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WATER RESERVOIRS PROJECT - ARMENIA

Environmental and Social Impact Assessment for the Artik Reservoir Construction Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Rev02

December 2025

Prepared for:

**European Bank for
Reconstruction and
Development**

and

**Water Committee under the
Ministry of Territorial
Administration and
Infrastructure of the Republic of
Armenia**



ATMS Solutions Ltd.
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Consultancy Services Contract № 2023.009567

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- European Bank for Reconstruction and Development
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This Environmental and Social Management Plan (ESMP) has been developed as part of the Environmental and Social Impact Assessment (ESIA) for the Artik Reservoir Construction Project (hereinafter referred to as "the Project"). It is intended to guide the implementation of environmental and social management measures during the Project's design (pre-construction), construction, and operational phases, in alignment with applicable national regulations and international best practices.

The information presented in this ESMP is based on data available at the time of its preparation and may be subject to revision as project conditions evolve.

Although every effort has been made to ensure the accuracy and completeness of this document, the Consultant makes no warranties, express or implied, regarding the reliability or suitability of the information for any specific purpose. This ESMP does not constitute legal advice and should not be considered a substitute for compliance with statutory obligations.

Responsibility for implementing the mitigation measures, monitoring activities, and stakeholder engagement strategies outlined herein rests solely with the Project Client and its contractors. Any use of this document by third parties is at their own risk, and the Consultant shall not be held liable for any consequences arising from such use.

List of Abbreviations

BAP	- Biodiversity Action Plan
BMP	- Biodiversity Management Plan
CESMP	- Construction Environmental and Social Management Plan
CH	- Critical Habitat
CJSC	- Close Joint Stock Company
EBRD	- European Bank for Reconstruction and Development
EIA	- Environmental Impact Assessment
EPRP	- Emergency Preparedness and Response Plan
ESAP	- Environmental and Social Action Plan
ESIA	- Environmental and Social Impact Assessment
ESHS	- Environmental, Social, Health, and Safety
ESMP	- Environmental and Social Management Plan
ESMS	- Environmental and Social Management System
ESP	- Environmental and Social Policy
EU	- European Union
E&S	- Environmental and Social
GBVH	- Gender-Based Violence and Harassment
GHG	- Greenhouse Gas
GIP	- Good International Practice
HMMP	- Hazardous Materials Management Plan
ME	- Ministry of Environment
MSDS	- Material Safety Data Sheets
MTAI	- Ministry of Territorial Administration and Infrastructure
OHS	- Occupational Health and Safety
OHSMP	- Occupational Health and Safety Management Plan
GA	- Government of Armenia
PAP	- Project Affected Person
PBF	- Priority Biodiversity Features
PIU	- Project Implementation Unit
PPE	- Personal Protective Equipment
PR	- Performance Requirement
RA	- Republic of Armenia
SDA	- Spoil Disposal Area
SDMP	- Spoil Disposal Management Plan
SPA	- Spoil Disposal Area
SPMP	- Spill Prevention and Management Plan
SSESMP	- Site-Specific Environmental and Social Management and Monitoring Plan
TLV	- Threshold Limit Value
TsMP	- Topsoil Management Plan
ToR	- Terms of Reference
WCRA	- RA Water Committee
WMP	- Waste Management Plan

Table of Content

1. Introduction.....	6
2. Purpose and Scope	6
3. Project Overview	7
4. Legal and Regulatory Framework.....	8
4.1 Applicable Legal and Regulatory Requirements	8
4.2 Environmental Criteria and Limits	12
5. Roles and Responsibilities.....	14
5.1 RA Water Committee (WCRA).....	14
5.2 Supervising Engineer.....	14
5.3 Construction Contractor.....	15
5.4 EBRD	15
5.5 Project Implementation Unit (PIU).....	15
5.6 "Jrar" CJSC - Reservoirs Operator	16
5.7 Governmental Authorities and Local Self-governmental Bodies.....	16
6. Environmental and Social Management across the Project Life Cycle.....	16
6.1 Project Life Cycles.....	16
6.2 Environmental and Social Management Plans.....	17
7. Environmental and Social Management Measures	19

1. Introduction

The Government of the Republic of Armenia ('RA') plans to construct 17 reservoirs within the EU support initiative 'Recovery, resilience and reform: post 2020 Eastern Partnership priorities' to the Government of Armenia ('GA') to enhance the water and food security level in the country. The European Bank for Reconstruction and Development ('EBRD' or the 'Bank') is considering provision of a loan to the GA to finance the construction of five water reservoirs in different regions (Marzes) of Armenia:

- Kassakh reservoir in Aragatsotn Marz¹,
- Lichk reservoir in Syunik Marz,
- Yelpin reservoir in Vayots Dzor Marz,
- Artik reservoir in Shirak Marz,
- Astghadzor reservoir in Gegharkunik Marz.

The EBRD has categorized this greenfield project as 'A' in line with its Environmental and Social Policy ('ESP') (2019) because it may cause significant environmental and social impacts. This means that a comprehensive Environmental and Social Impact Assessment ('ESIA') report and associated documents must be elaborated, followed by their public disclosure for a minimum period of 120 days.

One of the five reservoirs listed above is planned for construction within the administrative boundaries of Artik community, located in the Shirak Marz of the Republic of Armenia (RA). The Artik Reservoir is to be constructed on the Artikjur River, a tributary of the Karkachun River, and is intended to supply irrigation water to 300 hectares of agricultural land in the rural settlements of the Artik community, including the villages of Nor Kyanq, Vardaqaq, Panik, Meghrashen and Anushavan.

The Bank has engaged the Consultant² to update the national Environmental Impact Assessment ('EIA') report for the Artik Reservoir Construction Project in accordance with the EBRD ESP and to prepare the associated Environmental and Social (E&S) documentation, including this Environmental and Social Management Plan ('ESMP') proportionate to the Project's specific impacts, benefits, and opportunities.

2. Purpose and Scope

This ESMP is a standalone document associated with the Project's ESIA Report. It comprises a set of mitigation and management measures, criteria for their effective implementation, sources of financing, anticipated targets and institutional arrangements to be undertaken throughout the Project's life cycle to prevent, reduce and compensate adverse E&S impacts to acceptable levels. The ESMP has been prepared based on the findings of this E&S appraisal to ensure that the Project is implemented in compliance with applicable national E&S laws and regulations, the EBRD ESP (2019), relevant EU directives, and Good International Practices (GIP).

The ESMP is a key document that outlines the E&S requirements, including those related to cultural heritage (both tangible and intangible), land tenure, emergency situations, and community and occupational health and safety risks, and specifies the operational procedures necessary to manage significant issues that may arise during Project implementation.

This ESMP designated to:

¹Marz - Region in Armenian

²A consortium consisting of ATMS Solutions Ltd. (Armenia) and Ecoline International Ltd. (Bulgaria)

- Legislative and regulatory framework applicable to the Project,
- Ensure that the requirements of the EBRD are met,
- Outline the organisational structure, and key roles and responsibilities associated with E&S management,
- Document how the E&S risks and impacts identified through the ESIA studies will be managed. Management implies avoiding or limiting the adverse impacts as well as maximising the positive impacts (benefits) of the Project.

The scope of this ESMP encompasses the design (pre-construction), construction, and operation phases of the Project. Accordingly, it applies to the Construction contractor and its sub-contractors; specialized companies engaged to conduct specific studies required under the ESMP; the Supervising engineer; and the Client, represented by the RA Water Committee (WCRA) under the Ministry of Territorial Administration and Infrastructure (MTAI). It also covers the Project Implementation Unit (PIU), which is involved in the design and construction phases of the Project, as well as "Jrar" CJSC, responsible for the operation and maintenance of the completed reservoir.

3. Project Overview

The planned Artik Reservoir construction site is located within the administrative boundaries of the Artik multi-settlement community, at an elevation of approximately 1,700 masl. The reservoir will supply irrigation water to 300 ha of agricultural land across five rural settlements within the Artik community, specifically, the command area encompassing the villages of Nor Kyanq, Vardaqaq, Panik, Meghrashen, and Anushavan. Water for the reservoir will be sourced from the Artikjur River via a feeding channel consisting of a steel pipeline, while irrigation water will be distributed from the reservoir to the command area through a steel pipeline network (**Figure 1**).

Figure 1. Layout of Project reservoir, feeding and irrigation channels



The hydraulic unit of the Artik Reservoir will consist of:

1. Dam,
2. Reservoir body,
3. Construction (diversion) channel,
4. Feeding channel,
5. Main irrigation channel,
6. Outlet,
7. Emergency spillway,
8. Electricity supply.

The active storage capacity of the reservoir is planned to be 1.152 mln m³, while the dead storage volume will be 0.327 mln. m³. At the normal top water level, the reservoir will cover a surface area of 22 ha, with an additional 9.607 ha occupied by the feeding and irrigation pipelines/channels. The dam crest will be at an elevation of 1,670 masl, with a total length of 610 m, width of 6 m, and height of 10 m, respectively.

The dam body is planned to be constructed using local construction materials, including cobble-pebble aggregates. As an anti-filtration measure, the Project envisions the use of a clay loam screen. To prevent water infiltration from the 20 ha reservoir, the Project design provides for anti-seepage measures by lining the reservoir bottom with bentomat.

The upstream slope of the dam is planned to be reinforced with a stone layer. The dam's reverse filter will be constructed with a slope of 3 m, as will the screen. The transition layer, composed of gravel-pebble ground is planned to have a slope of 2 m. Stone drainage is also planned along the inner slope of the dam. A bentomat liner will be installed on the dam's screen, with a double-layer covering, designed in accordance with the dam's seismic stability requirements.

Two construction camps with necessary auxiliary facilities will be established within the construction site. These camps will be located in designated areas on unused land during the construction period. The first construction camp will serve the dam, its structures, the reservoir body and the irrigation and feeding channels, while the second camp will serve the borrow-pits.

The number and locations of the SDAs are not specified in the Project design document. Their placement will be proposed by the construction contractor and agreed upon with the heads of the affected communities and, in the case of private land, with the respective landowners. No blasting operations are envisioned by the Project design document.

Duration of the construction works was estimated as 33 months³. There is currently no available information regarding the workforce requirements for the Artik reservoir construction project. However, based on its experience conducting E&S assessments for similar projects, the Consultant estimates that approximately 100 workers will be engaged during the construction phase.

