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GEO: Nenskra Hydropower Project

Prepared by SLR Consulting France SAS

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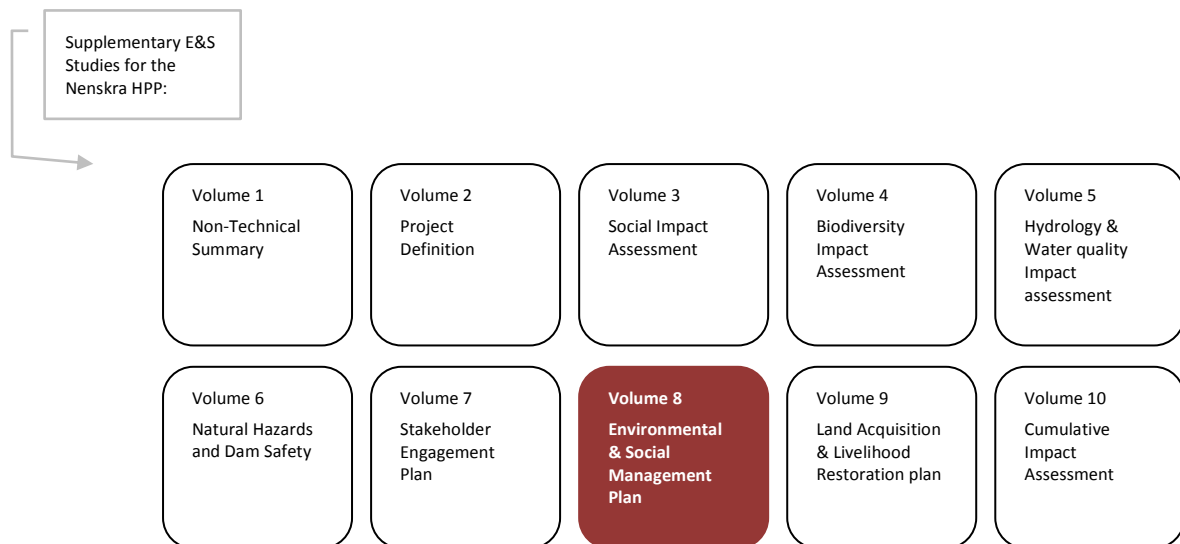
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Nenskra Hydropower Project

Supplementary Environmental & Social Studies

Volume 8 Environmental & Social Management Plan



DISCLOSURE AUTHORIZED

February 2017



Issue and revision record

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Acronyms

AAF	Average Annual Flow
APA	Agency of Protected Area
[CC]	Contractor Construction ESMP management actions
CIP	Community Investment Program
CMP	Change Management Procedure
EF	Environmental Flow
EPC	Engineering-Procurement-Construction
E&S	Environmental & Social
ESAP	Environmental & Social Action Plan
ESIA	Environmental & Social Impact Assessment
ESMP	Environmental & Social Management Plan
ESMS	Environmental & Social Management System
EU	European Union
FSL	Full Supply Level
[GC]	Governmental Agency E&S management actions during construction
GEL	Georgian Lari
GIP	Good Industry Practices
GSE	Georgian State Electrosystem
GHG	Greenhouse Gas
GIS	Gas Insulated Substation
[GO]	Governmental Agency E&S management actions during operation
IFC	International Finance Cooperation
JSCNH	JSC Nenskra Hydro (the Project Company)
LALRP	Land Acquisition and Livelihood Restoration Plan
MoE	Ministry of Environment Protection and Natural Resources
m asl	Meters above sea level
Mm ³	Million cubic meter
MoENRP	Ministry of Environment and Natural Resources Protection
MSDS	Material Safety Data Sheets
NGO	Non-Governmental Organization
NTS	Non-Technical Summary
[OC]	Owners Construction ESMS management actions
OE	Owners' Engineer
[OO]	Owners Operation ESMS management actions
PA	Protected Area
PMF	Probable Maximum Flood
RoW	Right of Way
SEP	Stakeholder Engagement Plan
TBM	Tunnel Boring Machine
TL	Transmission Line
TT	Transfer Tunnel

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Preamble

In August 2015, the final Environmental & Social Impact Assessment Report (ESIA) for the proposed Nenskra Hydroelectric Power Plant (HPP), located in the Svaneti Region was submitted to the Government of Georgia as part of the national environmental permitting process. The 2015 ESIA report had been prepared by Gamma Consulting Limited (Gamma) – a Georgian environmental consulting company. The ESIA was based on the findings of field investigations undertaken in 2011 and 2014. Public consultations meetings had been held in May 2015 and the Environmental Permit was awarded by the Environmental Authorities in October 2015.

In the present document, the ESIA submitted in 2015 is referred as the 2015 ESIA.

Since then, several International Financial Institutions (the Lenders) have been approached to invest into the Project. In compliance with their environmental and social policies, the Lenders have recommended that a number of additional environmental and social studies be undertaken in supplement of the existing ESIA report.

This report n°901.8.5_ES Nenskra_Vol.8_ESMP is Volume n°8 of the Supplementary Environmental and Social Studies prepared by SLR Consulting and issued in 2017. It details the Environmental & Social Management Plan to be implemented by JSCNH during the project construction and operation. It must be read in conjunction with the other volumes of the Supplementary Environmental and Social Studies organised as follows:

- Volume 1: Non-Technical Summary
- Volume 2: Project Definition
- Volume 3: Social Impact Assessment
- Volume 4: Biodiversity Impact Assessment
- Volume 5: Hydrology & Water Quality Impact Assessment
- Volume 6: Natural Hazards and Dam Safety
- Volume 7: Stakeholder Engagement Plan
- **Volume 8: Environmental & Social Management Plan (this document)**
- Volume 9: Land Acquisition & Livelihood Restoration Plan
- Volume 10: Cumulative Impact Assessment.

1 Objectives & Structure of the ESMP

1.1 Overview

This report is the Environmental & Social Management Plan (ESMP) for the Nenskra Hydropower Project (the Project). The purpose of the ESMP is to guide the implementation of mitigation measures and monitoring requirements identified through the ESIA process conducted in 2015 and through the Supplementary Environmental & Social studies prepared in 2016.

The proposed Nenskra Hydropower Project is a greenfield high head hydropower project with an installed capacity of 280 Megawatts (MW), located in the upper reaches of the Nenskra and Nakra valleys in the North Western part of Georgia in the Samegrelo-Zemo Svaneti Region (see Map 1-1).

The Project uses the available discharges from the Nenskra River and the adjacent Nakra River, developing a maximum available head of 725 metres down to the powerhouse located approximately 17 kilometres downstream the dam.

The main project components comprise a 130 m high, 870 m long asphalt face rock fill dam on the upper Nenskra River creating a live storage of about 176 million m³ and a reservoir area at full supply level of 2.67 km². The Nakra River will be diverted into the Nenskra reservoir through a 12.2 km long transfer tunnel. The power waterway comprises a headrace tunnel of 15.1 km, a pressure shaft and underground penstock of 1,790 m long. The aboveground powerhouse is located on the left side of the Nenskra River and will house three vertical pelton turbines of 93 MW capacity each, for a total installed capacity of 280 MW. A 220 kilovolt (kV) transmission line that connects the powerhouse switchyard to a new Khudoni Substation will be built.

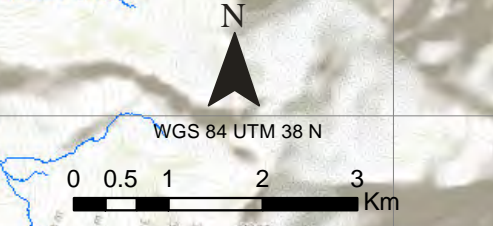
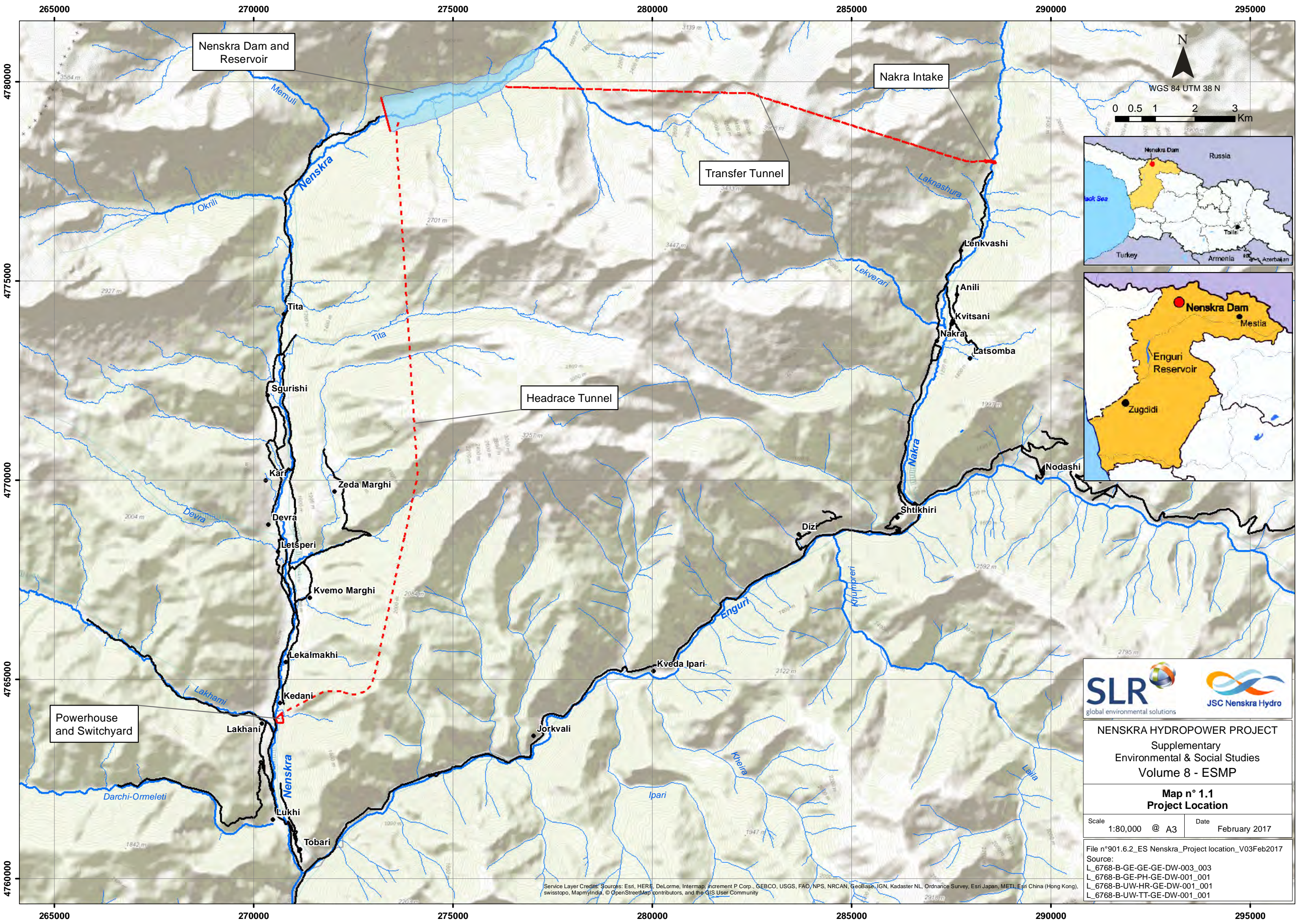
The main construction period is planned to start in September 2017 and will last 4 years. Some early works will be executed from October 2015 to September 2017: rehabilitation of access roads, construction of workers camps and technical installations. Power generation is planned to start end of 2020 if the conditions are favourable.

The Project is being developed by JSCNH, whose main shareholders are K-water, a Korean government agency and Partnership Fund, an investment fund owned by the Government of Georgia. K-water and Partnership Fund are referred to as the Owners in this document.

1.2 Objectives

This ESMP is a living document that is constantly updated and improved as the project progresses. The broad aims of the ESMP are:

- Ensuring compliance with national regulatory authority stipulations and guidelines, as well as ensuring compliance with the E&S Policies and standards of the potential Lenders (EBRD, ADB, EIB, SACE and KDB);
- Ensuring that there is sufficient allocation of resources on the project budget so that the scale of ESMP-related activities is consistent with the significance of project impacts;
- Realising the agreed environmental and social objectives for the Project and verifying environmental and social performance through information on impacts as they occur;



NENSKRA HYDROPOWER PROJECT
 Supplementary
 Environmental & Social Studies
 Volume 8 - ESMP

Map n° 1.1
Project Location

Scale: 1:80,000 @ A3 Date: February 2017

File n°901.6.2_ES Nenskra_Project location_V03Feb2017
 Source:
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- Responding to changes in Project implementation not considered in the impact assessment process thus far or responding to unforeseen events.

To achieve these objectives, the ESMP contains the following information:

- Definition of the environmental and social commitments and mitigation strategy identified in the ESIA and the supplementary E&S studies and approved by JSCNH and which will be implemented over the lifetime of the Project;
- Description of the management actions necessary to implement the commitments and mitigation strategy, including the manner in which they will be executed, the schedule, the resources and performance indicators.
- Description of the means of monitoring and assessing the performance of the social and environmental actions, so that they can be adapted and/or improved, plus the corresponding documentation.
- Definition of responsibilities: organisational structures, roles, communications and reporting process required for the implementation of the ESMP.

1.3 Who is this ESMP for?

The ESMP is an operational document that is available to the public for information. It is linked to the 2015 ESIA report and the 2017 E&S Supplementary Studies (see Section 1.4). It is intended for several parties:

- Administrative authorities responsible for monitoring the environmental and social impacts of the Project and the effectiveness of the mitigation measures. It is also a reference document that local and central authorities can use to check that JSCNH honours its commitments in the construction, operations and closure phases.
- Lenders: The ESMP provides evidences that the commitments made through the ESIA documentation and the financing closure process, which reflects the Lenders E&S policies requirements, are actually implementable, budgeted, can be monitored and audited.
- Local communities and organisations: The ESMP describes the measures to mitigate negative impacts and corrective measures to adapt to unforeseen changes during its implementation. The ESMP forms a basis for exchanges and negotiations in the consultation phases and the validation of the mitigation and compensation strategy proposed by JSCNH.
- JSCNH's Environment & Communities Team and the Technical Team. The ESMP acts as the environmental and social roadmap for construction and operations. It sets out the commitments made by JSCNH before the authorisation to start the main construction works and establishes the logic behind the social and environmental actions. It identifies monitoring constraints and the planning for annual budgets.
- Owners or operators of hydropower facilities located downstream or within the same river basin as the Project. The ESMP informs such parties of the objectives of each social and environmental action. In this way, it helps to facilitate possible synergies or avoid interference with other Project ESMPs, and to develop collective solutions, where appropriate.

1.4 Source documents and outputs

The ESMP is the framework document that summarises all environmental and social measures recommended in, or required by, the various projects documents (i.e. the source documents) and which translates them into management actions. Detailed implementation plans will be

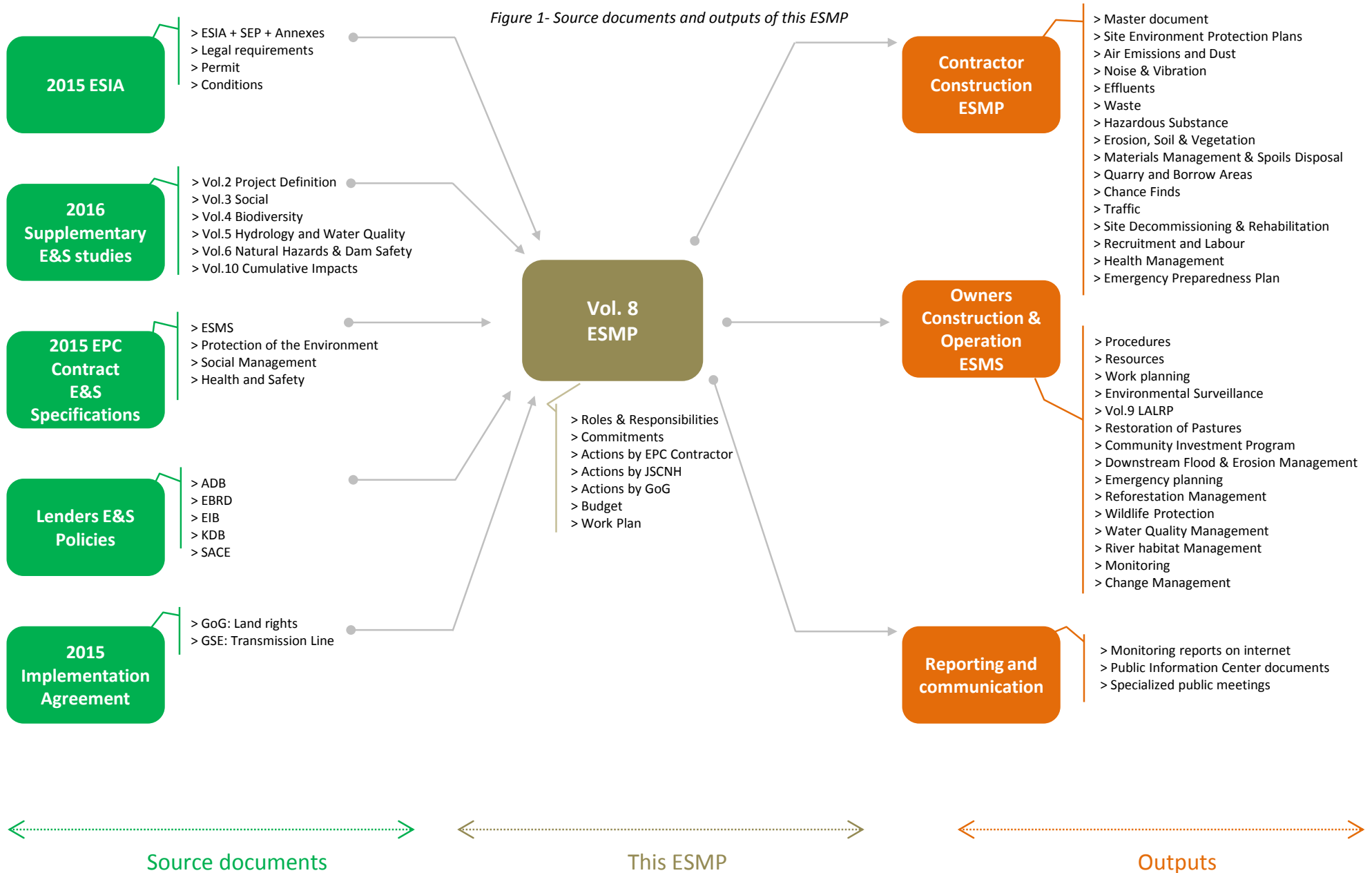
further developed and/or executed as outputs of this ESMP during the construction phase or during the operation period. Figure 1 below illustrates the source documents and outputs of the present ESMP.

The source documents include:

- ESIA prepared by Gamma Consulting and approved by the Government of Georgia (GoG) in October 2015 together with its Stakeholder Engagement Plan (SEP) and annexes. The GoG awarded the environmental permit on the basis of the E&S commitments made in the ESIA report and additional environmental and social conditions presented in Vol. 2 “Project Definition”.
- Supplementary Environmental & Social studies issued in 2017.
- Detailed environmental and social specifications included in the EPC Contract signed in 2015.
- Environmental and social policies of each of the Lenders approached in 2016 to finance the Nenskra HPP.
- Implementation Agreement signed between the GoG and JSCNH that includes clauses on the land acquisition process for the Nenskra HPP and the environmental permitting process for the 220 kV Transmission Line design, construction and operation.

The output documents are:

- Contractor Construction ESMP prepared by the EPC Contractor to achieve the E&S performance objectives set out in the present ESMP.
- JSCNH Environmental and Social Management System required to implement and monitor the Management Actions described in this ESMP.
- Detailed action plans described in this ESMP to address the mitigation and compensation measures identified through the 2015 ESIA and the 2017 Supplementary studies. Two of these plans have already been developed and are disclosed together with the present ESMP (i.e. the updated Stakeholder Engagement Plan and the Land Acquisition and Livelihood Restoration Plan).
- Documents that will be produced and disclosed during the course of the Project development to inform on the Project’s construction and operation activities and the results of the environmental and social monitoring activities.



1.5 Structure of the ESMP

Although there is no universally accepted standard format for ESMPs, the format needs to fit the circumstances in which the ESMP is being developed. The present ESMP has been prepared in 2016 after the EPC Contractor had already been contracted and after the Implementation Agreement between the GoG and JSCNH had been established. Of note, the presence of these agreements does not preclude amendments to take into account the requirements of this ESMP; it has influenced the structure but not the content of the ESMP. Responsibilities between each of the three main entities involved in the E&S Management of the Nenskra HPP (i.e. JSCNH, the EPC Contractor and the Governmental Agencies) are therefore clearly established. In this context, the ESMP has been structured by commitments and responsibilities:

- The present Section 1 briefly introduces the context and the objective of the ESMP.
- Section 2 describes the roles planned for each of the entities involved in the E&S Management of the Nenskra HPP, and the associated organisation.
- Section 3 summarizes the impacts predicted through the 2015 ESIA and the 2016 Supplementary E&S studies together with the Project's commitments to mitigate or compensate the adverse effects.
- Section 4 describes the E&S management measures which are under the responsibility of the EPC Contractor. They cover the construction period and the reservoir filling period.
- Section 5 details the E&S management measures which are under the responsibility of JSCNH during the construction and operation phases of the Project.
- Section 6 indicates the E&S measures that should be undertaken by the governmental agencies.
- Section 7 provides the budget for the ESMP.
- Section 8 describes the ESMP work plan for the construction period and highlights the dependencies between the project milestones and the implementation period of the E&S measures.

2 Environmental & Social Management Philosophy

2.1 Construction, Operation, Decommissioning

2.1.1 Hydropower Project and Transmission Line Development

JSCNH will take the full responsibility of the environmental & social management of the construction, operation and decommissioning of the Nenskra Hydropower Project.

The 220 kV Transmission Line to link the Nenskra switchyard to the Khudoni substation will be designed, constructed and operated by a third party company, namely Georgian State Electrosystem (GSE). GSE will take the full responsibility of the environmental & social management of the construction, operation and decommissioning of the 220 kV Transmission Line that evacuates the power produced by the Nenskra Hydropower Project.

The present ESMP addresses the environmental and social management plan for the Nenskra Hydropower Project only. A separate ESMP will be prepared by GSE to cover the E&S management of the 220 kV Transmission Line.

2.1.2 Implementation of mitigation prior and during construction

Although JSCNH takes the overall responsibility for the implementation of E&S mitigation and compensation measures of the Project, JSCNH delegates to the EPC Contractor (Salini Impregilo SA) the implementation of the E&S measures relating to the construction methods. This delegation is ruled by the Environmental and Social specifications that form part of the EPC Contract and that establish the objectives in terms of E&S performance for the construction methods as described in Section 4. Effective implementation of these specifications will be supervised by the Owners Engineer. A Performance Security will cover any remedial works (e.g. revegetation of areas disturbed during construction) required during a period of two years after full completion.

In the present documents, the management actions that are under the responsibility of the EPC Contractor are tagged [CC] standing for Contractor Construction ESMP management actions.

Some environmental and social actions that do not relate to the construction methods will be initiated during the construction period. These actions result from the mitigation strategy of the long-term effects identified by the 2015 ESIA process and the 2017 Supplementary E&S studies. Their implementation will be under the responsibility of JSCNH as described in Section 5. In the present documents, the management actions that are under the responsibility of JSCNH are tagged [OC] standing for Owner Construction ESMS management actions. Likewise, several E&S actions will have to be undertaken by governmental agencies during the construction period. They are tagged [GC] standing for governmental agency E&S management actions.

2.1.3 Implementation of mitigation during operation

The operation phase starts with the full commissioning of the 3 turbine units at the powerhouse planned to be in late 2020. At that stage all works will have been taken over from the EPC Contractor by JSCNH. Most E&S management measures will then be implemented by JSCNH to ensure compliance with this ESMP. They are tagged [OO] in this document, standing for Owner Operation ESMS management Actions. Some of the E&S measures, mostly monitoring, will also be implemented by the Governmental Agencies and they are tagged [GO] as for Governmental Agencies Operation E&S management Actions in the present document.

2.1.4 Implementation of mitigation during decommissioning

E&S management actions for the decommissioning phase of the Nenskra hydropower project cannot be planned for in 2017 for the following reasons:

- Hydropower projects rely on renewable fuel which is supposed to last for ever, subject to climate changes. Unlike a mining project or an oil & gas project, there is therefore no planned depletion of the resource after a number of years of exploitation. Although the reservoir capacity could eventually be reduced by sedimentation after decades, there could be solutions to adapt the hydropower production to the new conditions. The economic lifetime of the Project has been taken at 50 years in the Feasibility Study. The concession agreement with the Government has been established for 36 years. The power production would not stop beyond these economic and legal timeframes.
- Given the real lifetime of hydropower projects, there are only a few examples in the world of large hydropower projects being removed or dismantled. There are many examples of hydropower projects being upgraded (e.g. dam height increase) or water storage scheme being transformed into run-off-river scheme because the reservoir was full of sediments. In most cases, given the capital investment required for the construction of large projects, priority is given to refurbishment rather than decommissioning.
- Even if the project had a shorter projected lifetime, it would not be feasible to identify a detailed decommissioning strategy in 2017. Decommissioning is subject to detailed study similar in scope to construction. Therefore anything identified at the construction phase would be indicative and subject to extensive change based on tailored studies carried out as part of the decommissioning scope of work.

Overall, planning E&S measures for the decommissioning phase at this stage of the project cycle would not be relevant.

2.2 Responsibilities

Table 1 below outlines the roles and responsibilities for each party taking part in environmental and social management of the project.

Table 1 - Responsibilities between JSCNH, EPC Contractor and the Government for E&S management

Who	What
Project Company: JSC Nenskra Hydro	<ul style="list-style-type: none"> • Implement and operate the Project and ensure that all Project-related activities are carried out in compliance with the lenders E&S requirements and Georgian regulations. • Establish objectives for E&S performance and ensure contractors has appropriate environmental controls & systems in place • Provide access to land to the EPC Contractor prior to main construction • Establish ESMS and perform E&S activities required to mitigate impacts other than those caused by construction methods and operation & maintenance activities

Who	What
	<ul style="list-style-type: none"> • Monitor the state of the receiving environment that could be affected by the Project activities. • Undertake environmental management actions as directed by regulatory agencies • Inform regularly the community & the larger public of project activities and impacts and address issues raised by the community.
EPC Contractor: Salini Impregilo	<ul style="list-style-type: none"> • Prepare detailed E&S Management plans and schedule works in a way that avoids/ minimises adverse E&S effects • Work with Project Company to improve and adapt the design to minimize adverse impacts • Conduct activities in accordance with Management Actions listed in this ESMP • Respond to any complaints received
Governmental Agencies	<ul style="list-style-type: none"> • Assist in acquiring land privately owned: Partnership Fund. • Transfer of logs to local population: National Forestry Agency • ESIA for the Transmission Line: GSE • Coordination with APA for Protected area • Coordination between HPP developers within the Enguri Watershed: Ministry of Energy • Monitoring of E&S conditions in the Environmental Permit: Ministry of Environment and Natural Resources Protection.

Throughout this ESMP it is assumed that the Owners Engineer forms part of JSCNH. It is not therefore discussed separately except where explicitly required.

2.3 Standards of E&S performance

The Project internal stakeholders (i.e. JSCNH, Owners Engineer, EPC Contractor, Sub-contractors for construction or operation phases) will comply with all norms, standards, discharge and abstraction limit values defined in the Georgian national regulations.

The Project will also comply with the environmental and social policies of the potential Lenders, namely:

- 2014 EBRD Environmental & Social Policy and the EBRD Environmental and Social Guidance Note for Hydropower Projects.
- 2009 ADB Safeguard Policy Statement, 2001 ADB's Social Protection Strategy, 1998 ADB Gender and Development Policy, 2011 ADB Public Communications Policy.
- 2012 IFC Performance Standards applied by SACE and KDB.
- 2013 EIB's Environmental and Social Standards.

JSCNH, as the subsidiary of an international responsible company, will also apply - and require its subcontractors to comply with - Good Industry Practices while managing environmental, social and safety issues. The following documents might, among others, be referred to by JSCNH as Good Industry Practices:

- The World Commission on Dams (WCD)
- The International Hydropower Association (IHA)
- The International Commission on Large Dams (ICOLD)

The Project activities will further comply with norms, standards and when applicable with discharge limit values, recommended by the specialised international organisations affiliated to the United Nations, including:

- The World Bank, including the IFC and its Environmental, Health and Safety guidelines
- The World Health Organization (WHO)
- The International Labour Organization (ILO)

2.4 Contractor ESMP and Owner ESMS

A key success factor for the effective implementation of this ESMP is the definition of responsibilities between the EPC Contractor, JSCNH and any other third parties involved in the E&S management or monitoring of the Project.

The EPC Contractor will develop a Contractor Construction ESMP and associated sub-plans (Sectorial Technical Plans and Site Environment Protection Plans - See Section 4.1). JSCNH, assisted by the Owners Engineer, will review and approve the documents.

JSCNH will establish the Owner ESMS (see Section 5.1). The ESMS establishes the organizational structure, responsibilities, practices and resources necessary for implementing the Project-specific management plans listed in Section 5 covering the construction and/or the operation period.

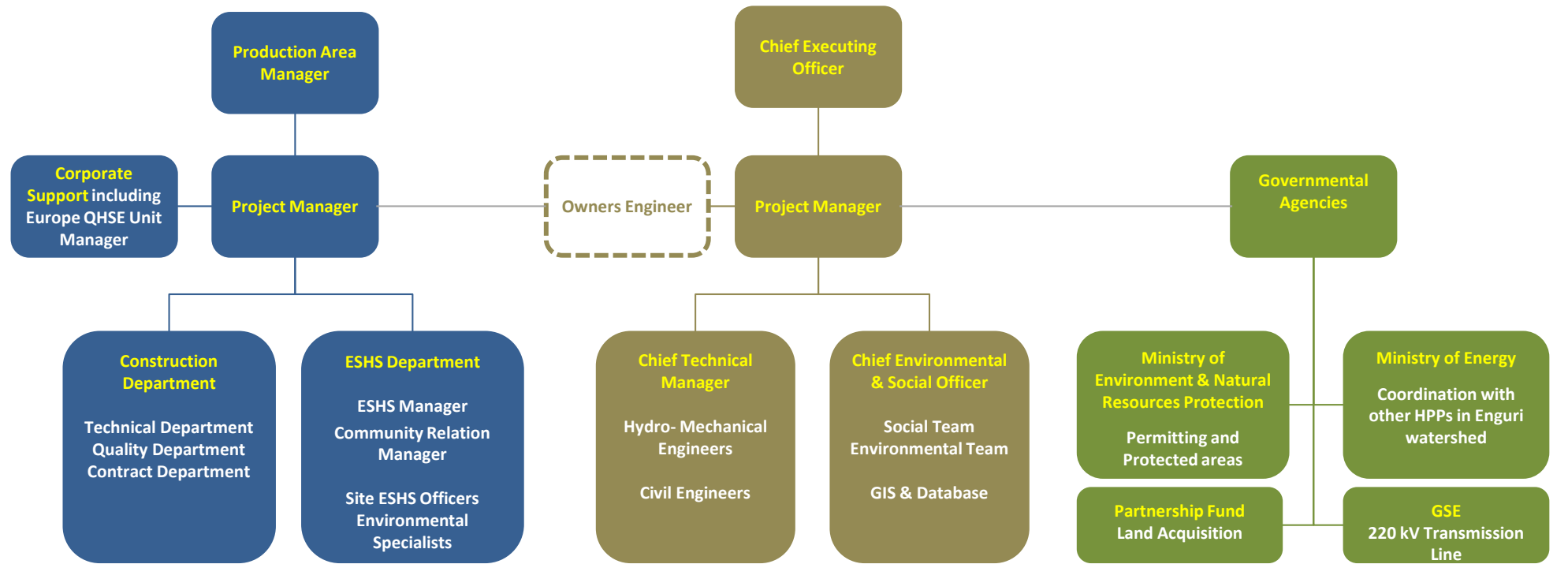
2.5 Organisation

Figure 2 overleaf depicts the organization of each party involved in the implementation of the ESMP management actions presented in this document. JSCNH Environmental & Social Team organization is presented in greater details in Section 5.1.

2.6 Documents flow chart

Table 2 thereafter lists the main documents that will be prepared by the EPC Contractor and JSCNH as part of the ESMP implementation. The justification and the content of these documents is further described in the referred sections.

Figure 2 - Organisation of ESMP implementing parties



EPC CONTRACTOR

JSC NENSKRA HYDRO

GOVERNMENTAL AGENCIES

- Sub-contractor of JSCNH in charge of detailed engineering and construction activities
- EPC Contract managed and supervised by Owners Engineer on behalf of JSCNH
- Responsible for the management of environmental and social issues relating to construction methods

- Overall responsibility for environmental and social management of the Project activities, including this ESMP
- Supervised by the Ministry of Environment and Natural Resource protection to ensure compliance with Environmental Permit conditions
- Monitored by the Lenders to verify compliance with their environmental and social policies and good industry practices
- In close contact with local community to inform on project activities and manage the grievance mechanism

- Monitor compliance with Environmental Permit conditions
- Manage the land acquisition process as per the Implementation Agreement
- Transfer logs cut in the reservoir to local population
- Organize coordination between HPP developers within Enguri Watershed
- Identify areas of cooperation with Project for the creation of the proposed Svaneti Protected Area.

Table 2 - Documents flow chart

Documents	What is required	Timing for issue
1. Prepared by the EPC Contractor		
<ul style="list-style-type: none"> • CC-ESMP - Master Document 	<ul style="list-style-type: none"> • E&S organization and production: personnel, roles and responsibilities, mobilized resources, site procedures, communication, management of non-conformities, documents and data management, auditing. Includes a Permit management plan and permitting schedule, including E&S studies preparation and permit approval times and linked to the project construction schedule - Cf §4.1.2 	<ul style="list-style-type: none"> • April 2017 (revised issue)
<ul style="list-style-type: none"> • CC-ESMP - Air Emissions and Dust Control Management Plan • CC-ESMP - Noise & Vibration Control Plan • CC-ESMP - Effluent Management Plan • CC-ESMP - Waste Management Plan • CC-ESMP - Hazardous Substance Handling & Storage Management Plan • CC-ESMP - Erosion, Soil & Vegetation Management Plan • CC-ESMP - Materials Management & Spoils Disposal Management Plan • CC-ESMP - Quarry and Borrow Areas Management Plan • CC-ESMP - Reservoir Vegetation Method Statement • CC-ESMP - Chance Finds Procedure • CC-ESMP - Traffic Management Plan • CC-ESMP - Site Decommissioning & Rehabilitation Plan • CC-ESMP - Recruitment and Labour Management Plan • CC-ESMP - Occupational Health & Safety Management Plan • CC-ESMP - Emergency Preparedness Plan • CC-ESMP - Community Safety Plan and Community Health Plan 	<ul style="list-style-type: none"> • Measures to identify, manage & reduce nuisances caused by air emissions and dust production from construction activities, including from project's traffic along access roads and aggregate stockpiles and storage areas - Cf § 4.4.1 • Measures to minimise and manage noise and vibration impacts during construction - Cf § 4.5.2 • Measures to identify, drain and treat all effluents generated on site from the construction activities, i.e. liquid discharges, including infiltration, from Worksite, transporting a pollutant (dissolved, colloidal or particles) - Cf § 4.6.1 • Measures to identify, collect, transport and treat all waste produced on the Worksites - Cf § 4.7.1 • Measures to identify and manage hazardous substances planned for use on the Worksite (e.g. Explosive, Inflammable, Irritant, Toxic, Corrosive, React with water, Dangerous for the environment). Cf § 4.8.1 • Measures to minimize vegetation clearing and prevent increase in sediment loads being exported from the site - Cf § 4.9.1 • Measures to minimize the footprint, adverse socio-economic impacts and ecological effects, and to ensure long-term stability and control erosion while stockpiling the material excavated from all construction sites - Cf § 4.10.1 • E&S management and monitoring measures to operate quarry and borrow areas for rockfill material, aggregates and rip rap material, sand, gravel, laterite clay) - Cf § 4.11.1 • Measures to manage the cutting of above-ground biomass in the reservoir area and within project footprint and transfer logs to forest authorities - Cf § 4.9.2A • Measures to manage physical cultural heritage encountered unexpectedly during the construction works - Cf § 4.12.2 • Characteristics of the construction fleet of vehicles & site machinery, Predicted Project's traffic and Measures to minimize the nuisances to neighbourhood generated by the project fleet and reduce the risk of accident - Cf § 4.13.1 • Measures to be implemented at the end of the construction period to rehabilitate all temporary areas disturbed by the works - Cf § 4.14.1 • Manpower needs for the construction period, local recruitment process, approach to maximize local employment and local content opportunities - Cf § 4.16.1 • Measures to manage hygiene conditions and medical care in each of the worker camps - Cf § 4.17.1 • Measures to manage Common Hazards and Emergency Situations during construction, and Responses to circumstance that potentially indicates an increase in the likelihood of a dam failure hazard or downstream release hazard happening during operation • Measures to ensure no impact on health and safety of communities occurs during the construction period. 	<ul style="list-style-type: none"> • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • April 2017 (revised issue) • Sept. 2017 • April 2017 (revised issue) • April 2017 (revised issue) • Sept. 2017 • April 2017 (revised issue) • April 2017 (revised issue) • H2 2017 • Sept. 2017
<ul style="list-style-type: none"> • CC-ESMP - Site Environment Protection Plans 	<ul style="list-style-type: none"> • For each worksite (e.g. quarry areas, worksites, camps, disposal and borrow areas, roads) definition and mapping of site-specific E&S management and monitoring measures 	<ul style="list-style-type: none"> • Prior to start of construction activities on each worksite
<ul style="list-style-type: none"> • CC-ESMP - Weekly monitoring reports • CC-ESMP - Monthly monitoring reports • CC-ESMP - Notification for non-compliance 	<ul style="list-style-type: none"> • Results of monitoring analysis (drinking water, wastewater, stormwater, discharge from sedimentation ponds, air quality, noise) - Cf §4.3.4 • Summary of all E&S initiatives implemented in relation to the execution of the works during the reporting period. Cf §4.3.4 • Description of environmental non-conformities (ENC) detected by the EPC Contractor staff - all non-conformities are tracked as an 	<ul style="list-style-type: none"> • Every week, start with MC in Sept. 2017 • Every month, start with MC in Sept. 2017 • Immediately after detection

Documents	What is required	Timing for issue
	appendix with photos. The stage of the non-conformity is tracked week on week - Cf § 5.2.4	
2. Prepared by JSCNH		
<ul style="list-style-type: none"> ESMS - Environmental & Social Management system Permit management plan and permitting schedule Stakeholder Engagement Plan LALRP Update of LALRP Community Investment Programme Emergency Preparedness Plan Downstream Flood Management Plan Bear and Lynx Monitoring plan River Habitat Management plan Fish Pass Operation & Maintenance Plan Reforestation Management Plan 	<ul style="list-style-type: none"> Policies and procedure to quality manage all activities included in the ESMP - Cf § 5.1 Permit management plan and permitting schedule, including ESIA preparation and permit approval times and linked to the project construction schedule Information disclosure, Meetings and consultations with project affected people, Grievances mechanism - Cf § 5.11 Land acquisition process and livelihood restoration strategy for persons affected by physical or economical displacement, compliant with national legal framework and the Lenders E&S policies - Cf § 5.3 Supplementary LALRP for land take of projects components not know end of 2016 (e.g. Nakra road upgrade, supply power lines) - Cf § 5.3.3.3 Needs Assessment, Priority action plan for year 1 and 2 in each of the two valleys, Governance- Cf § 5.5 Actions and resources to respond to rapid variations of downstream river water level including interface with local authorities and emergency services - Cf § 4.19 and 5.7 Engineering studies and associated tender documents for protection works if required - Cf § 5.6 Annual survey monitoring report with methodology, observations and DNA analysis of dung collected in watershed - Cf § 5.9.3.1 Detailed methodology and resources schedule to implement Habitat Enhancement and Management along Nenskra and Nakra rivers downstream of damming structures. Cf § 5.9.3.3. Operating procedure of the Nakra fish pass, including maintenance requirements. Cf § 5.9.4.3 Detailed methodology and resources schedule to perform the detailed floral inventory, to identify and agree reforestation and management areas, and to manage nurseries, replanting and aftercare - Cf § 5.8.3.1 	<ul style="list-style-type: none"> Prior to MC in Sept. 2017 May 2017 March 2017 Prior to start of works on affected sites - Q1 2017 Prior to start of works on affected sites - 2017 Prior to MC in Sept. 2017 May 2019 May 2018 for Nenskra Nov 2019 for Nakra Start Sept. 2017 First year of full water diversion - 2020 Jan. 2021 June 2018
<ul style="list-style-type: none"> Water Quality Monitoring Reports Socio-economic Monitoring Reports Hydrology, EF & Climate Change Monitoring reports Land use, erosion and revegetation monitoring reports River fish & Aquatic Invertebrate Monitoring reports 	<ul style="list-style-type: none"> Annual survey monitoring report documenting methodology, results of sampling and trends - Cf 5.13.3.1 Annual survey monitoring report documenting methodology, results of surveys and recommendations - Cf 5.13.3.4 Annual survey monitoring report documenting methodology, observations and trends - Cf 5.13.3.2 Annual survey monitoring report documenting methodology, mapping and progress in revegetation - Cf 5.13.4.3 Annual survey monitoring report documenting methodology, results of surveys and recommendations - Cf 5.13.3.5 	<ul style="list-style-type: none"> First issue in Sept 2017 First issue in Sept 2017 First issue in Sept 2017 First issue in Sept 2017 First issue in Sept 2017
<ul style="list-style-type: none"> Six-Monthly E&S Performance Reports Six-Monthly E&S Compliance Reports Six-Monthly newsletter 	<ul style="list-style-type: none"> Summary of E&S activities, results of monitoring, corrective actions taken during reporting period - English & Georgian - Cf 5.13.4.7 Report to Lenders on compliance of project activities with Lenders' E&S policies and safeguards - Cf 5.13.4.7 Short document in Georgian distributed local - Summary of project activities and E&S performance - Cf 5.13.4.7 	<ul style="list-style-type: none"> First issue in Jan 2018 First issue in Jan 2018 First issue in Jan 2018
<ul style="list-style-type: none"> Avalanche, debris flow and rock fall detailed assessment report Climate Change Risk Assessment Dam Rupture and Emergency flood releases during operation 	<ul style="list-style-type: none"> Field studies to locate hazard, estimate quantities potentially mobilised, and estimate likelihood of event. Computer modelling of path taken by avalanche or by debris - Cf 5.2.3.1 Evaluate long-term implications of climate change on natural hazards - Cf 5.2.3.1 Detail dam failure risk assessment in alignment with ICOLD methodologies, Dam failure consequence modelling, Downstream flood releases modelling - Cf 5.2.3.1 	<ul style="list-style-type: none"> H1 2017 H1 2017 H2 2017

3 Summary of impacts and commitments

Table 3 next page summarises all impacts, as well as the mitigation, compensation, safety and improvement measures (JSCNH commitments) identified as part of 2015 ESIA work and the 2017 Supplementary Environmental and Social studies.

These measures are all translated into implementable terms (management action, schedules, responsibilities) in the ESMP. For the sake of tracking and consistency, the table next page identifies which management plan of the ESMP addresses the commitment made in the present document.

The acronyms used for the timing of impact stands for:

- [EW]: Early works (2015-2017)
- [MC]: Main construction period (2017-2021)
- [RF]: Reservoir Filling (2020)
- [OP]: Operation (>2020)

Acronyms used for the relation between commitments made in this ESMP and measures committed in the 2017 Supplementary Environmental & Social studies are:

- SOC_N: measure number N committed in Vol. 3 “Social Impact Assessment” of the 2017 Supplementary E&S studies
- BIO_N: measure number N committed in Vol. 4 “Biodiversity Impact Assessment” of the 2017 Supplementary E&S studies.
- WAT_N: measure number N committed in Vol. 5 “Hydrology and Water Quality Impact Assessment” of the 2017 Supplementary E&S studies.
- SAF_N: measure number N committed in Vol. 6 “Natural Hazards and Dam Safety” of the 2017 Supplementary E&S studies.
- CUM_N: measure number N committed in Vol. 10 “Cumulative Impact Assessment” of the 2017 Supplementary E&S studies.
- ESMP: commitment added in this ESMP which was not specifically recommended in one of the 2017 Supplementary Environmental & Social studies.

Table 3 - Summary of impacts and commitments

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
Surface water hydrology	Reduced river flow between Nenskra dam and powerhouse	[RF], [OP]	WAT1	C.1	Nenskra dam designed with a minimum mandatory ecological flow of 0.85 m ³ /s	EPC	EPC Contract, Employer Requirements
			WAT1	C.2	Nenskra dam operated with a minimum mandatory ecological flow of 0.85 m ³ /s	JSCNH	ESMS 2.- System Implementation
			WAT5, SOC53	C.3	Two hydrological monitoring stations established on Nenskra River: (i) automatic river gauge station located upstream of the powerhouse and (ii) simple measurement facility in the river bed to allow independent third party visual check of ecological flow located immediately downstream of the dam, (iii) real-time monitoring and disclosure on a website of the ecological flow.	JSCNH	MON2.- Hydrology, Environmental flow and Climate change
			WAT21	C.4	Prepare and implement a programme for hydrological monitoring of the Nenskra River	JSCNH	MON2.- Hydrology, Environmental flow and Climate change
			WAT5	C.5	Availability of safety and ecological flow functions of the bottom outlet are ensured through design, operational procedures and inspection, control & maintenance programmes.	EPC / JSCNH	ESMS 1.- System Development
	Reduced river flow downstream of Nakra water intake	[OP]	WAT21	C.6	Two hydrological monitoring stations established on Nakra River: (i) automatic river gauge station located downstream of the Nakra Intake close to the Nakra village and (ii) simple measurement facility in the river bed to allow independent third party visual check of ecological flow located immediately downstream of the Nakra weir, (iii) real-time monitoring and disclosure on a website of the ecological flow.	JSCNH	MON2.- Hydrology, Environmental flow and Climate change
			WAT21	C.7	Prepare and implement a programme for hydrological monitoring of the Nakra River		
			WAT2	C.8	Nakra weir designed with a minimum mandatory ecological flow downstream of Nakra weir of 1.20 m ³ /s	EPC	EPC Contract, Employer requirements
			WAT2	C.9	Nakra weir operated with a minimum mandatory ecological flow downstream of Nakra weir of 1.20 m ³ /s	JSCNH	ESMS 1.- System Development
			WAT8	C.10	Nakra water intake design includes features to ensure that (i) sediment trapped upstream can be efficiently flushed downstream and (iii) Nakra Transfer can be remotely suspended if required.	EPC	Basic Design Dec. 2016 (with further development through final design stages)
			WAT4, 7, 8	C.11	Nakra weir operating procedures prepared and implemented so that trapped sediment is efficiently flushed downstream and Nakra Transfer can be remotely suspended if required.	JSCNH	ESMS 1.- System Development
	Reduced river flow in tributaries due to water abstraction for camps or site installations	[EW], [MC], [OP]	WAT11	C.12	Water abstraction from tributaries of the Nenskra or Nakra Rivers subject to prior environmental review.	EPC	4.15 Protection of adjacent communities and areas
	Risk of temporary stopping of Nenskra river during construction of dam & coffer dam	[MC]	WAT6, WAT8	C.13	Nenskra dam and coffer dam construction methods are adapted to ensure that the minimum ecological flow will be maintained at all times during construction, reservoir filling and commissioning	EPC	4.15 Protection of adjacent communities and areas
C.14				Nakra intake construction methods are adapted to ensure that the minimum ecological flow will be maintained at all times during construction and commissioning.			

