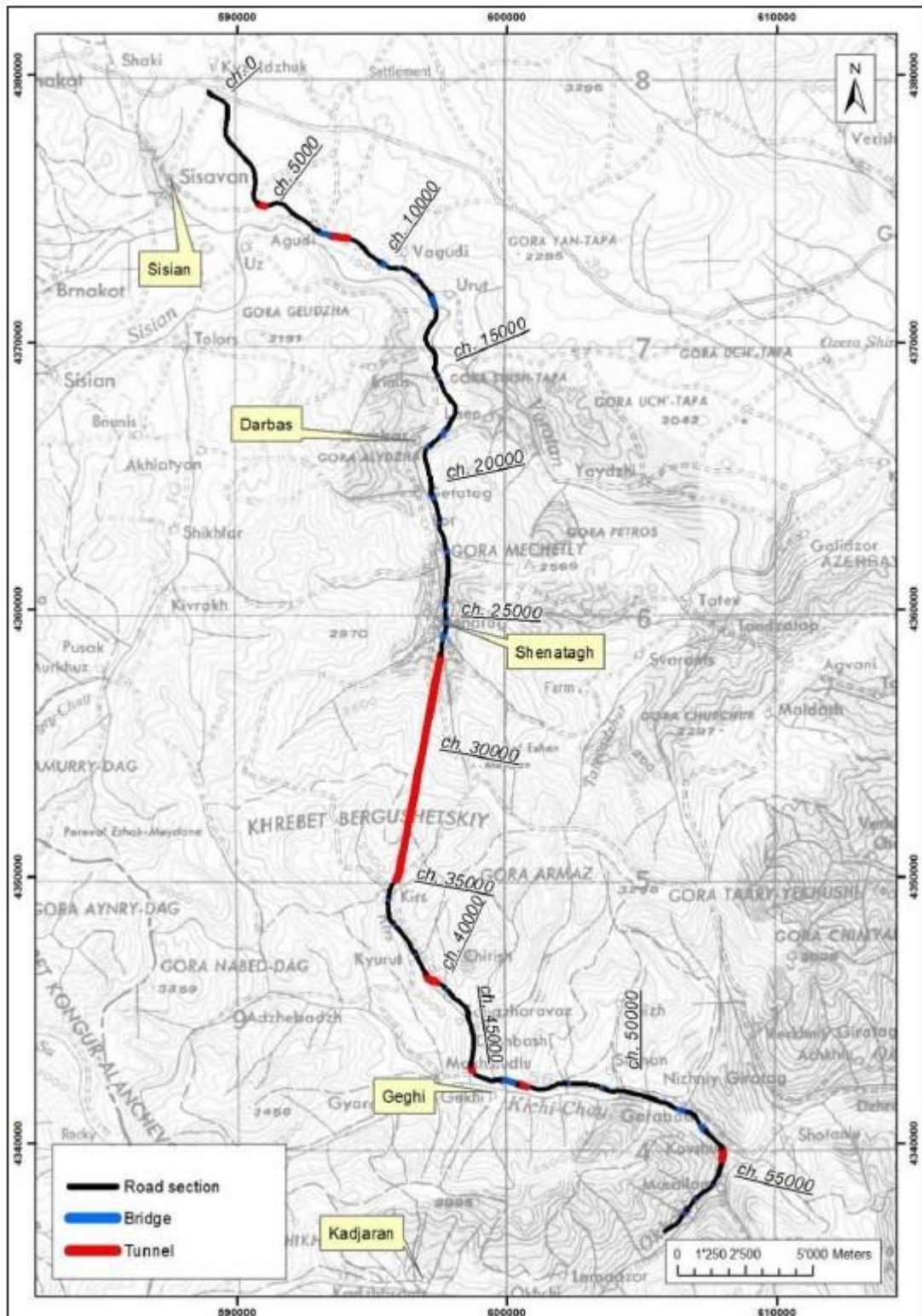
Figure 3. Typical Road Cross Section Showing the Two Lanes and a Passing Lane on uphill sections⁴

2.4.2 General Description of the Road Section

In addition to the characteristics detailed above the new road section would have three main interchanges, 27 bridges and 9 tunnel sections. Of the tunnel sections, the most significant is the proposed Bargushat Tunnel. The tunnel is 8,600m long, more than 3,100m amsl, and has an overburden of almost 1,200m. The tunnel would provide a connection between the section north of the Bargushat mountain and the section to the south. The road starts on the plain located north-east of Sisian and runs in south-east direction towards the village of Vorotan and then southwards to the village of Shenatagh. In this sector the road will extend mainly along the left bank valley sides of the Vorotan River and then on the right side of Shenatagh valley, before passing through the Bargushat tunnel. From the southern side of the tunnel the road will descend along the Qirs valley first on the right side and then along its left side, to the junction with the Geghi River in the Geghi valley. From this point the road would turn eastwards to the junction with the Voghji River where it turns west to connect with the existing M2 highway near Kajaran (**Figure 4**).

³ North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detailed Design, General Report, April 2019.

⁴ Source: *ibid*.



Source: North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detailed Design, General Report, April 2019.

Figure 4. The Proposed Sisian-Kajaran Road together with the Positions of Tunnels and Bridges

2.4.3 Detailed Description of the Proposed Road

The proposed road is illustrated in the figures that follow and described in detail in tables below.



Figure 5. The Alignment Proposed for the Sisian-Kajaran Road Section from km 0+000 to km 10+000

Table 2. Components of the Sisian-Kajaran Road Section from km 0+000 to km 10+000

Road feature	Chainage (km)		Length (m)
	km	+	
The starting point of the project is on the existing M-2 road after the first main junction for Sisian and near the second junction (in the direction of Kapan). The first approximately 500 m will be rehabilitated and improved to meet the new road design standard. Thereafter, the road turns right curving at R=425 m (minimum for this road category) and traverses the left side of an existing open valley that has no major constraints for the next 5 km.	0	0,00	
First interchange	0	400,00	
From km 4+840 the alignment turns left with R=450 m cutting into the mountain	4	840,00	
Tunnel 01	4	840,00	420,00
Service road 001	5	550,00	1 170,00
After the tunnel the alignment turns right following the same left bank of the river before crossing a minor existing road (which will be re-aligned in order to maintain functionality).	5	766,50	
Service road 002	6	980,00	1 009,00
Service road 003	7	57,00	200,00
Bridge 001	7	640,95	429,00
Village of Aghitu			
Tunnel 02	8	80,00	680,00



Figure 6. The Alignment Proposed for the Sisian-Kajaran Road Section from km 10+000 to km 20+000

Table 3. Components of the Sisian-Kajaran Road Section from km 10+000 to km 20+000

Road feature	Chainage (km)		Length (m)
	km	+	
Road runs close to the Vaghatin village on the left side of the river valley	10	0,00	
Bridge 002	10	265,00	246,00
Service road 004	10	450,00	329,00
Bridge 003	10	919,80	66,00
Service road 006	11	390,00	329,00
Passes by the Vorotnavank Monastery (approx. 200 m away)	11	500,00	
Bridge 004	11	583,50	174,00
Service road 007	11	725,64	255,00
Service road 008	11	610,00	657,00
Bridge 005 (over Vorotan River)	12	653,00	486,00
Service road 010	13	20,00	340,00
Runs in cut and fill section following the natural shape of the right valley side	13	382,00	718,00
Bridge 006	14	941,56	84,00
Runs through an agricultural and flat area mostly on embankment on south side of Shamb reservoir	15	0,00	2 000,00
Service road 009	15	310,00	261,09
Second interchange	15	900,00	
Bridge 007	15	768,63	246,00
Tunnel 03	17	191,00	359,00
Bridge 008 (over Loradzor River)	18	327,54	250,00
Bridge 009	19	34,00	102,00
Village of Darbas	19	300,00	
Runs on right side of river valley	18	300,00	1 700,00
Bridge 010	19	623,60	84,00
Service road 011	19	630,00	1 280,00

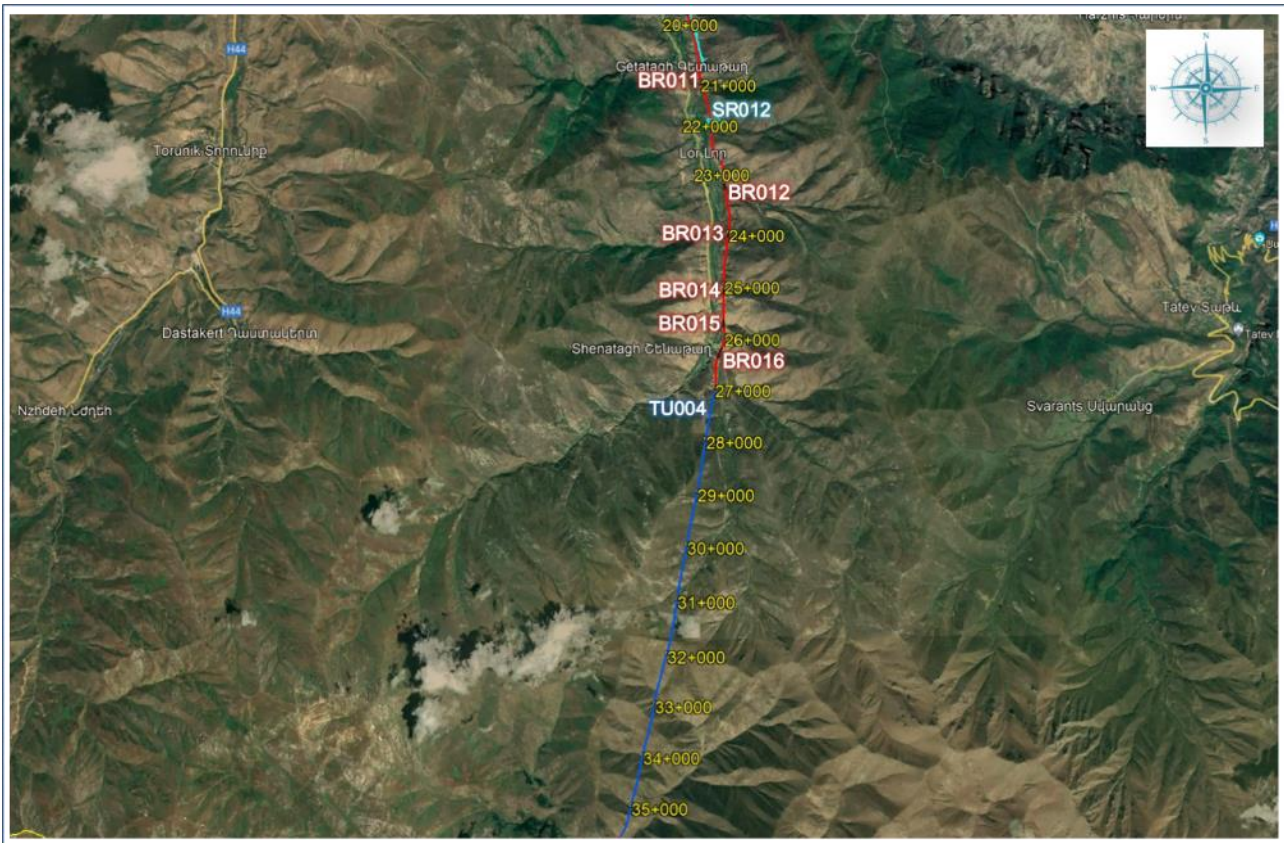


Figure 7. The Alignment Proposed for the Sisian-Kajaran Road Section from km 20+000 to km 35+770

Table 4. Components of the Sisian-Kajaran Road Section from km 20+000 to km 35+770

Road feature	Chainage (km)		Length (m)
	km	+	
Alignment runs on the left side of the main valley in cut and fill			
Bridge 011	20	986,35	114,00
Village of Getatagh	21	0,00	
Service road 012	21	794,05	580,00
Village of Lor	22	700,00	
Bridge 012	23	65,22	156,00
Bridge 013	24	41,00	102,00
Bridge 014	25	135,93	114,00
Village of Shenatagh	25	900,00	
Bridge 015	25	729,66	156,00
Bridge 016	26	257,07	246,00
Bargushat tunnel (Tunnel 04)	27	130,00	8 640,00

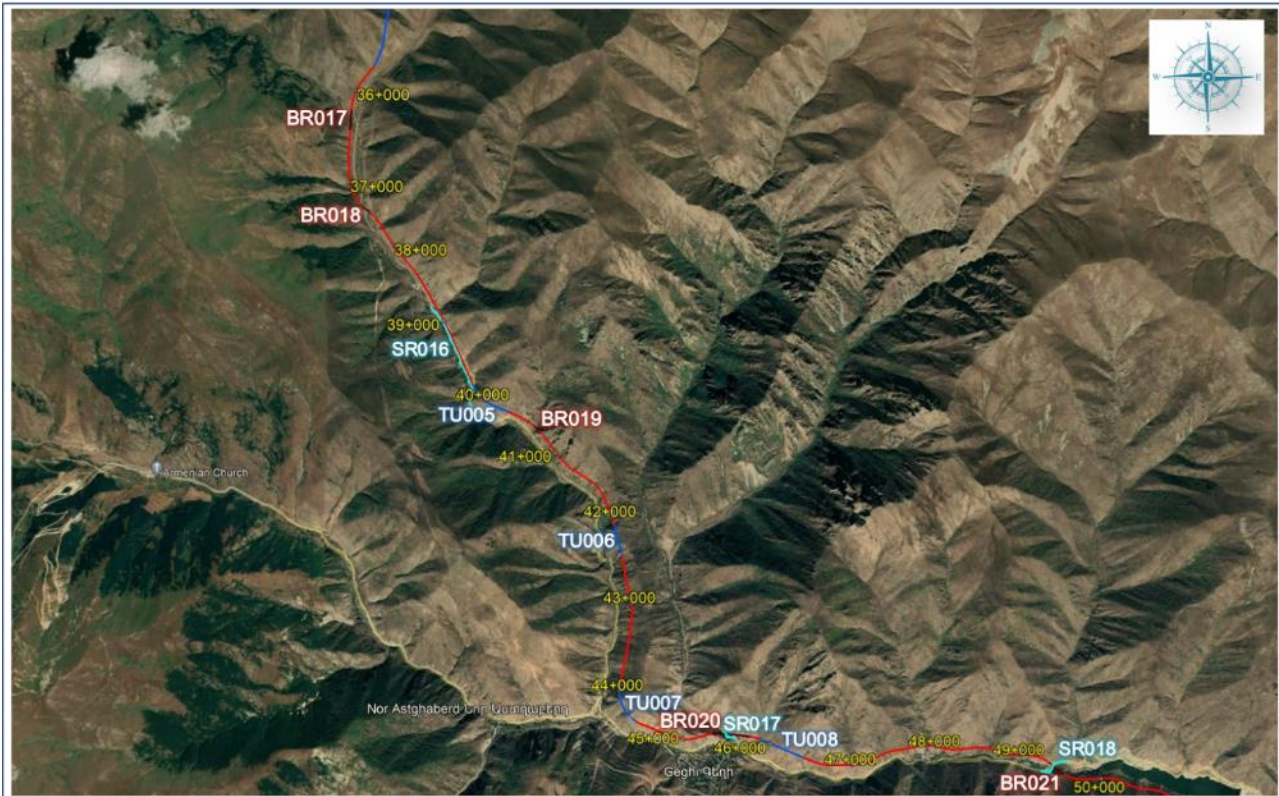


Figure 8. The Alignment Proposed for the Sisian-Kajaran Road Section from km 35+770 to km 50+000

Table 5. Components of the Sisian-Kajaran Road Section from km 35+770 to km 50+000

Road feature	Chainage (km)		Length (m)
	km	+	
Runs on the right side of the valley mostly in cut and fill section minimizing earthworks quantity, with bridges crossing the minor valleys	35	770,00	
Bridge 017	36	315,53	222,00
Road crosses to other side of valley and then continues to follow Geghi valley			
Bridge 018	37	418,08	114,00
Service road 016	38	770,00	1 260,00
Tunnel 05	39	755,00	515,00
Road remains on the left side of the valley in cut and fill section			
Bridge 019	40	592,67	84,00
Tunnel 06	42	58,00	366,00
Tunnel 07	43	919,00	480,00
Village of Geghi	45	0,00	
Bridge 020	45	312,15	434,00
After the village, the road crosses to the other side of the valley to avoid natural vegetation and to limit ice on the road surface during winter by maximising sun exposure.			
Service road 017	45	469,50	209,70
Tunnel 08	45	878,00	521,00
Bridge 021	49	341,12	222,00
Service road 018	49	411,00	355,20
Alignment turns right and crosses the valley to minimise the topography and to avoid a dam and associated lake	50	0,00	

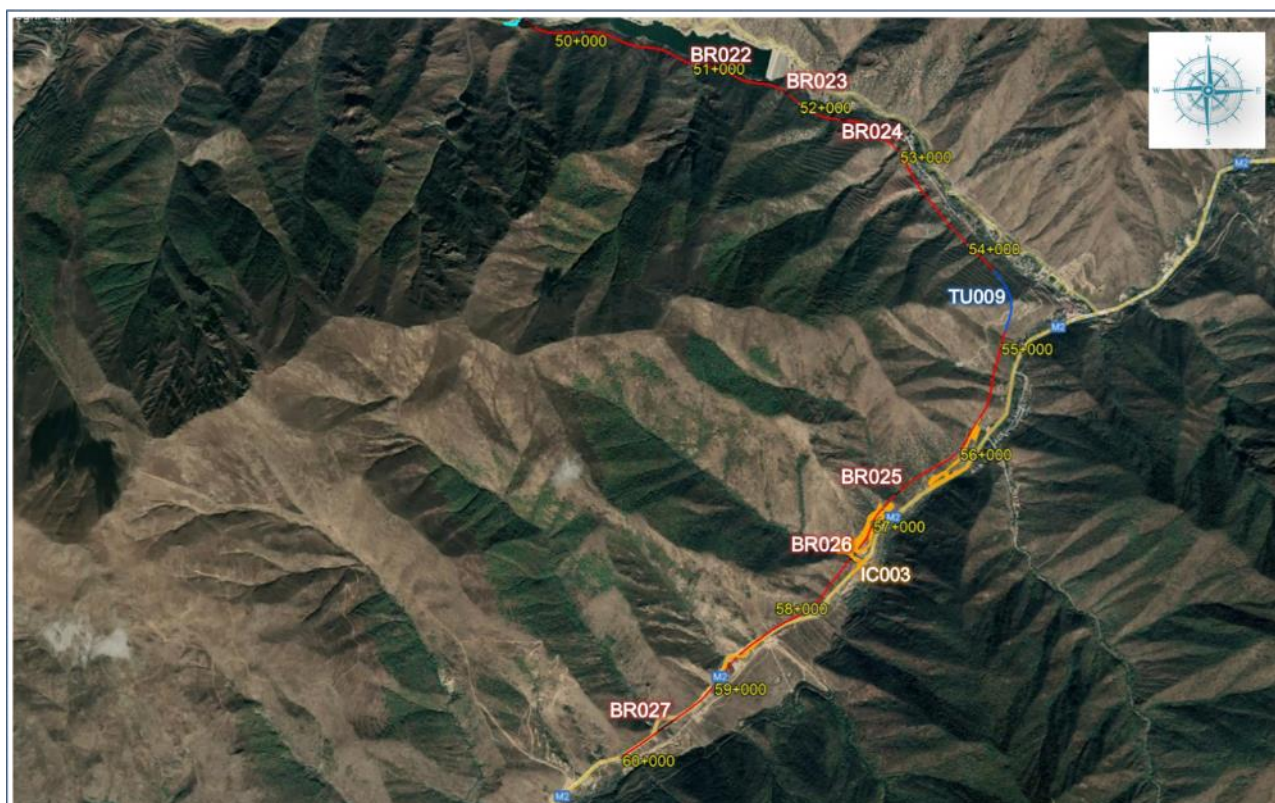


Figure 9. The Alignment Proposed for the Sisian-Kajaran Road Section from km 50+000 to the end of the Project

Table 6. Components of the Sisian-Kajaran Road Section from km 50+000 to end of the Project

Road feature	Chainage (km)		Length (m)
	km	+	
Bridge 022	51	1,00	102,00
Bridge 023	51	824,60	560,00
Bridge 024	52	390,00	66,00
Tunnel 09	54	410,00	490,00
New road runs parallel to the existing M2 road connecting Kapan to Kajaran. The existing road is closer to the river and lower (in elevation) than the new one.	55	0,00	
Bridge 025	56	640,22	60,00
Bridge 026	57	271,99	128,00
Third interchange	57	500,00	
Bridge 027	59	463,00	174,00
The road descends to reach the same elevation as the existing M2. End of new road section is where the new and existing roads meet in horizontal and vertical alignment.	60	22,00	

2.5 Key Components of the Road

2.5.1 Tunnels

2.5.1.1 Introduction

There will be nine tunnels in total ranging in length from 359 m (tunnel 3) to 8.64 km (Bargushat tunnel). All the tunnels will provide for single lane, two-way traffic. Should additional capacity be required later, a second parallel tunnel would be established next to those constructed for this Project. The Bargushat tunnel deserves special mention given its size and the important role that it will play in avoiding direct impacts on the Zangezur Sanctuary. At the same time,

the other tunnels can be seen as smaller versions of the Bargushat tunnel, with largely the same characteristics and construction requirements.

The Bargushat Tunnel will cross the Bargushat Mountain Range ascending from the Shenatagh portal (1,870m) (northern portal) to the Qirs portal (2,065m) (southern portal). The geology of the tunnel section has been preliminarily characterised as:

1. The first approximately 2.7 km is granites with intercalations of mafic dykes. There are several faults in this section oriented at high angles to the tunnel axis and with variable dip;
2. Thereafter the geology is complex with intercalations of mafic rocks, marbles, limestones, conglomerates, siltstones and quartzite;
3. Some 4.5 km into the tunnel is a large (around 230m) ductile shear zone in sedimentary rock (possibly siltstones, slates, marbles and limestones). These conditions and the high overburden at that point could make this section of the tunnel especially difficult to construct;
4. The next stage of the tunnel has similar geology to (2) above;
5. The last section again consists of intercalations of mafic and granitic rocks, with few stretches in marble-limestones;
6. Both portals are located in areas with a thin (few meters) cover of superficial debris above a medium fractured bedrock;
7. Veins of mineral ores a few meters thick have been observed consist of sulfur and oxides; and,
8. No karst features have been observed within the limestone-marble.

The low average annual precipitation (500-600mm) together with a general impermeability of the rock masses suggest that water inflows should be generally low to absent. Some large inflows could occur in the major fault zones, though with the largest quantities during the spring thaw. Aggressive, hot water resulting from deep fluid circulation and gases may also be present.

2.5.1.2 Characteristics of the Tunnels

The main tunnel will have a radius of 5.68m and will be 9.70m high (**Figure 10**) and has been designed to comply with the "Safety Requirements for Tunnels in the Trans-European Road Network Regulations" (Directive 2004/54/EC) for bi-directional tunnels of more than 1,000m. This compliance means:

- two fans and one duct in the vault of the tunnel to provide the required capacity of fresh air and exhaust and smoke extraction (semi-transversal ventilation),
- a separate duct under the pavement, between the carriageway and the tunnel invert (the base of the tunnel), provides an escape route in case of fire.

The tunnel is also designed to include:

- Widening for emergencies every 1,000m.
- Access to escape way every 500m.
- SOS and fire extinguishers every 250m.
- Fire system with water tanks at portals.
- Longitudinal ventilation with ventilation stations at each portal.

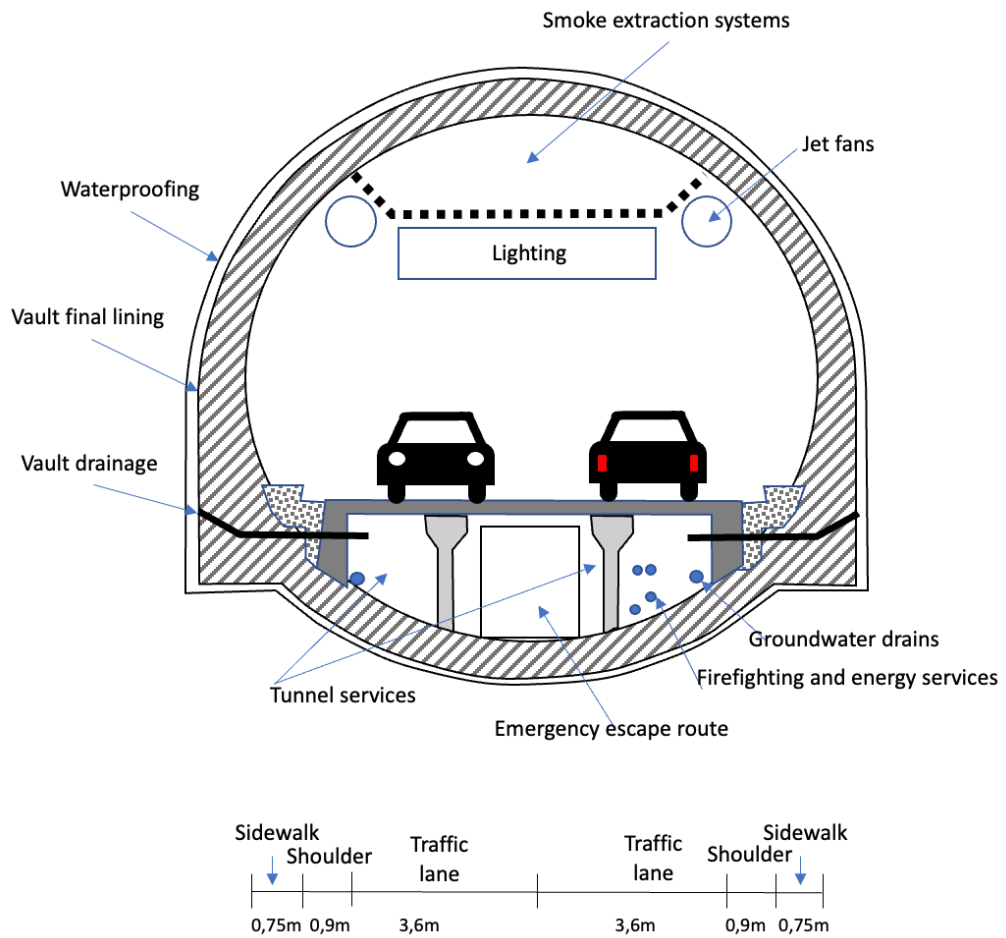


Figure 10. Schematic Typical Cross-Section of the Bargushat Tunnel

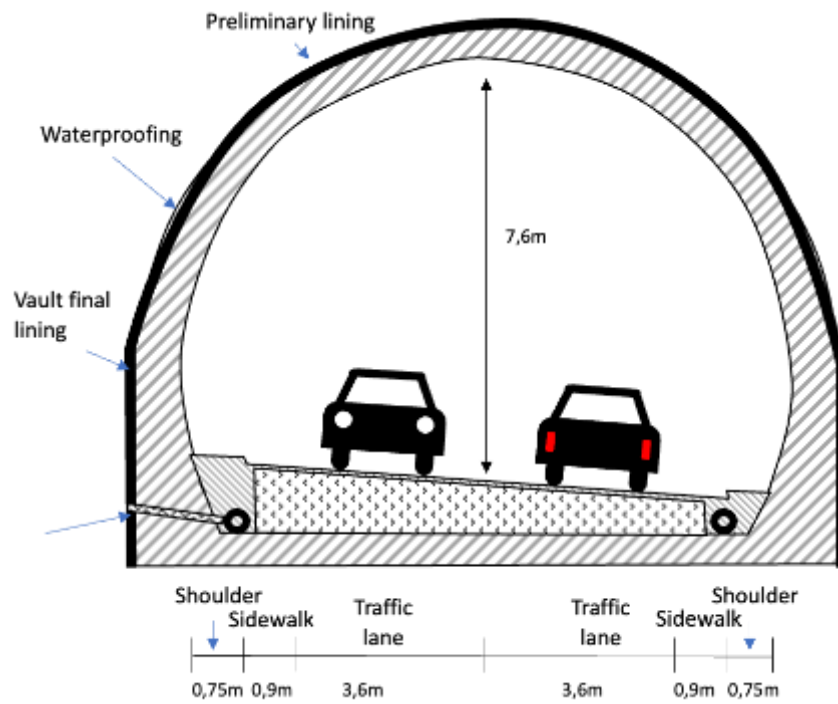


Figure 11. Schematic Typical Cross-section of the Other Tunnels

2.5.1.3 Construction of the Tunnels

Due to the significant overburden depth (i.e. material overlying the tunnel section), it is not possible to accurately and reliably characterise the rock mass along the tunnel alignment, and so construction of the tunnel will be based on the so-called “observational design method”. This approach means:

- on site surveying during construction, whereby the rock mass conditions assumed for the design, are confirmed or modified.
- an operating phase, during which stabilizing measures are implemented to control possible deformation;
- a monitoring and design fine-tuning phase during which deformation of the surrounding rock mass/ground for the entire excavation is measured, interpreted and verified and stabilizing measures are optimized.

The tunnel excavation technique is not defined in the 2019 detailed design. The Client expects the Construction Contractor to propose and justify a suitable method.

It is assumed that the rock quarries, concrete batching and asphalt plants existing in the region will be used instead of establishing new ones. The identification of these facilities will be a task of the Construction Contractor as well.

2.5.1.4 Power Supply to the Tunnels

It is essential to maintain safe and reliable power supply to all the tunnels to ensure the safety of the road users in the tunnel. To that end, the Bargushat tunnel will be equipped with two MT / BT cabins at the entrances. It is unclear at this stage as to how power will be supplied whether overhead transmission lines or underground lines.

2.5.1.5 Firefighting System

The firefighting system will be based on water spraying with pressurized water supplied from water storage tanks, via ring-locked piping. The ring-locking prevents water from escaping the system into the tunnel in the event of damage to a pipe. One water tank will be provided at each portal.

2.5.2 Bridges

There will be 27 bridges on the road section to cross both rivers and valleys and maintain the overall design grade for the road. The bridges range in length from 60 m (Bridge 25) to 560 m (Bridge 23). Two types of bridges will be deployed, namely:

- Steel-concrete bridges: maximum span length up to 72 m;
- Precast concrete bridges: maximum span up to 28 m.

The foundations for the bridge piers will be either flat type (a typical platform foundation), piling and/or micro-piling. Between two and seven piers will be required to support the bridges depending on the length of the bridge. The pier foundations will obviously also result in land transformation as a function of the size of the foundations. Each bridge will also require abutments on either side of the span of the bridge. An abutment is the ‘footing’ needed to transition from the natural underlying surface onto the bridge and upon which the bridge rests together with the piers. According to the 2019 Detailed Design, structurally, the bridges are designed to sustain 9.0 magnitude seismic impact.

2.5.3 Road Pavement

The road pavement will comprise 10cm of gravel-sand, 30cm of crushed stone sand course C-5, 8 cm of crushed stone a/c high porosity, 7 cm of course-grained dense a/c I cat B type and 5cm of fine-grained dense a/c I cat A type. Shoulders will be covered with surface dressing. The road has been designed in accordance with (i) Bridge Design Building Code SNIP 2.05.03.84*, Construction Norm of the RA IV11.05.02-99, AASHTO and Eurocodes.

The high risk of seismic activity and flooding has been incorporated in the design of the structural elements of the project. The key design features of the road are as follows:

- Design speed – 100 kph;
- Maximum grade – 50%;
- Number of lanes – 2;
- Width of one lane - 3.3m;
- Width of shoulders – 3.3m;
- Width of edge safety lane (security strip) from shoulder's side – 0.7m (or 0.6m).

2.5.4 Service Roads

The last component of the Project will be the construction of new roads that would serve to provide a connection between the existing roadways and the new road section. 14 such 'secondary' roads were proposed in the Project design (for the details of their location refer to tables in [Section 2.4.3](#)). The construction of the connecting roads is currently assumed to be funded as part of the Project.

The access roads to the potential spoil disposal areas have not yet been considered or sited. It is assumed that the existing (earth) roads will be used as much as possible and extended as required. The Construction Contractor will oversee arranging these roads as part of the Project.

2.5.5 The Road Reserve

For the purposes of the ESIA it is essential to understand the direct footprint of the road. Stated differently, it is necessary to understand where land will be transformed either temporarily for purposes of construction or permanently for the actual road infrastructure. Armenian legislation defines an 'alienation zone' of 1m, and in areas outside settlements, also protection zones.

For II class roads, the protection zone is 50m on either side of the central axis of the road (Article 13 of the RA Law on Roads). The protection zone would then define an area of restricted development, so that there would not be a clash between proposed developments and the effective and safe functioning of the road.

At the same time, the mountainous terrain through which the road will pass, requires cuts into the terrain on the upslope side of the road and embankments on the downslope side of the road. The resultant permanent land transformation would then be from the start of the cut to the toe of the embankment on the downslope side of the road. The width of the road footprint will depend on the slope steepness with steeper slopes requiring greater widths. The cutting on the upslope side of the road may also require benches ('steps') to ensure that the slope is stable resulting in an even greater width.

2.5.6 Disposal of Residual Excavated Material (Spoil)

The cut-to-fill ratio of material is shown in [Table 7](#). It can be seen from the table that there will be a substantial quantity of spoil (material that cannot be re-used on the Project and will need to be disposed of).

Table 7. Cut-to-fill Ratio for the Project

Source	Quantity (m ³)
Excavation	5 671 477
Top soil stripping	34 361
Rock excavation	9 147 683
Unsuitable excavation	1 437 295
Embankment	-3 311 148
Spoil quantity	12 979 668

Note: Positive numbers indicate available material quantities, negative where the material is re-used on the Project.

Eight spoil disposal areas are tentatively expected to be arranged for the Project (see **Figure 12** and **Figure 13**). Their possible locations were discussed with and then approved by the community authorities in 2016-2017; however according to the consultations held with the community authorities in December 2021, the locations of all spoil disposal areas should be revisited and reconfirmed as the Project progresses.