4. Legal and Regulatory Framework

4.1 Applicable Legal and Regulatory Requirements

The following legal and regulatory requirements have been taken into account during the ESIA study and have accordingly served as criteria for the formulation of the management measures proposed in this ESMP:

³Consulting Services for the Preparation of Design and Estimate Documentation for the Reconstruction of the Artik Reservoir, Shirak Region, Republic of Armenia, Book №1 - Explanatory Note, 2024

- 1) Applicable national E&S laws and regulations,
- 2) Applicable international conventions ratified by Armenia,
- 3) Applicable EU legislation,
- 4) EBRD ESP and Performance Requirements (PRs).

The E&S legal and regulatory acts applicable for the Project are outlined in details in [Section 4](#) of the ESIA report and are listed below:

- The RA Law on Environmental Impact Assessment and Expert Examination (2014, re-edited in 2023),
 - The procedure for public notification and public discussions is outlined in the RA Government Decree №1325-N dated 19.11.2014,
 - The RA Government Decree №399-N dated 09.04.2015 "On approval of procedure for the environmental impact examination of concept documents and intended activities",
 - The Order №438-N of the RA Minister of environment dated 29.10.2024 "On approval of the guidelines for the strategic environmental assessment and environmental impact assessment",
- The RA Water Code (2002),
 - The quality of surface water in Armenia is monitored as per the principles of EU Water Framework Directive adopted by the RA Government Decree №75-N dated 27.01.2011,
 - The RA Government Decree №1332-N dated 03.08.2023 "On the procedures for issuing a water use permit, its extension, reformulation, review, suspension, revocation, termination, and the approval of the standard form of a water use permit, well passports, and well design geological and technical section forms",
- The Law on RA water national program (2006),
- The RA Law on the fundamentals of national water policy (2005),
- The RA Land Code (2001),
 - The procedure for topsoil use, approved by the RA Government Decree №1396-N dated 08.09.2011,
 - The requirements for determination of topsoil stripping norms and for stripped topsoil preservation and use, approved by the RA Government Decree №1404-N dated 02.11.2017,
 - The procedure for soil excavation, approved by the RA Government Decree №572-N dated 10.05.2019,
- The RA Law on surveillance over the land use and land conservation (2008),
- The RA Law on waste (2004),
- The RA Law on alienation of property for overriding interests of the public (2006),
- The RA Law on atmospheric air protection (1994, re-edited in 2022),
 - The RA Government Decree №160-N dated 02.02.2006 approving the maximum permissible concentrations of ambient air pollution in residential areas,
- The RA Law on flora (1999),
- The RA Law on fauna (2000),
- The RA Government Decree №71-N on approval of the RA Red Book of animals,
- The RA Government Decree №72-N on approval of the RA Red Book of plants,

- The RA Law on special protected areas of nature (2006),
- The RA Law on protection and use of immovable cultural and historic monuments and historic environment (1998),
- The RA Law on intangible cultural heritage (2009),
 - RA Government Decree №310-A "On Defining the Criteria for Preparing the Lists of Intangible Cultural Values and Approving the List of Intangible Cultural Heritage Values"
 - RA Government Decree №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",
 - RA Government Decree №241-N "On approving the criteria for defining cultural spaces and published the list of cultural spaces",
- The RA Code on subsoil resources (2011),
- The RA Forest Code (2005),
- The RA Law on environmental oversight (2005),
- The RA Law on public health (2024),
- The Labour Code (2004),
- The RA Law №HO-57-N (2013) On ensuring of equal rights and equal opportunities for men and women,
- The RA Law on fire safety (2001),
- The Fire Safety Rules approved by Order №595-N of the RA Minister of Territorial Administration and Emergency Situations (2015).

The International Conventions and Protocols ratified by RA and applicable to the Project are summarised in **Table 1**.

Table 1. List of ratified by the RA international agreements applicable for the project

International agreements (convention or protocol)	Description
Convention on Wetlands of International Importance - (Ramsar 1971)	The Convention entered into force in Armenia in 1993.
Paris Convention for the Protection of the World Cultural and Natural Heritage (1972)	Armenia became a State party in 1993.
The Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)	Armenia is a State party since 2011
Convention on the Conservation of European Wildlife and Natural Habitats, Bern (1979)	Ratified by Armenia in 2008.
The Convention on Biological Diversity (1992)	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 (UNFCCC) (1992)	Armenia became a state party in 2002.

International agreements (convention or protocol)	Description
Paris Agreement under the United Nations Framework Convention on Climate Change	Ratified by Armenia in 2017.
UN Convention to Combat Desertification, Paris (1994)	Ratified by Armenia in 1997.
UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003)	Ratified by Armenia in 2006.
Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, Aarhus Convention (1998)	Armenia became a State-party in 2001.
Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention (1991)	Ratified by Armenia in 1997.
International Labour Organization (ILO) Conventions	Armenia has ratified 29 ILO conventions including the 8 fundamental ones.

The European Union (EU) legislation that is applicable to the Project includes the following Directives:

- 1) Directive 2011/92/EU, as amended by Directive 2014/52/EU, on assessment of the effects of certain public and private projects on the environment (the EIA Directive),
- 2) Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) (the Industrial Emissions Directive),
- 3) Directive 2009/147/EC on the conservation of wild birds (the Birds Directive),
- 4) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive),
- 5) Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the Water Framework Directive),
- 6) Directive 2008/98/EC on waste (Waste Framework Directive),
- 7) Directive 2003/10/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise),
- 8) Directive 2002/44/EC on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (vibration).

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),
- The International Finance Corporation (IFC) General Environmental, Health and Safety Guidelines (2007),
- ICOLD Bulletin 173 (2021) - Integrated Operation of Hydropower Stations and Reservoirs,
- ICOLD Bulletin 96 (1994) - Dams and environment - Water quality and climate,
- ICOLD Bulletin 86 (1992) - Dams and Environment - Socio-economic impacts.

The EBRD outlines its key E&S requirements in the Environmental and Social Policy (ESP, 2019). The PRs applicable to this Project are listed below

- PR1: Assessment and Management of Environmental and Social Risks and Impacts,
- PR2: Labour and Working Conditions,

- PR3: Resource Efficiency and Pollution Prevention and Control,
- PR4: Health, Safety and Security,
- PR5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement,
- PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources,
- PR8: Cultural Heritage,
- PR10: Information Disclosure and Stakeholder Engagement.

4.2 Environmental Criteria and Limits

The environmental criteria and limit values applied to determine baseline physical conditions within the Project area and its affected surroundings, and to guide environmental monitoring during the construction and operation phases, are summarized in **Tables 2-5**.

The criteria for assessing ambient air quality in the residential areas in Armenia is defined by the RA Government Decree №160-N and the World Health Organization (WHO) *Air Quality Guidelines - Global Update 2021*⁴, and are summarized in **Table 2**.

Table 2. Air quality standards highlighting (in blue cells) the most stringent

№	Pollutant	Averaging period	Maximal Permissible Concentrations (MPC), mg/m ³		
			WHO		Armenian standards
			2005	2021	
1	PM2.5	24-hour	0.025	0.015	0.035
		Annual		0.01	
		Maximum			0.16
2	PM10	24-hour	0.05	0.045	0.06
		Annual	0.02	0.015	
		Maximum			0.3
3	Sulphur dioxide	1-hour			
		24-hour	0.02	0.04	0.05
		Maximum			0.5
4	Nitrogen dioxide	1-hour			
		24-hour		0.025	0.04
		Annual	0.04	0.01	
		Maximum			0.2
5	Carbon monoxide	Maximum daily 8hour			
		24-hour		4.0	3.0
		Maximum			5.0

Threshold Limit Values (TLVs) for equivalent (average) and maximum noise/sound levels set by the RA Sanitary Norms №2-III-11.3 *Noise in the workplaces, in residential and public buildings and housing in construction areas*⁵, the IFC *Environmental, Health, and Safety General Guidelines (2007)*⁶ and WHO *Guidelines for Community Noise (1999)*⁷ are presented in **Table 3**.

Table 3. Threshold limit values (TLV) for noise

⁴<https://www.who.int/publications/i/item/9789240034228>

⁵<https://www.arlis.am/hy/acts/163246>

⁶<https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-en.pdf>

⁷<https://www.who.int/publications/i/item/a68672>

№	Premises and territories, receptors		TLV, dBA		
			National		IFC/WHO
			Equivalent to sound level	Maximum sound level	One hour equivalent sound level
1	Workplace		80		85
2	Shops, trading halls, airport and railway stations waiting rooms, drop-off points of public service providers		60	75	
	Industrial, commercial				70
3	Territories adjacent to residential buildings, clinics, ambulatories, rest houses, care homes, disabled persons homes, libraries, kinder gardens, schools and other educational facilities	day-time ⁸	55	70	55
		night-time ⁹	45	60	45

The TLVs set by the Hygienic Norms №2.2.4-009-06 *Vibration in the workplaces, in residential and public buildings*¹⁰ and summarised in **Table 4**.

Table 4. Threshold limit values (TLV) for vibration acceleration

№	Whole-body vibration	TLV for corrected and equivalent corrected values	
		m/sec ²	dB
1	Transport-technological (2nd category)	0.28	109
2	Technological (3rd category a)	0.1	100
3	Technological (3rd category b)	0.04	92
4	Technological (3rd category g)	0.014	83
5	Residential buildings, clinics	0.004	72

Admissible Concentration Limits (ACL) for chemical elements in soil set out in the Sanitary Rules and Norms №2.1.7.003-10 "Hygienic requirements for soil quality"¹¹ are given in **Table 5**.

Table 5. Admissible Concentration Limits (ACL) for chemical elements in soil

№	Chemical elements	Unit	ACL of chemicals in soil
1	Vanadium	mg/kg	150
2	Chrome	mg/kg	6
3	Manganese	mg/kg	1500
4	Cobalt	mg/kg	5
5	Nickel	mg/kg	4
6	Copper	mg/kg	3
7	Zinc	mg/kg	23
8	Arsenic	mg/kg	2
9	Antimony	mg/kg	4.5
10	Lead	mg/kg	32

⁸between 07:00 and 23:00

⁹between 23:00 and 07:00

¹⁰<https://www.arlis.am/hy/acts/163276>

¹¹<https://www.arlis.am/DocumentView.aspx?docid=146741>

The quality of surface water in Armenia is monitored in accordance with the principles of the EU Water Framework Directive, as adopted by RA Government Decree №75-N dated 27.01.2011¹². The environmental water quality standards for watercourses within the Akhuryan River Basin are defined in Annex 6 of the same decree.