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
				C.15	Compliance with C.13 and C.14 is monitored by JSCNH	JSCNH	MON2.- Hydrology, Environmental flow and Climate change	
	Risk of flooding of the Nenskra downstream of powerhouse caused by turbinning regime and increased normal and flood flows	[OP]	WAT18 SOC51	C.16	Flood studies include the reach downstream from the powerhouse down to the junction with Enguri River and establish if flood protection structures are required for normal operations	EPC	4.19 Emergency Preparedness Plan	
			WAT19	C.17	Flood protection and mitigation measures (if any) identified in the flood studies for downstream from the powerhouse, included in the Project design.	EPC	4.21 Design adjustment required for Environmental and social reasons	
	Downstream hydropower schemes affected by reservoir impoundment and operation	[RF], [OP]	WAT20	C.18	Coordination with GSE and Enguri HPP operators regarding changes in river hydrology as a result of the Project.	JSCNH	PUB5.- Engagement with NGOs and national level Stakeholders	
			CUM1	C.19	Coordination with Ministry of Energy regarding any HPP downstream developments along the Nakra River that could be impaired by the reduced flow downstream of the Nakra Intake.			
	Risk of blocking the bottom outlet gate/transfer tunnel with sediment	[OP]	WAT37	C.20	Venting of sediments from the Nenskra reservoir using the bottom outlet gate is programmed during flood events and with free-flow in the bottom outlet.	JSCNH	ESMS 1.- System Development	
			WAT5, 17	C.21	Monitoring of reservoir sedimentation and sediment accumulations around the bottom outlet to anticipate venting operations and undertake prior appropriate assessment.	JSCNH	MON2.- Hydrology, Environmental flow and Climate change	
	Surface and groundwater quality and groundwater availability	Risk of high sediment load and turbidity of Nenskra River downstream from worksites and spoil disposal areas and tunnelling dewatering	[EW], [MC]	WAT25	C.22	Runoff and dewatering sediment control measures will be implemented in construction sites, camps, site installations, and spoil disposal areas using silt traps and runoff drainage channels.	EPC	4.6 Effluent Management
				WAT26	C.23	Revegetation of temporary construction site areas	EPC	4.14 Site Rehabilitation
		Risk of surface and groundwater pollution from accidental spillage of hazardous substance	[EW], [MC]	WAT33 SOC21, 44	C.24	Pollution prevention and protection measures, such as bunding of all inventories of hazardous materials, tank overfilling prevention measures, are planned and implemented on construction worksites.	EPC	4.8 Handling and storage of hazardous substance
Risk of pollution from metal leaching and acid rock drainage from tunnel boring spoils containing sulphur bearing rocks		[MC]	WAT27 SOC 44	C.25	Preparation and implementation of an ARD and other geochemistry risk assessment programme for the tunnelling activities including definition of management of spoils representing an ARD risk or other geochemistry risks.	EPC	4.10 Materials Management and Spoil disposal	
			WAT27	C.26	Disposal of spoil that represents a geochemistry hazards to prevent pollution of water resources according to Good Industry Practice			
Risk of pollution from construction camp wastewater and runoff from worksites		[EW], [MC]	WAT34 SOC44	C.27	Construction camps equipped with wastewater treatment plants and discharges compliant with IFC EHS guidelines	EPC	4.6 Effluent Management	
			WAT34	C.28	Implementation of a wastewater discharge monitoring programme during construction			

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
	Risk of modification of water quality in Nenskra reservoir and downstream Nenskra River after impounding	[RF], [OP]	WAT28	C.29	Reservoir vegetation clearing management plan is prepared prior to start of the main construction period.	EPC	4.9 Erosion, soil & vegetation	
			WAT28	C.30	Vegetation in the reservoir area is cleared prior to impounding and evacuated outside the reservoir area.			
			WAT29	C.31	Transfer of trees of commercial value cleared from Nenskra reservoir to local forestry authorities is planned and executed			
			WAT30	C.32	Marketing of non-commercial trees cut from reservoir	JSCNH		WQM2.- Green waste management
			WAT32	C.33	Re-use of rapidly-degradable biomass, top soil and non-commercial non-rapidly biodegradable biomass taken within the reservoir area for site rehabilitation (e.g. mulching)	EPC		4.9 Erosion, soil & vegetation; 4.14 Site Rehabilitation
			ESMP	C.34	Access to collect and evacuate floating debris upstream of the dam during reservoir first impoundment and operation is designed, built and operational prior reservoir filling.	EPC		4.21 Design adjustment required for Environmental and social reasons
			ESMP	C.35	Laydown area is available downstream of the dam to dispose floating debris which are removed from the reservoir during operation			
	Risk that ecological flow comprises reservoir water of a highly modified nature and causing a discernible modification to the Nenskra River water quality	[RF], [OP]	WAT35	C.36	Design of the small diversion weir (downstream of the dam on the right bank) includes by-pass to allow the creek to be diverted to the Nenskra downstream from the dam to complement ecological flow and reduce river water quality modification.	EPC	4.21 Design adjustment required for Environmental and social reasons	
			WAT38	C.37	Monitoring of ecological flow water quality	JSCNH	MON1.- Water quality	
			WAT36 BIO17	C.38	Stream diversion at dam to be used to augment or substitute ecological flow if required for water quality reasons.	JSCNH	ESMS 1.- System Development; WQM3.- Reservoir operating management	
Risk of modification to groundwater quality and availability as a result of modified river flow rate and water quality	[RF], [OP]	SOC45	C.39	Preparation and implementation of a groundwater monitoring programme encompassing seeps and springs used by local communities	JSCNH	MON1.- Water quality; MON2.- Hydrology, Environmental flow and Climate change		
		Venting of sediments using bottom outlets and risk of downstream water quality degradation.	[OP]	WAT17	C.40	Preparation of a sediment venting ESIA and implementation of recommended mitigation measures prior to the first opening of the bottom outlet for sediment venting purposes.	JSCNH	WQM3.- Reservoir operating management
Riverbed erosion	Risk of erosion of river banks and bed downstream of powerhouse due to increased flows and daily variations	[OP]	WAT24	C.41	Preparation and implementation of a programme for monitoring erosion of Nenskra River banks and beds downstream from the powerhouse	JSCNH	DOWN1.- Nenskra River downstream Flood & Erosion protection	
			WAT24	C.42	Nenskra riverbank strengthening downstream from the powerhouse as and when required if erosion resulting from the Project operations is detected.			

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
Riverbed erosion & geomorphological changes	Risk of erosion of riverbed / river banks below Nenskra dam due to discharge of waters with low sediment loading and rapid changes in flow rates	[OP]	WAT23	C.43	Preparation and implementation of a geomorphological monitoring programme including areas where there is a risk of Nenskra riverbed/riverbank erosion caused by the Project	JSCNH	DOWN1.- Nenskra River downstream Flood & Erosion protection
			WAT22	C.44	Specialist study with regard to the evaluation and control of unstable Nenskra river bank slopes near the village of Kari		
	WAT23		C.45	Preparation and implementation of a geomorphological monitoring programme including areas where there is a risk accumulation of sediment in the river that cannot be flushed away because of reduced bedload capacity of the Nenskra.			
	ESMP		C.46	Corrective action in the event of accumulation of sediment in the Nenskra that results from Project activities and that represents a risk of flooding			
	Risk that reduced bedload capacity of the Nenskra could reduce the capacity of the river to flush away accumulated sediments from debris flow and/or mudflow, hence creating natural dams.	[OP]	WAT8	C.47	Gate on the Nakra transfer tunnel inlet will be closed periodically and simultaneously the weir gates opened to allow the Nakra River's natural flow rate to be re-established so that sediment that has accumulated in the riverbed can be flushed away.	JSCNH	ESMS 1.- System Development
			WAT9 SOC65	C.48	Specialist study to determine the most effective method for controlling accumulated sediment by re-establishing periodically the natural flow of the Nakra River: (i) flushing flow rates, frequency and duration, (ii) sediment accumulation monitoring and (iii) evaluation of the need for and concept of river maintenance works.	JSCNH	DOWN2.- Nakra River Downstream Sedimentation Protection
			WAT9	C.49	Design and implementation of river maintenance works recommended by the specialist study to avoid consequences of additional sediment accumulation caused by Project downstream of the Nakra intake.		
			WAT23	C.50	Preparation and implementation of a geomorphological monitoring programme including areas where there is a risk of additional sediment accumulation caused by the Project that could guide the periodic Nakra river maintenance works if required.		
Air and Climate	Greenhouse gas emissions produced from biomass from reservoir area	[MC], [OP]	WAT31, WAT32	C.51	Solutions for management of soft biomass that is not of economic value will be identified; Burning rapidly-degradable biomass will be avoided.	EPC	4.9 Erosion, soil & vegetation;
	Micro-climate change around reservoir	[OP]	WAT41	C.52	Project design includes microclimate monitoring stations in Dam site and in Chuberi Preparation and implementation of a microclimate monitoring programme - Automatically collected weather data will be shared on the Project website to the possible extent.	JSCNH	MON2.- Hydrology, Environmental flow and Climate change
	Climate change impact on future hydrology	[OP]	WAT39	C.53	Climate change risk assessment	EPC	4.20 Climate change and Natural Hazards
WAT40			C.54	Design criteria for flood control in alignment with findings of the Climate Change Risk Assessment			
Socio-economics	Sharing of economic benefits.	[MC], [OP]	SOC1	C.55	Creation and management of a Community Investment Programme to finance local development initiatives in both Nenskra and Nakra valleys during construction and operation.	JSCNH	Community Investment
	Physical displacement of households located within the land-take area	[EW], [MC]	SOC2	C.56	Physical displacement will be avoided through project design and construction method adjustment. Measures will be designed to ensure health and safety of communities adjacent to worksites.	EPC	Land Acquisition and Livelihood Restoration
			SOC3	C.57	If physical displacement cannot be avoided the provisions described in the LALRP in compliance with the Lenders policies will be implemented including compensation of any losses at full replacement cost, and resettlement assistance provided to physically displaced people	JSCNH	4.15 Protection of adjacent communities and areas

Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
Economic Displacement: Loss of crops, structures, trees and land	[EW], [MC]	SOC2	C.58	Avoid or at least minimize economic displacement.	JSCNH	
		SOC4	C.59	Any losses will be compensated at full replacement cost as per the provisions described in the LALRP in compliance with the Lenders policies.		
		SOC3	C.60	Severely affected people will benefit from the livelihood restoration activities described in the LALRP		
Economic Displacement: Loss of pasture areas or impaired access to pastures areas because of project footprint, or construction activities	[EW], [MC]	SOC5	C.61	Maintain safe access to existing pastures which are away from the construction worksites and which could be blocked by temporary facilities such as construction camp or site installations.	EPC	4.15 Protection of adjacent communities and areas
	[OP]	ESMP	C.62	Access restriction to surroundings of the Dam, Powerhouse and Nakra intake during operation will not impair access to pastures which are away from the project permanent facilities.	JSCNH	PAST1.- Restoration of access to existing pastures
	[EW], [MC]	ESMP	C.63	Improvement of access to non-affected existing pastures and assistance to hay production for households impacted by loss of pasture.	JSCNH	Land Acquisition and Livelihood Restoration
	[EW], [MC]	SOC6	C.64	At the end of construction work, rehabilitation of areas used for temporary construction purposes into pasture land without compromising the objective to replace removed woodland with similar species of tree where practicable.	EPC	4.14 Site Rehabilitation
Loss of Access to the upper part of the Nenskra Valley blocked by the Nenskra reservoir	[RF], [OP]	SOC7	C.65	A reservoir by-pass cattle track will be constructed higher up the slopes of the side of the valley above the reservoir water level.	JSCNH	PAST3.- Construct a reservoir by-pass cattle track
Loss of bridge at Nakra weir site resulting in loss of access to pasture land	[EW], [MC]	SOC8	C.66	Design and construction of the Nakra weir as a bridge with public pedestrian access.	EPC	EPC Contract, Employer Requirements
Decline in fisheries in the Nenskra	[RF], [OP]	SOC11	C.67	In addition of aquatic biodiversity mitigation and monitoring measures C.165 to C.179 thereafter, promotion of fish farming initiatives as part of the agricultural component of the Community Investment Programme	JSCNH	CIP1.- Governance and planning of community investment
Impacts on beekeeping	[EW], [MC]	SOC12	C.68	Participatory definition and implementation of beekeeping mitigation measures to avoid any impact from dust and noise measure	JSCNH	PUB1.- Regular Community Liaison
Loss of natural features important for tourism and recreation	[RF], [OP]	SOC13	C.69	Definition, funding and development of ecotourism activities as part of the Community Investment Programme	JSCNH	CIP2. - Delivering community investment
Cumulative impacts of land acquisition and resettlement for Nenskra and Khudoni projects	[MC], [OP]	CUM4, CUM5	C.70	Public disclosure of the potential risks of cumulative impacts in terms of land acquisition and coordination with the developers of other hydropower projects in the Nenskra and Nakra valleys regarding potential overlap of land requirements and areas affected by the Projects.	JSCNH	PUB2.- Public consultations on E&S Studies and Management Plans

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
Community health	Relationships between local communities and project employees	[EW], [MC]	SOC52	C.71	Effective implementation and monitoring of the Stakeholder Engagement Plan	JSCNH	Public consultation & participation
			SOC35	C.72	To ensure maximum local benefits are achieved through the construction phase, the Project will aim at 100% of unskilled workers recruited from the local area (the Nenskra and Nakra valleys) if available. If not available, the recruitment will be extended to the nearest villages in the Mestia Municipality and the Svaneti region as secondary catchment areas.	EPC	4.16 Recruitment and Local Labour Management
			SOC35	C.73	The Project will aim at 50% of semi-skilled workers are recruited from Mestia Municipality and 75% from Georgia.		
			SOC35	C.74	The Project will aim at 80% of all recruited workers are from Georgia.		
			SOC60	C.75	A Code of Conduct will be defined and implemented for employees and contractors, aiming at mitigating interactions offsite with communities	EPC	4.15 Protection of adjacent communities and areas
			SOC61	C.76	All Project's employees not originating from the Nenskra and Nakra valleys will be accommodated in Construction camps	EPC	4.16 Recruitment and Local Labour Management
			SOC62	C.77	Efficient communication carried out throughout construction and operation to ensure that all potentially affected stakeholders know how to contact the company and to file grievances in accordance with the Project's Grievance Management System.	JSCNH	PUB3.- Grievance Mechanism
	Loss of safe drinking water sources in case of degraded water quality during construction or poor quality water being released downstream the dam during operation	[MC], [RF], [OP]	SOC47	C.78	In addition of above technical and monitoring measures from C.22 to C.39 on river water quality, commitment to provide an alternative source of household potable water before springs used by a household as main source of potable water are affected by the Project.	JSCNH	DOWN1.- Nenskra River downstream Flood & Erosion protection DOWN2.- Nakra River Downstream Sedimentation Protection
			SOC46	C.79	Disclosure of the water monitoring results to the local communities	JSCNH	MON1.- Water quality
	Risk of increased incidence of communicable diseases (including STDs, HIV/AIDS)	[EW], [MC]	SOC41, 42, 43	C.80	Preparation and implementation of a health plan including: (i) coordination with local health authorities, (ii) awareness raising campaigns on health issues for settlements close to camps and associated facilities, (ii) monitoring of implementation of workers' health specifications by contractors.	EPC	4.15 Protection of adjacent communities and areas
CUM9			C.81	Coordination between HPP developers and regional authorities with respect to managing transmittable diseases in case cumulative effects on transmittable diseases arise from increased numbers of construction workers in the region (for example as a result of concurrent Nenskra and Khudoni construction work).	JSCNH	PUB5.- Engagement with NGOs and national level Stakeholders	
Physical disturbance and safety risks around work sites	[EW], [MC]	SOC22, 27, 28, 32, 49	C.82	Preparation & implementation of a safety plan, includes: regular community meetings on safety & construction hazards, announcement in advance of heavy construction activities, restriction of access to working sites, access restriction to dam site.	EPC	4.15 Protection of adjacent communities and areas	

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
	Working sites - Noise and vibration around working sites, including roads	[EW], [MC]	SOC24	C.83	Vibration monitoring at buildings nearest to worksite during works susceptible to generate offsite vibration effects.	EPC	4.5 Noise and vibration
			SOC25	C.84	Structural assessment of buildings closest to the powerhouse worksite to verify structural integrity prior to the start of construction works.		4.15 Protection of adjacent communities and areas
			SOC23, 24, 29	C.85	Preparation and implementation of dust, noise and vibration control plan		4.5 Noise and vibration
		[MC]	SOC26	C.86	Noise generating works (e.g. blasting, quarrying, drilling, hammering) inducing an increase of 3 dB in ambient noise levels at the nearest occupied off-Worksite receptor area will be carried out during normal working days, but prohibited at night between 6:00pm and 06:00am	EPC	
		[OP]	SOC37, 38	C.87	Noise impacts due to powerhouse operation will be minimized through design adjustment in order to prevent community health impacts in accordance with the guidelines established by the World Health Organization.	EPC	4.21 Design adjustment required for Environmental and social reasons
		[MC], [OP]	SOC39	C.88	Participatory noise monitoring	JSCNH	MON6.- Participatory noise pollution monitoring
		[MC]	SOC26	C.89	Project's traffic restriction along public roads during night time except for rare occasions such as heavy and wide loads that may circulate in the night time to avoid obstruction of local traffic.	EPC	4.13 Traffic Management Plan
Community safety	Community security and Human rights	[MC], [OP]	SOC79	C.90	JSCNH is committed to adhering to the Voluntary Principles for Security and Human Rights, this include contractors and their subcontractors.	JSCNH, EPC	4.15 Protection of adjacent communities and areas
		[EW], [MC]	SOC81	C.91	Mobilization of a Security and Human Right advisor.	JSCNH	ESMS 2.- System Implementation
			SOC82	C.92	Preparation and implementation of a Security Management Plan		
			SOC78	C.93	Coordination with local police forces to ensure that there is no impact on local people security and human rights, and implementation of security staffing practices as per arrangements that will be defined with local police forces, including regular reporting.		
	[EW], [MC]	SOC80	C.94	Specific training and monitoring of the security personnel on human rights.	EPC	4.15 Protection of adjacent communities and areas	
Risk of unwanted impacts on social cohesion	[EW], [MC]	SOC59	C.95	Effective implementation and monitoring of the Stakeholder Engagement Plan to avoid misunderstanding on perceived treatment by, or benefits from, the Project to one community or stakeholder group over another	JSCNH	Public consultation & participation Public consultation & participation	

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
Community Safety	Traffic related risks	[EW], [MC]	SOC14, 16	C.96	Preparation and implementation of a Traffic Management Plan, which will be disclosed to the public	EPC	4.13 Traffic Management Plan	
			SOC15, 26	C.97	No traffic for all Project's vehicles will be allowed in the villages from 8pm to 8am except for exceptional heavy loads convoys that must circulate in the night to avoid obstruction of local traffic; Traffic marshals will be affected at key locations in the villages; Project's heavy vehicles (i.e. with a GVWR of more than 3.5 tons) will be forbidden to circulate in the villages at time when pupils go to school or come back from school.			
			SOC17	C.98	Announcement to community in advance of heavy and wide loads convoys			
			SOC18	C.99	Awareness campaigns on traffic related risks, including school children	EPC		4.15 Protection of adjacent communities and areas
			CUM7	C.100	In case of use of Jvari – Mestia road, and Khaishi – Chuberi road by concurrent Nenskra and Khudoni construction works, public disclosure of the risk of potential cumulative impacts associated with concurrent road use by hydropower projects and public disclosure of the forecast Nenskra Project traffic and road use.	JSCNH		PUB2.- Public consultations on E&S Studies and Management Plans
	Physical disturbance and safety risks around work sites	[EW], [MC]	SOC29	C.101	Dilapidation survey prior main construction activities to document state of buildings located near the worksites and the roads used by the Project	EPC	4.13 Traffic Management Plan	
			SOC49	C.102	Access restrictions and control to working sites and warning signs for local communities, tourists or crossing of herders and herds.		4.15 Protection of adjacent communities and areas	
		[MC]	SOC28	C.103	Regular community meetings on safety and construction hazards			
	Physical disturbance and safety risks around permanent facilities	[EW], [MC]	SAF5	C.104	Adoption of seismic design criteria for buildings and facilities at the dam site, operator's village and powerhouse that are in alignment with Georgian seismic construction codes and standards and Good International Practice	EPC	4.15 Protection of adjacent communities and areas	
		[OP]	SOC49 WAT14	C.105	Access restrictions to riverbed immediately downstream of the dam and the plunge pool and warning signs against spillage, risk of fall from height and drowning.			
		[OP]	SOC49 WAT15	C.106	Access restrictions to riverbed around the tailrace and immediately downstream of powerhouse and warning signs against the risk of sudden variation of water level due to powerhouse operation.			
		[OP]	SAF26, WAT10	C.107	Transfer of water from the Nakra River will be suspended to the extent possible in order to avoid spillage at the Nenskra dam	EPC, JSCNH		4.21 Design adjustment required for Environmental and social reasons
		[RF], [OP]	SOC52 WAT16	C.108	Public awareness campaigns on risks relating to sudden variations of river water levels.	JSCNH		EPP2.- Early Warning Systems, Training and Exercise

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
Community safety	Natural Hazards and Dam Safety	[RF], [OP]	SAF18, 19, 20 SOC54	C.109	Operating procedures and structural measures to avoid inadvertent opening of the bottom outlet.	JSCNH	EPP1.- EPP Development	
			SOC50	C.110	Alarm and warning signage along the Nenskra River against the risk of sudden variation of water level due to dam spillage and powerhouse daily operations.	EPC	4.15 Protection of adjacent communities and areas	
			SAF21 SOC55	C.111	Flood study downstream of the dam for the case of bottom outlet full and partial opening and natural flood events	EPC	4.19 Emergency Preparedness Plan	
			WAT12	C.112	Powerhouse and reservoir operating procedures established to avoid creation of hazards for downstream users	EPC, JSCNH	ESMS 1.- System Development	
		[RF]	CUM10	C.113	Reservoir Triggered Seismicity mitigation, including monitoring of seismic activities, reservoir filling plan, and coordination between HPP developers if the Khudoni HPP project were to developed concurrently with the Nenskra HPP.	EPC	4.21 Design adjustment required for Environmental and social reasons	
	Natural Hazards and Dam Safety	[EW], [MC]	SAF3, SOC63	C.114	Detailed natural hazard risk assessment for all construction camps and technical installations to be completed before camps and installations constructed, including avalanche and debris flow risk.	EPC	4.20 Climate change and Natural Hazards	
			[MC]	SAFs1	C.115			Natural hazard protection measures included in the design of temporary construction camps and technical facilities to protect assets and workers, including monitoring, early warning system and identification of safe areas of avalanche and debris flow risk at the dam site, bottom outlet, spillway and headrace portal worksite worksites.
			[MC], [RF]	SAF35, 36, 37, 38, 39, 40	C.116			Technical measures for cofferdam safety during construction: capacity of diversion tunnel commensurate with risk, protection of diversion tunnel against blockage from avalanche of debris flow, design for seismicity and erosion hazards.
		[RF], [OP]	SAFs2 SOC63, 64	C.117	Technical measures on dam safety during operation: Flood control designed to evacuate extreme floods; Protection of spillway, bottom outlet and headrace tunnel portal against blockage from avalanche of debris flow; Prevention of internal and external erosion of dam structure and foundation; Dam stability designed to resist instability from seismic activity; monitoring of slope stability; Bottom outlet gate operation risk assessment in alignment with ICOLD methodologies; Risk assessment with regard to avalanche generated impulse waves, dam overtopping and eventual changes in Project design, if necessary.	EPC during construction; JSCNH during operation		
			SOC66 SAF42	C.118	Finalization of the Emergency Preparedness Plan development prior to first reservoir impoundment.	EPC		4.19 Emergency Preparedness Plan
			SOC67 SAF43	C.119	Implementation of Early Warning Systems, Training and Exercise covering extreme cases (such as dam failure) but also natural floods that would be strong enough to create a risk or affect people’s assets.	JSCNH		EPP2.- Early Warning Systems, Training and Exercise

¹ SAFs: [2], [3], [5], [8], [9], [10], [11], [12], [16], [17], [18]

² SAFs: [1], [4], [6], [7], [13], [14], [15], [19], [20], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34]

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
			SAF44, WAT13, SOC68	C.120	Annual meeting with civil security services (authorities, civil security, elected representatives of the population) on day-to-day risks associated with the scheme operation.	JSCNH	EPP3.- Public Awareness Campaigns	
			SAF41	C.121	Assessment of the risk of the failure of the Enguri dam as a result of the failure of the Nenskra dam using an ICOLD method and if necessary estimation of the consequences using flood modelling	EPC	4.19 Emergency Preparedness Plan	
			CUM8	C.122	While finalizing the Emergency Preparedness Plan, knock-on effect of Nenskra dam rupture on Khudoni dam – and Enguri dam are considered for the required coordination between HPP developers and regional authorities with respect to dam failure emergency planning.	EPC		
Employment	Enhance opportunities for employment for the local communities, unskilled, semi-skilled and skilled	[EW], [MC]	SOC72	C.123	Information of local recruitment process and opening of recruitment offices in the 2 valleys	EPC	4.16 Recruitment and Local Labour Management	
			SOC74	C.124	Monitoring of local jobs and women employment			
			SOC69	C.125	Prepare and implement an Employee Skills Development Plan for the construction period.			
		[EW]	SOC70	C.126	Human resources policy and labour management principles on the Project are developed and implemented in alignment with national, Lenders and ILO requirements.	EPC, JSCNNH		4.16 Recruitment and Local Labour Management ESMS 1.- System Development
		[MC]	SOC69	C.127	The Project will develop and implement a skills training program for local unskilled workers employed by the Project before the end of the construction period, in order to raise their skills levels and enhance their employment opportunities for the operation phase	JSCNH		CIP2. - Delivering community investment
		[OP]	ESMP	C.128	JSCNH will aim at 95% of all recruited workers from Georgia during the operational phase	JSCNH		ESMS 2.- System Implementation
	Enhance opportunities for employment of women	[EW], [MC]	SOC73	C.129	Women employment targets will be established in the EPC Contract	EPC	4.16 Recruitment and Local Labour Management	
		[EW]	ESMP	C.130	An Equal Opportunity Action Plan is prepared to enhance skill development for local youth and equal opportunity for women in the Nenskra HPP Project.	JSCNH	ESMS 2.- System Implementation	
	Enhance indirect employment and business opportunities	[EW], [MC]	ESMP	C.131	Prepare and implement a Supply Chain monitoring programme to ensure that local supply for food, goods or services is used wherever and whenever possible	EPC	4.16 Recruitment and Local Labour Management	
	Risk of project-induced in-migration	[EW], [MC]	SOC56	C.132	Development with local authorities of a monitoring system to document in-migration within the 2 valleys' communities	JSCNH	MON4.- Socio-economic indicators	
SOC58			C.133	Monitoring of local prices to detect any project-related local inflation				
SOC1, SOC57			C.134	As part of the Community Investment Programme, rehabilitation and support of existing health facilities in the two valleys	JSCNH	CIP2. - Delivering community investment		

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
	Temporary employment for concurrent Nenskra and Khudoni construction (cumulative impacts)	[MC]	CUM6	C.135	Public disclosure of the risk of potential cumulative impacts associated with recruitment of workers from outside the region and public disclosure of the numbers of local and non-local workers recruited by the Nenskra Project	JSCNH	PUB2.- Public consultations on E&S Studies and Management Plans
	Demobilization of workers	[MC]	SOC76	C.136	Preparation of a Workers Demobilization plan prior to end of construction to mitigate the negative impacts of the decrease of jobs offered by the Project	EPC	4.16 Recruitment and Local Labour Management
	Workers' Rights, Health and Safety	[EW], [MC]	SOC19, 20	C.137	Preparation and implementation of an occupational health and safety plan	EPC	4.17 Workers health & Safety management
			SOC75	C.138	Establish a workers' safety committee		
			SOC30	C.139	Occupational health and safety measures for fire and explosion during construction		
		SOC31	C.140	Work supervision by the Owner's Engineer to include regular fire and safety audits	JSCNH	SURV.2- Environmental supervision of construction methods	
		SOC83	C.141	Labour audits	JSCNH	MON4.- Socio-economic indicators	
	[OP]	SOC33, 34, 36	C.142	General health and safety measures during operation. Specific health and safety measures for hazardous materials. Specific noise measures for workers.	JSCNH	ESMS 1.- System Development ESMS 2.- System Implementation	
Supply chain human rights, forced labour and child labour risks	[EW], [MC]	SOC77	C.143	Monitoring of the Supply Chain compliance with the occupational health and safety plan	EPC	4.17 Workers health & Safety management	
Cultural heritage	Loss of archaeological, historical or cultural monuments within reservoir or worksites	[EW], [MC]	SOC84	C.144	Chance Find Procedure is prepared before construction starts and implemented during construction works.	EPC	4.12 Chance finds procedure
		[MC], [OP]	SOC85	C.145	The Community Investment Programme developed by JSCNH will include initiatives supporting the preservation of the local intangible cultural heritage.	JSCNH	Community Investment
Terrestrial Biodiversity	Impacts on bats and birds caused by loss of forest habitat from the clearing of vegetation from the reservoir area prior to impounding	[MC]	BIO13	C.146	Annual installation of 150 bat boxes in Nenskra valley near the reservoir for first 10 years of operation	JSCNH	WILD2.- Contribution to biodiversity conservation initiatives
			BIO16	C.147	Boreal owl nest boxes to be placed in trees between the reservoir and Tita village	JSCNH	
			BIO15	C.148	Avoidance of bird nesting period for all tree and scrub vegetation clearing works unless a suitably qualified ornithologist has certified the tree nest free first.	EPC	4.9 Erosion, soil & vegetation
			BIO14	C.149	If bat roost is suspected in felled tree, leave it in situ overnight.		
			ESMP	C.150	Quarry and borrow areas will be exploited within the Nenskra reservoir and will not encroach above the reservoir full supply level where practicable. If sites outside of the reservoir supply level are used, post construction, sites will be rehabilitated, revegetated and landscaped to prevent erosion.	EPC	4.11 Quarry and borrow areas management

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed	
Terrestrial biodiversity	Permanent loss of vegetation within reservoir area including floral species and wildlife habitats due to flooding	[MC]	BIO1	C.151	Prepare and implement a further survey for <i>Paracynoglossum imeretinum</i> to confirm identification of this species and assess if other plants of the same species are present within the project area.	JSCNH	VEG3.- Rare floral conservation program	
			BIO2	C.152	If presence of <i>Paracynoglossum imeretinum</i> confirmed, identify possible recipient sites outside of the project area and prepare and implement a translocation programme as a mitigation strategy.	JSCNH		
	Areas subject to temporary habitat loss/disturbance	[EW], [MC]	BIO5	C.153	Habitat loss areas will be mapped and surveyed prior to loss to inform the Revegetation and Habitat Management Plan within the Project footprint	EPC	4.9 Erosion, soil & vegetation	
			[MC]	BIO6	C.154	Revegetation and Habitat Management Plan within the Project footprint prepared and executed.	EPC, JSCNH	VEG2.- Revegetation and Habitat Management Plan
			[OP]	BIO7	C.155	Implementation of a 5-year after care programme for revegetation and habitat restoration	JSCNH	VEG2.- Revegetation and Habitat Management Plan
	Permanent loss of vegetation within reservoir area including floral species and wildlife habitats due to flooding	[MC]	ESMP	C.156	Detailed woodland inventory prior to tree cutting and agreement on timber storage area with local municipality authorities.	EPC	4.9 Erosion, soil & vegetation	
			[MC]	BIO4, BIO3	C.157	Preparation and implementation of a Detailed Reforestation Management Plan - Applies to areas not covered by the Revegetation and Habitat Management Plan - Includes Detailed floristic inventory of forest habitat loss, to inform the habitat-hectare approach.	JSCNH	VEG1.- Reforestation Management Plan
	Man-made influence such as trenches and waste disposal.	[EW], [MC]	BIO9	C.158	Excavations and trenches to be fenced or covered when not in use to avoid animals fall	EPC	4.15 Protection of adjacent communities and areas	
			BIO10	C.159	Waste management plan to include measures for discouraging access to waste by wild animals	EPC		
	Access track to upper Nenskra valley may cause an increase in hunting and logging	[MC]	ESMP	C.160	Control of access newly installed by the Project for construction purpose, prevent use of unauthorized vehicles.	EPC		
			[OP]	BIO8	C.161	Control of access along the reservoir by-pass cattle track, prevent use of vehicles.	JSCNH	PAST3.- Construct a reservoir by-pass cattle track
		[MC], [OP]	BIO11	C.162	Engage with local CSOs, formulate educational programme with regard to bears and hunting	JSCNH	WILD2.- Contribution to biodiversity conservation initiatives	
			BIO12	C.163	Prepare and implement brown bear population monitoring programme	JSCNH	WILD1.- Ongoing monitoring brown bear	
	Improved access to the upper Nakra valley	[MC], [OP]	BIO32	C.164	Consultation with MoENRP to identify defined conservation project(s) to (part) fund to aid in the creation of the proposed Svaneti Protected Area.	JSCNH	WILD2.- Contribution to biodiversity conservation initiatives	

	Potential risk	Timing of impact	Ref. in Suppl. E&S studies	Ref. in this table	Commitment	Responsibility	Chapter of this ESMP or other Project document where commitment is addressed
Aquatic biodiversity	Physical presence of the dam and impact on ecological continuity of the Nenskra river	[RF], [OP]	BIO27, 30	C.165	Preparation and implementation of a fish & invertebrate monitoring programme on the Nenskra river, and of fish within Nenskra reservoir. Remedial measures implemented if required.	JSCNH	MON5.- River fish and aquatic invertebrate
			BIO31	C.166	Disclose annual reports of the findings of fish and invertebrate monitoring	JSCNH	MON7.- Reporting and public disclosure
			BIO18, WAT3	C.167	Capacity of environmental flow bypass pipe will be doubled compared to initial design to allow for larger flow release if required. The diameter of the Environmental Flow pipe is defined to confirm its capacity at minimum operating level and the option to use two pipes to minimise the risk of gate valve malfunction will be assessed as part of the detailed design process.	EPC	4.21 Design adjustment required for Environmental and social reasons
			BIO19	C.168	Preparation and implementation of a river channel maintenance/habitat enhancement to ensure the availability of spawning areas for trout.	JSCNH	5.9.3.3 WILD3.- River Fish Habitat Maintenance
		[RF]	BIO20 SOC9	C.169	Year 1 of operation, River Habitat Survey to be undertaken		
		[OP]	BIO21	C.170	Implement a fish population monitoring programme in river channel maintenance/habitat enhancement areas		
			[OP]	CUM2	C.171	Coordination with the Government of Georgia (Ministry of Environment and Ministry of Energy) to ensure that run-of-river schemes in the Nenskra and Nakra catchment are required to be equipped with ecological flows and fish passes.	JSCNH
	Fish mortality at the transfer tunnel, headrace tunnel and turbines	[OP]	BIO22	C.172	Standard vertical bar screening installed on entrance to tunnel.	EPC	Basic Design Dec. 2016
			BIO23	C.173	Fish screen maintenance measures	JSCNH	
	Fish mortality at the Nakra weir	[OP]	BIO24	C.174	A bypass channel is employed at the Nakra Weir site with a short baffled section across the steepest part of the pass.	EPC	
		[MC]	BIO26	C.175	Timing of Nakra weir and fish pass construction is outside of migration period or alternative measures are provided	EPC	4.15 Protection of adjacent communities and areas
		[OP]	BIO25	C.176	Nakra River - current level of ecological continuity within river to be maintained, remedial maintenance measures may be required.	JSCNH	MON5.- River fish and aquatic invertebrate DOWN2.- Nakra River Downstream Sedimentation Protection
		[OP]	CUM3	C.177	Coordination with Nakra HPP developer, if any, with respect to ecological continuity along the Nakra River taking into account the water intakes of both projects.	JSCNH	PUB5.- Engagement with NGOs and national level Stakeholders
		[OP]	BIO28	C.178	Preparation and implementation of a fish & invertebrate monitoring programme on the Nakra river, and of fish on Nakra water intake.	JSCNH	MON5.- River fish and aquatic invertebrate
		[OP]	BIO29	C.179	Fishing ban within proximity to the Nakra weir fish pass (fencing and signs)	JSCNH	ESMS 1.- System Development

4 Management measures under the responsibility of the EPC Contractor

4.1 Contractor Construction ESMP

4.1.1 Environmental & Social Standards

The EPC Contractor activities will comply with all norms, standards and discharge limit values defined in the Georgian national regulations.

The EPC Contractor's planning, environmental & social assessment, design, construction and rehabilitation methods will also be executed in accordance with the following International Financing Institutions environmental & social policies:

- The 2014 EBRD Environmental and Social Policy.
- The 2009 ADB Safeguard Policy Statement.
- The 2009 EIB Statement of Environmental & Social Principles and Standards
- The 2012 IFC Performance Standards.

The EPC Contractor will comply with norms, standards and discharge limit values recommended by the specialised international organisations affiliated to the United Nations, including:

- World Bank, including the IFC and its Environmental, Health and Safety guidelines available from <http://www.ifc.org/ehsguidelines>,
- World Health Organization (WHO),
- International Labour Organization (ILO).

4.1.2 Planning requirements

As many large construction companies, the EPC Contractor will be expected to have its own ESMS. The provisions of this Contractor Construction ESMP (Section 4) would take precedence on the EPC Contractor internal ESMS in case of any conflicts between the two systems.

[CC- 1] The EPC Contractor will prepare and implement a Construction Contractor Environmental & Social Management Plan (CC-ESMP). The CC-ESMP will represent the unique reference document in which the EPC Contractor defines in detail all organisational and technical provisions implemented to satisfy the obligations of this Section 4.

[CC- 2] The CC-ESMP will be structured into 3 stand-alone documents:

- Part 1: Master Document, which defines the EPC Contractor's general environmental and social commitments in terms of organization and production: personnel with roles and responsibilities, mobilized resources, site procedures, communication, management of non-conformities, documents and data management, auditing.
- Part 2: Sectorial Technical Plans (STPs), which detail the environmental and social best practices implemented by the Contractor on the worksites to satisfy the obligations of this Section 4.
- Part 3: Site Environment Protection Plans (SEPPs) which define, for each worksite, the

environmental and social measures implemented by the Contractor. An individual site shall present a logic of homogeneity in terms of area and/or in terms of activities. Such individual sites include access roads, worker camps, workshops and storage areas, spoil disposal areas, quarries, borrow areas and the various construction sites: Dam site, Nakra water Intake, tunnels, power house.

[CC- 3] Parts 1 and 2 of the CC-ESMP will be finalized prior to start any work on sites. Part 3 shall be prepared and implemented site by site, depending on a general site opening program established by the EPC Contractor.

[CC- 4] The EPC Contractor will prepare and implement the Sectorial Technical Plans listed below:

- Air Emissions and Dust Control Management Plan (see Section 4.4.1).
- Noise & Vibration Control Plan (see Section 4.5.2)
- Effluent Management Plan (see Section 4.6.1)
- Waste Management Plan (see Section 4.7.1)
- Hazardous Substance Handling and Storage Management Plan (see Section 4.8.1), including the Spill Contingency sub-plan.
- Erosion, Soil & Vegetation Management Plan (see Section 4.9.1), including the Detailed reservoir vegetation clearing management sub-plan
- Material Management and Spoils Disposal Management Plan (see Section 4.10.1)
- Quarry and Borrow Areas Management Plan (see Section 4.11.1)
- Chance Finds Procedure (see Section 4.12.2)
- Traffic Management Plan (see Section 4.13.1)
- Site Decommissioning and Rehabilitation Plan (see Section 4.14.1)
- Recruitment and Labour Management Plan (see Section 4.16.1), including the Skills Development and Local Procurement sub-plan.
- Occupational Health and Safety Management Plan (see 4.17.1)
- Emergency Preparedness Plan (see 4.19)
- Community Safety Plan and Community Health Plan (see 4.15), including the Powerhouse and Penstock Area Safety Sub-Plan and Powerhouse and Penstock Area Safety Sub-Plan.
- Reservoir Impoundment Plan (see 4.21).

[CC- 5] The EPC Contractor maintains a Permit Register listing all permits required by the national regulations for construction activities relating to the Nenskra Hydropower Project. Critical paths and bottlenecks between permitting timeframe and construction schedule must be identified and discussed with the Owners Engineer. Timing for each permitting process must be clearly included in the Construction Schedule. Contradictions between national permit requirements and these CC-ESMP requirements must be flagged and discussed with the Owners Engineer sufficiently in advance of the occurrence of the contradiction so that a solution can be found.

[CC- 6] Management plans of this CC-ESMP (Parts 1, 2 and 3) are revised as required to reflect any changes in design, in field situation or Lenders requirements. In particular, they are revised and updated after the disclosure period of the draft 2017 Supplementary E&S studies on the basis of the finalized Supplementary E&S studies planned in the second semester of 2017.

[CC- 7] Management of Non-conformities with the present CC-ESMP are ruled by the E&S specifications of the EPC Contract. Should the Owners' staff or the Owners' Engineer Staff observe on site non-conformity of Level NC2 or above, the Owners' staff or the Owners' Engineer Staff have the right to immediately stop the works and report to the ESHS Manager for corrective actions.

4.2 Environmental and Social Assessment of Design Changes

[CC- 8] Design Changes implemented by the EPC Contractor are designed to meet the 2014 EBRD performance requirements, the 2012 IFC Performance Standards, the 2009 ADB Safeguard Policy

Statement and the 2009 EIB Statement of Environmental & Social Principles and Standards, from the outset. They are referred as the Lenders E&S standards in this section.

[CC- 9] Design Changes include:

- > The basic design of project's facilities that were not covered by the 2015 ESIA study and the 2017 Supplementary E&S studies, namely:
 - Power Supply Lines required to supply power during construction at the Powerhouse, the Dam site and the Surge shaft/TBM adit platforms at the headrace tunnel outlet.
 - Upgrading works for the Nakra access road, from the junction with the Mestia-Zugdidi national highway to the Nakra Intake worksite
 - Spoil Disposal Areas required to dispose of the spoils generated by the headrace tunnelling activities and all excavation works in the powerhouse worksites, including those required for the construction of the serpentine road from powerhouse to TBM adit portal.
 - Construction camp and site installations at the Powerhouse.
- > Design changes proposed by the EPC Contractor as a result of field investigations, obstacles met during construction or any other reasons required to complete the construction activities in accordance with the Lenders E&S standards.
- > Design Changes required by the Owners Engineer through notification of variation.

[CC- 10] The EPC Contractor undertakes an environmental and social assessment of Design Changes which is proportionate to the project facility's nature, size and location, as well as the characteristics of the potential impacts and risks.

[CC- 11] The scope of the environmental & social assessment covers the project facility and all associated facilities required for the construction of this project facility, such as access roads, power supply, quarry and borrow areas, disposal areas, camps.

[CC- 12] The environmental and social assessment examines alternatives to the project facility's location, design, technology, and components and their potential environmental and social impacts and documents the rationale for selecting the particular alternative proposed.

[CC- 13] While selecting the preferred alternative, the EPC Contractor will adopt a mitigation hierarchy approach to address adverse environmental or social impacts and issues to workers, affected communities, and the environment from the project facility and associated facilities. The mitigation hierarchy comprises measures taken to avoid creating environmental or social impacts from the outset of development activities, and where this is not possible, to implement additional measures that would minimise, mitigate and, as a last resort, offset and/or compensate any potential residual adverse impacts.

[CC- 14] The following criteria must be considered as part of the mitigation hierarchy while defining a Design change:

- Avoid physical displacement of persons
- Avoid encroachment into habitat of protected species
- Avoid decrease of flood capacity in river or streams
- Minimise encroachment into pasture, productive land, and forestry area
- Minimise nuisances to community due to noise, vibration, light, dust or obstruction to local traffic
- Minimise wildlife mortality through alternative alignment
- Mitigate community health and safety adverse effects through design adaptation, construction methods, working hours and public awareness.
- Mitigate loss of habitat or wildlife through ecological-friendly design and habitat reinstatement.

[CC- 15] The environmental and social assessment characterises potential future adverse environmental and social impacts associated with the selected project facility, identify potential improvement opportunities, and recommend any measures needed to avoid, or where avoidance is not possible, minimise and mitigate adverse impacts.

[CC- 16] As part of its environmental and social assessment process, the EPC Contractor identifies the

relevant requirements of the Lenders standards, and how they will be addressed and managed through the project design, construction and reinstatement.
[CC- 17] The environmental and social assessment is supported by relevant site specific investigations to establish the baseline on ecosystems and protected species, as well as the baseline on land ownership and land use of areas affected by the project facility and associated facilities. For power supply lines, this includes an avian risk assessment and ecological surveys to identify habitats and protected species potentially affected by selected alignment and associated facilities.
[CC- 18] The environmental and social assessment is supported by relevant technical studies as directed by the Owners Engineer.
[CC- 19] Prior to starting the environmental and social assessment, the EPC Contractor coordinates with the Owners Engineer to confirm (i) that the scope and level of details of the site investigations and the technical studies comply with the Lenders E&S standards, (ii) the reporting format for the environmental and social assessment and alignment with national regulation, and (iii) the required level of public consultations.
[CC- 20] The EPC Contractor Environmental and social assessment report is reviewed, and if required amended, by the EPC Contractor E&S Expert in charge of compliance Lenders E&S policies (see clause [CC- 26] prior to submission to the Owners Engineer for approval.
[CC- 21] Environmental and social assessment reports are available in English sufficiently in advance of the permitting process to allow (i) a meaningful review by the Owners Engineer, and (ii) corrective actions.

4.3 Resources allocated to CC-ESMP implementation

4.3.1 Human Resources

The organization chart next page depicts the minimum human resources requirements described below.

[CC- 22] The human resources requirements specified thereafter are the minimum resources required by the Employer for the management of the environmental and social measures of the EPC Contractor. As the adequacy of the proposed staffing levels will only be known once construction starts and the actual environmental and social issues arise, the EPC Contractor will increase its staffing levels if, during the course of the Project, this is identified as necessary.
[CC- 23] The Employer or the Owners Engineer may audit the environmental and social performance of the EPC Contractor. If the audit findings indicate that the EPC Contractor is lacking capacity, or the necessary skills or expertise to fulfil its obligations then the EPC Contractor will address the issue through increasing staff numbers or ensuring appropriately skilled staff are in position.
[CC- 24] The EPC Contractor will appoint an Environmental, Social Health & Safety Manager (ESHS) who is permanently based on the Worksite for the full duration of the works as of Contractor’s mobilisation until the provisional acceptance of all works. The ESHS Manager holds the power within the EPC Contractor’s organisation to be able to suspend the works if considered necessary in the event of non-conformities, and allocate all resources, personnel and equipment required to take any corrective action considered necessary. The ESHS Manager appoints a person responsible for relations with external stakeholders: local communities, administrative authorities, and representatives of economic activities located within one hour travel from the Worksite. This Community Relation Manager must have experience in community relation management obtained on construction sites of large infrastructure projects. The EPC Contractor will prepare a detailed job specification and experience criteria for the community relation

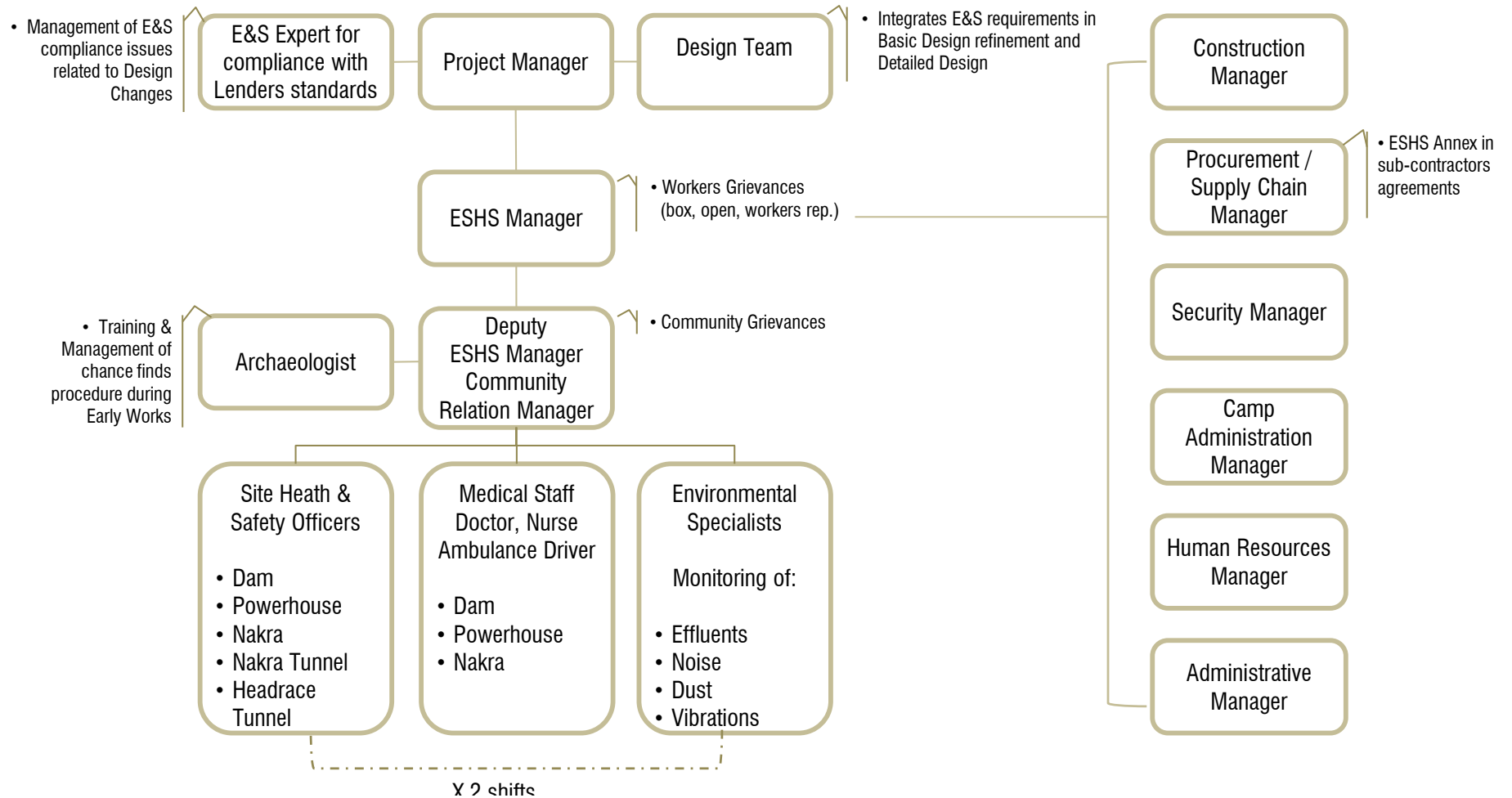
manager role drawing on the EPC Contractor's social obligations as described in this ESMP to the satisfaction of JSCNH and the Lenders.

In support to the ESHS Manager, the EPC Contractor will appoint one Site Environmental, Social Health & Safety Officer for each shift on each Worksite. Their role is to ensure that the works are carried out pursuant to the present CC-ESMP and notify the ESHS Manager if any detected non-conformities.

[CC- 25] The EPC Contractor will Environmental Specialists and sub-contractors to perform the monitoring activities required.

[CC- 26] The EPC Contractor appoints and mobilizes an E&S Expert in charge of compliance with Lenders policies and standards, with experience in delivering projects that meet the Lenders E&S requirements. He/she will report directly to the EPC Contractor's Project Manager. His/her role is to examine (i) the environmental and social implications of technical alternatives proposed during the basic design refinement and detailed design development, (ii) prepare the scope of environmental and social assessments required for the project facility not covered by the 2015 ESIA or the 2017 Supplementary E&S studies (see [CC- 9]) and review the quality and relevance of the environmental and social assessments prior to submission to the Owners Engineer.

Figure 3 - Organisation of EPC Contractor Environmental and Social Team



[CC- 27] The EPC Contractor mobilises an Archaeologist on site during the Early Works period to (i) train the banksmen to the Chance Finds Procedure, (ii) intervene when/if chance finds are discovered, and apply/report the Chance Finds Procedure.

4.3.2 Equipment

[CC- 28] The Environmental Department of the EPC Contractor will be allocated the necessary resources to operate independently: transportation, full computer facilities, field equipment.

[CC- 29] The EPC Contractor will mobilize on site the required field equipment for water, air and noise monitoring. Laboratory equipment on site will provide professional facilities to perform the routine monitoring of at least the following key water parameters: Temperature, pH, dissolved oxygen, EC, total dissolved solids, suspended solids, BOD5 (biochemical oxygen demand), COD (chemical oxygen demand), oil and grease, faecal coliforms, chlorine. All laboratory equipment will comply with the relevant standards of the International Standards Organization (ISO).

4.3.3 Training

[CC- 30] The EPC Contractor will prepare and implement a training programme for its workforce (including subcontractors) and described it in the CC-ESMP. The training activities will be further documented in the monthly ES activity reports.