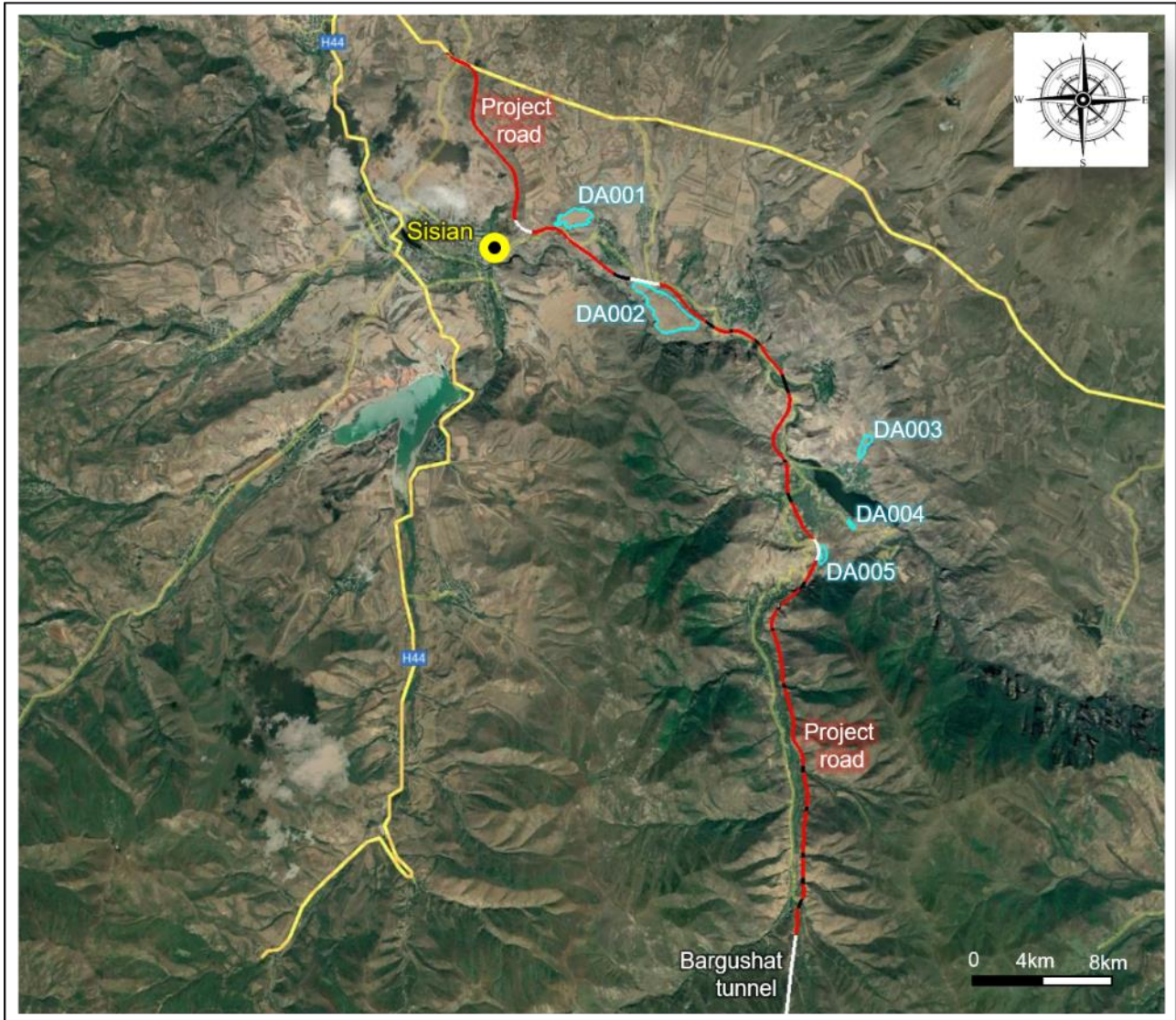


Figure 12. Location of five Spoil Disposal Areas along the Sisian-Shenatagh Road Section

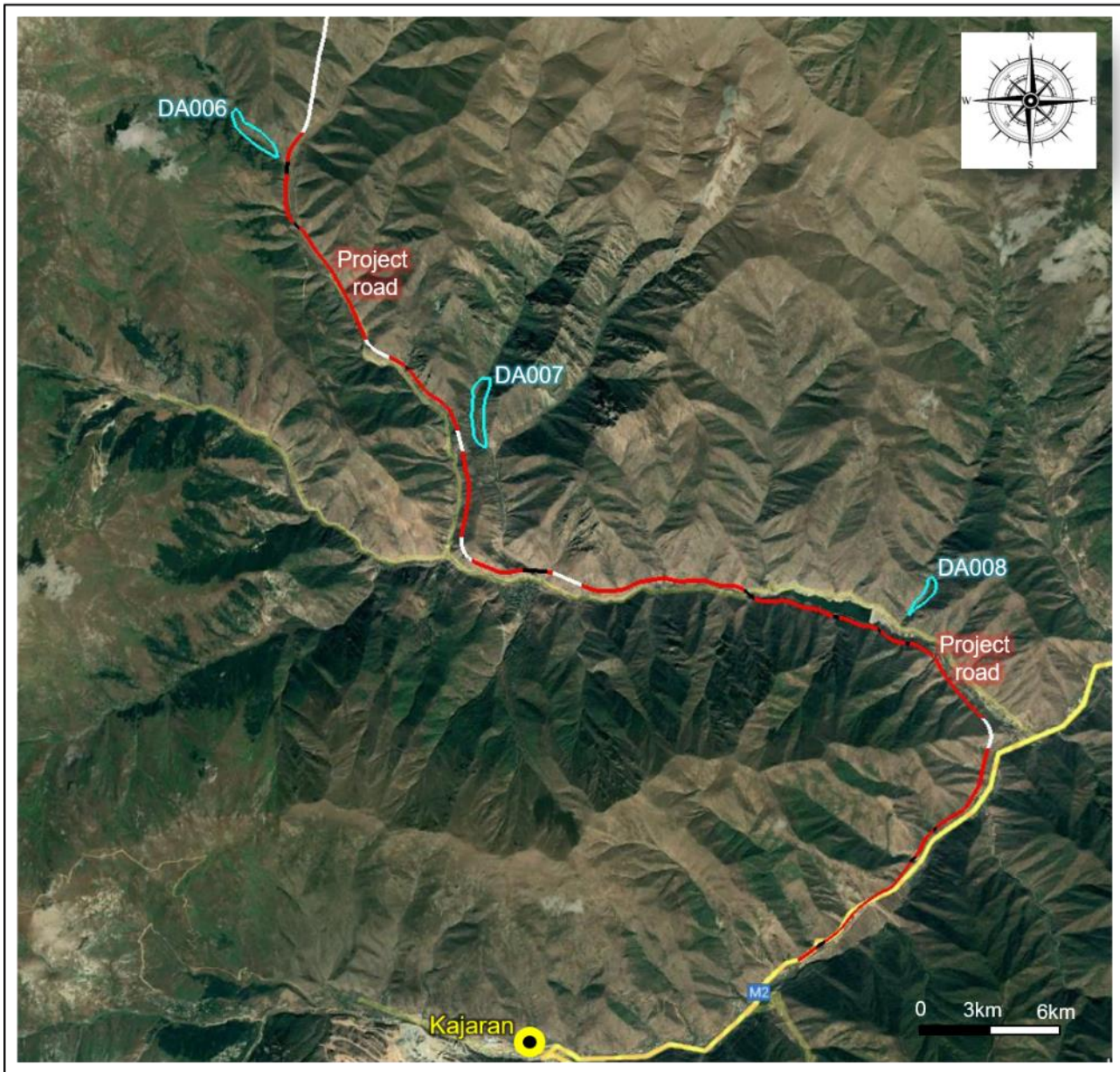


Figure 13. Location of three Spoil Disposal Areas along the Qirs-Kajaran Road Section

The quantity of excavated material (spoil) from the main tunnel is estimated at 1.2 million m³. Given that the capacity of spoil disposal sites on the northern side of the tunnel cannot cater for the volume of spoil excavated from that side of the tunnel (estimated at 0.6 million m³), it is planned to create a *temporary* dump site, until the tunnel has been completed whereafter the spoil would be transported to a spoil site south of the tunnel for final disposal. The average length of transportation of the material (1.2 million m³) coming from the Bargushat Tunnel is 7km.

It is intended to dispose of the main tunnel spoil at site DA006 (chainage - 36.2 km) which is a big valley to the west just after the south portal of the Bargushat Tunnel. The valley is some 1,000 m long and 250 m wide, with a height of the possible storage of about 30 m providing a capacity of 3 million m³. The remaining ca. 10 million m³ is expected to be spread over other seven potential disposal sites, as a function of optimising the distance of transporting the spoil. It must be remembered that the first time there will be the ability to access the whole roadway will be on completion of the Bargushat Tunnel.

The design of the spoil area envisages:

- Removal and temporary storage of topsoil (thickness 30 cm);

- Installation of a drainage pipe (diameter 3 m) at the bottom of the valley covered with drainage material;
- Geotextile layer on top of the drainage material to separate the spoil from the drainage material;
- Deposition of the spoil;
- Placing of topsoil on the spoil dump and grass seeding; and,
- Drainage of surface water via ditches.

A separate detailed design for the spoil disposal area is expected to be prepared by the Construction Contractor to be approved by the Client and relevant authorities.

2.6 Alternatives

The following alternatives have been considered at this ESIA stage:

- Zero alternative,
- Railway, and
- Alternative alignments.

2.6.1 “Zero” Alternative

The “Zero” alternative is no considered viable as current travel time is long and costly. The poor quality of the existing roads in the Sisian and Kajaran communities is one of the reasons for greater vehicle emissions negatively affecting air quality and creating safety risks for drivers and pedestrians. The “Zero” alternative would also be counter to the objectives and initiatives planned under transport development corridors and development plans of the region (see sections above).

2.6.2 Railway

Given the projected doubling of transport demand over the next several decades public transport and particularly rail, offer opportunities for transformative climate action in transport whilst creating multiple new job opportunities. For the Sisian-Kajaran road, however, the topography is mountainous rendering rail especially expensive to build. Motor vehicles are far more capable of dealing with steep slopes than trains and so through mountainous terrain, roads can be steep. In general terms rail cannot exceed slopes of 3% without significant reductions in loads, whereas roads may exceed 20% slopes. To limit the rail slope multiple tunnels and bridges would need to be built substantively increasing the costs and impacts of the transport tranche.

2.6.3 Alternative Alignments

Three alternative road alignments (**Figure 14**) were considered during the 2015 feasibility study and the EIA (as per ADB’s and national requirements and completed in 2016-2017). Key criteria for comparing the alternatives included:

- Cost,
- Traffic forecast,
- Geology, geotechnical issues and hydrology,
- Environmental and social impacts (including: air quality, land use, water, ecology, cultural heritage, natural resources (materials, water, energy and land utilization) social inclusion, amenity, access to social facilities, form and space, user comfort / satisfaction, health and welfare, and cross-cutting issues), and
- Cost effectiveness.

Summary parameters of the three alignments are shown in **Table 8**. It can be seen from the table that the C1 alignment is the shortest route at 60.1 km, has the embankments of at 42.5 km and the same number of two-level junctions as options C2 and C2. The C1 alignment has

more tunnels and bridges than C3 and less than C2, however their total length is the smallest. The tunnels serve to materially reduce the surface footprint of the road and thus the surface disturbance and in so doing reduce the overall cost and the scale of environmental and social impacts. The C1 alignment is accordingly the cheapest option at around 0.8 billion USD, with C2 at more than a billion USD and C3 at more than 1.6 billion USD.

Table 8. Comparison of Technical Parameters for the Three Alternative Alignments for the Sisian-Kajaran Road Section

Item	Parameter	Unit	C1	C2	C3
A	Length	km	60.1	62.2	76.7
B	Rehabilitation/widening	km	0.0	0.0	0.0
C	No of tunnels	No	13	19	12
D	Total tunnel length	km	14.1	22.7	26.2
E	Tunnel length > 250m	km	13.8	22	26.2
F	Tunnel length < 250m	km	0.3	0.7	0
F	Maximum tunnel length	km	8.0	9.7	5.4
G	No of bridges	No	7	22	6
I	Length of bridges	km	3.5	6.8	4.6
J	Maximum bridge length	km	1.2	0.9	2.1
K	Length of embankments/excavation	km	42.5	32.7	45.9
L	Two level junctions	No	3	3	3

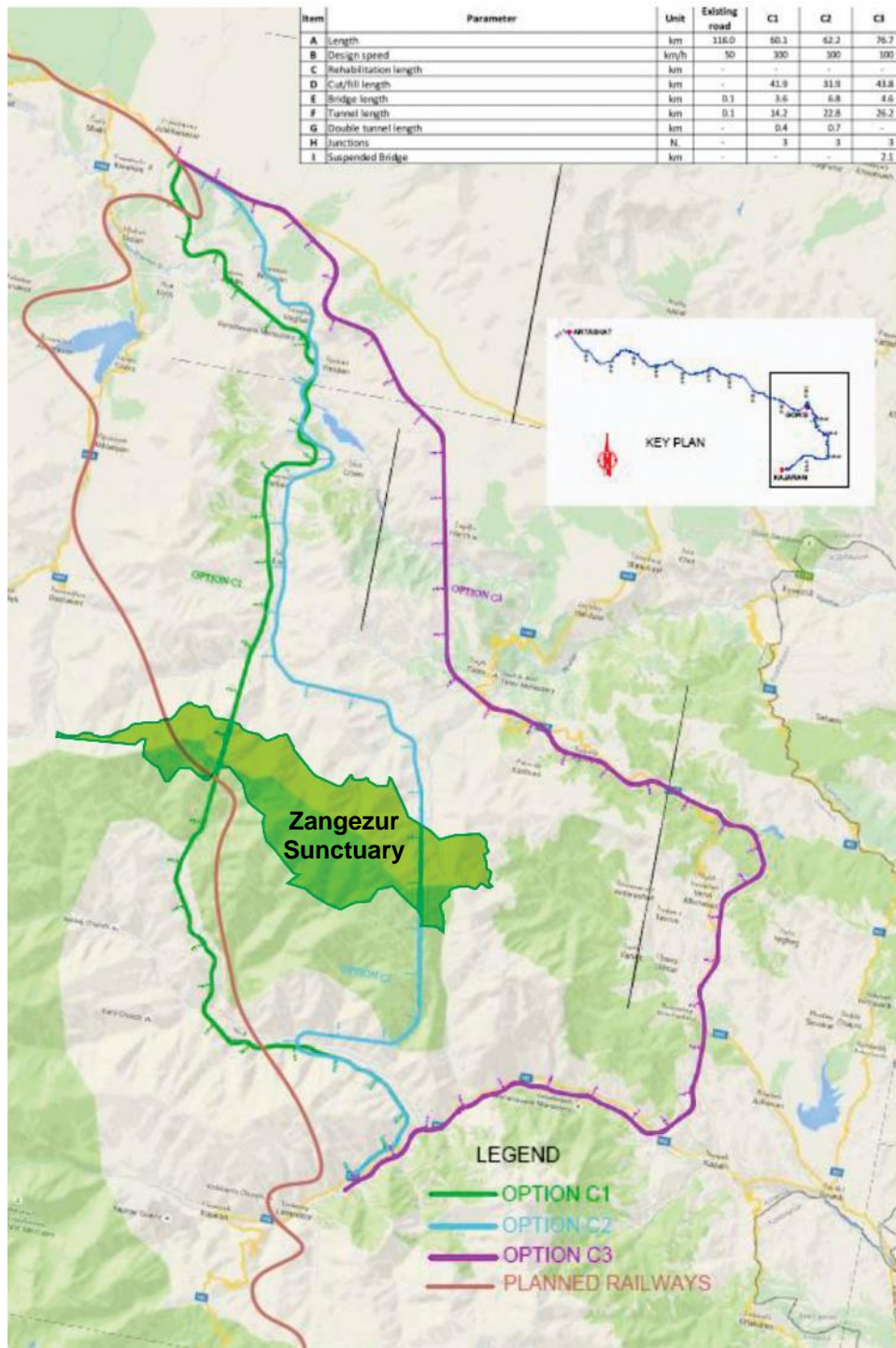
All the data were processed using a multicriteria analysis model that contains 75 sustainability indicators for transport infrastructure appraisal (UNEP and GRI). The tool is based on recognising the linkages between economic, social, natural resources and environmental systems and allows the sustainability of a project to be measured and illustrated graphically.

The preferred alignment for the Sisian-Kajaran section was selected, it was seen to offer the greatest benefits namely improving connectivity to a very important part of the country, by replacing a poor existing road and drastically reducing travel time, especially for freight traffic coming from Iran. This alternative was preferable in terms of its comparatively smaller potential for land acquisition and resettlement and environmental and social impacts (less disturbance to forests, soil and arable land, better access to social infrastructure for a wider range of local communities, greater contribution to developing potential for local tourism and so on). The long tunnel (Bargushat) means that the land surface footprint of the road, and associated land transformation potential, is comparatively less for this alignment, and it is the least cost option.

During the consultation meetings in 2016, the road alignment alternatives identified within the feasibility study and possible environmental and social/resettlement impact for each option were presented to the representatives of the communities, local NGOs, civil societies and other interested parties. The stakeholders excluded option C3 and focused on detailed consideration of options C1 and C2. During the ESIA inception meetings in 2021, the administrative units' and community authorities confirmed that they had had several opportunities to consider the alternative alignments and preferred C1. However, further consultations on alternatives will take place during the scoping consultations to verify the reasoning behind this choice.

A positive conclusion was issued for the alignment by the State Environmental Review in 2018. It is that alignment that constitutes the C1 alignment that formed the basis of the detailed design that was updated in 2019 and is described in this Scoping Report.

The preferred alternative is not expected to directly impact the Zangezour State Sanctuary (see [Section 5.1.8](#)) due to the decision to route the alignment via the Bargushat Tunnel.



Source: Adjusted from North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detailed Design, General Report, April 2019.

Figure 14. The Original Alternative Alignments Proposed for the Sisian-Kajaran Road

2.7 Associated Facilities

2.7.1 Power Supply to the Tunnel

The availability of reliable electricity at the tunnels is an essential requirement for operations of the tunnels in terms of ventilation, lighting and other features. It is unclear at the moment whether this will involve the establishment of a transmission line to the tunnel portals and if so the routing of such transmission lines. The transmission line is not part of the current Project scope.

2.8 Potential for Cumulative Impacts: Concurrent Road Projects

Tranche 4 (sub-project 4.3.) Kajaran-Agarak section with the total length of about 32 km is planned to be constructed with the funding of the Eurasian Development Fund of the Eurasian Development Bank and the RA Government⁵. A designer has been appointed and the design is currently underway. It is to be confirmed if this road project would time-wise run in parallel with the Sisian-Kajaran Project.

Other concurrent or parallel projects and/or activities that may jointly with the Project have a potential for cumulative impacts will be defined further during the ESIA process as per the methods outlined in **Section 4.5.5**.

⁵ RD. 2021. <https://armroad.am/en/projects/north-south-road-corridor-investment-program/Artashat-Qajaran-Sisian-Qajaran-Qajaran-Agarak>.

3 LEGAL AND REGULATORY FRAMEWORK

In addition to complying with the EBRD and EIB requirements, the ESIA must also recognise and comply with Armenian legal requirements. These legal requirements are detailed below.

3.1 Armenian Legal Requirements

According to the **Law on Environmental Impact Assessment and Expert Examination (2014)**⁶, there are two types of documents, which are subject to environmental impact assessment (EIA) and expert examination. These documents are: (i) Framework Document – a policy, strategy, concept, scheme of utilization of natural resources, program, master plan, urban development document, which are likely to affect the environment; and (ii) Design Document - technical report, feasibility study and construction-engineering design of intended activity. According to Article 14 of the Law, the types of activities, which should undergo EIA are divided into A, B and C categories depending on their expected impact on the environment. As per section 10 "Infrastructure activities" of Article 14.4 of the noted Law, the construction and reconstruction of roads having 4 or more traffic lanes or widening of roads from 2 to 4 and more traffic lanes provided that the constant length of road is 10 km and more is classified as "A" category activity and is subject to two (preliminary and main) stage EIA and expert examination procedures. The procedure for public notification and public discussions is outlined in the RA Government Decree No.1325-N dated 19.11.2014.

The **Water Code (2002)**⁷ provides the legal basis for protection of water resources, the provision of water for people and economic sectors through effective management of water resources and ensuring the protection of water resources for future generations. The Water Code includes the following: responsibilities of state/local authorities and public, development of the national water policy and national water program, water cadastre and monitoring system, public access to relevant information, water use and water system use permitting systems, trans-boundary water resources use, water quality standards, safe operation of hydraulic facilities, protection of water resources and state supervision. The quality of surface water in Armenia is monitored as per the principles of EU Water Framework Directive adopted by the RA Government Decree No. 75-N dated 27.01.2011.

The **Land Code (2001)**⁸ defines the key provisions for land-use in Armenia. Land is classified as per designated purposes (categories) into: 1) agricultural land, 2) settlement land, 3) industrial, mining and other production designation land, 4) land for energy, transport, communication, utility infrastructure facilities, 5) land for specially protected areas, (6) special designation land, 7) forest land, 8) water land, and 9) reserve land. The Land Code also specifies soil preservation principles, objectives and regulations via the following RA Government decrees:

- The procedure for topsoil use, approved by the RA Government Decree No. 1396-N dated 08.09.2011⁹,
- The requirements for determination of topsoil stripping norms and for stripped topsoil preservation and use, approved by the RA Government Decree No. 1404-N dated 02.11.2017¹⁰,

⁶<https://www.arlis.am/documentview.aspx?docid=140512>

⁷<https://www.arlis.am/DocumentView.aspx?docid=148955>

⁸<https://www.arlis.am/documentview.aspx?docid=150513>

⁹<https://www.arlis.am/documentview.aspx?docID=71439>

¹⁰<https://www.arlis.am/DocumentView.aspx?docID=117360>

- The procedure for soil excavation, approved by the RA Government Decree No. 572-N dated 10.05.2019¹¹.

The **Law on surveillance over the land use and land conservation (2008)**¹² provides objectives and types of effective use and conservation of RA lands, inspection related to enforcement of land legislation and institutions, procedures of control, rights and responsibilities of entities controlling land use and protection. The Law applies to all lands of the RA Land Fund, irrespective of purpose, ownership and/or right to use.

The **Law on Waste (2004)**¹³ provides the legal and economic basis for collection, transportation, disposal, treatment, re-use of wastes as well as prevention of negative impacts of waste on natural resources, human life and health. It defines the roles and responsibilities of state authorities as well as of waste generator organizations in waste management activities.

The **Law on alienation of property for overriding interests of the public (2006)**¹⁴ defines procedures for determining the overriding public interest, for alienating property in order to ensure public interest and for compensation for the alienated property. This law applies to all land ownership (real or movable estate, property rights, equities, etc.) located and registered in Armenia and belonging to physical persons, legal entities and communities. The constitutional conditions for the alienation of property in order to ensure overriding interests of the public are: (i) the alienation must be carried out in exceptional cases defined by the law and in accordance with the procedure established by the law; and (ii) adequate compensation must be paid for the alienated property.

The **Law on Atmospheric Air Protection (1994)**¹⁵ regulates air quality as well as public relations in the field of prevention and reduction of adverse chemical, physical and biological impacts on air. The Law also regulates emission permits and provides permissible limits/concentrations for atmospheric air emissions. The RA Government Decree No.160-N dated 02.02.2006 defines maximum permissible concentrations of ambient air pollution in residential areas.

The **Law on Flora (1999)**¹⁶ and **Law on Fauna (2000)**¹⁷ outline Armenia's policies for the conservation, protection, use, regeneration and management of natural populations of plants and animals as well as the impact of human activities on biodiversity. These laws are aimed at the sustainable preservation and use of flora/fauna and the conservation of biodiversity. The laws also contain provisions for assessing and monitoring flora and fauna, especially rare and threatened species. The RA Government Decrees No.71-N and No.72-N on approval of the **RA Red Book of Animals**¹⁸ and **RA Red Book of Plants**¹⁹ respectively define the biology of threatened (rare, threatened, endangered, vulnerable) species of flora and fauna as well as their quantity, habitats and variety.

The **Law on Special Protected Areas of Nature (2006)**²⁰ regulates special protected areas of the RA and eco-systems that have environmental, economic, social, scientific, educational, historical, cultural, healthcare and recreation value. It also outlines the legal basis for state

¹¹<https://www.arlis.am/documentview.aspx?docid=130889>

¹²<https://www.arlis.am/DocumentView.aspx?docid=144520>

¹³<https://www.arlis.am/documentview.aspx?docid=140521>

¹⁴<https://www.arlis.am/documentview.aspx?docid=153844>

¹⁵<https://www.arlis.am/documentview.aspx?docid=146626>

¹⁶<https://www.arlis.am/documentview.aspx?docid=120784>

¹⁷<https://www.arlis.am/documentview.aspx?docid=120790>

¹⁸<https://www.arlis.am/DocumentView.aspx?DocID=56347>

¹⁹<https://www.arlis.am/DocumentView.aspx?DocID=56348>

²⁰<https://www.arlis.am/documentview.aspx?docid=140513>

policies regarding sustainable development, restoration, protection, reproduction and use of natural objects and complexes. The Law defines four categories of protected areas in Armenia: (i) State Reserves; (ii) National Parks; (iii) Sanctuaries; and (iv) Nature Monuments. The list of the nature monuments is approved by the RA Government Decree No. 967-N dated 14.08.2008²¹.

The **Law on Protection and Use of Immovable Cultural and Historic Monuments and Historic Environment (1998)**²² provides the legal and policy basis for the protection and use of such monuments in Armenia. Article 15 of the Law describes procedures for discovering and registering monuments, establishing protection zones around them and creating historical and cultural reserves. Article 22 stipulates that the land plots located in historically sensitive areas can be allocated for construction, agricultural and other activities only upon approval of the authorized state body (Department of Historic and Cultural Monuments Preservation). The Law also sets the roles and responsibilities of State bodies engaged in management of cultural and historic monuments through the Procedure for State registration, study, conservation, strengthen, repair, reconstruction and use of immovable historic and cultural monuments, approved by the RA Government Decree No. 438 dated 20.04.2002²³. The RA Government Decree No. 2322-N dated 29.12.2005 defines the State list of immovable historical and cultural monuments in the RA Syunik region²⁴, while the Government decree No. 385-N dated 15.03.2007 approves the list of State owned immovable historical and cultural monuments that are not subject of alienation/acquisition²⁵.

The **Law on Intangible Cultural Heritage (2009)**²⁶ regulates the legal relations arising from the processes of preservation, safeguarding, and development of intangible cultural heritage, including identification, documentation, research, application, recreation, teaching, and dissemination of intangible cultural values, protection of the property rights over such values, maintenance of intangible cultural heritage of Armenia, international cultural cooperation, cultural communication between peoples of foreign countries and those of the RA. Several legal acts have been adopted by the RA to promote the administration of the legal framework of the sector which enables to regulate relations pertaining to preservation, safeguarding, and development of intangible cultural heritage; the activities of communities that create, preserve and transmit intangible cultural values; international cultural cooperation, including: (i) Government Decision No. 310-A "On Defining the Criteria for Preparing the Lists of Intangible Cultural Values and Approving the List of Intangible Cultural Heritage Values"²⁷, (ii) Government Decision No. 36-N "On the Criteria for Preparing the Lists of Intangible Cultural Heritage in Need of Urgent Safeguarding, and the List of Intangible Cultural Heritage Values Based thereon"²⁸, (iii) Government Decision No. 241-N "On approving the criteria for defining cultural spaces and published the list of cultural spaces"²⁹, etc.

The **Code on Subsoil Resources (2011)**³⁰ contains the main provisions in the area of use and protection of mineral resources and underground water, including sanitary protection zones for underground water resources.

²¹<https://www.arlis.am/documentview.aspx?docid=157090>

²²<https://www.arlis.am/DocumentView.aspx?docid=107521>

²³<https://www.arlis.am/documentview.aspx?docid=137204>

²⁴<https://www.arlis.am/DocumentView.aspx?DocID=36406>

²⁵<https://www.arlis.am/DocumentView.aspx?docid=55737>

²⁶<https://www.arlis.am/DocumentView.aspx?docid=121003>

²⁷<https://www.arlis.am/DocumentView.aspx?docid=151791>

²⁸<https://www.arlis.am/DocumentView.aspx?docID=157499>

²⁹<https://www.arlis.am/DocumentView.aspx?docID=134827>

³⁰<https://www.arlis.am/documentview.aspx?docid=146898>

The **Law on Road Safety Provision (2005)**³¹ regulates road safety, establishes the principles and the directions of Armenia's policy on traffic safety, the legal basis for traffic safety provision as well as defining the powers and responsibilities of State and local self-governmental bodies and other traffic related participants.

The **Forest Code (2005)**³² regulates sustainable management of forests: guarding, preserving, rehabilitation, afforestation and rational use of forests and forest lands in Armenia as well as with forest stock-taking, monitoring and control.

The **Law on Environmental Oversight (2005)**³³ regulates the organization and enforcement of oversight of national environmental legislation and defines the legal and economic basis underlying the specifics of oversight over the fulfilment of environmental requirements and relations between the parties. The existing legal framework relating to natural resources and environmental includes a range of legal tools. Government decrees are the key legal instruments for implementing environmental laws. The other tools are Presidential orders, Prime-Minister's resolutions, and ministerial decrees.

The RA **Law on Sanitary and Epidemiologic Security of Population (1992)**³⁴ defines the legal, economic and organizational basis for insuring sanitary and epidemiological security of the RA population, as well as state guarantees, eliminating adverse impact of the harmful working conditions on human health, and providing for favourable conditions for human life and vital activities for future generations. In addition, there are sanitary-hygienic norms and standards approved by the RA Minister of Health and regulating the sanitary hygienic conditions in public and residential areas viz.:

- Sanitary Norms ("SN") No.2-III-11.3. Noise in workplace, residential and public buildings and in the residential construction areas,
- Hygienic Norms ("HN") No.2.2.4-009-06. The hygienic norms of the vibration in the workplace, residential and public buildings.

The **Labour Code (2004)**³⁵ regulates collective and individual employment relationship; defines the basis and procedure of implementation for the establishment, revision and cessation of that relationship; assigns duties, authorities and responsibilities of the parties of employment relationship, as well as defines conditions for OHS. The Labour Code also recognizes workers' rights to form and to join workers' organizations of their choice, contains provisions for enabling collective bargaining, and prohibits any type of forced labour. Key principles related to ensuring the equal rights and opportunities for men and women are set out in the **Law No HO-57-N (20.05.2013) On ensuring of equal rights and equal opportunities for men and women**. As per Article 6 of this Law, gender discrimination is prohibited, *inter alia*, via setting different levels of wages, changing wages as well as worsening working conditions conditioned by gender. Armenia has ratified 29 Conventions of the International Labor Organization, including eight fundamental ones.

The **Law on Fire Safety (2001)**³⁶ regulates the relations of the state bodies and local self-governing bodies of Armenia, organizations/companies and people in fire safety-ensuring sphere. It defines the basic ways of shaping the state fire safety policies, as well as legal mechanisms of their implementation, such as provision of the populations with effective and reliable fire protection systems. The Law is supplemented by the Fire Safety Rules (Order No.595-N of the RA Minister of Territorial Administration and Emergency Situations (2015)).

³¹<https://www.arlis.am/documentview.aspx?docid=140522>

³²<https://www.arlis.am/DocumentView.aspx?docid=121312>

³³<https://www.arlis.am/documentview.aspx?docid=146636>

³⁴<https://www.arlis.am/documentview.aspx?docid=145840>

³⁵<https://www.arlis.am/documentview.aspx?docid=152137>

³⁶<https://www.arlis.am/documentview.aspx?docid=144513>

Armenia is a signatory/party to a number of **international agreements** related to the protection and management of the natural environment, communities, cultural heritage and labour issues (refer to **Annex 1** for those pertinent to the Project).

3.2 Applicable International Lenders' Requirements

3.2.1 European Bank for Reconstruction and Development (EBRD)

The main requirements of the EBRD for its own activities are formulated in the Bank's ESP (2019), and the requirements for the E&S aspects of the Client-borrower's activities are set out in the Performance Requirements (RRs)³⁷. The ESP sets E&S requirements for the EBRD clients' activities to achieve sustainable results. The following is a summary of the requirements applicable to this Project³⁸:

- **PR 1: Assessment and Management of Environmental and Social Risks and Impacts** requires the EBRD client (borrower) to conduct an E&S assessment and / or audit. Assessment is carried out for all stages of the project (construction, operation, decommissioning). Based on the assessment and audit, an ESAP, an Environmental and Social Management Plan (ESMP), and other plans are developed. An important feature of the EBRD's requirements is the *concept of associated facilities* that are not financed by the Bank, and therefore are not part of the project, but which are significant in determining the success of the project³⁹. These associated facilities may be carried out by both the client of the Bank and other parties. However, they should be part of the E&S assessment. PR 1 is also applicable to contractors involved in project implementation. EBRD also requires borrowers to implement an E&S Management System (ESMS) appropriate to the nature of the project, as well as reporting to EBRD on the project's E&S performance, including compliance with the relevant PRs and the approved ESMS, ESMP, ESAP, SEP and other documents or commitments.
- **PR 2: Labour and Working Conditions** establishes requirements in terms of labour and working conditions, including the prohibition of forced and child labour in the project. The PR 2 requirements are based on the conventions of the ILO.
- **PR 3: Resource Efficiency and Pollution Prevention and Control** requires efficient use of energy, water and resources, and minimisation of waste, as well as compliance with good international practice (GIP), and application of a mitigation hierarchy. This PR is based on the principles of the EU Industrial Emissions Directive (Integrated Pollution Prevention and Control)⁴⁰ and calls for the implementation of EU requirements on the use of Best Available Techniques (BAT) and related standards for emissions and discharges.
- **PR 4: Health, Safety and Security** requires the client (borrower) to identify and assess community and occupational health and safety risks and implement preventive measures. The focus is on preventing and eliminating risks rather than reducing and minimising them.
- **PR 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement** defines requirements related to project-induced land acquisition, including restrictions

³⁷ EBRD. 2019. ESP. <https://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html>.

³⁸ PR 7: Indigenous peoples and PR 9: Financial Intermediaries are not applicable to this Project.

³⁹ "These are new facilities or activities: i) without which the project would not be viable, and ii) would not be constructed, expanded, carried out or planned to be constructed or carried out" (EBRD ESP. 2019. Section II. Definitions).

⁴⁰ Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32010L0075>.

on land use and access to assets and natural resources, which may cause physical displacement (relocation, loss of land or shelter), and/or economic displacement (loss of land, assets or restrictions on land use, assets and natural resources leading to loss of income sources or other means of livelihood). The key requirement of PR5 is to avoid or, when unavoidable, minimise, involuntary resettlement via feasible alternative project designs/sites. A resettlement framework (RF), including livelihood restoration where needed, is developed in an early stage of the project to detail resettlement principles and organisational arrangements.

- **PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources** determines the requirements for the conservation of biological and landscape diversity in the development area. PR 6 requires the borrower to characterise the state of biodiversity, identifying sensitive species and habitats, and developing measures to avoid / reduce impacts. PR 6 defines criteria for critical habitat screening and requires developing a Biodiversity Action Plan (BAP) where significant adverse impacts on biodiversity are expected.
- **PR 8: Cultural Heritage** defines the requirements for the preservation of both tangible and intangible cultural heritage. PR 8 requires exploring the presence / possibility of the presence of objects of cultural heritage in the project's area of influence. Where the assessment identifies that the project may have material risks and impacts on cultural heritage, the client is required to develop a cultural heritage management plan.
- **PR 10: Information Disclosure and Stakeholder Engagement.** The EBRD requires careful and systematic stakeholder identification, including communities that may be affected by project impacts (affected groups) and groups whose vital interests may be affected by projects (vulnerable groups). The EBRD requirements for organising stakeholder engagement are also set out in its Access to Information Directive⁴¹. Meaningful stakeholder consultations are viewed by the EBRD as an ongoing process throughout the project lifecycle. The EBRD's stakeholder engagement requirements are detailed in the draft Stakeholder engagement Plan (SEP) for the Project.

3.2.2 European Investment Bank (EIB)

The 2009 EIB Statement on Environmental and Social Principles and Standards⁴² sets the policy context for the protection of the environment and human well-being. The Statement is operationalised via 10 EIB Environmental and Social Standards (ESSs) that EIB's clients/projects should comply with:

1. Assessment and management of environmental and social impacts and risks.
2. Pollution prevention and abatement.
3. Biodiversity and ecosystems.
4. Climate-related standards.
5. Cultural heritage.
6. Involuntary resettlement.
7. Rights and interests of vulnerable groups.
8. Labour standards.
9. Occupational and public health, safety and security.
10. Stakeholder engagement.

⁴¹ EBRD. 2019. Access to Information Directive. www.ebrd.com/documents/strategy-and-policy-coordination/access-to-information-policy-directive.pdf?blobnocache=true.

⁴² <https://www.eib.org/en/publications/environmental-and-social-principles-and-standards>.

The requirements of EIB are largely aligned with those of EBRD.

3.3 Good International Practice (GIP) Guidelines and European Union Directives

Specific E&S requirements applicable to the Project are set out in the EBRD's Sub-sectoral Environmental and Social Guidelines: Building and Construction Activities (2010)⁴³. They elaborate on typical E&S risks related to construction, operation, maintenance and decommissioning of facilities. Other relevant EBRD guiding documents⁴⁴ used in the ESIA relate to resettlement; forced labour; gender issues, non-discrimination and equal opportunity; workers' accommodation; and other E&S topics. They include:

- Resettlement Guidance and Good Practice (2016);
- Briefing notes BN01-BN05 on Occupational Health and Safety (OHS) for temporary construction projects (2021);
- Grievance Management: Guidance Note (2012);
- Family friendly working and the work-life balance: Good Practice Notes. (2008);
- Human resources policies and employee documentation: Guidance note. EBRD Performance Requirement 2. Labour and working conditions. (2017);
- EBRD's Guidance: Addressing Gender-Based Violence and Harassment in the Construction Sector (2020), as well as guidance: Addressing Gender-Based Violence and Harassment – Emerging Good Practice for the Private Sector (2020);
- EBRD/IFC Guidance Note on Worker Accommodation: Processes and Standards (2009);
- Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (draft of 2020);
- EBRD's additional requirements in the context of the COVID-19 pandemics, namely 2020 briefing notes⁴⁵ on OHS, working conditions, interaction with the public, placement of workers, etc.

Another useful reference is the International Finance Corporation's (IFC) General Environmental, Health and Safety Guidelines (2007)⁴⁶ that contain general and industry-specific examples of GIP.