5. Roles and Responsibilities

5.1 RA Water Committee (WCRA)

The WCRA (PIU) is the executing agency with overall responsibility for the Project and for implementing this Environmental and Social Management Plan (ESMP). It is also responsible for ensuring compliance with all Armenian environmental and social (E&S) legal requirements and for meeting the commitments set out in the Environmental and Social Impact Assessment (ESIA) Report.

While many of the ESMP requirements will be implemented by the Construction contractor and its sub-contractors, the WCRA will retain overall accountability for the Project's E&S performance. In addition, the WCRA (PIU) is responsible for the implementation of the Stakeholder Engagement Plan (SEP) and Biodiversity Action Plan (BAP)¹³, Cultural Heritage Management Plan (CHMP) and Resettlement Action Plan (RAP).

The WCRA employs environmental and social specialists who oversee and supervise the implementation of all Project obligations related to Environmental, Social, Health, and Safety (ESHS) matters. For specific E&S studies, the WCRA may engage specialised or licensed companies and consultants, as required.

5.2 Supervising Engineer

The Supervising Engineer will be contracted by the WCRA to oversee Project implementation during the construction phase and to ensure compliance with the requirements of the Environmental and Social Management Plan (ESMP) and other Project construction-related E&S management plans and procedures.

Responsibilities include developing and implementing a monitoring program, maintaining records, and reporting to the WCRA and the EBRD on the Construction Contractor's E&S performance. This will cover observed non-compliances, the corresponding corrective actions, and defined timelines, roles and responsibilities.

The Supervising Engineer will also provide capacity-building support and training to the Contractor's E&S team as needed and will be responsible for the approval of the management and monitoring plans outlined in **Section 6.2** of this ESMP.

The Supervising Engineer will be required to appoint suitably qualified and experienced ESHS individuals into the following specific roles:

- 1) International and local environmental specialists,
- 2) International and local Occupational Health and Safety (OHS) specialists,
- 3) Local social (including Gender) and resettlement specialist/s,
- 4) Local archaeologist,

¹²<https://www.arlis.am/hy/acts/200962>

¹³The SEP and BAP were developed by the ESIA consultant on behalf of the WCRA and form part of the ESIA disclosure package

- 5) Biodiversity (flora and fauna) specialists with international experience / experience with lender requirements.

5.3 Construction Contractor

The Construction contractor, selected through the WCRA tendering process, holds overall responsibility for the construction of the Project. The Contractor must fully comply with the requirements of this ESMP and all relevant WCRA management plans.

This includes developing the construction-phase E&S management plans outlined in [Section 6.2](#) of this ESMP and ensuring that all environmental and social management and mitigation measures specified in these plans are effectively implemented throughout construction activities.

The Contractor is also responsible for ensuring that all sub-contractors adhere to the requirements of all Project E&S management plans and procedures.

The Construction contractor will be required to appoint suitably qualified and experienced personnel to the following specific ESHS roles:

- 6) Project Manager,
- 7) Environmental specialist,
- 8) Occupational and community health and Safety specialist(s),
- 9) Social and resettlement specialist,
- 10) Cultural heritage expert,
- 11) Community liaison officers responsible for the implementation of the relevant tasks from the SEP at the community level (at least one such officer being a female),
- 12) Biodiversity (flora and fauna) specialist with international experience / experience with lender requirements.

5.4 EBRD

The Project Lender - EBRD will monitor the E&S performance of the Project to ensure compliance with the requirements of their respective E&S policies in relation to the water section which they will finance.

5.5 Project Implementation Unit (PIU)

The Project Implementation Unit (PMU) will, inter alia, assist the WCRA in implementing measures required in the ESMP and ESAP, provide training, as appropriate, to increase E&S management capacity of the WCRA and its contractors engaged in the Project implementation, review of the site-specific ESMPs, assist the WCRA in developing and integrating the policies, plans, procedures, actions, and mitigation measures required under the ESAP, Resettlement Plan, SEP, BAP, CHMP and other Management Plans into the Project overall management system and budget approval procedures, as appropriate.

The PMU assist the WCRA in implementing the measures required under the ESMP, the Environmental and Social Action Plan (ESAP) and related management plans. The PMU will also provide training, as appropriate, to strengthen the E&S management capacity of the WCRA and its contractors involved in Project implementation. Training for the JRAR staff on proper reservoir operation will also be arranged by the PIU.

In addition, the PMU will review site-specific E&S management plans and support the WCRA in developing and integrating the policies, plans, procedures, actions and mitigation measures required under the ESAP, SEP, BAP, CHMP and other management plans into the Project's overall management system and budget approval processes, as appropriate.

5.6 "Jrar" CJSC - Reservoirs Operator

"Jrar" is a Close Joint-Stock Company (CJSC) under the MTAI, responsible for the operation and maintenance of 1st and 2nd category water reservoirs in Armenia.

"Jrar" CJSC will develop and implement the management and monitoring plans and measures proposed in the ESMP for the operation and maintenance phase of the Artik Reservoir.

5.7 Governmental Authorities and Local Self-governmental Bodies

The Ministry of Environment (ME) will issue air emission permits, approve hazardous waste passports and limits for waste generation and disposal. The ME will also provide guidance and support to the Project within the scope of its statutory responsibilities.

The Ministry of Education, Science, Culture and Sport (MESCS) will support the Project in conducting archaeological studies and addressing issues related to tangible and intangible cultural heritage. The MESCS will also assist the Project in accordance with its statutory mandate.

The Artik Municipality will identify suitable locations for Spoil Disposal Areas (SDA) and topsoil storage sites, facilitate communication between the Construction Contractor and the populations of affected settlements, and assist the Contractor in cases of temporary land acquisition or use, as needed.

6. Environmental and Social Management across the Project Life Cycle

6.1 Project Life Cycles

Pre-construction Phase

Any requirement arising from the process of obtaining specific Project-related decisions (such as approvals, permits, or consents) from national and/or local self-governmental bodies (e.g., ministries, communities, inspection bodies, agencies) and/or the Client and EBRD during the pre-construction stage will be incorporated into the final construction documentation.

Construction Phase

In principle, the implementation of the key E&S mitigation measures related to the construction phase will be delegated to the Construction contractor(s). This delegation will be governed by the ESMP, which will form part of the tender documents, procurement process, and the Construction contractor's contract.

The Construction contractor(s) will develop their own Construction Environmental and Social Management Plans (CESMP), which must be aligned with this ESIA Report and this ESMP. The CESMP will include Site-Specific Environmental and Social Management and Monitoring Plans (SSESMs) or procedures to address E&S issues during the construction period. The Supervising engineer, appointed by the Client, shall review and approve these documents.

It will be the responsibility of the Construction contractor(s) to further elaborate on the issues addressed in the ESMP as the Project planning progresses, both prior to and during construction. This includes, but is not limited to, the establishment of construction zones, temporary facilities for the workforce, details for storing construction and other materials, traffic and transport management, environmental protection and waste management, labour management, occupational and community health and safety, emergency preparedness, and other relevant matters.

Operational Phase

The operation phase will commence following the full commissioning of the reservoir and supporting infrastructure. At that stage, all works will have been handed over by the Construction contractor to the reservoir operator ("Jrar" CJSC), who will be responsible for implementing the majority of E&S management measures to ensure continued compliance with the Project's mitigation strategy. These measures will be managed through "Jrar" CJSC's Environmental and Social Management System (ESMS), in alignment with applicable regulations and guidelines.

In addition, the implementation of key E&S mitigation measures related to maintenance activities may be delegated to a designated contractor (i.e. the reservoir maintenance contractor). Such delegation will be governed by specific contractual arrangements.

6.2 Environmental and Social Management Plans

A set of specific operational, management, and monitoring plans should be prepared by the Construction contractor in line with the Project's ESMP and implemented during the pre-construction and construction phases to effectively manage E&S impacts. At a minimum, the proposed SSESMPs shall include:

- Traffic Management Plan,
- Topsoil Management Plan,
- Borrow Pit Management Plan,
- Spoil Disposal Management Plan,
- Hazardous Materials Management Plan,
- Spill Prevention and Management Plan,
- Waste Management Plan,
- Occupational Health and Safety Management Plan,
- Construction Camp Management Plan, including sub-plans for Camp Code of Conduct and Camp Management,
- Cultural Heritage Management Plan,
- Chance Find Procedure,
- Riverine Habitat Construction Plan,
- Air, Water, and Soil Quality Monitoring Plan,
- Noise and Vibration Monitoring Plan,
- Resettlement Plan,
- Stakeholder Management Plan (that shall be updated at least once a year).

For the operation phase of the Artik Reservoir, a series of environmental and social (E&S) management plans will be developed and implemented by the Client (WCRA and PIU) in cooperation with "Jrar" CJSC, taking into account the recommendations and mitigation measures outlined in the Operation Phase section of this ESMP (see table below), including:

- Irrigation Water and Environmental Flow Releases Management Plan,
- Reservoir Operation and Maintenance Plan,
- Traffic Management Plan,
- Emergency Response Plan,
- OHS procedure (Plan),
- Waste Management Plan,
- Stakeholder Engagement Plan,
- Biodiversity Action Plan.

7. Environmental and Social Management Measures

The proposed mitigation measures for the Project's pre-construction (design) phase (Section A), construction phase (Section B) and operation phase (Section C) are summarised in **Table 6** below. This table outlines the activities and associated impacts that require mitigation, defines the targets and indicators needed to assess the effectiveness of the implemented measures, and identifies the sources of financing and responsible entities.

Table 6. Environmental and social management measures

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
Section A - PRE-CONSTRUCTION (DESIGN) PHASE					
Clearance of site, removal and storage of topsoil, loading and unloading operations	Impact on Geology (8.2.6)	In consultation with the Head of the Artik Community, identify suitable location(s) for the temporary storage of topsoil and determine options for its future use, preferably for the remediation of the borrow pit located in the Nor Kyanq settlement. <i>See also mitigation measures proposed in Section 8.2.8.</i>	4,000-5,000 EUR	Location/s for topsoil temporary storage are identified and approved.	D&I - Construction contractor A - Head of Artik community and Supervising engineer S - Client (WCRA/ PIU).