[CC- 31] Training sessions are two-fold: induction sessions for starting work at the Worksite, and technical training as required in relation to the execution of the works.

[a] Induction sessions are organised for each employee and shall cover as a minimum:

- Rules of procedure
- Safety rules on Worksite
- Protection of areas adjacent to Worksite
- Risks relating to communicable diseases
- Basic health: combating waterborne diseases, improving hygiene
- Emergency response procedures or evacuation
- Relation with the local communities
- Chances find procedure
- Biodiversity awareness program and hunting/fishing ban.

[b] Technical training:

- Training in the skills needed for tasks requiring a work permit
- Training in first aid and transporting the injured
- Ability to drive on rough ground.

[CC- 32] Training for each role will be identified through a comprehensive training and competency / skills matrix covering the training that will be required for each role.

4.3.4 Monitoring & Reporting

[CC- 33] The EPC Contractor will implement environmental monitoring measures consistent with international Best Industry Practices. Environmental parameters to be monitored by the EPC Contractor are water quality, dust emissions and noise levels.

[CC- 34] For water quality, a detailed monitoring program will be implemented to measure the quality of drinking water, effluents from waste water treatment plants and from sediment ponds, and storm water as described in Section 4.6 C.

[CC- 35] Weekly reports will be prepared and submitted by the EPC Contractor to provide (i) the results of monitoring analysis (drinking water, wastewater, stormwater, discharge from sedimentation ponds, air quality, noise) carried out during the week, and (ii) the status of Non-conformities opened or closed during the week,

[CC- 36] Monthly reports will be prepared and submitted by the EPC Contractor to summarize all Environmental and social initiatives implemented in relation to the execution of the works during the reporting period.

4.4 Air Quality

4.4.1 Planning requirements

[CC- 37] A detailed Air Emissions and Dust Control Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.4. The plan will detail all site-specific measures the EPC Contractor will implement during the construction period to identify and manage and reduce all nuisances caused by air emissions and dust production resulting from the construction activities including from project's traffic along the access roads. The plan will also include specific measures for the reduction of the greenhouse gas emissions in compliance with the Lenders E&S standards and proportionate to the potential impacts referring to greenhouse gas emissions.

[CC- 38] As for all requirements in this Section 4, specifications of this section apply to the EPC Contractor's vehicles and also to its subcontractors and any third parties who may loan vehicles to the Project.

[CC- 39] The equipment, construction methods and transport methods used by the Project will produce atmospheric emissions which are not in excess of the threshold emission values recommended in the Georgian standards and the World Bank Group Environmental, Health, and Safety Guidelines.

4.4.2 Management Actions

[CC- 40] Maintenance records for the fleet of vehicles, machinery and equipment will be documented and available in English.

[CC- 41] The fleet of vehicles or equipment emitting combustion gases will be maintained at the intervals and according to the methods specified by the manufacturer.

[CC- 42] Dust-reduction measures will be implemented on the worksites and along access roads used by project when required.

[CC- 43] On unpaved roads used by the vehicles and machinery of the Project, actions will be taken to abate fugitive dust emissions generated by vehicles or mobile equipment in residential areas and on roads within the Worksite perimeter. The abatement measures will include the regular spray of water or any other non-hazardous dust suppression agents to maintain humidity of the road and the cohesion of fine particles, as well as the reduction of vehicle speed in and near sensitive receptor areas.

[CC- 44] Road sections designated for the application of dust suppression measures and the methods and frequencies programmed will be described in the EPC Contractor's CC-ESMP.

[CC- 45] When storage, transport and handling of bulk materials happen in the open air and are exposed to the wind, the necessary dust abatement measures will be implemented, including one or several of the following techniques: humidification of the surface, covering of the surface, or vegetation of the surface.

[CC- 46] Dust emission will be monitored by the EPC Contractor on a monthly basis within worksite and along sensitive sections of roads.

[CC- 47] Dust emission will be monitored by the EPC Contractor on a monthly basis within worksite and along sensitive sections of roads

4.5 Noise and vibration

4.5.1 Objectives

4.5.2 Planning requirements

[CC- 48] A detailed Noise & Vibration Control Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.5. The plan will describe how the EPC Contractor will minimise and manage noise and vibration impacts during construction.

[CC- 49] The equipment, construction methods and transport methods used by the Project will not generate noise levels in excess of threshold values recommended by the Georgian regulations and the World Bank Group Environmental, Health, and Safety Guidelines.

4.5.3 Management Actions

[CC- 50] An off-Worksite receptor is defined as an offsite area used for nocturnal socioeconomic activities (e.g. accommodation camps, residential areas, hotels, health centres). Unless instructed otherwise by the Owners Engineer, noise generating works (e.g. blasting, quarrying, drilling, hammering) inducing an increase of 3 dB in ambient noise levels at the nearest occupied off-Worksite receptor area are prohibited at night between 6:00pm and 06:00am and in accordance with the World Health Organization guidelines.

[CC- 51] Within the Powerhouse area, where community live close to worksites and access roads, the EPC Contractor studies, proposes, implements, and monitor the efficiency of noise reduction measures to minimize the acoustic nuisances to adjacent households during day and night and ensure compliance with the above limits.

[CC- 52] As part of the studies to be performed within the powerhouse area, the EPC Contractor carried out a detailed noise modelling for the construction phase, which Scope of Work must be approved by the Owners Engineer prior to mobilization of the noise modelling specialists. It will include:

- > A noise baseline survey to determine the current environmental noise levels at the powerhouse, camp and site installations areas and at the nearest offsite receptors - Day and night. Applicable standards are Australian Standards AS 1055: Acoustics - Description and Measurement of Environmental Noise.
- > The description of sources of emissions, receptors and scoped-out effects during construction. Main noise-generating activities/equipment during night and day time must be listed and level of noise emissions must be determined according to the equipment specifications.
- > Mitigations already included in design
- > A noise prediction modelling to determine the propagation of construction noise across the proposed development site, and predict the ambient daytime and night-time noise levels at the facades of the nearest offsite receptors/dwellings based on the measurement data taken at site.
- > Additional mitigation measures and assessment of mitigated effects
- > Maps illustrating baseline, predicted noise levels at nearest receptors with and without additional mitigation measures.
- > Methods statement to detail-designed and implement the proposed additional mitigation measures for day and night time.

[CC- 53] The baseline monitoring carried out by the EPC Contractor is only for the purpose of informing the noise modelling study and the design of mitigation measures.

[CC- 54] If and when required by the Owners Engineer, provide all details on noise-generating equipment and facilities planned to be used or installed in the powerhouse area during the construction period and the operation phase. For the construction period, this includes plants, equipment, trucks and facilities to be used at the construction camp, site installations, spoil disposal areas, borrow areas, or along the access road, within the powerhouse, GIS yard and penstock area.

[CC- 55] Within the Powerhouse area, where community live close to worksites and access roads, the Contractor studies, proposes, implements, and monitor the efficiency of, all reasonable and practicable measures to minimize noise resulting from the activity and to minimize the acoustic nuisances to adjacent households during day and night and ensure compliance with the above limits.

[CC- 56] Worksite noise levels will comply with international health & safety norms and standards (OHSAS, World Bank EHS Guidelines) and will under no circumstances expose workers to intensities higher than 80 dBA without certified ear protection.

4.6 Effluent Management

4.6.1 Planning requirements

[CC- 57] Effluents consist of liquid discharges from Worksite, transporting a pollutant (dissolved, colloidal or particles). A detailed Effluent Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.6. The plan will detail all site-specific measures the EPC Contractor will implement during the construction period to identify, drain and treat all effluents generated on site from the construction activities.

[CC- 58] No effluent will be discharged by the construction activities into water courses, soils or natural water bodies without prior treatment and without monitoring of the treatment's performance to guarantee the absence of pollution.

[CC- 59] A pollutant is a given chemical compound that is at a concentration that is greater than the limit values recognised for that compound according to the applicable Georgian applicable regulations or the World Bank EHS guidelines, whichever is the strictest. If no recognised threshold exists, the EPC Contractor will provide proof that the charges are harmless.

4.6.2 Management Actions

A. Focus on prevention

[CC- 60] Initial management will focus on pollution prevention first as there will be chemicals used on site in various applications the chemical make-up of which will not be identifiable by the on-site laboratory tests. For all activities involving chemicals on site, a source - pathway - receptor assessment will be carried out and documented and measures identified to prevent chemicals entering the pathway at source. Measures also need to be defined within the assessment to detail the actions to be followed in the event that chemicals do end up in the pathway such that discharge to source is avoided.

B. Wastewaters from camps

[CC- 61] Grey and black waters from worker camps as well as grey water from canteens will be collected and directed to wastewater treatment units appropriately sized according to the population serviced.

[CC- 62] Regular maintenance of the wastewater treatment facilities will be performed in accordance with manufacturer's instructions in order to ensure permanently the efficiency of the treatment and the

compliance with applicable quality standards.

[CC- 63] Sludge resulting from wastewater treatment facilities maintenance will be deposited in dedicated open ditches, located within the landfill premises, where it will be stabilized with quicklime before being recovered by soil. Septic sludge shall never be discharged into the domestic landfill cell.

C. Runoff from technical installations

[CC- 64] Run off consists of the rainwater flow or from the washing waters on the surface or the soil and other technical surfaces at Worksites. Run-off will be considered as an effluent unless demonstrated otherwise by the EPC Contractor (i.e. absence of polluting charge).

[CC- 65] All platforms where generators, hydrocarbon storage tanks and refuelling stations are installed will have impervious surfaces with secondary containment and will be drained and equipped to an oil separator unit or similar treatment facility.

[CC- 66] Runoff from workshops, parking areas and garages will also be drained and equipped with an oil removal treatment or similar treatment facility to prevent pollution.

[CC- 67] Effluent from batching activities and cleaning of concrete trucks shall be collected in sedimentation ponds and treated in line with international good practice. This treatment will be subject to detailed study submitted to the Owners Engineer for approval prior to start of the batching plant operation, in advance enough to allow mobilization of the appropriate treatment equipment.

[CC- 68] Sludge resulting from the maintenance of oil separators and batching plant settling ponds will be considered as a hazardous waste and disposed of as such.

[CC- 69] The following measures will be taken for addressing treatment of water ingress into the tunnels:

- The expected volume of water ingress into the tunnels will be calculated prior to the layout of construction sites being defined;
- Tunnel water settlement ponds will be conservatively sized taking that calculation and best practice guidance on settlement pond sizing into account
- Mitigation to avoid cement contamination of tunnel waters will be defined and included in the CC-ESMP
- Mitigation to treat any tunnel waters contaminated with cement (including shotcrete) will be defined and approved prior to any tunnelling works commencing. This may require considering the ability to discharge contaminated waters to land.

D. Water Quality Monitoring

[CC- 70] All sources of effluents and outlets in the natural environment will be listed, located and characterized by the EPC Contractor, worksite by worksite.

[CC- 71] Monitoring of the effluent quality will be implemented as described below. The EPC Contractor will indicate the location of sampling stations, the frequency of analysis performed and parameters controlled, the analytical methods used for the control of each parameter and the proposed structure of the database for water monitoring results. At a minimum, the sampling stations will include the effluent stream prior to discharge, then at 5 and 10 m down the river or the stream to check for dilution effects. River water prior to discharge will also be tested to understand what extent discharges are effecting river water quality.

[CC- 72] The effluent monitoring will be carried out using equipment that complies with the relevant standards of the International Standards Organization (ISO).

The effluent quality monitoring will target the following operations and facilities:

- Treated effluent from wastewater treatment plants (main treatment plant, septic tanks);

- Tunnel waters
- Sedimentation ponds related to (i) batching plants activities; (ii) crusher plant.
- Sedimentation ponds related to storm water at sites considered particularly sensitive;
- Drainage water from workshop sites, hazardous products storage sites, and food preparation/ consumption areas;
- River work sites, with monitoring of the solids content of water upstream and downstream of the works;
- Monitoring wells drilled for landfill control.

[CC- 73] The physical and chemical parameters of the effluent that are monitored will be those that are listed in the Georgian environmental regulations, or if these do not exist, the parameters are based on the recommendations of the World Bank Group EHS guidelines.

[CC- 74] As a minimum, the following effluent quality indicators will be monitored.

- Organic pollution: BOD₅, nitrates, phosphates, particularly for effluents from living areas and sanitation systems.
- Oils and grease, particularly for drainage water from mechanical activities, hazardous products storage (hydrocarbons), and wastewater from food preparation/consumption areas.
- Suspended matter, in drainage water from anti-erosion activity areas and sedimentation ponds.
- Suspended matter and pH at the outlet of batching area sedimentation ponds.
- Bacterial pollution: Presence of faecal and total coliform in drinking water storage and distribution network.
- Groundwater pollution in relation to landfill sites: BOD₅, COD, ammoniac nitrogen, nitrates, chlorine, zinc, chromium, lead, mercury;
- For all samples, the following parameters shall be measured in situ: temperature, pH, Electrical conductivity, turbidity, dissolved oxygen.

[CC- 75] Effluent quality monitoring will be performed according a variable frequency from weekly to monthly, depending on sites, activities involved and sensitivity.

[CC- 76] An effluent quality monitoring report will be prepared on a monthly basis, including documentation for the following for each effluent discharge point: (i) average flow rates of discharged effluents, (ii) discharge frequencies and durations over the month, and (iii) the physical and chemical quality of the effluent discharged, for the conformity parameters listed in [CC- 74].

4.7 Waste management

4.7.1 Planning requirements

[CC- 77] A detailed Waste Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.7. The plan will detail all site-specific measures the EPC Contractor will implement during the construction phase to identify, collect, transport and treat all waste produced on the Worksites by its personnel.

[CC- 78] The EPC Contractor will be responsible for identifying, collecting, transporting and treating all waste produced on the Worksites by its personnel, subcontractors, representatives of JSCNH, and visitors to the Worksites.

4.7.2 Management Actions

A. General practices

[CC- 79] Selected suppliers will have a voluntary and documented policy to reduce the volume and weight of packaging, and to select recyclable or biodegradable packaging.

[CC- 80] A waste register will be established and maintained. This register will record all waste management operations: production, collection, temporary storage, transport, treatment. The following aspects are documented in this register: (i) Type of waste, using the nomenclature specified in the EPC Contract, (ii) Waste quantities, (iii) Name and address of the third party waste management facilities receiving waste or parties taking possession of the substances no longer considered as waste; (iv) Name and address of waste transport contractors; (v) Planned waste treatment.

[CC- 81] The waste register will be established and available as of the Contractors mobilisation to the Worksite. This register will be archived for at least 1 year after the provisional acceptance of the works.

[CC- 82] Specific waste management practices adapted to the level of danger for human health or the natural environment are implemented. Three waste categories are identified for Worksites and in tracking documents: (i) Hazardous waste, (ii) Non-hazardous waste, (iii) Inert waste.

[CC- 83] Local recycling or re-use options for the non-hazardous and inert wastes will be determined by the availability of local services and if confirmed will be effectively implemented.

[CC- 84] A registered company will be contracted for the collection and the recycling of recyclable materials. Recyclable wastes will be removed from their temporary storage location on a regular basis, not less frequently than every two months.

[CC- 85] Waste will be categorised and stored separately prior to removal from the Worksites, depending on the level of danger, phase (liquid, solid or gas), the waste management solution to be applied and its potential in terms of recycling or reuse.

[CC- 86] Waste will be collected from each Worksite at the same rate that it is produced and is placed in temporary locations meeting the following criteria: (i) Located at a distance of over 100 m from any natural sensitive area and over 500 m from any socioeconomic sensitive area, (ii) Located on a flat impervious surface to prevent infiltrations, (iii) Under cover for non-inert waste, (iv) Stored in containers of the appropriate size, tightness and level of resistance depending on the danger and phase (solid, liquid, gas) of the waste. (v) Liquid wastes storage is equipped with secondary retention with a volume at least equal to the volume of the waste contained in the containers. Should the first criteria (distance to socio-economic areas) be not possible given proximity to receptors to the work sites, then alternative solution will need to be identified and approved by the Owners Engineer prior to execution.

[CC- 87] Duration of storage in temporary location (time between two collects) is logged into the waste register for each temporary waste storage locations.

[CC- 88] Waste will be removed from Worksites and transported to recycling, treatment or waste management facilities on a regular basis. The frequency of removal will guarantee a) No overflow from containers, b) No unpleasant odour or emissions which are dangerous for human health, c) No proliferation of insects, rodents, dogs or other animals which are harmful or dangerous for human health, and d) Regular cleaning of containers and surfaces on which they are located.

[CC- 89] Waste incineration will be prohibited on Worksites. Two exceptions are medical waste and green waste.

[CC- 90] The use of third party waste management services will be subject to a documented prior audit of the treatment, storage and recycling facilities, to guarantee the conformity with the provisions of the present Management Actions.

[CC- 91] The present Management Actions will also apply to any third part waste management contractors. JSCNH will inspect third party waste management facilities and prohibit the EPC Contractor from using the facilities if considered unacceptable.

B. Non-hazardous waste management

[CC- 92] Non-hazardous waste may be either disposed of in municipal landfill or the EPC Contractor may develop its own land fill sites, subject to approval by the Georgian authorities. If the EPC Contractor uses

municipal landfill, this landfill will be subject to a documented audit which demonstrates that the quantity and type of wastes brought by the EPC Contractor does not raise an incremental risk for the environment and community which cannot be handled by the present management of the municipal landfill. If the project develops its own landfill then the following specifications apply.

[CC- 93] Non contaminated inert waste will be removed and can be disposed of to landfill with unused backfill material. The location, capacity and environmental protection measures, particularly for water courses will comply with the provisions of Section 4.9.

[CC- 94] Non-hazardous waste that cannot be recycled will be disposed of to landfill. The landfill will comply with the following criteria: The bottom of the landfill is not closer than 2 metres from the highest seasonal level of the water table; fully fenced and its access controlled on a 24/7 basis; Walls and base of landfill cells are made impervious; Drained for the recovery of leachates; Leachates are treated prior to release in the environment; Treated leachate BOD5 shall not be higher than 50 mg/l; Each landfill cell is surrounded by an external peripheral drainage to minimize drainage water inflow; Regularly compacted and covered by soil to limit odours and the proliferation of insects and rodents.

[CC- 95] When a landfill cell has reached full capacity, vents are installed to evacuate gases, and the landfill covered by a geo-membrane with a minimum thickness of 1 mm, or a 30cm layer of compacted clay, and a top layer of 1.5 m of topsoil, which is revegetated.

[CC- 96] At least two piezometers joining the underlying aquifer are installed by the Contractor, one upstream of the landfill and the second downstream, assuming the general direction of the underground water flow. These piezometers allow regular monitoring of the water table depth next to the landfill and regular sampling of underground water for quality analysis and detection of any pollution from the landfill, should it happen.

[CC- 97] The facility is sized to accommodate the domestic waste production during the construction period as well as the waste production of the Operator's housing during the first 5 years of operation of the Project.

C. Hazardous waste management

[CC- 98] Hazardous waste will be managed by a specialised waste subcontractor, accredited in Georgia for this activity.

[CC- 99] In the absence of such an accredited company, medical waste will be incinerated in a specific facility constructed and accredited for this purpose. Alternatively, an agreement with the nearest hospital facility equipped with an operational incinerator compliant with international standards (furnace temperature of at least 700°C).

[CC- 100] Used oil, hydrocarbons, lubricants, paints, solvents and batteries will be transported in drums to Tbilisi, or any other city where suitable waste management facilities are available. Sludge from settling tanks/ponds, septic tanks or oily water skimmers will also be managed in the same way.

[CC- 101] Contaminated soils from construction/demolition and drilling muds will be treated, stabilised and disposed of in the landfill. Authorisation from the competent local authorities will be obtained prior to any disposal to landfill.

[CC- 102] Documentation on hazardous waste landfilled at other sites than those accredited third party waste management facilities will be provided prior to the end of the construction works. The documentation will include a plan showing the location of landfill sites. The document is provided to the competent local authorities whose jurisdiction covers the landfill sites.

4.8 Handling and storage of hazardous substance

4.8.1 Planning requirements

[CC- 103] A detailed Hazardous Substance Handling and Storage Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present section 4.8. The plan will detail all site-specific measures the Contractor will implement during the construction phase to identify and manage hazardous substances planned for use on the Worksite.

[CC- 104] A substance is considered dangerous if one or several of its properties render it hazardous, as defined in the EPC Contractor (e.g. Explosive, Inflammable, Irritant, Toxic, Corrosive, React with water, Dangerous for the environment). The EPC Contractor will be responsible for identifying and managing hazardous substances planned for use on the Worksite in the manner described in the management actions listed in the next section.

4.8.2 Management Actions

A. Transport and handling

[CC- 105] The transport to the Worksite and use of hazardous substances requires prior authorisation from JSCNH.

[CC- 106] All necessary authorisations and/or licenses for the storage and use of hazardous substances are obtained from local authorities.

[CC- 107] For each hazardous substance used, the handling and management recommendations described (i) in the Material Safety Data Sheets (MSDS), and (ii) by the Globally Harmonized System of Classification and Labelling of Chemicals established by the United Nations for hazardous chemicals, will be complied with.

[CC- 108] All handling or transferring of hazardous substances is to be performed on impervious surfaces equipped with spill retention.

[CC- 109] Copies of MSDSs are kept on the Worksite, and made available to personnel.

B. Storage of hazardous substances

[CC- 110] Storage area will be designed and equipped based on the chemical and physical properties of the products, and based on the types of containers stored, the number of people requiring access, and the quantities of the substance used. The size of areas allocated for storage will be calculated based on the volume of the hazardous material that will be on site during peak construction for the relevant activity.

[CC- 111] The storage and management of hazardous waste will be planned and executed as required in Section 4.7.

[CC- 112] Access to storage areas is limited to trained and authorised individuals equipped with the appropriate personal protective equipment.

[CC- 113] An inventory is maintained up to date and all in/out movements of hazardous product are registered.

[CC- 114] MSDSs must be available for all stored hazardous substances and the substances must be clearly labelled.

[CC- 115] A strict and methodical storage system will be implemented, such as storage plan posted, large or heavy packaging may not be stored at heights, equipment and tools may not be stored in the

hazardous substance storage room.
[CC- 116] Compliance with product expiry dates and implementation of a disposal procedure for substances which are not needed or which have expired
[CC- 117] Entrances, exits and access to emergency equipment are kept clear at all times.
[CC- 118] Storage areas for hazardous substances are clearly identified with warning signs at the entrance. A storage plan is displayed and visible by all (location of the different products, maximum inventory). A summary of labelling system and information on chemical incompatibilities in both English and Georgian languages is available.
[CC- 119] Chemicals which could react together are physically separated (i.e. leading to explosions, fire, projections or the emission of dangerous gases).
[CC- 120] Products that react violently with water are stored so as to prevent contact with water, even in the event of flooding.
[CC- 121] Inflammable products will be stored separately in a dedicated area with adequate ventilation.
[CC- 122] Buildings used to store large quantities of hazardous substances are isolated from other buildings to avoid the spreading of fire. Such buildings are constructed using solid and non-combustible building materials, and are equipped with evacuation systems and the appropriate firefighting equipment. Access to the buildings is clear, allowing for rapid evacuation in the event of an accident. The electrical systems are reduced to the essential minimum, and access points are equipped with adequate lighting (300 lux).
[CC- 123] All storage areas for hazardous substances are equipped with secondary retentions to retain any spill or leakage from one of the containers stored. The secondary retention volume is defined as a minimum of 110% of the volume of the largest container stored on the site taking into consideration the volume occupied by the stored containers. Secondary containment bunds are to be maintained empty of rainwater.
[CC- 124] Tanks are to be equipped with level detectors and safety systems to prevent overfilling.
[CC- 125] Suitable absorbents (neutralising and non-combustible) are available in the storage area to clean up any spills and leaks. Polluted soils are to be removed and managed as hazardous waste.
[CC- 126] The Contractor maintains the storage area at a suitable temperature for hazardous substances to prevent overpressure and bursting of containers.
[CC- 127] Runoff from worksite areas where hazardous materials are stored or handled is to be collected and routed to an oil-water separator for separation of hydrocarbons before discharge of runoff to the natural environment.

C. Refuelling

[CC- 128] Refuelling of project vehicles and plants are made on dedicated refuelling stations equipped with impervious platforms as required in Section 4.4.
[CC- 129] Refuelling on worksite outside the dedicated refuelling stations is not authorized unless authorized otherwise by JSCNH.
[CC- 130] If authorized, refuelling of machinery on worksite will be performed using a dedicated equipment to minimize risks of leakage and soil contamination. Portable retention equipment will be used systematically to collect any accidental spill.

D. Spill contingency Planning

[CC- 131] Spills of hazardous substance cannot be entirely prevented; however, the impacts of spills can be minimized by establishing a predetermined line of response and action plan. The remote location of the Nenskra Hydropower Project and the environmental sensitivity of the river systems require a good spill contingency planning from the EPC Contractor.

[CC- 132] Prior to mobilization on site, the EPC Contractor will prepare, submit and implement a Spill Contingency Plan demonstrating its capability and state of readiness of responding and taking appropriate action in the event of a spill of hazardous substance.

[CC- 133] The content of the Spill Contingency Plan is based on the following structure:

- > Introduction and Project Details: Last revisions to spill contingency plan, Distribution list, Purpose and scope
- > Hazardous materials on-site: amount normally stored and storage capacity, types and number of storage containers, storage location, MSDS's for each material, Existing preventative measures e.g. secondary containment, fuel handling.
- > Flow chart of response organization.
- > Action Plan: Potential spill sizes and sources for each hazardous material on site; Potential environmental or social impacts of spill (include worst case scenario); Procedures (include alternative action in case of impeding environmental conditions):
 - Procedures for initial actions,
 - Spill reporting procedures,
 - Procedures for containing and controlling the spill e.g. on land, water, snow, ice, etc.,
 - Procedures for transferring, storing, and managing spill-related wastes,
 - Procedures for restoring affected areas.
- > Resources available for responding to spills: On-site resources e.g. spill kits, booms, sorbent materials, earth moving equipment; and Off-site resources e.g. contact numbers for deployment and time estimate.
- > Training Program: Outline of training program; and Training schedule and record keeping.

[CC- 134] The locations of spill response kits are identified in the Site Environmental Protection Plans (see § [CC- 3] based on the locations of potentially polluting works).

4.9 Erosion, soil & vegetation

4.9.1 Planning requirements

[CC- 135] A detailed Erosion, Soil & Vegetation Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.9. The plan will detail all site-specific measures the EPC Contractor will implement during the construction phase to minimize vegetation clearing and prevent an increase in sediment loads being exported from the site.

[CC- 136] The EPC Contractor will be responsible for planning earthworks and optimising the management of space to ensure that all cleared surfaces and areas exposed to soil erosion are minimised on all Worksites.

[CC- 137] Unless instructed otherwise by the Owners Engineer, side casting of material excavated for the construction of linear facilities or working platforms (e.g. road, tunnel, supply line) is not permitted on the adjacent slopes of the worksites.

4.9.2 Management Actions

A. Vegetation clearing

[CC- 138] Habitat loss areas will be mapped and surveyed prior to loss to inform the Revegetation activities required as part of the Site decommissioning and Rehabilitation activities for the temporary facilities (see Section 4.14).

[CC- 139] A Vegetation Clearing and Debris Management Plan will be prepared and implemented by the EPC Contractor based on the provisions of the present management actions prior to the start of main construction.

[CC- 140] The Vegetation Clearing and Debris Management Plan will provide an overview of clearing activities on each of the clearing sites, including: dam site, reservoir, quarries, powerhouse and serpentine road, Nakra intake, access roads, power supply lines. For each of the clearing sites, the plan will describe: (i) areas to be cleared in hectare, with details on area where stumps are removed and area where stumps are retained, (ii) volumes to be cleared in cubic meters, with breakdown of commercial timber to be handed over to forest authorities and non-commercial wood to be stockpiled separately (branches, tree tops, bark, foliage, stumps, roots, undersized trees, rotten and broken trees, waterborne woody debris and ground vegetation and branch), (iii) clearing schedule taking into account constraints on bird nesting period, (iv) vegetation inventory and mapping, (v) methods of clearing, (vi) Wood Utilization and Disposal, with breakdown on commercial and non-commercial wood, (vii) Management of waterborne woody debris entering in the Nenskra reservoir during the reservoir filling period (estimates of volumes, approach for collection, evacuation and disposal).

[CC- 141] The Vegetation Clearing and Debris Management Plan will also describe the measures taken by the EPC Contractor to re-use the rapidly-degradable biomass, non-commercial non-rapidly biomass and top soil extracted within the Nenskra reservoir area for rehabilitation of construction sites located outside the reservoir area (e.g. mulching).

[CC- 142] The Employer is to execute inventory of forest habitat loss within the reservoir, prior to start of the clearing activities, in order to achieve its commitment in terms of Reforestation Management. As a result, the EPC Contractor will coordinate with the Employer and ensure that the programme of work is compatible with the Employer's own plan to survey the reservoir.

[CC- 143] Vegetation clearing using chemicals will not be permitted.

[CC- 144] Bird nest surveys will be conducted on site by a bird biologist to determine (i) Low Risk Nesting Periods when restrictions would not normally apply. Where ground conditions permit, development activities will be planned within these timeframes, (ii) Cautionary bird nesting periods during which clearing activities should be avoided unless a suitably qualified ornithologist has certified the tree nest free first.

[CC- 145] Avoidance of cautionary bird nesting period for all tree and scrub vegetation clearing works unless a suitably qualified ornithologist has certified the tree nest free first.

[CC- 146] If bat roost is suspected to be in a felled tree, it is to be left in situ overnight.

[CC- 147] Vegetation clearing using bulldozer will not be permitted in zones less than 30 m from areas designated as sensitive by JSCNH, where only manual clearing is authorised.

[CC- 148] As a rule, burning the vegetation will be the last option to manage the green waste. It will only be authorized by JSCNH if the environmental benefit of that solution can be demonstrated (e.g. water quality or GHG emissions in the reservoir, lack of disposal areas in the immediate vicinities).

[CC- 149] Areas cleared prior to undertaking earthworks will be shown on a plan with a minimum scale of 1/10,000 before the start of the vegetation clearing works.

[CC- 150] Areas to be cleared will be physically demarcated using a method approved by JSCNH.

[CC- 151] The characteristics of trees to be retained (not cut down) will be defined by JSCNH (location,

species, diameter at breast height) - Such trees will be marked with paint and protected against clearing machinery.

[CC- 152] Vegetation clearing will be undertaken without damage to adjacent non-cleared areas. Topsoil will be stored within the cleared areas at the edge of the cleared zone. Clearing will be undertaken working from the edge of the zone inwards.

[CC- 153] During vegetation clearing, (i) the tree trunks with a diameter at breast height greater than the size defined by JSCNH and (ii) the trunks with a smaller diameter, branches, leaves, stumps and roots, will be stockpiled separately.

B. Topsoil

[CC- 154] After vegetation clearing, all topsoil (top 10 centimetres) from temporary or permanent worksite will be removed and safely stored separately from other excavation spoil.

[CC- 155] Topsoil will be safely stored in dedicated areas, separated from other spoil disposal areas and will be clearly indicated on site by appropriate signs. The height of topsoil stockpiles will be limited to 3 m.

[CC- 156] Topsoil stockpiles will be deep ripped to provide for moisture retention and re-growth. Drainage and erosion from the stockpiles will be controlled by locating them in areas away from surface runoff.

C. Storm water drainage

[CC- 157] The gradient of Worksites will allow the collection and drainage of rainwater from the entire surface area to one or several discharge points. No pools of water due to bad runoff drainage will be tolerated.

[CC- 158] Drainage network will be inspected regularly against damage caused by scouring, sediment deposit, channel obstruction and loss of vegetation cover.

[CC- 159] Suspended solids in rainwater will be removed using sediment traps or settling ponds. Rainwater from vehicle parking areas, machinery areas, workshops will be subject to treatment with oil separators.

D. Sedimentation ponds

[CC- 160] Sediments ponds will be sized, cleaned, maintained and accessible to ensure compliance with the effluent quality criteria defined in Section 4.6 and to allow monitoring of performance.

[CC- 161] Sedimentation ponds will be designed in order to ensure compliance with Georgian standards for Total Suspended Solids loads in discharges, or 80% abatement in sediment load after 24 hours residence time, whichever is the most stringent. Should the sediment be too fine to satisfy this obligation, other alternatives will be proposed such as flocculants.

[CC- 162] Sedimentation ponds shall be accessible anytime to heavy equipment in order to allow for regular maintenance dredging; deposition trenches must be kept opened next to the pond to allow the dredged sediment to dry out before being removed to final disposal area.

[CC- 163] Sedimentation ponds shall be dredged to as soon as 50% of the maximum water volume is occupied by sediments. Water depth of the ponds shall be monitored and documented on a daily basis to carry out maintenance dredging at the right time.

[CC- 164] Discharge of stormwater from a worksite into a watercourse will comply with Georgian standards for Total Suspended Solids loads in discharges, or not increase the solids content of the watercourse by more than 50%, measured as the difference between water sampled 50 metres upstream of the discharge point and water sampled 50 metres downstream of the discharge, whichever is the most stringent. Efficiency of the sedimentation ponds collecting drainage water from stormwater

will be monitored and documented through regular water quality monitoring during rain events.

[CC- 165] Efficiency of the sedimentation ponds collecting drainage water from tunnelling works and excavations will be monitored every two weeks through water quality sampling and analysis of the treated effluent discharged to the environment during the duration of the works. Between two formal water sampling campaigns, the EPC Contractor will perform daily visual inspections in order to detect potential high sediment loads and evidence of shotcrete contamination in the treated effluent.

E. Silt fences: Erosion control on slopes exposed to sheet erosion

[CC- 166] Silt fences will be installed to slow the flow of water and control sediment transport at Worksites with (i) a gradient of more than 20%, and (ii) where land is disturbed by the works and exposed to sheet erosion.

[CC- 167] Silt fences will be installed on the slope or at the base of the slope to protect the natural drainage system from sediment accumulation at levels higher than the natural situation. They will be installed following contour lines, deployed before the start of works and removal of topsoil. The surface area drained by the silt fence will not exceed 1,000 m² per 30 m of barrier.

F. Erosion control on steep slopes exposed to gully erosion

[CC- 168] Erosion control on steep slopes subject to gully erosion will be carried out by appropriate erosion control good practices. This issue is frequently observed along slopes of major excavations or spoil areas. These measures rely on (i) storm water control design (peripheral drainage), (ii) design of the slope (including berms), (iii) run-off control by revegetation and (iv) stabilisation of sensitive areas by engineering methods.

G. In-river works

[CC- 169]. In-river construction works will be planned in order to avoid major discharge of sediments or pollution in the river stream.

[CC- 170]. The EPC Contractor will detail its methodology regarding sedimentation control in the Site Environmental Protection Plan for (i) river diversion works (Nenskra and Nakra), (ii) dam site and cofferdam construction, (iii) and the tailrace channel at the Powerhouse.

4.10 Materials Management and Spoil disposal

4.10.1 Planning requirements

A. Materials Management Plan

[CC- 171] The EPC Contractor prepares and submits a Materials Management Plan that documents how excavated soils and materials are to be handled.

[CC- 172] The Materials Management Plan, subject to formal amendments, must be implemented throughout the execution of the Project.

[CC- 173] The Materials Management Plan must be prepared and submitted prior to movement of excavated soils and materials, and provides the following information:

- > Details of EPC Contractor organization - including subcontractors - involved with implementation of the Materials Management Plan.
- > Description of the excavated materials in terms of potential reuses and relative quantities involved by categories of materials, with a breakdown for each site.
- > Specification for use of materials against which proposed materials will be assessed based on an appropriate risk evaluation or risk assessment at the place excavated materials will be used.
- > Where and, if appropriate, how excavated materials will be stored or temporarily stockpiled for reuse.

- > The intended final destination and reuse of excavated soils and materials, with clear distinction between (i) excavated soil and materials reused for construction purposes and (ii) excavated soils and material that is surplus to requirements or unsuitable for reuse in fill and embankments.
- > How excavated soils and materials are to be tracked to monitor materials movements, including include transfer of loads on site into stockpiles awaiting use (as appropriate) and final placement.
- > The contingency arrangements that must be put in place.

[CC- 174] The EPC Contractor attaches to Materials Management Plan:

- > a Materials Flow Chart showing the origin and final destination of materials (top soil, sand, aggregates, rocks, quarry run, spoil) used or generated during the construction period and covering all worksites. Consolidation/compaction must be considered in the mass balance calculations.
- > A location plan for the sites and a plan of the sites which identifies where different materials are to be excavated from, stockpile locations (if applicable), where materials are to be treated (if applicable) and where materials are to be reused.
- > A schematic of proposed materials movement and an estimate of the project traffic generated by the movements from source to destination, during daily and night time.

[CC- 175] The Materials Flow Chart highlights what are the quantities of top soil required for the reinstatement of temporary facilities at end of the construction period, and from what site this top soil will be taken for the reinstatement work.

[CC- 176] Shortage of top soil must be anticipated for the reinstatement of temporary facilities. The Material Flow Chart will indicate how the top soil and vegetation taken from the reservoir area below full supply level will be re-used to rehabilitate temporary facilities outside of the reservoir area as specified in [CC- 141].

B. Spoil Disposal Management Plan

[CC- 177] Spoil is defined as any earthen material that is surplus to requirements or unsuitable for reuse in fill and embankments (such as unsuitable rock and soil material) or material that represents a geochemistry hazard.

[CC- 178] A detailed Spoil Disposal Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.10. The plan will detail all site-specific measures the EPC Contractor will implement during the construction period to minimize the footprint, adverse socio-economic impacts and ecological effects, and to ensure long-term stability and control erosion while stockpiling the material excavated from all construction sites.

[CC- 179] The detailed Spoils Disposal Management Plan will be prepared and implemented for each of the three main worksites (Dam, Powerhouse/Penstock/TBM Adit, Nakra Intake). It will include the following information:

- > Spoil types
- > Spoil strategy to (i) minimize the amount of spoil generated, (ii) maximise the beneficial reuse of spoil on-site and off-site based on its classification, and (ii) manage the excavation, storage, transport reuse and disposal of spoil to minimise impacts and meet other environmental or social requirements.
- > Spoil generating activities
- > Volumes and sources of spoil per worksite
- > Spoil classification, e.g. Virgin Excavated Natural Material, Inert fill, Potentially contaminated material.
- > Locations of spoil disposal and off-site storage / re-use sites
- > Transportation of spoil
- > Storage of spoil
- > Potential Environmental & Social adverse impacts
- > Management measures and mitigation strategies
- > Long-term maintenance requirements.

[CC- 180] For each proposed Spoil Disposal Area, the EPC Contractor will perform the required site

investigations and engineering studies demonstrating:

- > Mass stability and prevention of mass movement during and after construction
- > Drainage control to ensure safe transfer of flood waters
- > Maintaining of river or streams flood capacity.

[CC- 181] While planning the transportation of spoil, the EPC Contractor will comply with the restrictions of night traffic specified in 4.13.

[CC- 182] The Spoil Disposal Area design must be in accordance with Georgian requirements and approval from the government must be received prior to start of disposal activities.

[CC- 183] Pursuant to clause 4.2, the spoil disposal areas at the powerhouse requires an environmental and social assessment which covers an appropriate environmental & social analysis of technical alternatives prior to approval of proposed basic design.

[CC- 184] With regards the future selection of the powerhouse spoil disposal areas, the site selection strategy needs to make it clear that environmental receptors, including in particular terrestrial and aquatic ecology, will be included within an assessment of impacts of each site and appropriate mitigation proposed. As a principle, the CC-ESMP provisions will apply, however if additional mitigation is identified this will be reflected in an updated Spoil Disposal Management Plan for the powerhouse area. Ecological surveys of the sites to identify habitats and protected species must be carried out as part of the site selection process.

[CC- 185] The requirements of this Section will also apply to the material excavated for the construction of linear infrastructure (tunnels, access roads, pipelines) which cannot be reused as compacted fill.

[CC- 186] The EPC Contractor will be responsible for planning earthworks and optimising the management of space to ensure that all areas used for stockpiling of excavated material are minimised on all Worksites.

[CC- 187] Soil removal and habitat reinstatement plan for each of the spoil areas will need to align with GoG spoil permit requirements and Lender E&S policies. Separate plans for each area need to be submitted to GoG.

4.10.2 Management Actions

A. General principles

[CC- 188] Material excavated at the dam site, the powerhouse area and the Nakra water intake for the foundation works will be re-used as far as their geotechnical properties allow, as construction material (after screening or for unselected fill material) in order to minimize the volume being disposed of.

[CC- 189] Spoil generated will be classified using recognised guidelines approved by the Owners Engineer and its geotechnical characteristics.

[CC- 190] It is the responsibility of the EPC Contractor to determine if the chemical and geotechnical properties of excavated material meet relevant specifications for future end use such that they do not cause harm to human health or the environment. This includes the effect that the excavated materials may have on the environment where they are to be reused. Biological factors e.g. presence of invasive species or noxious weeds, as well as the effects of any radioactivity should also be considered. Measures based on a suitable risk assessment should be taken such that there is no adverse effect or risk to humans, animals, or ecosystems. This included impacts on water, air, plants or other soils.

[CC- 191] The management of all spoil will be handled in compliance with all local regulatory authority requirements and Lenders E&S standards. The contamination of groundwater will be prevented and considered in executing the works require for spoil disposal. When planning the Material Management Plan and all the related project decisions made regarding the suitability of the reuse of the excavated soils and materials involved, groundwater protection is to be considered at all times.

B. Non-waste spoil

[CC- 192] Subject to the limitations imposed by the Environmental Permit (Tunnelling spoils that cannot be stored in the reservoir area), disused quarry area and borrow areas will be filled in with excavated material in order to minimize the opening of new areas for disposal purposes.

[CC- 193] Management actions relating to preparation works (vegetation clearing, top soil management, site drainage) described in Section 4.9 will be applied for all spoils disposal areas.

[CC- 194] Unless instructed otherwise by the Owners Engineer, to ensure stability and resistance to rainwater runoff erosion, spoils disposal areas will not exceed a height of 6 m, with a maximum slope of 3:2 (H:V). The slope is intercepted at a height of 3 m by a berm at least 2 m wide with a peripheral drainage ditch. For permanent spoils disposal areas, the stockpile is shaped and compacted every 30 cm to ensure long-term stability.

[CC- 195] Should such stable dispositions not be satisfied for any technical reason (for example limited availability of land), the EPC contractor will produce a complete design of the spoil disposal supported by appropriate method statement related to drainage, slope stability, spoils compaction and revegetation.

[CC- 196] The drainage system will be strengthened (rockfill, concrete) at all points where run-off will concentrate and along vertical ditches. Culvert will be designed through spoil disposal areas where necessary; open culverts will be considered where there is a risk of blockage. If closed culverts are used these will be subject to regular maintenance.

[CC- 197] The slopes of any permanent spoil disposal areas will be vegetated in parallel with the progress of the disposal. For example, when constructing the first berm, the slope between ground level and this first berm (+3m) shall be immediately covered by preserved topsoil to favour natural vegetation of the slope.

[CC- 198] Temporary disposal areas in place for more than 60 days will be protected against runoff erosion by (i) revegetation using fast growing grass species, either by direct seeding or by hydro-seeding, or (ii) using other natural anti-erosion cover.

C. Treatment prior to reuse

[CC- 199] Other excavated materials may not have the required characteristics for reuse without first being treated. These excavated soils and materials may require further biological, chemical, physical or combination of these treatments that will need to be carried out. These treatment activities should be technically appropriate and in compliance with any required local regulatory requirements or approvals prior to reuse or final disposal.

[CC- 200] Sludge from sediment ponds needed to treat tunnel waters may fall into this category. These ponds will generate large quantities of very fine sediments which are likely be mixed with concrete waters as the project is using TBM.

D. Spoils with could represent a geochemistry risk

[CC- 201] There is a small possibility that acid sulfate soils may be encountered during tunnelling. The EPC Contractor will plan and execute a procedure to detect and screen tunnelling spoils, the disposal of which could represent an Acid Rock Draining risk or other geochemistry risks for the environment.

[CC- 202] Spoil that represents a geochemistry hazards will be managed and disposed of according to Good Industry Practice to prevent pollution of water resources.

4.11 Quarry and borrow areas management

4.11.1 Planning requirements

[CC- 203] A detailed Quarry and Borrow Areas Management Plan will be prepared and implemented for areas planned to be exploited for rockfill material, aggregates and rip rap material as well as for the other borrow areas (sand, gravel, laterite clay) that details all the environmental and social measures to be implemented for the operation of these sites.

[CC- 204] In order to avoid damages to habitats and reduce landscape effects, the EPC Contractor will make all efforts, and document these efforts, to minimize encroachment of the quarry and borrow areas above the reservoir full supply level.

[CC- 205] The Quarry Management Plan will show (i) the extent to the area to be developed, (ii) the working methods, (iii) access and haulage routes between the quarry/borrow area and the destination for the extracted material, (iv) the quantities of material to be extracted, an estimate of the waste materials to be generated and disposal details for such waste materials, (v) measures to minimize the quarry area and its visual impact on the surrounding area, (vi) measures for the long-term rehabilitation of the quarry and borrow workings, such as re-vegetation, drainage and sloping.

4.11.2 Management Actions

[CC- 206] Management actions applying to all worksites will apply to the quarry area and the borrow areas, e.g. Noise & Vibration control (section 4.5), Effluents management (Section 4.6), Erosion & Vegetation (Section 4.9), Chance finds procedure (Section 4.12), Traffic (Section 4.13) and Site rehabilitation (Section 4.14).

4.12 Chance finds procedure

4.12.1 Objectives

The 2015 ESIA investigations have not identified any physical cultural resources within the worksite. However, chance to find such resource during excavation works still exists.

4.12.2 Planning requirements

[CC- 207] Chance finds is defined as physical cultural heritage encountered unexpectedly during the construction works. A detailed Chance Finds Procedure will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.12.

4.12.3 Management Actions

[CC- 208] The chance finds procedure will include notification of relevant Georgian competent bodies of found objects or sites; alerting project personnel to the possibility of chance finds being discovered; securing the area of finds to avoid any further disturbance or destruction; and reporting to JSCNH.

[CC- 209] Any chance finds will not be disturbed until an assessment by a designated and qualified specialist is made and actions consistent with Georgian legislation are identified.

[CC- 210] The project's workforce will be trained to the chance finds procedure by the Archaeologist to

be mobilised on site during the early-works period (see [CC- 27]). The EPC Contractor defines who will be responsible for monitoring excavations at all sites in order to determine who needs to be trained, and document this measure.

[CC- 211] The ESHS Manager observes all trained staff after the training to ensure that they are applying what they have learnt. A log is kept for all excavations identifying who is performing the archaeological watching brief and signing off that no finds were identified.

4.13 Traffic Management Plan

4.13.1 Planning requirements

[CC- 212] A detailed Traffic Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.13. The plan will (i) define the characteristics of the construction fleet of vehicles and site machinery, (ii) describe the expected Project's traffic (frequency of trips between Worksites, working hours, convoys) and (iii) detail all site-specific measures the EPC Contractor will implement during the construction period to minimize the nuisances to neighbourhood generated by its fleet and reduce the risk of accident.

4.13.2 Management Actions

[CC- 213] Itineraries used by the Project fleet of vehicle and machinery will be mapped for each route from Zugdidi and between the different Worksites.

[CC- 214]. A Swept path analysis is performed and available to demonstrate that the planned itineraries can accommodate the movement of largest and longest vehicles intended to be mobilized by the EPC Contractor, without damages to assets and property, particularly for sites where room for vehicle manoeuvres is limited such as crossing of villages in the Nenskra and the Nakra valleys.

[CC- 215] Administrative authorities of areas crossed by the Project's vehicles will be informed of the itinerary and characteristics (frequency of passing, size and weight of trucks, materials carried) of the construction's fleet of vehicles. Relevant administrative authorisations will be obtained if public roads are used.

[CC- 216] If public roads are used, a bailiff will be mandated to document the state of the road prior to use by the Project's vehicles. For the public roads into the Nenskra and Nakra valleys, buildings close to roads will be subject to dilapidation survey.

[CC- 217] Except for exceptional conditions, heavy vehicles (i.e. with a GVWR of more than 3.5 tons) will not use public roads at night between 22:00 and 06:00. No traffic for all Project's vehicles will be allowed in the villages from 20:00 to 08:00. Project's heavy vehicles (i.e. with a GVWR of more than 3.5 tons) will be forbidden to circulate in the villages at time when pupils go to school or come back from school.

[CC- 218] A procedure will be established to avoid obstruction of local traffic due to project vehicles during normal operations and in case of accident or heavy vehicle breakdown.

[CC- 219] Actions to limit and check the speed of all vehicles and machinery used to execute the works will be implemented, including on-board GPS trackers. Traffic marshals will be affected at key locations in the villages.

[CC- 220] The maximum speed of all machinery and project vehicles will comply with the speed limit defined in Georgia or the following limits, whichever is the lowest: 30 km/h within the Worksites and in villages or hamlets, from 100m before the first house; 50 km/h in towns; 80 km/h on unpaved roads

outside of towns, villages, hamlets and camps.

[CC- 221] In coordination with the competent Georgian authorities, the Contractor provides and installs signs for the fleet of vehicles along public roads used by the Project, when public signs are inadequate.

[CC- 222] Specific traffic safety measures are defined, implemented and documented in areas close to schools.

[CC- 223] The Contractor provides each of its drivers with a map at the appropriate scale of the roads authorised for the execution of the works, clearly indicating the maximum speeds authorised, and ensures their understanding.

[CC- 224] It is strictly prohibited to transport people, equipment or products other than those required for the works and the management of Worksites, on board any of the Contractor's vehicles. This provision also applies to the transport of live animals and meat obtained from hunting, fishing or poaching.

[CC- 225] The trailers and skips used to carry materials which could be projected (sand, crushed material, aggregates, selected materials) are covered with a tarpaulin for the entire itinerary between two Worksites.

[CC- 226] Provisions to avoid drink driving are contained in the Traffic Management Plan and their implementation is controlled and documented on site. Mechanisms to screen drivers are introduced and controls are documented.

[CC- 227] Regular inspections will be carried out along the roads used by the project fleet of vehicles to ensure compliance with the above listed management actions.

[CC- 228] Announcement to community will be made in advance of heavy and wide loads convoys following a procedure (method of information, target groups, timing) to be approved by the Owners Engineer.