Directive 2010/75/EU on Industrial Emissions (integrated pollution prevention and control), Directive 2008/96/EC on Road Infrastructure Safety Management, and Directive 2004/54/EC Minimum Safety Requirements for Tunnels in the Trans European Network will be used to some extent as a reference source. In addition, the applicable provisions of the Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, Bern Convention (1979), Council Directive 2009/147/EC on the conservation of wild birds, and other relevant international treaties will be applied during the ESIA study.

⁴³ <https://www.ebrd.com/downloads/policies/environmental/construction/buidling.pdf>

All guidance documents are available at the following link (unless another link is provided) <https://www.ebrd.com/who-we-are/our-values/environmental-and-social-policy/implementation.html>.

⁴⁵ <https://www.ebrd.com/sustainability-covid.html>.

⁴⁶ <https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=jOWim3p>

4 ESIA METHODOLOGY

4.1 ESIA Process

The key stages of the ESIA process are: screening, scoping, baseline collection and analysis, analysis of alternatives, impact assessment, mitigation and enhancement planning, management and monitoring, and stakeholder consultations. The ESIA process is being undertaken in accordance with the EBRD and EIB policies and national legislation.

A national EIA was prepared for the Sisian-Kajaran Road Project and received a positive conclusion of the State Environmental Review in March 2018. The validity of this conclusion expired in March 2019. After the detailed design is reviewed by the EBRD's Technical Consultant, the national EIA procedure will be re-launched using the assessment that will be presented in this ESIA. It should be noted that the requirements of the EBRD and Armenian legislation have important differences but that the core assessment principles are the same. For this Project the assessment will be packaged to meet the EBRD requirements, and the same assessment then packaged to meet the Armenian legislative requirements and presented in Armenian.

4.2 Screening

Screening serves to establish the likely degree of difficulty and/or risks, based on which the need for an ESIA is determined. EBRD has assigned Category A to the Project as per its ESP (2019). This means that a comprehensive ESIA shall be prepared, alongside the associated E&S documents and management plans, followed by their public disclosure for 120 days.

4.3 Scoping

Scoping (as detailed in this document) is one of the major parts of the ESIA process. Scoping involves the preliminary identification of **aspects** of the Project and related **E&S impacts/risks**⁴⁷. Specific components of the natural or social environment that might be affected by the Project are referred to as **environmental or social receptors**⁴⁸.

The potential interactions are identified by cross-referring the Project (i.e., construction, operation and decommissioning activities) to the surrounding baseline E&S conditions. The interactions and potential impacts are identified using scoping matrices and "impact trees", as well as expert opinion and consultations and accordingly are scoped into or out of the subsequent ESIA process as follows:

- No identified (or discernibly important) interaction, so no (discernible) impact - scoped out of the ESIA process.
- Identified interaction and potentially moderate to significant negative or positive impact - scoped into the ESIA process.

During impact identification, the following types of potential impacts / risks are considered:

- **Direct impacts:** impacts of the Project that occur in the same space and time. Also known as primary impacts, they are the direct consequences on the natural or social environment;
- **Indirect impacts:** impacts of a chain of activities associated or induced by the Project that often occur later in time, affecting a broader area, but that are nevertheless reasonably foreseeable.

⁴⁷ The term 'impact' refers to any change in the state of natural or social environment attributed to the Project.

⁴⁸ Example environmental receptors are habitats disturbed as a result of earthworks / construction activities; example social receptors are residents of houses located next to the existing roads to be rehabilitated or connecting roads to be constructed (extended).

- **Cumulative impacts:** these impacts can result from the interaction amongst impacts of the Project, or from the interactions amongst impacts of several projects within a same area. They may also result from the incremental effects of an action when added to other past, present and reasonably foreseeable future actions.
- **Residual impacts:** the impacts that remain after implementation of the Project-associated mitigation / enhancement and other E&S management measures.

4.4 Baseline Study Areas and Baseline Analysis

The **environmental baseline study area** for the Project includes:

- Sisian-Shenatagh and Qirs-Kajaran road sections and the Bargushat tunnel and the adjacent areas of direct and indirect impact, including the connecting roads;
- The potential locations of the spoil disposal areas (to be confirmed);
- The southern portal of the Bargushat tunnel and adjoining section of the road that is mostly located in a mountainous area, with high biodiversity and landscape value;
- A 1km buffer corridor centred on the proposed road as a priority for the biodiversity surveys, along with the relevant specific ecologically appropriate areas of analysis (EAAAs) for potential biodiversity priority features⁴⁹ (**Figure 15**);
- The areas along the proposed road for physical parameters (see maps in **Annex 2**), as well as for the existing roads that are assumed to be used by construction transport:
 - Water quality in the water bodies/water channels that flow along with and/or cross the proposed road or are located in its vicinity and which may be affected by construction or operational activities;
 - Prevailing noise (at selected areas within 250 m on either side of the proposed road corridor);
 - Prevailing vibration (at selected areas within 100 m on either side of the proposed road);
 - Prevailing air quality (at selected areas within 250 m on either side of the proposed road corridor); and
 - Prevailing soil quality (limited campaign sampling).
- Cultural and historical heritage objects within the footprint of the Project facilities (the locations of which are confirmed) (200m centred on them);
- Residential areas that may experience construction traffic and visual impact due to the Project activities.
- Public roads that may be used to transport the construction materials.

To note: some of the Project facilities such as a construction camp, quarries, borrow pits, temporary disposal areas, spoil disposal areas, asphalt plant, areas for temporary storage of removed topsoil, locations of the water tanks for the tunnel's fire-lighting system, etc. are not currently defined and will be determined by the Construction Contractor.

⁴⁹ This is a specific landscape approach in the framework of the Critical Habitat Assessment. In the Project's mountainous context, the landmarks that will help define the larger area of influence and EAAAs will be ridges, water catchments, protected areas and main vegetation units (e.g. forests). Larger area of influence will be defined further for >1km buffer based on the literature review, stakeholder consultations and focused surveys, where needed.

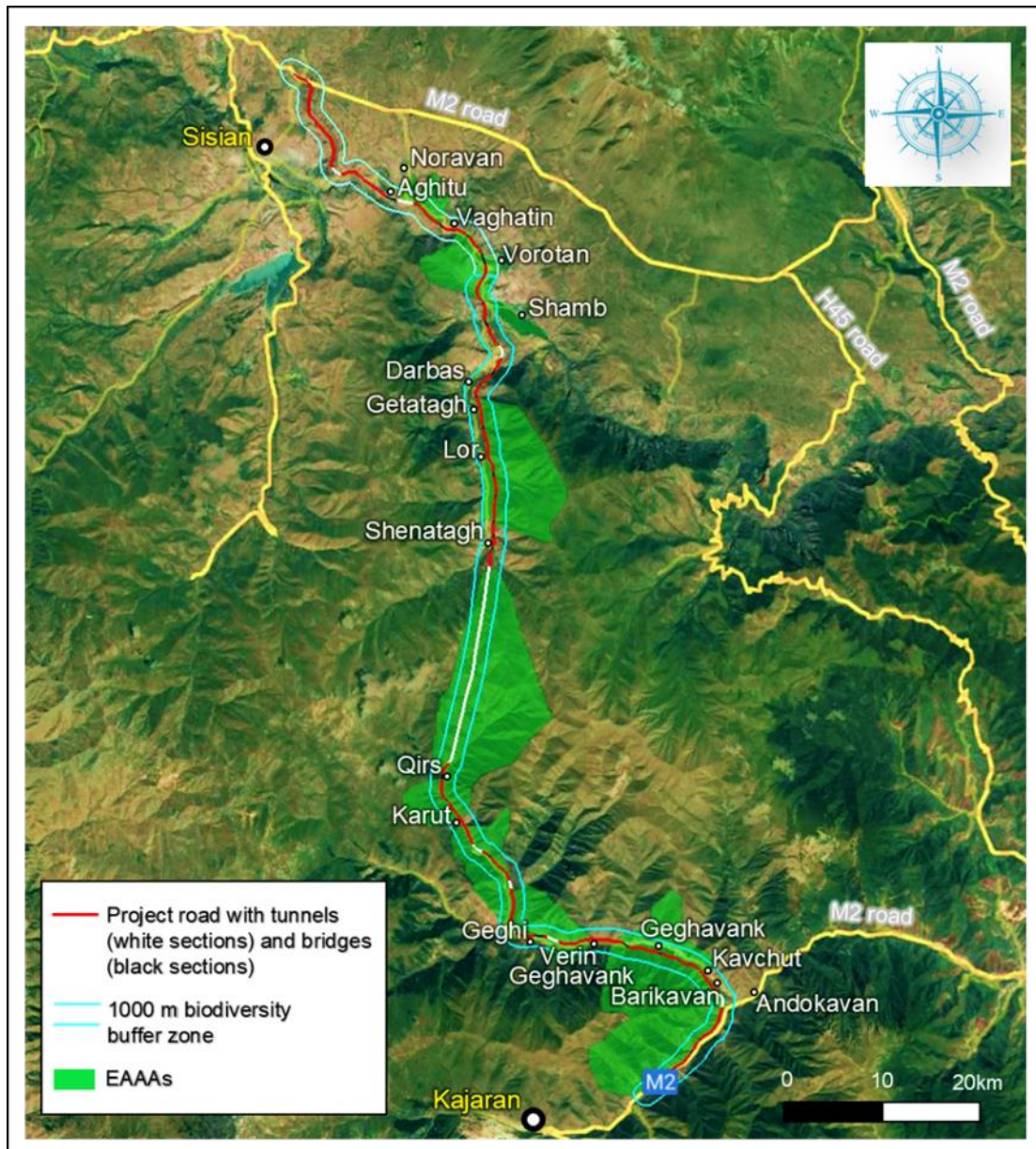


Figure 15. Proposed Biodiversity Study Area

The social baseline study area (as aligned with the Project’s potential socio-economic areas of Influence)⁵⁰ for the Project comprises (Figure 16):

- Persons and facilities that may be affected by land acquisition and land use restrictions related to the arrangement of the Project facilities (the road, tunnels, bridges, etc.) and associated facilities (e.g., transmission lines).

⁵⁰ The socio-economic study area is aligned with the socio-economic areas of influence:

- **Core socio-economic area of influence** (study area): this area comprises the territories of the rural settlements (administrative units) that are adjacent to or crosses by the proposed route, existing roads to be used by construction transport, and potential connecting roads and where the socio-economic receptors are exposed to impacts related to land acquisition, restricted access, and other local impacts.
- **Socio-economic area of influence** (study area): this area includes the territories of Sisian and Kajaran Communities, as well as Syunik Region, where the socio-economic receptors are exposed to direct impacts of municipal level, including employment opportunities and related impacts, tax revenues, and impacts of the associated projects and transport operations.

- Villages located along the existing and connecting roads (for all social parameters);
- Sisian and Kajaran Communities (municipalities) of the Syunik Region where the proposed Project is located (for demography, ethnicity, religion, and language use, employment, incomes and expenditure, and less socially protected and vulnerable groups, gender issues, public infrastructure, households' engagement in the tourism sector);
- Syunik Region (for demography, ethnicity, religion, and language use, structure of local economy, employment, incomes and expenditure, gender issues and existing transport infrastructure and tourism);
- Armenia (for demography, ethnicity, religion, and language, employment, incomes and expenditures, and gender issues).

The study areas may need to be adapted if changes are made to the 2019 detailed design during the ESIA process.



Figure 16. Proposed Socio-economic Study Areas (Areas of Influence)

To provide a context within which the impacts of the Project can be assessed, a description of physical, biological, social, economic, and health and safety conditions should be presented. In this respect, it is necessary to have comprehensive data pertaining to baseline E&S conditions.

The baseline chapter (**Chapter 5**) below provides a high-level overview of baseline conditions. Further information will be gathered from secondary and primary sources (field surveys and interactions with Project stakeholders). Secondary data have been sourced from studies conducted for the ADB's feasibility study and national EIA process (national EIA report and State Environmental Review conclusion for the Project, design data) provided by the Road Department and EBRD, as well as from the publicly available sources (official statistics, national environmental reports, online databases, municipal websites, and so forth).

Information on the planned field surveys is provided in the thematic sections of **Chapter 6** and summarised in the ESIA Workplan (**Chapter 9**).

4.5 Assessment of Impacts/Risks

Impact significance is determined as a function of a receptor's sensitivity (environmental or social value) and the magnitude (extent of change to the natural or social environment) of the impact. This section sets out the approach to determining impact significance through:

- Assigning receptor sensitivity (environmental or social value);
- Assigning impact magnitude;
- Assigning significance;
- Assessing residual impacts; and,
- Assessing cumulative impacts.

4.5.1 Assigning Receptor Sensitivity

The proposed descriptors and criteria for the sensitivity of a receptor are given below.

Table 9. Definitions for Sensitivity of Receptors

Sensitivity	Typical Criteria Descriptors
High	High or very high importance and rarity, international or national scale and very limited to no potential for substitution
Medium	Medium importance and rarity, regional scale, limited potential for substitution
Low	Low importance and rarity, local scale
Very low	Very low importance and rarity, local scale

4.5.2 Assigning Impact Magnitude

Magnitude refers to the 'size' or 'amount' of an impact. It is a function of various magnitude criteria including the impact's extent (i.e., the spatial dimension of the impact), duration (i.e., the temporal dimension of the impact), and reversibility (i.e., whether the impact is temporary (within a reasonable timescale) or permanent). In order to help define the range of impact magnitudes, the definition given in the table below will be used.

Table 10. Definitions for Impact Magnitude

Magnitude Category	Typical Criteria Descriptors
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, permanent / irreversible change, features or elements (Adverse)
	Large scale or major improvement of resource; extensive restoration or enhancement, permanent change major improvement of attribute quality (Beneficial)
Medium	Loss of resource, but not affecting integrity, partial loss of/damage to key characteristics, features or elements (Adverse)
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial)
Low	Some measurable change in attributes, quality or vulnerability, minor loss of or alteration to one (possibly more) key characteristics, features or elements (Adverse)
	Minor benefit to, or addition of, one (possibly more) key characteristics, features or

Magnitude Category	Typical Criteria Descriptors
	elements, some beneficial impact on attribute or a reduced risk of a negative impact occurring (Beneficial)
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse)
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial)
No change	No loss or alteration of characteristics, features or elements, no observable impact in either direction.

4.5.3 Assigning Impact Significance

Assigning impact significance relies on reasoned argument, professional judgement and consideration of views and advice of stakeholders. Some topics may have their predicted impacts assessed using quantitative thresholds and scales in the determination of significance. Assigning each impact to one of five significance categories enables different topic issues to be placed within the same scale to allow a direct comparison. The four significance categories are given in **Table 11**.

Table 11. Definitions for Impact Significance

Significance Category	Typical Criteria Descriptors
Major	Very large or large magnitude of change in environmental or socio-economic conditions. Impacts, both adverse and beneficial, which are likely to be important considerations at a national and regional level or could result in breaches of legally enforceable environmental protection mechanisms.
Moderate	Intermediate magnitude of change in environmental or socio-economic conditions. Impacts that are likely to be important considerations at a regional and local level.
Minor	Small magnitude of change in environmental or socio-economic conditions. Impacts may be raised as local issues but are unlikely to be of importance in the project's permitting process.
Negligible	No discernible change in environmental or socio-economic conditions. Impacts that are likely to have a negligible or neutral influence, irrespective of other impacts.

It is important to note that significance categories are required to be determined for both positive (beneficial) and negative (adverse) impacts / risks.

The greater the receptor sensitivity and the greater the impact magnitude, the more significant the impact. The consequence of a highly sensitive receptor suffering a major detrimental impact would be a very large significant adverse impact. The determination of impact significance is shown below in the impact significance matrix (**Table 12**).

Table 12. Impact Significance Matrix

Impact Magnitude	Receptor Sensitivity / Value			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Moderate	Minor	Negligible
Negligible	Moderate	Minor	Negligible	Negligible

4.5.4 Assessment of Residual Impacts

Significance of **residual impacts will be** assessed using the same approach as described above. Residual impacts should be environmentally and socially acceptable. Typically, negative residual impacts assessed as being either of minor (or negligible) significance are considered to be environmentally and/or socially acceptable. Negative residual impacts assessed as major or moderate are environmentally and/or socially unacceptable unless they

can be offset by other positive impacts of the project or controlled through the imposition of permitting conditions and/or specific actions implemented through the project's E&S management and monitoring plan.

4.5.5 Assessment of Cumulative Impacts

Cumulative effects will be assessed where they are predictable both within the project and in combination with existing and reasonably foreseeable future projects. Cumulative effects will be considered as either additive or interactive effects. Additive effects will be those effects for which a change in a receptor may be added to (or subtracted from) a similar change to the same receptor (e.g., the combination of several similar impacts on one receptor). Interactive effects will be those effects for which a change in a receptor may be added to (or subtracted from) a different change to the same receptor (e.g., the combination of different impacts on one receptor).

Cumulative impact assessment will be based on the stepped process described in the IFC's Good Practice Handbook⁵¹. Any additional mitigation and/or management measures required for cumulative impacts will be included in the ESMP for the Project.

4.6 E&S Management and Monitoring

Based on the assessment, mitigation will be developed to avoid, reduce or manage the potential negative impacts and enhance positive impacts. Mitigation measures will be translated into clear, practical measures applicable to the local conditions and will be based on GIP.

The various mitigation, monitoring and management measures identified through the impact assessment process will be compiled in an **ESMP**. The ESMP will be split into the construction and operational stages. The ESMP will also contain a management framework, that will serve to ensure E&S risks are included in decision-making and day-to-day operations. It will set a framework for tracking, evaluating and communicating E&S performance and help ensure that E&S risks and liabilities are identified, minimised and managed. The ESMP will include guidance for the Construction Contractor to develop further specific ESMPs, such as Waste Management Plan, Spoil Management Plan, Worker Camp Management Plan, Health and Safety Management Plan and/or other plans to be determined during the ESIA process. The framework ESMP for the construction stage will be included in the Construction Contractor's contract.

4.7 Stakeholder Engagement and Public Consultations

Within the framework of this ESIA, a SEP will be developed, including a grievance mechanism. The SEP will detail a structured and systematic approach for stakeholder engagement during the Project planning and implementation stages. Further details are provided in **Chapter 7**.

4.8 Data Availability, Assumptions and Limitations

Because ESIA's are predictive processes, there is always data uncertainty. Furthermore, a fully comprehensive suite of E&S information is seldom available. Where data do exist, they are sometimes outdated. Where information is not available or too outdated to be used with confidence, assumptions and estimates need to be made and this will be clearly indicated in the ESIA.

⁵¹ IFC. Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets" (2013). https://www.ifc.org/wps/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_cumulativeimpactassessment.

5 ENVIRONMENTAL AND SOCIAL BASELINE

5.1 Environmental Baseline

5.1.1 Climate

The Project is situated in Syunik Region within the administrative boundaries of Sisian and Kajaran Communities (**Figure 1**). The climate of Syunik Region is influenced by eastern air masses from the Caspian Sea and the dry Iranian plateau and is accordingly defined continental. Humid air masses are highly transformed and dried in overcoming the Zangezur Mountain Range. However, the extreme diversity of the relief creates climate diversity too. In general, temperature decreases with height and rainfall increase with height. The climatic map of Syunik Marz including the Project area is presented in **Figure 17**.

Mean annual temperatures in the Sisian and Kajaran regions are 8.5°C and 6.9°C, with mean annual rainfall of 532 mm and 686 mm, respectively⁵². The annual distribution of precipitation is highly variable. Most precipitation occurs in the period of March-June with the Sisian region, experiencing mostly clear weather with a high radiation balance - 60-62 kcal/cm². The longest multi-year annual average sunshine period observed in Sisian was 2,660 hours.

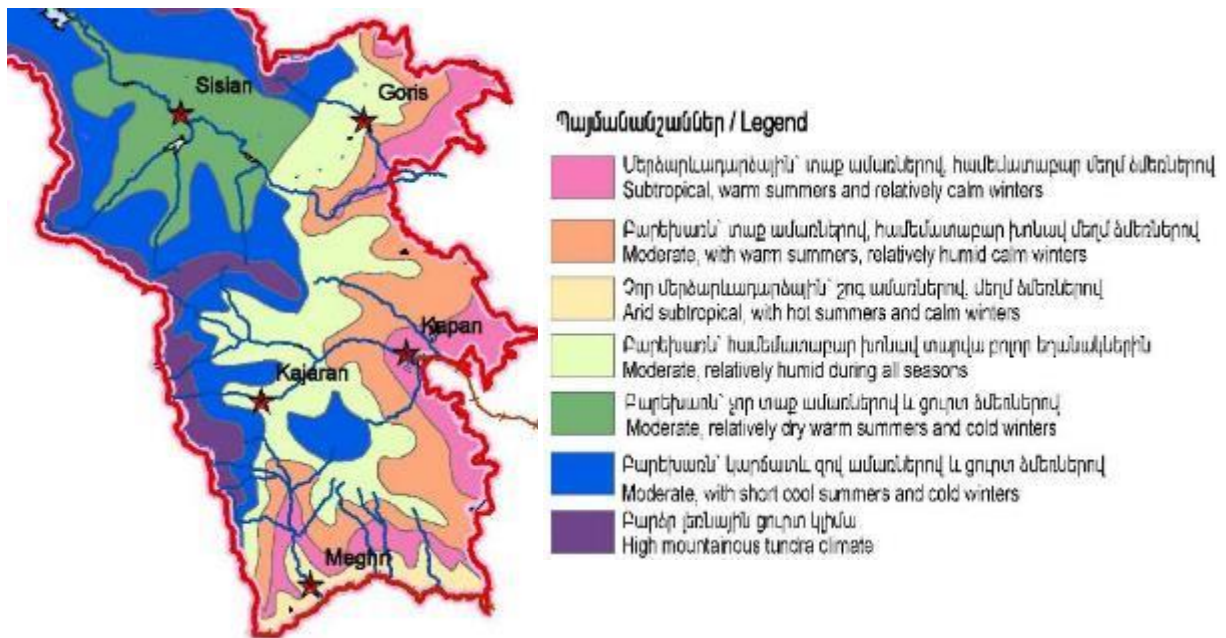


Figure 17. Climatic Map of Syunik Region

Snow cover starts at altitudes of 1,200 MASL and lasts for 35-165 days a year. The snow depth is 15-180 cm and remains for 1-1.5 months at altitudes of up to 1,500 m, and 6.5-7 months at altitudes of 3,000 m and higher. The depth of snow cover is 15-20 cm at altitudes of 1,300-1,500 m and 120-180 cm at 3,000 m and higher. The average annual relative humidity is 60% for Sisian and 70% for Kajaran, with less than 30% at low altitudes (up to 1,000 m) and 60- 80% at higher altitudes - 2,600 m⁵³.

5.1.2 Ambient Air Quality

Ambient concentrations of sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) in Kajaran are monitored by the "Hydrometeorology and Monitoring Centre" State Non-Commercial

⁵² Source: North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detail Design, Final Environmental Impact Assessment Report and Environmental Management Plan, November 2019.

⁵³ RA Construction Norms II-7.01-2011 "Construction Climatology" (HShN).

Organization (SNCO)⁵⁴. Measured concentrations during 2020 in Kajaran were below the 0.04 mg/m³ and 0.05 mg/m³ average daily Threshold Limit Value set by the RA Government Decree No. 160-N.

In 2016, within the EIA for the Project⁵⁵, the Environmental Impact Monitoring Centre conducted air quality measurements, in particular SO₂ and NO₂ concentrations at ground level in Sisian, Shamb Hydro Power Plant ("HPP"), Lor, Geghavank and Barikavan settlements. Monitoring results are presented in **Table 13**.

Table 13. Ground Level SO₂ and NO₂ Concentrations (2016)

No. of sample	Settlement	Average daily national Threshold Limit Value ⁵⁶ , mg/m ³	
		SO ₂ - 0.05	NO ₂ - 0.04
1	Sisian town	0.054	0.002
2	Shamb HPP	0.072	0.003
3	Lor settlement	0.036	0.003
4	Geghavank settlement	0.01	0.004
5	Barikavan settlement	0.02	0.004

There are no available data on dust (PM_{2.5} and PM₁₀) and CO concentrations in the atmospheric ground layer of Sisian and Kajaran communities as well as settlements located near the proposed road.

During the inception/scoping site visits, the Consultant identified sites for air quality measurements for the ESIA study (see **Annex 2** and **Section 6.1**).

5.1.3 Topography, Landscape and Geology

5.1.3.1 Topography

The Sisian-Kajaran road section is entirely located within Syunik Region. The terrain is highly complex and has diverse topography. It combines fold, coulisse-shaped and linearly stretched mountain ranges, volcanic massifs, upland plateaus, intermountain concavities, and river valleys. Mountain slopes are intensively weathered (eroded) with steep slopes (35° and more) and fragmented by the Vorotan, Voghji and Geghi River Valleys. The Bargushat ridge (which will be traversed by the road section) is located on the hillside of the Zangezur Mountain Range and extends for 42 km amid the Vorotan and Voghji River Basins. Peaks reach over 3,000 m, particularly Aramazd – 3,392 m, Geghaqar – 3,343 m, and Tarkatar – 3,277 m. The mountain Range descends in the south-east (near Kapan).

Greater Ishkhanasar, located 9 km northeast of the village of Noravan, is the highest point of the Project region (3,549 m). The Noravan river, Metsdzor and Vaghatin tributaries of the Vorotan river and the Shamb river flow from the slopes of this mountain. The mountain is of volcanic origin and its steep slopes are dissected by deep gorges and crevasses. The relief of the Project region is:

- a) slopes and plateaus (1,500-2,800 m) "armoured" with lava sheets; folded structures slightly dissected in the base and rugged with disturbances (section of the southern foot of Mount Ishkhanasar),

⁵⁴ Annual information bulletin on environmental conditions in the Republic of Armenia.

⁵⁵ North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detail Design, Final Environmental Impact Assessment Report and Environmental Management Plan, November 2019.

⁵⁶ RA Government Decree No. 160-N, 2006.

- b) lava-covered marginal plateaus (1,100-2,200 m) on slightly sloped, folded structures (from highway M2-Meghri to Vorotan river gorge),
- c) wide valleys with gully and terraces (wide valley of the Vorotan river, a section adjacent to Shamb reservoir),
- d) V-shaped narrow valleys (valley and tributaries of the Shenatagh and Geghi rivers),
- e) transverse and oblique mountain ranges and plateaus that are sedimentary-volcanogenic, with carbonate intensive folded base (the northern mountain slope of the Bargushat ridge beginning from Aramazd mountain summit),
- f) structural erosive relief, high mountains (over 2,800 m), represented by forms of snow-glacial relief, severely dissected, sharp and rocky crests, sloping sides up to 350m (the southern mountain slope of the Bargushat ridge beginning from Aramazd mountain summit),
- g) with steep slopes (up to 250-350m), slightly wavy watershed, northern, eastern and southern mountain slopes of the eastern mountain arm of the Zangezur ridge (to the north of Kajaran).

5.1.3.2 Landscape

The planned road passes through six vertical landscape zones: low and middle mountain below forest level, low and middle mountain forest, middle mountain steppe, middle mountain meadow steppe, high mountain subalpine, high mountain alpine and will have direct and indirect impacts on the physical and biological resources of the environment, archaeological/historical sites and cultural monuments.

5.1.3.3 Geology

The starting section of the planned road is characterized by volcanic rocks of the Greater Ishkhanasar volcanic massif: Upper Pliocene - Eo-pleistocene period represented by basalt, andesite, dacite, rhyolite, obsidian, perlite, tuff-breccia, travertine (3.3-0.85 the absolute age in million years). There are numerous volcanic centres. The above - mentioned rocks are mainly covered with quaternary loose deposits: deluvial, proluvial, alluvial, eluvial colluvial, and so forth. The bed and washout of the Vorotan river, as well as the terraces are lacustrine, fluvial proluvial and slope deposits of Upper pliocene - pleistocene age (3.3-0.01 the absolute age in million years). Within the section between the Vorotan river valley and the Bargushat mountain slope, the volcano - sedimentary rocks, such as andesites, tuff-breccias, tuff sandstones, marl stones, limestones, clays, argillaceous sandstones, aleurolites and olivine basalts occur. The Bargushat ridge has comparably large and small granitoid bodies, which become exposed between the Voghji and Vorotan Rivers, in the central and western boundaries of the mountain range. Information on the range is no more than superficial⁵⁷. The road section passes through Shenatagh (northern slope of the mountain range) and Karut (southern slope of the mountain range) intrusions or their middle part (tunnel section). Shenatagh intrusion occupies a larger area (100-120 km²) than Qirs - Karut intrusion (about 50km²).

These two intrusions contain similar rocks: gabbro, pyroxenite, gabbrodiorite, monzonite, granodiorite and pink syenites. Two other intrusions (50-60 km²), Kazangel and Geghi, are prominent on the southern slope of the Bargushat ridge. They contain porphyrites and limestones of Lower Jurassic age located in the contacting part of powerful normal granite and granodiorite massif. The Kazangel intrusion also contains Lower Jurassic porphyrites and pink porphyrite granodiorites. The valley of the Geghi River contains basalts, andesites, tuff

⁵⁷North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detail Design, Final Environmental Impact Assessment Report and Environmental Management Plan, November 2019.

sandstones, tuff-aleurolites, limestones and alluvial (fluvial) deposits of Upper Jurassic - Lower Cretaceous age. The right-bank slope of the Geghi river and the left-bank slope of the Voghji river up to the entrance to Kajaran contains Lower Cretaceous limestones, aleurolites, metamorphic laminated limestones, tuff sandstones, basalts, andesite basalts (135-96 million years), as well as limestones, sandstones, quartz sandstones, clay shales of Devonian - Lower Carbon age (385-315 million years). Near the entrance to Kajaran, gabbros, granodiorites, quartz diorites, monzonites, nephelinic syenites, leucogranites of Upper Eocene age (42-38 million years) also appear.

5.1.4 Soil Structure and Composition

The Project region has the following soil types (see also **Figure 18**):

- a) Mountain-fulvous soils of dry steppes,
- b) Brown mountainous-forest soils of dry forests and bushes,
- c) Subalpine mountain-meadow brown soils,
- d) Mountainous-forest steppe soils, and
- e) Alpine mountain-meadow turf-peat soils.

There are no data on soil quality and composition within the study area. Campaign soil sample locations for the ESIA are presented in **Annex 2**.

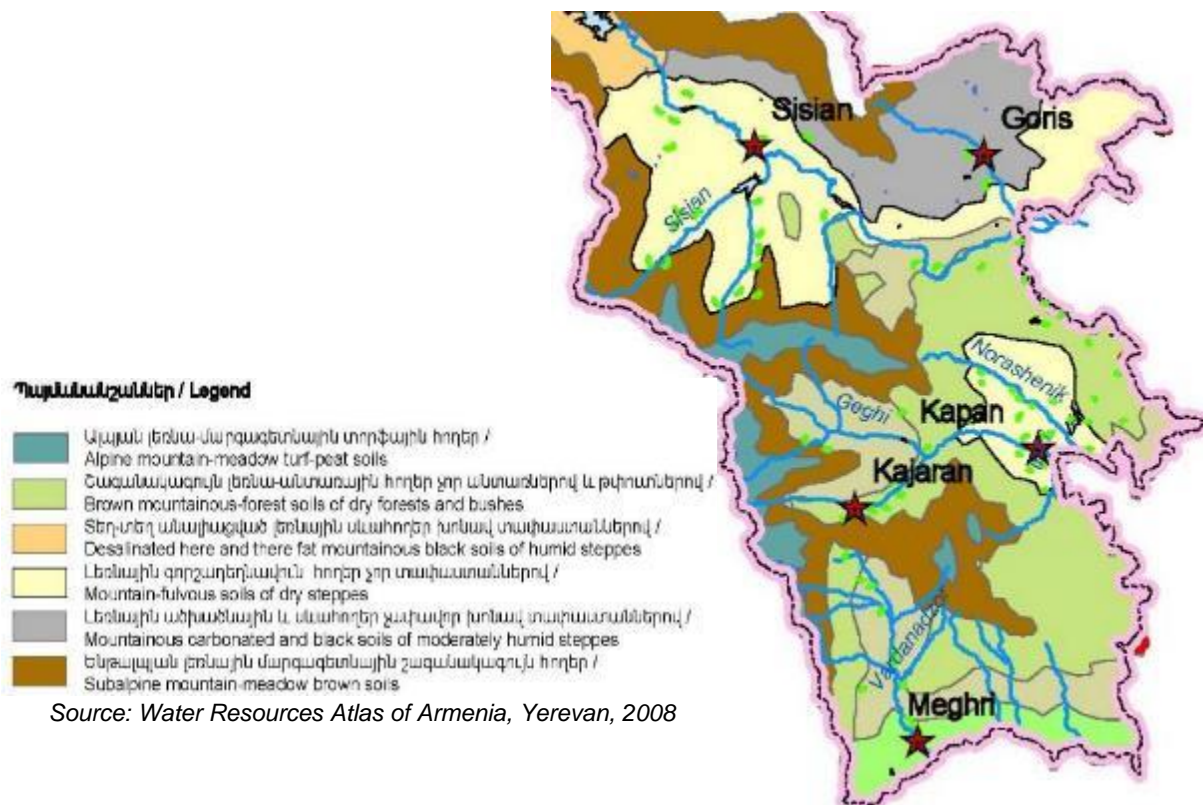


Figure 18. Map of Soil Types in Syunik Region and Project Area

5.1.5 Hazardous Events and Processes and Seismicity

The Project is situated in medium and low natural hazards risk areas in the RA⁵⁸ (**Figure 19**). Part of the Sisian-Shenatagh road section runs through medium mudflow risk areas.

⁵⁸ Water Resources Atlas of Armenia, Yerevan, 2008.

The seismic zoning map of the RA (national atlas) (volume A. Yerevan 2007), indicates that The road traverses two seismic zones of different intensity:

- 1) Beginning of the road - Shenatagh community (upstream of the Shenatagh river). Horizontal acceleration is $g=0.3-0.4 \text{ m/sec}^2$ (probability of non-exceedance in 500 years - 90%), Y (possible intensity of earthquake) = 9 points,
- 2) Upstream of the Shenatagh river - Kajaran. Horizontal acceleration is $g=0.3 \text{ m/sec}^2$, Y (possible intensity of earthquake) = 8-9 points. The highway section passes through the middle part of an intense seismic focus. There are lateral shifts and faults.

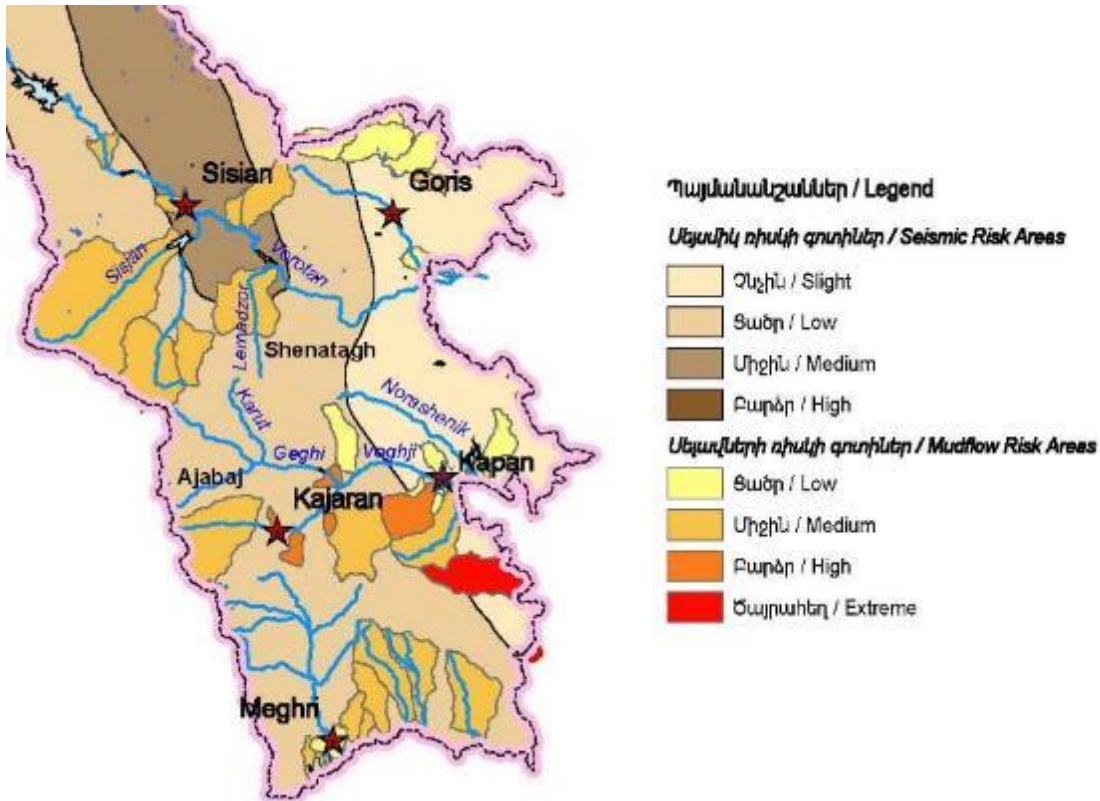


Figure 19. Map of Seismic and Mudflow Risks Areas in Syunik Marz

Erosion is mainly anthropogenic due to mine operations around Kajaran and Ajabaj village in the Geghi River basin as well as the Loradzor River basin. The slopes surrounding Shenatagh village are exposed to erosion due to the density of earth roads. Erosion caused by livestock husbandry, uncontrolled establishment of earth roads, and use of fallow agricultural lands are observed on the slopes close to almost all settlements within the Project region.