¹⁴D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-Operation

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
Discharge of communal wastewater of Artik town into the Artukjur River	Impact on Water Resources (8.2.7)	1) Conduct water quality monitoring of the Artik River upstream and downstream Artik town during high and low water periods to assess the contribution of communal wastewater discharges and their potential impact on the water entering the planned Artik Reservoir prior to the start of construction works,	10,000 EUR	The quality of water in the Artukjur River before and after the discharge of communal water is known.	D - Client (WCRA/ PIU) I - Accredited laboratory S - Client (WCRA/ PIU).
		2) Use the water quality monitoring data to calculate and model the reservoir water quality and determine its compliance with the irrigation water standards established by RA Government Decree №75-N dated 27.01.2011,			
		3) Consider constructing an artificial wetland upstream of the reservoir to naturally treat and purify wastewater inflows, thereby improving the quality of water entering the reservoir (if water quality modelling indicates non-compliance with the irrigation water standards).	Within the Project's Construction contract.	Ensure that the water quality in the reservoir complies with the applicable standards.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Topsoil removal and storage, loading and unloading operations, transportation of spoil and materials, storage of construction materials and oil products, etc.	Impact on Soil (8.2.8)	1) Develop Topsoil Management Plan (TsMP) and obtain approval from the Supervision engineer and the Client, 2) Obtain required permit for topsoil transportation and storage operations, 3) Take soil samples from the surface (0-20 cm) and deeper layers (20-50 cm) in the planned reservoir area and nearby areas. Analyse the samples in a licensed laboratory and compare the results with the Admissible Concentration Limits (ACLs) set by Sanitary Rules and Norms №2.1.7.003-10,	Within the Project's Construction contract.	TsMP, HMMP and SPMP are developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		4) Develop Hazardous Materials Management Plan (HMMP) and obtain approval from the Supervision engineer and the Client, 5) Develop Spill Prevention and Management Plan (SPMP) and obtain approval from the Supervision engineer and the Client. <i>See also mitigation measures proposed in Section 8.2.6.</i>			
All waste generation processes and activities during the construction phase	Waste Generation and Management (8.2.9)	1) Obtain all required permits and regulatory documents governing waste management in Armenia, as a minimum including: <ul style="list-style-type: none"> - hazardous waste passports, - waste generation norms, and their disposal limits, - waste generation register, etc., - waste primary registration log-books. 2) Prepare and put into effect the Waste Management Plan (WMP) for the Project, 3) Identify potential Spoil Disposal Areas and obtain agreement from Artik Municipality for the use of the SDAs, or propose an alternative SDA, 4) Develop Spoil Disposal Management Plan (SDMP) for the selected SDA and obtain approval from the Supervision engineer and the Client.	Within the Project's Construction contract	All permits required by the RA waste sector legislation are obtained. WMP and SDMP are prepared and approved. SDAs are identified and agreed.	D - Construction contractor A - Supervising engineer and Head of Artik community (for SDA locations) S&M - Client (WCRA/ PIU) and EBRD.
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	Develop a Traffic Management Plan, that will be approved by the Supervising engineer and agreed with the Client and EBRD as well as relevant regional authorities and road police.	Within the Project's Construction contract.	TMP is prepared and approved.	D - Construction contractor A - Supervising engineer, Head of

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		<i>See also mitigation measures proposed in Sections 8.3.2, 8.3.5 and 8.5.2.</i>			Artik community, Road Police S&M - Client (WCRA/ PIU) and EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Habitats <ol style="list-style-type: none"> 1) Conduct pre-construction survey of the priority grasslands habitat (CH) in the Project area to identify its plant composition and ecological structure, level of existing disturbance and determine its precise extent, 2) Survey areas around the construction location to define existing habitats similar to the following: E1.2 Perennial calcareous grasslands and basic steppes = 62C0* Ponto-Sarmatic steppes, 3) Develop a habitat offset Project aimed at conserving/restoring the habitat in areas most suitable for conservation, 4) Study the existing pond (including study of the tadpoles of Syrian spadefoot living there - see below) to decide whether the reservoir may be considered as similar to the priority habitat: C1.4 Permanent dystrophic lakes, ponds and pools = 3160 Natural dystrophic lakes and ponds (1.42 ha), 5) If it is considered impossible to replace the pond by the reservoir, include construction of the similar pond in the vicinity of the reservoir in the offset project. <u>Preliminary quantitative assessment</u>	25,000 EUR or can be included into the Project's Construction contract.	Project impacts on habitats are avoided, reduced, mitigated, or compensated.	D - Specialised company or Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		<p><i>The total lost area of the grasslands' habitat E1.2/62C0* is 28.54 ha. The buffer/protection zone of the reservoir can't be considered for the grasslands habitat restoration because it is narrow (10 m) and riverine vegetation will appear there. Accordingly, the suitable area should be found and conserved/restored in the area around the reservoir.</i></p> <p><i>The total lost area of the water habitat (the existing pond) is 1.42 ha. If it is considered impossible to replace the pond by the reservoir, the similar pond should be constructed in the vicinity of the reservoir.</i></p> <p><i>Proposals for the construction and conservation of the habitats, including multipliers, should be finally developed in the BAP. It should be taken into account that the grasslands habitat is partly disturbed.</i></p>			
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Flora 1) Study plant composition and structure of the priority grasslands habitat, 2) Develop a Habitat Restoration/Construction Plan using indigenous plant species as the basis for habitat creation, 3) Develop the grassland habitat in the vicinity of the reservoir area.	Within the Project's Construction contract.	Habitat Restoration/ Construction Plan is developed and approved. Grassland habitat is constructed.	D - Specialised company A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.
Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	Fauna Develop the Worker Code of Conduct for employees of the Construction contractor to prevent poaching.	Within the Project's Construction contract.	Worker Code of Conduct is developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Sedentary animals 1) Conduct pre-construction survey of the reservoir footprint area to map local habitats and estimate the number of individuals of lizards and snakes, and amphibians, 2) Identify existing habitats which are suitable for relocation of the animals in the vicinities of the flooded area, 3) Create additional rocky outcrops in the vicinity of the flooded area to increase the number of native shelters to enhance habitats for snakes and lizards, 4) Survey the area to map inhabited burrows of badger and other burrowing animals.	Within the Project's Construction contract.	Project impacts on sedentary animals are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Conservation of medium mammals	Impact on Biodiversity (8.2.12)	Medium mammals Survey the footprint area to confirm/rule out presence of the den of Marbled Polecat; if den is found, take measures to scare away animals from the reservoir area. <i>The survey should be conducted before or after the breeding season (March-July).</i>	Within the Project's Construction contract.	Project impacts on medium animals are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Conservation of bird species	Impact on Biodiversity (8.2.12)	Birds Provide conservation/restoration of grasslands (with planting thorny bush species) in the vicinity of the reservoir, to support the breeding habitats of the Red-backed Shrike and Ortolan Bunting. <u>Preliminary quantitative assessment</u> <i>The minimum area (multiplier = 1) for compensation of the lost habitats of the two bird species, based on a "no net loss" approach is 6.65 ha.</i>	Within the Project's Construction contract.	Project impacts on birds are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		<p><i>This area can be compensated in the framework of the grassland habitat conservation/restoration of area 28.54 ha (see above).</i></p> <p><i>If sustainable grazing practices are applied in the grasslands surrounding the site area, they will help to maintain the necessary food supply for the two priority species (see Operation phase). In this case, these areas may be taken into account in the compensation.</i></p> <p><i>Proposals for the use of restored and conserved habitats including multipliers and related calculation, should be developed as part of the BAP.</i></p>			
Conservation of invertebrates	Impact on Biodiversity (8.2.12)	<p>Invertebrates</p> <p>Study and quantify the lost habitats of the priority species, establish habitat features for this species in the surrounding grasslands (primarily planting forage plants for the butterfly species and large stones for beetles).</p> <p><i>These habitats may be included in the restored grassland habitats (see above) in areas located in the vicinity of the reservoir site.</i></p> <p><i>If sustainable grazing practices are applied in the grasslands surrounding the site area, these areas may be taken into account in the compensation.</i></p>	Within the Project's Construction contract.	Project impacts on invertebrates are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.
Conservation of aquatic species	Impact on Biodiversity (8.2.12)	<p>Aquatic species</p> <p>1) Conduct a specialized assessment of the existing pond by amphibian experts to evaluate the potential impacts of its conversion into a reservoir, and to determine whether the reservoir will remain a viable breeding and</p>	Within the Project's Construction contract.	Project impacts on aquatic species are avoided, reduced, mitigated, or compensated.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		<p>possibly mating habitat for the Syrian spadefoot (<i>Pelobates syriacus</i>),</p> <p>2) If it identified that reservoir cannot serve as a replacement habitat to support pond aquatic life, build similar pond in the vicinity of the reservoir.</p> <p><u>Preliminary quantitative assessment</u></p> <p><i>The total lost area of the water habitat (the existing pond) is 1.42 ha. Final area of the replacement water habitats should be calculated after the study.</i></p>			
Transportation of construction materials, oil products, workers.	Impacts on Public Facilities and Infrastructure (8.3.2)	<p>1) Develop a TMP aiming to minimize pressure on the regional and local road infrastructure and avoiding as much as possible sensitive receptors,</p> <p><i>See also mitigation measures proposed in Sections 8.2.11, 8.3.5 and 8.5.2.</i></p> <p>2) Inspect and document the condition of community roads to be used for Project purposes jointly with the affected community representatives prior to the commencement of construction. Restore the roads to their original condition and compensate for any damage.</p>	Within the Project's Construction contract.	TMP is prepared and approved.	<p>D - Construction contractor</p> <p>A - Supervising engineer, Head of Artik community, Road Police</p> <p>S&M - Client (WCRA/ PIU) and EBRD.</p>
Land acquisition and compensation. Receiving and registering grievances and concerns from project stakeholders, investigating issues, providing solutions and maintaining communication and	Land Tenure Impacts (8.3.3)	<p>1) Develop and implement a Resettlement Plan (RP) for the Project based on the Resettlement Framework (RF), ensure that necessary mitigation measures for all the affected communities, including vulnerable households are included and implemented,</p> <p>2) Ensure that public consultations with Affected Households (AHs) are conducted in all affected settlements as per the RP to present the Project's aims, stages of land acquisition and</p>	Separate budget for the RP consultant	RF with the Grievance Mechanism and RP are developed and implemented.	<p>D&I - RP consultant</p> <p>A - Supervising engineer</p> <p>S&M - Client (WCRA/ PIU) and EBRD.</p>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
records throughout the resolution process.		compensation process, a concept of "cut-off date", basic eligibility and entitlements, survey timelines, resettlement timelines, 3) Establish a Grievance Mechanism to deal with the Project-related concerns.			
Transportation of construction materials, oil products, workers	Impact on Community Health and Safety (8.3.5)	1) Develop TMP that will contain at least: <ul style="list-style-type: none"> - Avoiding community access roads if possible and documenting quality of roads prior to their use, - Optimised routes and times of the day for transporting materials to site, especially bulky equipment parts (e.g., pipes) agreed with the traffic police and local administrations, - Identification of the sensitive receptors (schools, hospitals, residential areas, other social infrastructure) along the transportation routes and development of the mitigation measures where necessary. <i>See also mitigation measures proposed in Sections 8.2.11, 8.3.2 and 8.5.2.</i> 2) Develop Emergency Preparedness and Response Plan (EPRP) covering whole Project lifecycle. <i>See also mitigation measures proposed in Section 8.4.</i>	Within the Project's Construction contract.	TMP and EPRP are prepared and approved.	D - Construction contractor A - Supervising engineer, Head of Artik community, Road Police S&M - Client (WCRA/ PIU) and EBRD.
All processes and operations during the construction activities	Health and Safety Impact (8.3.6)	Develop an Occupational Health and Safety Management Plan (OHSMP), covering the key elements of the OHS performance management during the construction stage, including: <ul style="list-style-type: none"> - Allocation of OHS roles and responsibilities - Identification of OHS risks and hazards, 	Within the Project's Construction contract.	OHSMP is developed and approved.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/ PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
		<ul style="list-style-type: none"> - Briefing, training and knowledge check, - OHS procedures and regulations, - Medical examination, - Emergency response, - Management of hazardous materials, chemicals and oil / fuel, - Fire safety and emergency response, - Performance of high hazard tasks - Use of PPE, - Supervision of sub-contractors, - Investigation of safety accidents, - Responsibilities for non-compliance, etc. 			
Operations and activities related to labour and working conditions, including the management of the construction camp and accommodation facilities.	Workers' Rights and Working Conditions Related Impacts (8.3.7)	<ol style="list-style-type: none"> 1) Include requirements related to the compliance with the national labour regulations and EBRD PR2 in the contractual clauses with the Construction contractor, 2) Develop a Labour and Working Conditions Management Plan (at least a month before the construction), 3) Before the commencement of construction develop a Construction Camp Management Plan, including sub-plans for Camp Code of Conduct and Camp Management, with requirements for worker accommodation in compliance with the Armenian labour, sanitary and health standards, EBRD PR 2 requirements, EBRD/IFC guidance on worker accommodation (2009), ILO Workers' Housing Recommendation 1961 (№115), and gender-specific provisions, 	Within the Project's Construction contract.	Relevant requirements of the EBRD PR2 are included in the Construction contract. Labour and Working Conditions Management Plan and Construction Camp Management Plan are developed.	<p>D - Client (WCRA/ PIU) (for item 1) and Construction contractor (for items 2 and 3)</p> <p>A - Supervising engineer (for items 2 and 3)</p> <p>S&M - Client (WCRA/ PIU) and EBRD.</p>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