4.14 Site Rehabilitation

4.14.1 Planning requirements

[CC- 229] A detailed Site Decommissioning and Rehabilitation Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.14. The plan will detail all site-specific measures the EPC Contractor will implement at the end of the construction period to rehabilitate all temporary areas disturbed by the works.

4.14.2 Management Actions

A. General principles

[CC- 230] All temporary buildings and free standing and underground structures (e.g. piping, underground tanks, sumps and basins) will be removed prior to demobilization of the EPC Contractors.

[CC- 231] After removal of building structures and rubble, Worksites will be returned to their original condition. For that purpose:

- A detailed survey of the site is carried out before any earth works are started. This survey must record all details of the site that will need to be restored, including mapping the areas to be lost and characterising them with a floristic species list with abundances as they will have to be restored post-

construction.

- Worksites will be levelled to ensure that run-off water drains without eroding soil or stagnating in pools, the gradients of restored sites (excluding backfill) being similar to the adjacent undisturbed land.

[CC- 232] Worksites will be rehabilitated so that they represent no hazards for people. Areas near steep drops will be indicated with permanent concrete signs, holes will be refilled, Sharp or unstable items will be rendered inoffensive, operating areas which are easily accessible by the general public will be fenced, and reinforced steel bars which are protruding and no longer needed for construction will be removed.

B. Revegetation

[CC- 233] Revegetation of all Worksites disturbed by the works will be implemented.

[CC- 234] Topsoil set aside during initial earthworks (see Section 4.9) will evenly be spread over areas which have been levelled or where ruts have been cut into compacted areas. The surface of compacted soils on Worksites will be loosened by scouring using rakes or other acceptable methods.

[CC- 235] Topsoil and soft biomass set aside from the reservoir area during initial earthworks (see Section 4.9) will be re-used for rehabilitation of construction sites located outside the reservoir area.

[CC- 236] Revegetation works will be planned in advance to ensure sustainable Worksite rehabilitation: methods, plant species to be used and their origins, activity schedule based on a progressive provisional acceptance of Worksites

[CC- 237] The species used for revegetation will be suitable for the local environmental and climatic conditions, and selected according to the specific rehabilitation programme: stabilisation of backfill, landscaping, drainage, prevention of erosion.

[CC- 238] Depending on the suitability requirements mentioned in [CC- 237], the EPC Contractor would aim to replace removed woodland with similar species of tree, if practicable, but otherwise it would be revegetated suitable for pasture land grass. Land which was not woodland prior to Works the will be revegetated suitable for pasture land grass.

[CC- 239] Stabilization matrix will be installed prior to seeding with pasture species. Hay will be collected and sprayed on ground.

[CC- 240] Species selected for revegetation or replantation will not be classified as invasive species for the local region, in compliance with national invasive species list and species defined in the EU Regulation 1143/2014 on Invasive Alien Species.

[CC- 241] Revegetation will be undertaken throughout the duration of construction works, and will not be limited to the rehabilitation of Worksites at the end of the works.

[CC- 242] The present management actions will also apply to the side casting of spoil materials generated during the excavation works of linear infrastructures (roads, pipelines, tunnels) if side-casting has been authorized by the Owners Engineer as per Clause [CC- 137].

4.15 Protection of adjacent communities and areas

4.15.1 Planning requirements

Protection of adjacent communities and areas will be ensured through the health, safety, and environmental measures specified in the previous sections and further completed by the measures of this section. Likewise, in addition of the planning requirements already described in the previous sections, the EPC Contractor will prepare and implement the following plans.

[CC- 243] Preparation & implementation of a Community Safety Plan, which includes regular community meetings on safety & construction hazards, announcement in advance of heavy construction activities, restriction of access to working sites, access restriction to dam site, awareness campaigns on traffic related risks, including school children.

[CC- 244] As a sub-plan of the Community Safety Plan, the EPC Contractor prepares and implements a Powerhouse and Penstock Area Safety Plan, which examines, includes and map all measures required to avoid accidents to traffic management and vibration hazards. These include:

- > Blasting to be avoided as much as possible (e.g. mechanical excavation instead). If not avoidable, international good practices must be applied (e.g. Adapting the blast plan and drilling pattern, Safety buffer zone, temporary evacuation, warnings, post-inspections, community awareness).
- > Structural assessment of the nearest buildings to verify structural integrity prior to start of the constructions works.
- > Vibration monitoring.
- > Footbridge over the Nenskra River to link the Nenskra River left-bank houses to the right bank.

[CC- 245] Presence of Project workforce could increase communicable diseases. The EPC Contract will prepare and implement a Community Health Plan that rules: (i) the coordination with local health authorities, (ii) community awareness raising campaigns on health issues in both valleys via posters, leaflets, through health clinics, and community meetings, (iii) the monitoring of implementation of workers health specifications by sub-contractors.

[CC- 246] As a sub-plan of the Community Health Plan, the EPC Contractor prepares and implements a Powerhouse and Penstock Area Health Plan, which examines, includes and map all measures required to minimize noise acoustic, light and dust nuisances during night and day. These include:

- > Light pollution: directional floodlights and window curtains installation.
- > Noise acoustic pollution: studies and measures specified in [CC- 51].
- > Dust reduction measures as specified in 4.4.

[CC- 247] The EPC Contractor will select security providers which are ICOCA certified (International Code of Conduct Association).

4.15.2 Management Actions

[CC- 248] As a rule, construction methods and means of protection will be used in order that no adverse effects are incurred on people, people assets, vegetation, soils, groundwater, biodiversity, natural drainage and the water quality in areas adjacent to Worksites for the entire duration of the works.

[CC- 249] Damages to people and property caused by the execution of the works or the procedures used for execution will be documented and compensated in compliance with the applicable Georgian regulation and the Lenders policies. JSCNH will be informed of any damage caused to people, or the property of individuals, within 6 hours of the event, regardless of the value of the prejudice.

[CC- 250] With the exception of access roads, the perimeter of each worksite (or the entire perimeter of land should the worksites being adjacent) will be physically demarcated with a fence. For Worksites with a surface area of more than 4 hectares, the perimeter will be physically demarcated by a track, road, signs or any other means leaving no possible ambiguity as to the location of the Worksite perimeter.

[CC- 251] Within the limit of the available space or the definition of the permanent works, worksites will be installed at a distance of at least: a) 50 m from any permanent water course and outside of floodable areas, b) 300 m from sensitive urban services and buildings (health centre, school, water supply for populations), c) 200 m from any housing, and d) 300 m from residential areas in the specific case of work requiring the use of explosives.

[CC- 252] If the footprint of the works is located in the situations b) to d) of above management action [CC- 251], a bailiff will be mobilized to make a sworn statement regarding the existence and conditions of any structure or building situated around the site with a distance specified in paragraph b) to d). The bailiff's sworn statement is prepared prior to the start of the works on the worksite and a copy will be

provided to the building/structure owner or to the representative of the local community if the owner cannot be identified.
[CC- 253] Housing existing before the start of the works, located within a minimum radius of 800 m around the perimeter of the quarry area or within a minimum radius of 500 m around the other Worksites that are subject to blasting, will also be documented by a bailiff.
[CC- 254] Seismic design criteria for buildings and facilities at the dam site, operator's village and powerhouse are adopted in alignment with Georgian seismic construction codes and standards and Good International Practice.
[CC- 255] Include within the Rules of Procedure, a Code of Conduct for setting out the EPC Contractor's values, responsibilities and ethical obligations and for providing employees with guidance for the relations with local communities. The code should include a way for employees to report violations anonymously, and a way for employees to get advice about ethical issues or concern.
[CC- 256] The community awareness raising campaigns on health issues will be implemented either by the medical staff mobilized by the EPC Contractor in camps or by an NGO specialized in Community health awareness, following an approach approved by the Owners Engineer.
[CC- 257] To mitigate the risks on the community members' security and human rights arising from the presence of security personnel, the following measures will be implemented: (i) Security guards will not be armed; (ii) Security guards are trained on human rights, on the Project's goals to establish good relationships with local stakeholders and on the grievance mechanism for communities to voice concerns; (iii) Implement and provide training in the Code of Conduct modules specific to security personnel, which outlines appropriate conduct, engagement and appropriate use of force, ensure that security personnel receive and remain up to date on human rights and cultural sensitivity, as well as the Voluntary Principles on Security and Human Rights ³ ; (iv) Ongoing monitoring of security personnel, and audits of the application of the Voluntary Principles on Security and Human Rights; (v) Coordination with local police forces, to ensure that there no impact on local people security and human rights; and (vi) Implementation of security staffing practices as per arrangements that will be defined with local police forces, including regular reporting.
[CC- 258] Access restrictions and control to working sites and warning signs for local communities, tourists or crossing of herders and herds.
[CC- 259] Control of access newly installed by the EPC Contractor for construction purpose, prevent use of unauthorized vehicles.
[CC- 260] Hunting and fishing will be strictly banned for the Project workforce. The EPC Contractor will prepare, execute and document a Biodiversity Awareness Program for its employees and its subcontractors employees and train its workforce accordingly.
[CC- 261] Excavations and trenches to be fenced or covered when not in use to minimize accidental fall of wild mammals in night-time. Waste management plan to include measures for discouraging access to waste by wild animals.
[CC- 262] Nenskra dam and coffer dam construction methods are adapted to ensure that the minimum ecological flow will be maintained at all times during construction, reservoir filling and commissioning.
[CC- 263] Nakra intake construction methods are adapted to ensure that the minimum ecological flow will be maintained at all times during construction and commissioning.
[CC- 264] Safe access to existing pastures which are away from the construction worksites and which could be blocked by temporary facilities such as construction camp or site installations will be maintained in consultation with the local communities. At the Nakra water intake, it means that a temporary wooden bridge would have to be built and maintained during construction downstream of

³ The Voluntary Principles on Security and Human Rights is a collaborative effort by governments, major multinational extractive companies, and NGOs to provide guidance to companies on tangible steps that they can take to minimize the risk of human rights abuses in communities located near their working sites.
http://www.voluntaryprinciples.org/wp-content/uploads/2013/03/voluntary_principles_english.pdf

the construction site to compensate the loss of the existing wooden bridge.

[CC- 265] Timing of Nakra weir and fish pass construction will take into consideration the migratory periods of river fish. If any works that could block migration are unable to be scheduled outside of the migration season, alternative measures must be identified and implemented to enable passage of fish (e.g. catch and release).

[CC- 266] Applications for water abstraction permits will be made as per the national regulations and documented prior to start of abstraction activities.

[CC- 267] In the event that water does need to be abstracted from the tributaries of the Nenskra River or of the Nakra River during construction, this will be subject to environmental assessment by the EPC Contractor and approval by the Owners Engineer prior to any abstraction.

4.16 Recruitment and Local Labour Management

4.16.1 Planning requirements

[CC- 268] The EPC Contractor develops and implements a Human Resources Policy and labour management principles in alignment with national, Lenders and ILO requirements.

[CC- 269] A detailed Recruitment and Labour Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.16. The plan will detail the manpower needs for the entire construction period, the local recruitment process and the approach planned to maximize local employment and local content opportunities.

[CC- 270] Definitions of skills/semi-skilled/unskilled labour in this document are those of the International Labour Office described in ISCO-08 "Volume I - International Standard Classification of Occupation – Structure, group definitions and correspondence tables" – Definition of the four ISCO Skills levels" with the following correspondence:

- > Unskilled occupations for Nenskra HPP = ISCO Skill Level 1
- > Semi-skilled occupations for Nenskra HPP = ISCO Skill Level 2
- > Skilled occupations for Nenskra HPP = ISCO Skill Level 3 and 4

[CC- 271] To ensure maximum local benefits are achieved through the construction phase, the EPC Contractor and subcontractors will aim at 100% of unskilled workers recruited from the local area (the Nenskra and Nakra valleys) if available. If not available, the recruitment will be extended to the nearest villages in the Mestia Municipality and the Svaneti region as secondary catchment areas.

[CC- 272] The EPC Contractor and subcontractors will aim at 50% of semi-skilled workers are recruited from Mestia Municipality and 75% from Georgia.

[CC- 273] The EPC Contractor and subcontractors will aim at 80% of all recruited workers are from Georgia.

[CC- 274] A Skills Development and Local Procurement Plan is prepared as a sub-plan of the Recruitment and Labour Management Plan. The plan is structured as such:

- > Identification of the Skills and Labour Needs
- > Existing Skills Capacity Gaps and Training Demand Analysis
- > Tailored Skills Development Programmes
- > Local Procurement Opportunities
- > Mapping Local Companies
- > Communicating Local Content
- > Pre-Qualification of Companies
- > Strategies to Encourage Local Companies to Tender

[CC- 275] 24 months before the start of power generation, prepare a Retrenchment/demobilization Plan with the EPC Contractor, to anticipate significant job losses resulting from the Project's transition from construction to operation. The plan will be prepared and implemented in line with national law and good industry practice and based on the principles of non-discrimination, and will reflect the Project's consultation with employees and their organizations, and eventually with the appropriate governmental agencies. This plan should include: (i) the reasons why job losses are necessary, (ii) the timescale and when notice of employment contract end will be given, (iii) what jobs are likely to be maintained during the operation phase and how best employees would be selected for the transition construction-operation, (iv) how broader community impact issues are to be addressed, (v) the consultation process proposed with the workforce and the local authorities.

4.16.2 Management Actions

[CC- 276] Local labour needs will be estimated prior to the start of the main construction works with the following information: Positions that could be filled by local staff and the level of qualification required, Planned procedure for the effective recruitment of these members of staff, Deployment schedule for these positions, Initial training to be provided for each job description.

[CC- 277] A voluntary local recruitment policy for the contractor's personnel involved in the construction activities for the duration of the works will be implemented and controlled by JSCNH.

[CC- 278] The EPC Contract will advertise positions to maximize local recruitment and to demonstrate that no local skills are available despite all efforts made to recruit locally should the above local recruitment target not be achieved.

[CC- 279] A voluntary recruitment policy for women for the contractor's personnel involved in the construction activities for the duration of the works will also be implemented and controlled by JSCNH.

[CC- 280] A training programme aiming to support the voluntary local and women recruitment policies will be implemented.

[CC- 281] Local recruitment at the Worksites, including at the entrance, will be prohibited to limit the influx and settlement of spontaneous population waiting for employment.

[CC- 282] Local recruitment offices will be established in the project-affected villages and in Mestia in order to provide information on job vacancies and lists local job applications.

[CC- 283] Written employment contracts will be established by the EPC Contractors and its subcontractors for all recruitments, including with employees based in the Nenskra and the Nakra valley. Individual records will be established per local employee indicating the worked hours, the type of tasks carried out, and any training provided.

[CC- 284] Collective bargaining: workers will have a right to be part of a union.

[CC- 285] Unless authorized otherwise by the Owners Engineer, all Project's employees not originating from the Nenskra and Nakra valleys will be accommodated in Construction camps.

[CC- 286] Local employees not housed in the camps and living more than 15 minutes' walk from the Worksite and less than one hour by land transport will be provided or enabled access to daily collective transport.

[CC- 287] A Workers Grievance Mechanism is established for the construction period. The mechanism will be explained to workers as part of their formal induction and signage will be placed in communal areas around site providing details of the mechanism and how grievances can be made. A workers representative will be elected and a Workers Safety Committee will be established. The workers will be able to raise their grievance by referring to their elected representative or by filing a form and posting it in the complaint boxes that are disposed in key locations in each construction sites (offices and canteens). All workers grievances will be registered and tracked by the EPC contractor HSE site manager

in a workers grievance database. Workers grievances will then be raised and answered at each Workers Safety Committee meeting. The EPC contractor HSE site manager then transmits the grievance resolution to the workers and documents their resolution and the workers acceptance. This workers grievance mechanism will be monitorable by the Owner's engineers and the Project Company on demand.

[CC- 288] The workers Grievance Mechanism is available to all workers, including those of sub-contractors. The EPC Contractor undertakes and documents information sessions of sub-contractors' workers on the Workers Grievance Mechanism.

[CC- 289] Prepare and implement a Supply Chain monitoring programme to ensure that local supply for food, goods or services is used wherever and whenever possible.

4.17 Workers health & Safety management

4.17.1 Planning requirements

[CC- 290] A detailed Occupational Health and Safety Management Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.16 and in Section B0.1.13. "Health and Safety Requirements" of Part B 0.1 "General Technical Specification for Civil Works" of the EPC Contract.

[CC- 291] The Occupational Health and Safety Management Plan must be aligned with OHSAS 18001.

[CC- 292] The plan will detail the measures taken by the EPC Contractor to manage the hygiene conditions and medical care in each of the workers camps. It will also address occupational health & safety in alignment with ILO recommendations, Good International Industry Practices (GIIP), EBRD PR4 and IFC PS2. This plan shall include (but not limited to) the following topics: (i) Health and safety policy and commitment from management, (ii) Description of organization; human resources, definition of roles and responsibilities, (iii) workers accommodation, hygiene facilities and food supply, (iv) Description of material resources including Personal Protective Equipment (PPE) to be used by workers, (v) Health and safety procedures, (vi) Risk assessment, (vii) Pollution prevention and protection, (viii) Health and safety training, (ix) Monitoring of health and safety performance, and (x) Medical checks. Community health & safety management planning is addressed in Section 4.15.

4.17.2 Management Actions

A. Hygiene

[CC- 293] Workers will be provided with drinking water at all Worksites. The quantity and quality of this water will comply with the standards of the World Health Organization at supply points. Regardless of the means of supply of drinking water, the quality of the drinking water provided to workers will be tested on a monthly basis or more frequently. The protocol for taking and analysing samples is based on the recommendations of the World Health Organization.

[CC- 294] Accommodation provided for non-resident personnel in a camps or an alternative structure outside of the Worksites, such as a hotel or rented house, will comply with the conditions of the 2009 guidance note by IFC and the EBRD on Workers' accommodation: processes and standards.

[CC- 295] Meals will be provided to all employees per shift in a canteen area and according to a food supply system which complies with the following provisions: (i) food supplies for the meals exclude any meat obtained from hunting or poaching, (ii) cleanliness of food transport vehicles, temperature control and the cold chain are inspected and documented, as well as best before dates, (iii) health requirements are met for food storage conditions in the kitchen or other locations, food cooking times and temperatures. Likewise, conditions in which prepared products are left prior to consumption are

controlled to ensure no health risks.

[CC- 296] The medical doctor working at the camp's first aid station will carry out regular an audit on all Worksites and will consider, as part of the audit, the conditions of hygiene in which meals are prepared and food conserved.

B. Health care

[CC- 297] Medical check-ups will be organized for all employees prior to the initial mobilisation to the Worksite to check aptitude for the work pursuant to the recommendations of the International Labour Organization. Medical examination will be carried out on any employee returning to work after leave caused by a work related accident.

[CC- 298] A First Aid Station will be installed in each of the three main camps and managed with an experienced medical doctor. An ambulance will be on stand-by in each camp.

[CC- 299] First aid officers will be present during working hours in sufficient number per shift of workers. Each Worksite will be equipped with an adequate number of first aid kits to ensure that all workers can access these kits in approximately 5 minutes. The content of each first aid kits comply with OSHA standard n°1910.266 App.A.

[CC- 300] An agreement will be established with a specialised company for the handling of personnel in the event of a serious accident requiring an emergency medical evacuation, which cannot be organised using the ambulance. The agreement will include a convention with a referral hospital where the member of personnel evacuated in emergency conditions will be treated.

[CC- 301] Access to health care for all personnel will be guaranteed in case of accident or illness occurring during the execution of the works. Subcontractor personnel, other contractors, the Employer or the Engineer, present at the Worksite, will not be refused medical assistance, under the pretext that they are not directly employed by the EPC Contractor.

[CC- 302] Emergency Drill exercises will be organized not less than one quarterly exercise on each of the three main working sites. Scenarios to be performed will depend on the emergency event, e.g. flood, fire, truck accident, seriously wounded person, major chemical spill, etc.

C. Fire & explosions

[CC- 303] The Contractor implements measures to ensure that the fire and explosion risks are at acceptable levels in accordance with Good International Industry Practice. These include (but are not limited to) the following:

- > Facilities are designed in alignment with Georgian safety standards and Good Industry Practice;
- > Risk assessment are carried out in alignment with Good International Industry Practice;
- > Accidental event consequence calculation are undertaken to confirm adequacy of safety distances;
- > Facilities are equipped with:
 - Integrity safety prevention and protection systems;
 - Emergency alarm systems;
 - Human and material resources for emergency response – including mobile and fixed fire-fighting equipment, ambulances, medical facilities, and medical staff.

D. Workers safety

[CC- 304] Management actions on workers safety shall comply with Section B0.1.13. "Health and Safety Requirements" of Part B 0.1 "General Technical Specification for Civil Works" of the EPC Contract.

[CC- 305] Establish a workers' safety committee.

[CC- 306] Monitor the Supply Chain compliance with the occupational health and safety plan, document

and report to the Owners Engineer on a monthly basis.

[CC- 307] The risk of avalanche is monitored worksite by worksite and dully considered prior to authorizing the restart of the construction activities after each annual winter break (December to February).

4.18 Environmental Permitting

[CC- 308] The EPC Contractor will conduct the environmental and social investigations required to obtain the environmental permit and any other authorizations as required by the authorities for the Project components that were not covered by the 2015 ESIA or the construction permit. It includes - but does not limit to – (i) the electrical transmission lines required for the construction activities from the existing Khudoni sub-station to the powerhouse (110kV) and from the Powerhouse to dam site and to the TBM launching platforms (35 kV), and the (ii) the spoil disposal areas at the powerhouse, dam site and Nakra intake.

[CC- 309] The environmental and social investigations will be compliant with the national legal framework in terms of environmental permitting. They will also be compliant with the Lenders environmental and social policies.

4.19 Emergency Preparedness Plan

4.19.1 Planning requirements

[CC- 310] A detailed Emergency Preparedness Plan will be prepared and implemented as part of the CC-ESMP in accordance with the provisions listed in the present Section 4.19.

[CC- 311] The detailed Emergency Preparedness Plan (EPP) will be structured into two sub-plans:

- EPP during construction for Common Hazards and Emergency Situations
- EPP during operation for Emergency Flood Release and Dam Break

[CC- 312] The EPP for Common Hazards and Emergency Situations during construction will be structured as such:

- Identification of potential emergencies based on hazard assessment
- Procedures to respond to the identified emergency situations;
- Procedures to shut down equipment;
- Procedures to contain and limit pollution (see requirements on Spill Contingency Plan in 4.8.2D);
- Procedures for decontamination;
- Procedures for rescue and evacuation, including a designated meeting place outside the facility;
- Location of alarms and schedule of maintenance;
- List and location of equipment and facilities for employees responsible for responding to the emergency (fire-fighting equipment, spill response equipment, personal protection equipment for the emergency response teams, first aid kits and stations);
- Protocols for the use of the emergency equipment and facilities;
- Schedule for periodic inspection, testing and maintenance of emergency equipment;
- Clear identification of evacuation routes and meeting points;
- Schedule of trainings (drills), including with local emergency response services (e.g. fire fighters);
- Procedures for emergency drills;
- Emergency contacts and communication protocols, including with affected communities when

necessary, and procedures for interaction with the government authorities;

- Procedures for periodic review and update of emergency response plans.

[CC- 313] The EPP for Common Hazards and Emergency Situations during construction will be prepared and submitted to the Owners Engineer for approval not later than four months prior to the start of the Final Notice To Proceed / main construction period.

[CC- 314] The EPP for Emergency Flood Release and Dam Break during operation will be structured as such:

- Purpose
- Project information
- Flood studies and inundation maps
- Emergency detection, evaluation and classification
- Notification flowcharts
- Evacuation table
- Roles and responsibilities
- Emergency alert system
- EPP testing and training
- EPP contacts
- EPP updates

[CC- 315] The EPP for Emergency Flood Release and Dam Break during operation will be prepared and submitted to the Owners Engineer for approval not later than December 2017. It will be finalized in the course of 2018 after consultation with stakeholders.

4.19.2 Management Actions

A. Common Hazards and Emergency Situations during construction

[CC- 316] Areas where accidents and emergency situations may occur, and communities and individuals that may be impacted, are identified, including the following:

- > Traffic accident
- > Accidents arising from use of platform, scaffolding, ladders and working at elevated places
- > Injuries sustained from lifting and hauling
- > Exposure and emergency events due to hazardous, flammable, explosive, and radioactive substances
- > Hazards from excavation work and works carried out with construction machinery
- > Hazards from work involving sand blasting, painting and coating work
- > Exposure to injury from work carried out in confined spaces
- > Hazards and emergency events arising from working with electrical energy, and with electrical hand tools and machines
- > Natural hazard risks to workers, including avalanche and debris flow risk as well as rock falls or flash or river floods and cofferdam failure, as identified and addressed through the detailed studies required in Section 4.20.

[CC- 317] Response procedures are developed for each identified emergency situation that clearly explain what actions need to be taken. These are detailed clearly for everyone in the EPC Contractor's organization - including subcontractors - to understand what he or she needs to do.

[CC- 318] Necessary equipment and resources to effectively implement the response plans are provided and made available where it can be immediately accessed during accidents and emergencies.

[CC- 319] Responsibilities are assigned so that each activity has people responsible for carrying it out. People who will routinely analyse how well the system is working and update the risk assessment and plans, are designated.

[CC- 320] Regular communication are undertaken so that everyone in the EPC Contractor organization - including subcontractors - understands the importance of the emergency preparedness and response

system and is encouraged to help monitor and improve its effectiveness. Include people in the community who may be affected.

[CC- 321] Periodic training are provided so that everyone in the EPC Contractor organization - including subcontractors - has an overview of the system, and knows the response plans.

[CC- 322] Working sessions with government agencies and community groups are held to identify areas where parties can collaborate to respond effectively to internal and external situations.

[CC- 323] Periodic checks and drills are conducted to test how well the system is working and to re-assess the risks to reflect changing conditions. Findings are incorporated to continually improve the EPC Contractor system.

[CC- 324] Emergency response plans will be site specific will be independently reviewed for their suitability and effectiveness.

B. Emergency flood release or dam break during operation

[CC- 325] Prepare an Emergency Preparedness Plan as directed by the Owner Engineer which identifies and determines the EPC Contractor and the Project Company responses to emergency conditions for the Nenskra dam, defined as follows: (i) a dam failure hazard; or (ii) a downstream release hazard; or (iii) a circumstance that potentially indicates an increase in the likelihood of a dam failure hazard or downstream release hazard happening.

[CC- 326] As part of the preparation of the EPP for Emergency flood release or dam break, identify and engage all entities, jurisdictions, and individuals that should be consulted in the preparation of the Nenskra EPP, i.e. parties affected by an incident at the Nenskra dam or that have the statutory responsibilities for warning, evacuation and post-incident actions.

[CC- 327] While preparing the EPP for Emergency flood release or dam break, the requirements of the SEVESO directive for Emergency Planning in relation to upper tier sites shall be applied. There shall be an internal emergency plan and an external emergency plan for the local authorities, prepared with the full support and cooperation of the EPC Contractor and JSCNH. As part of the scenarios for dam failure hazard, include the risk of sabotage in addition of natural hazards.

[CC- 328] Perform the required detailed flood studies to determine flood plains created by emergency flood release (flow through bottom outlet or spillway, for the whole range of scenarios from Q_5 to Probable Maximum Flood) and dam break analysis (including cofferdam break, early impoundment dam break analysis, final dam break analysis). The emergency flood release shall take into account impact on the area from downstream of Nenskra dam to the junction with the Enguri River, including all foreseeable operational events with the Nakra Transfer Tunnel and the Powerhouse. The dam break analysis shall take into account impact on the area downstream of Nenskra dam, Enguri dam and as well consider potential impact on the dams downstream of Enguri.

[CC- 329] Establish, test and install Early Warning Systems, communication systems, both internal (between persons at the dam) and external (between dam personnel and outside entities or persons) to be activated in case of dam failure hazard or inadvertent opening of the bottom outlet.

[CC- 330] As and if required by the local emergency management authorities, develop evacuation and shelter-in-place training materials for people in the Nenskra valley living immediately downstream of the dam and who would be inundated within a short timeframe.

[CC- 331] Assist the Project Company in conducting the required public consultations on the Emergency Preparedness Plan during the disclosure period of environmental & social documents required by the Lenders and the Public Awareness Campaigns on Emergency Preparedness Planning during the main construction period.

4.20 Climate change and Natural Hazards

A. Climate Change Risk Assessment

[CC- 332] The EPC Contractor will perform a Climate Change Risk Assessment in line with the European Financing Institutions Working Group on Adaptation to Climate Change (EUFIWACC) guidance on Integrating climate resilience into project development and implementation.

[CC- 333] Design criteria for flood control at the Nenskra dam and the Nakra intake will be in alignment with findings of the Climate Change Risk Assessment.

B. Protection for natural hazards

[CC- 334] Perform, to the satisfaction of the Independent Panel of Experts, the complementary studies and design adjustment required by the Independent Panel of Experts with respect to dam safety and public safety.

[CC- 335] The findings of the Climate Change Risk Assessment must inform the natural hazard risk assessments.

[CC- 336] Perform, to the satisfaction of the Lenders and JSCNH, the complementary studies and design adjustment required by the Supplementary Environmental & Social studies in Volume 6 Natural Hazard and Dam safety as further listed in the table below.

Table 4 - Natural hazard studies to be performed and safeguard measures to be designed

Hazard	Unwanted events	Studies completed	Studies still to be performed	Timing	Safeguard measures to be designed	Timing
1. Extreme flood event	Dam overtopping – leading to dam failure	Hydrological studies and definition of PMF	Climate Change risk assessment Review by OE, LTA and IPoE	Q1 2017	Detailed design of flood control structures with PMF capacity Development of operational procedures Review by OE, LTA and IPoE	H2 2017
2. Earthquake	Dam instability – leading to dam failure	Earthquake Hazard Assessment - definition of MCE Physical and numerical modelling of dam structure stability	N/A	N/A	Detailed design of structures to resist MCE Development of operational procedures Design of monitoring system Review by OE, LTA and IPoE	H2 2017
3. Avalanche / debris flow	Blockage of spillway, bottom outlet or headrace tunnel portals – in the event of a flood event could cause dam overtopping and dam rupture	Natural hazards risk assessment	Detailed natural hazard risk assessment for all construction camps and technical installations to be completed before camps and installations constructed. Avalanche / debris flow studies – including modelling - to determine estimate quantities potentially mobilised, paths taken and structures at risk Consideration of climate change risk assessment in the avalanche/debris flow studies Review by OE, LTA and IPoE	H1 2017	Design of avalanche / debris flow protection measures for permanent structures and worksites Design of avalanche / debris flow protection measures for construction camps and technical installations Design of monitoring and alarm systems Development of operational procedures Review by OE, LTA and IPoE	H2 2017
	External erosion of dam structure (or coffer dam) leading to instability and dam rupture	Natural hazards risk assessment				
	Temporary construction camps and technical installations and work sites impacted by avalanche / debris flow	Preliminary natural hazards risk assessment for construction camps and technical installations				
	Impulse wave generated in reservoir causing either (i) dam overtopping and rupture or (ii) spillage and a high flow in the Nenskra river	Natural hazards risk assessment				
4. Slope instability	Landslide and impulse wave generated in reservoir causing either (i) dam overtopping and rupture or (ii) spillage and a high flow in the Nenskra river	Natural hazards risk assessment Radar interferometry study to establish recent movement of the slope	N/A	N/A	Design of monitoring and alarm systems Development of operational procedures Review by OE, LTA and IPoE	H2 2017
5. Dam failure	Dam failure	Tentative qualitative risk assessment	Detail dam failure risk assessment in alignment with ICOLD methodologies and including coffer dam. Assessment of the risk of the failure of the Enguri dam as a result of the failure of the Nenskra dam using an ICOLD method and if necessary estimation of the consequences using	H2 2017	Emergency Preparedness Plan (EPP) Review by OE, LTA and IPoE	H1 2018

Hazard	Unwanted events	Studies completed	Studies still to be performed	Timing	Safeguard measures to be designed	Timing
			flood modelling. Review by OE, LTA and IPoE			
6. Bottom Outlet (BO) malfunction	Downstream flooding	Tentative qualitative risk assessment	Bottom outlet gate operation risk assessment in alignment with ICOLD methodologies Review by OE, LTA and IPoE	H2 2017	Design BO gate operating system Review by OE, LTA and IPoE	H2 2017
			Flood modelling for various discharges from bottom outlet Review by OE, LTA and IPoE	H1 2017	BO gate operating rules and procedures If and where required, design and build river flood protection works downstream of dam Include event in EPP Design warning systems Review by OE, LTA and IPoE	H1 2018
7. Rockfall	Nakra transfer tunnel outlet portal impacted by rockfall. Damage to structures injury to workers.	Natural hazards risk assessment	Detailed natural hazard risk assessment for all construction camps (see avalanche/debris flow above).	H1 2017	Design of rockfall protection measures for permanent structures and worksites Design of monitoring and alarm systems Review by OE, LTA and IPoE	H2 2017
	Temporary construction camps and technical installations and work sites impacted by rockfall	Preliminary natural hazards risk assessment for construction camps and technical installations	Rockfall studies to determine estimate quantities potentially mobilised, paths taken and structures at risk. Review by OE, LTA and IPoE		Design of rockfall protection measures for construction camps and technical installations Design of monitoring and alarm systems Review by OE, LTA and IPoE	H2 2017

4.21 Design adjustment required for Environmental and social reasons

A. Floating debris

[CC- 337] Access to collect and evacuate floating debris upstream of the dam during reservoir first impoundment and operation is designed, built and operational prior reservoir filling.

[CC- 338] Prior reservoir filling, laydown area is available downstream of the dam to dispose floating debris which are removed from the reservoir during operation.

B. By-pass capacity at dam site

[CC- 339] Design of the small diversion weir (downstream of the dam on the right bank) includes by-pass to allow the creek to be diverted to the Nenskra downstream from the dam to complement ecological flow and reduce river water quality modification.

[CC- 340] Capacity of environmental flow bypass pipe will be designed for 1.7 m³/s compared to initial design (0.85 m³/s) to allow for larger flow release if required.

[CC- 341] The diameter of the Environmental Flow pipe is defined to confirm its capacity at minimum operating level and the option to use two pipes to minimise the risk of gate valve malfunction will be assessed as part of the detailed design process.

C. Environmental flow monitoring

[CC- 342] A simple solution will be provided downstream of the Nenskra dam and downstream of the Nakra weir to allow third party monitoring of minimum environmental flow in a transparent manner.

D. Operational Noise levels at the powerhouse

[CC- 343] Noise impacts due to powerhouse operation will be minimized through design adjustment in order to prevent community health impacts within the limit described in the guidelines for Community Noise established by the World Health Organization or the Georgian legal framework, whichever is the stricter.

[CC- 344] Compliance of the design with the relevant standards will be tested through monitoring of noise at full load and during worst case (for noise) climatic and flow conditions during the first year of commissioning, i.e. those conditions that would result in greatest level and propagation of noise.

[CC- 345] Compliance of the design with the relevant standards will be demonstrated and documented through monitoring of noise at full load and during worst case (for noise) climatic and flow conditions during the first year of commissioning, i.e. those conditions that would result in greatest level and propagation of noise. Scope of this first year monitoring will be approved by the Owners Engineer prior to mobilisation of the required specialist resource.

[CC- 346] If this operational noise monitoring during the first year finds an exceedance of the relevant standards then noise attenuation measures to bring the Powerhouse back into compliance will be identified and installed by the EPC Contractor.

E. Natural Like fish pass at the Nakra intake

[CC- 347] A natural-like fish pass channel is designed, constructed and employed at the Nakra Intake in compliance with the design criteria established in Vol. 4 - Biodiversity Impact Assessment of the 2017 Supplementary Environmental and Social Studies.

[CC- 348] The EPC Contractor demonstrates the attractiveness and efficiency of the upstream and

downstream inlets of the natural-like fish pass designed at the Nakra Intake, taking into account the seasonal and project-induced variations of river flow and river water levels.

F. Public safety

[CC- 349] Access restrictions to riverbed immediately downstream of the dam and the plunge pool and warning signs against spillage, risk of fall from height and drowning, will be installed.

[CC- 350] Access restrictions to riverbed around the tailrace and immediately downstream of powerhouse and warning signs against the risk of sudden variation of water level due to powerhouse operation, will be established.

[CC- 351] Alarm and warning signage along the Nenskra River against the risk of sudden variation of water level due to dam spillage and powerhouse daily operations will be installed.

[CC- 352] Design and install a monitoring system of reservoir inflows along the Nenskra River upstream of the Nenskra Reservoir to identify risk of upstream blockage and pre-emptive reservoir lowering.

[CC- 353] Design and install a system that suspends the transfer of water from the Nakra River to the Nenskra reservoir to avoid spillage at the Nenskra dam. Incorporate this requirement into the operating & maintenance procedures.

[CC- 354] The detailed design of the power intake will ensure risk of blockage and safe removal of debris from trash rack are addressed. Methods and frequency of cleaning will be integrated into the operating procedures.

G. Reservoir triggered seismicity

[CC- 355] Installation of three seismographs (2 at dam site and 1 at powerhouse) to monitor seismic activities and demonstrate absence of Reservoir Triggered Seismicity during reservoir filling and first year of operation.

[CC- 356] Preparation and submission of a Reservoir Impoundment Plan one year prior to start of the reservoir filling, covering a risk and safety analysis, management of the filling and the water level, management of floating debris, monitoring concept and procedure during the reservoir impounding, detailed operation and procedure of the bottom outlet, reservoir triggered seismicity monitoring and mitigation measures in case of triggered seismicity.

5 Management measures under the responsibility of JSCNH

5.1 Environmental & Social Management System

5.1.1 Why is this plan needed?

JSCNH has been created in August 2015. A number of management actions listed in the present ESMP are under JSCNH responsibilities. They define the rules and the objectives but the challenge is in the implementation. The Environmental and Social Management System (ESMS) will therefore help integrating the rules and objectives into JSCNH management and business operations, through clearly, repeatable defined processes.

Specific objective:

Systems, processes, staff and resources are available in time within JSCNH for the effective implementation of the ESMP in accordance with national regulation and Lenders environmental & social policies.

5.1.2 Components, timing and responsibilities

A management system is comprised of trained, committed people routinely following procedures⁴. JSCNH ESMS will be structured into two main components:

- **ESMS 1.- System Development:** Documented company policies and Health, Safety, Environmental & Community (HSEC) procedures will be established to implement management actions committed in this ESMP and to ensure continuity when people in the organization change.
- **ESMS 2.- System implementation:** Trained, committed people will routinely follow these procedures.

The two components will be developed during the early works (2015-17) and implemented in full during the main construction period (2017-21) and the operation phase (>2020).

The ESMS development and implementation will be JSCNH's responsibility. Advisory services and support from K-water's corporate management may be required to establish the system however the day-to-day management of the ESMS will be executed by JSCNH employees.

The ESMS established by JSCNH for the construction period will follow the ISO 9001, ISO14001 and OSHAS18001 standards. The ESMS established by JSCNH for the operation period will be ISO 9001, ISO 14001 and OSHAS 18001 certified.

⁴ IFC, Environmental and Social Management System Implementation Handbook, General, March 2015

5.1.3 Management Actions during the Construction period

5.1.3.1 ESMS 1.- System Development

[OC- 1] - Policies and Procedures.

- > Develop a set of environmental & social policies to (i) summarize the commitments made by JSCNH to manage the E&S risks and (ii) establish the expectations for conduct in all related aspects of the Project implementation. The following issues will be covered: Environmental Protection, Community Health and Safety, Labour and Working Conditions (including a Human Resources Policy in alignment with national, Lenders and ILO requirements).
- > In support to the E&S policies, develop and document a set of internal procedures, including but not limited to, the following topics:
 - Roles and responsibilities of the Project personnel. The roles required to implement the ESMP, and establish and maintain the ESMS are outlined in [OC- 7] below for JSCNH and in [CC- 24] and [CC- 25] for the EPC Contractor. These roles need to be reviewed and incorporated into organizational structures for the various phases of the early works and main construction period.
 - Formalize the battery limits between JSCNH and the Owners Engineer for the review of CC-ESMP documents as well as any changes in design and procedures as rules by the Change Management Procedure in section 5.12.
 - Register of legal requirements to (i) track developing legislations and regulations that may apply top construction and operations to anticipate and prepare for compliance, (ii) inform employees and others working on behalf of JSCNH of existing and emerging obligations that apply to their job responsibilities.
 - Code of Conduct for JSCNH employees
 - Documentation and record keeping
 - Register of E&S risks and impacts. Link to Surveillance and Monitoring.
 - Reporting requirements: activity (internal and lenders, see Section 5.13.3.7), incident notifications, technical.
 - Management of the grievance mechanism.
 - Security and Human Rights, in compliance to the Voluntary Principles for Security and Human Rights
 - Joint site inspections with Owners Engineer and the EPC Contractor.
 - Environmental procurement
 - Communication (SEP and who manages the website) and key messages.
 - Management of changes, including but not limited to, environmental permitting for changes in design during the construction phase and Land Acquisition and Livelihood Restoration Planning for projects components not known in December 2016.

[OC- 2] - Finalize the 2017 Supplementary E&S studies after disclosure

- > Summarize all comments and responses collected during the disclosure period of the Supplementary E&S studies (see Section 5.11.3.2) in 2017 and list the changes required on the E&S documents
- > Update the Supplementary E&S studies accordingly
- > Post on the project websites the approved documents for the lifetime of the Project.

[OC- 3] - Compliance Execution Plan.

- > Prepare a Compliance Execution Plan for the construction period. It will detail: (i) the conditions required by the Ministry of Environment and Natural Resources Protection through the Environmental Permit obligations, (ii) the E&S Management actions committed through the 2015 ESIA and the present ESMP, including the necessary coordination with the Governmental Agencies in charge of third party management actions (see Section 6), (iii) the Lenders covenants attached to the financing agreements (e.g. ESAP for the EBRD), and (iv) the relevant E&S national regulation framework (e.g. water quality effluents, alignment on EU directives) and possible changes.
- > Conflicts between the national and international plan requirements will be identified and a process for addressing both sets of requirements identified.
- > The Compliance Execution Plan will be prepared and implemented by the Chief Environmental & Social Officer. It will indicate (i) the persons within JSCNH or the EPC Contractor who owns the compliance requirement, (ii) the methods to be used to comply with the requirement and where appropriate, performance standards and criteria to be satisfied, and (iii) whether the associated activities will be executed by the company's own employees, or by others acting on its behalf. The Compliance Execution Plan will then be further scheduled in Annual Work Plans as provisioned through Management Action [OC- 6] below.

[OC- 4] - Database Management.

- > Establishment of the Project-Geographic Information System using remote sensing data.
- > Preparation of the associated databases for environmental and social monitoring, as well as grievance,

stakeholder communication and disclosure, land acquisition and resettlement.

[OC- 5] - Quantify Performance Indicators.

- > Quantify the performance indicators proposed in this ESMP to render them measurable and time-bound.
- > Integrate the quantified indicators in the monitoring reports.

5.1.3.2 ESMS 2.- System Implementation

[OC- 6] - Annual Work Plan and resource scheduling

- > Every December, prepare Annual Work Plan for the execution of the ESMP Management Actions by JSCNH for the coming year. Establish dependencies with the Construction Activities (e.g. closure of the bottom outlet) and between the environmental and social Management Actions (e.g. public information on water quality monitoring).
- > Allocate responsibilities within the Environmental and Social team for each activity and specify the estimated effort required for each of the team member to achieve these activities. Where sub-contractors are to be involved (e.g. river fish monitoring), specify the time and effort required to contract and supervise and specify who owns the management of their contract.
- > List the milestones for all planned deliverables (e.g. monitoring report) and meetings.

[OC- 7] - Mobilize human resources: Team and training

- > Staff the Environmental and Social Team as described in Figure 4 next page
- > Define job description and describe accountability for each of the ESMP measures under the responsibility of JSCNH.
- > Allocate to each staff member the equipment required for fieldwork (camera, GPS, phone, Personal Protective Equipment), reporting (computer, internet access), transportation (vehicle) and specific monitoring equipment as required.
- > Work with the Security and Human Right Advisor to prepare and implement a Security and Human Rights detailed risk assessment and develop a Security Management plan (internal, not to be publicly disclosed) for construction and operation, to comply with the Voluntary Principles for Security and Human Rights.
- > Develop the Equal Opportunity Action Plan to enhance skill development for local youth and equal opportunity for women in the Nenskra HPP Project.
- > Provide training as required in the use of monitoring equipment (e.g. water quality), software (e.g. GIS), reporting, and Security and Human rights (A specific training will be done on how to integrate complaint about security and human rights into the Project's grievance mechanism).

[OC- 8] - Prepare the transition, between construction to operation to maximise local content

- > One year before powerhouse commissioning, identify Georgian personnel with potential to take on operating responsibilities.
- > Coordinate with O&M operator to list and describe job descriptions for operation of the powerhouse, the dam and the Nakra intake.
- > Provide specific training to Georgian personal with regard to specific skills required for operation of the hydropower scheme.
- > Monitor progress through monthly update of work programme.

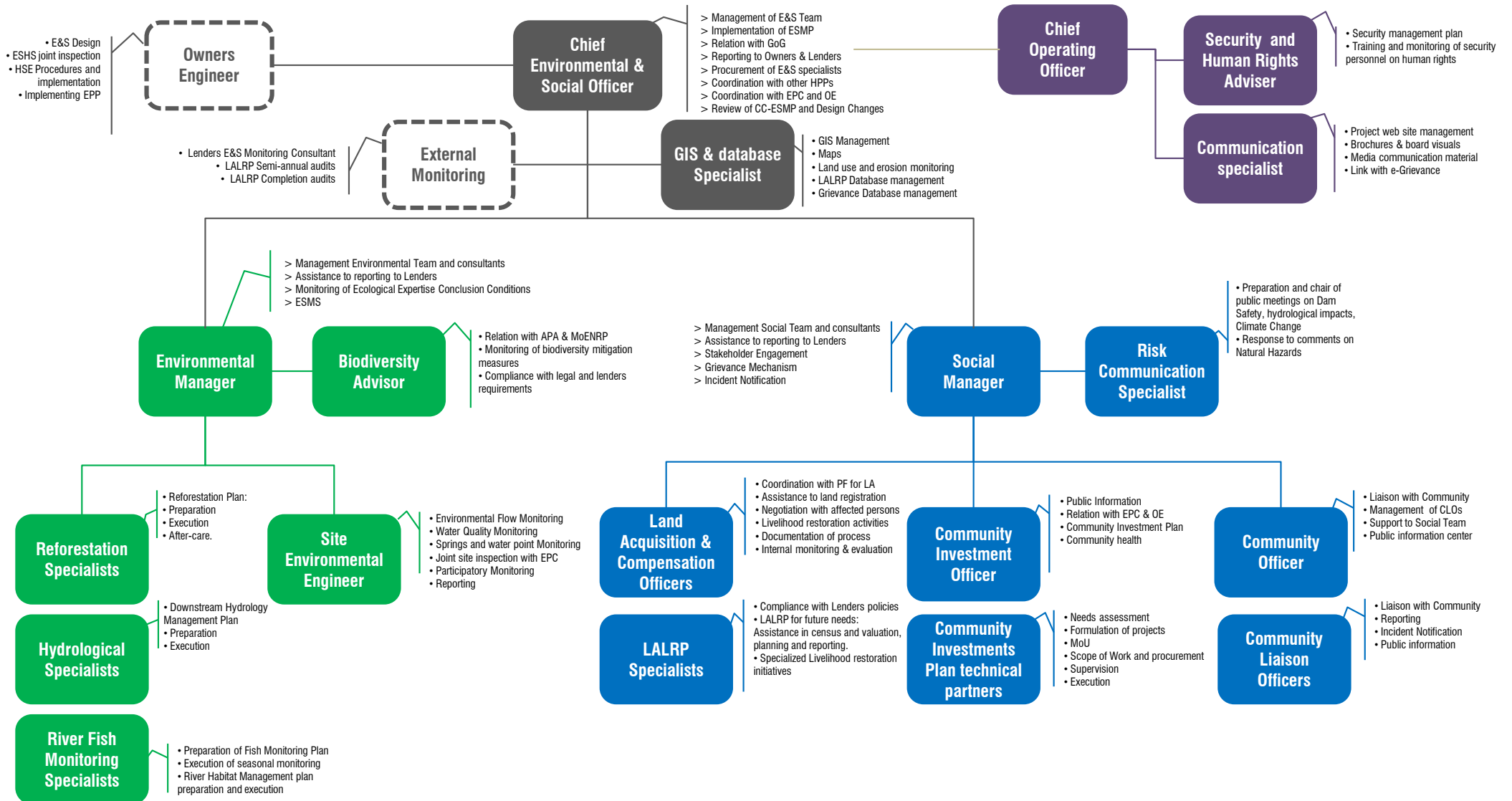
[OC- 9] - Execution of the Annual Work plan activities

- > Implement the activities defined in the Annual Work Plan
- > Monitor progress through monthly update of work programme

[OC- 10] - Progress Activity Reporting and Communication

- > As defined throughout this ESMP, prepare the progress activity reports on environmental and social performance:
 - Project Incident Notification to Lenders: if and when required
 - Six-monthly Environmental & Social Report to Lenders
 - Six-monthly Environmental & Social Performance report to larger public, posted on the Project's web site
 - Six-monthly newsletter for the Nenskra and Nakra communities.
- > Translate in Georgian the Six-monthly Environmental & Social Performance Report and the six-monthly newsletter and deliver in hardcopies in locations specified in the Stakeholder Engagement Plan.

Figure 4 - Organisation of JSCNH Environmental and Social Team



5.1.4 Management Actions during the Operation phase

5.1.4.1 ESMS 1.- System Development

[OO- 1] - Policies and Procedures.