Avalanches are observed upstream the Voghji and Geghi Rivers, at altitudes of 1,400-3,400 m. The most damaging avalanche occurred in the Vorotan River basin in 1988, at a volume of 96,000 m³.

5.1.6 Noise

There is no information on noise and vibration along the proposed road and the existing roads that might be used by contraction transport. Noise and vibration will be measured at various locations to inform the ESIA as shown in [Annex 2](#).

5.1.7 Water Resources (Surface Water and Groundwater)

5.1.7.1 River Network

The proposed road passes through the valleys of the **Vorotan, Loradzor (Shenatagh)⁵⁹, Karut, Geghi and Voghji Rivers** and crosses some of these rivers (Vorotan, Shenatagh, Karut, and Geghi) and their numerous tributaries (Noravan, Vaghatin, Aghbashget, etc.). The rivers are typically mountainous with fractured relief and hydrographic networks in the catchment basin. The rivers are steep and fast flowing (**Figure 20**).



Figure 20. Hydrological Map of Syunik Marz⁶⁰

The **Vorotan River** is the largest tributary of the Araks River in the Zangezur area. The river originates in the North-Eastern Syunik plateau and eastern slopes of the Zangezur Mountain Range from the small lakes and springs and flows into the Araks river beyond the Armenian border. The total length of the river is 178 km (111 km within the RA), with 5,650 km² catchment area, including 2,597km² within the territory of the RA. The main tributaries of the Vorotan river are the **Sisian, Loradzor and Goris Rivers**. The Project's Sisian-Shenatagh section runs along the right-bank mountain slope of the **Vorotan River** for about 10 km at 100-1,000 m from the river and then crosses the Vorotan river in the northern part of the Shamb water reservoir, near the Vorotan village..

The 23 km **Loradzor River** (also called Loraget or Lernashen) originates in the south-west slopes of the Bargushat mountain range, flows through Shenatagh, Lor, Getatagh, Darbas, and Ltsen villages and enters the Shamb reservoir via a 2 km long tunnel. After crossing the Loradzor river, the existing Sisian-Shenatagh road section runs along the river for about 8 km.

After intersecting the Bargushat ridge, the Qirs-Kajaran section runs along the Karut tributary of the **Geghi River** for about another 8 km, crossing the upper part of the tributary. The **Geghi River** (30 km) originates in the eastern slopes of the Zangezur mountains at 3,130 m altitude and joins the **Voghji River** from the left. The 1.8 ha Gazana lake occurs in the headwaters of

⁵⁹Loradzor river is also called Shenatagh.

⁶⁰Some tributaries within the Project region are not shown in the map.

the Geghi River at 3,150 m. The lake was included in the list of RA Natural Monuments in 2008 and has a catchment area of 308.3 km².

The **Voghji River** is the second largest river in the Zangezur area. The **Kaputjugh River**, originates from the melt waters of Mount Kaputjugh (3,905 m), joins **the Kajaran River** and forms the Voghji River, a tributary of the Araks River. The Voghji River's total length is 82 km (52 km within the RA) and its catchment area is 2,337 km² (1,240.47 km² within the RA). The largest tributary is the Geghi River. Another important river in this basin is the **Tsav River**. The relief of the basin forms a dishevelled network of hills, with the surface of the basin incised by canyons, valleys and meadows. The basin of the **Voghji River** is characterized by strong fragmentation and relatively moderate water-permeability.

Table 14. Main Rivers in the Project Area⁶¹

No	Name of rivers	Length, km	Catchment area in the RA, km ²	Flow rate, mln. m ³ /year	Crossed by the proposed road?
1	Vorotan	178	2597	716	Yes
2	Loradzor	23	118	13	Yes
3	Voghji	82	1241	366	No
4	Geghi	30	308	145	Yes

To sum up, the proposed road crosses surface water courses ten times, of which six are located in Sisian-Shenatagh section and four crossings - in Qirs-Kajaran section. The information about the rivers/tributaries that are crossed by the proposed road as well as numbers and locations of the respective bridges are given in **Table 15**.

Table 15. Water Streams to be Crossed by the Project Road

No	Name of rivers/ tributaries	Length, km	Number of bridge over the river	Location of the bridges
1	Noravan (tributary of Vorotan)	20	BR002	km10+250 - km10+500
2	Vaghatin (tributary of Vorotan)	12	BR004	km11+580 - km11+750
3	Vorotan	178	BR005	km12+650 - km13+150
4	Unknown (tributary of Vorotan)	-	BR007	km15+750 - km16+000
5	Loradzor	23	BR008	km18+200 - km18+450
6	Aghbashget (tributary of Loradzor)	10	BR016	km26+250 - km26+500
7	Karut (tributary of Geghi)	~20	BR017	km36+280 - km36+500
8	Karut (tributary of Geghi)	~20	BR018	km37+430 - km37+540
9	Kiladara/Karakhan (tributary of Geghi)	-	BR020	km45+310 - km45+750
10	Geghi (tributary of Voghji)	30	BR021	km49+350 - km49+570

River flows are variable during the year as a function of snowmelt and rainfall intensity. More than half the flow occurs during spring (March-June), while the lowest flows are observed in the winter period (8-17%). About 30% of total annual river flows occur in summer-autumn.

5.1.7.2 Lakes and Reservoirs

There are no natural lakes near the proposed road, tunnel, bridges and/or connecting roads. Some small mountain lakes, found at 2,300-3,500 MASL, are located far away from the road sections.

There are two reservoirs located close to the existing road sections: **Shamb and Geghi reservoirs**. The **Shamb reservoir** is fed by the Vorotan river and has a total capacity is 13.6 mln.m³ and usable capacity of 11.8 mln.m³, while the water table surface area is 11 ha. The

⁶¹ "Hydrometeorology and Monitoring Center" SNCO.

reservoir is used for hydropower generation and fish production. It is about 200 m from the existing road.

The **Geghi reservoir** is located on the Geghi river with a capacity 15 mln.m³, with current utilisation of 12 mln.m³, and water surface area of 35 ha. The dam wall is being rehabilitated. The reservoir is used for hydropower generation, fish farming and irrigation. In addition, Zangezur Copper Molybdenum Combine CJSC abstracts water during low flow periods. The reservoir is about 40 m from the existing road.

5.1.7.3 Water Regime and Water Flow

The competent state bodies have multi-year monitoring data on water levels, however there is no aggregate information on the water regime and water flows in the rivers located within the Project's area of influence. During the ESIA, a hydrological study will be conducted using multi-year monitoring data purchased from state bodies and the results presented in the ESIA. A flood risk assessment will be included supplemented by stormwater management requirements defined as part of the technical due diligence.

5.1.7.4 Surface Water Quality

The RA Government decree №75 adopted in January 2011 specifies the requirements for river water quality management. The decree defines specific surface water quality criteria in five categories for the river basins of Armenia. The "Hydrometeorology and Monitoring Centre" SNCO regularly analyses water quality in the Vorotan, Loradzor and Geghi rivers. The results show that the water quality is fair (3rd category) in the Vorotan river 3 km downstream from Sisian Town, good (2nd category) in the Loradzor river, and fair (3rd category) at the confluence of the Geghi River.

Water quality sampling will be conducted in the rivers that may be affected by the Project as a component of the ESIA. **Annex 2** illustrates the locations of the proposed water sampling points for the ESIA.

5.1.7.5 Hydrogeology

Groundwater occurs in the weathering crust of various rocks and deep cracks, as well as in the pores of alluvial-proluvial formations along riverbeds. The groundwater reserve of 429 mln.m³/year exists for the Vorotan River and 185.1 mln.m³/year for the Voghji River Basin, according to the multi-year average values (**Table 16**). The major springs are spread in the Vorotan River valley and slopes of the Syunik volcanic plateau, in the upper and middle reaches of the Voghji and Geghi Rivers.

Table 16. Groundwater Resources⁶²

№	River basin	Groundwater resources by flow components, mln.m ³ /year			Height of the water table
		Total	Spring	Drainage flow	
1	Vorotan	429	118	208	107
2	Voghji	185.1	72.2	26.5	86.4

5.1.8 Biodiversity

5.1.8.1 Protected Areas

The Project is planned in an area containing several protected areas. These protected areas are presented in figures below and detailed depending on their national and international categories.

⁶²North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detail Design, Final Environmental Impact Assessment Report and Environmental Management Plan, November 2019

National sites

The Project region is rich in nationally specially protected areas (SPA). These SPA are: Arevik National Park; Shikahogh State Reserve; and Zangezur, Khustup, Plane Grove, Boghaqar, and Sev Lich sanctuaries (Figure 21). According to RA Government decree №1465-N dated 19.12.2013, all these SPAs have been merged into the Zangezur Biosphere Complex and managed by the "Zangezur Biosphere Complex" SNCO under the RA Ministry of Environment with the head office in Kapan. Summary information relating to the SPAs included in the Zangezur Biosphere Complex is given in Table 17.

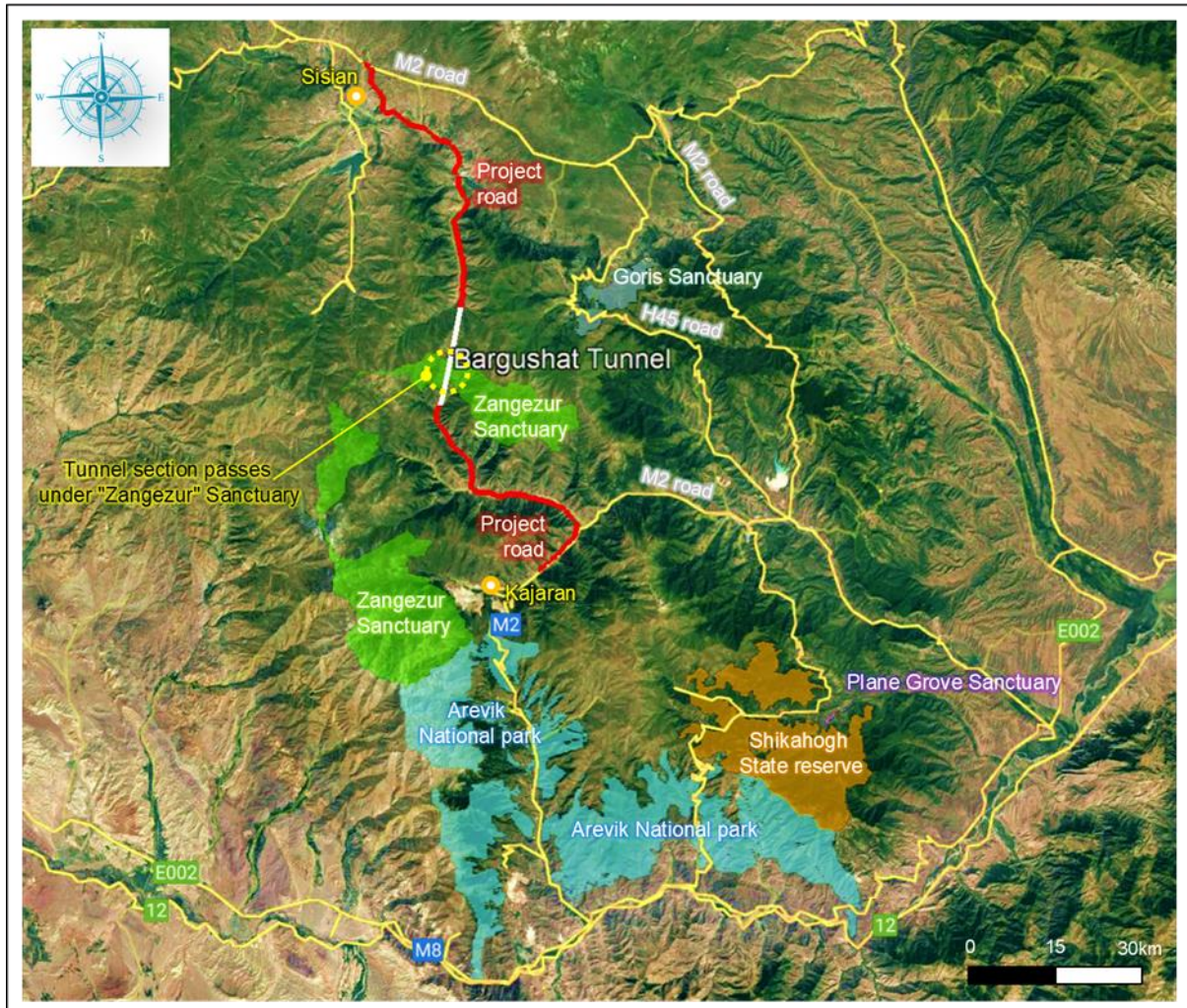


Figure 21. Location of the Nearest SPAs Relative to the Project Road

Table 17. The IUCN Management Categories, Subjects of Protection and Areas of the SPAs Included into the Zangezur Biosphere Complex

No	SPA	IUCN management category	Area, ha	Subject of protection
1	Arevik National Park	II	31,211.2	Conservation of broad-leaved forests and open woodlands of juniper of the Meghri and Zangezur Mountain Ranges. More than 1,500 species of high plants grow in the park, which is also the habitat for more than 245 species of vertebrate animals. The Park area is one of the main habitats of the Caucasian Leopard in Armenia, and a place where representatives of many endemic species of flora and fauna and those recorded in the Red Data Book of Armenia occur. Conservation of habitats of the species of Armenian Mouflon.

No	SPA	IUCN management category	Area, ha	Subject of protection
2	Shikahogh State Reserve	Ia	12,137.1	Protection of oak, hornbeam and oak-hornbeam forests, oriental beech, yew, oriental plane and animals.
3	Zangezur Sanctuary	IV	25,711.6	Protection of alpine, subalpine and alpine-steppe ecosystems of the area. Conservation of habitats of the species of Armenian Mouflon.
4	Khustup Sanctuary		6,946.74	Protection of natural development of ecosystems in the upper part of the Khustup forest zone, meadow-and-steppe and meadow ecosystems. Preservation of landscape and biodiversity, protection of nature monuments, conservation, restoration and reproduction of natural heritage, as well as sustainable use of natural resources.
5	Plane Grove Sanctuary	IV	64.2	Protection and preservation of the only Eastern plane grove in the Caucasus.
6	Boghaqar Sanctuary	IV	2,728.0	Protection of endemic flora and fauna (Sosnovsky rosacea, Takhtajyan ryegrass, etc.) and rare (orchids, Araks oak, saga) species.
7	Sev Lich Sanctuary	IV	240.0	Protection of the natural ecosystem of Sev Lake. The sanctuary is situated on the eastern slope of Mount Ishkhanasar.
Total (Zangezur Biosphere Complex)			79,038.87	

Sources: https://www.wwf.am/en/our_work/wildlife/development_of_the_protected_area_system/ and <http://mnp.am/shrjaka-mijavayr/yndhanur-teghekutyuner>

The tunnel through the Bargushat ridge will **run under the Zangezur Sanctuary, with the tunnel's portals being located outside the Sanctuary (Figure 21)**. This was confirmed by the Ministry of Environment of Armenia in response to the request submitted by the Consultant⁶³.

The connecting (secondary) roads between the existing roads and the planned road are not expected to be constructed within the SPAs. Contractors will also not be permitted to access the sanctuary area at all and certainly not for establishing construction related infrastructure such as lay down areas, camps and so forth.

Emerald Network Sites⁶⁴

Armenia signed the Bern Convention in 2006 and ratified in 2008. The country has since advanced the Emerald Network and listed more than 110 species requiring protection and habitat conservation, according to the Bern Convention Resolutions №4 (1994) and №6 (1998). Of these species, the most iconic include the Persian leopard, *Panthera pardus*, the greater horseshoe bat, *Rhinolophus ferrumequinum*, and the fern leaf peony, *Paeonia tenuifolia*. Four different habitats of European importance, such as the Continental glasswort swards, occur in Armenia.

As of December 2020, Armenia had no officially adopted Emerald Network sites. However, 23 sites situated in the RA territory have been officially nominated as *candidate* Emerald Sites. Of these, six are located in Syunik Province:

⁶³ The Consultant held several rounds of consultations with the Head of the Zangezur Biosphere Complex in December 2021 and January 2022. It was found out that the exact contours of the Zangezur Sanctuary were being verified in collaboration with the state land cadastre bodies and the Ministry of Environment (and maps and a management plan were under development). Thus, on 02.02.2022, the Consultant filed a formal request to the Ministry of Environment to verify if there would be any risk of overlap between the Project facilities and the Zangezur Sanctuary (the request was accompanied by supporting maps with the portals' coordinates). In its letter № 2/16.5/1097, dated 15 February 2022, the Ministry of Environment stated that both portals would be located outside the territory of Zangezur State Sanctuary of the Zangezur Biosphere Complex SNCO.

⁶⁴ Source: <https://www.coe.int/en/web/bern-convention/emerald-network>.

- "Impassable brushwood" area (Site Code AM0000008) - 274.4 ha,
- "Gorhajak" area (Site Code AM0000013) - 274,4 ha,
- "Arevik" National park (Site Code AM0000014) – 60,804.7 ha,
- "Zangezur" area (Site Code AM0000015) – 49,066.6 ha,
- "Tatev" area (Site Code AM0000016) – 14,873.1 ha,
- "Khndzoresk" area (Site Code AM0000018) – 3,425.7 ha.

The Impassable Brushwood and Gorhajak Areas are located far from the Project site and thus not shown on **Figure 22**. The proposed Bargushat tunnel passes under the Bargushat ridge which is partly included in the nominated Zangezur Emerald Network Site. **The tunnel would run under the Zangezur Emerald Network Site, with the closest surface sections of the proposed road about ca. 1,200m from the site boundaries. The Sisian-Shenatagh road section (Bridge 008) to the north of Darpas is about 20-30 m from to the nominated Tatev Emerald Site.**

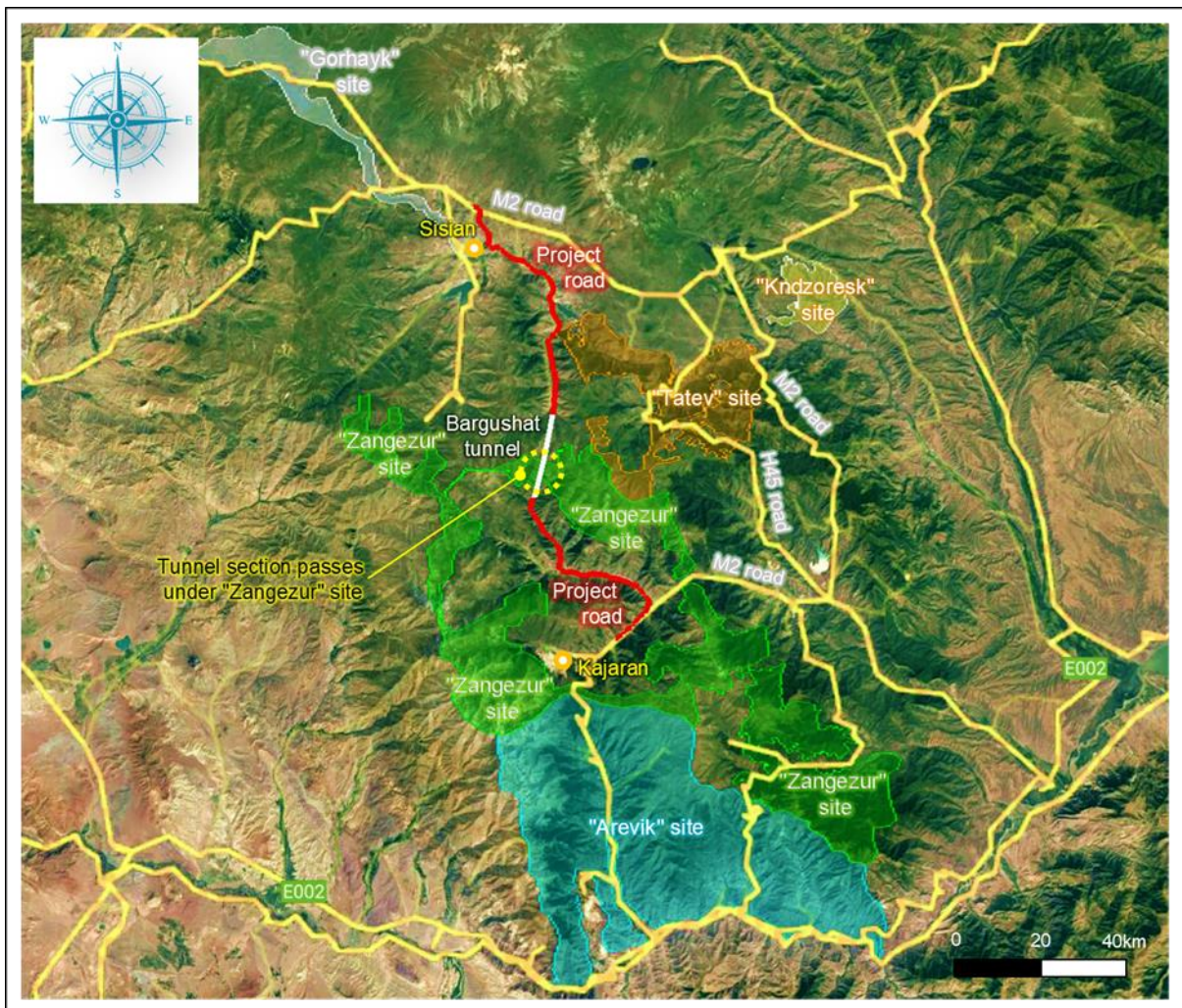


Figure 22. The Location of the Nearest Nominated Emerald Network Sites Relative to the Project Road

The nominated Zangezur Emerald Network site occupies 49,066.6 ha and consists of Plane Grove, Shikahogh and Khustup as well as Zangezu Sanctuaries. The site is located in an Alpine geographical region. The area contributes substantially to the survival of more than 150 threatened species included in the Armenian Red Book and 50 endemic species. It further supports more than 1,200 plant species, and contains important representatives of some

locally endangered habitats. There are 52 species from Resolution No.6 of the Convention⁶⁵ that require specific habitat conservation measures:

Plants:	<i>Echium russicum, Steveniella satyrioides</i>
Invertebrates:	<i>Callimorpha (Euplagia) quadripunctaria, Cerambyx cerdo</i>
Reptiles:	<i>Mauremys caspica</i>
Birds:	<i>Accipiter brevipes, Aegypius monachus, Alcedo atthis, Anthus campestris, Aquila chrysaetos, Aquila pomarina, Bubo bubo, Buteo rufinus, Caprimulgus europaeus, Ciconia nigra, Circaetus gallicus, Coracias garrulus, Dendrocopos medius, Dendrocopos syriacus, Dryocopus martius, Emberiza hortulana, Falco naumanni, Falco peregrinus, Ficedula parva, Ficedula semitorquata, Gypaetus barbatus, Gyps fulvus, Hieraaetus pennatus, Lanius collurio, Lanius minor, Lullula arborea, Luscinia svecica, Milvus migrans, Neophron percnopterus, Pernis apivorus, Pyrrhocorax pyrrhocorax, Sylvia nisoria</i>
Mammals:	<i>Canis lupus, Capra aegagrus, Lutra lutra, Lynx lynx, Miniopterus schreibersii, Myotis blythii, Myotis emarginatus, Panthera pardus, Rhinolophus euryale, Rhinolophus ferrumequinum, Rhinolophus hipposideros, Ursus arctos</i>

The area of the **nominated Tatev Emerald Network Site** is 14,873.1 ha. It is mostly situated in an Alpine geographical region with mainly forest habitat. The site is important for conservation of some bird species and some habitats. There are 52 species from Resolution No.6 of the Convention that require specific habitat conservation measures:

Plants:	<i>Dactylorhiza chuhensis, Echium russicum, Steveniella satyrioides</i>
Invertebrates:	<i>Callimorpha (Euplagia) quadripunctaria, Cerambyx cerdo, Rosalia alpina</i>
Reptiles:	<i>Emys orbicularis, Mauremys caspica</i>
Birds:	<i>Accipiter brevipes, Aegypius monachus, Alcedo atthis, Anthus campestris, Aquila chrysaetos, Aquila pomarina, Bubo bubo, Buteo rufinus, Calandrella brachydactyla, Caprimulgus europaeus, Circaetus gallicus, Circus cyaneus, Coracias garrulus, Dendrocopos medius, Dendrocopos syriacus, Dryocopus martius, Emberiza hortulana, Falco peregrinus, Ficedula parva, Ficedula semitorquata, Gypaetus barbatus, Gyps fulvus, Hieraaetus pennatus, Lanius collurio, Lanius minor, Lullula arborea, Luscinia svecica, Melonocorypha calandra, Milvus migrans, Neophron percnopterus, Pernis apivorus, Pyrrhocorax pyrrhocorax, Sylvia nisori</i>
Mammals:	<i>Canis lupus, Capra aegagrus, Lynx lynx, Miniopterus schreibersii, Myotis blythii, Myotis emarginatus, Panthera pardus, Rhinolophus blasii, Rhinolophus euryale, Rhinolophus ferrumequinum, Rhinolophus hipposideros, Ursus arctos</i>

Important Bird Areas (IBAs)⁶⁶

There are 18 Important Bird (and Biodiversity) Areas (IBAs) designated for Armenia that occupy 415,132 ha. Key features of the IBAs are listed in **Table 18**.

Table 18. Names, Locations and IBA Criteria of IBAs in Armenia

Region	Site name	IBA Criteria	Final Code
Shirak	Amasia	A1, A4i, B1i, B1iv, B2	AM006
Ararat	Arماش fish-farm	A1, A4i, B1i, B2	AM004
Lori	Dsegh	A1, A2, B2	AM008
Armenia	Gndasar	B1iv, B2	AM013
Syunik	Gorayk	A1, B2	AM016
Tavush	Haghartsin	A1, A2, A3, B2	AM009
Vayots Dzor	Jermook	A1, B2, B3	AM015
Ararat	Khosrov Reserve	A1, A3, B2	AM003
Shirak	Lake Arpi	A4i, B1i	AM001
Gegharkunik	Lake Sevan and environs	A1, A4i, B1i	AM005
Syunik	Meghri	A1, A2, A3, B2, B3	AM018
Armavir	Metsamor	A1, B1iv, B2	AM012
Aragatsotn	Mount Ara	A1, A2, B2, B3	AM010
Vayots Dzor	Noravank	A1, B2	AM014

⁶⁵Convention on the Conservation of European Wildlife and Natural Habitats, Bern (1979)

⁶⁶<http://www.birdlife.org/>

Region	Site name	IBA Criteria	Final Code
Kotayk-Lori	Pambak mountain chain	A1, A3, B2	AM002
Armavir	Sardarapat	A1, B1iv, B2	AM011
Lori	Tashir	A1, B1iv, B2	AM007
Syunik	Zangezoor	A1, A2, A3, B2	AM017

The Qirs-Geghi section of the proposed road runs through the **Zangezoor IBA (Figure 23)**. Zangezoor IBA occupies 23,236 ha and contains terrestrial, forest, grassland and rocky (e.g. inland cliffs, mountain peaks) habitats. The areas of the Arevik National Park, and Boghaqar and Zangezur Sanctuaries partly overlap with the Zangezoor IBA.

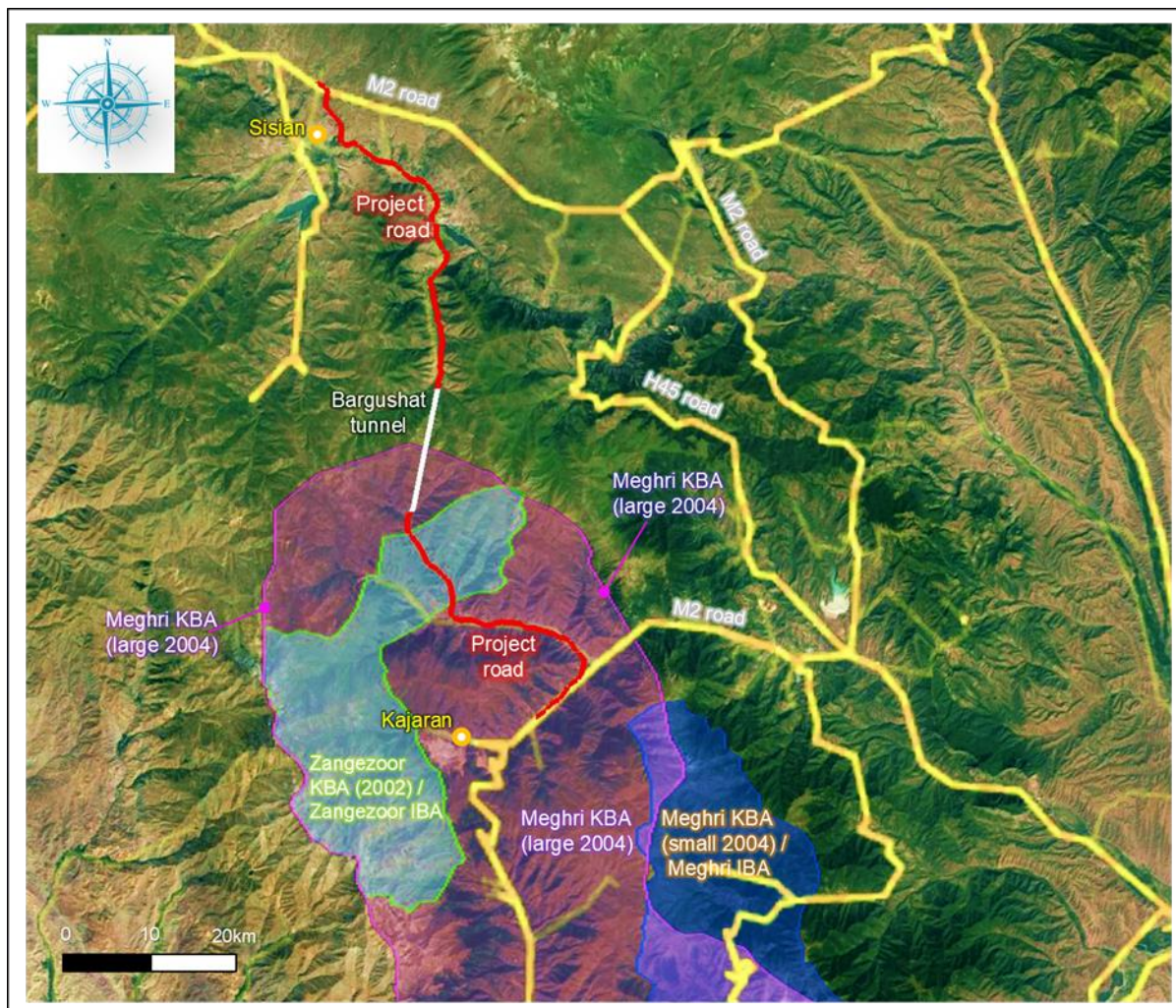


Figure 23. Location of the Nearest KBAs⁶⁷ and IBAs Relative to the Project Road

The populations of the Zangezoor IBA trigger species⁶⁸ are given in **Table 19**.

Table 19. Populations of Zangezoor IBA Trigger Species⁶⁹

Species	Current IUCN Red List Category	Season	Population estimate	IBA Criteria Triggered
Caspian Snowcock <i>Tetraogallus caspius</i>	LC	breeding	200-300 individuals	A3, B2

⁶⁷ Using *inter alia* the data from <https://maps.birdlife.org/portal/apps/opsdashboard/index.html#/754b32566bfa4f23ba7fa67942684553>.

⁶⁸ Trigger species are those for which site-scale conservation is appropriate.

⁶⁹ from BirdLife International. 2022. Important Bird Areas factsheet: Zangezoor. Downloaded from <http://www.birdlife.org> on 06/01/2022.

Species	Current IUCN Red List Category	Season	Population estimate	IBA Criteria Triggered
Caucasian Grouse <i>Lyrurus mlokosiewiczii</i>	NT	breeding	20-40 individuals	A2, A3, B2
Bearded Vulture <i>Gypaetus barbatus</i>	NT	breeding	1-2 breeding pairs	B2
Egyptian Vulture <i>Neophron percnopterus</i>	EN	breeding	3-5 breeding pairs	A1, B2
Golden Eagle <i>Aquila chrysaetos</i>	LC	breeding	2-4 breeding pairs	B2

The current criteria for trigger species and associated IBAs are currently being revised to be consistent with the latest update from Birdlife International (2022).

Key Biodiversity Area (KBA)

Zangezoor KBA⁷⁰ exactly matches the Zangezoor IBA (having the same area of 23,268 ha (Figure 23). The biodiversity elements triggering KBA criteria for Zangezoor KBA are the same five bird species that are listed in Table 19.

The road section linking Qirs to Geghi falls within the **Zangezoor KBA/IBA and Meghri KBA**, and the Geghi – Kajaran section falls within the **Meghri KBA**, so these road sections are expected to present a potential threat to biodiversity priority features triggering the KBA (notably the Caucasian Grouse, Egyptian Vulture, Bezoar goat, Otter, Armenian Mouflon and the Greek Tortoise). At the same time, it should be noted that the proposed road in these sections will run parallel to the existing road, 100-200m away from it, and at the end of the route will be aligned with the M2 road, thus limiting the overall footprint.

The Project route is located about 4.5 km north-west of **Meghri IBA** that is also a **KBA** (smaller of the two Meghri KBAs)⁷¹. The area of this KBA is 33,378 ha and there are 17 bird species triggering IBA and KBA criteria. A larger **Meghri KBA**⁷² of 123,647 ha encompasses Zangezoor IBA/KBA almost fully, around half of **Meghri IBA's** area, and the large part of Syunik Region, including the Project area (Figure 23). The species triggering the larger Meghri KBA criteria are *Capra aegagrus*, *Lutra lutra*, *Ovis orientalis*, *Testudo graeca*, *Neophron percnopterus*, *Gypaetus barbatus*, and *Lyrurus mlokosiewiczii*. The larger Meghri KBA is described in the CEPF Ecosystem Profile of the Caucasus Biodiversity Hotspot (East lesser Caucasus Hotspot)⁷³. Both Meghri KBAs as well as Zangezoor KBA need to be reassessed against the global KBA Standard.

Other Identified Areas of Biodiversity Conservation Interest

The Caucasus priority conservation areas and eco-corridors (WWF Caucasus)⁷⁴ are close to the Project area. Desk-top screening indicates that the Project is located between two Caucasus eco-corridors, i.e., 1) Bichenek – Zangezur eco-corridor in the west and 2) Mount Giamysh - Meghri - Marakan-Kiamaky. The Project then overlaps the cross-border Priority conservation area of Zangezur and is in the vicinity of the Priority Conservation Area of Meghri.

Alliance for Zero Extinction Sites

⁷⁰ <http://www.keybiodiversityareas.org/site/factsheet/19768>. Year of assessment 2002.

⁷¹ <http://www.keybiodiversityareas.org/site/factsheet/19761>. Year of assessment 2002.

⁷² <http://www.keybiodiversityareas.org/site/factsheet/46744>. Year of assessment 2004.

⁷³

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjgkCwL_wAhWSmRQKHTCYBpwQFjABegQIBBAD&url=https%3A%2F%2Fwww.cepf.net%2Fsites%2Fdefault%2Ffiles%2Ffinal.caucasus.ep_.pdf&usq=AOvVaw3RxW3qMFqtsiqpWnX-VHJa

⁷⁴ WWF Caucasus. <https://sustainable-caucasus.unepgrid.ch/maps/1042> and <https://drive.google.com/file/d/1Jazc5DKPYTj5hbdJkfgGQ0iKZFMHC32p/view>. WWF. 2020. Edited by Zazanashvili et al. https://wwfeu.awsassets.panda.org/downloads/ecp_2020_part_1_1.pdf.