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		4) Develop and implement a Local Employment and Procurement Plan (LEPP), which shall at a minimum include: <ul style="list-style-type: none"> - local employment targets and commitments, - provisions for the procurement of goods, works, and services from local suppliers where feasible, - requirements for labour standards and social safeguards in accordance with applicable EBRD PR2, - monitoring and reporting procedures, - measures for integrating these requirements into procurement and contractual documentation. 			
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	Develop and implement GBVH Policy and assign focal points responsible for handling GBVH incidents within the workforce and beyond.	Within the Project's Construction contract.	Management of GBVH risks related to interactions between workers and residents of affected settlements.	D - WCRA/PIU I - Construction contractor A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.
Emergency situations such as landslides, earthquakes, incidents, spills, and leakages.	Emergency Situations and Response (8.4)	Prepare site-specific emergency response procedures for incidents such as landslides, machinery accidents, or hazardous material spills. <i>See also mitigation measures proposed in Section 8.3.5.</i>	Within the Project's Construction contract.	All potential emergencies are managed in accordance with the site-specific emergency response procedures.	D - Construction contractor A - Supervising engineer S&M - Client (WCRA/PIU) and EBRD.
Earthworks, excavation, borrow pit operations, construction of electricity	Impact on Tangible Cultural Heritage (8.5.1)	1) Develop a Chance Finds Procedure (CFP) for the Project prior to the commencement of construction works,	Within the Project's Construction contract.	The CFP and CHMP are prepared and	D - Construction contractor

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁴
transmission lines, and other related construction activities that have the potential to impact cultural heritage sites situated beyond the Project's direct impact area, yet within its designated buffer zone.		<p>2) Hire a qualified cultural heritage expert to be present during the construction works and implement archaeological surveillance for all construction sites and help implement all heritage focused mitigations, if required,</p> <p>3) Conduct detailed field archaeological investigation within the planned reservoir and dam areas and buffer zone, as well as along the proposed feeding and irrigation channels. If necessary, protective (safeguard) excavations shall be carried out by the construction contractor under the supervision of qualified specialists,</p> <p>4) Prepare a site-specific Cultural Heritage Management Plan (CHMP) that shall be reviewed and approved by the Supervision engineer, the Client, and the Authorized State Body (Ministry of Education, Science, Culture and Sport (MESCS)).</p>		approved; detailed field archaeological investigations are completed prior to the start of construction; and a qualified cultural heritage expert is engaged within the construction contractor's team.	A - Supervising engineer and MESCS (for CHMP) S&M - Client (WCRA/PIU) and EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
Section B - CONSTRUCTION PHASE					
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, etc.	Impact on air quality (8.2.4)	<ol style="list-style-type: none"> 1) Use modern construction machinery equipped with engines compliant with at least Euro IV standards, with emission control and minimal noise characteristics, 2) Perform regular technical maintenance of used construction machinery and heavy vehicles, 3) While transporting friable materials keep the body of heavy vehicles covered with tarpauline, 4) Minimizing dust from open area sources, including storage piles and top-soil storage areas, by using control measures such as installing enclosures and covers, and increasing the moisture content, 5) Restrict excavation and earthworks during the periods of strong winds, 6) Select the location of construction yards and construction machinery taking into account prevailing wind directions, 7) Apply regular watering to on-site and off-site dirt roads, especially during the excavation and other earthworks, 8) Minimize the period between excavation and backfilling works, 9) Prohibit construction materials and waste burning. 	Within the Project's Construction contract	Air, water, and soil quality monitoring plan is developed, approved prior to the start of construction and implemented during the construction. All specified mitigation measures are implemented effectively throughout construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD
Removal of vegetation and topsoil, earth and excavation works, materials storage,	Impact on Landscape and Visual Amenity (8.2.5)	<ol style="list-style-type: none"> 1) Limit the spatial footprint of construction areas and stockpiles to the extent practicable, 	Within the Project's Construction contract	Project's impact on landscape is minimised through the implementation	I - Construction contractor

¹⁵D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
loading-unloading operations, etc.		2) Store construction materials and fuel in designated and screened areas, 3) Avoid unnecessary night-time lighting and ensure that any required lighting is directed downward and shielded to reduce light spill, 4) Rehabilitate disturbed areas and remove temporary facilities and equipment promptly after completion of works.		of the proposed measures.	S - Supervising engineer M - Client (WCRA/ PIU), EBRD
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, storage of construction materials and spoil, etc.	Impact on Geology (8.2.6)	1) Diversion ditches or berms: redirect surface runoff away from disturbed areas, 2) Proper grading: ensures slopes are stable and directs water flow in controlled paths, 3) Slope breakers: break long slopes into smaller segments to reduce erosion potential, 4) Phased construction: limits the area of exposed soil at any one time, 5) Avoid earthworks during rainy seasons, where feasible, to reduce erosion risk.	Within the Project's Construction contract	Site inspections of construction material and spoil storage areas are regularly conducted, and sediment control measures are effectively maintained to ensure the stability of geological conditions within the Project area.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of borrow-pits, loading-unloading operations, storage of construction materials and spoil, etc.	Impact on Water Resources (8.2.7)	1) Construct intermediate collection pools between runoff-generating surfaces and downstream watercourses to regulate flow to water bodies. These pools will allow soil particles to settle at the bottom, thereby reducing the turbidity of the runoff, 2) Limit excavation and other earthworks near the Artikjur River during the rainy season, 3) Prohibit the discharge of any untreated wastewater effluent into surface water bodies,	Within the Project's Construction contract	Surface water quality is protected, and adverse impacts from construction activities are minimized through implementation of mitigation measures.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		4) Where practical, construct local perimeter drains around working areas (e.g., storage and parking areas) to collect suspended runoff and prevent its discharge into surface water resources.			
<p>Topsoil removal, storage, transportation, reuse, loading and unloading operations.</p> <p>Transportation, storage and use of spoil, construction (friable) and hazardous materials, including oil products, refueling of construction equipment and trucks.</p> <p>Accidental spills of friable materials, leakages of oil, fuel, and other liquid chemicals during the field works within the construction site.</p>	Impact on Soil (8.2.8)	<p>Topsoil management</p> <ol style="list-style-type: none"> 1) Carry out the removal, transportation, storage, and use of topsoil in accordance with RA Government Decrees №1396-N and №1404-N, 2) Store topsoil separately to prevent mixing with subsoil, maintaining it in a condition that preserves the natural seed bank, until construction works are completed, 3) Locate topsoil stockpiles at least 50 m away from watercourses to prevent water siltation, 4) Avoid placing topsoil stockpiles near planned excavation areas, 5) Limit the height of stockpiles to a maximum of 3 m, and ensure the slope gradient does not exceed 25°, 6) Clearly label all topsoil stockpiles to ensure easy identification, 7) Cover topsoil stockpiles to prevent soil erosion, where natural revegetation has not occurred, 8) Fence off topsoil stockpiles to prevent unauthorized access and compaction by Project vehicles, 9) Reuse the stored topsoil for landscaping the disturbed areas and/or tree planting within the Project area after the completion of reservoir and dam construction. <p>Hazardous materials</p>	Within the Project's Construction contract	The provisions of the Topsoil Management Plan are implemented and controlled.	<p>I - Construction contractor</p> <p>S - Supervising engineer</p> <p>M - Client (WCRA/PIU), EBRD</p>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		<ol style="list-style-type: none"> 1) Store all hazardous materials in clearly labeled, secure, and ventilated areas, 2) Hazardous materials containers to be clearly labelled according to contents and hazards, 3) Equip sites with spill response kits and train workers on emergency response, 4) Maintain Material Safety Data Sheets (MSDS) in accessible language for all hazardous materials on-site, 5) Segregate incompatible hazardous materials to ensure they are not stored together, 6) Equip hazardous materials storage areas with eye wash kits and fire extinguishers, 7) Use appropriate PPE. <p>Soil contamination</p> <ol style="list-style-type: none"> 1) Transport friable materials using trucks equipped with waterproof canvas covers, 2) Store construction and other friable materials in separately designated areas that are fenced and covered with waterproof tents, 3) Store oil products and chemicals separately, in special drums or tanks placed on secondary containment systems or trays (secondary containment should withhold 110% of the volume of the container), 4) Carry out refueling of oil, fuel, and other chemicals only in dedicated areas eqiped with impervious surface and protective berms, 5) Equip storage facilities for oil and chemicals, as well as heavy trucks transporting these materials, with appropriate spill kits, 			