- > In support to the E&S policies, as for the construction phase, develop and document a set of internal procedures for the operation phase, including but not limited to, the following topics:
 - Organizational Structure and Responsibility
 - Communication
 - Environmental and Social Management System Documentation; Documents control
 - Monitoring and Measurement
 - Reporting requirements.
 - Management of the grievance mechanism.
 - Human Resources Policy in alignment with national, Lenders and ILO requirements.
- > Develop the internal procedures that were under the responsibility of the EPC Contractor during the construction phase, and will be under the responsibility of the O&M operator during the operation phase, including but not limited to, the following topics:
 - Emergency Preparedness and Response.
 - Reservoir Operating Procedures: In the Reservoir and Powerhouse Operating Procedures prepared by the Operator, in relation to the bottom outlet opening, the turbines daily operations, and the reservoir lowering, integration of (i) water quality issues, (ii) ecological flow (see below), (iii) downstream flood protection and public safety, (iv) river habitat protection, and (v) venting of sediments during flood events and with free-flow in the bottom outlet.
 - Ecological flow management: water quality monitoring and hydrological monitoring of the ecological flow and adaptive management: (i) Stream diversion at dam to be used to augment or substitute ecological flow if required for water quality reasons by-pass of small creek diversion, (ii) larger flow release if required for aquatic biodiversity reasons. Timings and thresholds for implementing these two measures will be defined. The decision to take this action will be supported by an ecological / hydrological / water quality monitoring programme and clear thresholds (that can be monitored by that programme) for triggering adaptive management.
 - Nakra weir operating procedures: Remotely controlled suspensions of Nakra transfer to Nenskra reservoir in case of spillage at the Nenskra dam, Ecological flow through the fish pass, Management of gate on the Nakra transfer tunnel inlet and of weir gates to maintain the sediment transport function of the Nakra River, Integration of the downstream sediment management measures for Lekverari, Fishing ban within proximity to the Nakra weir fish pass.
 - For the Gas Insulated Station installation at Powerhouse, O&M procedures and reporting procedures in case of any SF6 releases (both in line with Good Industry Practices).
 - Waste management: (i) identification of all solid and liquid wastes produced by the various installations (volumes, nature, frequency, and collection period) including green wastes such as floating debris in the reservoir, (ii) creation of waste registers and tracking systems from collection to disposal, (iii) establish/document the agreement with the municipal waste collection organisation.
 - Labour management procedures, which will set out the way in which Project workers are managed, in accordance with the requirements of national law and the Lenders E&S policies: Terms and Conditions of Employment, Non-Discrimination and Equal Opportunity, Worker's Organizations, Grievance Mechanism, Occupational Health and Safety, Contracted Workers, Workers in Community Labour, Primary Supply Workers.
 - Training and audits of Security Guards to the application of the *Voluntary Principles on Security and Human Rights*, including coordination with and regular reporting to police forces.
 - Traffic Management.

[OO- 2] - Compliance Execution Plan.

- > Prepare a Compliance Execution Plan for the operation period. It will detail: (i) the conditions required by the Ministry of Environment and Natural Resources Protection through the Environmental Permit obligations, (ii) the E&S Management actions committed through the 2015 ESIA and the present ESMP, (iii) the Lenders covenants attached to the financing agreements for the operation phase, (iv) the relevant E&S national regulation framework (e.g. water quality effluents, alignment on EU directives) and possible changes, and (v) from the Permits Register established by JSCNH, what are the permits owned by the E&S team.
- > Conflicts between the national and international plan requirements will be identified and a process for addressing both sets of requirements identified.

> Indicate (i) the persons within JSCNH who owns the compliance requirement, (ii) the methods to be used to comply with the requirement and where appropriate, performance standards and criteria to be satisfied, and (iii) whether the associated activities will be executed by the company's own employees, or by others acting on its behalf. The Compliance Execution Plan will then be further scheduled in Annual Work Plans as provisioned through Management Action [OO- 4] below.

[OO- 3] - Occupational health & safety

- > Prepare the procedures required for OSHAS 18001 accreditation, get audited and accredited and implement.
- > Develop a Health and Safety Plan addressing the health and safety hazards at the site and which are expected to encompass the same type of hazards as those addressed in construction.
- > Include in the Health and Safety Plan:
 - Management measures for chemicals and hazardous material, similarly to that for construction though adapted for smaller inventories and fewer material.
 - Specific measures related to the management of noise: high performance hearing protection devices for operators and procedures for enforcement, operator health checks including checking of hearing, procedures, Regular equipment noise monitoring and maintenance program.
- > Undertake regular health and safety risk assessments, monitor the implementation of the Health and Safety Plan and provide health and safety trainings to its employees during operation.

5.1.4.2 ESMS 2.- System Implementation

[OO- 4] - Annual Work plan, resource scheduling and mobilization.

- > As for the Construction period, every December, prepare Annual Work Plan for the execution of the ESMP Management Actions by JSCNH for the coming year and allocate responsibilities and effort within the Environmental and Social team for each activity, including sub-contractors.
- > Staff the Environmental and Social Team as described in Figure 4 for the first two years of operation. Define job description and describe accountability. Allocate equipment and logistics support as required by the functions.
- > Undertake regular health and safety risk assessments, monitor the implementation of the Health and Safety Plan and provide health and safety trainings to JSCNH employees during operation.
- > Ensure hazardous material is transported to the site by licensed transport contractors in compliance with Georgian and EU transport regulations.

[OO- 5] - Prepare the transition, between construction to operation to maximise local content

- > One year before powerhouse commissioning , identify Georgian personnel with potential to take on operating responsibilities.
- > Coordinate with O&M operator to list and describe job descriptions for operation of the powerhouse, the dam and the Nakra intake.
- > Provide specific training to Georgian personal with regard to specific skills required for operation of the hydropower scheme
- > Establish a programme with O&M operator to build progressively Georgian content for the operation of the scheme in order to achieve the target of 95% of Georgian nationals within the workforce for the operation phase.

[OO- 6] - Progress Activity Reporting and Communication.

- > As defined throughout this ESMP, prepare the progress activity reports on environmental and social performance:
 - Project Incident Notification to Lenders: if and when required
 - Six-monthly Environmental & Social Report to Lenders during the first three years and then on an annual basis
 - Six-monthly Environmental & Social Performance report to larger public during the first three years and then on an annual basis, posted on the Project's web site
 - Six-monthly newsletter for the Nenskra and Nakra communities during the first three years and then on an annual basis.
- > Translate in Georgian the Environmental & Social Performance Reports and the newsletters and deliver in hardcopies in locations specified in the Stakeholder Engagement Plan.

5.1.5 Performance indicators

Component	Performance indicators
ESMS1.- System Development	<ul style="list-style-type: none"> • Availability and relevance of policies and procedures. • GIS-based database available: software, computer, dedicated staff • Availability and completeness of the Compliance Execution Plan
ESMS2.- System Implementation	<ul style="list-style-type: none"> • Annual Work Plans available in December • Staff available on time and with the right experience and profile at the beginning of the construction period: Training and Human Resources records, showing CV and appropriate qualifications. • Progress Activity Reports prepared on time and covering most E&S issues

5.2 Environmental Surveillance of Construction works

5.2.1 Why is this plan needed?

Section 4 describes the environmental and social management actions under the responsibilities of the EPC Contractor. These measures are complex and require detailed planning as well as supervision to ensure timely and qualitatively execution. In addition, the ESIA process (ESIA and Supplementary E&S studies) recommended alternative design for some of the project infrastructures (e.g. fish pass at Nakra water intake). It will have to be addressed during the [DD] preparation period.

Adaption of initial design and environmental supervision of construction works require specific resources and activities; this is the reason why the present plan is needed.

Specific objective:

Construction methods do not incur adverse or non-compensated effects on communities, vegetation, soils, groundwater, biodiversity, natural drainage and water quality in areas adjacent to Worksites for the entire duration of the works.

5.2.2 Components, timing and responsibilities

Two components form the present plan:

- SURV.1- Integration of alternative design into final design
- SURV.2- Environmental supervision of construction methods

The two components will be implemented during the early works (2015-17) and the main construction period (2016-21) until the taking over of the works by JSCNH.

JSCNH delegated the management and supervision of the EPC Contract execution to the Owners Engineer. The Owners Engineer is therefore the primary implementing body for the management actions described below.

5.2.3 Management Actions during Early works

5.2.3.1 SURV.1- Integration of alternative design into final design

[OC- 11] - Materialize proposed changes in design for E&S purposes into detailed design.

> Instruct the EPC Contractor to modify the basic design to integrate the following changes recommended by the ESIA process:

- Natural fish pass at the Nakra water intake, with structural provision so that a control device can be installed to monitor its efficiency.
- Detailed design of the Nakra water intake to (i) maintain downstream sediment transfer, (ii) minimize incremental risk of increased flooding of the Nenskra caused by the Nakra waters transfer, (iii) ensure operability of the fish pass with respect to upstream inlet.
- By-pass gate for the creek diversion at the dam site
- Increase the capacity of the Environmental Flow by-pass pipe in gates chamber at dam site
- Preservation of existing accesses to pasture areas or construction of alternative access around worksites
- Access to collect floating debris during reservoir first impoundment and operation
- Seismicity monitoring devices to measure possible RTS events and adapt the reservoir filling process accordingly
- Noise reduction measures at the powerhouse against acoustic nuisance from transformers, aeration conduit and tailrace.

[OC- 12] - Verify appropriateness of proposed detailed design with intended purpose.

- > Verify the alternative design proposed by the EPC Contractor for the above listed components through engagement of the relevant stakeholders (e.g. villagers for access to pasture, fish specialist for Nakra fish pass, location of bridges) prior to formal acceptance of proposed detailed design.
- > Inform JSCNH Technical Team and JSCNH E&S Team of any changes detected through the reports/letters/drawings approval process that could result in environmental or social impacts not addressed in the 2015 ESIA or the 2017 Supplementary E&S Studies

[OC- 13] - Review and approve the studies and actions on natural hazards management

- > Review the additional studies to be prepared by the EPC Contractor on natural hazards assessment as part of the detailed design, as listed in Section 4.19.
- > Supervise the execution of all safeguards on natural hazards management and dam safety issues during the construction period as listed in Section 4.19.

5.2.3.2 SURV.2- Environmental supervision of construction methods**[OC- 14] - Landscaping and limited use of shotcrete for slopes stabilization.**

- > Discuss construction method for slopes stabilization of excavated areas above the powerhouse and the main operating structures (e.g. surge tank, gate chamber, spillway, service roads) with the EPC Contractor.
- > Examine the economic and technical feasibility of environmentally-friendly alternatives to the use of shotcrete/concrete (vegetation, stone walls).
- > Confirm selected method with JSCNH and instruct the EPC Contractor accordingly.

[OC- 15] - Review and approve the CC-ESMP preparation.

- > Confirm mobilization of resources allocated to Health, Safety, Environment and Community management as per contract requirements: management staff, logistics, monitoring equipment.
- > Require timely submission of CC-ESMP specific planning documents as described in Section 4.1.2 (Master Document, Sectorial Technical Plans and Site Environment Protection Plans) prior to the start of site preparation works, particularly for works that would result in vegetation clearing and/or excavation.
- > Check compliance of with contractual requirements (Specifications B2.26) in terms of structure, content and mapping documents. Coordinate with JSCNH E&S Team to confirm compliance with Lenders E&S policies and requirements.
- > Verify that the footprint of quarry and borrow areas required for dam construction purpose remains within the Nenskra reservoir full supply level. If not practically feasible, document that alternatives were examined before authorizing potential quarry areas outside/above the reservoir full supply level.
- > Require timely revision of CC-ESMP specific planning documents as when required, including after the disclosure of the 2017 Supplementary E&S studies and after their finalization following the meaningful consultations during 2017.

[OC- 16] - Environmental permitting & social license to operate for non-defined project components

- > Obtain detailed design for project infrastructures that were yet to be designed when the ESIA and the Supplementary E&S studies were completed:
 - Service line (from powerhouse to dam site)
 - Disposal area at the powerhouse for stockpiling tunnelling spoils
 - Road upgrading final design (Nakra village).
- > This design must be submitted (i) with sufficient details and clarity to understand land requirements or encroachment into sensitive area and (ii) on time to allow JSCNH or the EPC Contractor to negotiate the social licence to operate with affected villagers or leave the environmental authority assess the acceptability of proposed footprint.
- > Verify that all environmental and social authorization, whether legal permits or compliance with Lenders policies, are obtained prior start of the works on these sites.

[OC- 17] - Stakeholder Engagement Measures

- > Ensure the provisions of the Stakeholder Engagement Plan, which are under the responsibility of the EPC Contractor, are timely and relevantly carried out:
 - Local Recruitment Policy disclosed in villages
 - Traffic Management Plan presented to heads of village
 - Workers' grievance mechanism.
 - Communication on perceived-as-risky construction methods, e.g. use of explosives, Tunnel Boring.

5.2.4 Management Actions during Construction period

5.2.4.1 SURV.2- Environmental supervision of construction methods

<p>[OC- 18] - Site inspection and environmental coordination meetings.</p> <ul style="list-style-type: none"> > Organize weekly inspection of the different work sites jointly by the HSE Managers of the Owners Engineer and the EPC Contractor. > Prepare weekly report using a standard inspection sheet. This information sheet will check all the environmental and social specifications imposed on the EPC contractor item by item, giving an immediate overview, during each inspection, of potential cases of non-conformity (photo illustrations before/after non-conformity). > Organize formal fortnightly environmental coordination meetings (i.e. separated from technical activity progress meetings) on site with the Construction Manager of the EPC Contractor, the Resident Engineer (Owners Engineer) and the Chief Operating Officer (Project Company) together with the HSE Managers of each of the three parties. > Conduct regular fire safety audits
<p>[OC- 19] - Environmental non-conformity management.</p> <ul style="list-style-type: none"> > Inform each environmental non-conformity (ENC) detected by the EPC Contractor staff, the OE or JSCNH staff in a standard record sheet to be filled in by the observer, including photographs, and submitted to the OE-HSE Manager for action. This process will follow the EPC Contract provisions and will be adapted to the severity of the situation. > Record ENCs into a dedicated Register (Excel spreadsheet). If the solution proposed by the EPC Contractor result is acceptable, ENCs are closed after checking that the measure has been effectively and successfully implemented on site.
<p>[OC- 20] - Environmental monitoring carried out by the EPC Contractor.</p> <ul style="list-style-type: none"> > Collect monthly results of the environmental and social monitoring carried out by the EPC Contractor for effluent quality, air quality, noise and vibration, ground water close to landfill, or jobs offered to local population. > Forward them to Project Company for incorporation into the Project GIS Data Base.
<p>[OC- 21] - Site Rehabilitation Planning and execution.</p> <ul style="list-style-type: none"> > Review of EPC Contractor Site Rehabilitation Management Plan by JSCNH to ensure consistency with Vegetation Management Plan. > Selection of seeds and species planned to be used for site rehabilitation in accordance with agreed long-term use of reinstated area: fodder species for future pastures, erosion control, red list species replanting. > Preparation of tree nursery scheduled on time, location and quantities in accordance with intended replanting schedule and after-care work plan.

5.2.5 Performance indicators

Component	Performance indicators
SURV1.- Integration of alternative design into final design	<ul style="list-style-type: none"> • Detailed Design drawings showing adopted alternative design as recommended by the ESIA and Supplementary E&S documentation prior to start of the works. • Minutes of Meeting with villagers showing agreement with proposed/restored access to pasture areas blocked by the worksites prior to access impediment. • Visual inspections during construction works to check progress of works and compliance with agreed alternative design.
SURV2.- Environmental supervision of construction methods	<ul style="list-style-type: none"> • Approved alternative method statement proposed to replace/limit the use of shotcrete/concrete protection above the main project components (e.g. powerhouse). • CC-ESMP plans submitted according to contractual provisions. Approval letters from OE. • Land-take drawings, method statements, environmental permits if required and/or agreement with affected stakeholders, for infrastructures not covered by the Environmental Permit (2015 ESIA) or the October 2015 land take drawings

Component	Performance indicators
	<p>(e.g. access roads, service line, and disposal area at the powerhouse).</p> <ul style="list-style-type: none"> • Local recruitment policies and offices opened as per EPC Contract specifications • Minutes of public information meetings on traffic management and construction methods. Attendance sheets. • Weekly Environmental Inspection Sheets • Up-to-date, fully populated Non-Conformities register • Monthly report of monitoring activities (water quality, air & noise, local jobs). • Availability of tree nursery(ies) two years prior to first replanting activities.

5.3 Land Acquisition and Livelihood Restoration

5.3.1 Why is this plan needed?

The construction and operation of the Nenskra HPP will require land acquisition and restriction of land use. These land acquisition and restriction of use could induce adverse effects for the affected households. A detailed Land Acquisition and Livelihood Restoration Plan (LALRP) has been prepared in compliance with the Lenders E&S policies (see Vol. 9 of the Supplementary E&S Studies) to mitigate these effects. This ESMP aims at capturing all commitments and measures planned by the Project to mitigate or compensate adverse E&S effects, therefore the paragraphs below summarize the management actions relating to the detailed LALRP.

The LALRP issued in 2017 with the Supplementary E&S studies covers the Project's components for which the footprint was known before the public disclosure started. They include (i) the Nenskra dam site and the reservoir area, (ii) the powerhouse area, (iii) the Nakra water intake area; (iv) the operators village, and (v) the Nenskra road widening. A total of 771 ha will be needed for these components.

There will not be any permanent physical displacement. Overall, 80 households could be affected by the land take process and would be entitled to compensations and measures defined in the LALRP (53 in the Nenskra valley and 27 in the Nakra valley):

- Four households at the powerhouse site affected by loss of land, crops and trees, one unoccupied house and ancillary structures;
- One households will lose an unused land plot for the construction of the Operator village;
- Twenty households in the Nenskra valley, who use pasture land within (i) the future reservoir area and (ii) the area planned for site installations and workers camp during the construction period;
- Twenty-seven households in the Nakra valley will lose pasture and forest land that is required for the Nakra water intake as well as site installations and workers camp during the construction period.
- Thirty-two households affected by partial loss of land plots, 31 fences and 48 trees in the Nenskra valley as a result of road widening works. Amongst these 32 households, 4 are at the same time affected by one of the other Project components.

Significantly affected households are defined as the households losing 10% or more of their income generating assets. Severely affected households are defined as the households losing more than 20% of their income generating assets. The significance of the impacts of the Land acquisition is synthetized in the Table 5 below.

Table 5 – Overview of the significance of the land acquisition impacts

	Project's component	Number of households	Number of individuals	Number of vulnerable households	Number of woman headed households
Total affected by land acquisition	All	80	366	28	9
Total affected by loss of non-productive assets, without loss of means of livelihood	Nenskra road upgrading + operator's village	29	128	13	6
Total economically displaced	Nenskra dam & reservoir, powerhouse, Nakra water intake	51	238	15	3

	Project's component	Number of households	Number of individuals	Number of vulnerable households	Number of woman headed households
Total significantly affected	Nenskra dam & reservoir, powerhouse	24	127	4	1
Total severely affected	Nenskra reservoir, powerhouse.	13	76	1	0

The principles adopted for this LALRP will be applied to the future land acquisition process required for components which are not defined at this time, namely (i) the rehabilitation of the Nakra road, (ii) the disposal areas at the powerhouse, (iii) the 35 kV electric service line between the powerhouse and the dam site and the 110 kV transmission line from the existing Khudoni Substation to the Powerhouse, both required for the construction period. The LALRP will be updated when the basic design of these components is known in 2017.

Specific objective

The objectives of the LALRP are to:

- > Avoid involuntary resettlement. When avoiding involuntary resettlement is not possible, minimize and mitigate adverse impacts.
- > Provide full and accurate information about the Project, and offer to the potentially affected persons opportunities for participation in design, implementation and monitoring, with particular attention paid to the requirements of vulnerable households and women;
- > Prevent the impoverishment of affected persons as a consequence of compulsory land acquisition or loss of livelihood due to project activities through (i) compensating the losses to full replacement cost; and (ii) improving whenever possible or at least restoring the levels of livelihoods of the people affected by the Project's land take.
- > Ensure that affected persons are informed of the resettlement process and are aware of the grievance resolution system available through the Project, and
- > Provide, when needed, additional assistance for vulnerable groups.

5.3.2 Components, timing and responsibilities

Five main components form the LALRP:

- LALRP1.- Preparation, negotiation and compensation
- LALRP2.- Livelihood Restoration
- LALRP3.- Update of the LALRP
- LALRP4.- Monitoring

Most of the LALRP activities will be implemented during the construction phase. Some livelihood restoration activities could continue during the operation phase. JSCNH has the overall responsibility of the LALRP implementation.

5.3.3 Management actions during Construction and Operation

5.3.3.1 LALRP1.- Preparation, negotiation and compensation

[OC- 22] - Land report preparation and submission.

- > Obtain land take drawings from EPC Contractor.

- > Describe compensation framework using LALRP report
- > Submit to GoG and engage the GoG Resettlement unit.

[OC- 23] - Assist the GoG in negotiation with affected households.

- > Ensure identification of affected persons, their entitlement and negotiation with them follow LALRP Policy framework that reflects the Lenders policies.
- > Plots registration for legalizable land
- > Document the process: agreed compensation package, willingness of affected persons to move, documents signed by the parties, unsolved issues.

[OC- 24] - Payment of compensation.

- > Document the process: sums, timing, form of payment.

5.3.3.2 LALRP2.- Livelihood Restoration

[OC- 25] - Transitional supply of fodder for people affected by loss of pasture

- > Temporary supply of fodder provided to households to allow them to continue feeding livestock during the transition period between the time when access to pasture land is lost and when all the mitigation measures, including livelihood restoration measures, have been implemented and are operational.

[OC- 26] - Livelihood restoration for people significantly affected

- > Hire preference and Skills training
- > Assistance for management of received financial compensation
- > Support to improve exiting economic activities
- > Development of alternative sources of income
- > Assistance for legalisation and land ownership
- > Improvement of existing tracks to non-affected pasture areas.

[OC- 27] – Livelihood restoration for severely affected people.

- > Measures available to significantly affected households
- > Assistance to develop sustainable livestock production
- > Assistance to develop to grow and sell nuts and hazelnuts
- > Assistance to develop beekeeping and sale of honey
- > Assistance to develop market gardening.

5.3.3.3 LALRP3.- Update of the LALRP

The update of the LALRP for land take caused by project components not defined at this stage, will follow a similar process as the process described in LALRP1.

[OC- 28] – Avoidance or minimization of any additional physical displacement

- > It is not anticipated that physical displacement will be caused during the main construction period as result of the project components which are yet to be defined.
- > Document the change of design/construction methods implemented by the EPC Contract to avoid physical displacement.

[OC- 29] - Land report preparation and submission for areas not defined in December 2016

[OC- 30] - Assist the GoG in negotiation with affected households for areas not defined in December 2016

[OC- 31] - Payment of compensation for affected areas not defined in December 2016

[OC- 32] – Update LALRP report and database

5.3.3.4 LALRP4.- Monitoring

[OC- 33] – Internal monitoring and evaluation

- > Monitor internally the implementation of the LALRP. Record details of all affected persons, their compensation entitlements and the status of payment in the Project database and update regularly.

<p>> Prepare internal monitoring reports on a monthly basis during the first 3 years of the LALRP implementation and then on a quarterly basis until the LALRP completion: Accomplishments to-date; Number of compensation agreements signed; Number and amount of compensation paid; Number of PAP having received transitional allowance, by nature (in kind or cash) and amount; Number and nature of livelihood restoration activities conducted, and number of PAP participating in these activities; Objectives attained and not attained during the period; Problems encountered; Number of grievances lodged, by type, location and gender of complainant, and number resolved, and Suggested options for corrective measures.</p> <p>> Prepare internal completion report three years after payment of last compensation packages.</p>
<p>[OC- 34] – External monitoring and audit</p> <p>> Appoint an external monitoring consultant to conduct six-monthly monitoring audits, to demonstrate that livelihood restoration is being achieved or if supplemental assistance is required for PAPs.</p> <p>> Appoint an external auditor to undertake an external completion audit 3 years last payment of compensation packages.</p>

5.3.4 Performance indicators

Component	Performance indicators
LALRP1.- Negotiation and compensation	<ul style="list-style-type: none"> • Land reports containing land take drawings are submitted to the GoG on time and the Resettlement Unit is created. • Availability of documentation on number of affected households and people, on the negotiation processes and on agreed compensation packages. • Availability of the documentation regarding the compensation processes.
LALRP2.- Livelihood Restoration	<ul style="list-style-type: none"> • Km of pasture tracks improved • Number of farmers receiving agricultural support to improve fodder crops production and receiving transitional fodder supply • Number of affected people recruited by the Project and receiving skills training • Number of affected people receiving support for Financial management of compensation • Number of affected people receiving support to improve exiting economic activities • Number of affected people receiving support to develop alternative sources of income • Number of affected people receiving assistance to develop sustainable livestock production • Number of affected people receiving assistance to develop to grow and sell nuts and hazelnuts • Number of affected people receiving assistance to develop beekeeping and sale of honey • Number of affected people receiving assistance to develop market gardening
LALRP3. – Update of the LALRP	<ul style="list-style-type: none"> • Land reports containing land take drawings for areas not defined in December 2016 are submitted to the GoG on time. • Availability of documentation on number of affected households and people, on the negotiation processes and on agreed compensation packages for areas not defined in December 2016 • Availability of the documentation regarding the compensation processes for areas not defined in December 2016 • Availability of the updated LALRP and of the updated LALRP database.
LALRP4.- Monitoring	<ul style="list-style-type: none"> • Comprehensive database of affected people established and updated at least on a monthly basis • Number of up-to-date internal LALRP monitoring reports available and fully populated. • Availability of Internal Completion Report 3 years after the payment of the last compensation package • Number of six-monthly monitoring audits available • Final completion compliance report available 3 years after the payment of the last compensation package.

5.4 Restoration of access to pastures

5.4.1 Why is this plan needed?

Social baseline surveys as well as public meetings conducted in 2015 and 2016 confirmed the primary role of livestock rearing in local subsistence activities. Project facilities in the three main worksites (Nenskra dam, Powerhouse area and Nakra water intake) could impair access to existing pastures in the upper part of the Nenskra or Nakra valleys. Likewise, temporary installations such as construction camps and disposal areas could damage existing pastures. These two adverse impacts (loss of pastures and loss of access to pastures) are to be addressed during the detailed design of the temporary installations as well as during the planning of the rehabilitation works in order to avoid or limit their significance for the community. This requires activities that must be undertaken by both the EPC Contractor and JSCNH (i) on time to avoid impairment of access to pasture and (ii) in consultation with affected villagers; this is the reason why the present plan is needed.

Specific objective

Impairment of access to pasture which are located outside the worksites and blocked by temporary facilities (camps, technical installations) will be avoided during the construction period. Site rehabilitation plans will be prepared and executed to optimize the creation of pastures on reinstated areas. Impairment of access to pasture which are located upstream of the reservoir area will be restored through the construction of a reservoir by-pass cattle track.

This plan does not aim at compensating the loss of pastures, whether permanently lost due to operating purposes (reservoir impoundment, permanent facilities) or temporarily during the five years of construction period (camps, technical installations). Compensation for permanent or long-lasting loss of pasture is addressed in the Land Acquisition and Livelihood Restoration Plan.

5.4.2 Components and responsibilities

Two components form the present plan:

- PAST.1- Restoration of access to pastures
- PAST.2- Restoration of pastures on temporary facilities
- PAST.3- Construct a reservoir by-pass access track

The three components will be implemented at different periods:

- The restoration of access to pastures (PAST.1) will be implemented at the dam site and the powerhouse during the early works, in **March to Sept. 2017** as the workers' camps and technical installations are constructed. At the Nakra water intake area, this component will be implemented in 2018 when the construction activities for the camp and technical installations start.
- The restoration of pasture lost on temporary facilities will be implemented during the main construction period, starting with the planning phase during the final landform design (disposal area, camps) and continuing during the rehabilitation works prior to demobilization (2020).
- The construction of the reservoir by-pass access track will start after the main construction activities at dam site. The proposed route may recycle one of the access

tracks used for construction purposes (e.g. access to quarry areas or access to Transfer Tunnel outlet). The use by the EPC Contractor of the land situated above the reservoir supply level must be finished before starting opening the cattle track to the communities. This is required for safety reasons but also for land use planning reasons.

The EPC Contractor is the entity that executes the works. JSCNH delegated the management and supervision of the EPC Contract execution to the Owners Engineer. The Owners Engineer is therefore the primary implementing body for the management actions described below.

5.4.3 Management actions during Construction

A. PAST1.- Restoration of access to existing pastures

[OC- 35] - Map existing accesses and propose alternatives to avoid disruption of access to pastures.

- > Map existing access identified through the ESIA process at the appropriate scale in three main worksites (powerhouse, dam site and Nakra water intake).
- > Instruct EPC Contractor to adapt detailed design of temporary facilities to avoid disruption of access to pasture or to design the construction of a by-pass track to surround the works.
- > Map the selected alternatives.

[OC- 36] - Engage the affected villagers and confirm appropriateness of proposed alternative.

- > Using the drawings proposed by the EPC Contractor, engage the communities and check appropriateness of the proposed alternatives for each of the three worksites.
- > Confirm the proposed solution or amend accordingly.

[OC- 37] – Execute and control effectiveness of agreed solutions

- > Execute the agreed solution to restore access to existing pastures before construction at each of the three construction sites
- > Disclose the availability of access to pastures to the affected farmers
- > Control effectiveness of access to existing pasture every season.

[OC- 38] - Reinstate main access to existing pasture prior to demobilization.

- > Ensure that main access to existing pasture are restored after removal of site installations and camps
- > Ensure that access to pastures which are away from the project permanent facilities will not be impaired by the access restrictions implemented for safety reasons in the immediate vicinity of the dam, the Powerhouse and the Nakra intake.

B. PAST2.- Restoration of pastures lost on temporary facilities

[OC- 39] - Design the final landform of temporary facilities to optimize conversion into pastures

- > Before the start of the disposal activities, discuss the planned final landform (slope, footprint, crown) of disposal areas with EPC Contractor.
- > Agree on rehabilitation targets (pasture, forested area) on all temporary areas (camps, disposal areas, site installations, borrow areas)
- > Review proposed planning of disposal areas earthworks according to agreed rehabilitation target.
- > Supervise stockpiling of appropriate volume of topsoil during excavation in accordance to needs planned for rehabilitation.
- > Anticipate lack of top soil for site rehabilitation downstream of dam, and supervise removal of topsoil and vegetation compost from future reservoir area and stockpiling outside the reservoir area.

[OC- 40] – Execute the planned conversion of temporary facilities into pastures

- > Supervise the zoning of the areas to be converted into pasture, and the preparation of the land as soon as the temporary area is no longer used: topsoil, slopes, drainage, levelling.
- > Confirm or amend the selection of pasture-adapted seeds by EPC Contractor
- > Monitor and document sowing of pasture-adapted seeds.

C. PAST3.- Construct a reservoir by-pass cattle track

[OC- 41] - Routeing study and feasibility study

- > At the start of main construction, map track(s) planned by the EPC Contractor for access to worksites located above reservoir full supply level (e.g. Nakra Transfer Tunnel outlet) and confirm timing for handing over.

- > Procure the Engineering work required for feasibility study
- > Perform routing study taking into account topography, exposure to natural hazards (avalanche, debris flow), maintenance requirements, physical obstacles newly created by construction (e.g. quarry area, dam operational areas, transfer tunnel outlet), and possibility to recycle one of the accesses used for construction purposes.
- > Identify all legal requirements relating to construction of new cattle track
- > Consult with community about preferred option
- > Conduct required field work to establish the conditions of technical feasibility
- > Establish basic design, construction schedule, investment and maintenance cost.
- > Complement the EPP for the operation phase (see Section 5.7.4) with any potential risks and mitigation that would need to be in place from the moment the cattle track is brought into service. Any mitigations would need to form part of the annual EPP meetings with local community representatives. Also, any mitigations would need to form part of the handover to the municipality if it takes ownership.

[OC- 42] – Agree with authorities on ownership, operation and maintenance

- > Discuss and agree with Mestia municipality on which governmental agency or local authority will own the newly created reservoir by-pass track
- > Determine responsibilities on (i) maintenance in case of blockage by debris flow, (ii) liabilities in case of accident, (iii) controlling access to prevent use by vehicle.
- > Establish memorandum of understanding accordingly with relevant authorities or governmental agencies.

5.4.4 Management actions during operation

A. PAST2.- Restoration of pastures lost on temporary facilities

[OO- 7] – Conversion of temporary facilities into pastures - Aftercare

- > Provide required after care during the first season following the EPC Contractor demobilisation.

B. PAST3.- Construct a reservoir by-pass cattle track

[OO- 8] - Execute the construction works

- > Procure the construction works.
- > Supervise works execution
- > Handover to Owner designated in the Memorandum of Understanding

5.4.5 Performance indicators

Component	Performance indicators
PAST.1- Restoration of access to pastures	<ul style="list-style-type: none"> • Design drawings of temporary facilities showing adaptation to avoid disruption of access to pasture or availability of design drawings of a by-pass track to surround the works • Minutes of meetings with affected farmers documenting agreed solution to restore impaired access to pastures for each of the three construction sites • Availability of access to pasture areas before construction at each of the three construction sites (Nenskra dam, Powerhouse, Nakra water intake). • Availability of access to pasture areas each summer during construction • Availability of reinstated main access to existing pasture prior to demobilization.
PAST.2- Restoration of pastures lost on temporary facilities	<ul style="list-style-type: none"> • Design drawings showing conversion into pasture of part of the temporary facilities in the rehabilitation plan • Availability of maps of areas that will be converted into pastures • Areas (ha) of pastures rehabilitated before EPC Contractor demobilization. • Percentage of reinstated areas effectively converted into pasture after 2 years
PAST.3- Construct a reservoir by-pass cattle track	<ul style="list-style-type: none"> • Conceptual design of preferred option • Contract with construction company • Availability of reservoir by-pass cattle track in 2021

5.5 Community Investment

5.5.1 Why this programme is needed?

The Project recognizes that the economic benefit at national level will be produced using the natural resources of the Nenskra and Nakra valleys and that communities have a right to share in that benefit – and that this is not compensation for negative impacts. The Social Impact Assessment as well as public meetings conducted in 2015 highlighted the need to share the Project benefits more fully with local communities. For that purpose, a Community Investment Strategy will be established by JSCNH. Based on this strategy, annual Community Investment Programmes will be developed and implemented to contribute to local initiatives that address educational, economic and social needs of communities and that will be sustainable in the long term.

JSCNH's competence is primarily power generation. Supporting Community Investments requires specific management and governance to achieve the planned development target, to reach the intended beneficiaries and to avoid misappropriation of funds. It calls for the implementation of activities and the mobilization of appropriate skills; this is the reason why the present plan is needed.

Specific objective

Local investments which sustainably address educational, economic and social needs of communities will be financially supported through Community Investment Programmes sourced by JSCNH during the construction and operation periods.

5.5.2 Components, timing and responsibilities

Two components form the present plan:

- CIP1.- Governance and Planning
- CIP2.- Delivering community investment

The CIP will fund initiatives and activities in affected villages in the Nenskra and Nakra Valleys. Residents of Chuberi village in Nenskra valley and Naki village in the Nakra valley will be the primary target groups. The CIP will be active during the life of the Project with a financing peak planned during the construction period (2017-2021). During operation, the number and nature of financed local initiatives will depend on a new Community Investment Strategy which will be developed based on the achievements during construction phase and lessons learnt.

The CIP will be managed by JSCNH. An internal unit (see organization chart in Section 5.1.3) will be created to work directly with communities to implement the Community Investment initiatives. The objective is to materialize the first investments in 2017 on the basis of the investments proposed to the communities and further prioritized by the representatives of each valley end of 2016.

During the Project's construction period (2017-2021), implementation of the CIP will be monitored by an Advisory Committee made up of: (i) representatives of the Mestia Gamgeoba in Chuberi and Nakra communities, (ii) members of Mestia Sakrebulo elected from Chuberi and Nakra communities, (iii) representatives of each hamlet in each valley (Nenskra and Nakra valleys), and (iv) and representatives of JSCNH. During the operation period, JSCNH will also work with the Advisory Committee to screen the future investment options and prioritize

shared areas of interest. This screening will be undertaken internally based on the input received from communities and Mestia Municipality before soliciting feedback from stakeholders. Screens that would be applied are:

- Level of priority for Chuberi and Nakra communities.
- Sustainability factors, i.e. viable handover strategy and clear set-up for the ownership, operation and maintenance arrangements to avoid creating dependency and to ensure that the initiative can become self-sustaining once JSCNH withdraws its support. This includes consideration of the local government's interest in reaching an agreement for revenue sharing, and the availability of local implementing partners to deliver the initiatives and services.
- Alignment with existing government or municipal plans for local developments.
- Benefits are spread equitably among beneficiaries.
- When possible, rehabilitate or complete existing infrastructure before investing in new construction.
- Avoid infrastructure investments to dominate the Community Investment portfolio and complete these investments with others that build capacity and productive skills.
- Cost-benefit analysis, i.e. the number of people benefiting from the option versus the cost for JSCNH

Funding will not be allocated to initiatives supporting one of the following agenda:

- political and religious purposes,
- private business purposes,
- individual personal gain.

5.5.3 Management actions during construction

5.5.3.1 CIP1.- Governance and planning of community investment

[OC- 43] - Finalize the priority investment plan for 2017 and establish annual CIP

- > Confirm priority investments presented to, and refined with, Mestia Municipality and representatives of Nenskra and Nakra in November 2016: Ambulances for Chuberi and Nakra; Upgrading works of village internal roads in the two village; Kindergarten in v. Lakhani; Administrative building in Chuberi; Rehabilitation of administrative-cultural buildings in Nakra; Technical study on improved water supply system.
- > Clarify institutional arrangements: who owns the works/services during construction/establishment and how/when/to whom is transferred the ownership when project funding ends. Flag/remove initiatives that have no sustainable (i.e. without Project's support) operation and/or maintenance system.
- > Clarify potential liability issues associated with initiatives and flag/remove initiatives where liabilities are unacceptable.
- > Establish memorandum of understanding with Mestia Municipality on ownership, operation and maintenance responsibilities.
- > Screen local implementing partners' capacity to deliver the initiatives and services.
- > Breakdown the execution of each investment into sub-tasks, establish an activity schedule with milestones and share with Advisory Committee.

[OC- 44] - Create the CIP Advisory Committee and establish operating rules.

- > Create the Advisory Committee for each of the 2 valleys in charge of (i) monitoring implementation, (ii) informing the households they represent about progress, (iii) evaluate achievement of initially-agreed objectives for each funded initiative. JSCNH Social Team will invite each hamlet in the 2 valleys to nominate one or two representatives, gender balanced. A MoU will be developed and signed by all members of the Advisory Committee.
- > Organize the first CIP Advisory Committee and present the investment plan for the construction period: preparation steps (i.e. procurement, technical studies), time required for construction or supply, required

conditions of sustainability

- > Prepare, discuss and sign off a Memorandum of Understanding that will (i) rule the Committee decision process, (ii) detail responsibilities and accountabilities, (iii) establish the reporting system.

[OC- 45] - Manage the CIP.

- > Organize monthly site visits and quarterly meetings with Advisory Committees to monitor progresses, solve pending issues and evaluate achievements.
- > Manage budget, invoices and payment
- > Prepare six-monthly reports on CIP management and achievements.
- > Disclose CIP achievements to local communities as part of the external E&S reporting from the Project including on the Project's website.

[OC- 46] - Secure long-term use/benefit of the CIP-funded initiatives.

- > Formalize taking-over with the long-term owner of the goods/services/works funded by the CIP
- > Sign a MoU on long-term responsibilities and maintenance requirements with owner.

5.5.3.2 CIP2. - Delivering community investment

[OC- 47] - Investments in the health sector

- > Obtain typical specifications from institutional suppliers (Ministry of Health or Mestia) for ambulance, medical diagnostic devices, and medical incinerator for the Chuberi Clinic. Obtain a list of potential suppliers.
- > Work with Chuberi Clinic to (i) validate or amend specifications and (ii) verify availability of resources to operate and maintain the ambulances and equipment without assistance from JSCNH.
- > Request quotations, select, procure and deliver the ambulances (2017, Chuberi and Nakra), medical diagnostic devices (2018, Chuberi) and medical incinerator (2019, Chuberi).
- > Select engineering firm or architect to design, supervise and specify the rehabilitation works required for the Clinic's Premises in Chuberi. Agree on scope of work, contract, and mobilize.
- > Work with the Clinic operators to agree on rehabilitation programme, constraints during construction (i.e. continuity in providing medical care) and prepare tender document for rehabilitation works of the clinic.
- > Pre-select three local construction companies specialized in building rehabilitation/construction, request proposals. Select, mobilize and supervise.

[OC- 48] - Internal roads

- > Select engineering firm to design, specify and supervise the works required for the upgrading of village internal roads. Agree on scope of work, contract, and mobilize.
- > Survey the existing internal roads. Establish preliminary program of works in line with available budget. Consult local community representatives. Design upgrading works and prepare tender documents.
- > Pre-select three local construction companies specialized in road rehabilitation, request proposals. Select, mobilize and supervise.

[OC- 49] - Rehabilitation or construction of buildings

- > Pre-select engineering firms or architects to design, specify and supervise the works required for the construction of the Lakhmi and Chuberi kindergartens, the construction of an administrative building in Chuberi, the rehabilitation of administrative-cultural buildings in Nakra, and the construction or rehabilitation of Nenskra and Nakra school buildings. Organize a site visit, agree on scope of work, select and contract preferred candidate.
- > Verify land tenure and ownership of all individual parcels where the construction or rehabilitation works are located.
- > Conduct the required site investigations or building diagnosis for each investment. Establish a programme of works, site by site, according to the annual budget planned with JSCNH. Consult with beneficiaries. Assess constraints in terms of service continuity during construction. Prepare technical specifications and tender documents.
- > Pre-select three local construction companies specialized in building rehabilitation/construction, request proposals. Select, mobilize and supervise the works for the Lakhmi kindergarten (start in 2017), the administrative buildings in Chuberi and in Nakra (start in 2017), the Nenskra and Nakra school buildings (start in 2018) and the Chuberi kindergarten (start in 2018).

[OC- 50] - Vocational training and skills development for construction period

- > Establish with EPC Contractor and its subcontractors the skills which will be hired in Georgia during the main construction period.
- > Define objectives of vocational training and skills development programme (i.e. training of voluntary candidates

from Chuberi and Nakra to skills need for the main construction period) and procure a call for proposals to select a consultancy or an NGO with best experience and appropriate delivery model - Contract for 1 year and agree with the selected organisation on a management framework adapted to the Project situation and vocational training objectives

- > Establish preliminary list of training centre or providers and discuss relevance and skills match with the EPC Contractor. Establish eligibility criteria to training sessions and validate with Advisory Committee. Inform local community and establish list of candidates to vocational training. Ensure candidates understand that the proposed vocational training purpose is to raise competences and increase likelihood of finding a job, with no obligation for contractors or subcontractors to hire trained persons.
- > Organize logistics arrangements for training sessions performed away from Mestia Municipality.
- > Execute the training sessions and deliver training certificates.
- > Inform the EPC Contractors and subcontractors of list of trained persons with contact details.
- > Evaluate effectiveness of vocational training supported by the CIP with EPC Contractor.
- > Adapt next training sessions accordingly.

[OC- 51] - Agriculture and livestock support

- > Establish scope of work for the technical assistance and define a management framework adapted to the need of agricultural support.
- > Select a technical partner (consultancy or NGO) specialized in agricultural support initiatives in mountainous areas. Contract.
- > Establish conditions of sustainability (e.g. pilot farms, input from beneficiaries) and annual work programmes for the first three years. Consult with community and get consent on the proposed approach. Formulate proposed objectives, results, activities, performance indicators, budget and assumptions into a concept note and present to Advisory Committee.
- > Execute the programme activities.
- > Monitor efficiency, effectiveness and sustainability every 6 months against initial objectives.

[OC- 52] - Tourism enhancement

- > Archaeological studies and survey program
- > Implementation of recommended tourism information boards and parking areas / view points

[OC- 53] - Support to preservation of Intangible Cultural Heritage

- > Participatory inventorying of local intangible cultural heritage in the Nenskra and Nakra Valley
- > Support to the Svaneti Museum of History and Ethnography in Mestia
- > Support to the development of a cultural centre in Nenskra and Nakra valley
- > Support to traditional craftworks

5.5.4 Management actions during operation

5.5.4.1 CIP1.- Governance and planning of community investment

[OO- 9] - Evaluation of CIP performance during construction period

- > Independent evaluation of the past years CIP initiatives funded by the Project and effectiveness of the Community Investment Strategy.
- > Lessons learnt from construction period on governance, technical partners, impacts, sustainability.
- > Consultation with local stakeholders, conduct perception survey and revise Community Investment governance accordingly.

[OO- 10] - Four year community investment strategy

- > Conduct a need assessment in the 2 valleys and identify potential initiatives eligible to CIP funding using participatory approach and in line with available annual CIP budget.
- > For each project proposal, clarify institutional arrangements: who owns the works/services during construction/establishment and how/when/to whom is transferred the ownership when project funding ends. Flag/remove initiatives that have no sustainable (i.e. without Project's support) operation and/or maintenance system.
- > Include fish farm activities in agricultural support.
- > Present proposed initiatives to CIP Advisory Committee and assist in prioritizing projects.
- > Establish Annual Work Plan for the CIP implementation in the Nenskra Valley and the Nakra valley.

5.5.4.2 CIP2.- Delivering community investment

[OO- 11] - Execute the works/services required for the CIP-funded initiatives.

- > Contract executing entity as required by the selected initiatives: construction company, advisory services company, supplier, governmental agency.
- > Execute the works/services
- > Report on works/services progress
- > Formalize taking-over with the long-term owner of the goods/services/works funded by the CDF

5.5.5 Performance indicators

Component	Performance indicators
CIP1.- Governance and planning of community investment	<ul style="list-style-type: none"> • Signed contract with technical partners • CIP Advisory Committee created • Signed Memorandum of Understanding for each CIP initiatives • Minutes of meetings of quarterly CIP Advisory Committee • Number of available reports on CIP management and achievements.
CIP2.- Delivering community investment	<ul style="list-style-type: none"> • Availability of the results of the Community needs assessment • Number of available annual work plans for CIP implementation • Number and nature of works/services undertaken as part of the CIP • Number of signed MoU on long-term responsibilities and maintenance requirements with owner

5.6 Downstream flood and erosion protection plan

5.6.1 Why is this plan needed?

The Hydrology and Water Quality Impact Assessment (Vol. 5 of the Supplementary E&S studies issued in 2017) showed that:

- The reduced flow in the Nakra River resulting from the diversion of the water to the Nenskra reservoir could significantly reduce the capacity of the river to flush away accumulated sediments from downstream debris flow and/or mudflow.
- The opening of the bottom outlet gate at the Nenskra Dam could, in extremely rare and unlikely situations, generate downstream flows and water levels higher than those observed in the past decades, hence exposing structures and settlements located within flooding areas.

The two above-listed risks must be further studied in details in order to design and execute the river works required to protect the downstream riverine population from determined flood risks prior to the start of reservoir impoundment. It requires specific engineering expertise and budget resources; this is the reason why the present plan is needed.

Specific objective

Flood risk for downstream communities due to (i) reduced bedload capacity of the Nakra River downstream of the Nakra water intake or (ii) Nenskra flood flows downstream of the Nenskra dam that could be higher than for the natural situation due to reservoir operations, is mitigated through river works, river maintenance and operating procedures.

5.6.2 Components, timing and responsibilities

Two components form the present plan:

- DOWN1.- Nenskra River Downstream Flood & Erosion Protection
- DOWN2.- Nakra River Downstream Sedimentation Protection

Engineering studies and associated construction of recommended flood protection works will take place during the construction period, prior to the materialization of the cause of the risks, i.e.:

- Prior to the diversion of the Nakra River flow through the Transfer Tunnel planned in January 2020.
- Prior to the closure of the bottom outlet planned in mid-2020.

JSCNH will implement the measures recommended in this plan. The detailed engineering studies will be performed by the Design team of the EPC Contractor specialized in hydraulics and river management studies. River maintenance activities, if required, would be subcontracted to a civil works company.

5.6.3 Management actions during construction

5.6.3.1 DOWN1.- Nenskra River Downstream Flood & Erosion Protection

[OC- 54] - Reservoir filling management

> Review the reservoir impounding plan proposed by the EPC Contractor and ensure the following aspects are

treated as per international good practices:

- Risk and safety analysis,
- Management of the filling and the water level,
- Monitoring concept and procedure during the reservoir impounding,
- Detailed procedure for operation of the bottom outlet.

[OC- 55] - Engineering studies within Chuberi and downstream of powerhouse.

- > Agree on Scope of Work with the Design Team of the EPC Contractor to study in details the following aspects:
 - Conduct topographic surveys and hydraulic modelling from dam to confluence with Enguri River in selected areas where floods could affect the downstream population.
 - Run the model for the entire flood range, in order to determine the flow values (and the associated return periods) which are associated with certain levels of risks, so that the early warning system can be used to inform and protect people. The model will also be used to define the operation mode for planned discharge (e.g. sediments flushing from bottom outlet).
 - Map flood plain delineation downstream of the dam down to confluence with Enguri River using the results of the hydraulic model run by the EPC Contractor for various operational discharge from dam (bottom outlet and/spillage - From Q₅ to PMF).
 - Describe exposed assets (houses, socio-economic structures).
 - Propose technical or operational solutions to reduce flooding risks.
- > There could be a risk of solid material accumulation and blockage in the Nenskra riverbed caused by lateral landslide on a steep high slopes above the river near the hamlet of Kari. Contract specialist engineering company to study the slope stability and identify solutions to protect the river or prevent landslides.
- > Engage and validate with local authorities.

[OC- 56] - Procurement of selected protection works.

- > Undertake detailed design for selected technical solutions in selected exposed areas, if any.
- > Prepare tender documents and procure the works.

[OC- 57] - Execution of flood protection measures.

- > Execute selected flood protection works, if any.
- > Assist local authorities in preparing required local regulation to ban or limit new constructions into exposed areas.
- > Integrate into the Emergency Preparedness Plan areas exposed to potential flood events due to reservoir operation.

5.6.3.2 DOWN2.- Nakra River Downstream Sedimentation Protection

[OC- 58] - Detailed engineering studies in Nakra river and downstream tributaries.

- > Prepare terms of Reference, select and contract specialist engineering company to study and determine the most effective method for controlling accumulated sediment by re-establishing periodically the natural flow of the Nakra River when the river is blocked:
 - flushing flow rates, frequency and duration,
 - sediment accumulation monitoring, and
 - evaluation of the need for and concept of river maintenance works.
- > Conduct topographic surveys and hydraulic modelling investigations where required to design the selected river maintenance works.
- > Prepare program of civil engineering works (during construction, before Nakra river diversion): initial design of selected technical solutions.
- > Prepare program of maintenance activities (during operation, from the start of Nakra river diversion) with detailed requirements in terms of (i) monitoring of sediments accumulation, (ii) standby and when needed mobilization of excavator to clean river bed, (iii) location and management of disposal area(s) for sediments removed from areas of accumulation.
- > Engage and validate with local authorities on the above listed aspects. Update the Stakeholder Engagement Plan accordingly.