Only one 'Alliance for Zero Extinction Site' is demarcated in Armenia; i.e., Sevan Lake, which is due east of Yerevan, close to the Azerbaijan border and well removed from the Project area. This is also confirmed by the IBAT report generated for the Project location⁷⁵.

Synthesis on Protected Areas and Areas of Biodiversity Importance Relative to the Project

The proposed road will overlap the following protected areas (for details refer to [Table 20](#)):

- Zangezur Sanctuary (100 % subterranean based on the Project design to date);
- Zangezoor IBA and KBA, and
- Meghri KBA (2004).

The Project will thus occur in areas of conservation importance that are nationally and globally significant. The largest type is KBA, and the most vulnerable fauna here are large mammals – *Capra aegagrus*, *Ovis orientalis*, *Ursus arctos*, *Panthera pardus*; cocks and raptors – *Lyrurus mlokosiewiczzi*, *Tetraogallus caspius*, *Gypaetus barbatus*, *Neophron percnopterus*, *Aquila chrysaetos*, reptiles – *Testudo graeca*, as well as some invertebrates – *Parnassius apollo*, *Agrodiaetus aserbeidschanus*.

Birds and mammals may be sensitive to blasting, especially in breeding, hibernation and migration seasons. Reptiles may be vulnerable due to habitat fragmentation, while invertebrates are vulnerable to habitat destruction. As a such, biodiversity surveys must determine specific locations and timing of stages of the annual lifecycle, while for the invertebrates, core habitats must be defined.

Table 20. Synthesis of Protected Areas and Areas of Biodiversity Importance Relative to the Project Area

N°	Name of the Area	IUCN PA Category	Type	Overlap with the Project's footprint
1	Arevik	II	National Park	No
2	Shikahogh	Ia	State Reserve	No
3	Zangezur Sanctuary	IV	Sanctuary	The Bargushat tunnel runs under Zangezur sanctuary through the Bargushat ridge (Figure 21).
4	Khustup	-	Sanctuary	No
5	Plane Grove	IV	Sanctuary	No
6	Boghaqar	IV	Sanctuary	No
7	Sev Lich	IV	Sanctuary	No
8	Zangezoor	-	IBA / KBA	The Bargushat tunnel runs under the Zangezur IBA/KBA through the Bargushat ridge (Figure 23).
9	Meghri (2002)	-	IBA / KBA	No
10	Meghri (2004)	-	KBA	Yes (Figure 23)
11	Zangezur	-	Emerald site	Yes (Figure 22)

5.1.8.2 Habitats and Flora

Habitats

Preliminary desktop information includes the following habitats: inland surface waters, grasslands and lands dominated by forbs, mosses or lichens, woodland, forest and other wooded land, regularly or recently cultivated agricultural, horticultural and domestic habitats and inland unvegetated or sparsely vegetated habitats. Detailed information on these habitats and how they may be affected by the road is partly available. Further ESIA investigations

⁷⁵ IBAT PS6 & ESS6 Report. Generated under licence 7790-17641 from the Integrated Biodiversity Assessment Tool on 24 June 2021 (GMT).

include detailing the types of habitats (natural/modified), identifying habitat locations on the road segments, and depending on the availability of information, producing a map of the land use focusing on the EAAAs and a 1km buffer centred on the entire Project footprint.

Flora

The Project area is in the Zangezur floristic region (Caucasian sub province, Tsirkumboreal province, Boreal Floral sub-kingdom and Holarctic kingdom). The vegetation of the study area has mezo-xerophilous and mesophilic character with specific steppes, steppe-meadows and forests including riparian forests. In some sections the area has scrub and rocky vegetation but in the southern part of study area, the flora is mainly woody. In the upper parts, the area has perennial grasses but in the northern part and middle altitudes the flora is mainly light forests with different Juniper species, Jerusalem thorn bushes, wild palms, and others.

During a flora and faunal survey (FFS) conducted in 2016-2017, 363 species, 240 genera and 85 families from 5 classes of higher plants were recorded along the proposed road alignment and proximity. Dicotyledons dominate with 299 species, 194 tribes, 63 families. Monocotyledons include 51 species, 37 species of 15 families. Gymnospermae, Pteridales, Equisetales and Mosses together make up 3.6% of the species composition within the study area and includes 13 species (see [Table 21](#)).

Table 21. The Main Taxonomy Units within the 2017 and 2021 Study Areas

Main taxonomy units			Number of families	Number of genera	Number of species	
Kingdom	Division	Classes				
Plants	Mosses		1	1	1	
	Equisetales		1	1	2	
	Pteridales		2	4	4	
	Gymnospermae		3	3	6	
	Angiospermae	Dicotyledones		63	194	299
		Monocotyledones		15	37	51
Total			85	240	363	

Desktop screening indicates 119 flora species registered in the RA Red Book of Plants in the Zangezur floristic region and within the basins of the Vorotan, Geghi and Voghji rivers. Amongst the 119 flora species, the following seven species are included in Annexes of the CITES⁷⁶ and Bern Conventions:

- The CITES Convention: *Galanthus artjuschenkoae*, *Ophrys apifera*, *Orchis tridentate*, *Orchis punctulate*, *Sternbergia fischeriana* and *Steveniella satyrioides*;
- The Bern convention: *Paeonia tenuifolia*.

In the FFS conducted in October 2016, 10 plant species registered in the Red Book were identified in the study area, mainly occurring in the Shenatagh River canyon near Darbas and in the surroundings of Kajaran, of which, eight are restricted-range species. The list of plants registered in the RA Red Book of Flora and the IUCN Red List are given in [Table 22](#).

Further flora surveys conducted in summer and autumn of 2021 determined the presence of 288 species of flora, including 37 priority species, listed in the RA Red Book of Flora (2010). The species are listed in [Table 22](#).

⁷⁶Convention on International Trade in Endangered Species of Wild Fauna and Flora.

5.1.8.3 Fauna

Birds

The FFS conducted for the 2016-2017 EIA included one season survey (October 2016). Some 68 species of birds, of which 40 species belonged to 10 orders and 28 families, were observed. Seven species are listed in the Red Book of Armenia (*Aquila chrysaetos* - Golden Eagle (VU), *Gypaetus barbatus* - Bearded Vulture (VU), *Accipiter gentilis* - Northern Goshawk (VU), *Circaetus gallicus* - Short-toed Snake-eagle (VU) *Larus armenicus* - Armenian Gull (EN), Roller - *Coracias garrulus* (VU), *Neophron percnopterus* - Egyptian Vulture (EN)) and one bird (*Neophron percnopterus* - Egyptian Vulture (VU)) is registered in IUCN Red Book as endangered.

Subsequent desktop screening indicates a further 17 species that were not identified during the previously conducted FFS, that could occur in the study area (**Annex 3**). From these species two are classified vulnerable as per the IUCN Red Book, namely: 1) A076, Bearded Vulture - *Gypaetus barbatus* (VU) and 2) A229, Kingfisher - *Alcedo atthis* (VU).

Further surveys implemented in winter, spring, summer and autumn of 2021 saw the list of registered birds further expanded to 87 species, including 14 priority species. These include the species included in Red Book of Armenia: Black Stork – *Ciconia nigra* (VU), Levant Sparrowhawk – *Accipiter brevipes* (VU), Lesser Spotted Eagle – *Clanga pomarine* (VU), as well as restricted range species: Green Warbletr – *Phylloscopus nitidus*, Mountain Chiffchaff – *Phylloscopus sindianus*. No breeding populations of IUCN listed Bearded Vulture and Egyptian Vulture yet been identified, with the sites only used for occasional foraging.

Mammals

Armenia and the Syunik Region particularly, is very rich in mammal species due to landscape diversity. Endemic and endangered species that have historical and economic importance occur in the region. The FFS conducted in 2016-2017 lists 94 species and at least 50 mammals were observed during the field study (October 2016). Of these mammal species, 11 are registered in Red Book of Armenia and one species (*Vormela peregusna* - Marbled polecat (VU)) is included in the IUCN Red List.

According to the FFS, the study area contains several bat species habitats: *Rh. hipposideros*, *M. blithy*, *Eptesicus bottae*, *Epresicus serotinus*, *Rhiniolophus ferrumequimun*, *Rh. euryale*, *Myotis blythi*, *Myotis emarginatus*, *Pipistrellus pipistrellus*, and *Plecotus macrobularis* dwelling in canyon from the Qirs to Geghi section. On the mountain slopes near Qarut camera traps of WWF-Armenia recorded Bezoar goats (2012-2015). Armenian mouflon uses the Qirs-Geghi canyon to migrate from summering to wintering habitat. The area is also inhabited by carnivores with evidence of foxes, golden jackals, wild cats and brown bear. Near the forested areas adjacent to Kavchut, roe deer were observed. Mountain meadows were inhabited by several small mammals: *Sorex satunini*, *Sorex volnuchini*, *Mesocricetus brandti*, *Chionomys nivalis* and *Ellobius lutescens*.

In the 2016 field study, several rodent species and insectivore nests were observed along the proposed road route. The high density of rodents and insectivores attracts carnivores. Ungulates were mostly localized within the Qirs-Geghi section and carnivores such as lynx, wolf, bear and leopard may occur.

Further surveys implemented in winter, spring, summer and autumn seasons of 2021 identified 29 species mammals, including 13 priority species. Some of these species are included in the IUCN red List and the Red Book of Armenia such as the Mediterranean horseshoe bat - *Rhinolophus euryale* (IUCN status – NT, Armenian Red Book status - VU).

Amphibians, Reptiles and Fishes

According to the 2016-2017 FFS, the composition of amphibians within the study area is relatively homogenous along the whole Sisian-Kajaran study area. The composition consists of three widespread species, the green toad (*Bufo variabilis*), marsh frog (*Pelophylax*

ridibundus) and Asia Minor frog (*Rana macrocnemis*). In the Geghi-Qajaran section, the Savignyi tree frog (*Hyla savignyi*) can also be found. These species are widespread in Armenia, with wide-ranging habitat. The study area is rich in water bodies / reservoirs, which serve as spawning and growth habitat for these species. Six types of fish can be found in rivers and their various tributaries within the study area, of which *Salmo trutta fario* (Brown Trout or River Trout) is the most valuable in terms of fishing tourism (its population has declined in many other areas of the country due to poaching).

Reptile species composition is more diverse and includes both widespread, rare and protected species. Reptiles are more species rich in km388+00 - km492+00, km494+00 - km545+00, km545+00 - km610+00 and km612+00 - km652+00 chainages with most containing rare species. Twenty-five reptiles were identified during the FFS (2016-2017) from which 4 species (*Telescopus fallax* - Cat snake, *Zamenis hohenackeri* - Transcaucasian rat snake, *Montivipera raddei* - Radde's viper and *Vipera (Pelias) eriwanensis* - Armenian steppe viper) are registered in the Red Book of Armenia as vulnerable. *Vipera (Pelias) eriwanensis* - Armenian steppe viper is also included in the IUCN Red List as vulnerable. Two reptile and three fish species that can potentially inhabit the Project area have also been identified, from which *Barbus capito* - Bulat-mai barbel is classified as vulnerable ([Annex 4](#)).

Further surveys during 2021 identified 19 species of reptiles, including 6 priority species and 3 species of amphibians. Those include the species included in IUCN Red List and the Red Book of Armenia: Mediterranean turtle - *Testudo greaca* (IUCN status – VU, Armenian Rd Book status - VU).

Invertebrates

Some 70 orders of invertebrates and 1,735 species of insects and molluscs were noted in Syunik Region in the FFS. Given that the distribution of invertebrates in Syunik Region is highly variable, field studies covered the Sisian region and Voghji river basin (Kajaran region). In total, 153 rare and endangered invertebrate species are included in Red Book of Armenia, from which 55 species can be found in Syunik region (5 molluscs and 50 insects).

13 species of invertebrates can potentially occur in the Project study area or proximity although none have vulnerable or endangered IUCN categorisation. The invertebrates registered in the RA Red Book of Animals as well as their status as per the IUCN Red List are given in [Annex 5](#).

Further study of butterflies implemented in summer and autumn seasons of 2021 identified 90 species of butterflies, including three priority species. These include species in the Red Book of Armenia: *Parnassius apollo kashtshenkoi* (VU), *Brenthis ino schmitzi* (VU), *Agrodiaetus aserbeidschanus* (VU).

5.1.8.4 Ecosystem services

No information is available on ecosystem services in the Project area. As such EBRD PR6 and associated 2020 Guidance Note will be used in the ESIA to define ecosystem services. Affected communities will be consulted to ascertain ecosystem services and their degree of dependence (refer to stakeholder engagement proposed in [Section 7.4](#) and [Annex 6](#)).

5.1.8.5 Synthesis on Ecological Sensitivity along the Project

Preliminary results from the 2017 EIA Report, the EMP and 2021 surveys highlight that the most sensitive parts of the current Project are:

- The section between Aghitu and Shamb regarding flora species, some species of birds (*Gypaetus barbatus*, *Clanga pomarine*, *Phylloscopus lorenzii*, *Phylloscopus nitidus*, *Larus armenicus*) and a species of mammal (*Hystrix indica*): presence of diversified habitats (including a wetland) and preys for raptors;
- The section between Shenatagh and Qirs for birds lekking species such as *Tetraogallus caspius* and *Tetrao mlokosiewiczzi*, ungulates such as *Capra aegagrus*

and *Ovis orientalis gmelina*, carnivores such as *Panthera pardus*, *Ursus arctos*, *Canis lupus*, bats roosting and breeding in rocky habitats (this area is overlapping the Zangezur Protected Area, although at this stage the road will pass underneath the Sanctuary – in a tunnel), especially regarding tunnel blasting;

- The section between Qirs and Geghavank regarding large mammals.

The road section in the Kajaran area contains certain floral and bird sensitivity as well (e.g. *Tulipa sosnovskyi*; and breeding *Aquila chrysaetos* and *Accipiter gentilis*). Fieldwork planned in the Project area will determine such sensitivities and double check the ecological sensitivity of the other sections of the connecting and existing roads.

Table 22 below synthesises the estimated ecological sensitivity of the Project facilities and associated facilities based on literature review, studies of 2016, and the winter, spring, summer and autumn surveys of 2021 (conducted by Biogeotech (Armenia)).

Table 22. Synthesis of the Main Biodiversity Values along the Project Road

Habitats and Species	Section 0-x ⁷⁷	Section x-y	IUCN Red list	Armenia Red Book	EU Birds and Habitats Directive
Habitats⁷⁸					
<i>Inland surface waters</i>					
<i>Grasslands and lands dominated by forbs, mosses or lichens</i>					
<i>Woodland, forest and other wooded land</i>					
<i>Regularly or recently cultivated agricultural, horticultural and domestic habitats</i>					
<i>Inland unvegetated or sparsely vegetated habitats</i>					
Flora					
<i>Hypericum armenum</i>				CR	
<i>Polystichum lonchitis - Common Holly</i>				EN	
<i>Psephellus zangezuri</i>				EN	
<i>Tanacetum zangezuricum</i>				EN	
<i>Campanula zangezura</i>				EN	
<i>Astragalus xiphidium</i>				EN	
<i>Gladiolus hajastanicus</i>				EN	
<i>Iris lineolata (Trautv.)</i>				EN	
<i>Tulipa sosnovskyi</i>				EN	
<i>Pyrus voronovii</i>				EN	
<i>Botrychium lunaria</i>				VU	
<i>Allium derderanum</i>				EN	
<i>Bupleurum pauciradiatum</i>				VU	
<i>Arum conophalloides</i>				EN	
<i>Centaurea elbrusensis</i>				EN	
<i>Centaurea rhizocalathium</i>				EN	
<i>Cousinia gabrielianae</i>				EN	
<i>Tragopogon tuberosus</i>				VU	
<i>Physoptychis caspica</i>				EN	
<i>Thlaspi zangezuricum</i>				EN	
<i>Gypsophila aretioides</i>				EN	
<i>Astragalus agasii</i>				CR	
<i>Astragalus humilis</i>				CR	
<i>Astragalus kirpicznikovii</i>				EN	
<i>Astragalus prilipkoanus</i>				EN	

⁷⁷ The existing road section-wise information will be collected and synthesises following the field surveys.

⁷⁸ As per the Bern Convention.

Habitats and Species	Section 0-x ⁷⁷	Section x-y	IUCN Red list	Armenia Red Book	EU Birds and Habitats Directive
<i>Onobrychis meschetica</i>				CR	
<i>Lomatogonium carinthiacum</i>				VU	
<i>Dracocephalum botryoides</i>				EN	
<i>Teucrium hyrcanicum</i>				VU	
<i>Ophrys apifera</i>				CR	
<i>Steveniella satyroides</i>				EN	
<i>Paeonia tenuifolia</i>				EN	
<i>Bromopsis zangezura</i>				EN	
<i>Sclerochloa woronowii</i>				EN	
<i>Ranunculus cicutarius</i>				EN	
<i>Crataegus zangezura</i>				EN	
<i>Potentilla cryptophila</i>				EN	
<i>Pyrus grossheimii</i>				EN	
<i>Rubus zangezurus</i>				EN	
Amphibians					
Syrian spadefoot - <i>Pelobates syriacus</i>			LC	VU	-
Reptiles					
Cat snake - <i>Telescopus fallax</i>			LC	VU	-
Transcaucasian rat snake - <i>Zamenis hohenackeri</i>			LC	VU	-
Armenian Viper - <i>Vipera (Montivipera) raddei</i>			NT	VU	-
Armenian steppe viper - <i>Vipera (Pelias) eriwanensis</i>			VU	VU	-
Schneider's skink - <i>Eumeces schneiderii</i>			-	VU	-
Mediterranean turtle - <i>Testudo greaca</i>			VU	VU	VU
Invertebrates					
<i>Columella columella</i>			LC	CR	-
Ornate Bluet - <i>Coenagrion ornatum</i>			LC	VU	-
<i>Onychogomphus assimilis fulvipennis</i>			-	VU	-
<i>Phytodrymadusa armeniaca</i>			-	VU	-
<i>Procerus scabrosus fallettianus</i>			-	VU	-
<i>Cortodera kaphanica</i>			-	EN	-
<i>Cerambyx cerdo acuminatus</i> (Synonym: <i>Cerambyx cerdo cerdo</i>)			VU	VU	NT
<i>Parnassius apollo kashtshenkoi</i>			LC	VU	NT
<i>Brenthis ino schmitzi</i>			-	VU	-
<i>Maculinea arion zara</i>			-	VU	-
<i>Maculinea alcon monticola</i>			-	VU	-
<i>Agrodiaetus huberti</i>			-	EN	-
<i>Agrodiaetus aserbeidschanus</i>			-	VU	-
<i>Proserpinus proserpina</i>			DD	VU	NE
Mammals					
Long eared hedgehog – <i>Hemiechinus auritus</i>			LC	EN	-
Mehely's horseshoe bat - <i>Rhinolophus mehelyi</i>			VU	VU	VU
Mediterranean horseshoe bat - <i>Rhinolophus euryale</i>			NT	VU	VU
Blasius' horseshoe bat - <i>Rhinolophus blasii</i>			LC	EN	VU
Eastern Barbastelle – <i>Barbastella caspica</i> (Synonym of <i>Barbastella leucomelas</i>)			LC	VU	NE
Marbled polecat - <i>Vormela peregusna</i>			VU	VU	VU
Wild goat (Bezoar goat) – <i>Capra aegagrus</i>			NT	VU	NE
Armenian mouflon – <i>Ovis orientalis gmelinii</i>			NT	EN	NE
Transcaucasian Water Shrew – <i>Neomys teres</i>			LC	VU	-
Schreiber's Bat – <i>Miniopterus schreibersii</i>			VU	VU	NT
Indian Crested Porcupine – <i>Hystrix indica</i>			LC	VU	-
Brown bear – <i>Ursus arctos</i>			LC	VU	LC
Wildcat – <i>Felis silvestris</i>			LC	VU	LC
<i>Panthera pardus saxicolor</i>			-	CR	-

Habitats and Species	Section 0-x ⁷⁷	Section x-y	IUCN Red list	Armenia Red Book	EU Birds and Habitats Directive
Birds					
Caspian Snowcock – <i>Tetraogallus caspius</i>			LC	VU	-
Caucasian Black Grouse – <i>Tetrao mlokosiewiczii</i>			NT	VU	-
Black Stork – <i>Ciconia nigra</i>			LC	EN	LC
Bearded Vulture - <i>Gypaetus barbatus</i>			NT	VU	VU
Egyptian Vulture - <i>Neophron percnopterus</i>			EN	EN	EN
Black Vulture - <i>Aegypius monachus</i>			NT	EN	LC
Griffon Vulture - <i>Gyps fulvus</i>			LC	VU	LC
Northern Goshawk – <i>Accipiter gentilis</i>			LC	VU	LC
Levant Sparrowhawk – <i>Accipiter brevipes</i>			LC	VU	LC
Golden Eagle - <i>Aquila chrysaetos</i>			LC	VU	LC
Lesser Spotted Eagle – <i>Clanga pomarina</i>			LC	VU	LC
Kingfisher - <i>Alcedo atthis</i>			LC	-	VU
Green Warbler – <i>Phylloscopus nitidus</i>			LC	LC	LC
Mountain Chiffchaff – <i>Phylloscopus sindianus</i>			LC	LC	LC
Fishes					
Aral asp - <i>Aspius aspius</i>			LC	VU	LC
Bulat-mai barbel - <i>Barbus capito</i>			-	-	VU

5.2 Socio-Economic Baseline

5.2.1 Administrative Structure

The Project is in the Sisisan and Kajaran Communities of Syunik Region, in the south of the RA. In the north the region borders the Vayots Dzor Region, in the south - the Islamic Republic of Iran (the length of border is 42 km), in the west – with Nakhijevan Autonomous Republic of Azerbaijan and in the east – with Azerbaijan.

Syunik Region's area is 4,506 km² (15.1% of Armenia). Its administrative centre is Kapan Town. The Region includes eight communities (self-governing administrative units) that further encompass seven towns and 131 rural settlements⁷⁹.

5.2.2 Demography

The population of Syunik Region was 137.3 thousand people (around 4.6% of Armenia's population) in January 2011. The Region's population density is 30 inhabitants/km², which is one of the lowest of the RA regions (the country's average population density is around 100 inhabitants/km²). The region has the highest share of urban population among the RA regions: 67.9% vs. the country's average of 43.1%. Most of the region's population lives in towns (Kapan- 42.2, Sisian- 14.8, Goris- 20.4, Kajaran- 6.9, Meghri- 4.5, Agarak- 4.1 thousand inhabitants). Around 26% of the Syunik Region population is aged 65 and above, and around 47% are aged 0-19.

The population growth in 2016-2020 was negative (-1.5%). There is a substantial difference between population growth in urban (-0.9%) and rural (-2.9%) areas of Syunik Region. The region's population decline rate is among the country's lowest, the lower population decline rates were noted only in Ararat Valley regions (Ararat, Armavir) and Kotayk Region. The gender distribution of the Region's population is: male - 48.5%, female- 51.5%, which corresponds to the national rates (male-47.5% to female-52.5%).

⁷⁹ Statistical Committee of the RA, Marzes of the RA and Yerevan city in figures, 2020. <https://www.armstat.am/en/?nid=81&id=2324>

Syunik Region is characterized by the lowest birth rate (vs. other regions) in Armenia (9.8‰ against the 12.2‰ national average). The Region's death rate aligns with the national average (8.7‰ against 8.8‰)⁸⁰. Information on demographic and migration trends, as well as population age structure and other demographic characteristics, for some of the villages that are crossed or are located close to the Project facilities and the existing road is fragmented and partly outdated.

5.2.3 Ethnic Minorities

In Syunik Region, there are settlements where ethnic minorities live. According to the latest census of 2011⁸¹, there are only 414 ethnic minority residents, of whom 259 are Russians. During the 1987–1989 conflict over Nagorno-Karabakh, the Azeri inhabitants fled the region. Among the languages of ethnic minorities, only Russian is used in the region. Ethnic minorities can communicate in Russian with public and local authorities. Further information for the villages in the Project area needs to be collected and will be done so as part of the ESIA.

5.2.4 Economy

Industry is the leading sector of the Region's economy (73.1%), followed by agriculture (12.4%) and services (5.4%) (**Figure 24**). Around 68% of the region's total area is agricultural land⁸². The rural population is mainly involved in agriculture, i.e., plant growing and large and small cattle farming. The main crops are grains, dry grains, potatoes and vegetables. Orcharding occurs in the southern part of the region (Meghri Community).

The Syunik Region is rich in minerals. The most valuable are non-ferrous metals (copper, molybdenum, zinc and others), precious metals (gold and silver) and non-metal minerals (construction and decorative stones, basalt raw materials, limestone and burnt shale marble and granite resources). The main industrial activities, mining, processing industry and gas / power generation, constituting ca. 81%, 9.7% and 8.4%, respectively. Most electricity produced in the Region is generated by the Vorotan Hydro Power Stations Cascade.

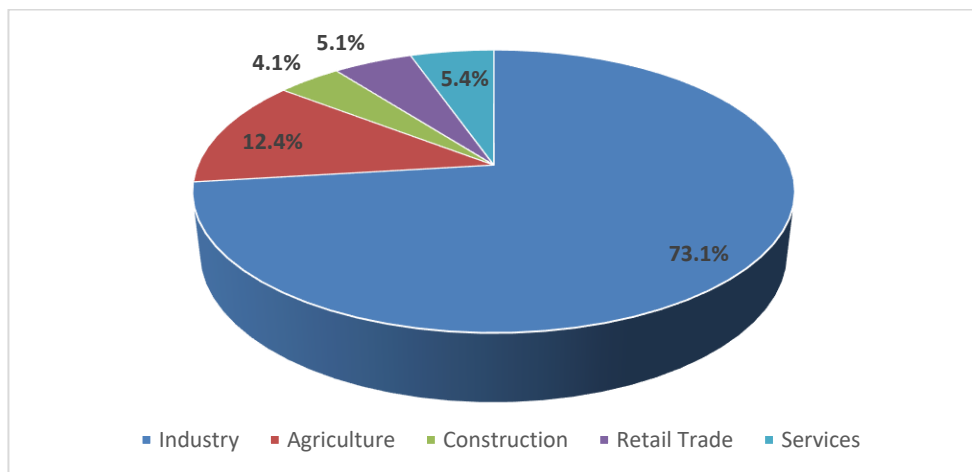


Figure 24. Structure of Syunik Region Economy (2019)

The shares of regional industrial and agricultural outputs in the corresponding sectoral national outputs are 16.6% and 6.9% respectively. The share of regional mining output in Armenia's total is 79.4%, so the region is of strategic importance for the country's economy. The Region

⁸⁰ ibid

⁸¹ The 2011 Census Results, ethnic composition of Syunik Region. <https://armstat.am/file/doc/99483408.pdf>

⁸² https://www.armstat.am/file/article/marzer_2020_33.pdf.

remains underpopulated, however, and economically less developed due to its remoteness / large distance from the capital and lack of alternative modes of transport communications.⁸³

5.2.5 Poverty and Unemployment, Incomes and Expenditures

The average monthly nominal wage in the Syunik Region was 266,832 AMD in 2019 (around EUR 505), which is the highest of the RA Regions (including Yerevan). The region's average wage is 32% higher than the national average. Such high average wages are due to high-paid jobs in the mining sector. At the same time, there is gap between wages in private (mainly male employment) and public (mainly female employment) sectors.

Similarly, the Syunik Region has the highest monthly per capita income among the RA regions (including Yerevan). The per capita income in 2018 was 97,146 AMD (around EUR 185), which is 59% higher than the country's average. Poverty in Syunik Region is one of the country's lowest: in 2018, the region's poverty rate was 16.7%, while the national average rate was 23.5%.

The region's unemployment rate is 15.0%, which is much less than the Country's average (18.3%). It is important to mention the gap between male (10.4%, one of the country's lowest) and female (21.1%, one of the country's highest) unemployment rates, which is caused by the predominance of mining employment, where limited employment opportunities for women are available⁸⁴.

5.2.6 Gender Issues

The country's Constitution guarantees equal rights for all citizens. The Law on Equal Rights and Equal Opportunities for Men and Women in Armenia laid the foundations for gender policies and legislation. Armenia has ratified the UN Convention on the Elimination of All Forms of Discrimination Against Women as well as several ILO Conventions, among them Convention 100 on Remuneration for Male and Female Workers for Work of Equal Value. The Government of Armenia has adopted the Gender Equality Strategy 2019–2023⁸⁵ that articulates priorities and way forward to mainstream gender across diverse sectors.

Armenia's Human Development Index (HDI), for 2019 is 0.776 – a high human development category - positioning it at 81 out of 189 countries and territories (2020 Human Development Report⁸⁶). The 2019 female HDI value for Armenia is 0.766 in contrast with 0.780 for males, resulting in a Gender Development Index (GDI) value of 0.982, placing it into Group 1⁸⁷ (the GDI is calculated for 167 countries). In comparison, GDI values for Azerbaijan and Georgia are lower - 0.943 and 0.980, respectively⁸⁸.

Meanwhile, the country is still facing the following gender inequality challenges (2019)⁸⁹:

- **Gender norms and attitudes.** Gender equality is not only enshrined in law but is becoming more accepted as a social norm. However, prevailing gender stereotypes limit women and men to defined social, domestic, and economic roles. Men are

⁸³ ibid

⁸⁴ ibid

⁸⁵ The RA Government Decree No 1334-L dated 19.09.2019, <http://www.irtek.am/views/act.aspx?aid=151906>

⁸⁶ UNDP Human Development Report 2020, Armenia. <http://hdr.undp.org/sites/default/files/Country-Profiles/ARM.pdf>.

⁸⁷ Countries are divided into five groups by absolute deviation from gender parity in HDI values. Group 1 comprises countries with high equality in HDI achievements between women and men (absolute deviation of less than 2.5%) and group 5 comprises countries with low equality in HDI achievements between women and men (absolute deviation from gender parity of more than 10%).

⁸⁸ ibid

⁸⁹ ADB, Armenia: Country Gender Assessment, 2019 <https://www.adb.org/sites/default/files/institutional-document/546716/armenia-country-gender-assessment-2019.pdf>

strongly perceived as breadwinners and better politicians. Women's roles are more associated with domestic and childcare tasks.

- **Women's participation in decision-making.** An amendment to the Electoral Code of the RA increased the minimum quota for women's representation to 25% of electoral candidates who run for office. As a result, women hold that ratio of national assembly seats. Despite this positive advancement, further progress is needed to increase their political representation. Only 1 out of 14 ministerial positions is held by a woman. At the subnational level, women are only 11% of the members of community councils, 8% of deputy heads of province, and no of province heads.
- **Economic empowerment.** Women's labour force representation is lower than that of men, with just over half (51.4%) of women of working age participating in the labour force, compared with 70.6% of men. Women are more likely to work in part-time positions than men (34% vs. 18%). Unemployment is high among young women (aged 15–24) at 45%, compared with 33.3% of men in the same age group.
- **Reduced time poverty.** Women experience time poverty due to their responsibility for unpaid domestic tasks. Women's time poverty is accentuated when they enter the labour force and their domestic workload does not reduce. In rural areas, men are more likely to assume mechanical/technological tasks, leaving more time-consuming manual labour such as fetching water, to women.

Further information on gender employment and wage gaps in Syunik Region is to be collected for the village level during the ESIA.

5.2.7 Brief Overview of the Affected Communities

Kajaran Community includes Kajaran town and 20 rural settlements. The community's population is around 8,300 people, including 6,940 people living in Kajaran. The main contributor to the economy is mining. The community's economy has its share of the processing industry, in which the production of food and finished metal products dominates. Agriculture is mostly cattle.

Sisian Community includes Sisian and Dastakert as well as 30 rural settlements. The community's population is around 30,600 people, including about 14,800 people living in Sisian. Power generation is the main economic activity followed by food processing and non-metal mining. Agriculture is mainly grain and potatoes as well as cattlebreeding.

5.2.8 Land Use and Land Rights

The proposed road will cross the lands of 22 villages belonging to 13 administrative units:

- **Sisian Community:** Ishkhanasar, Sisian, Uyts, Aghitu, Noravan, Vaghatin, Vorotnavan, Darbas, Shamb, Getatagh, Lor, and Shenatagh.
- **Kajaran Community:** Qirs, Karut, Geghi, Verin Geghavank, Geghavank, Getishen, Vocheti, Nor Astghaber, Kavchut, and Dzagikavan.

Table 23 below lists the settlements that are located in the vicinity of the proposed road and indicates distances to it. All of them will be affected by the land take to a various extent.

Table 23. Settlements Located in the Vicinity of the Proposed Road

No.	Administrative Unit/Area	Settlement (Village/City)	Location in relation to the proposed road
Sisian Community			
1	Ishkhanasar	Ishkhanasar	Approximately 820 m to the north of the proposed road intersection with the M-2 highway
2	Sisian	Sisian	650 m to the west from the tunnel TU001 (section km 4+750 - km 5+250 of proposed road)
3	Uyts	Uyts	Approximately 1300 m to south of the tunnel TU001 (section km 4+750 - km 5+250 of proposed road)

No.	Administrative Unit/Area	Settlement (Village/City)	Location in relation to the proposed road
4	Aghitu	Aghitu	The nearest residential house is located at the distance of 50 m to the north of km 7+400 of the proposed road
5	Noravan	Noravan	Approximately 1000 m to the north of the tunnel TU002 (section km 8+100 - km 8+800 of proposed road)
6	Vaghatin	Vaghatin	The nearest residential house is located at the distance of 250 m to the north of km 11+500 of proposed road
7	Vorotnavan	Vorotnavan	Approximately 650 m to the east of the bridge BR005 over the Vorotan river (section km 12+650 - km 13+200 of proposed road)
8	Darbas	Shamb	Approximately 1300 m to the west of proposed road, section km 15+600 - km 16+200
		Darbas	Approximately 200 m to the east of proposed road, section km 18+700 - km 19+300
9	Getatagh	Getatagh	Approximately 200 m to the west of proposed road, section km 20+000 - km 20+750
10	Lor	Lor	Approximately 170 m to the west of proposed road, section km 22+050 - km 20+350
11	Shenatagh	Shenatagh	The proposed road passes near the eastern border of Shenatagh settlement, 1-2 houses can be affected (section km 26+200 - km 26+500)
Kajaran Community			
12	Geghi	Qirs	Located under the bridge at the section km 36+300 - km 36+550
		Karut	Located at the distance of about 50 m to west from the road section km 38+700 - km 39+000
		Geghi	About 180-200 m to the south of the proposed road section km 45+000 - km 45+600
		Verin Geghavank	About 90-100 m to the south of the proposed road section km 47+700 - km 48+000
		Geghavank	About 350 m to the north of the proposed road section km 50+900 - km 51+000
		Getishen (old name: Chayqend)	Located at the distance of more than 400 m to west from the tunnel TU007 (section km 43+900 - km 44+400)
		Vocheti (old name: Hajatin)	Located at the distance of more than 500 m to west from the tunnel TU007 (section km 43+900 - km 44+400)
		Nor Astghaberd (old name: Payahan)	Located at the distance of more than 1000 m to west from the tunnel TU007 (section km 43+900 - km 44+400)
13	Lernadzor	Kavchut	About 65-70 m to the north-east of the proposed road, near the tunnel TU009 (section km 54+300 - km 54+900)
		Dzagikavan (old name: Musallam)	About 200 m to the east of the proposed road section km 55+500 - km 55+800

According to the Preliminary LARP⁹⁰, the following legal categories of lands are affected based on cadastral maps:

1. **Privately owned:** 245 plots (209 agricultural; 33 residential, 1 industrial; 2 special use) with an area of 276,855.87m². During the consultation meetings conducted by the ESIA Consultant in the affected settlements it was found out that only in 1-2 cases (in Shenatagh village), there are private houses that may be affected by the bridge pillars

⁹⁰ J/V SPEA Engineering-IRD Engineering. Nov. 2016. Preliminary LARP. Preliminary Design. TRANCHE 4. Section Sisian – Kajaran. North-South Road Corridor Investment Program.

installation, in most cases, the residential category lands are used for agricultural purposes as arable or pasture lands as well as orchards.