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		6) Immediately stop work in the event of uncontrolled spillage of fuel, engine oil, or chemicals. Contain the spill. Remediate contaminated soil by removing the affected layer (to be treated as hazardous waste) and replacing it with clean soil, 7) Train all staff on the safe execution of construction works and on response procedures for environmental incidents such as spills and leaks, 8) Ensure spoil piles do not exceed 3 m in height, and maintain slope gradients not exceeding 25°. Manage spoil piles to prevent erosion and runoff.			
All waste generation processes and activities during the construction phase	Waste Generation and Management (8.2.9)	General 1) Train the workers engaged in waste management on provisions of the WMP, 2) Apply waste hierarchy approach (prevention, minimization, reuse, recycling, energy recovery, disposal) while implementing the construction activities, 3) Elaborate and implement waste handling procedures for the construction operations, 4) Equip the construction site and construction camps with the waste separate collection area/ clearly labelled storage containers and locations, 5) Fence the waste storage / collection facilities and provide fire extinguishers, secondary containment trays, oil and chemicals spill clean-up kits, etc.,	Within the Project's Construction contract	Waste management during the reservoir construction phase shall be implemented in accordance with applicable national legislation, the waste hierarchy principles and GIP.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		6) Store liquid waste in leak-proof, sealed containers. 7) Sign contracts with the licensed waste handling (recycling, treatment, disposal) companies to hand them over the generated wastes. Waste transportation 1) Transport all types of wastes using adequate, sealed and covered trucks to avoid the leakage or dispersal of the waste on roads and surroundings, 2) Ban waste fly tipping and/or their disposal in unauthorized locations, 3) Select less risky routes for the transportation of waste from the area of its generation to its storage and recycling / disposal area, 4) Instruct the waste truck drivers on waste transportation safety rules. Household waste management 1) Equip the construction site with household collection containers / bins, 2) Sign a contract with the communal company for the regular removal of household waste from the construction site and construction camps. <i>In addition to the measures listed above: enforce the use of PPE and in particular, the protective clothes, shoes, gloves, respirator / masks for the workers dealing with the waste.</i>			
Site clearance, earth and excavation works, operation of construction machinery and heavy trucks, operation of	Noise and Vibration Impact (8.2.10)	1) Keep all diesel-powered vehicles and equipment (such as generators and air compressors) at a high level of maintenance. This will particularly include the regular	Within the Project's Construction contract.	Noise and vibration impacts arising from construction activities are effectively	I - Construction contractor S - Supervising engineer

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
borrow-pits, loading-unloading operations, etc.		<p>inspection and, if necessary, replacement of intake and exhaust silencers,</p> <p>2) Shut down or throttle back the machinery/vehicles that are used intermittently when not in use,</p> <p>3) Whenever possible: enclose noisy equipment, restrict non-stop operation of noisy equipment, avoid simultaneous operation of noise generating equipment,</p> <p>4) Avoid unnecessary idling times,</p> <p>5) Minimise the need for equipment to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur,</p> <p>6) Avoid unnecessary horn hooting from the used construction machinery,</p> <p>7) Limit truck speeds - not to exceed 40 km/h, when driving through local community roads,</p> <p>8) Inform the population of Nor Kyanq and Meghrashen rural settlements of the schedule and duration of construction activities, particularly where these are likely to generate high noise levels and before the blasting works,</p> <p>9) Prohibit movement of heavy trucks along the communal roads between 10 PM and 6 AM near residential areas.</p> <p><i>In addition to the measures listed above:</i></p> <p>1) Enforce the use of PPE and in particular, the protective devices capable to reduce the sound level at the ear to acceptable levels,</p>		<p>controlled to prevent exceedance of acceptable levels and to minimize disturbance to nearby receptors. Noise and vibration monitoring plan is implemented.</p>	M - Client (WCRA/PIU), EBRD

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		2) Provide employees engaged in 'noisy' operations with additional 15 minutes break per 2 hours.			
Transportation of construction materials, oil products, workers	Traffic Impacts (8.2.11)	1) Build the access roads as envisioned in the Project design document, 2) Implement the Traffic Management Plan (TMP), 3) Train drivers of heavy vehicles on the key requirements of the Traffic Management Plan, 4) Inform local residents of anticipated construction traffic impacts at least two weeks prior to the start of construction, 5) Equip roads used by Project vehicles with appropriate road safety signs and posters, 6) Provide additional crossings for cattle where necessary. <i>See also mitigation measures proposed in Sections 8.3.2, 8.3.5 and 8.5.2.</i>	Within the Project's Construction contract.	Traffic risks are minimized through effective implementation of the TMP, driver training programs, installation of clear safety signs and awareness posters along project roads, etc.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Implement a Biodiversity Action Plan (BAP) that encompasses No Net Loss and Net Gain activities for the pre-construction, construction, and operation phases. The BAP also provides guidance for key components, including the Biodiversity Management Plan (with associated monitoring) and the Biodiversity Offset Project. All mitigation and management measures outlined in this ESMP that relate to biodiversity impacts are incorporated into the BAP.	Within the Project's Construction contract.	BAP is effectively implemented. Other plans related to the biodiversity are developed and implemented by the during the construction phase.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation.	Impact on Biodiversity (8.2.12)	Flora Maintain the grasslands habitat based on indigenous plant species as identified in the ESIA.	Within the Project's Construction contract.	Maintenance and preservation of grassland habitats.	D&I - Construction contractor S - Supervising engineer

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
					M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation. Earth and excavation works. Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	Fauna <ol style="list-style-type: none"> 1) Plan and commence construction works starting from one edge of the reservoir/dam area; this approach will allow animals to leave the area, 2) Begin the construction works before or after the breeding season - prior to April or after August; this will protect lives of animals, including offspring, 3) Monitor compliance with the Worker Code of Conduct by the construction company workers to prevent poaching, 4) Develop the Worker Code of Conduct for the operator of the reservoir to prevent poaching. 	Within the Project's Construction contract.	Worker Code of Conduct for the Operator is developed. The project impact on the fauna species is reduced and/or mitigated.	D&I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Site clearance and removal of vegetation. Earth and excavation works. Behaviour of workers of the Construction contractor.	Impact on Biodiversity (8.2.12)	Sedentary animals <ol style="list-style-type: none"> 1) Before the reservoir construction starts, survey the construction area and capture found lizards and snakes, and amphibians, and relocate them to safe habitats identified during the pre-construction phase, 2) Before the reservoir construction starts take measures to scare away the priority species - Schidlovsky's vole and Asia Minor ground squirrel as well as other small mammals, 3) Before filling the reservoir, survey the site and capture as many individuals as possible, including snakes and lizards, and amphibians, and relocate them to the safe habitats identified and/or arranged during the pre-construction phase, 	Within the Project's Construction contract.	Project impact on sedentary animals is avoided, reduced, mitigated, or compensated.	D&I - Specialised company and/or Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		4) Before filling the reservoir, inspect the mapped residential burrows of badger and other animals; if any individuals remain, capture them and relocate to the safe habitats.			
Conservation of bird species	Impact on Biodiversity (8.2.12)	Birds Maintain the restored parts of grasslands.	Within the Project's Construction contract.	Project impact on birds is avoided, reduced, mitigated, or compensated.	D&I - Specialised company and/or Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Conservation of invertebrates	Impact on Biodiversity (8.2.12)	Invertebrates Maintain developed habitats.	Within the Project's Construction contract.	Project impact on invertebrates is avoided, reduced, mitigated, or compensated.	D&I - Specialised company and/or Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Conservation of aquatic species	Impact on Biodiversity (8.2.12)	Aquatic species 1) Before the reservoir construction starts, capture tadpoles of the Syrian spadefoot and relocate them to the newly created pond, 2) Maintain developed habitat and monitor the species being.	Within the Project's Construction contract.	Project impact on aquatic species is avoided, reduced, mitigated, or compensated.	D&I - Specialised company and/or Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Accidents and incidents during the construction works	Impacts on Public Facilities and	1) Implement TMP,	Within the Project's Construction contract.	A medical post is established in	I - Construction contractor