[OC- 59] - Procurement of selected river maintenance works.

- > Undertake detailed design for selected technical solutions.
- > Prepare tender documents and procure the works

[OC- 60] - Execution of downstream protection works.

- > Execute selected riverbed maintenance works.

5.6.4 Management actions during operation

5.6.4.1 DOWN1.- Nenskra River downstream Flood & Erosion protection

[OO- 12] - Riverbed geomorphological monitoring.

- > Conduct and document an annual visual survey of the riverbed between the Nenskra River between the dam and about 1 km downstream of the power plant: observe potential accumulation of sediments within riverbed and potential erosion of riverbed or river banks caused by the Project.
- > Perform a topographical survey of the longitudinal water level profile at low water, between 400m upstream of the Chuberi main bridge and 1 kilometre downstream and between 500 metres upstream of the power plant and 500 metres downstream, first survey before works, then with a periodicity of 5 years, after dam construction.
- > Nenskra riverbank strengthening downstream from the powerhouse as and when required if erosion resulting from the Project operations is detected.
- > Corrective action in the event of accumulation of sediment in the Nenskra that results from Project activities and that represents a risk of flooding.
- > Communicate annually with local population on flood events severity observed downstream of the dam and measured by the Project river gauge station.

[OO- 13] - River Maintenance

- > If landslide does occur near the hamlet of Kari and results in solid material falling into the river below, physically remove solid material that is hindering the Nenskra river flow.
- > Inspect every year the flood protection works constructed by the Project and maintain as required.

[OO- 14] - Unexpected adverse effects on downstream springs

- > Should the Environmental Monitoring (see Section 5.13.4.2) or the grievance mechanism show that springs used by a household as the main source of drinking water downstream of the Nenskra dam are affected by the Project, mobilize a hydrogeologist specialist and work with the household to examine the case. Confirm or invalidate the claim.
- > If the Project is proved to be responsible of reduced discharge rate at springs used by a household, provide an alternative and sustainable source of potable water.

5.6.4.2 DOWN2.- Nakra River Downstream Sedimentation Protection

[OO- 15] - Riverbed geomorphological monitoring

- > Conduct and document an annual visual survey of the riverbed between the water intake and downstream of the Naki village.
- > Perform a topographical survey of the longitudinal water level profile at low water, at least from 1 kilometre upstream of the Lekverari confluence down to 1 kilometre downstream of this confluence, first survey before works, then with a periodicity of 5 years, after dam construction.

[OO- 16] - River Maintenance.

- > Remove regularly accumulated solid material upstream of any river works that would have been constructed for controlling accumulated sediments after flood or mudflow events.
- > As a precaution an excavator should be maintained on standby at the Nakra weir site during seasons of heightened potential for mud and debris flow.

[OO- 17] - Unexpected adverse effects on downstream springs

- > Should the Environmental Monitoring (see Section 5.13.4.2) or the grievance mechanism show that springs used by a household as the main source of drinking water downstream of the Nenskra dam are affected by the Project, mobilize a hydrogeologist specialist and work with the household to examine the case. Confirm or invalidate the claim.
- > If the Project is proved to be responsible of reduced discharge rate at springs used by a household, provide an alternative and sustainable source of potable water.

5.6.5 Performance indicators

Component	Performance indicators
DOWN1.- Nenskra River Downstream Flood Protection	<ul style="list-style-type: none"> • Contract with engineering consultancy available before end of 2016 • Flood plain mapping downstream of the dam and downstream of powerhouse for maximum operational discharge. • If flood protection works are required, basic design for flood protection works available in 2017. • If flood protection works are required, basic design for flood protection works available in 2017, flood protection works executed downstream of the dam before start of reservoir first impoundment.
DOWN2.- Nakra River Downstream Flood Protection	<ul style="list-style-type: none"> • Contract with engineering consultancy available before end of 2017 • Basic design for river works available in 2018. • River works executed downstream of the Nakra weir before start of Nakra transfer.

5.7 Emergency Preparedness Plan

5.7.1 Why is this plan needed?

The Nenskra Dam is located into a seismic prone area. Although the dam has been designed to resist the Most Credible Earthquake in the region, good industry practice requires the development of comprehensive and consistent Emergency Preparedness planning to protect lives and reduce property damage in case of dam failure or operational incident.

The Emergency Preparedness Plans (EPP) will identify and determine JSCNH responses to emergency conditions for the Nenskra dam, defined⁵ as follows:

- A dam failure hazard; or
- A downstream release hazard; this definition captures those spillway or bottom outlet releases which could cause substantial enough downstream flow to make it appropriate to notify local authorities and persons who might be affected; or
- A circumstance that potentially indicates an increase in the likelihood of a dam failure hazard or downstream release hazard happening. The hazard does not need to fully develop before an emergency condition is considered to have occurred. An example is ‘an unusual amount of seepage from the dam’. Such an event might lead to the activation of the EPP if it was to become serious enough that a dam failure hazard could reasonably be expected to occur.

Specific objective

Recruit and procure adequate human and material resources and put in place emergency planning to respond to rapid variations of downstream river water level including interface with local authorities and emergency services.

Annex 1 provides a draft EPP prepared as part of the 2017 Supplementary E&S studies. The management actions below describe how the document and processes will be finalized as the Project further develops.

5.7.2 Components, timing and responsibilities

Three components form the present plan:

- EPP1.- EPP Development
- EPP2.- Early Warning Systems, Training and Exercise
- EPP3.- Public Awareness Campaigns

The EPP will need to be fully available one year before the reservoir impoundment, which is planned to start in mid-2020. The first component (EPP1.- EPP Development) will be implemented in 2017-2018. The second component (EPP2.- Early Warning Systems, Training and Exercise) will be implemented during the main construction period and completed six months before the start of the reservoir impoundment. The third component (EPP3.- Public Awareness Campaigns) will be initiated within 3 months of the start of the reservoir impoundment.

⁵ State of Queensland, Australia, Department of Energy and Water Supply, June 2013. *Emergency Action Planning For Referable Dams*.

JSCNH owns the development, implementation and update of the EPP. The development of the EPP is delegated to the EPC Contractor since the reservoir filling will start during the construction period (see Section 4.19). The development and the implementation of the EPP will involve several other organizations involved in, or affected by, the incident management.

5.7.3 Management actions during construction

5.7.3.1 EPP1.- EPP Development

[OC- 61] - Agree on the scope of work with the EPC Contractor.

- > Prepare scope of work based on Georgian regulatory requirements and on the Guidelines for Dam Safety - Emergency Preparedness Planning for Dams prepared by the US Federal Emergency Management Agency⁶.
- > Ensure the EPC Contractor mobilize specialized expertise experienced in preparing EPP for large dams, with experience in countries with similar national incident management system as Georgia.
- > Identify and engage all entities, jurisdictions, and individuals that should be consulted in the preparation of the Nenskra EPP, i.e. parties affected by an incident at the Nenskra dam or that have the statutory responsibilities for warning, evacuation and post-incident actions.

[OC- 62] - Preparation of inundation maps

- > Conduct a Dam Failure Analysis considering realistic breach scenarios (“Fair weather” and PMF breach) to develop dam failure hydrograph and to estimate routing dam break flows downstream.
- > Map the areas that would be flooded and travel times for wave front and flood peaks at critical locations if a dam failure occurs or if there are operational releases during flooding conditions.
- > Engage with Enguri Dam operator and assess anticipated knock-on effects in case of Nenskra dam breach:
 - Expected performance of the Enguri dam in case of Nenskra dam failure and timescale of the event.
 - Need for extending the inundation zone mapping to cover Enguri dam failure.
 - Possible operation actions at Enguri dam (e.g. drawdowns) that could alleviate the flood wave
 - Need for update of the Enguri Dam EPP
 - Required coordination during the development of the Nenskra EPP below.

[OC- 63] - Develop the Emergency Preparedness Plan document

- > Determine and identify conditions that represent emergency situations for the dam. The conditions are to include those that indicate an imminent emergency situation or result in significant changes in releases or outflows from dam during floods. Specify the actions to be taken and by whom under what circumstances.
- > Identify areas that would be potentially impacted by emergency events.
- > Early consultation by, or on behalf of, the dam owner with all relevant stakeholders.
- > Identify response actions to be taken by dam personnel in response to potential emergencies or significant changes in releases or outflows from dams during floods
- > Identify any necessary resources, special tools, equipment, keys and indicate where they can be located if required in an emergency.
- > List and prioritise all persons and entities (including contact details) involved in the notification process and the roles and responsibilities assigned to them (a flow chart will be used)
- > Identify primary and secondary communication systems, both internal (between persons at the dam) and external (between dam personnel and outside entities or persons)
- > Develop a draft of the EPP, structured into the following sections:
 - Notification flowcharts and contact information.
 - Response process: Incident Detection, Evaluation, and Emergency Level Determination; Notification and Communication; Emergency Actions; Termination and Follow-up.
 - Responsibilities: Dam Owner Responsibilities, Notification and Communication Responsibilities, Evacuation Responsibilities, Monitoring, Security, Termination, and Follow-up Responsibilities, EPP Coordinator Responsibilities.
 - Preparedness activities: Surveillance and Monitoring, Evaluation of Detection and Response Timing; Access to the Site; Response during periods of Darkness/holidays/Adverse weather; Alternative Sources of Power and Alternative Systems of Communication; Emergency Supplies and Information; Stockpiling Materials and Equipment; Coordination of Information; Training and Exercise; Public Awareness and Communication.
 - Inundation maps
 - Additional information in appendices

⁶ US Federal Emergency Management Agency, July 2013, *Federal Guidelines for Emergency Action Planning for Dams*.

- > Consult with all parties (including emergency management agencies if any) included in the notification list, to review the draft EPP. Make any necessary revisions as a result of consultation process.
- > Disseminate the EPP to those who have responsibilities under the EPP.

5.7.3.2 EPP2.- Early Warning Systems, Training and Exercise

[OC- 64] - Procurement and installation of Warning Systems

- > Specify, procure and install at key locations warning systems recommended in the EPP: early warning systems such as sirens, warning signs across/along access to/the Nenskra riverbed.
- > Document the process.

[OC- 65] - Training and Exercises

- > Execute the training activities for the first year required by the EPP for the operational staff at dam and powerhouse in the incident management process, including detection, evaluation, notification, and appropriate response actions during all emergency level determinations. Ensure a sufficient number of people are trained to ensure adequate coverage at all times.
- > As and if required by the EPP and/or the local emergency management authorities, develop evacuation and shelter-in-place training materials for people in the Nenskra valley living immediately downstream of the dam and who would be inundated within a short time frame.

5.7.4 Management actions during operation

5.7.4.1 EPP1.- EPP Development

[OO- 18] - Reviewing the EPP

- > First year: Complement the EPP prepared by the EPC Contractor for emergency flood releases and dam failure with the response to identified avalanche or debris flow risks along the reservoir by-pass cattle track (see Section 5.4.3C). Any mitigations would need to form part of the annual EPP meetings with local community representatives (see below). Also, any mitigations would need to form part of the handover to the municipality if it takes ownership.
- > Please ensure that cattle track inclusion in the operational EPP, or separate EPP is committed from 2.4.3C and also captured in the EPP section
- > Every year:
 - Update all references and contact details to relevant entities in the EPP,
 - Amend the EPP to address (i) relevant legislative amendments, (ii) changes to the disaster management plan of the relevant jurisdiction, (iii) deficiencies identified in the EPP up to that time or to improve the efficiency and the effectiveness of the EPP.
- > Once reviewed, JSCNH will give the relevant authorities a notice stating whether or not JSCNH proposes an amendment of the plan because of the review; and if JSCNH proposes an amendment, a copy of the plan including the proposed amendment.

[OO- 19] - Emergency Event Reporting

- > Prepare an emergency event report and submitted to local authorities within 30 business days after the end of an event. An emergency event ends (i) if the event is a dam failure hazard that has happened, when JSCNH reasonably considers the hazard no longer poses a risk to the dam; or (ii) if the event is a downstream release hazard that has happened, when JSCNH reasonably considers the hazard no longer poses a risk to the safety of persons or property.

5.7.4.2 EPP2.- Early Warning Systems, Training and Exercise

[OO- 20] - Training

- > Implement the annual training activities included in the EPP for the operational staff at dam and powerhouse in the incident management process, including detection, evaluation, notification, and appropriate response actions during all emergency level determinations.

[OO- 21] - Testing of Early Warning Systems and Exercises

- > Implement the exercise program proposed in the EPP. The frequency of exercise will be as follows:
- Annually, (i) conduct a drill to test the sirens and warning systems and to check material in hand, (ii) organize a seminar with authorities involved in emergency management and other organisations with a role in EPP implementation, (iii) conduct a call-down drill of those listed on the Notification chart.
 - Every three years, starting from 2020, organize a functional exercise (field activity is simulated) to validate the coordination, command, and control between various multi-agency coordination centres.
 - Every five years, initiate and participate to full-scale scale exercises (field movement and mobilization) involving coordination between the relevant disaster management entities and other authorities as required in the EPP.

5.7.4.3 EPP3.- Public Awareness Campaigns

- [OO- 22] - Annual Public Awareness Campaigns**
- > Every year, implement the public awareness measures that are proposed in the EPP with populations or local community representatives to explain the proximity of the dam, how people will be informed of an emergency, and the actions people should take during an emergency.
- > This exercise will also focus on operation-related risks and will be an opportunity for people to report near misses in order to help improve the safety around the hydropower installations, including along the reservoir by-pass cattle track.

5.7.5 Performance indicators

Component	Performance indicators
EPP1.- EPP Development	<ul style="list-style-type: none"> • Scope of work for the EPP consultancy available by early [...] • Inundation maps available mid-[...] • EPP main document available and presented to local population by end of [...]
EPP2.- Early Warning Systems, Training and Exercise	<ul style="list-style-type: none"> • Early Warning Systems defined in Q2 [...] and integrated into the detailed design of the dam and of the powerhouse • Early Warning Systems installed at dam site before start of first reservoir filling • Early Warning Systems installed at powerhouse before start of first power generation
EPP3.- Public Awareness Campaigns	<ul style="list-style-type: none"> • Public awareness measures implemented every year as planned by the EPP.

5.8 Vegetation management

5.8.1 Why is this plan needed?

The reservoir impoundment, as well as the temporary and permanent works required for the construction and operation of the Nenskra HPP, will affect forested habitats, areas of which are on steep slopes and hence prone to erosion. Good Industry Practice recommends that habitat loss mitigated for on site where possible, or compensated for through eco-compensation, i.e. the planting of forestry, or management of forests elsewhere within the Svaneti Region with the aim of achieving no-net loss of habitat (within the region) or where possible a net gain. The reinstatement of the areas disturbed during construction requires long-term actions which go beyond the construction period. In addition, the Biodiversity Impact Assessment (Vol. 4 of the Supplementary E&S studies issued in 2017) showed that rare plant species may be affected on some of the construction platforms and would therefore require conservation initiatives, if confirmed to be present.

These three actions (planting of forestry, reinstatement of areas exposed to erosion, conservation of rare plant species) require prior planning, the mobilization of specific competences, and budget allocation during the construction and the operation periods. This is the reason why the plans that make up the Vegetation management are needed.

Specific objective

Replanting of vegetation is planned and will be implemented by the Nenskra HPP in order to (i) eco-compensate the loss of forested area due to reservoir impoundment and construction of project's infrastructure, (ii) ensure the long-term reinstatement of areas disturbed during the construction period and prone to erosion, and (iii) conserve possible rare plant species existing on the construction areas.

5.8.2 Components, timing and responsibilities

Three components form the present plan:

- VEG1.- Reforestation Management Plan
- VEG2.- Revegetation and Habitat Management Plan for areas disturbed during construction
- VEG3.- Rare floral conservation program

Re-vegetation and forest replanting are activities which will be implemented during both the construction and operation periods. Depending on the revegetation, objectives (erosion control and/or restoration of pastures areas and/or tree replanting), the timing of the vegetation management activities will be influenced by the time required to collect/grow the seedlings in nurseries prior to replanting.

Rehabilitation of temporary areas affected by the construction activities (e.g. camps, technical installations, temporary access roads) is addressed by the EPC Contractor CC-ESMP in Section 4.14 (Site Rehabilitation). The measures described below are those under the responsibility of JSCNH to ensure consistency and effectiveness between the various re-vegetation activities managed globally by the Nenskra HPP. A Specialist Biodiversity Consulting Company will be contracted to assist JSCNH in preparing and implementing the three components of this Vegetation Management Plan.

5.8.3 Management actions during construction period

5.8.3.1 VEG1.- Reforestation Management Plan

[OC- 66] - Contract professional advice on reforestation and forest management

- > Prepare terms of reference to hire advisory services for reforestation and management and implement the management actions during operation (see below).
- > Procure and recruit accordingly.

[OC- 67] - Full-scale inventory of forest habitat loss.

- > Detailed floristic inventory of forest habitat loss, to inform the habitat-hectare approach and resulting calculation of hectares to be restored for each forest plant community.

[OC- 68] - Selection of replanting area.

- > Select the region/municipality and possibly target areas within the Nenskra/Nakra watershed.
- > Consult with local authorities and communities, undertake field surveys to assess suitability.
- > Select local municipality registered land.

[OC- 69] - Prepare the Reforestation Management Plan.

- > Prepare activity schedule, define assumptions, responsibilities & budget
- > Map habitat types using GIS so habitat areas may be calculated
- > Produce draft Reforestation Management Plan for review by authorities and Lenders and amend accordingly.

[OC- 70] - Collection of seeds and nursery preparation - for replanting.

- > Collect local seeds from “plus forest stands” (e.g. local population who collects seeds of pine)
- > Work with state nursery owned by forestry national agency to process the collected seeds (extract seeds from the cones and dry them).

[OC- 71] - Nursery management.

- > Grow up seedlings in state nursery or
- > Create new nursery(ies) in Upper Svaneti.

[OC- 72] - Planting works on reforestation sites.

- > Initiate planting activities using plants grown in state or project nurseries.
- > Organize protection or replanted areas (fence).
- > Start after-care works on off-site planting which started before operation.

5.8.3.2 VEG2.- Revegetation and Habitat Management Plan

[OC- 73] - Inventory of trees and shrubs listed on Georgian Red List.

- > Supervise the inventory of trees and shrubs listed on Georgian Red List (*Castanea sativa* - VU) as per the conditions of the Environmental Permit

[OC- 74] - Monitor selection of native species and nursery preparation.

- > Obtain on time and on quality the Site Rehabilitation Plan from the EPC Contractor as per the CC-ESMP deliverables.
- > Check that native species adapted to erosion and pasture will be selected
- > Check that nursery(ies) will be ready on time for growing tree plants.

[OC- 75] - Select areas targeted for the 1:10 replanting approach for each red list species trees/shrubs.

[OC- 76] - Supervise replanting and aftercare.

5.8.3.3 VEG3.- Rare floral conservation program

[OC- 77] - Additional survey for rare herbaceous species.

- > Additional survey for the herbaceous species: *Paracynoglossum imeratinum*- endemic to Georgia (rare) but not in red list – to confirm that this species is in fact present.

[OC- 78] - Selection of conservation strategy if presence is confirmed.

- > List the rare species using inventory in ESIA and Supplementary studies

- > Select the conservation strategy: (i) either replanting or (ii) existing rare floral species populations habitats enhancement.
- [OC- 79] - Execution of replanting or habitat enhancement measures.**
- > Execute the selected strategy:
 - Option 1 - Replanting: collect the seeds before vegetation clearance by the EPC Contractor, then create or sub-contract nursery(ies), and replant on reinstated areas during rehabilitation phase, or
 - Option 2 - Look for same plant population in adjacent areas of project sites and support their habitat enhancement: protection, signs.

5.8.4 Management actions during operation period

5.8.4.1 VEG1.- Reforestation Management Plan

- [OO- 23] - Planting works on reforestation sites.**
- > Execute planting activities using plants grown in state or project nurseries.
 - > Organize protection or replanted areas (fence).
- [OO- 24] - Management of natural regeneration.**
- > Organise protection of natural regeneration areas – (fencing).
 - > Fence off areas targeted for natural regeneration to protect from grazing stock.
 - > Inform the local population where these areas are.
- [OO- 25] - After-care works during 5 years.**
- > Monitor areas for regrowth, and develop key indicators against which to judge management success, or the need for remediation
 - > Provide after care works during the first 5 years following replanting: agro-technic specifications to be implemented as well as protection from cattle.
 - > Map and document annual evaluation of regrowth and canopy coverage.

5.8.4.2 VEG2.- Revegetation and Habitat Management Plan

- [OO- 26] – Mapping of replanted areas.**
- > Mapping to be undertaken using a GIS based system
 - > Mapping to reflect habitat types being re-established and/or areas of red list species planting
- [OO- 27] - Monitoring of erosion and progress of bio-restoration**
- > Monitoring to be undertaken using a GIS based system
 - > Photographs taken from fixed locations to document ongoing erosion and allow for comparison.
- [OO- 28] - Replanting program for areas where species survival is not succeeding.**
- > Monitoring to be undertaken to identify where significant failures have taken place.
 - > Where more than 25% mortality has occurred of planted species these will be replaced (time frame for this, annually for the first 5 years of operation).

5.8.4.3 VEG3.- Rare floral conservation program

- [OO- 29] - After care activities.**
- > Annual monitoring to be undertaken when plants are most easy to identify (i.e. flowering).
- [OO- 30] - Monitoring and reporting.**
- > Ground cover at each transplantation location to be estimated.

5.8.5 Performance indicators

Component	Performance indicators
VEG1.- Reforestation Management Plan	<ul style="list-style-type: none"> • Report providing results and mapping of the detailed floral inventory • Agreement with local residents regarding reforestation locations • Strategy for collecting seeds agreed, with local participation

Component	Performance indicators
	<ul style="list-style-type: none"> • Location for nursery agreed and mapped • Finalisation of Reforestation and Management Plan for issue • Annual surveys first five years, then review, to assess establishment rates and regrowth rates.
VEG2.- Revegetation and Habitat Management Plan	<ul style="list-style-type: none"> • Preconstruction survey and mapping of vegetation in areas to be subject to temporary loss – results provided as a report • Revegetation and Habitat Management Plan to be issued. • Reinstatement to monitored and an annual report to be provided on establishment rates and the need for remediation, initially for the first five years after operation begins, then the need for further management will be reviewed.
VEG3.- Rare floral conservation program	<ul style="list-style-type: none"> • <i>Paracynoglossum imeretinum</i> to be formally identified • Transplantation and management plan to be produced and issued • Transplantation to take place and monitored. • Results provided in an annual report (for first five years post transplantation).

5.9 Wildlife conservation

5.9.1 Why is this plan needed?

For mammal and bird species no significant impacts were predicted during the biodiversity impact assessment (See Vol. 4 of the Supplementary E&S studies issued in 2016); however mitigation is still proposed in the form of bird boxes for boreal owl, bat boxes and restrictions so that tree felling occurs where practicable outside of the bird nesting season. As an enhancement measure, further surveys for brown bear will be undertaken, to monitor the population within the Nenskra valley. Engagement with local schools, including environmental education regarding biodiversity and conservation in the area e.g. brown bear will also be agreed.

Enhancement measure in the form of funding of biodiversity related research programmes, or management plans, which are required for informing and managing the designation of the proposed Svaneti Protected Area will be negotiated and agreed.

Fish and invertebrate monitoring will be undertaken on the Nenskra and Nakra watersheds. Monitoring will be undertaken, pre, during and post construction as set out in the Environmental Monitoring section of this document. The monitoring will also include quantifying the use of the Nakra weir fish pass, gaining further information of the movement of the fish throughout the Nenskra and Nakra watersheds and their use of spawning areas as the river hydrology changes. Invertebrate surveys will be used to inform the health of the river system. The information gathered will also be used to inform the management of the fish habitat on the Nenskra river (creation of spawning areas) as well as the need for remedial measures on the Nakra (keeping the river navigable to fish). The management of the Nenskra river will be set out in a River Channel Maintenance/Habitat Enhancement Strategy document; which will include input from professionals regarding methodology and design. This is the reason why the present plan is needed.

5.9.2 Components and responsibilities

Three components form the present plan:

- WILD1.- Ongoing monitoring brown bear
- WILD2.- Contribution to biodiversity conservation initiatives
- WILD3.- River fish habitat Management

The three components will be implemented at different periods:

- The ongoing monitoring for brown bear (WILD1) will continue during the Early Works period in 2017 prior to the start of the main construction works (and associated perturbations) and continue to be undertaken during the construction and operational periods.
- The contribution to biodiversity conservation initiatives (WILD2) will be initiated in 2017 to establish a plan for the following years. The actual implementation of this component will depend on the agreement between the Ministry of Environment and Natural Resources Protection and JSCNH. The Project's support is intended to be effective over the long-term.
- The river fish habitat management activities (WILD3) e.g. fish and invertebrate monitoring will commence during the construction period; however the actual implementation of a

management strategy will start only after the start of power generation, when the new hydrological conditions in the Nenskra River will be realized.

Specific objective

Continue ongoing monitoring of key species in the project area, support conservation initiatives in the Enguri watershed and manage river fish habitats of project-affected rivers in order to achieve no net loss of fauna biodiversity.

5.9.3 Management actions during construction

5.9.3.1 WILD1.- Ongoing monitoring brown bear

[OC- 80] - Additional baseline surveys on bear

- > Recruit 2 specialists to undertake the surveys.
- > Two separate field survey visits to be undertaken annually, one in September and one in October.
- > Surveys to start prior to the main construction period in order to provide a robust and replicable survey methodology.
- > Survey strategy to involve walking 6 – 8 transect routes, noting all brown bear signs. Samples of bear dung and lynx scat to be collected where found. Other incidental mammal signs such as lynx and wolf also to be noted.
- > DNA analysis to be undertaken on the collected samples so that number of individuals present can be calculated. DNA analysis to be undertaken on collected samples of other large carnivores dungs (lynx and wolf) in addition to bear.
- > The results of the surveys are to be provided in a written report format on an annual basis.

5.9.3.2 WILD2.- Contribution to biodiversity conservation initiatives

[OC- 81] – Engage the Ministry of Environment regarding the proposed Svaneti Protected area

- > Meet the APA and express the Nenskra HPP commitment to contribute to the creation and the management of the proposed Svaneti protected area through financing of species inventories, biodiversity monitoring, scientific research, educational initiatives (i.e. no directing financing of operational budget).
- > Based on preliminary discussions held in April 2016 with the APA, examine which activities and at what stage of the Protected Area creation or management would benefit from the Project’s financial support and agree on a mechanism allowing the Project to transfer the agreed budget and verify the use of that budget.
- > Formalize this mechanism into a Memorandum of Understanding.
- > Execute and monitor the agreed financial support.

[OC- 82] - Install bat and bird boxes

- > Install outside of the reservoir area 150 bat and bird boxes every year, to compensate for bat roost loss. Georeference and take a picture of each installed box.
- > Install, photograph and georeference bird nest boxes outside the reservoir area.
- > Every year, when installing the next batch of boxes, perform a visual check that the bird nesting boxes and the bat boxes remain in position - Replace missing boxes.

[OC- 83] - Support educational projects against illegal hunting of bear

- > Identify NGOs which work on biodiversity conservation and have experience in educational projects against illegal hunting of large mammals
- > Request proposals for establishing educational projects in the project-affected area aimed at reducing illegal hunting of bear and at promoting conservation.
- > Select relevant initiatives and agree on work-plan, budget and performance indicators. Formalize Project’s financial support for two years.
- > Implement and monitor the educational projects against illegal hunting.

5.9.3.3 WILD3.- River Fish Habitat Maintenance

[OC- 84] - Finalize fish pass detailed design on the Nakra diversion weir.

- > Work with the EPC Contractor to ensure conceptual design of a natural by-pass channel proposed by the environmental team is functional and realistic.

> Prepare a Fish Pass Operating Manual that will be used by the operating teams while managing the water intake during the operation phase (e.g. hydraulics conditions, maintenance requirements, protection, safety).

[OC- 85] - Contract professional advice on river fish habitat management

- > Prepare terms of reference to hire advisory services in river fish habitat management and implement the management actions during operation (see below).
- > Procure and recruit accordingly.
- > Undertake fish and invertebrate surveys in the Nakra and Nenskra rivers, prior to construction, then annually during construction

[OC- 86] - Monitor physical obstacles to fish upstream migration in the Nakra River.

- > Undertake a pre-construction river survey based on a River Habitat Survey strategy, to record river morphology

5.9.4 Management actions during operation

5.9.4.1 WILD1.- Ongoing monitoring brown bear and lynx

[OO- 31] – Ongoing surveys for key species – brown bear

- > Where possible retain the specialists used in the original surveys.
- > Continue with two separate field survey visits, undertaken annually, one in September and one in October.
- > Repeat the survey strategy of walking 6 – 8 transect routes, noting all brown bear and incidental mammal signs and taking of samples of bear dung, and lynx scat (if found).
- > DNA analysis to continue being undertaken on the collected samples, so that number of individuals present can be calculated and compared to previous results.
- > Results of the annual surveys (September and October) to be provided as a written report.
- > These surveys will be undertaken annually for the first five years post construction, the results would then be reviewed and the frequency of future monitoring would be determined. From this survey data a population estimate can be made based on the number of individuals identified. If the population of bears appears to be decreasing, then remedial action may be required, such as engaging a ranger to monitor the area for illegal hunting activity.

5.9.4.2 WILD2.- Contribution to biodiversity conservation initiatives

[OO- 32] - Assess the Project's contribution to the proposed Svaneti protected area.

- > Meet every semester the team in charge of preparing the Protected Area Management Plan and/or the authorities in charge of managing the protected area.
- > Document the way the Project's financial contribution is being used and provide an opinion on the effectiveness of this contribution to the protection of the conservation target species.
- > Inform the Lenders in case of misuse of the Project contribution with respect to the conservation objectives.
- > If required, redirect the funds to other more efficient conservation initiatives.

5.9.4.3 WILD3.- River Fish Habitat Management

[OO- 33] - Initial one-year observation under new hydrological conditions

- > From the start of power generation, commission a River Habitat Survey as conducted in 2015 for the initial baseline and documented in Vol. 4 Biodiversity Impact Assessment. Confirm or amend the river stretches identified as potentially favourable to river habitat engineering.
- > From the start of power generation, assess habitat stability along the 2 km Nenskra river stretch targeted for river management (restoration of spawning habitat) and review site conditions during spawning season flows and peak flows (4 campaigns) of the first year: evaluation of water depths, velocities, substrate composition and channel gradient, temperature, dissolved oxygen, and site accessibility.
- > Map the observed seasonal changes over the targeted 2 km reach of river and identify areas which are assessed to be the most stable. Coordinate with the project team in charge of hydrological monitoring at the river gauge station to assess if floods occurred during the year and make an opinion about long-term stability of areas identified as stable during the first year of observation
- > Observe the rest of the Nenskra riverbed from powerhouse to dam during that first year of operation. Determine if new barriers to fish migration have been created as a result of the reduced river flow which would prevent the targeted 2km stretch of river from being an effective spawning area. Program two observation campaigns at peak and low flow.

<p>> Consolidate observations into a report.</p> <p>[OO- 34] - Design and implement first campaign of river habitat management</p> <p>> Using observations made during the first year, identify relevant and sustainable interventions in the riverbed along the 2km reach of river targeted to become a spawning area. This could include:</p> <ul style="list-style-type: none"> • Gravel placement (of specific size) in areas where gravels would be least likely to be washed downstream during floods, failing to provide any long-term benefits. Volume 5 of the Supplementary E&S studies “Hydrology and Water quality impact assessment” provide indications of the size of gravels likely to be washed away under the new hydrological conditions. Alternatively, propose and test efficiency of, gravel catchment structures. • Boulder placement (individually or in clusters) to increase habitat complexity and create new microhabitats providing refugia for macroinvertebrates as well as both juvenile and adult fish (small pools are often created on the downstream side of boulders). • Channel narrowing to maintain open water and increase flow velocities where required • Removal of newly created barriers to migration identified during the first years of observation. <p>> Prepare detailed implementation activity and resource schedule</p> <p>> Implement the first season activities</p>
<p>[OO- 35] - Monitor effectiveness of river fish habitat management</p> <p>> During first five years, assess modified habitat stability and review site conditions during spawning season flows and peak flows (2 campaigns) following the first year of intervention (evaluation of water depths, velocities, substrate composition and channel gradient and site accessibility).</p> <p>> Undertake a detailed fish monitoring survey over the 2 km reach of river targeted as new spawning area using non-lethal methods and assess spawning activity.</p> <p>> Implement maintenance activities as required by the observations after the spawning season. In particular, assess how the spillway and bottom outlet operations affect the reach of river managed as new spawning areas.</p> <p>> Document each survey and consolidate activities, findings and recommendations into an annual report.</p>
<p>[OO- 36] - Monitor the efficiency of the Nakra fish pass.</p> <p>> Prepare an Operation and Maintenance Plan for the Nakra fish pass that details: target fish biology and migration pattern, performance criteria (flow rate, water level, seasonal variations), maintenance requirements (measures, resources and timing).</p> <p>> Undertake a monitoring program of the performance of the fish pass built at the Nakra intake. The program will determine the number of fish gathering to migrate past the obstruction compared to the proportion of these fish which actually do so. This will be done through tagging or counting of fish downstream of the weir (not at the lower end of the fish pass) as well as counting the number of fish that migrate through the fish pass determined from a direct count, of from marked fish recoveries.</p> <p>> If no power is available at the Nakra weir, monitoring surveys would have to be prior to and during the fish spawning season when fish are most likely to migrate through the water course (September and November).</p> <p>> Size, sex and health of each fish to be recorded once caught, prior to release back into the river.</p> <p>> Fishing for non-monitoring purposes will be banned within the fish pass area and for a stretch of 25 metres above and below the fish pass. Fish pass will be checked visually daily for signs of trespass and fishing. Any issues will be recorded in the non-conformance log developed as part of the ESMS.</p>
<p>[OO- 37] - Monitor physical obstacles to fish upstream migration in the Nakra River.</p> <p>> Undertake a pre-construction river survey based on a River Habitat Survey strategy, to record river morphology</p> <p>> Undertake annual survey in order to record river morphology, and compare to initial results to identify if significant changes have taken place.</p> <p>> Identify areas where fish movement may be impinged by blockages in the river e.g. total blockage due to land slide, or barrier created by debris causing a cascade.</p> <p>> Blockages to fish navigation of the Nakra River below the weir will be removed within 4 months of identification, sooner if practicable.</p> <p>> The ongoing fish monitoring in the river will be used to inform the efficacy of the blockage removal. Remedial measures will be implemented if required.</p>

5.9.5 Performance indicators

Component	Performance indicators
WILD1.- Ongoing monitoring brown bear	<ul style="list-style-type: none"> • Estimate of bear population. • Trends in number of individuals living in the watershed

Component	Performance indicators
	<ul style="list-style-type: none"> • List evidence of other mammal species living in the watershed
WILD2.- Contribution to biodiversity conservation initiatives	<ul style="list-style-type: none"> • Identification of suitable initiatives to fund. • Reports produced for funded baseline wildlife surveys • Production of specific funded management plans.
WILD3.- River fish habitat Management	<ul style="list-style-type: none"> • Collation of baseline data to inform strategy • Production of the Fish River channel maintenance/habitat enhancement Plan • Year 5 monitoring – success would be indicated if fish populations remain stable • Repeat monitoring years, 10, 15, 20 to measure stability of fish population.

5.10 Water quality management

5.10.1 Why is this plan needed?

During the construction period also, the tunnelling activities could generate spoils that must be quality-checked to confirm the absence of hazards or to undertake a specific disposal strategy. During the construction period, the reservoir vegetation clearing would generate green wastes that must be managed adequately to reduce the impacts on water quality and for safety reasons. Vol. 5 “Hydrology and Water Quality Impact Assessment” showed that the water quality of the Nenskra River downstream of the dam could be affected during the first years following the reservoir filling. The management of these issues require resources and actions, this is the reason why this plan is needed. It comes in support to the water quality monitoring activities provisioned in Section 5.13.

5.10.2 Components and responsibilities

Six main components form the present plan:

- WQM1.- Geochemical hazard during tunnelling
- WQM2.- Green waste management
- WQM3.- Reservoir operating management

WQM1 and WQM2 will be undertaken during the construction period but will require follow-up actions, mainly monitoring - during the first years of the operation phase. Preparation of WQM3 will start before the reservoir filling starts, and will then be executed during the first years of operation.

Although some of the planned actions under WQM1 and WQM2 will be executed by the EPC Contractor, JSCNH will have an active role in monitoring and documenting how the tunnelling spoils and the vegetation cut from the reservoir has been managed during and beyond construction. WQM3 will be implemented by JSCNH with the assistance of the Owners Engineer.

5.10.3 Management actions during construction

5.10.3.1 WQM1.- Potential geochemical hazards of tunnelling spoils

[OC- 87] - Screening tunnelling spoils for presence of sulphur and other hazards.

- > Prior to the start of tunnelling activities, review the procedures and resources of the EPC Contractor for checking for the potential presence of sulphur bearing rock and any other sources of geochemical hazards in the spoiling spoils
- > Verify that the 2015 Environmental permit conditions on disposal of tunnelling spoil are complied with.

[OC- 88] - Geochemical testing of spoils that could represent a hazard.

- > Geochemical testing of any suspected sulphur bearing rock in tunnels to evaluate the risk of Acid Rock Drainage (ARD) and heavy metal leaching
- > Testing for presence of other suspected hazardous in tunnel spoils (e.g. radioactivity) to establish the potential for environmental or health issues relating to spoil disposal.

[OC- 89] - Management of spoil that represents an environmental risk.

- > Confirm absence of geochemical risk represented by rock material excavated during tunnelling activities, or
- > Ensure dedicated management of spoil that represents a risk of ARD or other geochemical risk.
- > Document the process.

5.10.3.2 WQM2.- Green waste management

[OC- 90] - Reservoir Vegetation Clearing management.

- > Review the method statement for Reservoir Vegetation Clearing proposed by the EPC contactor.
- > Unless required for operational reasons, prohibit burning of biomass as an alternative to clearing of vegetation using manual or mechanical means (trunks, branches, leaves).
- > Verify and discuss how, when and where the cleared vegetation is removed from the reservoir.
- > Verify and document agreement between the EPC Contractor and the forest administration for the hand-over of timber removed from the reservoir inundated area. Document arrangement of transfer of timber from the Forest Administration to third party.
- > Estimate the volume and nature of biomass disposed of outside the reservoir inundated area that is unlikely to be used third part or by the local population.

[OC- 91] - Facilitate solutions to make good use of reservoir non-commercial forest products.

- > Engage a consultant specialized in forest products monetization in Georgia (e.g. firewood). The consultant will assist in identifying solutions to make good use of reservoir non-commercial forest products removed by the EPC Contractor. The objective is to avoid the creation of an environmental liability if the vegetation cleared from the reservoir inundated area were to be left disposed of in an unsuitable manner in the valley and not used by the local population.
- > Engage the Chuberi population to understand, and agree on, what biomass disposed of outside the reservoir inundated area will not be of interest for them.
- > For this biomass of lesser interest for the local population, facilitate intermediation between potential users coming from other parts of Georgia and the forest administration to maximize the removal of disposed vegetation prior to the end of the construction period
- > Required the EPC Contractor to re-use part of the soft biomass, leaves and undergrowth cut or mulch within the reservoir for future use in the revegetation of disturbed areas. This should be reflected in the Reservoir Vegetation Clearing Method Statement and in the Site Rehabilitation Plan.

[OC- 92] - Removal of floating debris from the reservoir

- > Ensure the final Project design makes provisions for (i) an access to remove floating debris coming from the reservoir (first impoundment) and the upper catchment area (operation) and (ii) a laydown area immediately downstream of the dam to stockpile the removed floating debris.
- > Include in the Reservoir Operating Procedure or other ESMS procedures, the proposed approach to remove floating debris and evacuate or disposed them on a sustainable and environmental-friendly manner.

5.10.3.3 WQM3.- Reservoir operating management

[OC- 93] - Change in design for environmental reasons

- > Ensure the proposed change of design for water quality purposes are materialized in the final design prepared by the EPC Contractor in 2016:
 - By-pass gate in the diversion weir designed to divert into the reservoir the seasonal stream that descends the mountain side on the right bank at the dam site,
 - Doubling the capacity of the environmental flow by-pass pipe in the gate chamber to allow greater flexibility in terms of discharge if need be for water quality reasons.

[OC- 94] - Incorporate water quality management into reservoir operating procedures.

- > Ensure that the reservoir operating procedures include provisions for adapting the downstream release strategy to the monitored reservoir water quality:
 - Timely communication of water quality monitoring results to the operator's team (within 24 hours of the water quality measure).
 - Use the seasonal stream that descends the mountain side on the right bank at the dam site (which is diverted by the Project into the reservoir) as the main source of the environmental flow if the water discharged through the bottom outlet tunnel is significantly degraded.
 - Program testing of the correct functioning of the bottom outlet gate during flood events in order to minimise any impacts on the downstream river quality.

5.10.4 Management actions during operation

5.10.4.1 WQM1.- Geochemical hazard during tunnelling

[OO- 38] - Monitoring of runoff /seepage from special disposal areas and tunnel dewatering.

- > In case of dedicated management of spoils that represents a risk of ARD or other geochemical risks during disposal, implement regular monitoring of runoff from the rock dump area.

5.10.4.2 WQM2.- Green waste management

[OO- 39] - Reservoir Vegetation Clearing management

- > Monitor the temporary storage area where the vegetation cut from the future reservoir inundated area during the construction period has been stockpiled and which is outside the inundated area and not been used by a third party, whether the local population or small businesses.
- > Ensure the disposal area does not represent a safety hazard for the general public or improve accordingly.

[OO- 40] - Removal of floating debris from the reservoir

- > Include in the Reservoir Operating Procedure or other ESMS procedures, the proposed approach to remove floating debris and evacuate or disposed them on a sustainable and environmental-friendly manner.
- > Plan the maintenance vegetation clearing of the reservoir banks every 5 to 10 years and the associated procedure to dispose of the cleared vegetation.
- > Map and monitor the state of the disposal area for floating debris, if any.

5.10.4.3 WQM3.- Reservoir operating management

[OO- 41] - Consider water quality issues when managing the Nenskra reservoir.

- > Verify timely communication of water quality monitoring results to the operator’s team (within 24 hours of the water quality measure).
- > Use of bottom outlet instead of spillway during certain months of the first years of operation if bottom water proved to be of better quality than the water at the reservoir surface.
- > Use the seasonal stream that descends the mountain side on the right bank at the dam site (which is diverted by the Project into the reservoir) as the main source of the environmental flow if the water discharged through the bottom outlet tunnel is significantly degraded. The threshold value for this decision is Dissolved Oxygen content less than 5 mg per litre and pH outside of 6 to 8 range.
- > Program testing of the correct functioning of the bottom outlet gate during flood events in order to minimise any impacts on the downstream river quality.

[OO- 42] – Sediment venting ESIA and mitigation measures prior to the first opening of the bottom outlet for sediment venting purposes

- > One year prior to the planned first opening of the bottom outlet for sediment venting purposes, commission an ESIA study taking into account the new baseline conditions with respect to community usages of the river downstream of the dam and river habitat management initiatives undertaken by the Project.
- > Establish mitigation strategy if required and execute in coordination with planned bottom outlet opening operations.

5.10.5 Performance indicators

Component	Performance indicators
WQM1.- Geochemical hazard during tunnelling	<ul style="list-style-type: none"> • Method statement for geochemical testing • Logs during tunnelling work • Separate handling of spoils according to chemistry is effectively executed • Method statement for disposal of waste rock that represent a geochemical risk outside the reservoir area • Results of waste rock laboratory analysis

Component	Performance indicators
	<ul style="list-style-type: none"> • Results of effluent quality monitoring
WQM2.- Green waste management	<ul style="list-style-type: none"> • Method statement for reservoir vegetation clearing. • Agreement with National Forestry Agency for managing disposal of timbers cut for construction purpose • Report from the consultant specialized in forest products monetization • Structures, accesses and procedures to remove floating debris are available prior to start of the reservoir filling
WQM3.- Reservoir operating management	<ul style="list-style-type: none"> • Change in design effective and documented during detailed design • Reservoir operating procedures include provisions for downstream water quality management

5.11 Public consultation & participation

5.11.1 Why is this plan needed?

JSCNH recognizes the importance of an open and transparent engagement between the Project, its workers, local communities directly affected by the project and other stakeholders as an essential element of Good International Practice and corporate citizenship. Such engagement is also a way of improving the environmental and social sustainability of the Nenskra Hydropower Project. A detailed Stakeholder Engagement Plan (SEP) has been prepared in compliance with the Lenders E&S policies (see Vol. 7 of the Supplementary E&S Studies). Since this ESMP aims at capturing all commitments and measures planned by the Project to mitigate or compensate adverse E&S effects, the paragraphs below summarize the management actions relating to the detailed SEP.

The purpose of the public consultation programme is to plan and manage the stakeholder engagement activities during the construction and operation phases of the Project. It orients information disclosure, meetings and consultations with people affected by the Project. It proposes ways to engage with stakeholders aiming at enhancing their understanding of the Project and the anticipated impacts. Engagement with affected people and other stakeholder will allow JSCNH to integrate their views and concerns into the Project's mitigation strategy.

Specific objective

A platform is provided to potentially affected people to participate in the Project through awareness and feedback sharing. A trusting relationship is built with the host communities and other interested stakeholders based on a transparent and timely supply of information and open dialog. A grievance mechanism to address communities' concerns and complaints is established to assist JSCNH and communities in identifying problems and discovering solutions together.

5.11.2 Components and responsibilities

Five main components form the present plan:

- PUB1.- Regular Community Liaison
- PUB2.- Public consultations on E&S Studies and Management Plans
- PUB3.- Grievance Mechanism
- PUB4.- Project web site management
- PUB5.- Engagement with NGOs and national level Stakeholders

Implementation of these components has started in 2016 during the early works period, and will continue during the main construction phase and throughout operation.

The responsibility for the implementation of the public consultation activities and the management and resolution of grievances rests with JSCNH. This also applies to situation where third parties, including the EPC Contractor, are involved. JSCNH has mobilized human and material resources dedicated to stakeholder engagement activities (see Vol. 7 – SEP). The Social Manager will be in charge of the implementation of the stakeholder engagement activities on site. The representatives from Mestia Municipality *Gamgeoba* in the villages and representative of Chuberi and Naki villages will also participate in the grievance resolutions.

5.11.3 Management actions during Early Works

5.11.3.1 PUB1.- Regular Community Liaison

[OC- 95] – Establishment of Community Liaison System

- > Recruitment of one Community Liaison Officer in each valley (Nenskra & Nakra)
- > Recruitment of a Social Manager permanently based in Chuberi
- > Appointment of external consultants for consultation activities on specific issues, such as dam safety.
- > Explanation of the Community Liaison system to the communities living in the Nenskra and Nakra valley, to the people living along the Zugdidi Mestia road, and to the general public using this road.
- > Installation of billboards in each hamlet of the Nenskra and Nakra valleys to advertise construction activities or any other announcement required by the Project activities.
- > Establishment of a Community Information Centre in Chuberi village

[OC- 96] – Consultation regarding the location of new bridges in the Nenskra valley

- > Present proposed rehabilitation programme of existing bridges (9 out of 11 bridges)
- > Present location for the proposed new bridge in Chuberi (bridge n°4 for access to powerhouse area)
- > Present location for the proposed new bridge in Tita (bridge n°11 for access to left bank of dam site)

[OC- 97] – Awareness campaigns on traffic related risks

- > Organize campaigns in Nenskra and Nakra valleys with EPC Contractor to raise awareness on traffic-related risks during the construction period.

[OC- 98] - Regular meetings with affected communities

- > Organize quarterly formal meetings after the Public consultations on E&S Studies and Management Plans (see below) in each valley to explain and discuss the Project activities, and the status and performance of environmental and social management plans activities.
- > Organize informal information meetings on an ad-hoc basis with inhabitants of the Nenskra and Nakra valleys.

[OC- 99] - Mitigation of the disturbance of beehives around the roads used by the Project

- > Notify the beekeepers of the start of the construction activities
- > Identify and discuss solutions such as protection nets to protect the beehives and/or move them more than 300 meters away from the construction activities and the roads used by the Project.

[OC- 100] – Information on construction activities

- > Disclosure of the Local Recruitment Plan locally in the two affected valleys
- > Disclosure of the Traffic Management Plan locally in the two affected valleys
- > Announcement in advance of construction activities perceived as risky or which could obstruct local traffic.
- > Announcement in advance of any activity potentially affecting traffic on Zugdidi-Mestia Road.

[OC- 101] – Monitoring and Progress reporting

- > Monitor and record in a systematic manner all stakeholder engagement activities. All stakeholder engagement actions will be tracked in a dedicated tracking matrix to be managed by the Social Manager role.
- > Maintain and make publicly available on-demand the Stakeholder Engagement database
- > Preparation of internal monthly progress report by Community Liaison Officers, explaining the activities undertaken, the number of formal and informal meetings, and a synthesis of the concerns and feelings of the people in Nenskra and Nakra valleys about the Project.
- > Contribution to six-monthly E&S reports, with a section on Stakeholder Engagement

5.11.3.2 PUB2.- Public consultations on E&S Studies and Management Plans

[OC- 102] – Disclosure of the 2017 supplementary E&S studies

- > Disclose on internet and locally the Supplementary Environmental and Social studies finalized in 2017, in both English and Georgian languages.
- > Notify inhabitants of the Nenskra and Nakra Valleys of the availability of these documents.
- > Prepare information material culturally appropriate
- > Train the JSCNH Social Team on the E&S reports

[OC- 103] – Communication on Dam Safety and Natural Hazards

- > Mobilize a Risk Communication Specialist to develop and implement a communication strategy focused on Dam Safety and micro-climate change.

- > Mobilize technical engineering expertise involved in the dam design (Owner Engineer and/or EPC Contractor) to further provide technical details on dam safety and protection measures designed for the Nenskra HPP design.
- > Prepare information material culturally appropriate
- > Organize complementary meetings dedicated to dam safety in Chuberi.

[OC- 104] – Formal public meetings

- > Organize rounds of formal meetings in each valley to explain the process and the content of the E&S documents.
- > Receive and analyse feedback on the E&S documents disclosed through internet, the CLOs, comments registers in the public information centre.
- > Organize a second series of formal meetings one month later to discuss the contents of the Environmental and Social Studies and address comments collected during the disclosure period. Describe implementation details of the proposed Community Investment Programme. Discuss cumulative impacts with other hydropower projects.