2. **Community land:** 236 plots (191 agricultural; 26 non-agricultural; 19 special use) with an area of 1,955,421.61 m². These lands are directly administered by local self-governing bodies and are typically used by community members as pastures and designated as places for public amenities, rural roads or reserved for future use. Some of these lands can be formally leased to private persons or informally given for free short-term use to private persons (informal tenants on the community land). Data on leased or informally used community lands will be identified during the LARP development.
3. **Government Land:** 36 plots with an area of 611,729.27 m². From these, 1 plot is agricultural and the rest (35) are special use lands.
4. **Mixed Land:** 9 plots with an area of 425,242.25 m² have mixed ownership status, from these 2 are agricultural and 7 are non-agricultural.
5. **Unidentified Land:** The land type and ownership status of 21 land plots is unknown due to the lack of information in cadastre on them. The ownership status of these properties will be determined during the Resettlement Plan development.

Land needs for other Project components are unknown at present, especially in respect of temporary land-take such as laydown areas, construction camps and borrow pits. These facilities will be determined by the Construction Contractor using the land acquisition principles of the Project's Resettlement Framework (RF).

It is assumed that the existing roads - Sisian-Shenatagh (either via Sisian or Norovan) and Tatev-Kapan (H45) roads) will be used to transport the construction materials and staff to the construction sites. The existing Sisian-Shenatagh road runs through the Project's affected communities in parallel with the proposed alignment. The existing road Tatev-Kapan H45 runs through ten settlements (Shinuhayr, Halidzor, Tatev, Aghvani, Tandzaver, Verin Khotanan, Shrevenants, Norashenik, Achanan, and Kapan). Some residential buildings and social facilities (such as a school, hospital, kindergarten, rural administrations, and churches) are located very close to the existing roads (**Figure 25**), and this sensitivity will need to be recognised, assessed and managed during project implementation.



Buildings in Vоротanavan, Kajaran Community

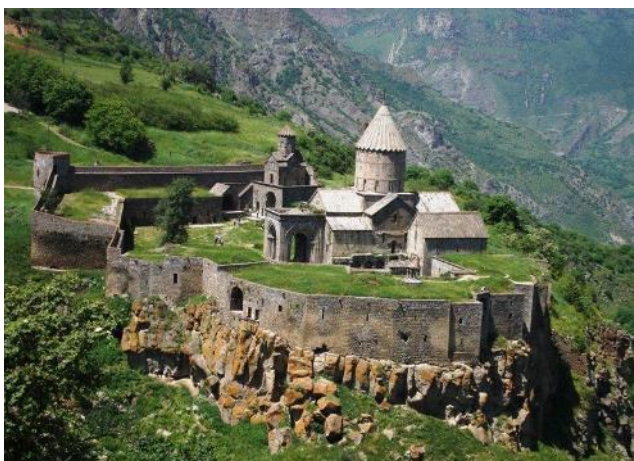


Figure 25. Residential or Social Structures Adjacent to the Project Road

5.3 Cultural Heritage

5.3.1 Tangible Cultural Heritage

The Syunik Region and the environs of the proposed road particularly, are rich in historical and cultural monuments. The Region is one of the most beautiful in Armenia and contains significant historical and cultural heritage sites. The area is mountainous with large, deep gorges of mountain rivers and poorly investigated archeologically. The important historical monuments of the region include the Tatev Monastery (**Figure 26, a**), the picturesque spiritual capital of Southern Armenia, Vorotnavank (**Figure 26, b**), Vahanavank (**Figure 26, c**), the "Zorats Qarer" standing stones near Sisian (**Figure 26, d**), the medieval cave-dwellings of Khndzoresk (**Figure 26, e**) as well as natural heritage such as Sev Lich (**Figure 26, f**) and Shikahogh. Almost all roads in the Syunik Region are surrounded by beautiful monuments and/or sacred sites.



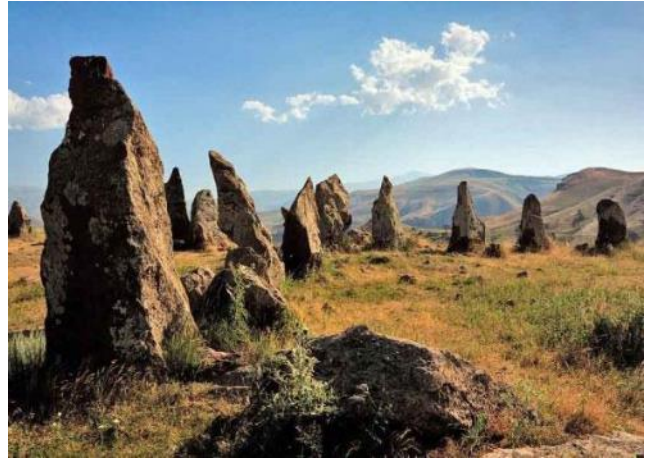
a) Tatev Monastery



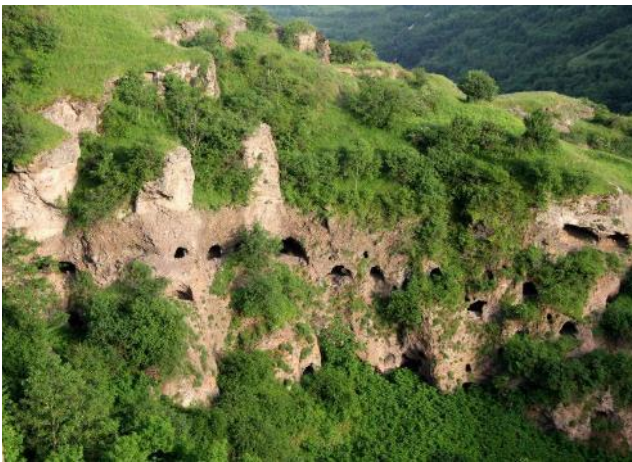
b) Vorotnavank Monastery



c) Vahanavank Monastery



d) "Zorats Qarer" standing stones



e) "Khndzoresk" medieval cave-dwellings



f) "Sev Lich" Lake natural preserve

Figure 26. Famous historical and cultural heritage sites and nature monuments of Syunik Region

Historical and cultural sites/monuments were identified for the purpose of this ESIA using:

1. The RA Government decree No. 2322-N dated 29.12.2005 "On approval of the State list of immovable historical and cultural monuments in the RA Syunik region";
2. The RA Government decree No. 967-N dated 14.08.2008 "On approval of the list of the RA monuments of nature";
3. The RA Government decree No. 385-N dated 15.03.2007 "On approval of the list of State owned immovable historical and cultural monuments that are not subject of alienation/acquisition";
4. The archaeological survey conducted in 2016-2017 within the EIA study of the Tranche 4: Sisian-Kajaran Section Detailed Design Study⁹¹; and
5. The Consultant's inception mission/tour and re-scoping visits held in April and December 2021 respectively.

The archaeological survey conducted for the 2016-2017 EIA included 81 features of cultural, historical, archaeological, paleontological and spiritual importance that could be affected by

⁹¹North-South Road Corridor Investment Program, Tranche 4: Section Sisian-Kajaran, Detail Design, Final Environmental Impact Assessment Report and Environmental Management Plan, November 2019.

the proposed road, including caves, tomb fields, cemeteries, shrines, churches and monasteries, fortresses, units of archaeological, historical-cultural and spiritual significance; fossils, sections of diatomite origin lacustrine sediment, raw-material source (units of geological significance) and natural heritage. The 81 cultural heritage features are concentrated in 59 locations/sites (**Table 24**), of which 11 sites are part of the State list of immovable historical and cultural monuments in the RA Syunik Region (per RA Government decree 2322-N) and 48 were discovered during the archaeological survey. The features were divided into two groups:

- 1) Features (or sites) within the 'area of Project direct impact'
Note from the Consultant: this area was defined as the 'RoW' in the English version of the EIA and as the 'road alignment' in the Armenian version of the EIA and includes the road facilities' footprint; and
- 2) Features (or sites) indirectly affected/impacted by either construction or operations of the road
Note from the Consultant: these are assumed to be outside the proposed road alignment.

Some 38 cultural heritage sites⁹² were expected to be *directly* impacted during Project implementation (**Table 24, red rows**), with 21 sites deemed to be indirectly impacted (**Table 24, blue rows**). Among the 59 cultural heritage locations: i) the "Arzuman's bridge" and Medieval road (**Table 24, site 54**), ii) the Enclosed khachkar or "Loriki khach (Lorik's Cross)" (**Table 24, site 55**) and iii) Spring-monument (**Table 24, site 60**) located in Darbas, Lor and Shenatagh settlements, respectively, are considered important in attracting tourists to the area.

Table 24. Cultural Heritage Units and Sites Identified around the Project Road Alignment

Site	Cultural heritage units (monuments)	Type of the cultural heritage monument	GPS coordinates		Status of cultural heritage site/unit	proposed road piquet
			X	Y		
Sisian Community						
Sisian settlement (sites-5 / units-17)						
1	1	Natural monument	589637.11	4378309.15	newly discovered	km 1+450
2	2	Shrine-sanctuary "Stepan ukht"	589742.85	4377476.55	newly discovered	km 2+320
3	3-15	Settlement and tomb field	589941.37	4377328.34	8.6.4.1*	km 2+550 - km 3+750
4	16	Section of diatomite origin lacustrine sediments 1	590622.36	4375555.18	newly discovered	km 4+600
5	17	Section of diatomite origin lacustrine sediments 2	590755.48	4375228.52	newly discovered	km 4+950
Uyts settlement (sites-1 / units-3)						
6	18-20	Tomb field	590882.84	4375188.72	newly discovered	km 5+100 - km 5+550
Aghitu settlement (sites-10 / units-12)						
7	21	Unclassified structure remains 1	591739.53	4375149.88	newly discovered	km 6+000
8	22	Natural monument 1	591791.68	4375166.81	newly discovered	km 6+040

⁹²Including seven natural monuments, three geological monuments, four monuments of historical, architectural and spiritual significance, and 27 archaeological monuments.

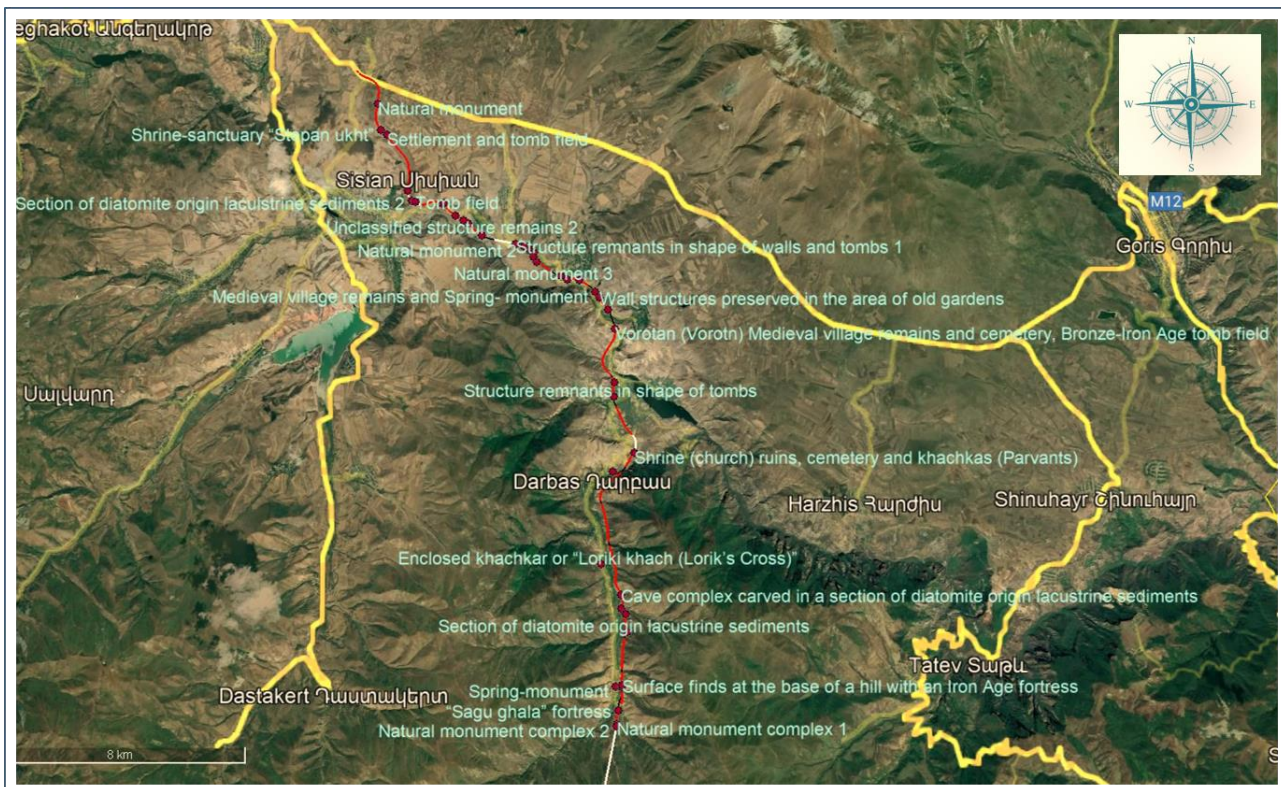
Site	Cultural heritage units (monuments)	Type of the cultural heritage monument	GPS coordinates		Status of cultural heritage site/unit	proposed road piquet
			X	Y		
9	23	Unclassified structure remains 2	592164.03	4374775.3	newly discovered	km 6+550
10	24	Structure remnants or settlement 1	592429.32	4374625.95	newly discovered	km 6+850
11	25	Tomb field or cemetery	592573.23	4374540.64	newly discovered	km 7+020
12	26	Structure remnants or settlement 2	593025.74	4374152.79	newly discovered	km 7+630
13	27-29	Structure remnants in shape of walls and tombs 1	594129.25	4373887.3	newly discovered	km 8+790 - km 8+830
14	30	Natural monument 2	594383.92	4373824.69	newly discovered	km 9+030
15	31	Structure remnants in shape of walls and tombs 2	594435.65	4373827.65	newly discovered	km 9+090
16	37	Natural monument 3	594813.28	4373323.1	newly discovered	km 9+700
Noravan settlement (sites-5 / units-5)						
17	32	Natural monument 1	594560.26	4373734.38	newly discovered	km 9+220
18	33	Natural monument 2	594583.13	4373677.82	newly discovered	km 9+250
19	34	Wall structure remnants near Natural monument 2	594582.88	4373719.89	newly discovered	km 9+250
20	35	Natural monument 3	594722.14	4373624.47	newly discovered	km 9+400
21	36	Remnants of a truncated settlement	594711.82	4373483.48	newly discovered	km 9+500
Vaghatin settlement (sites-5 / units-8)						
22	38	Section of diatomite origin lacustrine sediments	595603.62	4372883.26	newly discovered	km 10+600
23	39	Surface finds around wall structure remnants	595807.70	4372771.01	newly discovered	km 10+890
24	40	Wall structure remnants	596196.00	4372761.73	newly discovered	km 11+230
25	41	Medieval village remains and Spring monument	596715.64	4372393.01	newly discovered	km 11+900
26	42-45	Wall structures preserved in the area of old gardens	596856.03	4372211.17	newly discovered	km 12+100 - km 12+590
Vorotan settlement (sites-2 / units-4)						
27	46	Section of diatomite origin lacustrine sediments	597138.84	4371825.09	newly discovered	km 12+590
28	47-49	Vorotan (Vorohtn) Medieval village remains and cemetery, Bronze-Iron Age tomb field	597371.12	4371210.73	8.78.2 and 8.78.2.1*	km 13+240 - km 12+550
Darbas settlement (sites-4 / units-5)						
29	50	Flint raw-material source for making stone tools	597376.53	4369479.94	newly discovered	km 15+200
30	51	Structure remnants in shape of tombs	597366.60	4369017.05	newly discovered	km 15+660
31	52-53	Shrine (church) ruins, cemetery and khachkas (Parvants)	598052.12	4367209.37	8.31.3*	km 17+690
32	54	"Arzuman's bridge" and Medieval road	597362.24	4366594.72	8.31.10*	km 18+600
Lor settlement (sites-5 / units-5)						

Site	Cultural heritage units (monuments)	Type of the cultural heritage monument	GPS coordinates		Status of cultural heritage site/unit	proposed road piquet
			X	Y		
33	55	Enclosed khachkar or "Loriki khach (Lorik's Cross)"	597025.94	4363619.91	8.41.2.1*	km 22+200
34	56	Cave complex carved in a section of diatomite origin lacustrine sediments	597679.78	4362642.3	newly discovered	km 22+750
35	57	Mardakayr Medieval village remains and Tsaru S.Hovhannes church, tomb field	597692.66	4362200.24	8.41.6. and 8.41.4*	km 23+160
36	58	Medieval village remains	597842.15	4362030.18	newly discovered	km 23+390
37	59	Section of diatomite origin lacustrine sediments	597902.61	4361461.73	newly discovered	km 23+950
Shenatagh settlement (sites-6 / units-6)						
38	60	Spring-monument	597545.44	4359705.99	-	km 25+700
39	61	Surface finds at the base of a hill with an Iron Age fortress	597753.35	4359756.66	newly discovered	km 25+660
40	62	Cave complex carved in a section of diatomite origin lacustrine sediments	597749.93	4359700.23	newly discovered	km 25+700
41	63	"Sagu ghala" fortress	597645.02	4358944.11	8.71.1*	km 26+920
42	64	Natural monument complex 1	597596.56	4358515.16	newly discovered	km 26+920
43	65	Natural monument complex 2	597591.84	4358452.27	newly discovered	km 26+990
Kajaran Community						
Geghi (Qirs, Karut) settlement (sites-5 / units-5)						
44	66	Medieval village remains 1	595660.36	4349504.58	newly discovered	km 36+140
45	67	Church	595627.95	4349362.21	8.112.1.2*	km 36+300
46	68	Medieval village remains 2	595661.18	4349001.66	8.112.1.1*	km 36+650
47	69	Medieval and modern cemetery	595647.02	4348925.67	8.112.1.1.1*	km 36+720
48	70	Siliceous limestone raw material source 1	598417.98	4344488.79	newly discovered	km 42+300
Nor Astghaberd settlement (sites-2 / units-2)						
49	71	Natural monument 1	598682.12	4344327.34	newly discovered	km 42+510
50	72	Natural monument 2	598733.25	4344258.56	newly discovered	km 42+580
Geghi settlement (sites-1 / units-1)						
51	73	Siliceous limestone raw material source 2	601429.88	4342042.15	newly discovered	km 47+000
Geghi (Verin Geghavank) settlement (sites-1 / units-1)						
52	74	Structure remains (Medieval village remains)	602987.61	4342238.88	newly discovered	km 48+600
Lernadzor (Kavchut) settlement (sites-2 / units-2)						
53	75	Cave-complex Lernadzor-1	607138.97	4340774.49	newly discovered	km 53+180
54	76	Tomb field	607268.98	4340683.48	newly discovered	km 53+300
Lernadzor settlement (sites-4 / units-4)						
55	77	Chalcolithic settlement	604397.66	4335594.95	newly discovered	km 60+270

Site	Cultural heritage units (monuments)	Type of the cultural heritage monument	GPS coordinates		Status of cultural heritage site/unit	proposed road piquet
			X	Y		
56	78	Archaeological complex - Upper Paleolithic open air site, Chalcolithic settlement and Early Medieval tomb field	604171.22	4335110.31	newly discovered	km 60+900
57	79	Kolagegh Medieval village remains and S. Gevorg church	604113.11	4334917.95	8.38.6. and 8.38.6.1*	km 61+100
58	80	Archaeozoological site	604112.06	4334945.02	newly discovered	km 61+100
Kajaran town (sites-1 / units-1)						
59	81	Cemetery	601520.01	4333973.43	recorded in state cadastral map	km 64+000

*Number as per the RA Government decree No. 2322-N dated 29.12.2005

The distribution of main cultural heritage sites along the proposed road identified during the 2016-2017 archaeological survey is presented in the figures below.



a) Sisian-Shenatagh section



b) Qirs-Kajaran section

Figure 27. Distribution of Main Cultural Heritage Sites along the Sisian-Shenatagh (a) and Qirs-Kajaran (b) Sections of the proposed road

The comprehensiveness of the archaeological survey is unclear:

- The archaeological study area is not defined, so it is uncertain if it covered the proposed road with its RoW or a larger area.
- It is unclear if this study covered all Project construction components such as access roads, construction camps, spoil disposal areas, tunnel water tank locations, borrow pits and so forth, but seems unlikely as these elements are still not defined even in the detailed design.

A supplementary cultural heritage study, including an archaeological survey, will be completed as part of this ESIA, but it should be noted that some of the components will only be sited once a construction contractor is appointed. Should the proposed siting of components of the project fall outside the areas assessed as part of this ESIA investigation then it will be necessary to conduct additional studies at a later stage to ensure that cultural heritage features are known. The project will also need to develop and implement a chance finds procedure.

5.3.2 Intangible Cultural Heritage

The preservation of intangible cultural heritage is one of the main directions of the State cultural policy. The UNESCO Convention for "The Safeguarding of Intangible Cultural Heritage" was ratified by the RA in 2006, and various local and international projects have been implemented to preserve, safeguard and disseminate intangible cultural heritage in the spirit of the convention. A professional council on the issues of intangible cultural heritage safeguarding was established under the RA Minister of Culture in 2009, which, in cooperation with scientific and educational organizations, developed and submitted for Government approval legal acts for the inventory of RA intangible cultural heritage. Such legal acts include the Government Decisions No. 310-A, No. 36-N and No. 241-N (see [Section 3.1](#)), etc. and established a basis for the process of registration of the intangible cultural heritage in Armenia. Currently, the list of intangible cultural heritage is established and includes 33 values that are

represented by national songs and musical instruments, dances, ethnic cuisine, types of craft, pilgrimage, and so forth.

Within the process of preservation of Armenian intangible cultural heritage values, the following applications are inscribed on the representative list of the UNESCO Intangible Cultural Heritage of Humanity: "Duduk and its Music" (2008), "Armenian Cross-Stones Art. Symbolism and Craftsmanship of Khachkars" (2010), "Performance of the Armenian Epic of "Daredevils of Sassoun or 'David of Sassoun" (2012), "Lavash - the Preparation, Meaning and Appearance of Traditional Bread as an Expression of Culture in Armenia" (2014), "Kochari Traditional Group Dance" (2017), "Armenian Letter Art and its Cultural Expressions" (2019).

The national legislation in the area of cultural heritage and historical monument protection are in general in line with the EBRD's PR8⁹³. However, there is no national requirement that a chance find procedure should be project-specific and developed for each project separately. The provisions of the UNESCO's Convention for the Safeguarding of the Intangible Cultural Heritage are applied.

⁹³ Refer to the analysis implemented within the 2020 KfW study "High Level Environmental and Social Safeguard System Assessment of Armenia" (Ecoline International Ltd. in cooperation with ATMS Solutions).

6 PRELIMINARY IDENTIFICATION AND SCOPING OF POTENTIAL E&S IMPACTS

The Scoping Study identifies the potential significant issues to be assessed and the nature of information to be provided in the ESIA Report. Each E&S theme is dealt with in a separate section and each section is subdivided into two parts as follows:

- Potential Impacts – provides an overview of the potential impacts they may arise on the parameter because of construction and / or operational activities; and
- Scope of Work for ESIA - provides a tabulated summary of the baseline surveys and assessments and that are required to gather the required information for the impact assessment.

6.1 Potential Impact on Air Quality

6.1.1 Construction

The potential impacts during construction activities are related to:

- The generation of dust and particulates (e.g. from quarrying, earth moving or transport of dry materials) for construction and new access roads, potentially having an adverse impact on sensitive nearby receptors; and
- Exhaust emissions from construction traffic and machinery may result in a deterioration of local ambient concentrations of nitrogen dioxide (NO₂), VOCs, SO₂ and particulate matter (PM_{2.5} and PM₁₀).

Mechanically generated dust emitted by construction activities may cause impacts on nearby receptors, such as residential properties, agriculture and people through:

- Dusting / soiling of surfaces, crops, water bodies, and others; and
- Human health effects through exposure to airborne fine particulate matter.

6.1.2 Operation

Major (by mass) motor vehicle emissions are greenhouse gases including carbon dioxide (CO₂), nitrous oxide (N₂O) and methane (CH₄). Other vehicle related atmospheric emissions include carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), volatile organic compounds (VOCs) and benzene. Such emissions may negatively impact local air quality and result in secondary pollutants such as photochemical smog and tropospheric ozone all of which pose the risk of negative human health effects, impacts on biota as well as material damage.

6.1.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter; the tasks are presented in **Table 25**.

Table 25. Air Quality: Further Work for the ESIA

Data required
Desk Based
Obtaining representative meteorological data that can be used as input to the dispersion model for predicting ambient air quality.
Site Surveys
A baseline air quality survey will be conducted at selected possible receptors along the proposed road alignment. NO ₂ and SO ₂ , will be measured using passive samplers and CO, PM ₁₀ and PM _{2.5} measured using a handheld continuous sampler for one hour, three times a day at seven locations along the Sisian-Shenatagh road corridor and seven locations along the Qirs-Kajaran road corridor. Baseline air quality would also be modelled. The proposed sampling points are shown in Annex 2 . In addition, six dust (PM _{2.5} and PM ₁₀) measurements will be performed near the existing road from Sisian to Shenatagh and two measurements near the Qirs-Kajaran existing road.

Ambient air quality will be predicted using the AERMOD dispersion model.

6.2 Potential Impact on Geology, Soil and Geo-hazards

6.2.1 Construction

During construction, road sections may require excavations resulting in impacts on the underlying geology and soil cover. Borrow pits may also be established to source aggregate needed for the road construction. The construction of the tunnels presents multiple risks of structural failure and collapse as does working on steep slopes. Seismic risk is an important consideration.

In addition, the presence of sulphur oxides in the lithology of the tunnel implies a risk of acid rock drainage from the spoil stockpile.

6.2.2 Operation

Possible impacts on geology and geohazards are limited during operations but motor vehicle accidents could result in large scale spills of hazardous materials, which if *not* effectively controlled may result in soil contamination. Soils may also be affected by roadside deposition of atmospheric pollutants.

6.2.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter (**Table 26**).

Table 26. Geology, Soil and Geo-hazards: Further Work for the ESIA

Data required
<p>Desk Based</p> <p>Review soil investigations and seismic risk assessment from the available EIA documentation and feasibility study phase.</p> <p>An assessment of geochemical implications of the spoil from the tunnel recognising that the geology of the tunnel section will only be fully understood once the tunnel is being constructed. There are no rock samples that can be used for either static or kinetic tests at this stage.</p>
<p>Site Surveys</p> <p>A site walkover survey will be undertaken in order to provide up-to-date visual information on land use and land quality. Soil will be sampled at four locations along the Qirs-Kajaran road corridor and three locations along the Sisian-Shenatagh road corridor as shown in Annex 2.</p>

6.3 Potential Impacts on Water Resources

6.3.1 Construction

During construction, water resources may be negatively affected by spillage of hazardous materials, especially hydrocarbons, that are transported into surface water resources, and potentially also infiltrate groundwater. Excavations may also result in erosion and resultant sedimentation of surface water resources. In addition, it will be important to understand the potential impact of the tunnelling on ground water levels during construction (the tunnels will be lined to prevent groundwater ingress so that there will be a return to equilibrium after completion of the construction). Finally, but importantly, it will be necessary to characterise the risk of groundwater contamination within the tunnel because of sprayed concrete and the use of explosives for blasting.

6.3.2 Operation

During operations of the road network, contaminants on the road surface such as spilled fuel or lubricants may be washed into adjacent surface water during rainfall events. Litter discarded from vehicles may also be washed into surface water. Finally motor vehicle accidents,

especially involving freight carrying vehicles may see the release of a range of potentially hazardous materials that could end up in surface and even potentially groundwater.

6.3.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter as shown in **Table 27**.

Table 27. Water Resources: Further Work for the ESIA

Data required
<p>Desk Based</p> <p>Review of geotechnical investigations conducted during the feasibility study to identify vulnerable groundwater resources (such as may exist) and to characterise groundwater quality from secondary sources (such as wells or water taps in adjacent villages, farms and so forth). Review of anticipated construction activities and risks of contamination of tunnel water.</p>
<p>Site Surveys</p> <p>There are rivers, a water reservoir and irrigation channels in the area that would be crossed by the proposed roadway or at least potentially affected by construction or operations. A walkover survey will be undertaken to characterise and map the surface water conditions with selected water quality samples. Surface water will be sampled at seven locations along the Qirs-Kajaran road corridor and four locations along the Sisian-Shenatagh road corridor, observing the necessary sampling protocols. The survey locations are shown in Annex 2.</p>

6.4 Potential Noise and Vibration Impacts

6.4.1 Construction

The potential impacts of construction noise and vibration may arise from:

- Activities carried out for the project infrastructure (earth moving and excavation, building, and so forth),
- Construction traffic such as large trucks, scrapers and graders, heavy rollers and heavy goods vehicles servicing, delivering and removing materials (including spoil and fill), and
- Tunnel blasting.

6.4.2 Operation

During road operations, traffic will generate noise from the roadway and vibration could occur from the road sections.

6.4.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter; the tasks are presented in **Table 28**.

Table 28. Noise and Vibration: Further Work for the ESIA

Data required
<p>Desk Based</p> <p>Review proposed construction methods especially drilling and blasting methods.</p>
<p>Site Surveys</p> <p>A noise baseline will be established representing the diurnal (24 hour) change in noise profiles. Noise and vibration will be monitored at seven locations for noise and vibration along the Qirs-Kajaran road corridor and at eight (noise) and twelve (vibration) locations along the Sisian-Shenatagh road corridor during the day and night. The sampling locations represent the closest areas of human exposure to potential noise and vibration effects.</p>

3D noise modelling will be conducted for two different traffic scenarios which are still to be selected.

JKSimblast design software will be used to predict vibration.

6.5 Potential Impact on Biodiversity

6.5.1 Construction

Construction activities may cause impacts on biodiversity through clearing of vegetation and resultant loss and/or fragmentation of habitat. In addition, fauna may be displaced due to the noise and general disturbance caused by construction activities including lighting and especially because of blasting. Migration routes of fauna may also be affected by the direct physical construction of the road. Finally, but importantly, there is the risk of propagating and spreading alien invasive species.

It will be especially important to characterise the biodiversity in the area envisaged for the disposal of tunnel spoil on the southern side of the tunnel as well as identifying the area that would be used for the intermediate storage of spoil from the northern side of the tunnel prior to the tunnel being completed. No site has yet been identified for such intermediate storage.

6.5.2 Operation

Operational activities may affect biodiversity principally through impacts on fauna, of noise, light and vibration, vehicle movement and physical blocking of migration paths. Motor vehicles emissions may result in negative impacts on flora. Spillages of hazardous material may result in destruction of plant communities if the spillages are not contained within the road section. The constructed road may result in better accessibility of protected areas and thus increase unsustainable collection of natural resources and poaching.

6.5.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter; the tasks are presented in **Table 29**.

Table 29. Biodiversity: Further Work for the ESIA

Data required
Desk Based
Further review of available literature and biological records. Screening of areas of key biodiversity relative to the road routings. Critical Habitat Screening study. Review of the updated project design in order to take into consideration all the elements related to the project pre-construction, construction and maintenance as soon as possible as it will determine/influence the biodiversity related fieldworks.
Site Surveys
GIS coverages will be prepared of hydrography (watersheds crossed by the project and included in the EAAAs), topography, road corridor, areas to be affected by the connecting roads, the bridges, the new road and the proposed spoil disposal area. These coverages will include: <ul style="list-style-type: none"> • Functional Area (landscape area) • Protected areas around/linked with the project footprint • Fieldwork (transects, area prospected, GPS points of observations, habitats, etc.) • Analysis (e.g. species distributions, habitat maps). Detailed tables will be prepared of: <ul style="list-style-type: none"> • Habitat lists • Species lists (fauna and flora) with status, and so forth • Ecosystem services (List of stakeholders to consult and related topics). Habitats (list of habitats specifying natural and modified habitats) will be identified as a function of: <ul style="list-style-type: none"> • Priority Biodiversity features - species/Triggering species for Critical Habitat Assessment • Summary of Priority Biodiversity Features • Preliminary potential sensitive areas: Tunnel area (goes through the Zangezour PA), Shenatagh area and others. Biodiversity will be characterised and assessed as a function of: <ul style="list-style-type: none"> • species composition in the study areas;

- **total number of animals, habitats by species and families, food supplies;**
- **daily and seasonal behaviour, transition and migration paths of the animals and their causes;**
- **breeding and wintering sites;**
- **presence of endemic, rare and endangered species recorded in the Red Book of Armenia.**

Four seasons' surveys were completed in 2021 and two more seasons (winter and spring) are planned for 2022.

Terrestrial Mammals

Straight-line transects have been selected for monitoring of medium and large mammals along the proposed road area and live trapping of small mammals will be used to determine their presence. Camera traps were installed at the selected sites (based on consultations with WWF, Kapan Forestry, and Zangezur Sanctuary authorities) to study the main movements of medium and large mammals along the proposed road.

Birds

Bird species diversity and relative abundance will be obtained from two different types of observation: (i) unstandardized observations (opportunistic data) and (ii) standardized counts (data, collected according to standard methodology). Both would be used to create species distribution maps and estimation of species' populations.

Butterfly

The data on butterfly species diversity was collected via direct observation of the species flying around along the bird transect, and in the early mornings at their roosting sites.

Fish

The data on the fish species diversity, relative abundance, and important biological peculiarities will be obtained from two different types of observation:

- **Identification of the fish species composition in the study areas and their relative abundance;**
- **Identification of the main pathways of the seasonal migration of fish and breeding terms.**

To carry out the above-mentioned surveys, sampling sites at the rivers and reservoir sections of the study area are identified. At the sampling sites, crayfish device, fishing baskets, nets, etc. as per the established protocols. The fish species will be determined by visual characteristics.

Herpetofauna (Reptiles and Amphibians)

Studies of the herpetofauna will be conducted in accordance with the generally accepted methods of herpetology. Observation of reptiles will be done by route survey. Animals encountered and locations of their permanent shelters will be recorded with GPS devices. Amphibians will be recorded not only visually but also acoustically (by emitted sounds).

Day and night observations will be made to determine the species of amphibians in the Project area. In addition, hand-fishing nets will be used for aquatic species capture, and for night capture cones will be placed in the ground at their inhabiting places.

The following seasonality will be used for the assessments:

- Wintering report
- Breeding season completion of the baseline
- Autumn completion of the baseline
- Winter completion.

6.6 Potential Impact on Landscape and Visual Amenity

6.6.1 Construction

Construction activities will have a potentially significant impact on landscape character due to large scale ground clearing, excavations, borrow pits, temporary stockpiling of material, large construction vehicles and machinery, scaffolding and shuttering and so forth.

6.6.2 Operation

Operations will see a permanent change in the landscape character as a function of the finished project. The change will be tempered by the reestablishment of vegetation in disturbed areas and the removal of all construction equipment.

6.6.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter; the tasks are presented in **Table 30**.

Table 30. Landscape: Further Work for the ESIA

Data required
Desk Based
Review of the information from the available EIA documentation and feasibility study phase.
Site Surveys
A photographic survey of the area will be undertaken to facilitate landscape assessment with particular consideration of sensitive receptors such as designated landscapes, residents, tourists / recreational users of the area and road-users.

6.7 Potential Impacts on Economy

6.7.1 Construction

The potential impacts on economy associated with the Project are:

- Regional and local procurement opportunities for goods and services / supply chain mobilisation and the associated tax payments.
- Local employment opportunities and the related social tax payments (see also a separate section on other job creation impacts).

6.7.2 Operation

The potential impacts on economy during the Project operation derive from:

- Opportunities for increased and quicker transportation of goods and people, leading also to time savings (from 2-3 hours currently to less than 1 hour in the future).
- Stimulation of the economic growth of Armenia due to better accessibility and trading opportunities with its neighbouring countries such as Iran in the south and Georgia in the north.
- Increased transport safety due to improved road quality.
- Less spending on maintenance of vehicles as the road cover will be improved.
- A potential for tourism and recreation development in the region and the related increase of the number of jobs in this sector.
- Regional and local procurement opportunities among road maintenance contractors.

6.7.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline to complete the ESIA for this parameter; the tasks are presented in **Table 31**.