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
	Infrastructure (8.3.2)	2) Oblige the construction contractor to set up a medical post at least at one of the labour accommodation camps. <i>See also mitigation measures proposed in Sections 8.2.11, 8.3.5 and 8.5.2.</i>		accommodation camp.	S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Stakeholder engagement process, recruitment and remuneration of employees during the construction works.	Impact on Vulnerable Groups (8.3.4)	1) Implement the SEP to ensure that information about the Project and its opportunities is widely available and communicated to vulnerable households, including the female-headed and elderly households engaged in agricultural activities, households below the poverty line, 2) Equal employment opportunities and payment for men and women should also be ensured during the Project construction stage.	Within the Project's Construction contract.	The Project's SEP is effectively implemented. Inclusive stakeholder engagement with vulnerable groups; equitable recruitment and fair remuneration during construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Transportation of construction materials, oil products, workers. Operation of the construction machinery and trucks. Operation of construction and accommodation camps.	Impact on Community Health and Safety (8.3.5)	1) Implement TMP, <i>See also mitigation measures proposed in Sections 8.2.11, 8.3.2 and 8.5.2.</i> 2) Implement Emergency Preparedness and Response Plan (EPRP) covering whole project lifecycle, <i>See also mitigation measures proposed in Section 8.4.</i> 3) Maintain machinery to reduce noise and limit work to daytime hours, 4) Screen worker influx for communicable disease and provide treatment, as appropriate, to reduce exposure to local population, 5) Secure construction zones with fencing, barriers, and warning signage,	Within the Project's Construction contract.	TMP and EPRP are effectively implemented. All engaged workers are vaccinated and have passed the required medical examinations prior to commencing construction works and regularly during the construction.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		6) Inform local residents about construction schedules, risks, and safety precautions, 7) Other measures proposed by the Code of Conduct.			
All processes and operations during the construction activities.	Health and Safety Impact (8.3.6)	1) Implement the provisions of the Occupational Health and Safety Management Plan, 2) Conduct regular audits of the construction site to monitor the OHS performance of the contractors.	Within the Project's Construction contract.	Compliance with applicable national legislation and GIP concerning OHS requirements.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Operations and activities related to labour and working conditions, including the management of the construction camp and accommodation facilities.	Workers' Rights and Working Conditions Related Impacts (8.3.7)	1) Implement Labour and Working Conditions Management Plan, 2) Implement Construction Camp Management Plan, including sub-plans for Camp Code of Conduct and Camp Management, 3) Set up and maintain grievance mechanisms available to all project workforce, including the opportunity for anonymous complaints, 4) If a large-scale maintenance is planned, oblige the Maintenance Contractor to develop a Labour and Working Conditions Management Plan and Worker Code of Conduct (if needed) in line with Armenian labour laws and EBRD PR2 at least a month before any maintenance works, and implement it.	Within the Project's Construction contract.	Compliance with applicable national legislation, EBRD PR2 and GIP concerning labour and working conditions.	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	1) Conduct mandatory and regular training for workers on required lawful conduct in local community, the Code of Conduct and GBVH Policy and consequences for failure to comply with the above, 2) Maintain a grievance mechanism, which includes a specific mandate on GBVH,	Within the Project's Construction contract.	All workers receive mandatory induction and regular refresher training on the Code of Conduct, GBVH Policy and	I - Construction contractor S - Supervising engineer M - Client (WCRA/PIU), EBRD.

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
		3) Organize information and awareness raising campaigns for community members, specifically women and girls, 4) Provide information to communities on how to use the grievance mechanism to report GBVH issues.		expected behaviour in the local community.	
Emergency situations such as landslides, earthquakes, incidents, spills, and leakages.	Emergency Situations and Response (8.4)	1) Firefighting equipment and first aid kits should be available and maintained at all construction sites and project-related delivery vehicles. Selected workers should be trained on their usage, 2) After completion of the dam integrity risk assessment and flood safety check, consider the need of an early-warning system and provision of the life-saving equipment in the local communities, with the requirement of regular maintenance and emergency evacuation drills, 3) Establish traffic and access management plans to reduce accident risks for workers and local residents.	Within the Project's Construction contract.	All construction sites are equipped with appropriate firefighting kits. Warning systems and equipment are properly installed, maintained and operational (if required).	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Earthworks, excavation, borrow pit operations, construction of electricity transmission lines, etc.	Impact on Tangible Cultural Heritage (8.5.1)	Train relevant personnel in the implementation of the CFP to ensure that workers are able to identify potential chance finds, suspend work in the affected area, and notify site management promptly. Maintain an up-to-date training log and include relevant information in regular monitoring reports.	Within the Project's Construction contract.	Relevant staff are properly trained and aware of the provisions and requirements of the CFP.	I - Construction contractor S - Supervising engineer M - Client (WCRA/ PIU), EBRD.
Rituals, ceremonies and celebrations representing the traditional and	Impact on Intangible Cultural Heritage (8.5.2)	Communicate the provisions of the Traffic Management Plan to the population of rural settlements within the Project command area to help them plan Christmas, New Year, Easter,	Within the Project's Construction contract.	Residents of the Project-affected settlements are informed and aware of the	I - Construction contractor S - Supervising engineer

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁵
cultural identity of the affected settlements.		Trndez, weddings, and other celebrations and to avoid additional nuisance. <i>See also mitigation measures proposed in Sections 8.2.11, 8.3.2 and 8.3.5.</i>		provisions of the (TMP) and the measures proposed to reduce potential nuisance.	M - Client (WCRA/ PIU), EBRD.

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
Section C - OPERATION (MAINTENANCE) PHASE					
Regular maintenance of the reservoir body, dam and supporting infrastructure	Impact on air quality (8.2.4)	<ol style="list-style-type: none"> 1) Use modern construction machinery equipped with engines that comply with at least Euro IV standards, featuring emission control systems and low-noise characteristics, 2) Perform regular technical maintenance of all construction machinery, 3) If maintenance services are outsourced, contractors will be required to use modern, well-maintained equipment that complies with all applicable technical requirements. 	Within the Project's Construction contract.	Only modern and maintained construction machinery are operated	I - Operator ("Jrar" CJSC) or engaged contractor S - WCRA M - State Inspection Body
<i>Technical and maintenance measures that could potentially be included in the Project design documents</i>	Impact on air quality (8.2.4)	<i>If technically and economically feasible, implement all of some of the following activities:</i> <ol style="list-style-type: none"> 1) Consider aeration systems to oxygenate water and suppress anaerobic methane production, 2) Install surface aerators or diffused air systems to increase dissolved oxygen, 3) Remove decaying vegetation, crop residues, or debris from the reservoir and inflows, 	Can be included in the loan agreement, if deemed appropriate for the project.	Proposed equipment is installed and operated; clearance and cultivation measures is implemented	I - Specialised contractor O - Operator S - WCRA

¹⁶D-development, I-implementation, A-approval, S-supervision, M-monitoring, O-operation

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
		<p>4) <i>Keep banks and inflow channels clear to reduce organic loading,</i></p> <p>5) <i>Establish buffer zones with vegetation to absorb nutrients before they reach the reservoir.</i></p>			
Planning, design and cultivation of agricultural land within the command area of the Artik Reservoir	Impact on Landscape and Visual Amenity (8.2.5)	<p>Consult with the heads of affected settlements and landowners who will gain access to irrigation water as a result of Project implementation, to discuss and agree on design solutions for establishing potato and vegetable cultivation based on modern agricultural and irrigation technologies.</p> <p><i>This may transform the organically evolved cultural landscape into a designed cultural landscape.</i></p> <p><i>See also measures proposed in Section 8.3.2.</i></p>		Landowners and cultivators within the Artik Reservoir command area plan and cultivate their agricultural plots using modern, water-efficient and sustainable agricultural and irrigation practices.	I - Specialised contractor S&M - Client (WCRA/PIU)
Coastal erosion around the entire perimeter of the reservoir due to water encroachment during the initial years of operation	Impact on Geology (8.2.6)	<p><i>If technically and economically feasible, implement all or some of the following activities:</i></p> <p>1) Bioengineering / Vegetative Measures</p> <ul style="list-style-type: none"> - Plant native grasses, shrubs, and trees to stabilize soil through root systems and reduce erosion, - Install biodegradable or synthetic mats that support vegetation growth while preventing initial soil loss. <p>2) Embankment Stabilization Measures</p> <ul style="list-style-type: none"> - Place layers of large, durable stones along vulnerable embankments to dissipate wave energy and prevent erosion, - Place sloped structures on banks to absorb and deflect the energy of incoming water. <p>3) Reservoir Operation Management</p>	Can be included in the loan agreement, if deemed appropriate for the project.	Recommended mitigation measures for controlling coastal erosion are implemented effectively	I - Specialised contractor S&M - Client (WCRA/PIU)

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
		<ul style="list-style-type: none"> - Gradually fill the reservoir to allow embankment soils to stabilize and minimize sudden saturation that can lead to collapse, - Avoid large, rapid fluctuations in water level during early years to reduce destabilization of new embankments. <p>4) Erosion Monitoring and Adaptive Management.</p>			
Delivery of irrigation water to end users	Impacts on Water Resources (8.2.7)	<p>Hydrological Regime</p> <p>1) Develop and implement Irrigation Water and Environmental Flow Releases Management Plan to:</p> <ul style="list-style-type: none"> - Ensure reliable and efficient delivery of irrigation water to agricultural areas, - Maintain minimum environmental flows to support the health of downstream aquatic and riparian ecosystems, - Prevent over-extraction and degradation of water resources, - Comply with national water use regulations and environmental protection standards. <p>2) Review the irrigation water and environmental flow releases management plan annually, or after major hydrological events, to incorporate new data, regulatory changes, and operational experience,</p> <p>3) In the event of low reservoir levels or critical drought conditions, implement a prioritization protocol that protects environmental flows up to a predefined minimum threshold before allocating water for irrigation.</p> <p>Water losses</p>	-	Irrigation water is supplied to users in a manner that ensures the maintenance of the minimum environmental flow. Reservoir Operation and Maintenance Plan for the operation phase is developed and implemented.	I&O - Operator S&M - Client (WCRA/PIU)

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
		4) Develop Reservoir Operation and Maintenance Plan, 5) Carry out technical maintenance of the reservoir's supporting infrastructure to eliminate incidents and breakdown in accordance with the Reservoir Maintenance Plan.			
Regular maintenance of the reservoir body, dam and supporting infrastructure	Impact on Soil (8.2.8)	Outsource the maintenance of the operated reservoirs to the contractors equipped with modern and technically serviced equipment.	Within the Operator's budget.	Only modern and maintained construction machinery are operated	I&O - Operator or engaged contractor S - WCRA M - State Inspection Body
All waste generation processes and activities during the operation and maintenance works	Waste Generation and Management (8.2.9)	1) Obtain all required permits and regulatory documents relevant to the operation of reservoirs in Armenia, as required by local waste-related legislation (can be done at the corporate level), 2) Develop and implement WMP for the operation and maintenance of the reservoir (can be done at the corporate level), 3) Apply waste hierarchy approach (prevention, minimization, reuse, recycling, energy recovery, disposal) for the generated waste, 4) Equip the site with waste collection and storage containers and areas, 5) Sign a contract with the communal company for the regular removal of household waste from the reservoir site.	Within the Operator's budget.	Waste management during the reservoir operation phase shall be implemented in accordance with applicable national legislation, the waste hierarchy principles and GIP.	D,I&O - Operator S - WCRA M - State Inspection Body
Operation of the Artik Reservoir	Impact on Biodiversity (8.2.12)	1) Implement the offset project to conserve/restore the following habitat:	Within the biodiversity conservation budget.	The E1.2 (=62C0*) and C1.4 (=3160) habitats are conserved/restored.	D&I - Specialised company via WCRA/PIU