5.11.3.3 PUB3.- Grievance Mechanism

[OC- 105] – Implementation of the Grievance Mechanism

- > Install Grievance registers in the town halls of Chuberi and Naki villages in Q1 2017.
- > Establish the Grievance Resolution Committee of each valley in Q1 2017.
- > Disclose of the outline of the grievance mechanism process on the Project's billboards in each village.
- > Establish one database to keep a written record of all complaints recorded (i) in the Nenskra and Nakra Valleys; (ii) at headquarter level in Tbilisi or (iii) through the website
- > Check that workers' grievances mechanisms are defined and implemented by its contractors in compliance with Lenders requirement regarding workforce management.
- > Capture all grievances from all sources within the centralised grievance database - including international NGO that send grievance to lenders and worker grievances.

[OC- 106] – Management of the Grievance Mechanism

- > Document of grievance registration and responses in the Data Base
- > Keep track of implementation of grievances resolution and grievance closure Data Base

[OC- 107] – Monitoring and Progress reporting

- > Maintain and make publicly available on-demand the Grievances database
- > Preparation of internal monthly progress report by Community Relation Officer, explaining current grievances trends and situation.
- > Contribution to six-monthly E&S reports, with a section on Grievances management

5.11.3.4 PUB4.- Project Website Management

[OC- 108] – Establishment of the Project Website

- > Establish by July 2016 a website presenting the Project and its social and environmental performance, in Georgian and in English, following the principles highlighted in the Aarhus Convention.
- > Integrate the Grievance Mechanism in the website: electronic complaint form and contact details of the Community Relation Manager available, as well as a way for the website's visitors to request some environmental or social information and to send comments.

[OC- 109] – Public Disclosure of the 2015 ESIA and of the 2016 Supplementary E&S Studies

- > Disclose on the Project website all ESIA and Supplementary E&S documentation available in English and in Georgian.

[OC- 110] – Regular update of the Website

- > Disclosure on a six-monthly basis of the Environmental and Social performance of the Project including the results of the monitoring activities.

5.11.3.5 PUB5.- Engagement with NGOs and national level Stakeholders

[OC- 111] – Engagement with NGOs

- > Organization of a workshop with interested civil society organisations and NGOs in Tbilisi, when the English version of the supplementary environmental and social studies have been disclosed on internet.

[OC- 112] – Engagement with Governmental Agencies

- > Consultation with Governmental Agencies having a responsibility in the Project's ESMP: see Section 6 of this

ESMP.

[OC- 113] – Engagement with other HPP developers or operators

- > Additional meetings with the developers of other hydropower projects or potential hydropower sites (e.g. Khudoni HPP, Darchi HPP, Nakra HPP).
- > Presentation of the Nenskra HPP activities, schedule as well as predicted environmental & social impacts and planned mitigation strategy.

5.11.4 Management actions during construction

5.11.4.1 PUB1.- Regular Community Liaison

[OC- 114] – Regular meetings with affected communities

- > Organize quarterly meetings during the main construction period and the first 3 years of operation in each valley to explain and discuss the Project activities, and the status and performance of ESMP activities.
- > Continue to organize unformal meetings on an ad-hoc basis by the Community Liaison Officers and the Community Relation Officer with inhabitants of the Nenskra and Nakra valleys.
- > Distribute six-monthly newsletters in Nenskra and Nakra valley to present the E&S performance of the Project and general information related to the construction or operation.

[OC- 115] – Continuation of awareness campaigns of traffic related risks

- > Organization regular campaigns in Nenskra and Nakra valleys to raise awareness on traffic-related risks throughout the construction period.

[OC- 116] – Monitoring & Reporting

- > Continue to monitor and record all stakeholder engagement activities, including agreed actions during stakeholder engagement tracked in a dedicated tracking matrix.
- > Prepare monthly progress report by each Community Liaison Officer during the construction period
- > Contribution to six-monthly and then annual E&S reports, with a section on Stakeholder Engagement

[OC- 117] – Announcement of construction and operation activities to local communities

- > Announcement in advance of heavy construction activities, including blasting activities.
- > Announcement in advance of any activity potentially affecting traffic on Zugdidi-Mestia Road.

5.11.4.2 PUB2.- Public consultations on E&S Studies and Management Plans

[OC- 118] – Communication on the Emergency Preparedness Plan

- > Communication to the local representatives of the Nenskra communities on the finalized Emergency Preparedness Plan.
- > Implementation of Early Warning Systems Training and Exercise
- > Regular annual Public Awareness Campaigns on Emergency Preparedness Planning
- > Regular communication and awareness campaigns on Dam Safety

5.11.4.3 PUB3.- Grievance Mechanism

[OC- 119] – Management of the Grievance Mechanism

- > Continuation of Grievance database management
- > Continuation of implementation of Grievance management processes
- > Database is to be maintained at site, or at least up to date records are kept at site.

[OC- 120] - Reporting on Grievance Mechanism

- > Continuation of preparation of monthly internal reports
- > Contribution to six-monthly and then annual E&S reports, with a section on Grievances management

5.11.4.4 PUB4.- Project Website Management

[OC- 121] – Update of the Website with E&S monitoring activities

- > Six-monthly update of the Environmental & Social performance of the Project including the results of the environmental and social monitoring activities.

5.11.4.5 PUB5.- Engagement with NGOs and national level Stakeholders

[OC- 122] – Six-monthly meetings with interested NGOs and civil society organisation

- > Presentation of the status of Nenskra HPP construction activities and lessons learnt in terms of environmental & social management
- > Discussion and action plan for any issues reported by the NGOs that may affect the local communities or the natural environment

[OC- 123] – Six-monthly meetings with interested Governmental Agencies.

- > Coordination with GSE and Enguri HPP operators regarding changes in river hydrology as a result of the Project

[OC- 124] – Annual meetings with other HPP developers

- > Annual meetings at the Ministry of Energy with the developers of other hydropower projects or potential hydropower sites (e.g. Khudoni HPP, Darchi HPP, Nakra HPP).
- > Presentation of status of Nenskra HPP construction activities and lessons learnt in terms of environmental & social management.
- > Discussion and action plan for managing any cumulative environmental or social issues that may arise from concomitant HPP construction activities.

5.11.5 Management actions during operation

5.11.5.1 PUB1.- Regular meetings with PAPs during ESMP implementation

[OO- 43] – Definition and disclosure of a SEP for the operation phase

- > Preparation of a Stakeholder Engagement Plan adapted to the operation phase taking into account the lessons learnt during the construction phase
- > Disclosure of the SEP for the operation phase locally (Chuberi and Naki villages) and on the Project's web site.

[OO- 44] - Meetings with local communities

- > Organize six-monthly meetings with local communities during the first 3 years of operation to discuss any issues raised by villagers and the Project social and environmental performance. After the first 3 years of operations, these formal meetings will be held annually.
- > Disclose the minutes of each meeting both locally and on the internet website.
- > Contribution to six-monthly and then annual E&S reports, with a section on Grievances management

5.11.5.2 PUB3.- Grievance Mechanism

[OO- 45] – Management of the Grievance Mechanism

- > Continuation of Grievance database management
- > Continuation of implementation of Grievance management processes

[OO- 46] - Reporting on Grievance Mechanism

- > Continuation of preparation of monthly internal reports
- > Contribution to the annual E&S reports, with a section on Grievances management

5.11.5.3 PUB4.- Project Website Management

[OO- 47] – Update of the Website with E&S monitoring activities

- > During the first three years of the operation phase, update of the Environmental & Social performance of the Project including the results of the hydrological and water quality monitoring, land use and revegetation monitoring, river fish monitoring and socio-economic indicators.
- > Keep the 2015 ESIA, 2017 Supplementary E&S Studies and all other documents prepared as part of the E&S management of the project (e.g. monitoring reports) available on website over the Project lifetime.

5.11.5.4 PUB5.- Engagement with NGOs and national level Stakeholders

[OO- 48] – Annual meetings with interested NGOs and civil society organisation

- > During the first three years of operation, annual working session with interested NGOs
- > Presentation of the observed environmental and social effects relating to the reservoir operation, powerhouse

<p>operation and Nakra water intake operation</p> <p>> Discussion and action plan on issues reported by the NGOs that may affect the local communities</p>
<p>[OO- 49] – Annual meetings with other HPP developers</p> <p>> During the first three years of operation, annual meetings at the Ministry of Energy with the developers of other hydropower projects or potential hydropower sites (e.g. Khudoni HPP, Darchi HPP, Nakra HPP).</p> <p>> Presentation of status of Nenskra HPP operation activities and lessons learnt in terms of environmental & social management.</p> <p>> Discussion and action plan for managing any cumulative environmental or social issues that may arise from concomitant HPP construction activities.</p>

5.11.6 Performance indicators

Component	Performance indicators
PUB1.- Regular Community Liaison	<ul style="list-style-type: none"> • Effective presence of one project billboard in each hamlet in Nenskra and Nakra valleys by July 2016. • Availability of monthly reports of the CLOs starting from July 2016. • Minutes of Meetings of the formal meetings starting from August 2016 • Number of informal meetings and individual households' visits by the CLOs documented in their reports. • Minutes of meetings of Number of activities meetings documented as part of the awareness campaigns on traffic related risks documented in the monthly reports of the CLOs, starting from July 2016 until the end of construction activities. • Minutes of meetings with beekeepers
PUB2.- Public consultations on E&S Studies and Management Plans	<ul style="list-style-type: none"> • Contract to recruit a Communication Specialist and some facilitators to develop and implement the Communication on Dam Safety • Minutes of meetings of the meetings on Dam safety organized in Chuberi in 2016. • Minutes of meetings of the meaningful consultation meetings organized to discuss the E&S documents in each valley in July and August 2016.
PUB3.- Grievance Mechanism	<ul style="list-style-type: none"> • One Grievance Resolution Committees is functioning in each valley by July 2016. • Grievance registers are available in Naki and Chuberi Town halls by July 2016. • A grievance database exists by July 2016. • Tracking and specific corrective actions to address repeat grievances (on the same issue), as well as tracking and analysis of repeat grievances from the same individual or community. • Monthly and six-monthly reports on Grievance management are available and indicated the number of grievance lodged and treated, as well as the nature of the grievances. • The Emergency Preparedness Plan is prepared and disclose locally one year before the first impoundment of the Nenskra Dam reservoir • Number of Early Warning Systems Training and Exercise undertaken • Number of annual Public Awareness Campaigns on Emergency Preparedness Planning and Dam Safety
PUB4.- Project Website Management	<ul style="list-style-type: none"> • Project Website is ready and accessible in English and Georgian in July 2016 • The 2015 ESIA and the 2016 supplementary E&S studies are accessible publicly on the Project Website by July 2016 • Six-monthly update of the Environmental and social Performance section of the Project Website, including result of monitoring activities.
PUB5.- Engagement with NGOs and national level Stakeholders	<ul style="list-style-type: none"> • Minutes of meetings of the workshop organized in Tbilisi with interested NGOs. • Minutes of meetings of the discussion with Governmental Agencies

5.12 Change Management Procedure

5.12.1 Why this process is needed?

The 2015 ESIA and the 2017 Supplementary E&S studies have been prepared based on the basic design information provided by the EPC Contractor in 2015 (ESIA) and 2016 (Supplementary E&S Studies). As stated within Vol. 2 Project Definition and as usual for projects of this scale, further design development, including the detailed design necessary for the construction of the power supply lines, disposal areas, Nakra access roads and the construction camp at Powerhouse, is to be undertaken.

This Change Management Procedure (CMP) sets out how the potential environmental and social implications of the design development will be assessed. The assessment of the design will aim to ensure that adequate mitigation is adopted to minimise and avoid effects where any deviations to the scheme described in the 2015 ESIA and the 2017 Supplementary E&S studies are proposed. An overall change management process considers not just environmental and social aspects, but also financial, construction, programme aspects. The procedure set out in this section describes only how the environmental and social aspects are to be assessed, but will become an integrated part of the overall decision-making process for reviewing design changes.

As is typical for such a large hydropower project, it is expected that there will be changes required to many design aspects of the Project. Many changes in design will be of a purely technical nature with little environmental or social relevance (e.g. asphalt face specifications). Other changes in design are expected to fall within the areas and issues already covered by the Supplementary E&S studies (e.g. change of camp layout within a land take area already included in the LALRP).

An overview of the CMP for Environmental and Social assessment topics is provided in Figure 5. Potential changes can be triggered at various stages of the Project implementation (e.g. Basic/Detailed Design, Construction, Operation) and by various stakeholders (Owners, Designers, Lenders, Community). They could include:

- Basic design refinement in 2017 due to detailed topographic or geotechnical information or Lenders requirements. It also include definition of projects components that were not approved at time of writing this ESMP, e.g. Power Supply Lines, Nakra road upgrade, Spoil Disposal Areas and construction camp at the Powerhouse.
- Detailed design development submitted by the Design team of the EPC Contractor in advance of the construction activities and approved by the Owners Engineer. Throughout the 2017 Supplementary E&S studies, JSCNH committed to maintain ecological or socio-economic functions that will materialize at the detailed design stage (e.g. efficiency of the upstream inlet of the Nakra fish pass).
- Field obstacles during construction, which requires a change in design such as unexpected geological situation in the tunnels.
- Results of further field surveys (e.g. archaeology, through the Chance Finds Procedure) and monitoring.
- Comments or concerns submitted by community or the Lenders as long as the basic design is refined or the detailed design is developed.
- Changes in regulations or comments by regulatory bodies, including the Ministry of Environment and Protection resources or the Forest Fund.

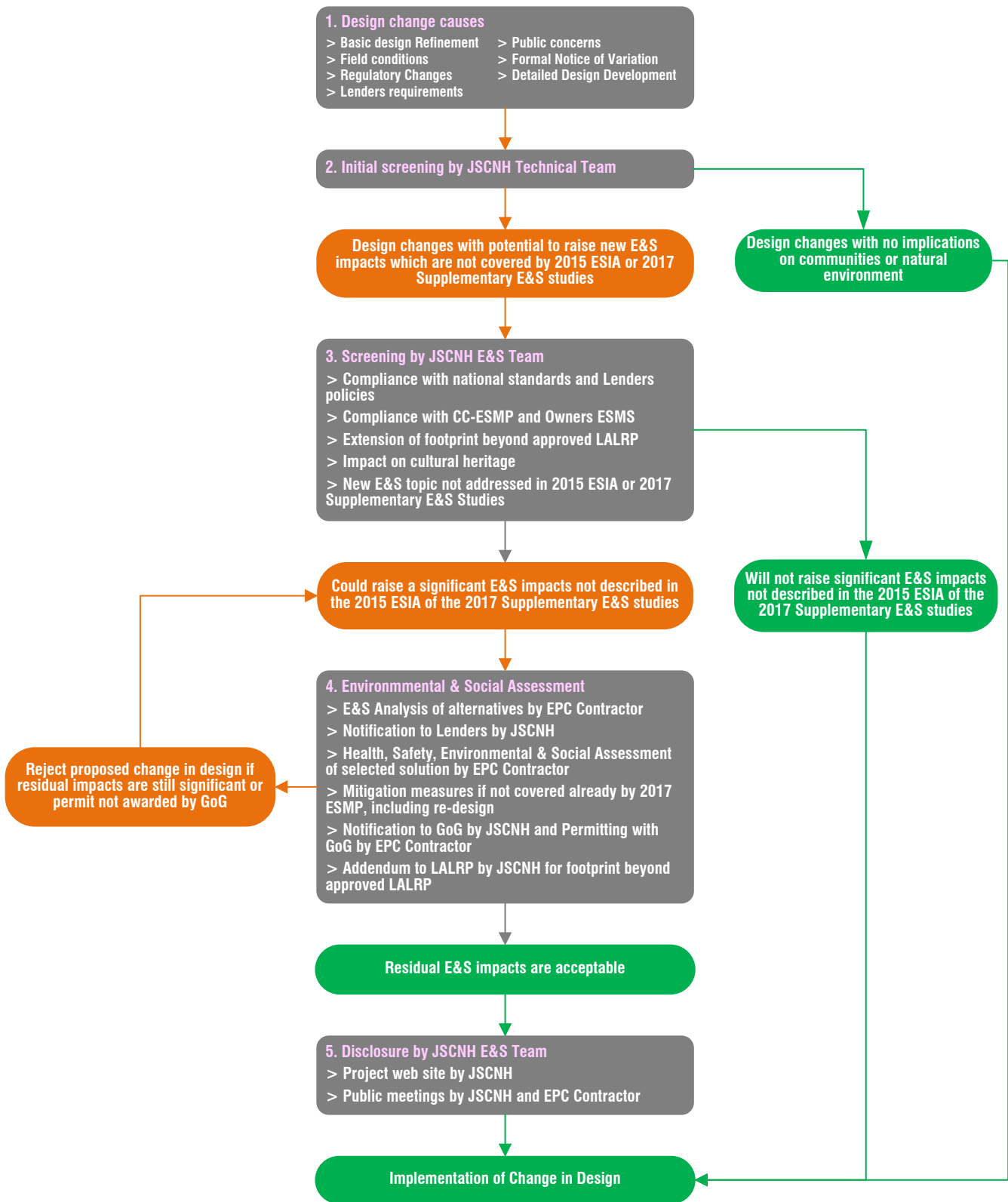


Figure 5 - Change Management Process

- Operating & Maintenance procedures for the Nenskra dam and reservoir, the Nakra water intake and the Powerhouse prepared by the EPC Contractor and refined by the future operator. As for the detailed design stage, through the 2017 Supplementary E&S studies JSCNH committed to maintain ecological or socio-economic functions through the Operating procedures (e.g. river water quality downstream of the Nenskra dam, sediment transport capacity downstream of the Nakra weir).

Regardless of the trigger source, any potential changes in design will be formally processed through the Change Management Procedures.

Specific objective

Changes in design or operating procedures which occur during construction or operation are systematically screened to detect any environmental or social implications that were not addressed in the 2015 ESIA or the 2017 Supplementary E&S studies and that would require additional mitigation strategy and public disclosure.

5.12.2 Components and responsibilities

Three main components form the present plan:

- CMP1.- Screening
- CMP2.- Assessment and approvals
- CMP3.- Public Disclosure

Implementation of these three components will start in 2017 during the early works period, and will continue during the main construction phase and throughout operation.

JSCNH has the overall responsibility for the management of the CMP. During the early works and the construction period, the Owners Engineer and the EPC Contractor will play a key role in the implementation of the CMP. The Owners Engineer will be involved in the initial screening and in the notification of variation orders when and if required to execute the additional mitigation measures (see Section 5.2.3.2 SURV 2). The EPC Contractor will conduct the environmental and social assessment required to inform the potential implications of changes in design and will execute the approved mitigation measures (see Section 4.2). In addition of the internal stakeholders (JSCNH, Owners Engineer, EPC Contractor), changes could also be required by the Lenders, GoG or the Community. This requires a specific organization and this is why this procedure is needed.

5.12.3 Management actions during construction

5.12.3.1 CMP1.- Screening

[OC- 125] – Formalize and coordinate CMP with EPC Contractor and Owners Engineer

- > Meet with OE and EPC Contractor to (i) describe the CMP procedure, and (ii) formalize the screening responsibilities and log in accordance with EPC Contract and this ESMP.
- > Organize and document weekly meetings in Tbilisi or on site during the Early works period, then fortnightly meetings on site or in Tbilisi to list all changes detected in the previous period, decide on way forward and track progresses on agreed E&S assessment or mitigation actions.
- > Verify that the E&S management Plans prepared by the EPC Contractor in 2016 are revised in accordance with the present ESMP requirements under the responsibility of the EPC Contractor in 2017, including after the 2017 Supplementary E&S Studies are finalized based on the outcomes of the disclosure period.
- > Populate and inform the CMP log as required

[OC- 126] – Initial Screening by JSCNH Technical Team

- > Require the Owners Engineer to (i) screen any changes submitted by the EPC Contractor through the Document Management Software used by EPC / JSCNH / Owners Engineer to transmit, record, track and approve all documents prepared and submitted by the EPC Contractor and (ii) provide a preliminary opinion to JSCNH E&S team on changes which could result in environmental or social impacts not addressed in the 2015 ESIA or the 2017 Supplementary E&S Studies.
- > Coordinate with Owners Engineer to discuss any changes required by third party (Lenders, GoG, Community) and to agree on way forward to materialize these changes or to justify rejection.

[OC- 127] – Screening by JSCNH E&S Team and decision on way forward

- > Examine the technical documents (drawing, method statement, technical note, Feasibility Study, risk assessment) provided by the EPC Contractor or the Owners Engineer to understand features of the proposed change which could influence the E&S examination, e.g. location and land requirements, permanent facility or temporary installation, nuisances to adjacent community (traffic, noise, vibration, light, dust) during construction and operation, safety aspects (blasting, traffic accidents, landslips), erosion and sedimentation from runoff, earthworks required for construction, long-term maintenance requirements.
- > Using an E&S topics screening matrix, provide an opinion on compliance of the proposed change with: (i) Lenders E&S policies, (ii) Good Industry Practice including IFC Environmental, Health, and Safety Guidelines, (iii) National regulation and permitting requirements, (iv) E&S specifications of the EPC Contract, (v) E&S commitments made in this ESMP, (v) Required level of consultation with communities.
- > If no significant E&S implications are identified as compared to the issues addressed in the 2015 ESIA or the 2017 Supplementary studies, log the screening results and the design change will be further evaluated on the basis of technical, cost and other non-E&S criteria. Otherwise, notify the OE of (i) the likely significance of potential impacts and (ii) the level of detail of the Environmental and Social assessment required to avoid or mitigate the predicted adverse effects prior to approval.
- > Document all decisions and populate the CMP log accordingly.

5.12.3.2 CMP2.- Assessment and approvals**[OC- 128] – Agree on responsibilities for E&S Assessment**

- > Establish who will implement the studies identified by JSCNH E&S team as required for the E&S assessment of the proposed change.
- > Involve the Owners Engineer to establish contractual implications and arrangements for the EPC Contractor
- > Meet the OE and the EPC Contractor to explain and agree on the way forward for the Environmental and Social assessment.
- > Prepare a detailed activity schedule showing planned studies and decisions, as well as interactions between activities - Include GoG permitting requirements - Define the critical path - Communicate with JSCNH Planning Controller to ensure feasibility within overall construction schedule or to amend accordingly.
- > Report to the Lenders to inform on the proposed change, result of the E&S screening and agreed strategy prior to approval.
- > Notify GoG of all material design changes where these could affect the terms of permits already issued, and for all design changes, carry out a review of existing permits to determine whether these could be affected.

[OC- 129] – Environmental and Social Analysis of technical alternatives

- > Describe the technical alternatives examined by the Design Team while studying the proposed change: location/alignment, layout, technology, construction method, operation mode, access.
- > Document how the E&S aspects were taken into account in complement of the technical and economic aspects:
 - List what aspects of the community and/or the natural environment could be affected (e.g. health, safety, livelihoods, biodiversity, cultural heritage, water resource) and describe how each technical alternative would induce adverse effects on these aspects
 - Demonstrate that the mitigation hierarchy was applied in the ranking of alternatives: avoid (resettlement, encroachment into sensitive habitat or productive land/assets), minimize and mitigate (footprint, working hours, construction method, re-design, rehabilitation, public consent) or compensate (land acquisition, temporary loss of access to productive assets).
 - Justify the selection of the preferred technical solution. If the selected solution does not avoid or minimize adverse E&S effects, demonstrate this could not be achieved without exceeding excessive cost.
- > Report to Lenders on technical alternative selected for further Environmental and Social Assessment

[OC- 130] – Environmental and Social Assessment of selected technical solution

- > Establish the need for (i) site specific surveys and (ii) technical studies to inform the E&S assessment of the

selected solutions

- > Coordinate with Owners Engineer and EPC Contractor (if in charge of the E&S risk assessment) to ensure that these needs are being addressed through their E&S risk assessment - If a third party consultant performed the E&S assessment, prepare the scope of work and procure the studies.
- > Review the E&S assessment and verify (i) robustness of the baseline description, (ii) relevance of the impact assessment, (iii) effectiveness of the proposed mitigation strategy and (iv) level of public consultation undertaken while designing the mitigation strategy.
- > Approve or require improvements
- > When the E&S assessment is prepared under the form of an ESIA study submitted to GoG for permitting, verify compliance with the Lenders E&S standards, whatever is GoG's approval status.
- > Coordinate with the Owners Engineer to ensure that the proposed mitigation measures are actually and timely implemented in the field.
- > Submit the environmental & social assessment report(s) to the Lenders

[OC- 131] – Addenda to LALRP

- > As provisioned in section 5.3.3, conduct the land surveys required and the necessary consultations to update the LALRP for the area affected by the proposed change in design.
- > Using the result of the LALRP investigations, coordinate with EPC Contractor to minimize impacts on livelihoods.
- > Submit the addenda to the LALRP to the Lenders

5.12.3.3 CMP3.- Public Disclosure

[OC- 132] – Public disclosure

- > Organize public meeting and provide details on construction schedule, predicted impacts and mitigation measures
- > Post the relevant documentation on the project website.

5.12.4 Management actions during operation

5.12.4.1 CMP1.- Screening

[OO- 50] – Update of this ESMP for the Operation period

- > During the last year of the construction period, revise and update the present ESMP taking into account the environmental / social / technical / political / internal situation at that time and the lessons learnt in terms of implementation to date.
- > Refine budgets, implementation schedules and human resources assessment.
- > Share with Lenders and disclose the updated ESMP on the Project website prior to the start of operation

[OO- 51] – Screening by JSCNH E&S Team and decision on way forward

- > Examine any changes proposed by the operator as proposed for the construction period: (i) review of technical documents to understand features of the proposed change which could influence the E&S examination, (ii) provide an opinion on compliance of the proposed change with Lenders E&S policies and Good Industry Practices.
- > If material E&S implications are identified as compared to the issues addressed in the 2015 ESIA or the 2017 Supplementary studies, inform the operator and the Lenders of the likely significance of potential impacts and the level of detail of the Environmental and Social assessment required to avoid or mitigate the predicted adverse effects prior to approval.
- > Document all decisions and populate the CMP log accordingly.

5.12.4.2 CMP2.- Assessment and approvals

[OO- 52] – Environmental and Social Analysis of technical alternatives

- > As for the construction period, describe the technical alternatives examined by the operator while studying the proposed change and document how the E&S aspects were taken into account in complement of the technical and economic aspects.
- > Justify the selection of the preferred technical solution. If the selected solution does not avoid or minimize adverse E&S effects, demonstrate this could not be achieved without exceeding excessive cost.
- > Report to Lenders on technical alternative selected for further Environmental and Social Assessment

[OO- 53] – Environmental and Social Assessment of selected technical solution

- > Establish the need for (i) site specific surveys and (ii) technical studies to inform the E&S assessment of the selected solutions.
- > Prepare the Scope of Work for the E&S assessment, procure and mobilize the consultants.
- > Review the E&S assessment and submit the environmental & social assessment report to the Lenders.

5.12.4.3 CMP3.- Public Disclosure**[OO- 54] – Public disclosure**

- > Organize public meeting(s) and provide details on implementation schedule, predicted impacts and mitigation measures
- > Post the relevant documentation on the project website.

5.12.5 Performance indicators

Component	Performance indicators
CMP1.- Screening	<ul style="list-style-type: none"> • CMP log available and populated with changes in design
CMP2.- Assessment and approvals	<ul style="list-style-type: none"> • Analysis of Alternatives reports available and relevant • E&S assessment reports compliant with Lenders E&S standards • Permits timely obtained from GoG
CMP3.- Public Disclosure	<ul style="list-style-type: none"> • Availability of E&S assessment report on the Project website prior to start of implementation of the design change.

5.13 Environmental Monitoring Plan

5.13.1 Why is this plan needed?

The 2015 ESIA and the 2016 Supplementary E&S Studies have identified potential adverse effects on communities and the environment and established a mitigation strategy to minimize or compensate those effects. This process has been based on predictions and assumptions that must be verified during the Project implementation through a monitoring program. The objective is to detect changes in the key environmental quality parameters, which can be attributed to the project in order to plan the necessary corrective measures. The results of the monitoring program are used to evaluate the following: (i) extent and severity of the environmental impacts against the predicted impacts; (ii) performance of the environmental protection measures or compliance with pertinent rules and regulations; (iii) trends in impacts; and (iv) overall effectiveness of the project ESMP.

As described in Vol. 7 Stakeholder Engagement Plan, JSCNH will prepare periodic monitoring reports that describe progress with implementation of the ESMP and compliance issues and corrective actions, if any. Such periodic reports will be posted on the project websites.

5.13.2 Components and responsibilities

Six main components form the present plan:

- MON1.- Water quality
- MON2.- Hydrology, Environmental flow and Climate change
- MON3.- Land use, erosion and revegetation progress
- MON4.- Socio-economic indicators
- MON5.- River fish
- MON6.- Reporting and public disclosure

Specific objective

Monitoring of key environmental (water, vegetation, river fish) and social (health, revenues) indicators is carried out and deviations are detected for the implementation of corrective actions.

Implementation of these six components will start in 2016 during the early works period, and will continue during the main construction phase and throughout operation.

JSCNH has the overall responsibility for the implementation of the environmental monitoring and reporting. During the construction period, the EPC Contractor's monitoring results will complement the Company's own monitoring activities. For monitoring activities that requires specific expertise (e.g. socio-economic monitoring, river fish monitoring), JSCNH will retain qualified and experienced external experts or qualified NGOs to plan, conduct and analyse the monitoring survey.

Planning and conducting surveys and sampling programs and then, analysing the data collected and preparing the reports to support environmental management require resources and professional advice. This is the reason why the present plan is needed.

Bear monitoring activities (Section 5.9.3.1), as well as the River Habitat Monitoring (Section 5.9.4.3) are covered by the Wildlife Conservation Plan (Section 5.9). Likewise, Riverbed geomorphological monitoring is covered by the Downstream Flood and Erosion Protection Plan (Section 5.6). They are not repeated here.

5.13.3 Management actions during construction

5.13.3.1 MON1.- Water quality

[OC- 133] – Nenskra reservoir water quality monitoring

- > Objectives: long-term, standardised measurement and observation of the reservoir water quality in order to define status and trends.
- > 3 Stations: (i) upper reaches of the reservoir, (ii) middle of the reservoir and (iii) the reservoir proximity to the dam.
- > Parameters: T°, pH, Dissolved oxygen, Conductivity, Total phosphorus, Turbidity, Phosphates, Total Suspended Solids, Ammonia, Nitrate, Total alkalinity, Nitrite, Organic carbon, Chlorophyll-a.
- > Method and Analysis: in-situ direct measurement using portable equipment for the first 4 parameters. Sampling in dedicated containers and analysis in laboratory in Tbilisi or abroad for the other parameters. A boat will be required to collect the water samples. Three water depths.
- > Frequency: Monthly monitoring starting with reservoir filling.
- > Reporting: Results included in the six-monthly E&S reports and disclosure of the monitoring results to the communities

[OC- 134] – Nenskra and Nakra rivers water quality monitoring

- > Objectives: long-term, standardised measurement and observation of the reservoir water quality in order to define status and trends.
- > 2 stations in the Nenskra River downstream of the dam, 1 station in the Nenskra River downstream of the powerhouse, and 2 stations in the Nakra River downstream of the diversion weir.
- > Parameters for the rivers water quality: T°, Dissolved oxygen, pH, Conductivity, Phosphates, Ammonia, Turbidity, Nitrate, Total suspended solids, Nitrite, Specific conductance, Total Petroleum Hydrocarbons, Total alkalinity, Benzene, Toluene, Ethylbenzene, Xylene (BTEX), EPA 13 Priority pollutant Metals (PP-13), Total phosphorus, Total coliforms, Organic carbon, Faecal coliforms.
- > Method and Analysis: in-situ direct measurement using portable equipment for the first 4 parameters. Sampling in dedicated containers and analysis in laboratory in Tbilisi (e.g. Coliforms) or abroad for the other parameters.
- > Frequency: For the Nenskra River, quarterly monitoring during the 2 first years of construction until the start of the reservoir filling, and then monthly monitoring. For the Nakra River, quarterly monitoring, starting in 2017 with the commencement of construction works at the Nakra site.
- > Reporting: Results included in the six-monthly E&S reports and disclosure of the monitoring results to the communities.

[OC- 135] – Monitoring of water springs and mineral water quality

- > Objectives: baseline and monitoring of water quality of drinking water springs and mineral water springs in the two valleys.
- > 15 stations for the water springs (10 locations in the Nenskra valley and 5 locations in the Nakra valley) and 5 stations for the mineral water springs in the Nenskra valley.
- > Parameters: Total Organic Carbons, Metals, Ammonium and fluorides, Chlorides, Nitrites, Nitrate, Sulphates, Total Alkalinity, Biological Oxygen Demand, Chemical Oxygen Demand, Total Coliforms.
- > Method: Selection of exact locations of stations will be made with local villagers' representatives. Direct sampling in the springs. Where and if possible, measurement of water discharge or water levels. Sampling in dedicated containers and analysis in laboratory in Tbilisi (e.g. Coliforms) and/or abroad for the other parameters.
- > Frequency: every six months, starting with the main construction period.
- > Reporting: Results included in the six-monthly E&S reports and disclosure of the monitoring results to the communities.

5.13.3.2 MON2.- Hydrology, Environmental flow and Climate change

The water level monitoring in the Nenskra reservoir, the Nenskra river flow upstream of the reservoir, the discharge of turbined waters and the quantities of Nenskra reservoir water spilled via the spillway will be monitored for operational and safety purposes and are not discussed in this section.

[OC- 136] – Monitoring of Mandatory Environmental Flow

- > Objectives: Demonstrate that the mandatory ecological flows downstream of the Nenskra dam and Nakra diversion weir are indeed operational.
- > 2 Stations, one immediately downstream of the Nenskra dam and one immediately downstream of the Nakra water intake.
- > Method: simple structure that will allow a visual check that the river flow is equal or greater than the mandatory environmental flow.
- > Frequency: Daily record, from the start of the reservoir filling in the Nenskra River and from the start of the Nakra transfer in the Nakra River, including during cofferdam construction and dismantlement at both the Nenskra dam site and the Nakra intake.
- > Reporting: Results included in the six-monthly E&S reports and disclosure of the monitoring results to the communities.

[OC- 137] – Monitoring of river flow

- > Objectives: Establish the actual flow rates of the Nenskra and Nakra rivers once the scheme is in operation.
- > 2 Stations, one immediately upstream of the Nenskra powerhouse and one immediately upstream of the Nakra water intake.
- > Method: River gauging stations.
- > Frequency: If the stations are automated, they will measure on a continuous basis the river flow rate. If the stations are of water level gauge type, the measurement will be made twice per day in the Nenskra valley and once per day in the Nakra valley. Recording will start at least one year before the start of the reservoir filling in the Nenskra River and at least one year before the start of the Nakra transfer in the Nakra River.

[OC- 138] – Monitoring of water springs discharge

- > Objectives: confirm that the discharge rate of seeps and water springs used by the downstream community as source of drinking water are not affected by flow reduction in the Nenskra and Nakra River.
- > 15 stations for the water springs (10 locations in the Nenskra valley and 5 locations in the Nakra valley) and 5 stations for the mineral water springs in the Nenskra valley.
- > Indicator: litter per second
- > Method: filling rate of a 5 liters bucket.
- > Frequency: monthly. First year from Jan. to Dec. 2018 to establish baseline. Then during two years following the start of the reservoir impoundment in the Nenskra River and during two years following the start of the Nakra transfer in the Nakra River. Disclosure of the monitoring results to the communities

[OC- 139] – Monitoring of local weather in Nenskra reservoir and Chuberi

- > Objectives: comply with 2015 Environmental Permit condition and demonstrate absence effects on micro-climate change in the Nenskra valley
- > 2 weather stations: one in the Nenskra Reservoir (upper reaches) and one in Chuberi.
- > Indicators: wind speed and direction; Air Temperature; Rainfall gauge; Humidity; Barometric pressure.
- > Frequency: If the stations are automated, they will measure on a continuous basis the weather conditions. Recording start one year prior to reservoir filling.
- > Reporting: Results included in the six-monthly E&S reports and disclosure of the monitoring results to the communities.
- > Examine possibilities to, and implement if practically feasible, disclosure of automatically collected weather data on the Project website.

5.13.3.3 MON3.- Land use, erosion and revegetation progress**[OC- 140] – Annual land use monitoring**

- > Objectives: Document the changes in land use induced by the Project activities in the two valleys and monitor reinstatement of areas disturbed during the construction period.
- > Observations: Areas opened or disturbed for construction purposes, e.g. site installations, camps, parking areas, disposal and borrow areas, quarry area, cut and fill areas, areas adjacent to upgraded roads or service roads with side-casted material, 110kV and 35kV Supply electrical line right of way, reservoir area.
- > Indicators: location, area in m², status of use (on-going works / under reinstatement / fully rehabilitated), percentage of vegetation coverage; percentage affected by erosion pattern.
- > Method: site inspection every quarter, photo reporting and production of GIS-based maps based. Every 2 years, starting in July 2017, Remotely Piloted Aircraft Systems (drones) survey of affected sites.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website

5.13.3.4 MON4.- Socio-economic indicators

[OC- 141] – Annual Socioeconomic Households Survey

- > Objectives: evaluate the effects of the Project on the community's social and economic welfare and ensure no degradation of local livelihood. Based on data collected from a representative sample of households which are not affected by the land acquisition process caused by the Project.
- > Target groups: 10% of the approx. 385 households identified in the both valleys: Nenskra Valley (10% of 300 households) and Nakra Valley (10% of 85 households). Surveyed will cover one of the following three employment situations: (i) households with at least one member employed by the Project; (ii) households with wage employments non-relating to the Project, (iii) household with no wage employments.
- > Indicators: (i) Employment status of all households members, (ii) Sources of Income, level of cash and non-cash income, (iii) Budget and expenditure surveys with measurement of current consumption patterns, (iv) household's use of market places, (v) involvement in emerging tourism activities (vi) Market Prices.
- > Method: mobilization of an external monitor specialized in social issues contracted by JSCNH. Annual survey each year during the construction period. Survey based on questionnaires.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OC- 142] – Community Perceptions Survey

- > Objectives: Assess perceptions and expectations of the project-affected population on the Project activities, impacts and benefits and implement corrective actions as required.
- > Target groups: all households living in the Nenskra and Nakra valleys each year.
Indicators: (i) Perception of Employment opportunities; (ii) Perception of Roads improvement and road safety; (iii) Perception of Benefits from the Project; (iv) Perception of adverse effects from the Project; (v) Knowledge and awareness regarding the Project activities.
- > Method: mobilization of an external monitor specialized in social issues contracted by JSCNH. One community perception survey each year during construction. Survey based on a combination of questionnaires and semi-structured interviews conducted with a sample of households and with focus groups, including women's groups, elderly and young people.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OC- 143] – Collaboration with local Health Authorities to establish Community Health Baseline

- > Objectives: Existing prevalence rates of communicable diseases are not available at the local level. JSCNH will collaborate with the Health authorities to set up a community health baseline in the two valleys and to monitor possible changes.
- > Target groups: communities of the Nenskra and Nakra valleys
- > Indicators, methods and frequency of the community health baseline and monitoring will be determined with local Health Authorities. The modality and frequency for community health monitoring will be determined with the Health Authorities. The baseline will be realized in the first two years of the main construction activities.
- > Reporting: Results of the baseline surveys and of subsequent health monitoring activities will be reported to the Ministry of Health and included in the six-monthly E&S reports.

[OC- 144] – Project-induced in-migration

- > Objectives: The assumption is that project-induced in-migration will be limited during the construction and operation phase. This must however be confirmed through documentation of in-migration in the 2 valleys in close collaboration with the local authorities.
- > Target groups and Indicators: JSCNH will work with the Representatives of Mestia Municipality in Chuberi and Naki villages to document anonymously the number of newcomers who migrates into the villages during the construction phase. This measure will be explained and disclose to the local communities.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OC- 145] – Local inflation monitoring

- > Objectives: The assumption is that project-induced in-migration will be limited and will not induce significant negative impact such as local inflation. This must however be confirmed through documentation of local prices.
- > Target groups and Indicators: JSCNH will work with the shopkeepers in Chuberi and Naki villages, as well as in Khaishi village, to register the prices of a group of key products sold locally. The choice of the key products to be monitored will be discussed with the shopkeepers and with representatives of the local communities, as part of the participative monitoring system.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OC- 146] – Labour audits

- > Quarterly Employees Rights/Standards independent Audits for all workforce including contractor personnel to ensure compliance with national legislations and ILO standards.

5.13.3.5 MON5.- River fish and aquatic invertebrate

Monitoring of the area(s) selected for river habitat management on the Nenskra River and evaluation of the Nakra fish pass efficiency are proposed as part of the Wildlife Management Plan in Section 5.9.4.3.

The monitoring presented here aims to verifying that the Project operation and the proposed mitigation measures do not significantly reduce the population of brown trout in the Nenskra and Nakra rivers.

[OC- 147] – Fish monitoring in the Nenskra and the Nakra rivers

- > Objectives: Provide brown trout population and use estimates pre and post construction to identify if any brown trout population or behaviour changes occur in the river.
- > Indicators: Fish (number, condition, age and sex of the fish). Monitoring for otter presence will also be undertaken at the same time as the fish surveys.
- > 10 stations: six on the Nenskra River, four on the Nakra River, which include sampling locations upstream and downstream of the impoundment structures. The areas cover gorges, braided channels, areas with vegetated banks, bolder cloaked channels and cobble riverbed with stock grazed semi eroded banks.
- > Frequency: twice per year (spring and autumn), start in 2017 with the main construction period.
- > Method: Recruit specialist fish surveyors. Replicable survey techniques will be required, using set survey points as well as standardised survey techniques (e.g. box traps, casting net, fishing rods, trotlines and seine netting, drift traps and cone traps). Fish quantity in the river, or at each survey point, can be represented as catch per unitary effort (CPUE).
- > Reporting within annual E&S report.

[OC- 148] – Invertebrate surveys in the Nenskra and the Nakra rivers

- > Objectives: (i) Obtaining data about the natural composition and structure of aquatic macro-invertebrates, their quantitative distribution by main habitats, (ii) Assessment of biological status of Nenskra and Nakra rivers prior Nenskra HPP commencement and during operation, (iii) Calculation of food basis for the trout based on indicators of abundance and biomass of water macroinvertebrates communities.
- > Stations and Frequency: Sampling during the same survey periods and at the same stations as the fish surveys, so that the food basis for fish can be defined.
- > Method: invertebrates sampling in line with European Union standard methods (EN ISO 5667-3, ISO 7828, EN ISO 8689). Homogeneities will be identified using the EU scheme "AQEM/STAR". Collection of drifting macroinvertebrates will be undertaken during each season. Identification of the invertebrates captured will be undertaken in a specialist laboratory.
- > Reporting within annual E&S report.

5.13.3.6 MON6.- Participatory noise pollution monitoring

Community adjacent to the proposed powerhouse area have raised concerns about potential acoustic noise pollution during construction and operation. Noise levels during construction will be constrained by specification 4.5 with lower noise limits set during the late evening and night time. Noise levels during operation will be constrained by specification 4.21. JSCNH will implement a noise monitoring program to establish the baseline, verify the compliance with the aforementioned constraints and undertake corrective measures if the maximum noise levels are not complied with.

This monitoring will be participative; representatives of the adjacent community will be invited to attend the measurement campaign, discuss with surveyors and verify transparency through the public-disclosed results of the monitoring campaign.

[OC- 149] – Establish the baseline

- > Objectives: Provide baseline of background and ambient noise levels at the nearest occupied off-Worksite receptor area.
- > Parameters monitored: noise levels L_{Aeq} (15 minute) during day/Evening time; L_{Aeq} (15 minute) and L_{A1} (1

minute) night time

- > 5 stations: two on the left bank of the Nenskra River where households are presently living, three on the right bank on of the Nenskra River.
- > Frequency: every month from March 2017 to February 2018.
- > Method: Recruit specialist noise monitoring consultancy. Replicable survey techniques will be required, using set survey points as well as standardised survey techniques. Applicable standards are Australian Standards AS 1055: Acoustics - Description and Measurement of Environmental Noise. The specialist noise monitoring consultancy shall, before any noise monitoring is carried out, prepare a detailed noise monitoring methodology that shall state clearly how the monitoring survey results will be used to define the baseline.
- > Reporting within annual E&S report.

[OC- 150] – Manage complaints

- > If JSCNH receives complaints regarding noise at a particular receiver location, specific monitoring will be undertaken

5.13.3.7 MON7.- Reporting and public disclosure

[OC- 151] – Reporting disclosed to public

- > As described in Vol. 7 Stakeholder Engagement Plan, prepare and distribute locally the six-monthly newsletter in Georgian.
- > Prepare and publically disclose (locally and internet) the Six-monthly E&S Performance reports in Georgian and in English that summarizes the following information during the reporting period:
 - Project construction activities and update of the construction schedule.
 - Environmental monitoring activities and results: water quality, hydrology, land use, socio-economic, river fish.
 - Social or community development initiatives undertaken by the Project.
 - Interaction with stakeholders, including meeting or other initiatives to engage with members of the public or public organisations, civil society, communities, including vulnerable groups.
 - Main issues raised in the complaints or grievances and how they were resolved.
 - Number of direct employees, contracted workers and temporary workers recruited and dismissed, whether international, national or from the two valleys.

[OC- 152] – Reporting to Lenders

- > Six-monthly E&S Compliance report: Prepare semi-annual report in form and scope satisfactory to the Lenders, on environmental and social matters arising in relation to the Project or which may affect the Project. The report could be structured as follows:
 - General: (i) Project update, (ii) Summary of environmental and social performance, including an update on Environmental and Social Action Plan (ESAP) and this ESMP implementation status to help the Lenders review JSCNH's compliance with the applicable E&S laws and the Lenders E&S policies. For actions with delays, reasons for the delays or changes and actions planned to meet the requirements and estimated completion date for the action.
 - Core questions: (i) new environmental, social or gender issues which were not foreseen during the ESIA stage, (ii) accidents or incidents that have caused damage to the environment, affected cultural property, or created liabilities for JSCNH, (iii) exceedances of the emission and discharge standards that apply to the Project, and (iv) court cases filed against JSCNH which are related to labour, health & safety, environment, land acquisition, damage to third party assets.
 - Human resource management: (i) local/national recruitment or dismissal, redundancy plans, workers grievances, strikes or collective disputes, (ii) health and safety data including any accidents / incidents that have happened to employees or third parties, training, audits, road traffic collisions, and remedial actions to any newly identified health or safety issue.
 - Land Acquisition Process: progress made in the implementation of the LALPR, using the monitoring indicators as detailed in the LALRP. Results of any other related monitoring carried out by JSCNH
 - Stakeholder engagement: progress made in the implementation of the SEP, including meetings to engage with communities and public organisations, any coverage in media on E&S issues related to the project, and interaction with any environmental or other community groups. Grievances not solved during the timeframe established in the Grievance Redress Mechanism.
 - Community Investment Programme: Social or community development initiatives undertaken by the project during the reporting period, and associated expenditure. Comment on whether/how the community has input into the selection of initiatives to be supported.

<ul style="list-style-type: none"> • Non-conformities of level 2 or level 3 from the EPC Contractor. • Change Management Procedure: changes in design or in operating procedure proposed during the reporting period which could have potential E&S implications - Screening actions, environmental and social assessment, mitigation measures decided and status of implementation. <p>> Project Incident Notification: In case of incident during Project implementation with fatality (e.g. vehicle accident, explosion, fall) or without fatality (e.g. strikes or other collective disputes related to working conditions, spill, major natural hazard):</p> <ul style="list-style-type: none"> • Inform immediately by email the Lenders safeguard specialists. • Describe the incident: What has happened and when; How many fatalities/injured, what were their ages, gender; Identify their relationship such as employee, contractor, member of the public; What is known to date about the damage to the environment or community health and safety; Are there effects off-site to the public or the environment; What was the cause of the incident/accident if known; What kind of follow-up investigation is being conducted.
<p>[OC- 153] – Participatory Monitoring</p> <p>> Involvement of key local stakeholders and representatives of communities for definition of indicators and monitoring protocols. Such participatory monitoring activities will include (but are not limited to):</p> <ul style="list-style-type: none"> • Participatory noise monitoring as described in 5.13.3.6. • Ecological Flow Monitoring: Organize a field visit with community representatives to the automatic river gauge stations and the ecological flow monitoring devices - Explain objectives, method of measurement, monitoring devices and internet disclosure of the hydrological monitoring. • Participatory monitoring of the implementation of livelihood restoration measures. <p>> Results of the participatory monitoring to be publicly disclosed and reported back to communities.</p>
<p>[OC- 154] – Reporting to Environmental Authorities</p> <p>> Report to the MoENRP on project activities and monitoring/mitigation activities as provisioned in the Conditions attached to the 2015 Environmental Permit as summarized in Table 6 in Section 6.5.</p>

5.13.4 Management actions during operation

5.13.4.1 MON1.- Water quality

<p>[OO- 55] – Nenskra reservoir water quality monitoring</p> <p>> Same objectives, stations, parameters, method and analysis as during the construction period (see section 5.13.4.1).</p> <p>> Frequency: Monthly monitoring during the first 5 years following reservoir filling, then twice a year (March/May and November) in subsequent years.</p> <p>> Reporting: Results included in the six-monthly E&S reports and then annual E&S reports.</p>
<p>[OO- 56] – Nenskra and Nakra rivers water quality monitoring</p> <p>> Same objectives, stations, parameters, method and analysis as during the construction period (see section 5.13.4.1).</p> <p>> Frequency: For the Nenskra River, monthly monitoring in the first 5 years following reservoir filling, and then twice a year in the subsequent years (January and July). For the Nakra River, monthly monitoring in the first 2 years following the first diversion into the transfer tunnel, and then twice a year in the subsequent years (January and July).</p> <p>> Reporting: Results included in the six-monthly E&S reports and then the annual reports and disclosure of the monitoring results to the communities.</p>
<p>[OO- 57] – Monitoring of water springs and mineral water quality</p> <p>> Same objectives, stations, parameters, method and analysis as during the construction period (see section 5.13.4.1).</p> <p>> Frequency: every six months during the first five years following the reservoir filling.</p> <p>> Reporting: Results included in the six-monthly E&S reports and then annual reports an disclosure of the monitoring results to the communities.</p>

5.13.4.2 MON2.- Hydrology, Environmental flow and Climate change

[OO- 58] – Monitoring of Mandatory Environmental Flow

- > Same objectives, stations, Method and Frequency as for the Construction period (see Section 5.13.3.2).
- > Reporting: Results included in the six-monthly E&S reports and then the annual reports.
- > Real-time monitoring and disclosure on a website of the ecological flow.