Table 31. Economy: Further Work for the ESIA

Data required
Desk Based
Review of the projected regional / local procurements and information about the expected suppliers. Review of data on the employment opportunities and expected traffic intensity.
Site Surveys
Collecting information about the local economy and sectoral development and the annual budgets of Sisian and Kajaran Communities and consultations with them (and their respective divisions) about the expected economic benefits including taxes, development of local small and medium business, including tourism; the potential for local procurement of goods and services, as well as about enhancement measures and wider distribution of the Project-related benefits.

6.8 Potential Impacts Associated with Job Creation and Labour Management

6.8.1 Construction

The needs of the Project in terms of construction workforce that can be sourced locally are not yet known (no estimates are provided in the 2019 detailed design and EIA for the Project). Assuming that the workforce can be mixed (expatriate and locally hired workers), the potential impacts due to job creation during construction activities can be identified as follows:

- Impact on local employment level;
- Impact on local incomes;
- Impact on local expenditures;
- Social tensions between community members and non-local workers;
- Social tensions resulting from competition for employment;
- Renting housing to migrant workers as an additional source of income for local residents;
- Social diseases;
- Potential temporary loss of employment for seasonal or permanent workers especially those engaged in agricultural activities.

While the provisions of 29 ILO conventions ratified by Armenia have been largely transposed into Armenian legislation, there are some gaps between the national law and ILO conventions/EBRD's PR2/EIB ESS 8. They related to⁹⁴:

- **Human resources management system** or procedures are not required by the national labour legislation to be developed and implemented by developers / initiators and to be communicated and made accessible to workforce.
- **Grievance mechanism** is not required to be established to cover direct and non-employee workers and anonymous grievances.
- **Worker accommodation**: there are no specific provisions on worker accommodation.
- **Non-employee workers**: there are no specific provisions on such workers.
- **Supply Chain**: national labour legislation does not set requirements for assessing, managing and monitoring the third parties' (contractors) performance in terms of labour and OHS issues.

A range of measures is to be undertaken to ensure that the Project construction labour force is managed in line with the requirements of EBRD/EIB and national legislation. In particular:

- The RD will develop and disclose a Human Resources policy, which includes a clear commitment to comply with i) Armenian labour laws, ii) EBRD's PR2, iii) EIB ESS8, and iv) ILO Conventions' provision of International Labor Organization (ILO). The Construction Contractor will need to comply with this policy.
- An overarching strategy with regards to the recruitment of construction workers will be outlined in the ESIA in line with the EBRD/EIB labour policies. Via the ESMP, the Construction Contractor would be obliged to develop and implement a detailed Recruitment and Procurement Plan.
- The Construction Contractor will be required to develop a Labour Management Plan covering both direct project employees and non-employee workers, and setting out specific requirements for primary suppliers. This plan will include preventive measures

⁹⁴ Another gap relates to collective dismissals (there is no obligation to consult or develop a plan to mitigate its adverse impacts), however this risk is not expected to arise from the Project and thus not reviewed above.

to manage gender-based violence and harassment risk during construction as per EBRD requirements (see [Section 3.3](#)).

- Worker accommodation to be provided for the Project workers will need to comply with the EBRD/IFC guidance (2009), national sanitary and health standards, and EBRD's COVID-19 recommendations. For this purpose, a Worker Accommodation Management Plan will be developed and implemented by the Construction Contractor.

6.8.2 Operation

Limited potential impacts due to job creation are expected during operations, as it is assumed the maintenance of the Project's tunnel and bridges will be conducted by the exiting workers of the RD bodies. During the road operation, indirect new permanent jobs can also be created at roadside services (trading centres, cafeteria, refuelling stations, and so forth). In addition, the benefit for the economy of the new road section will have a large multiplier effect in terms of job creation within the Armenian economy.

6.8.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline to complete the ESIA for this parameter ([Table 32](#)).

Table 32. Impacts Associated with Job Creation: Further Work for the ESIA

Data required
Desk Based
Review the Project design details, once available, such as the projected workforce flows for construction and operation stages, split of projected workforce by skill category and sourcing (local, regional, national or foreign).
Site Surveys
Collecting information about: <ul style="list-style-type: none"> • religion, ethnic composition, and language for the affected villages and the communities they belong to. • demographic and (seasonal) population migration trends, as well as number, size and composition of households, age structure and density of population, and death and birth statistics, vulnerabilities and gender issues at the community and village levels. • employment and income and expenditure structure at the village/settlement and community levels, aggregated by gender. • Economic analyses that may have been done at country level for the North-South road to see whether there are indications of job multipliers.

6.9 Potential Impacts on Land Use, Land-based and Non-land-based Livelihoods

6.9.1 Construction

The construction of the Project facilities and connecting roads will require permanent and temporary land acquisition.

The potential impacts on land use and the related land-based livelihoods of the local villages prior to construction activities can be identified as follows:

- Impacts due to temporary and permanent land acquisition owned or used by private persons (loss of grass-land, crops, plants, land plots; surface structures);
- Temporarily restricted access between the villages and to the locally important sites (such as cemeteries, churches) and social facilities (schools, shops, etc);
- Secondary impact on grass, bee-keeping and crops on the nearby properties due to dust emissions as addressed in [Section 6.1](#).

The Consultant will prepare the RF for the Project as per the EBRD PR5 requirements.

According to the Preliminary LARP⁹⁵, the proposed road is estimated to affect 547 properties with an area of 3,269,249m²⁹⁶. From the total affected lands 33% are privately owned, 48% community-owned, 11% state-owned, and 7% ownership status is unknown. The remaining 1% of the affected lands had a mixed ownership status per the cadastre; the exact ownership status of this land will be identified in developing the Resettlement Plan.

Land needs for other Project components are unknown at present, especially in respect of temporary land take such as laydown areas, construction camps and borrow pits. These facilities are expected to be sited by the Construction Contractor using the land acquisition principles in the Project's RF. The precise land needs will be determined during the preparation or at the outset of the implementation of the Resettlement Plan for the Project and prior to construction works.

6.9.2 Operation

No land take for the operations is envisioned, thus no resettlement impacts are expected. Temporarily used land will be returned to the pre-Project use following reinstatement (for instance, the construction camp, storage or spoil disposal areas).

Other economy-related impacts are considered above in [Section 6.7](#).

6.9.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline to complete the ESIA for this parameter ([Table 33](#)).

Table 33. Land Use, Land-based and Non-land-based Livelihoods: Further Work for the ESIA

Data required
Desk Based
Review of the Project details, once available, such as the precise locations and sizes/areas of the facilities, access road, and others
Site Surveys
<ul style="list-style-type: none"> • Analysis of the local land-based and non-land activities and livelihoods of the population in the potentially affected villages, including local livestock migration routes, locally practiced types of agriculture and the related use of the land plots that can be affected by the Project, use of ecosystem services and dependence on them (via interviews and consultations, including with males and females separately). • Analysis of the presence and livelihoods of refugees, pensioners and other socially less protected groups at the community and village levels in order to identify if these groups can be considered vulnerable in the context of the Project. • Interviews and consultations to explore the gender issues and the related potential sensitivities in the context of the Project within the affected villages.
The preferred data collection methods include interviews and consultations (mainly face-to face, but also focus groups subject to the COVID-19 restrictions).

⁹⁵ J/V SPEA Engineering-IRD Engineering. Nov. 2016. Preliminary LARP. Preliminary Design. TRANCHE 4. Section Sisian – Kajaran. North-South Road Corridor Investment Program.

⁹⁶ This calculation is assumed to be based on the road width of 16.5m (per the 2016 Preliminary LARP), which includes three lanes and two shoulders, each being 3.3m (per the 2019 Detailed Design). No safety strip is considered in the Preliminary LARP, however it is envisioned in the Detailed Design as 0.7m to both sides of the shoulders. To note, a safety strip of 1m is required to be established for by the Automobile road CHPA IV-11.05.02-99 design standards.

6.10 Potential Impacts on Public Utilities, Services and Transport Infrastructure

6.10.1 Construction

Power and water supply, wastewater removal and solid waste removal and disposal solutions for the construction phase are currently unknown and will be determined by the Construction Contractor. Additional loading of utilities and infrastructure can be expected.

Traffic on the Sisian-Shenatagh (either via Sisian or Norovan) and Tatev-Kapan (H45) roads, as well as on local roads may intensify and thus additional pressure will be imposed on the road network. A **Construction Traffic Management Plan** is expected to be developed by the Construction Contractor to avoid or mitigate this pressure.

No or limited impacts are expected on educational, cultural, and sport facilities.

Pressure on medical facilities may increase in case of outbreaks of COVID-19 or other diseases and construction related accidents and injuries. A **COVID-19 Preparedness and Action Plan** is expected to be developed for the construction stage.

Increased demand is also possible at local shops, cafes and over services by the construction workforce that can result in positive economic effects (see also **Sections 6.7** and **6.8**).

6.10.2 Operation

No impact is expected on water supply network and waste disposal facilities.

Road run off collection will be embedded in the design and will have no impact on the public wastewater network.

Limited impacts on public power supply can be expected as the tunnel, bridges and associated road lighting will require additional power.

The Project vehicle flow (maintenance teams) will be minimal.

6.10.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline to complete the ESIA for this parameter (**Table 34**).

Table 34. Public Utilities, Services and Transport: Further Work for the ESIA

Data required
Desk Based
Review of the technical due diligence details, once available, regarding the connections and use of the water, power, heating, gas, sewage/wastewater removal, solid waste removal, use of local roads, need for access roads, etc.
Site Surveys
Analysis of public utilities or non-centralised options used by the Project affected settlements, such as local heating/cooking energy sources, drinking water sources, waste removal, sewage / waste water removal, use and state of local roads and tracks, Analysis of information on the availability of street lighting, local cultural, sport, and social, especially medical, facilities, and any issues related to local infrastructure. Consultations with the community authorities and their municipal services, local authorities and local residents (males and females separately).

6.11 Potential Risks to Public Health, Safety, and Security

6.11.1 Construction

The potential impacts to community health, safety and security during the construction works can be as follows:

- Risk of transport-related accidents (including pedestrian safety issues) on the public roads/tracks used by the Project construction vehicles;
- Potential exposure to impacts related to air emissions / dust;

- Risk of accidents due to open trenches, construction vehicle movement and other project related hazards for community members;
- Potential for increase in communicable diseases related to labour (in-)migration.
- Possible nuisance related to noise pollution and vibration, and light pollution;
- Potential impacts related to water pollution, and soil pollution;

The construction sites and camps are expected to be secured by fences and guards to prevent access by unauthorized people. The RD reports very low risk of possible social conflicts with the security staff, based on the experience with other projects in the country.

It is expected that the risk assessment for the construction stage, alongside the relevant control measures and prevention/reduction actions, will be embedded in the Project design and will cover risks to the public and workers. The Construction Contractor will be expected to develop the **Construction Environmental Management Plan** and **Construction Traffic Management Plan**.

6.11.2 Operation

Potential risks related to emergency situations: structural failure of Project facilities and related gas leakage, fire and explosion accidents, transport of hazardous chemicals/materials and associated accident risk.

6.11.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline to complete the ESIA for this parameter; the tasks are presented in **Table 35**.

Table 35. Public Health, Safety, and Security Risks: Further Work for the ESIA

Data required
<p>Desk Based</p> <p>Review of technical risk assessment, including blasting risk assessment and fire and explosion risk assessment, if this information becomes available during the technical audit of the Project detailed design. As part of the ESMP, provision of guidance for preparing a Health and Safety Management Plan for the Project (for the Construction Contractor).</p> <p>Review an independent Road Safety Audit of the Project detailed design, if becomes available during the ESIA, or integrate a requirement to conduct it into the ESMP.</p>
<p>Site Surveys</p> <p>Collecting data about the availability of healthcare and security facilities. Conducting the analysis of:</p> <ul style="list-style-type: none"> • availability of and community coverage of the area by emergency response bodies (state fire brigade, ambulance bodies, and rescue teams) and awareness about their contact details among the local population. • the crime and order conditions and perceptions in the potentially affected communities and villages.

6.12 Potential Impacts on Occupational Health and Safety

6.12.1 Construction

The potential OHS risks during the Project construction works can be as follows:

- Risk of transport related accidents on site and on the public roads involving the Project vehicles;
- Risks related to specific construction works such as dismantling works, blasting, hot work and asphaltting (when polycyclic aromatic hydrocarbons (PAHs) may be released), etc.
- Potential exposure to impacts related to air emissions / dust or heat and cold stress;
- Possible exposure to noise pollution and vibration, and light pollution;
- Potential impacts related to water pollution, and soil pollution;

- Potential risks related to emergency situations: structural failure of the Project temporary on-site facilities, fire and explosion accidents, transport accident involving hazardous chemicals/materials;
- Risks related to contact with hazardous materials/chemicals on site;
- Risk of contact with venomous or dangerous fauna – *to be verified during the biodiversity and social studies.*

It is expected that the risk assessment for construction, alongside the relevant control measures and prevention/reduction actions, will be embedded in the detailed project design and will cover risks to the public and workers. The Construction Contractor will be expected to develop a framework **OHS Plan for the Project and site-specific OHS Plans or procedures for each construction site / Project component**, as well as an **Emergency Response Plan** and **Waste Management Plan**.

6.12.2 Operation

It is expected that the RD staff will maintain the Project facilities. The potential risks to OHS during the Project operations can include:

- Risk of transport related accidents involving the Project vehicles;
- Potential exposure to impacts related to air emissions / dust;
- Possible exposure to noise pollution and vibration;
- Potential risks related to emergency situations: structural failure of the Project facilities (tunnel or bridges), fire and explosion accidents.

The RD will rely on the existing OHS procedures and safety regulations that need to be followed. Maintenance staff will participate in mandatory training courses covering routine operations and safety measures in case of accidents.

6.12.3 Scope of Work for ESIA

Further work is required to better assess this parameter in the ESIA (**Table 36**).

Table 36. OHS Risks: Further Work for the ESIA

Data required
Desk Based
Review of technical risk assessment, including blasting risk assessment and fire and explosion risk assessment, to be conducted during the Project design. As part of the ESMP, provision of guidance for the preparing of Construction Management Plans for the Project (for the Construction Contractor).
Site Surveys
N/A

6.13 Potential Impacts on Cultural, Archaeological and Historical Environment

6.13.1 Construction

Project construction will require earth works and blasting with the potential to damage or cause the loss of identified/to be identified and unknown cultural heritage/archaeological items. The risk of damage of the identified sites or those to be identified during the cultural heritage survey is seen as unavoidable and potentially significant (refer to the baseline **Section 5.3**).

The risk of the potential impact on the unknown cultural, archaeological and historical environment is considered to be moderate given relatively many sites identified in the Project area.

Overall, the due mitigation measures will be required as well as the preparation of the **Cultural Heritage Management Plan which will include a chance finds procedure**.

6.13.2 Operation

Given that the needed mitigation measures will be in place prior to construction and the **Cultural Heritage Management Plan** will be implemented, no potential impacts on cultural heritage are expected during the Project operations.

As per the scoping study, no adverse significant influence on intangible cultural heritage, registered in both national list of values and representative list of UNESCO is expected. On the contrary, the presence of some of the intangible cultural heritage values, such as preparation of Lavash, Dudik and its music, Armenian cross-stones (Khachkars) in the villages located along the Project road can serve as an additional trigger for the tourism and trade development in the region.

6.13.3 Scope of Work for ESIA

Further work is required to gain a better understanding of the baseline environment to complete the ESIA for this parameter; the tasks are presented in **Table 37**.

Table 37. Cultural and Historical Environment: Further Work for the ESIA

Data required
Desk Based
<ul style="list-style-type: none"> • Clarification of the Project components and connecting / accessing routes to the extent possible at present, and desk-based identification of the 'high risk' cultural heritage sites. • Inputs from and consultations with the Designer on avoiding impacts on cultural heritage sites/units.
Site Surveys
<ul style="list-style-type: none"> • A verification survey (current state) of the units listed in Section 5.3 that may be directly affected by the Project - the 'high risk' sites. • Supplementary archaeological and cultural heritage study of the areas where the Project components will be proposed to be located (construction camps, borrow pits, spoil disposal areas, tunnel water tanks, and so forth) if become known. • Once the service / connecting roads are defined: supplementary archaeological and cultural heritage study at the servicing and connecting roads (ca. 100m to both sides) if not covered during the previous surveys. • Consultations with the authorities of the Sisian and Kajaran Communities, settlements and local residents in order to identify any locally valued places of worship, sacred areas or sites of cultural, religious, historical or 'general' significance to the communities, and the extent of their use, as well as consultations with regards the local spread of intangible cultural heritage and practice of it use.
<i>Note: the initiation of the surveys is conditional upon the provision of design input data.</i>

6.14 Potential for Cumulative Impacts

There is a potential for cumulative impacts given due to other road rehabilitation projects being implemented in the region. The long list of the associated and/or concurrent development / activities that can add to the Project will be determined in the next stages of ESIA, together with the identification of the valued E&S components.

6.15 Potential for Transboundary Impacts

No significant adverse transboundary impacts that could trigger the application of the United Nations Convention on EIA in a Transboundary Context (1991) have been identified at this stage.

6.16 Paris Alignment

The Paris Agreement aims to limit global average temperature to well below 2°C and even as low as 1.5°C above pre-industrial levels. The EBRD's Green Economy Transition (GET) Approach for 2021-2025, published in 2020, commits the bank to "aligning its activities with the principles of international climate agreements, including principally the Paris Agreement". Such alignment would mean financial flows consistent with both the mitigation and adaptation goals of the Paris Agreement. This Project will therefore need to be assessed for its alignment with the Paris Agreement essentially:

- a. For climate change mitigation:
 - i. long-term low-carbon development,
 - ii. a low likelihood of carbon lock-in.
- b. For climate change adaptation:
 - i. that physical climate risks have been identified and addressed,
 - ii. that its activities do not undermine climate resilience in the context in which the project operates.

Any project requiring EBRD financing would have to meet each of these four conditions to be considered “Paris aligned”. The issue will require further investigation and assessment during the ESIA but at this early stage it is likely that the Project would more logically fit the climate change adaption requirements. In and of itself the Project is unlikely to result in significant climate change mitigation, even though the vehicles using the proposed road would be important and potentially significant sources of greenhouse gas emissions.

7 STAKEHOLDER ENGAGEMENT

7.1 Summary of Project Stakeholder Engagement Completed in 2016-2018

The first stakeholder engagement meetings were arranged during the project feasibility study in March-April and November 2016. The following stakeholders participated in these meetings: the MTAI, Transport Project Implementation Organization (TPIO), Ministry of Environment (MoE), Ministry of Economy, Ministry of Education, Science, Culture and Sport, Environmental Protection and Mining Inspection Body, Ministry of Health, State Committee of the Real Estate Cadastre, and Non-governmental organizations (NGOs).

The next round of public consultations served to present the project alignment and EIA. It comprised meetings in Kapan Community on 10 November 2017 (with 117 participants, of whom four were women), and in Sisian and Kajaran Communities on 17-18 January 2018, respectively, with 26 participants in total (of whom six were women).

Information regarding consultations and a call for participation was circulated through *Hayastani Hanrapetutyun* newspaper and on the TPIO website. In addition, invitations were sent directly to key stakeholders through the Yerevan Aarhus Center Network. The general public and local communities, as well as the government agencies and NGOs participated in the consultation.

Several core issues emerged, one of which was the alienation of community lands of agricultural significance that had no ownership certificates/titles. Participants were informed of the land cadastre measurement and registration process, as well as the procedure for changing land use from agricultural to industrial after the land would be registered to the state. As the consultation occurred at an early stage in project design, it was agreed that questions related to new dumping sites, size of Kapan Forestry zone to be affected, potential negative consequences on water supply and legal prohibition of allocating community lands along roads would be addressed after the final approval of the design. In response to concerns about archaeological protection zones, the project's environmental management and archaeology specialist assured that appropriate measures to preserve the monuments would be implemented.

7.2 Results of the Inception Stage Stakeholder Engagement (2021)

The consultation process for this ESIA, was initiated with inception / pre-scoping meetings with support of the RD:

- On 8-10 April 2021, consultation meetings were held with the representatives of in Syunik Regional Administration, Kajaran Community Administration, and Geghi Administrative Area, and Zangezur State Sanctuary (attended by the RD representatives as well).
- On 20 April 2021, consultation meetings were held with the representatives of Sisian Community Administration and Darbas Administrative Area.

The administrations of Syunik Region, and Kajaran and Sisian Communities have appointed Contact Points for the Project to support the Project and facilitate further ESIA engagement activities with the authorities and local population, as well as local NGOs.

During the meeting with the Syunik Regional Administration, the overall aim of the Project was presented. The representatives of the Syunik Regional Administration highlighted the potential positive impacts of the road construction on the development of infrastructure, tourism sector and road-related services (hotels or catering), time saving of the road uses, as well as reduction in transports costs, and greater accessibility of markets for local cattle breeders that would be able to sell their products. The road construction was mentioned to be likely to lead to economic diversification (i.e., reduction of mining dominance in the region's domestic product's structure).

A generally overall positive attitude towards the Project as part of the Sisian-Kajaran Road was also expressed during the consultations with the Kajaran Community Administration highlighting the benefits for residents in terms of temporary labour opportunities (at present, the majority of the population in Kajaran are employed in the Kajaran Copper-Molybdenum Mine). The municipal authorities requested that spoil disposal during the construction must be discussed with them.

Meetings in the Sisian Community Administration revealed anticipation of a large-scale assets acquisition given a few small farms and larger businesses in the area. Hence, private sector stakeholders will require special attention during the Project engagement depending on the connecting roads alignments.

After the Sisian-Kajaran road alignment (and respectively the Consultant's scope of work) was confirmed by the RD and EBRD (see [Section 2.4](#)), the Consultant continued inception consultations.

On 8 December 2021, a meeting with Syunik Region Deputy Governor was held to present and discuss the Consultant's scope of work, the road alignment as well as the potential E&S impacts/opportunities. The Deputy Governor has committed to supporting the Consultant in E&S studies and to being a high-level focal point for the Project.

On 9 December 2021, meetings were held in Kajaran and Sisian Community Administrations, and the following topics were discussed:

- the current status of Project implementation and next steps,
- the current design of the Sisian-Kajaran road section,
- the key potential E&S risks/opportunities, and
- land acquisition issues.

Both community administrations were familiar with the presented alignment from earlier consultations held in 2016-2018.

To identify the scale and types of land acquisition impacts the Consultant conducted seven meetings with heads of rural settlements in Kajaran and Sisian communities' affected by the road construction on 27-28 December 2021. The key findings are summarized below:

- The cadastral maps have some inconsistencies with de facto boundaries of the lands which should be considered during the LARP preparation;
- A number of private land plots, ancillary structures, such as barns and cattle sheds, and several private residential houses may be affected (both used and ruined / abandoned);
- In some villages, the potentially affected land plots are non-irrigated arable lands;
- Some Project affected households will need support in legalising their rights to land;
- The proposed route is located at the distance of around 90ms from the Shamb HPP and crosses the water tunnel of the HPP;
- The cattle passages shall be considered in the road design and agreed with the village Vorotnavan, Lor, Shenatagh and Darbas administrations [in some villages, the passes shall be large enough to allow passage of agricultural machinery];
- The cultural heritage sites of Davit Bek Fortress and the Vorotnavank Monastery are not affected by the planned road;
- An old burial site/tomb in Vorotnavan located 50m from the proposed route and a historical monument "cross stone" (Khachqar) in Darbas located closed to the proposed road should be protected during the construction works;
- The Iran-Armenia Gas pipeline is crossed by the route in three points in Darbas and at one point in Gekhi, and an irrigation water pipe is crossed in one point in Darbas;
- There is an issue with soil erosion in Darbas at the project affected area which shall be considered during the detailed design;

- In Aghitu, a crushed stone mine is located under the planned bridge and a natural monument (a cave) is located at the distance of 125m from the planned route;
- In Geghavank and Kavchut, structures are located downslope the proposed route and measures should be taken to avoid stone falls.

7.3 Initial Stakeholder Identification

Initial stakeholder identification and analysis was based on desktop review and preliminary meetings and consultations with the representatives of Syunik Regional Administration and Sisian and Kajaran Communities. This information was fed into a preliminary Stakeholder Engagement Programme (**Annex 6**) and will be updated and incorporated into a draft SEP to be developed for the Project.

The Project stakeholders can be categorised as external and internal stakeholders (RD staff and contractors). The SEP will be designed for engagement with external stakeholders. For the purposes of effective and tailored engagement, the external stakeholders are grouped as:

- Potentially affected parties;
- Potentially vulnerable groups;
- National authorities and government;
- Regional administrations;
- Local (community) authorities, including rural settlements; and
- Other interested parties (NGOs, mass media, academia, business, etc.).

A tentative list of external stakeholder groups and their relation to and/or interests in the Project is provided below, and the updated list will be incorporated in the Draft SEP.

Any stakeholder that is not included in the list below but wishes to receive or provide information about the Project and its E&S aspects can address their request to be included in the stakeholders register to:

- **Artur Sanoyan**, NSRCIP Tranches 2 and 4 Project Manager, "Road Department" Fund (Government House 3, Republic Square, Yerevan 0010, Armenia), office: 374 10 51-13-91 (269), mobile: +374 95 111 537, e-mail: artur.sanoyan@armroad.am OR
- **Suren Gyurjinyan**, Deputy Director at ATMS Solutions Ltd. (Yerevan, Armenia), office: mobile: +374 91 43-47-60, +37491 49-71-28 e-mail: suren.gyurjinyan@atms.am.

Table 38. Tentatively Identified External Stakeholders and Their Relation to / Interests in the Project

STAKEHOLDER GROUPS	INTEREST/RELATION
POTENTIALLY AFFECTED PARTIES	
The residents of the settlements that are crossed by the existing and connecting roads or are in close proximity to the proposed road (construction sites) <i>Preliminarily:</i> <ul style="list-style-type: none"> • <i>Sisian Community: Ishkhanasar, Noravan, Vaghatin, Vorotnavan, Shamb, Darbas, Getatagh, Lor, and Shenatagh rural settlements.</i> • <i>Kajaran community: Verin Geghavang, Geghavank, Geghi, Getishen, Nor Astghaberd, Ajabaj, Qirs, Karut, Katnarat, Pukhrut, Lernadzor, Kavchut, Babikavan, Andokavan, and Dzaghikavan rural settlements</i> 	May be: <ul style="list-style-type: none"> • affected by the transportation of building materials, noise, vibration, air pollution and road safety issues or other construction-related impacts. • Interested in employment opportunities. • Interested in benefiting from the economic opportunities that the project may bring to the communities / road side developments.
Farmers, land and assets users or owners whose land or assets may fall within the planned	May be:

STAKEHOLDER GROUPS	INTEREST/RELATION
<p>road's RoW (including intersections) and other Project components the locations of which are unknown yet (spoil disposal areas, construction camp, etc).</p> <p><i>Preliminarily:</i></p> <ul style="list-style-type: none"> <i>Sisian Community: Ishkhanasar, Sisian, Noravan, Vaghatin, Vorotnavan, Shamb, Uyts, Aghitu, Darbas, Getatagh, Lor, and Shenatagh;</i> <i>Kajaran Community: Qirs, Karut, Geghi, Verin Geghavank, Geghavank, Getishen, Vocheti, Nor Astghaberd, Kavchut, and Dzagikavan.</i> 	<ul style="list-style-type: none"> affected by impacts related to land use / access restrictions, temporary or permanent land acquisition / easement. interested in employment opportunities. interested in benefiting from the economic opportunities that the project may bring to the communities
Small and medium enterprises located near / along the existing and connecting roads or the construction sites and their employees	<p>May be:</p> <ul style="list-style-type: none"> affected by the access restrictions due to the Project works. interested in raising revenues, increased procurement due to the Project activities.
Public infrastructure operators and their employees (such as HPPs and infrastructure located close to the proposed road, gas transport and electricity transmission infrastructure operators)	<p>May be:</p> <ul style="list-style-type: none"> affected by the land acquisition and access restrictions due to the Project.
Services located along the Goris-Vorotan-Kapan road (tourism, guesthouses, catering, etc.)	<p>May be:</p> <ul style="list-style-type: none"> affected by less demand for their services due to decreased traffic after the tunnel is commissioned. interested in procurement opportunities and diversification of services.
Churches, cemeteries or other social or religious facilities located close to the planned road and adjacent to the existing and connecting roads and their users (including custodians over cultural heritage monuments/churches)	May be affected by the restricted access due to the Project.
<p>Associated facilities (to be verified):</p> <ul style="list-style-type: none"> Owners and users of land plots to be temporary and permanently acquired/leased for such facilities 	<p>May be:</p> <ul style="list-style-type: none"> affected by impacts related to temporary or permanent land acquisition / easement. interested in employment opportunities.
POTENTIALLY VULNERABLE GROUPS	
Displaced people from Nagorno Karabakh residing in the settlements that are crossed by or are close to the existing and connecting roads	<p>May:</p> <ul style="list-style-type: none"> have difficulties to access or understand the information, provide feedback on the E&S aspects of the Project, or need specific assistance to assert their rights. be interested in temporary employment opportunities.
Russian-speaking residents of the settlements that are crossed by or are close to the existing and connecting roads	
Families registered as living below the poverty level, pensioners, single-parent families, female headed households, multi-children families, people with disabilities	
Children living in the settlements that are crossed by the existing and connecting roads or that will be located close to the construction sites	May be exposed to risks related to vehicles/machinery traffic to/from the Project's construction sites
NATIONAL AUTHORITIES / BODIES AND GOVERNMENT	
<p>Ministry of Infrastructure and Territorial Development (MTAI):</p> <ul style="list-style-type: none"> Road Department Fund (RD) Environmental Impacts Management Service Social Impacts and Resettlement Service 	<ul style="list-style-type: none"> One of the key partners in charge of effective implementation of projects in the transport sphere mainly through RD. The project will also closely collaborate with Environmental Impacts Management Service and Social Impacts and Resettlement Service under MTAI for ESIA study and other tasks.
<p>Ministry of Environment (MoE):</p> <ul style="list-style-type: none"> Environmental Impact Examination Center SNCO (State Environmental Review body) The Inspectorate for Nature Protection 	<ul style="list-style-type: none"> Ensures environmental protection and rational use of natural resources. The MoE, through its key departments, will have administrative authority over the project approval processes in compliance with environmental protection legislation.

STAKEHOLDER GROUPS	INTEREST/RELATION
and Mineral Resources, <ul style="list-style-type: none"> The Forest Committee and its “Hayantar” (ArmForest) SNCO, Sisian Forestry” and “Kapan Forestry” branches. 	<ul style="list-style-type: none"> Is in charge of controlling the State EIA Review as well as for environmental law enforcement within the Project implementation. Is in charge of forestry management.
State Cadastre Committee of Armenia	Maintains state registry of real estate, promotes the development of and implementation of land policy. Cooperation with the Committee is important in relation to land acquisition
Ministry of Education, Science, Culture and Sports	<ul style="list-style-type: none"> In charge of historical and cultural sites in Armenia. interested in avoiding impacts on local historical and cultural (NB: the 2019 design and the initial consultations revealed 81 cultural sites in the Project area) will be engaged in the EIA and construction permitting processes. Interested in potential chance finds during the Project construction.
Ministry of Health	Is one of the key stakeholders in terms of examination of the Project’s potential impact on public health and safety.
Zangezur Biosphere Complex (includes Zangezur State Reserve).	<ul style="list-style-type: none"> Is one of the largest protected areas in the Region; interested in avoiding impacts If the Project components or access/connecting roads pass through the reserve, pollution, noise and vibration will disturb the course of regular life in the reserve.
Ministry of Emergency Situations (Rescue Service; National Center of Technical Safety SNCO)	Involved in approving the technical provisions in compliance with the existing regulations.
SYUNIK REGIONAL ADMINISTRATION	
<ul style="list-style-type: none"> Urban Development Department Transport and Road Construction Division Local Government and National Executive Authorities Department Development Projects and Analysis Division Land State Inspectorate 	Key stakeholder in terms of consultations on the measures to be implemented on the regional level. The regional Administration carries out inspectorate, inventory and assessment as well as control and monitoring over the Project’s progress and its impact on the region on many levels.
<ul style="list-style-type: none"> Family, Women and Children’s Rights Protection Department Department of Education, Culture and Sports 	Important in terms of making sure that the children’s rights are protected if the parents will have to change their children’s school due to the road construction.
LOCAL AUTHORITIES	
Sisian Community <ul style="list-style-type: none"> Urban development division Environment, agriculture and development programs division 	<ul style="list-style-type: none"> Will be engaged in working directly with the affected population, communicating the Project aim to the residents, organising public hearings and information disclosure, gathering the residents’ concerns and suggestions as well as mitigating miscommunications. Possess data on the population, lands, social and economic conditions of the household, etc. Expect improvement of socio-economic conditions of the community. Interested in understanding the Project’s possible negative and positive E&S impacts
Kajaran community <ul style="list-style-type: none"> Urban development division Environment, agriculture and development programs division 	
Representatives of Kajaran Community Head in Geghi and Lernadzor Administrative Areas; Representatives of Sisian Community Head in Ishkhanasar, Aghitu, Noravan, Vaghatin, Vorotnavan, Darbas (Darbas & Shamb settlements), Lor, Shenatagh settlements/ administrative areas.	<ul style="list-style-type: none"> Will be engaged in working directly with the affected population, communicating the Project aim to the residents, organising public hearings and information disclosure, gathering the residents’ concerns and suggestions as well as mitigating miscommunications and supporting land/assets acquisition (if any). Possess data on the population, lands, social and economic conditions of the household, etc. Expect the local population to benefit from service development (retail, catering and accommodation) and temporary employment
NON-GOVERNMENTAL STAKEHOLDERS	

STAKEHOLDER GROUPS	INTEREST/RELATION
<p>National NGOs: Armenian Women for Health and a Healthy Environment (AWHHE), Birds of Armenia (BoA) Project, Acopian Center for the Environment (ACE), Armenian Birdwatching Association, (AWP) WWF Armenia, ECOLUR Information Network, ICOMOS-Armenia, and others.</p> <p>Regional and local NGOs and other civil society organisations, eg: Sisian Tourism Center; Sisian Women's Resource Center Foundation; Khustup environmental NGO; Ecological Safety and Democracy NGO, ECO SIS NGO; and others.</p> <p>International NGOs or organisations: EU's Environment & Climate Change Mainstreaming Facility</p> <p><i>The list of the NGOs will be supplemented and refined in the course of the ESIA development and Project implementation.</i></p>	<ul style="list-style-type: none"> • Consultations on specific topics, such as biodiversity or cultural heritage • Interested in the information about the planned Project activities, its positive and negative impacts on the people and the environment. <p>Close cooperation with NGOs will allow the Project to ensure smoother communication with the residents and organise more inclusive public hearings.</p>
National, regional and local media	Coordinated and regular communication with the media will be necessary to make sure the information about the updates is communicated with the local audience in due course and build trust to avoid reputation crises.
Academia (National University of Architecture and Construction of Armenia; Institutes of natural sciences, etc).	May be interested in the Project related E&S impacts.
Business (mining companies, food processing, etc.)	Expect to use the new road and may be interested in the Project related E&S impacts.

7.4 Further Stakeholder Engagement Steps

Stakeholder engagement started during the inception meetings in April 2021 and will continue in parallel with information disclosure from the early stage of the Project development. The stakeholder engagement activities will include several components, with the aim of facilitating meaningful consultation and providing information on the Project and its E&S implications:

- The Project **ESIA disclosure and consultations:** this component will be led by the Consultant with support of the RD and local authorities and will include:
 - The ESIA scoping consultation meetings, potentially in Sisian and Kajaran towns⁹⁷. During these meetings a Project Scoping Leaflet⁹⁸ will be distributed, the Project and potential alternatives will be discussed, as well as potential E&S impacts and further scope of ESIA work; and the initial SEP will be presented and Community Grievance Mechanism explained.
 - Relevant stakeholder and public consultation meetings and events following the disclosure of the draft ESIA package. The locations and methods of engagement will be determined taking into account the lessons learnt at the scoping stage and the COVID situation at that time.
- **Consultations with regards to biodiversity issues** started in April 2021 and will continue to be held with the "Zangezur Biosphere Complex" SNCO (that is in charge

⁹⁷ The locations for the scoping consultations will be discussed with the authorities of Sisian and Kajaran Communities and heads of administrative areas (affected villages) to ensure the best accessibility. The arrangement of transport for the villages will be considered, as well as a possibility to hold the meetings in the villages per se (subject to availability of suitable premises meeting the Project needs and allowing to comply with COVID-19 social distancing requirements).