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
		E1.2 Perennial calcareous grasslands and basic steppes = 62C0* Ponto-Sarmatic steppes, and, possibly, to construct the water habitat: 2) C1.4 Permanent dystrophic lakes, ponds and pools = 3160 Natural dystrophic lakes and ponds.		All proposed mitigation measures are effectively implemented.	S&M - Client (WCRA/ PIU) and EBRD
Conservation of flora species.	Impact on Biodiversity (8.2.12)	Flora Maintain the grasslands habitat based on indigenous plant species.	Within the biodiversity conservation budget.	Maintenance and preservation of grassland habitats.	D&I - Specialised company S&M - Client (WCRA/ PIU) and EBRD
Behaviour of the Operator's workers	Impact on Biodiversity (8.2.12)	Fauna Monitor compliance of the reservoir's operator with the Worker the Code of Conduct to prevent poaching during operations.	-	Operator's staff regularly participate in emergency response training and practical drills, consistently use appropriate PPE, and affected settlements are equipped with the required safety signage and devices.	S&M - Client (WCRA/ PIU)
Conservation of flora and habitats.	Impact on Biodiversity (8.2.12)	Sedentary animals 1) As part of offset strategy introduce or support sustainable grazing practices in the areas that surround the planned reservoir, as improved quality of the habitats can provide a more diverse food supply for small mammals, reptilians and Syrian spadefoot, thus supporting	Within the biodiversity conservation budget.	Project impact on sedentary animals is avoided, reduced, mitigated, or compensated.	D&I - Specialised company S&M - Leadership of affected community with training support from Client (WCRA/ PIU)

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

Type of Activity	Expected Impact	Mitigation Measures	Cost (if discrete and feasible for including into bill of quantities)	Target / Indicator	Responsible / Supervising Entities ¹⁶
		<p>an increase in the population density of the species,</p> <p>2) Maintain rocky habitats which are habitats for relocation snakes and lizards in the vicinities of the flooded area,</p> <p>3) Provide training to the leadership of the affected community on the offset strategy and sustainable grazing practices.</p> <p><u>Preliminary quantitative assessment</u></p> <p>Areas calculated as minimum (multiplier 1, "no net loss" approach) compensation areas for the priority species (Asia Minor ground squirrel - 1.1 ha, Schidlovsky's vole - 6.49 ha, Valentin's lizard - 1.19 ha) can be compensated in the framework of the grassland habitat conservation/restoration of area 28.54 ha (see above).</p> <p>Proposals for the construction and conservation of the habitats, including multipliers, should be developed in the BAP.</p>			
Conservation of bird species	Impact on Biodiversity (8.2.12)	<p>Birds</p> <p>Maintain the restored parts of grasslands.</p> <p>1) Introduce/support sustainable grazing practices in Artik community to improve the quality of grassland habitat, increase the number and diversity of invertebrates, and support the necessary food supply for the Red-backed Shrike and Ortolan Bunting, thereby contributing to a potential increase in their population density,</p> <p>2) Maintain the restored parts of grasslands.</p>	Within the biodiversity conservation budget.	Project impact on birds is avoided, reduced, mitigated, or compensated.	D&I - Specialised company S&M - Client (WCRA/PIU) and EBRD

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

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Conservation of invertebrates	Impact on Biodiversity (8.2.12)	Invertebrates 1) Introduce/support sustainable grazing practices in the Artik community around the reservoir site, that can improve quality of grassland habitat, 2) Maintain developed habitats.	Within the biodiversity conservation budget.	Project impact on invertebrates is avoided, reduced, mitigated or compensated.	D&I - Specialised company S&M - Client (WCRA/ PIU) and EBRD
Conservation of aquatic species	Impact on Biodiversity (8.2.12)	Aquatic species Maintain developed habitat and monitor the species being.	Within the biodiversity conservation budget.	Project impact on aquatic species is avoided, reduced, mitigated or compensated.	D&I - Specialised company S&M - Client (WCRA/ PIU) and EBRD
Irrigation water supply to the users. Cultivation of the agricultural land. Operation and maintenance of the Artik Reservoir.	Impacts on Public Facilities and Infrastructure (8.3.2)	1) Ensure equitable allocation of water to all beneficiaries, preventing conflicts and enhancing trust in the system, 2) Hire local labour for reservoir maintenance, canal management, and monitoring activities to create permanent jobs, 3) Train local staff and farmers in irrigation management, water-saving techniques, and maintenance of associated infrastructure, <i>See also measures proposed in Section 8.2.5.</i> 4) Conduct regular inspections and maintenance of access roads and bridges exposed to heavy transport or increased traffic for reservoir operations, 5) Design alternative routes or strengthen existing infrastructure to handle maintenance vehicles and community traffic, 6) Maintain embankments, spillways and outlet structures to ensure controlled water releases and avoid downstream flooding that could damage public infrastructure.	Within the Operator's budget.	Landowners and cultivators within the Artik Reservoir command area plan and cultivate their agricultural plots using modern, water-efficient and sustainable agricultural and irrigation practices.	I - Specialised contractors (for items 1, 3, 4 and 5), Operator (for items 2 and 6) S&M - Client (WCRA/ PIU)

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

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Stakeholder engagement process, recruitment and remuneration of employees during the construction works.	Impact on Vulnerable Groups (8.3.4)	<ol style="list-style-type: none"> 1) Implement subsidies or reduced fees for low-income households to access irrigation water or reservoir-related services, 2) Ensure transparent and equitable allocation of water to all farmers, prioritizing smallholders and disadvantaged users, 3) Facilitate access to financial or technical support for low-income farmers to maximize the benefits of irrigation, 4) Ensure emergency response plans explicitly consider vulnerable groups, including designated evacuation routes and assistance during floods or dam releases, 5) Prioritize participation of vulnerable groups in water user associations or community decision-making on irrigation schedules and reservoir management. 		<p>Subsidies and reduced fees were provided to the irrigation water users represented as vulnerable groups.</p> <p>Water supply to the small land holders and disadvantaged users are ensured.</p> <p>Participation of vulnerable groups in water user associations or community decision-making on irrigation is prioritised.</p>	<p>D&I - Client (WCRA/ PIU) and Operator (for items 2, 4 and 5)</p> <p>S&M - Client (WCRA/ PIU)</p>
Transportation of materials, oil products and workers. Operation and maintenance of the Artik Reservoir.	Impact on Community Health and Safety (8.3.5)	<ol style="list-style-type: none"> 1) Monitor the technical conditions of the reservoir, provide timely maintenance, 2) Conduct community awareness campaigns on drowning risks, especially targeting children, 3) In case if heavy machinery or large number of vehicles is needed for the performance of the maintenance works, a Traffic Management Plan should be developed, accounting for the recommendation outlined above, 4) Develop and implement an Emergency Response Plan, <p><i>See also mitigation measures proposed in Section 8.4.</i></p>	Within the Operator's budget.		<p>D&I - Operator</p> <p>S&M - Client (WCRA/ PIU)</p>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

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Operation and maintenance of the Artik Reservoir.	Health and Safety Impact (8.3.6)	<ol style="list-style-type: none"> 1) Develop an OHS procedure/instruction for the maintenance and repair works, 2) Comply with the requirements of the relevant national OHS legislation. 	Within the Operator's budget.	<p>OHS procedures are prepared and implemented.</p> <p>The activities of the Operator are in line with the national OHS requirements.</p>	<p>D&I - Operator</p> <p>S - Client (WCRA/ PIU)</p> <p>M - Health and Labor Inspection body</p>
Operations and activities related to labour and working conditions, including the management of the construction camp and accommodation facilities.	Workers' Rights and Working Conditions Related Impacts (8.3.7)	<ol style="list-style-type: none"> 1) Ensure formal contracts for all workers specifying wages, roles, and duration of employment, 2) Implement regulated working hours with adequate breaks and rest periods, 3) Establish transparent grievance and complaint mechanisms for all staff, 4) Promote gender equality and inclusivity of persons with disabilities in recruitment, training, and promotion, 5) Provide regular training on operational procedures, safety, and skills development. 	Within the Operator's budget.	The Operator's activities are carried out in accordance with national legislation governing labour and working conditions.	<p>D&I - Operator</p> <p>S - Client (WCRA/ PIU)</p> <p>M - Health and Labor Inspection body</p>
Interactions between workers and residents of affected settlements.	Gender-Based Violence and Harassment (8.3.8)	<ol style="list-style-type: none"> 1) Develop and implement GBVH policy, 2) Monitor access to the irrigation infrastructure following the Project completion, 3) Maintain the grievance mechanism during the Project operation, including the GBVH cases. 	Within the Operator's budget.	Effective grievance mechanism, including provisions for addressing GBVH-related cases is implemented.	<p>D&I - Operator</p> <p>S&M - Client (WCRA/ PIU)</p>
Operation and maintenance of the reservoir, provision and proper use of personal protective equipment (PPE) during work	Emergency Situations and Response (8.4)	<ol style="list-style-type: none"> 1) Carry out preventive maintenance of gates, valves, and pumps, and ensure staff are trained in emergency response, 2) Protect workers by enforcing PPE use, confined space entry protocols, and safety training on electrical and mechanical hazards, 	Within the Operator's budget.	Operator's staff regularly participate in emergency response training and practical drills,	<p>I&O - Operator</p> <p>S&M - Client (WCRA/ PIU)</p>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Artik Reservoir Construction Project

Environmental and Social Management Plan

Rev02

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implementation, delivery of training and induction sessions for the Operator's staff, installation and maintenance of safety signage and devices in affected settlements.		3) Develop and implement an Emergency Action Plan, including early warning systems, evacuation routes, and periodic drills with local authorities and communities (both for staff and local residents), 4) Enhance community safety with fencing, signage and awareness programs on drowning risks, 5) Engage with local communities and provide grievance mechanisms to address concerns.		consistently use appropriate PPE, and affected settlements are equipped with the required safety signage and devices.	
Promotion of rituals, ceremonies, celebrations, and cultural heritage values that represent the traditional and cultural identity of the affected settlements, socio-economic development of the Artik community.	Impact on Intangible Cultural Heritage (8.5.2)	Engage with local cultural NGOs, tourism organizations, the heads of the Artik community and Nor Kyanq settlement, the organizers of the Ghapama Festival, and other relevant stakeholders to explore opportunities for promoting and institutionalizing the Ghapama Festival as a recurring cultural event.	5,000 EUR	Events promoting the intangible cultural heritage values of the Artik community are organized and implemented.	D&I - Specialised company (for example cultural NGO) S&M - Client (WCRA/ PIU) and EBRD