⁹⁸ The Scoping Leaflet will be prepared in Armenian, and possibly in Russian, if such need is identified during scoping **planning** consultations with the community and village authorities.

of Zangezur State Sanctuary and other six SPAs); environmental NGOs in Armenia, including WWF Armenia, Birds of Armenia (BoA); “Hayantar” (ArmForest) SNCO and “Sisian Forestry” and “Kapan Forestry” branches; MoE, and EU’s Environment & Climate Change Mainstreaming Facility. Ecosystem use and dependence on ecosystems will be discussed with the local villagers, including during the social baseline studies.

- **Consultations within the land acquisition and livelihood restoration framework planning for the Project:** this component will include consultations with the local authorities about the draft entitlement matrix and valuation approaches that will be proposed as part of the RF.
- **Consultations with regards to cultural heritage issues** will be held with the state cultural heritage bodies and local communities, including during the social baseline studies.
- **Special purpose events:** these events will aim at addressing the ESIA commitments and will cover the following topics, as a minimum:
 - Community health and safety (including pedestrian and road safety);
 - Job creation opportunities and challenges.

The list of the events can be expanded based on further consultations.

- **Not part of this ESIA:** The RD will prepare the national EIA documentation and hold the Project’s **national EIA disclosure and consultation** according to the Armenian legislation. It will include two public scoping meetings and two EIA public hearings (one of each of these will be the responsibility of the State Environmental Review bodies under the MoE). The feedback documents/comments collected by the MoE will be analysed by the RD and included in the final version of the EIA reports.

The possibility to merge some of the consultation events envisioned in the bankable ESIA and national EIA processes will be discussed between the RD, EBRD and the Consultant.

A detailed Stakeholder Engagement Programme for the ESIA period is presented in **Annex 6** and further engagement will be presented in the draft Project SEP. This Programme will describe engagement activities, responsible bodies and timing of the activities that will be structured around the above-mentioned stakeholder engagement components (i.e., international ESIA, national EIA, land acquisition and restoration, special purpose events) and will be split into design, construction and operation stages. Stakeholder engagement for decommissioning will be developed at the outset of the decommissioning planning stage.

7.5 Grievance Mechanism

A grievance mechanism is required by EBRD to review and resolve concerns and/or questions raised by stakeholders in relation to a project, in an efficient, timely, transparent, and non-discriminatory manner. In line with this, the RD establishes the Project grievance mechanism for external stakeholders⁹⁹ building on the communication channels used at the RD and supplementing them by actions to meet EBRD requirements. Currently, the RD has several means for collecting feedback, inquiries or complaints of the stakeholders:

- An inquiry submission form at the RD’s website available in Armenia (<https://armroad.am/am/contacts>), Russian (<https://armroad.am/ru/contacts>) and English (<https://armroad.am/en/contacts>);
- The RD’s phone number and email that can be used by the Project stakeholders – tel.: +37410511391; e-mail: info@armroad.am.

⁹⁹ A separate mechanism is developed to address worker grievances.

- The RD's Facebook web-page at <https://www.facebook.com/armroad.am/> and other social platforms (Twitter and YouTube), which are monitored by the due RD staff.

The RD will maintain the existing practice, yet supplement it with the following actions in order to create a comprehensive grievance mechanism as per EBRD requirements:

- On a par with the above channels**, the stakeholder complaints / suggestions in relation to the Project planning and implementation can be made in writing, by email or by telephone to the following RD Contact Person:

Contact name	Lilit Dilanyan, Head of Social Impact Management Service, "Road Department" Fund	Artur Sanoyan, NSRCIP T2, T4 Project Manager, "Road Department" Fund
E-mail	lilit.dilanyan@armroad.am	artur.sanoyan@armroad.am
Telephone	374 10 51-13-91 (206), mobile: +374 95 111 287	374 10 51-13-91 (268)
Address	Government House 3, Republic Square, Yerevan 0010, Armenia	

- The inquiries can also be communicated to the community authorities**, namely, the nominated Contact Persons at the regional and community administrations, who will subsequently transmit these to the RD:

Syunik Regional Administration Sarik Aghabekyan, Head of Transport and Road Construction Department Tel.: +37477 66-99-70 E-mail: syunik@mta.gov.am	Sisian Community Simon Hovhannisyan, Head of Urban Development Department Tel.: +37493 91-09-97 E-mail: gaxshin.sisian@mail.ru	Kajaran Community Zohrab Araqelyan, Deputy Community Head Tel.: +37498 19-90-13 E-mail: gajarancity@mail.ru
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- The inquiries about the Project and ESIA process** can be communicated to the Consultant, who will subsequently transmit these to the RD:

Contact name	Suren Gyurjinyan, Deputy Director at ATMS Solutions Ltd.
E-mail	suren.gyurjinyan@atms.am
Telephone	Tel.: +37491 43-47-60, +37491 49-71-28
Address	1, 11 Griboedov str., 0051, Yerevan, Armenia

The current practice of the RD is such that all inquiries, complaints and requests are collected centrally in the RD, registered in the central database and then distributed to the relevant units / departments for consideration and response provision. Following this, a decision and/or response to the inquirer/complaint is communicated through the channel specified by her/him within one month following the receipt and no later than 15 days for applications and complaints not requiring further review and verification¹⁰⁰.

The Project grievance mechanism will be administered by the RD who will receive the Project-related inquiries/complaints and will enter them in the Inquiry and Grievance Logbook. Depending on the form of the inquiry, the RD will reply until the inquirer is satisfied with the answer. Questions and requests that have not been answered to satisfaction of a stakeholder twice will be escalated as grievances and will be addressed by a committee including the RD's E&S Managers, MTAI and the local authority concerned. Further details on the grievance mechanism, including for the construction state, will be provided in the Project's Draft SEP.

¹⁰⁰ <https://armroad.am/en/contacts>.

8 RECOMMENDATIONS RELATED TO PROJECT DESIGN

8.1 Intermediate Spoil Disposal

A key issue is what will be done with the spoil from the tunnel excavations. The cost of transport of the spoil typically requires disposal close to the source of the excavation. Special provisioning will need to be considered regarding the disposal site and the route to it, the frequency of vehicle movements, suitability of the roadways, limitations such as travelling at night and others. Notably: 1) the most important contributor to the climate change and terrestrial eco-toxicity impacts are the loading and hauling process; 2) the drilling and blasting process is the dominant contributor to the human toxicity, photochemical oxidant formation, particulate matter formation and terrestrial acidification impacts; and 3) the three main sources for all impacts are explosives and diesel and electricity use. Therefore, a significant potential of environmental impacts reduction could be reached by optimising drilling and blasting operation to reduce explosive consumption, and by improving renewable energy sharing.

8.2 Characterisation of Tunnel Spoil and Risk of ARD

Only a preliminary assessment of the lithology that will be affected by the tunnelling is currently available due to the depth of the overburden on the tunnel alignments and other limitations. As such the exact geology will only become known as the tunnels are being excavated. The preliminary geological assessment has, however, highlighted the possible presence of sulphur oxides in the rock mass which implies the possibility of acid rock drainage. It will be necessary to characterise the acid rock drainage potential of the waste rock, and should the acid rock drainage potential be identified, to make provisions in the disposal to prevent formation of the same.

8.3 Choice of Road Pavement

Due to the proximity of the planned road to existing residential areas in some locations, it seems likely that there will be a need to establish noise attenuation mitigation at various points along the roadway. In addition, the Qirs-Kajaran section of the road passes through a number of potential sensitive biodiversity areas where additional noise disturbance may have a detrimental impact on the biodiversity. For these various reasons, the choice of road pavement may warrant a surface that minimises road noise.

8.4 Siting of Facilities Needed during Construction

The siting of facilities needed during construction such as laydown areas, construction camps, borrow pits and so forth, will need to be carefully planned to ensure that these do not create significant negative impacts in their own right. As part of the ESIA, siting criteria for such facilities will be defined taking the requirements of the local administrations into account.

9 ESIA WORK PROGRAMME AND TIMELINE

The scope and details of the further ESIA works are outlined in the above sections in relation to potential E&S impacts and risks of the Project.

The preparation timeline of the ESIA and supporting documents is proposed as follows:

- Draft RF: April 2022 (with the Government-approved version to be issued in June-July 2022);
- Draft SEP: May 2022;
- Draft BAP: June 2022;
 - Biodiversity surveys in April 2021, June-July-August 2021, November-December 2021, January – March 2022, and April-May 2022.
 - Critical Habitat / Priority Biodiversity Features screening in April 2022.
- Draft ESIA report: early June 2022;
 - Noise, air quality, water quality and soil contamination surveys in April 2022.
 - Socio-economics surveys, including gender aspects, in April-May 2022.
 - Cultural heritage survey in April-May 2022.
 - Noise, vibration and air modelling in April 2022.
 - Critical Habitat Assessment – May-June 2022.
- Draft ESMP: July 2022;
- Draft NTS: July 2022;
- Draft ESAP: July 2022;
- Final drafts of NTS, SEP, ESIA, ESAP, RF, and BAP for disclosure: early August 2022.

The stakeholder comments received and/or collected during the 120-day disclosure period (early August – early December 2022) will be reviewed and considered, as much as possible. By end-December 2022 / early January 2023, the relevant amendments will be introduced to the Project's NTS, SEP, ESIA, ESMP, ESAP, RF, and BAP based on the stakeholder comments.

Annex 1. INTERNATIONAL E&S CONVENTIONS AND AGREEMENTS PERTINENT TO THE PROJECT

International Convention or Protocol	Description
Convention on Wetlands of International Importance - (Ramsar 1971)	The Ramsar Convention is an intergovernmental treaty to maintain the ecological character and plan the sustainable use of Wetlands of International Importance. The Convention entered into force in Armenia in 1993.
Paris Convention for the Protection of the World Cultural and Natural Heritage (1972)	The Convention establishes the need to preserve natural and cultural heritage and the balance between the two. Armenia became a State party in 1993.
The Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)	The objective of the Bonn Convention, which was adopted in 1979, is to ensure the conservation of land, marine and air migratory species over the whole of their area of distribution. Armenia is a State party since 2011
Convention on the Conservation of European Wildlife and Natural Habitats, Bern (1979)	The Bern Convention is a binding international legal instrument in the field of nature conservation, covering most of the natural heritage of the European continent and extending to some States of Africa. Ratified by Armenia in 2008.
The Convention on Biological Diversity (1992)	The three main objectives of the Convention are: the conservation of biological diversity; the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Signed by Armenia in 1993.
European Landscape Convention, Florence (2000)	The European Landscape Convention of the Council of Europe promotes the protection, management and planning of the landscapes and organises international co-operation on landscape issues.
United Nation Framework Convention on Climate Change (1992)	The UNFCCC is one of the "Rio Conventions" adopted at the Rio Earth Summit in 1992. The principal objective is to prevent "dangerous" human interference with the climate system. The UNFCCC entered into force in March 1994 and the first Conference of the Parties of the Convention took place in Berlin, 1995. Armenia became a state party in 2002.
Paris Agreement under the United Nations Framework Convention on Climate Change	The aim of the agreement is to decrease global warming through: (a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change; (b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; (c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. Ratified by Armenia in 2017.
UN Convention to Combat Desertification, Paris (1994)	This Convention is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. Ratified by Armenia in 1997.
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003)	The purposes of this Convention are: (a) to safeguard the intangible cultural heritage; (b) to ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned; (c) to raise awareness at the local, national and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof; (d) to provide for international cooperation and assistance. Ratified by Armenia in 2006.
Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (1998)	The Aarhus Convention is a multilateral environmental agreement through which the opportunities for citizens to access environmental information are increased and transparent and reliable regulation procedure is secured. Armenia became a State-party in 2001.
International Labour Organization (ILO) Conventions	Armenia has ratified 29 ILO conventions including the following fundamental ones: <ul style="list-style-type: none"> • Forced Labour Convention, 1930 (Ratified 17.12.2004), • Freedom of Association and Protection of the Right to Organize Convention, 1948 (Ratified 02.01.2006), • Right to Organize and Collective Bargaining Convention, 1949 (Ratified 12.11.2003), • Equal Remuneration Convention, 1951 (Ratified 29.07.1994), • Abolition of Forced Labour Convention, 1957 (Ratified 17.12.2004) • Discrimination (Employment and Occupation) Convention, 1958 (Ratified 29.07.1994), • Minimum Age Convention, 1973 (Ratified 27.01.2006), • Worst Forms of Child Labour Convention, 1999 (Ratified 02.01.2006).

Annex 2. PROPOSED AIR, NOISE, VIBRATION, WATER AND SOIL SAMPLING AND MEASUREMENT LOCATIONS

Sisian-Shenatagh section



Monitoring points at sensitive receptors along the proposed road

Point S1-ANVS	Piquet: ~ km 0+420	GPS coordinates		
		39°33'27.30"N	46° 2'20.59"E	
Point description and sensitivity	Intersection of M2 road with the starting point of project road Sisian-Shenatagh section, near the Ojax restaurant. The area is commercial.			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water
Point S2-ANVS	Piquet: ~ km 7+250	GPS coordinates		
		39°30'51.67"N	46° 4'46.29"E	
Point description and sensitivity	Aghitu settlement. In front of the nearest residential house (on the left side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water
Point S3-W	Piquet: ~ km 10+400	GPS coordinates		
		39°30'3.03"N	46° 6'35.11"E	
Point description and sensitivity	The Noravan river, under the planned bridge BR002.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point S4-ANVS	Piquet: ~ km 10+950	GPS coordinates		
		39°29'27.56"N	46° 7'33.26"E	
Point description and sensitivity	Vaghatin settlement. In front of the nearest residential house (on the left side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water
Point S5-V	Piquet: ~ km 11+500	GPS coordinates		
		39°29'50.25"N	46° 7'15.97"E	
Point description and sensitivity	In front of the Vorotanavank Monastery (on the right side).			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point S6-W	Piquet: ~ km 12+850	GPS coordinates		
		39°29'17.69"N	46° 7'52.19"E	
Point description and sensitivity	The Vorotan river, under the planned bridge BR005.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point S7-ANV	Piquet: ~ km 14+800	GPS coordinates		
		39°28'22.33"N	46° 7'51.01"E	
Point description and sensitivity	In front of the Shamb HPP (on the right side). The area is industrial.			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water
Point S8-W	Piquet: ~ km 15+000	GPS coordinates		
		39°28'15.97"N	46° 7'51.99"E	
Point description and sensitivity	The river (without name), under the planned bridge BR006.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point S9-W	Piquet: ~ km 18+300	GPS coordinates		
		39°26'38.56"N	46° 8'8.46"E	
Point description and sensitivity	The Shenatagh river, under the planned bridge BR008.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point S10-ANVS	Piquet: ~ km 18+550	GPS coordinates		
		39°26'34.00"N	46° 7'51.33"E	
Point description and sensitivity	Darbas settlement. In front of the nearest residential house (on the right side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water

Point S11-W	Piquet: ~ km 21+050	GPS coordinates		
		39°25'19.92"N	46° 7'48.37"E	
Point description and sensitivity	The river (without name), under the planned bridge BR011.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water

Point S12-ANVS	Piquet: ~ km 22+150	GPS coordinates		
		39°24'49.07"N	46° 7'50.40"E	
Point description and sensitivity	Lor settlement. In front of the nearest residential house (on the right side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water

Point S13-W	Piquet: ~ km 22+200	GPS coordinates		
		39°24'47.70"N	46° 7'54.03"E	
Point description and sensitivity	The Shenatagh river, near the piquet km 22+200.			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water

Point S14-ANVSW	Piquet: ~ km 26+350	GPS coordinates		
		39°22'32.77"N	46° 8'2.67"E	
Point description and sensitivity	Shenatagh settlement. Under the planned bridge BR0016.			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water

Qirs-Kajaran section



Point K1-ANVS	Piquet: ~ km 42+800	GPS coordinates		
		39°14'25.85"N	46° 8'37.24"E	
Point description and sensitivity	Unpopulated area located at the distance of approx. 1.5km to the north from the crossing point of the existing road with the road to Nor Astghaber			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water

Point K2-W	Piquet: ~ km 44+100	GPS coordinates		
		39°13'45.48"N	46° 8'28.00"E	
Point description and sensitivity	The Karut River, near the discharging point with the Geghi river			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water

Point K3-ANVS	Piquet: ~ km 45+300	GPS coordinates		
		39°13'28.38"N	46° 9'18.30"E	
Point description and sensitivity	Geghi settlement. In front of the nearest residential house (on the right side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water

Point K4-V	Piquet: ~ km 46+400	GPS coordinates		
		39°13'18.10"N	46°10'2.09"E	
Point description and sensitivity	Industrial facility within the administrative boundaries of Geghi settlement (on the right side).			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point K5-ANV	Piquet: ~ km 48+100	GPS coordinates		
		39°13'24.71"N	46°11'3.02"E	
Point description and sensitivity	Geghi (Verin Geghavank) settlement. In front of the nearest residential house (on the right side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water

Point K6-V	Piquet: ~ km 49+200	GPS coordinates		
		39°13'20.71"N	46°11'52.18"E	
Point description and sensitivity	HPP within the administrative boundaries of Geghi settlement (on the right side).			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water
Point K7-W				
Point K7-W	Piquet: ~ km 49+400	GPS coordinates		
		39°13'18.29"N	46°12'4.75"E	
Point description and sensitivity	The Geghi river, before discharging point to Geghi reservoir			
Parameters to be monitored				
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point K8-ANV				
Point K8-ANV	Piquet: ~ km 52+500	GPS coordinates		
		39°12'53.48"N	46°14'5.71"E	
Point description and sensitivity	Geghi (Geghavank) settlement. After dam of Geghi reservoir (on the left side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water
Point K9-ANVS				
Point K9-ANVS	Piquet: ~ km 53+250	GPS coordinates		
		39°12'34.57"N	46°14'30.67"E	
Point description and sensitivity	Kavchut settlement. In front of the nearest residential house (on the left side).			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water
Point K10-ANVSW				
Point K10-ANVSW	Piquet: ~ km 56+050	GPS coordinates		
		39°11'11.75"N	46°14'49.08"E	
Point description and sensitivity	Lernadzor settlement. In front of the nearest residential house (on the left side). Water sampling from Voghji river.			
Parameters to be monitored				
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input checked="" type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water
Point K11-ANV				
Point K11-ANV	Piquet: ~ km 59+650	GPS coordinates		

		39°10'1.82"N	46°12'51.51"E
Point description and sensitivity	Lernadzor settlement. Near Electrical substation / Pump station.		
Parameters to be monitored			
<input checked="" type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil <input type="checkbox"/> Water

Point K12-W	Piquet: ~ km 59+900	GPS coordinates	
		39° 9'52.83"N	46°12'49.39"E
Point description and sensitivity	Water sampling from Voghji river.		
Parameters to be monitored			
<input type="checkbox"/> CO, SO ₂ , NO ₂ , and PM _{2.5} , PM ₁₀	<input type="checkbox"/> Noise	<input type="checkbox"/> Vibration	<input type="checkbox"/> Soil <input checked="" type="checkbox"/> Water

Monitoring points at sensitive receptors along the existing roads Sisian-Shenatagh and Qirs-Kajaran

Point ER1-DNV	Piquet: -	GPS coordinates	
		39°31'6.69"N	46° 4'46.35"E
Point description and sensitivity	Near the school within the administrative boundaries of Aghitu village.		
Parameters to be monitored			
<input checked="" type="checkbox"/> PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil <input type="checkbox"/> Water

Point ER2-DNV	Piquet: -	GPS coordinates	
		39°31'15.96"N	46° 5'34.07"E
Point description and sensitivity	Near the school within the administrative boundaries of Noravan village.		
Parameters to be monitored			
<input checked="" type="checkbox"/> PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil <input type="checkbox"/> Water

Point ER3-DNV	Piquet: -	GPS coordinates	
		39°26'29.21"N	46° 7'26.63"E
Point description and sensitivity	Near St. Stephan church within the administrative boundaries of Darbas village.		
Parameters to be monitored			
<input checked="" type="checkbox"/> PM _{2.5} , PM ₁₀	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil <input type="checkbox"/> Water

Point ER4-DNV	Piquet: -	GPS coordinates	
		39°25'35.08"N	46° 7'31.24"E

Point description and sensitivity	Near Holy Mother church within the administrative boundaries of Getatagh village.			
Parameters to be monitored				
<input checked="" type="checkbox"/> PM2.5, PM10	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point ER5-DNV	Piquet: -	GPS coordinates		
		39°24'45.79"N	46° 7'46.31"E	
Point description and sensitivity	Near St. Gevorg church and residential houses. Within the administrative boundaries of Lor village.			
Parameters to be monitored				
<input checked="" type="checkbox"/> PM2.5, PM10	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point ER6-DNV	Piquet: -	GPS coordinates		
		39°22'38.50"N	46° 7'55.70"E	
Point description and sensitivity	Near the Memorial to R. Vasiryan within the administrative boundaries of Shenatagh village.			
Parameters to be monitored				
<input checked="" type="checkbox"/> PM2.5, PM10	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point ER7-DNV	Piquet: -	GPS coordinates		
		39°12'14.62"N	46°15'7.17"E	
Point description and sensitivity	Near the 3 multi-residential buildings within the administrative boundaries of Kavchut settlement.			
Parameters to be monitored				
<input checked="" type="checkbox"/> PM2.5, PM10	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Point ER8-DNV	Piquet: -	GPS coordinates		
		39°11'54.91"N	46°15'26.87"E	
Point description and sensitivity	Near the commercial facility located at the crossing point of M-2 road and the existing road to Qirs settlement.			
Parameters to be monitored				
<input checked="" type="checkbox"/> PM2.5, PM10	<input checked="" type="checkbox"/> Noise	<input checked="" type="checkbox"/> Vibration	<input type="checkbox"/> Soil	<input type="checkbox"/> Water

Annex 3. ADDITIONALLY IDENTIFIED BIRD SPECIES THAT CAN BE ENCOUNTERED IN THE PROJECT AREA

No	Natura 2000 species code	Name	Threat status (IUCN)	Breeding habitats
1	A079	Black Vulture - <i>Aegypius monachus</i>	LC	Sparsely vegetated land, woodland and forest
2	A229	Kingfisher - <i>Alcedo atthis</i>	VU	Rivers and lakes
3	A243	Short-toed Lark - <i>Calandrella brachydactyla</i>	LC	Cropland, grassland, heathland and shrub, sparsely vegetated land
4	A224	Nightjar - <i>Caprimulgus europaeus</i>	LC	Heathland and shrub, woodland and forest
5	A082	Hen Harrier - <i>Circus cyaneus</i>	NT	Grassland, heathland and shrub, wetlands
6	A238	Middle Spotted Woodpecker - <i>Dendrocopos medius</i>	LC	Agricultural mosaics, cropland, woodland and forest
7	A429	Syrian Woodpecker - <i>Dendrocopos syriacus</i>	LC	Agricultural mosaics, cropland, urban, woodland and forest
8	A379	Ortolan Bunting - <i>Emberiza hortulana</i> Linnaeus	LC	Agricultural mosaics, cropland, grassland, heathland and shrub, sparsely vegetated land, woodland and forest
9	A320	Red-breasted Flycatcher - <i>Ficedula parva</i>	LC	Woodland and forest
10	A442	Semi-collared Flycatcher - <i>Ficedula semitorquata</i>	LC	Woodland and forest
11	A076	Bearded Vulture - <i>Gypaetus barbatus</i>	VU	Sparsely vegetated land
12	A078	Griffon Vulture - <i>Gyps fulvus</i>	LC	Sparsely vegetated land
13	A339	Lesser Grey Shrike - <i>Lanius minor</i>	LC	Agricultural mosaics, cropland
14	A272	Bluethroat - <i>Luscinia svecica</i>	LC	
15	A242	Calandra Lark - <i>Melanocorypha calandra</i>	LC	Cropland, heathland and shrub
16	A346	Chough - <i>Pyrrhocorax pyrrhocorax</i>	LC	Sparsely vegetated land
17	A307	Barred Warbler - <i>Sylvia nisoria</i>	LC	Agricultural mosaics, cropland, grassland, heathland and shrub, woodland and forest

Annex 4. ADDITIONALLY IDENTIFIED AMPHIBIANS, REPTILES AND FISH THAT CAN BE ENCOUNTERED IN THE PROJECT AREA

No	Natura 2000 species code	Name	Threat status (IUCN)	Breeding habitats
1	1220	European pond terrapin – <i>Emys orbicularis</i>	NT	Rivers and lakes, wetlands
2	2439	<i>Eumeces schneideri</i>	LC	Shrubland, grassland, wetlands (inland), rocky areas (eg. Inland cliffs, mountain peaks), Artificial/terrestrial
3	1130	<i>Aspius aspius</i> - Aral asp	LC	Rivers and lakes
4		<i>Barbus capito</i> - Bulat-mai barbel	VU	
5	1146	<i>Sabanejewia aurata</i> - Golden Loach	NE	Rivers and lakes

Annex 5. INVERTEBRATES REGISTERED IN THE RA RED BOOK OF ANIMALS AND THEIR IUCN STATUS

No	Natura 2000 species code	Name	RoA Red Book of Animals	Threat status (IUCN)	Breeding habitats
Mollusks					
1		<i>Columella columella</i> (Martens, 1853)	CR	LC	Forest, Grassland
Insects					
2		<i>Coenagrion vanbrinkae</i> Lohmann, 1993	VU		
3		<i>Onychogomphus assimilis fulvipennis</i>	VU		
4		<i>Phytodrymadusa armeniaca</i> Ramme	VU		
5		<i>Procerus scabrosus fallettianus</i> Cavazzutti	VU		
6		<i>Cortodera kaphanica</i> Danilevsky	EN		

№	Natura 2000 species code	Name	RoA Red Book of Animals	Threat status (IUCN)	Breeding habitats
7		Cerambyx cerdo acuminatus Motschulsky (Synonym: Cerambyx cerdo cerdo)	VU	NE	
8	1057	Parnassius apollo kashtshenkoi Sheljuzhko	VU	NT	Grassland, sparsely vegetated land
9		Brenthis ino schmitzi Wagener	VU		
10		Maculinea arion zara Jachontov	VU		
11		Maculinea alcon monticola	VU		
12		Agrodiaetus huberti Carbonell	EN		
13	1076	Proserpinus proserpina	VU	NE	Grassland, heathland and shrub

Annex 6. PRELIMINARY STAKEHOLDER ENGAGEMENT PROGRAMME FOR THE ESIA PERIOD

No.	Engagement activity	Stakeholder / Stakeholder group	Information to be disclosed	Timeframe	Responsibility	Opportunity for stakeholders to participate
1.	Communication means during ESIA					
1.1	Posting regular updates on the RD website (https://armroad.am/) about the Project progress and sharing public disclosure documents	All stakeholders	Project updates (e.g., about the ESIA, EIA, planned design FS works, land acquisition planning updates) and E&S documentation	January 2022 and onwards	The RD	The stakeholders can obtain the recent Project information, post a question and get a reply (any time during the Project implementation)
1.2	Media communications	National and regional paper and electronic newspapers, TV and radio	Project works and progress, E&S impacts, press releases as news appear, announcement about public consultation meetings	April 2022 and onwards throughout the Project life-cycle	The RD	The residents in the Project area and the wider public are informed about the Project initiation and planned activities / updates, consultation events
1.3	Setting up and maintaining a grievance mechanism	Potentially affected parties and all stakeholders	Scoping Leaflet Scoping Report Draft SEP with the description of the grievance mechanism	April 2022; maintain throughout the project cycle	The RD, with the Consultant's support	Provision of feedback, possibility to make inquiries, file concerns, and seek resolution
1.4	Newsletters, leaflets, individual and group meetings; phone calls and email correspondence (possibly, posting of information on the notice boards / website of Sisian and Kajaran communities and at publicly accessible places in all villages along the existing and connecting roads and where Project components will be located)	Residents of villages along the proposed road alignment, existing and connecting roads and where Project components will be located; village and community authorities; Other interested parties: social protection and cultural heritage bodies, NGOs	Advance informing about the planned works	Prior to scoping and ESIA hearings / consultation events.	The RD, with the support of the local authorities and the Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
2.	Scoping stage disclosure and consultations					
2.1	Scoping planning consultations with the Syunik Regional Administration, authorities of Sisian and Kajaran Communities and potentially affected settlements / administration areas (to agree on logistics, premises, COVID precautions measures)	As listed to the left	Preliminary engagement programme and scoping meetings plan / agenda	April 2022	The Consultant	Consultation process / phone discussions / email or mail exchange

No.	Engagement activity	Stakeholder / Stakeholder group	Information to be disclosed	Timeframe	Responsibility	Opportunity for stakeholders to participate
2.2	Announcement about the scoping consultations in all villages along the existing and connecting roads and where Project components will be located	Potentially affected parties, other stakeholders	Brief information about the Project, venue, date and time of the meetings (via posting in the accessible places in these settlements, on the notice boards of the Communities' and villages' administration buildings, newspapers and on the RD webpage)	April 2022	The Consultant The RD	Being informed.
2.3	Disclosure of the Scoping Leaflet, Scoping Report including this draft ESIA Stakeholder Engagement Programme: - RD office in Yerevan; - RD webpage; - authorities' administration buildings in Sisian and Kajaran Communities; - authorities administration buildings in the potentially affected settlements / administration areas (where such exist)	Potentially affected settlements along the existing and connecting roads Other stakeholders	Scoping Leaflet Scoping Report including this draft ESIA Stakeholder Engagement Programme, Scoping presentation	February 2022	The Consultant, with support of the RD and local authorities	A possibility to provide written or verbal comments to the RD, ESIA Consultant or local authorities during the 30-day disclosure period.
2.4	Public scoping consultation meetings in at least: - Sisian - Kajaran - Yerevan (workshops with state bodies, NGOs, media, academia) - Several administrative units in the Project area	Potentially affected settlements along the existing and connecting roads; NGOs, media, academia and any stakeholders		February 2022	The Consultant, with support of the RD and local authorities	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
2.5	Collection and analysis of stakeholder comments after a 30-day disclosure	n/a	n/a	April-May 2022	The Consultant, with inputs from the RD and local authorities	Follow-up calls or meetings by the Consultant to clarify the comments and/or provide the requested information.
3	Consultations with regards to biodiversity					
3.1	Inception and scoping consultations / workshops	Zangezur Biosphere Complex" SNCO, Hayantar" (ArmForest) SNCO and "Sisian Forestry" and "Kapan Forestry" branches	Scoping Leaflet Scoping Report including this draft ESIA Stakeholder Engagement Programme, Scoping presentation	April-May 2022	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement

No.	Engagement activity	Stakeholder / Stakeholder group	Information to be disclosed	Timeframe	Responsibility	Opportunity for stakeholders to participate
3.2	Scoping consultations / workshops (could be online via Zoom, etc.)	Environmental NGOs in Armenia, including WWF Armenia, Birds of Armenia; Environmental & Climate Change Mainstreaming Facility	Scoping Leaflet Scoping Report including this draft ESIA Stakeholder Engagement Programme, Scoping presentation	April-May 2022	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
3.3	Interviews and consultations about the use of ecosystem services and dependence on them (including with males and females separately)	Affected parties	Scoping Leaflet Scoping Report including this draft ESIA Stakeholder Engagement Programme	April-May 2022 (during the scoping consultations and later during the socio-economic survey)	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
3.4.	Consultations on impact assessment and mitigation strategies	MoE, Zangezur Biosphere Complex" SNCO, Hayantar" (ArmForest) SNCO and "Sisian Forestry" and "Kapan Forestry" branches, Environmental NGOs in Armenia, including WWF Armenia, Birds of Armenia, Affected parties;	Draft BAP and ESIA package	During the ESIA disclosure period: August – December 2022	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
4	Consultations on land acquisition and livelihood restoration framework					
4.1	Consultations about options to avoid the economic and physical displacement as much as possible / verification of the preferred route as causing least land and livelihood-related impacts	Authorities of Sisian and Kajaran Communities and of potentially affected settlements / administration areas	The 2017 EIA report, maps of the proposed road alignment, Scoping report (in particular, the Land Use baseline and assessment sections), Scoping Leaflet	April-May 2022 (based on December 2021 meetings)	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
4.2	Consultations about the entitlement matrix and valuation approaches that will be proposed in the RF	<ul style="list-style-type: none"> Authorities of Sisian and Kajaran Communities and of potentially affected settlements / administration areas Potentially affected land owners / users / farmers / businesses 	Draft Project RF, Description of land acquisition process and draft entitlement matrix	During the ESIA disclosure period: August – December 2022	The Consultant with inputs from the RD	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
5	Consultations with regards to cultural heritage					

No.	Engagement activity	Stakeholder / Stakeholder group	Information to be disclosed	Timeframe	Responsibility	Opportunity for stakeholders to participate
5.1	Scoping consultations on the use of the local culturally, historically and socially values facilities, sites or objects; ways to avoid impacts (alternatives)	<ul style="list-style-type: none"> State cultural heritage bodies; Kapan regional museum, Local authorities Cultural heritage NGOs and other organisations 	Scoping Leaflet Cultural Heritage sections of the Scoping Report	April-May 2022 (during the scoping consultations and socio-economic survey)	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
5.2	Focus groups, personal meetings / consultations on the use of the local culturally, historically and socially values facilities, sites or objects (including with males and females separately)	Local residents and authorities of the villages along the road	Scoping Leaflet Cultural Heritage sections of the Scoping Report	April-May 2022 (during the scoping consultations and socio-economic survey)	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
5.3	Consultations on impact assessment and mitigation strategies	<ul style="list-style-type: none"> State cultural heritage bodies; Kapan regional museum, Local authorities Local potentially affected parties Cultural heritage NGOs and other organisations 	Draft ESIA package	During the ESIA disclosure period: August – December 2022	The Consultant	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
6	Throughout the scoping and ESIA stages: special purpose activities and events (determined by the Project needs or expression of interest by stakeholders)					
6.1	Focus group/ individual meetings to be organized whenever a specific topic appears to be of concern/ misunderstood (exchange of phone calls or emails)	Affected parties Other interested parties	Specific printed or electronic materials to be prepared	Any time as needed during the ESIA period (then during the Project life-time)	The Consultant (then the RD)	Personal participation and communication
6.2.	Awareness raising activities on pedestrian and road safety/ community health and safety	Affected parties Other interested parties	Safety rules and regulations	Any time as needed during the ESIA period (then prior to and during construction)	The Consultant (then the RD and its Contractors)	Group participation
6.3	Meeting on employment opportunities and challenges (workforce qualification needs)	Affected parties	Special materials or leaflets	Any time as needed during the ESIA period (then prior to and during construction)	The Consultant (then the RD and its Contractors)	Being informed, personal participation and communication
7.	Draft ESIA disclosure and consultations					

No.	Engagement activity	Stakeholder / Stakeholder group	Information to be disclosed	Timeframe	Responsibility	Opportunity for stakeholders to participate
7.1	Announcement about the draft ESIA report public disclosure and consultations (in Sisian and Karajan) (via posting in the accessible places in the settlements along the road, on the notice boards of the Communities' administration buildings, newspapers and on the RD webpage)	All stakeholders	Brief information about the project, venue, date and time of the meetings	August 2022 (disclosure period: August - December 2022)	The Consultant with inputs from the RD	Being informed.
7.2	Disclosure of the ESIA package in: - RD office in Yerevan; - RD webpage; - authorities administration buildings in Sisian and Kajaran Communities; - authorities administration buildings in the potentially affected settlements / administration areas (where such exist)	Potentially affected settlements along the existing and connecting roads; NGOs, media, academia and any stakeholders	Draft ESIA package: SEP, ESIA report, NTS, ESMP, BAP, ESAP and RF	Disclosure period: August - December 2022	The Consultant with inputs from the RD	Provide written or verbal comments to the company during the 120-day disclosure.
7.3	ESIA public consultation meetings in at least: - Sisian - Kajaran - Yerevan (workshops with state bodies, NGOs, media, academia) - several administrative units in the Project Area	Potentially affected settlements along the existing and connecting roads; NGOs, media, academia and any stakeholders		August - December 2022	The Consultant, with support of the RD and local authorities	Personal participation and communication; a possibility to get immediate feedback, establishing contacts for further engagement
7.4	Collection and analysis of stakeholder comments during and after the disclosure	n/a	n/a	August - December 2022	The Consultant, with inputs from the RD and local authorities	Follow-up calls or meetings by the Consultant to clarify the comments and/or provide the requested information.