[OO- 59] – Monitoring of river flow

- > Same objectives, stations, Method and Frequency as for the Construction period (see Section 5.13.3.2).
- > Reporting: Results included in the six-monthly E&S reports and then the annual reports.

[OO- 60] – Monitoring of reservoir sedimentation

- > Objective: document the rates of sedimentation of the Nenskra reservoir to anticipate corrective measures, risk of blockage of the bottom outlet and anticipate sediment venting.
- > Method: Map the sediment deposit when the reservoir is the lowest (March/April).
- > Annual reporting to the MoENRP.

[OO- 61] – Monitoring of local weather in Nenskra reservoir and Chuberi

- > Same objectives, stations, Method and Frequency as for the Construction period (see Section 5.13.3.2).
- > Reporting: Results included in the six-monthly E&S reports and then the annual reports. Consolidation of weather data from Enguri HPP and annual report to MoENRP on detected changes in weather conditions as a result of regional cumulative impact with other HPPs.
- > Implement, if practically feasible, disclosure of automatically collected weather data on the Project website.

[OO- 62] – Monitoring of wider climate change in the Nenskra and Nakra watersheds

- > Objectives: Identify climate change trends in the catchment to inform any modifications to the operation of the Project as may be required.
- > Indicators: temperature, precipitations (incl. snow), glacier footprint, hydrology.
- > Study area: Nenskra and Nakra watersheds at the damming structures.
- > Frequency: analysis made every 5 years.
- > Method: Statistical analysis that combines the results of multiple scientific studies plus satellite imagery interpretation
- > Reporting within annual E&S report.

[OO- 63] – Monitoring of water springs discharge

- > Same objectives, stations, Method and Frequency as for the Construction period.
- > Duration: 2 years after first impoundment (Nenskra reservoir) and first Nakra transfer.
- > Reporting: Results included in the six-monthly E&S reports and then the annual reports.

[OO- 64] – Monitoring on changes in air humidity and dynamics of glaciers

- > Objective: Document the changes in the glaciers melting that supply water to the Nenskra watershed
- > Methods: Use remote sensing data available in the public domain, map and conduct comparative assessment.
- > Reporting to the MoENRP and within the annual E&S reports.

5.13.4.3 MON3.- Land use, erosion and revegetation progress

[OO- 65] – Annual land use monitoring

- > Same objectives, observations, method and indicators as for the Construction period (see Section 5.13.3.3).
- > Method: site inspection every semester, photo reporting and production of GIS-based maps based, Remotely Piloted Aircraft Systems (drones) survey of affected sites every 2 years during the 5 years of operation.
- > Reporting: results to be included in the six-monthly E&S reports and annual E&S reports disclosed on the project website.

5.13.4.4 MON4.- Socio-economic indicators

[OO- 66] – Annual Socioeconomic Households Survey

- > Same objectives, target groups, and indicators as for the Construction period (see Section 5.13.3.4).
- > Method: mobilization of an external monitor specialized in social issues contracted by JSCNH. Annual survey during the first three years of the operation phase. Survey based on questionnaires.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OO- 67] – Community Perceptions Survey

- > Same objectives, target groups, and indicators as for the Construction period (see Section 5.13.3.4).
- > Method: mobilization of an external monitor specialized in social issues contracted by JSCNH. Annual community perception survey during the first three years of the operation phase.
- > Reporting: results to be included in the six-monthly E&S reports disclosed on the project website.

[OO- 68] – Collaboration with local Health Authorities to establish Community Health Baseline

- > Same objectives, target groups, and indicators as for the Construction period (see Section 5.13.3.4).
- > Methods and frequency of the community health monitoring will be determined with local Health Authorities. Monitoring during the first three years of the operation phase.
- > Reporting: Results of the health monitoring activities will be included in the six-monthly E&S reports.

[OO- 69] – Labour audits

- > Annual Employees Rights/Standards Audits for all workforce including contractor personnel to ensure compliance with national legislations and ILO standards.

5.13.4.5 MON5.- River fish

[OO- 70] – Fish monitoring in the Nenskra and the Nakra rivers

- > Same objectives, indicators, sampling stations and methods as for the Construction period (see Section 5.13.3.5)
- > Frequency: twice per year (spring and autumn) during the first 5 years of operation. At year 5 post construction, the frequency of survey requirement will be reviewed and may be reduced to once every five years thereafter, in order to continue to assess the efficacy of the maintenance works and the likelihood that the brown trout populations will survive in the Nenskra River.
- > Reporting within annual E&S report.

[OO- 71] – Invertebrate surveys in the Nenskra and the Nakra rivers

- > Same objectives, observations, methods as for the Construction period (see Section 5.13.3.5)
- > Sampling during the same survey periods and at the same stations as the fish surveys, so that the food basis for fish can be defined.
- > Reporting within annual E&S report.

[OO- 72] – Adaptive Management

- > Objective: The reporting of the findings from these surveys will be used to inform the ongoing management of the river, and the need for further remedial action, if required.
- > For example, if fish populations in the Nenskra River, below the dam are found to have significantly reduced for two years in a row (four survey periods) then further action such as catch and release, or re-stocking of the river with brown trout raised in local hatcheries will be considered.
- > The exact form of remedial measure used will be decided at the time, based on fish, invertebrate and other available environmental data e.g. flow rates.

[OO- 73] – Fish monitoring in the Nenskra Reservoir

- > Objectives: Providing information on the viability of the brown trout population in the reservoir and assessing if other species have been artificially introduced, in order to undertake remedial action if required.
- > Indicators: fish populations and species presence, state and behaviour of the fish, weather conditions, time of day.
- > Method: Netting unless electro fishing can be used if authorization has been obtained from authorities. Fish quantity can be represented as catch per unitary effort (CPUE). Range of survey periods (spring, summer autumn) will be used.
- > Frequency: Starting from year 2 after first reservoir filling, then every 5 years during 15 years or until the population levels of brown trout in the reservoir have established and hopefully stabilised.
- > Reporting within annual E&S report.

5.13.4.6 MON6.- Participatory noise pollution monitoring

[OO- 74] – Monitoring of the operational noise at the powerhouse

- > Objectives: (i) demonstrate compliance with Georgian legal framework or WHO guidelines, whichever is the stricter, during the operation phase and (ii) satisfy commitments made to community during the ESIA preparation.
- > Parameters monitored: Parameters monitored: noise levels L_{Aeq} (15 minute) during day/Evening time; L_{Aeq} (15 minute) and L_{A1} (1 minute) night time.
- > 5 same stations as monitored during the baseline establishment.
- > Frequency: every quarter, during the first year of the powerhouse operation. This will capture operations at full load and in a representative worse case climatic and river flow conditions.
- > Method: Recruit specialist noise monitoring consultancy. Replicable survey techniques will be required, using set survey points as well as standardised survey techniques. Applicable standards are Australian Standards AS 1055: Acoustics - Description and Measurement of Environmental Noise. All surveys will include two nights of attended monitoring with a 15-minute period of attended monitoring undertaken at each site per night. This will ensure a wide range of potential mining noise impacts are sampled, and will account for variability in atmospheric conditions. All attended monitoring will be undertaken during periods when the powerhouse is fully operational, including periods of the early morning and the late evening when turbines are switched off or switched on.
- > If operational noise monitoring demonstrates an exceedance of the above noise standards, JSCNH shall implement corrective measures to comply with these standards.
- > Reporting within annual E&S report.

5.13.4.7 MON7.- Reporting and public disclosure

[OO- 75] – Reporting disclosed to public

- > Same reporting as for the Construction period (see Section 5.13.3.7).
- > Frequency is six-monthly during the first three years of operation and then annual.

[OO- 76] – Reporting to Lenders

- > Same reporting as for the Construction period (see Section 5.13.3.7).
- > Frequency is six-monthly during the first three years of operation and then annual.

[OO- 77] – Participatory Monitoring

- > Same principles, activities and reporting as for the Construction period (see Section 5.13.3.7).

[OO- 78] – Reporting to Environmental Authorities

- > Report to the MoENRP on project activities and monitoring/mitigation activities as provisioned in the Conditions attached to the 2015 Environmental Permit as summarized in Table 6 in Section 6.5.

6 Measures under the responsibility of a Governmental agency

6.1 Land rights

The Implementation Agreement established between the Government of Georgia and JSCNH specifies the role of the Government in the land acquisition process required for the construction of the Project infrastructures. It is described in Vol. 9 - Land Acquisition and Livelihood Restoration Plan (LALRP). Partnership Fund is the Governmental Agency appointed to manage the land acquisition process in close coordination with JSCNH. The measures under the responsibility of Partnership Fund are described below.

[GC- 1] – Examine and approve the land take required for the Project

- > Examine the Land Report prepared by JSCNH that details the land parcels required for JSCNH to undertake the Project.
- > Determine if all land parcels are deemed to be part of the lands required for the Project.
- > Approve or amend the land take required for the Project.

[GC- 2] – Land classification and land transfer

- > Provide a report to JSCNH that describes what parcels of the required lands are public lands and what other parcels are private lands.
- > Describe the cost and process to acquire the private lands, and acquire title to any private lands that are part of the lands required for the Project
- > Describe the process of re-designating agricultural lands as non-agricultural lands, and procure that the lands required for the Project designated as agricultural lands are re-designated as non-agricultural lands.
- > Transfer to JSCNH title that is valid and free of encumbrances to all required lands, and ensure that all necessary registration are completed.

6.2 Management of logs evacuated from the reservoir

Timbers cut by the EPC Contractor in the reservoir area and infrastructure footprints are to be handed over to the National Forestry Agency in compliance with resolution n°242 dated 20 August 2010 on Forest Usage Rules.

[GC- 3] –Management of logs evacuated from the reservoir

- > Instruct JSCNH where to store the trees cut by the EPC Contractor when clearing the vegetation from the reservoir. Discuss with local authorities access to land.
- > Formalize the delivery-acceptance act between the EPC Contractor and National Forestry Agency
- > Inform JSCNH about the planned strategy and timeframe to evacuate the logs from the lay-down area(s)
- > Organize timely and complete evacuation of logs handed over by the EPC Contractor prior to the end of construction period.
- > Plan and execute initiatives with local communities if timber/logs are not acquired by third parties and could stay on site and become a green waste.

6.3 ESIA for the Transmission Line

Georgian State Electrosystem (GSE) is the entity in charge of designing, constructing, operating and permitting the 220 kV Transmission Line that connects the Nenskra Powerhouse to the national grid. The ESIA and the land acquisition processes of the proposed transmission line will be undertaken by GSE taking due consideration of the Lenders Environmental and Social policies standards. The measures under the responsibility of GSE are described below.

[GC- 4] – Conduct an ESIA process in line with the Lenders E&S policies

- > ESIA Scoping based on basic design.
- > Impact Assessment based on comprehensive field work, including land tenure, socio-economic surveys, bats and birds species surveys.
- > Consistency with the mitigation strategy planned for the Nenskra HPP
- > ESMP with budget, activity schedule and performance indicators.
- > Stakeholder Engagement Plan and meaningful consultations

[GC- 5] – Land Acquisition and Livelihood Restoration Plan

- > Definition of land requirements, land use restrictions and access restrictions
- > Census,
- > Eligibility and Entitlements
- > Consistency with the compensation framework planned for the Nenskra HPP
- > Livelihood restoration strategies
- > Consultations
- > Institutional arrangements & Grievance Mechanism

The Implementation Agreement between GoG and JSCNH (see Vol 2 - Project Definition)

6.4 Planned Svaneti Protected Area

The Project will propose to the Ministry of Environment and Natural Resources Protection to contribute to the creation and management of the planned Svaneti Protected Area. This measure is captured in Section 5.9 of this ESMP. It requires a close coordination with the Agency for Protected Areas (APA) as follows:

[GC- 6] – Identify areas of possible contribution from JSCNH to the PA creation

- > Set up a task force within the APA to drive the protected area creation process and coordinate the various contributions from donors.
- > Organize a meeting with potential donors and present a road map with all the steps required to create the protected area. Agree on a priority Action Plan for the first two years and on a financing plan. This could include a Feasibility study for the planned Svaneti protected area to identify important biodiversity values and relevant territories to be included in new protected area; and Preparation of the draft law for the establishment of new protected area in Svaneti and the Protected Area Management Plan.
- > Establish a Memorandum of Understanding with JSCNH that details the contribution of each party and governance arrangements.

[GC- 7] – Coordinate and monitor the contribution of the various donors

- > Organize regular meetings with donors/consultants/NGOs to share findings and lessons learnt
- > Lead the stakeholder engagement process in region
- > Disclose outputs of the first two years investigations
- > Identify areas of further contribution from JSCNH until the effective creation of the Protected area, i.e. the enactment of the law for the establishment of new protected area in Svaneti.

[GO- 1] - Identify areas of possible contribution from JSCNH to the PA management

- > Every 2 years, identify initiatives that could be funded by JSCNH other than contribution to the operating budget, e.g. studies, field surveys, educational programs, infrastructure improvement.
- > Formalize the contribution from JSCNH through a Memorandum of Understanding and specify the monitoring and evaluation arrangements.

> Procure the agreed services or works and disclose publicly the results of JSCNH funded initiatives.

6.5 Ownership & maintenance of Community Investment Initiatives

Part of the investments funded by the Community Investment Programme (see Section 5.5) will be handed over to Mestia Municipality, other investments may be handed over to Ministries of governmental agencies depending on their jurisdictions.

[GC- 8] – Assist JSCNH in determining ownership of investments which should be transferred to Governmental agencies

- > Depending on jurisdictions, governmental agencies identified by JSCNH as ultimate owner of the local investment funded by the CIP should be involved from the start of the examination to agree on scope and timing for implementation and taking over of the investment.
- > Work jointly with JSCNH to establish the Memorandum of Understanding on ownership and maintenance responsibilities.
- > Mobilize the resources required to maintain the CIP-funded initiative over the long term.

[GC- 9] – Mobilize the resources required to maintain the CIP-funded initiative over the long term

- > Mobilize the resources required to maintain the CIP-funded initiative over the long term.

[GO- 2] – Assist JSCNH in determining ownership of CIP-investments and ensure maintenance over long-term

6.6 Monitoring of E&S conditions in the Environmental Permit

The 2015 Environmental Permit establishes 29 conditions associated with the Project Activities. They are summarized in Table 6 next page. The MoENRP will supervise the effective compliance of the Project with these conditions during the construction and operation periods.

[GC- 10] – Monitor the effective implementation of conditions included in Environmental Permit during construction

- > Verify timely and qualitatively submission of activity and monitoring reports from JSCNH
- > Review project documentation and ensure compliance with conditions listed in the Environmental Permit (see Table 6 next page).
- > Conduct regular monitoring site inspections.

[GO- 3] - Monitor the effective implementation of conditions included in Environmental Permit during operation

- > Verify timely and qualitatively submission of activity and monitoring reports from JSCNH
- > Review project documentation and ensure compliance with conditions listed in the Environmental Permit (see Table 6 next page).
- > Conduct regular monitoring site inspections.

6.7 Coordination between HPP developers within the Nenskra & Nakra watersheds

The Cumulative Impact Assessment (Vol 10 of the Supplementary E&S studies) highlighted the need to organize and coordinate the exchange of information about the mitigation strategies

planned by each hydropower project within the Nenskra and Nakra watershed. The Stakeholder Engagement Plan (Vol 7 of the Supplementary E&S studies) includes action management relating to the communication with other hydropower project developers in the two watersheds. The GoG, including the Ministry of Energy and the Ministry of Environment and Natural Resources Protection, would play a key role to ensure that all actors do participate to the forum organized by JSCNH for that purpose.

[GC- 11] – Sponsor the annual coordination between HPP developers within Nenskra & Nakra watersheds

- > Facilitate the communication between HPPs
- > Chair annual meetings on predicted E&S impacts of each HPP and planned mitigation measures
- > Discuss consistency and robustness of mitigation strategies while taken all together.

[GC- 12] – Ensure consistency of mitigation strategies between HPP Developers

- > Require that run-of-river schemes in the Nenskra and Nakra catchment are equipped with ecological flows and fish passes.

[GO- 4] – Sponsor the annual coordination between HPP developers within Nenskra & Nakra watersheds

- > Facilitate the communication between HPPs
- > Chair annual meetings on predicted E&S impacts of each HPP and planned mitigation measures
- > Discuss consistency and robustness of mitigation strategies while taken all together.

[GO- 5] – Ensure consistency of mitigation strategies between HPP Developers

- > Require that run-of-river schemes in the Nenskra and Nakra catchment are equipped with ecological flows and fish passes.

Table 6 - Register of conditions attached to the 2015 Environmental Permit

	Conditions (n°60, 02.10.2015) attached to attached to Environmental Permit	Where the condition is addressed in this ESMP or in other Project documentation
1	<ul style="list-style-type: none"> Implementation of the mitigation measures set forth in the 2015 ESIA report Waste management, Emergency response, Environmental Management & Environmental Monitoring Plans for construction and operation. 	<ul style="list-style-type: none"> CC-ESMP for construction period (Section 4) Owners ESMS for operation period (Section 5)
2	<ul style="list-style-type: none"> During detailed design, verify dam stability and constructions sites against seismicity and faults. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements; Owners ESMS (Section 5.2.3.1)
3	<ul style="list-style-type: none"> Development of a topographic map that shows dangerous geological processes (rockslide, landslide, erosion, torrents, avalanches). 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements; Vol. 6 Natural Hazards & Dam Safety
4	<ul style="list-style-type: none"> During construction, development and monitoring of mitigating measures for areas identified with dangerous geological processes. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements, Basic Design
5	<ul style="list-style-type: none"> During construction, inform the MoENRP of, monitor and document any dangerous geological processes as well as mitigation measures. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements; Owners ESMS (Section 5.13.4.7)
6	<ul style="list-style-type: none"> During operation, identify, monitor and report on changes in weather conditions as a result of regional cumulative impact with other HPPs. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.13.4.2)
7	<ul style="list-style-type: none"> Before commissioning, identify, report on, and monitor springs under the influence of construction and operation. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.13.3.1)
8	<ul style="list-style-type: none"> Before commissioning, management plan for mitigating high temperature waters created in the result of turbine cooling 	<ul style="list-style-type: none"> No water cooling planned with the project operations.
9	<ul style="list-style-type: none"> During construction and operation, monitoring of sediments transported by Lekvevari and Leknashura river torrents to the Nakra riverbed. If the situation becomes more serious in the area, removal and appropriate disposal of the sediments. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.6.4.2)
10	<ul style="list-style-type: none"> During construction and operation, identify and mitigate damages to ichthyofauna in Nenskra and Nakra rivers. 1 million units of 4-5 gr current year production to be considered as a compensation measure. 	<ul style="list-style-type: none"> Owners ESMS (Sections 0 and 5.13.3.5) Release of units to be discussed with JSCNH specialists and communities
11	<ul style="list-style-type: none"> From construction, installation of river gauging stations on Nenskra and Nakra rivers. Quarterly reporting to MoENRP During operation, installation of river gauging station between Nenskra dam and first tributary. Quarterly reporting to MoENRP 	<ul style="list-style-type: none"> Owners ESMS (Sections 5.13.3.2 and 5.13.4.2)
12	<ul style="list-style-type: none"> Do not dispose of the tunnelling spoil in the proposed Nenskra reservoir. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.10.3.1)
13	<ul style="list-style-type: none"> Submit to the MoENRP the locations of disposal areas proposed for storage of excavated material and tunnelling spoils and obtain consent. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements, Basic Design
14	<ul style="list-style-type: none"> Monitoring on the changes in the air humidity and the dynamics of glacier thawing from June through September. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.13.4.2)
15	<ul style="list-style-type: none"> Submit preventive measures developed for natural hazards and accident response plans to MoENRP. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements, Basic Design
16	<ul style="list-style-type: none"> During operation, monitoring of reservoir sedimentation and submit annual report to MoENRP. 	<ul style="list-style-type: none"> Owners ESMS (Section 5.13.4.2)
17	<ul style="list-style-type: none"> During construction, map and monitor the space used for disposal area and report to MoENRP 	<ul style="list-style-type: none"> Owners ESMS (Section 5.13.3.3)
18	<ul style="list-style-type: none"> Compliance with GoG regulation (Decree N°424, 31 Dec. 2013) on Removal, Retaining, Utilization and Recultivation of Fertile Layer of Soil. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements, Basic Design
19	<ul style="list-style-type: none"> Seek for National Forestry Agency approval on vegetation clearing before start of cutting operations 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements, Basic Design
20	<ul style="list-style-type: none"> Ensure treatment and quality monitoring of runoff from tunnelling activities. 	<ul style="list-style-type: none"> EPC Contract, Employers Requirements,
21	<ul style="list-style-type: none"> Ensure that the reservoir zone is added to the point for observation in the water quality monitoring plan for the operation phase. 	<ul style="list-style-type: none"> Owner ESMS (Section 5.13.4.2)
22	<ul style="list-style-type: none"> Ensure that seepages are monitored at the dam during operation. 	<ul style="list-style-type: none"> Owner ESMS (Section 5.13.4.2)
23	<ul style="list-style-type: none"> Development of management plan for inert waste material in compliance with Waste Management Code 	<ul style="list-style-type: none"> CC-ESMP for construction period (Section 4)
24	<ul style="list-style-type: none"> In the event if the licensed areas are covered, ensure agreement with the organization holding the license for mining operations. 	<ul style="list-style-type: none"> No mining licences in the Project's infrastructures & reservoir footprint
25	<ul style="list-style-type: none"> Implementation of mitigation measures on aquatic biodiversity and if required, implement relevant compensation actions. 	<ul style="list-style-type: none"> Owners ESMS (Sections 0 and 5.13.3.5)
26	<ul style="list-style-type: none"> Development of a plan for monitoring the botanical component of the biodiversity 	<ul style="list-style-type: none"> Owners ESMS (Sections 5.13.3.3 and 5.8.3.3)
27	<ul style="list-style-type: none"> Development of plans for conservation/restoration, specifications of the biological rehabilitation and compensation 	<ul style="list-style-type: none"> Owners ESMS (Sections 0 and 0)
28	<ul style="list-style-type: none"> Biodiversity management is to include all steps of the mitigation hierarchy based on results of additional researches. 	<ul style="list-style-type: none"> Vol. 4 Biodiversity Impact Assessment
29	<ul style="list-style-type: none"> Performance additional researches on plants, animals and habitats impacted by the Project and prepare mitigation plans. 	<ul style="list-style-type: none"> Owners ESMS (Sections 0)

7 Budget

The implementation responsibilities and cost of the ESMP measures under the responsibility of JSCNH are summarised in Table 7. It is a preliminary budget that would need to be updated as long as the Project's activities progress and that the need for mitigation materializes. It is made of:

- Budget during the construction period (2017-21): US\$ 16,596,000.
- Annual budget for the operation phase (>2022), for the first five years: US\$ 857,000.

The budget required for the implementation of the measures under the responsibility of the EPC Contractor is included in the EPC Contract. The budget required for the Owners Engineer work is included in the Owners Engineer Contract. Therefore the costs are not included in Table 7. The budget required for the implementation of the measures under the responsibility of Governmental Agencies has not been assessed however it is assumed that the required costs are included in the respective annual operating budget of each agency.

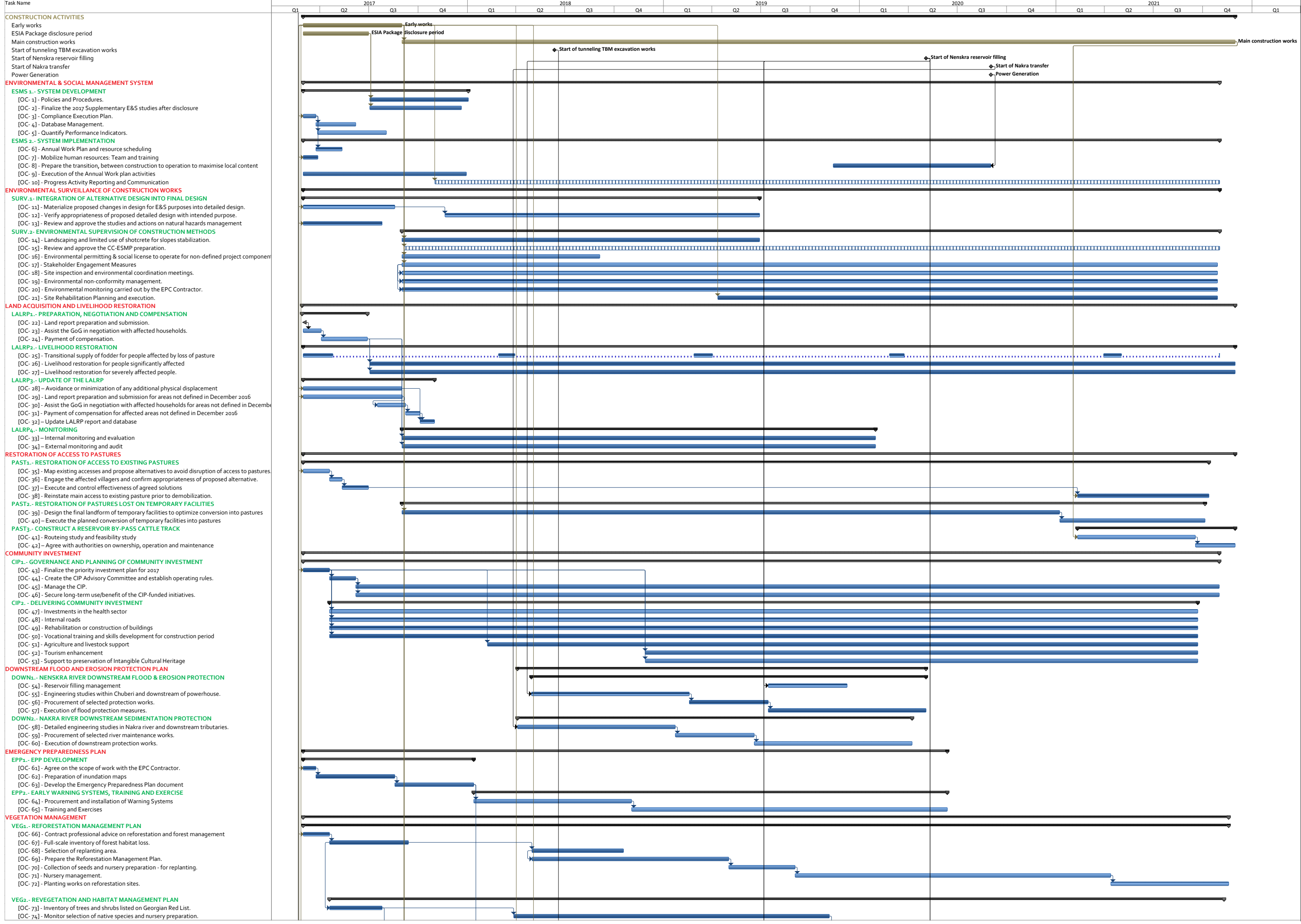
Table 7 - ESMP budget - Measures under the responsibility of JSCNH

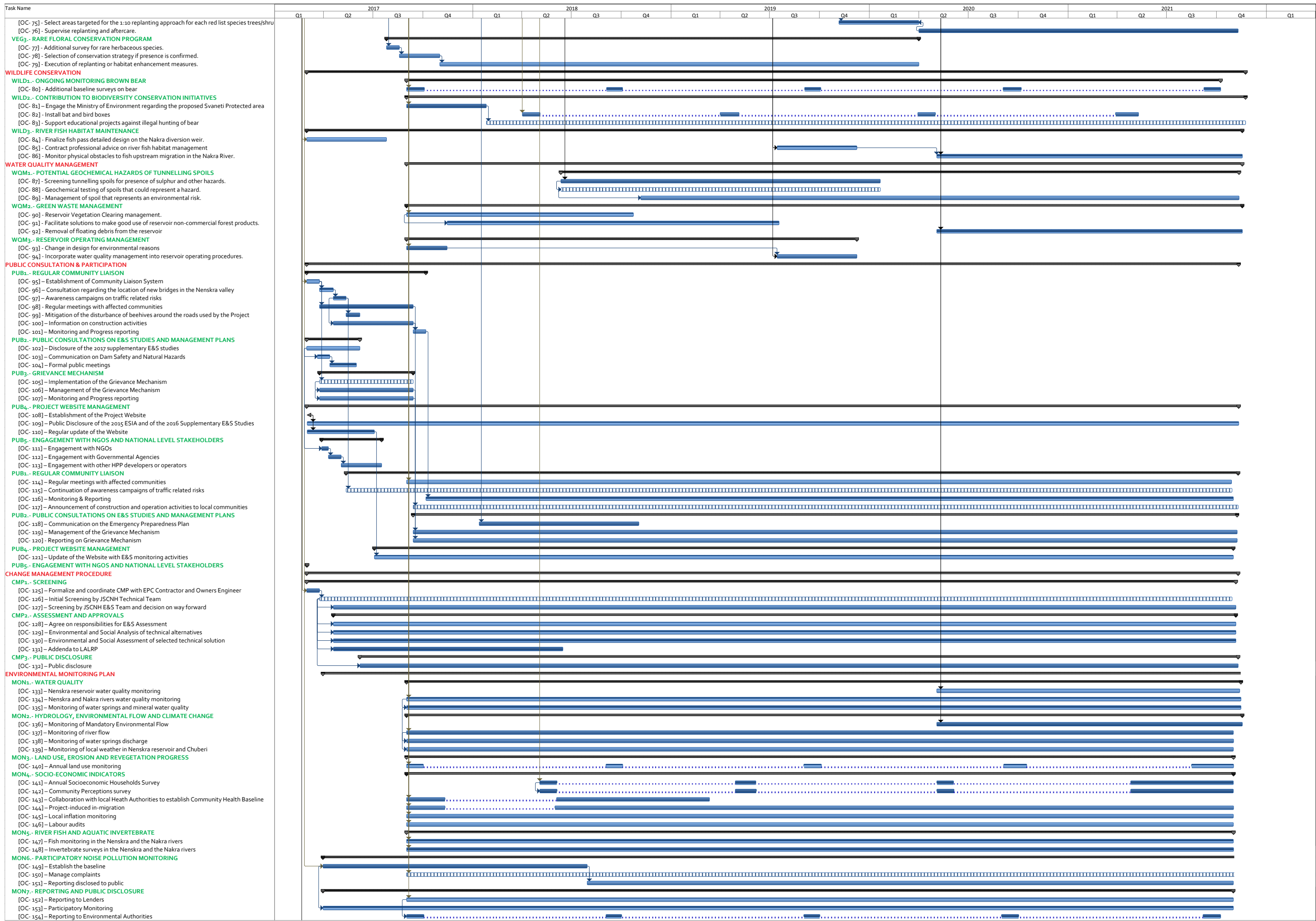
Management Plan	Implementing party		Construction 2017-2021	Operation per year	
	Preparation	Execution		5 first years of operation	> 2026
Environmental & Social Management System	JSCNH; AS	JSCNH	\$ 1 686 000	\$ 102 000	\$ 42 000
Environmental Surveillance of Construction works	OE	OE; JSCNH	\$ 350 000	\$ -	\$ -
Land acquisition and Livelihood Restoration	JSCNH	JSCNH, GoG	\$ 3 080 000	\$ -	\$ -
Restoration of access to pastures	JSCNH	EPC, CO	\$ 1 100 000	\$ 50 000	\$ 50 000
Community Investment Plan	JSCNH	NGO, AS, CO,	\$ 4 250 000	\$ 150 000	\$ 150 000
Downstream Flood and Erosion Protection Plan	ENG	CO	\$ 1 825 000	\$ 70 000	\$ 70 000
Emergency Preparedness Plan	EPC, JSCNH	JSCNH, GoG	\$ 770 000	\$ 10 000	\$ 10 000
Vegetation management	JSCNH, AS	AS	\$ 1 725 000	\$ 30 000	\$ 30 000
Wildlife conservation	JSCNH, AS	JSCNH, AS	\$ 600 000	\$ 145 000	\$ 70 000
Water quality management	JSCNH, OE	EPC, JSCNH	\$ 200 000	\$ 60 000	\$ 60 000
Public consultation and participation process	JSCNH, AS	JSCNH, AS	\$ 340 000	\$ -	\$ -
Environmental and Social Monitoring Plan	JSCNH, AS	JSCNH, AS	\$ 670 000	\$ 240 000	\$ 90 000
Total			\$ 16 596 000	\$ 857 000	\$ 572 000

EPC: EPC Contractor; OE: Owners Engineer; AS: Advisory Service Company; CO: Construction Company; NGO: Specialist NGO; JSCNH: JSC Nenskra Hydro; GoG: Governmental Agency; ENG: Engineering Company

8 Work Plan

The Gantt chart next page shows the implementation schedule of the management actions under the responsibilities of JSCNH for the construction period. The activity schedule for the operation period will be prepared and implemented as part of the ESMS implementation in 2020.





Annexes

Annex 1 - Emergency Preparedness Plan

JSC Nenskra Hydro

Nenskra HPP Construction

Emergency Preparedness Plan

Detailed framework



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1 Introduction

The goal of the present document is to set the detailed framework toward the elaboration of the Emergency Preparedness Plan (EPP) of the Nenskra hydroelectric power plant (Nenskra HPP, located in the upper Svaneti region, NW Georgia), both during construction and operation phases.

This document proposes guidelines based on technical literature (see Section 2), as well as preliminary analyses which are meant to be completed, updated and integrated in order to elaborate an applicable version of the EPP for the Nenskra HPP, both for construction and operation phases.

The preparation of this document also complies with the requirements of international financing institutions, according to the standard defined by the World Bank in Paragraph 4 of its specific Operational Manual OP 4.37 [28].

At present time, there is no information about the possible adoption by the Government of Georgia of a national legal and institutional framework for dam safety (special laws and technical regulatory issues): the reference used in the present document is a technical proposal coming from UNECE [9], about which the governments of Central Asia States (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) have already expressed their consensus in 2006.

The Annex 6 of that document contains a Model National Law on the Safety of Hydraulic Structures. This reference law sets up the legal framework of national activity about safety of hydraulic structures, and defines the powers and duties of local and national Authorities. This legal framework, as a proposal to be adopted from each signatory in the Caucasian Area, does not include any specific technical norm or standard as a reference for its practical application.

The technical characteristics of Nenskra HPP would position the latter among the projects of national interest, namely Category I of Art. 12 and 13, then subject entirely to the control scheme defined in the proposed law.

Within the aforementioned context, the present document is based on several references (see Section 2):

- International technical references and recommendations (e.g., ICOLD, UN);
- North American guidelines (e.g., FEMA, USBR, USACE);
- Swiss guidelines (OFEN); and
- Selected technical and scientific literature.

2 References

2.1 Project Documents

- [1] Lombardi Engineering Ltd. Nenskra HPP, Georgia, *Basic Design, Nenskra AFRD seepage and drainage system, Evaluation of drainage collection, Technical report*, December 2016.
- [2] Lombardi Engineering Ltd. Nenskra HPP, Georgia, *Basic Design, Hydraulic structures, Technical report*, December 2016.
- [3] Lombardi Engineering Ltd. Nenskra HPP, Georgia, *Basic Design, Flood management, Technical note*, December 2016.
- [4] Lombardi Engineering Ltd. Nenskra HPP, Georgia, *Basic Design, Hydrological study, Technical report*, December 2016.

- [5] Lombardi Engineering Ltd. Nenskra HPP, Georgia, Basic Design, *Risk assessment for spillway blocking, Technical report*, December 2016.
- [6] Lombardi Engineering Ltd. Nenskra HPP, Georgia, Basic Design, *Natural hazards risk assessment, Technical report*, December 2016.
- [7] Lombardi Engineering Ltd. Nenskra HPP, Georgia, Basic Design, *Emergency preparedness Plan framework, Technical report*, January 2017.

2.2 International Technical References and Recommendations

- [8] ICOLD. *Dam-break flood analysis—Review and recommendations*, Bulletin 111, 1998.
- [9] UN, ECE. *Dam Safety in Central Asia: Capacity-Building and Regional Cooperation*, Water Series N°5, ECE/MP.WAT/26, 2007.

2.3 North American Guidelines

- [10] FEMA. *Federal guidelines for inundation mapping of flood risks associated with dam incidents and failures*, FEMA P-946, July 2013.
- [11] FEMA. *Federal guidelines for dam safety—Emergency action planning for dams*, FEMA P-64, July 2013.
- [12] FEMA. *Federal guidelines for dam safety—Hazard potential classification system for dams*, FEMA 333, April 2004s.
- [13] USBR and USACE. *Best practices in dam and levee safety risk analysis*, Version 4.0, July 2015.
- [14] FERC. *Engineering Guidelines for the Evaluation of Hydropower Projects*. (<https://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide.asp> accessed 21.02.16).
- [15] Washington State Department of Ecology. *Guidelines for Developing Dam emergency Action Plans*. Publication no. 92-22, Rev. December 2013.
- [16] British Columbia Ministry of Forests, Lands and Natural Resource Operations. *Guide & Template for Preparing a Dam Emergency Plan (DEP) in British Columbia*. Dam Safety Program, Rev. June 2016.

2.4 Swiss Guidelines

- [17] OFEN (Federal Office of Energy). *Directive sur la sécurité des ouvrages d'accumulation—Partie A: Généralités*, Switzerland, March 2015.
- [18] OFEN (Federal Office of Energy). *Directive sur la sécurité des ouvrages d'accumulation—Partie B: Risque potentiel particulier comme critère d'assujettissement*, Switzerland, June 2014.
- [19] OFEG (Federal Office of Water and Geology). *Méthode simplifiée d'évaluation de l'inondation d'une vallée à l'aval en cas de rupture (instantanée) d'un barrage—Méthode CTGREF*, Switzerland, April 2003

2.5 Scientific and Technical Literature

- [20] Fell, R., Wan, C.F., Cyganiewicz, J., Foster, M. Time for development of internal erosion and piping in embankment dams. *Journal of Geotechnical and Geoenvironmental Engineering* 129(4): 307-314, 2003.

[21] Foster, M., Fell, R., Spannagle, M. The statistics of embankment dam failures and accidents. *Revue Canadienne de Géotechnique* 37(5):1000-1024, 2000.

[22] Pougatsch, H., Müller, R.W., Kobelt, A. Water alarm concept in Switzerland, in *Dam Safety*, Berga (ed.). Balkema, Rotterdam, 1998.

2.6 Hydraulic Model for Flood Mapping

[23] US Army Corps of Engineers. *HEC-RAS River Analysis System Hydraulic Reference Manual Version 5.0*, February 2016.

[24] US Army Corps of Engineers. *HEC-RAS River Analysis System User's Manual Version 5.0*, February 2016.

[25] US Army Corps of Engineers. *HEC-RAS River Analysis System Application's Guide Version 5.0*, February 2016.

[26] US Army Corps of Engineers. *HEC-RAS River Analysis System 2D Modeling User's Manual Version 5.0*, February 2016.

[27] EDF-R&D. *TELEMAC-2D Software User Manual Release 7.0*. December 2014.

2.7 Reference Documents of the Financing Institutions

[28] World Bank, *Operational Manual OP 4.37—Safety of Dams*, October 2001, revised April 2013.

3 Terminology

Appurtenant structures: ancillary features of a dam such as outlets, spillways, power plants, tunnels, etc.

Breach: an opening through the dam resulting in partial or total failure of the dam.

Consequences: potential loss of life or property damage downstream of a dam caused by floodwaters released at the dam or by waters released by partial or complete failure of dam. Includes effects of landslides upstream of the dam on property located around the reservoir.

Emergency: a condition that develops unexpectedly, endangers the structural integrity of the dam and/or downstream human life and property, and requires immediate action.

Emergency Action Plan (EAP): formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be undertaken to minimize property damage and loss of life. The EAP describes actions the dam Owner will take to moderate or alleviate a problem at the dam, as well as actions the dam Owner, in coordination with Emergency Management Authorities, will take to respond to incidents or emergencies related to the dam.

Failure mode: a potential failure mode is a physically plausible process for a dam or appurtenant structure failure resulting from an existing inadequacy or defect related to a natural foundation condition, the dam or appurtenant structures design, the construction, the materials incorporated, the operations and maintenance, or aging process, which can lead to an uncontrolled release of water.

Incident: an incident in terms of dam operation includes an impending or actual sudden release of water caused by an accident or failure of the dam or other water retaining structure, or the result of an impending flood condition when the dam is not in danger of failure, or any operation that may affect the safe operation of the dam. The release of water may or may not endanger human life, downstream property and structures, or facility operations.

Instrumentation: an arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.

Inundation map: map delineating areas that would be flooded as a result of a dam failure.

Notification: to inform appropriate individuals, organizations, or agencies about an emergency condition so they can initiate appropriate actions.

Piping: the progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.

Risk: a measure of the likelihood and severity of an adverse consequence.

Seepage: the natural movement of water through the embankment, foundation, or abutments of the dam.

Tailwater: water immediately downstream from a dam. The water surface elevation varies due to fluctuations in the outflow from the structures of the dam. Tailwater monitoring is an important consideration because a failure of a dam will cause a rapid rise in the level of the tailwater.

Top of dam (dam crest): the elevation of the uppermost surface of an embankment which can safely impound water behind the dam.

4 Basic Project Description

The Nenskra HPP project is located in the South Caucasus on the Nenskra River in Svaneti District of NW Georgia. Nenskra River represents the largest right tributary of the Enguri River.

The general layout is sketched in Figure 1. The Nenskra HPP project involves the following dam, powerhouse and appurtenant structures:

- Nenskra dam:
 - Asphaltic Concrete Face Rockfill Dam (AFRD)
 - Crest elevation: 1'435.00 m a.s.l.
 - H = 125 m
 - Maximum operation level: 1'430 m a.s.l.
 - Minimum operation level: 1'340 m a.s.l.
 - Probable Maximum Flood Level: 1'432.5 m a.s.l.
 - Inspection gallery at the upstream toe
 - Cut-off under inspection gallery
- Power house:
 - 3 Pelton units
 - Turbine axis level: 705 m a.s.l.
 - Installed capacity: 280 MW
 - Gross head = 725 m
 - Discharge = 46.88 m³/s

- Appurtenant structures:
 - Spillway (underground)
 - Bottom outlet
 - Headrace Tunnel (HRT): L = 15'120 m, D = 4.50 m
 - HRT power intake: el. 1'325 m
 - Surge shaft
 - Penstock: L = 1'746 m, D = 3 m
 - Level or turbine axis: 705 m a.s.l.
- Nakra transfer structures:
 - Nakra Transfer Tunnel (TT): L = 12'463 m, D = 3.52 m
 - Nakra TT intake: el. 1'555.10 m a.s.l.
 - Nakra TT outlet: el. 1'432.00 m a.s.l.
 - Makra TT weir

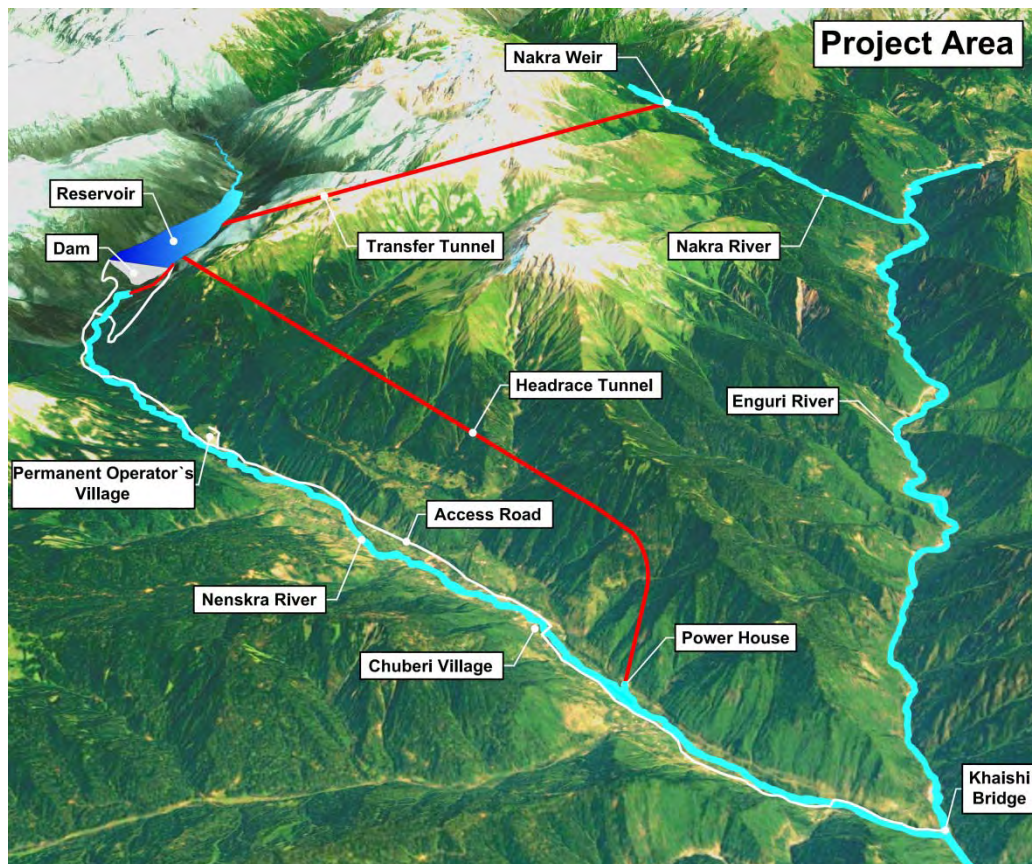


Figure 1: Sketch of the general layout of Nenskra HPP.

5 Emergency Levels

Four emergency levels are defined in Table 1, according to the recommendations of FEMA [11]. The EAP will describe how each emergency level applied to Nenskra HPP. These emergency levels may be adapted in coordination with the Emergency Management Authorities. They are considered as a preliminary basis in the present report.

Table 1: Emergency levels.

<p>Emergency level 1 High flow</p>	<p>Indicates that flooding is occurring on the river system, without apparent threat to the operation or structural integrity of the dam.</p>
<p>Emergency level 2 Unusual event, slowly developing</p>	<p>Indicates that the event is not normal, yet without threat to the operation or structural integrity of the dam. Absence of action may lead to dam failure.</p>
<p>Emergency level 3 Potential failure, rapidly developing</p>	<p>Indicates that conditions are developing and could lead to dam failure. This emergency level also applies when uncontrolled flow through the dam's outlet works or spillway has or is likely to result in flooding of downstream areas, but is not yet affecting buildings or roads, nor raising a significant risk to safety or welfare.</p>
<p>Emergency level 4 Urgent, imminent or in progress failure</p>	<p>Indicates that the dam has failed, is failing or is about to fail. Imminent failure typically involves a continuing and progressive loss of material from the dam. It is not usually possible to determine how long a complete breach of a dam will take. Therefore, once it is concluded that failure will occur, the emergency level 4 must be issued. For purposes of evacuation, Emergency Management Authorities may assume the worst-case condition that failure has already occurred.</p>

6 Identification of Potential Risks and Emergencies

Potential Failure Mode Analysis (PFMA) is a keystone of the EPP, and a necessary basis to develop the EAP as the identification of failure modes are directly involved in the emergency level determination and in the implementation of emergency responses.

A failure mode can be fully described by three steps, namely the initiator, the failure progression and the resulting impacts.

To elaborate the EPP/EAP for both construction and operation phases, an exhaustive PFMA will be performed. In the following, some samples are proposed by means of spreadsheets.

For the applicable versions of the EPP/EAP, event trees will be elaborated within the framework of PFMA.

6.1 Construction Phase

To be completed, e.g., by PFMA of the diversion tunnel, the cofferdam, or the Nenskra dam during construction and first filling.

6.2 Operation Phase

6.2.1 Nenskra Dam (AFRD) Failure Modes

Some sample of possible failure modes of the Nenskra dam and associated emergency levels are proposed in Table 2. As aforementioned, this analysis is meant to be deepened and completed under the form of event trees in the next project phase.

Table 2: Sample of possible failure modes for the Nenskra AFRD and guidance for determining emergency level (preliminary and incomplete assessment).

Possible failure modes	Situations	Resulting impacts	Level	
Overtopping	Flooding event, water level in the reservoir is increasing at a rate of XX cm/h	Water level below crest level, no risk of overtopping foreseen	1	
	Flooding event, spillway and outlet discharge capacity is foreseen insufficient to maintain water level in the reservoir below the crest level	Water level below crest level, without imminent risk of overtopping	2	
	Ongoing overtopping, limited depth of overflow (< XX m)	Low risk of imminent breach	3	
	On going overtopping, significant depth of overflow (> XX m)	Breach or imminent breach	4	
	Snow avalanche / debris flow (moderate risk for Nenskra dam)	Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope		2
		Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment		3
		Impulse wave did overtopped, breach is observed and is rapidly increasing		4
	Landslides (low risk for Nenskra dam)	Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope		2
		Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment		3
		Impulse wave did overtopped, breach is observed and is rapidly increasing		4
	Rockfall (low risk for Nenskra dam)	Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope		2
		Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment		3
		Impulse wave did overtopped, breach is observed and is rapidly increasing		4
	Glacial lake outburst (no risk for Nenskra dam)	Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope		2
		Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment		3
		Impulse wave did overtopped, breach is observed and is rapidly increasing		4

Internal erosion / seepage / Piping	New seepage areas in or near the dam	No immediate risk of breach	2
	New seepage areas with cloudy discharge or increasing flow rate by XX m ³ /s/h	Low risk of imminent breach	3
	Seepage with discharge > XX m ³ /s	Imminent breach	4
	New sinkhole resulting from localized settlement	No seepage observed, no progression of erosion	2
	Minor sinkhole that developed slowly and do not change over time	Low risk of imminent breach	3
	Rapidly enlarging sinkhole	Imminent breach	4
	Cracks	To be completed	
Slope instability / slides	Downstream	To be completed	
	Upstream	To be completed	
Earthquake	Measurable earthquake, felt or reported on or within XX km of the dam	Low damage, no immediate seepage	2
	Slope instability	To be completed	
	Permanent deformations	To be completed	
	Fissures or cracking	To be completed	
	Differential settling	To be completed	
	Liquefaction	To be completed	
Sabotage	Purposeful misoperation	To be completed	
	Physical attacks	Low damage, no immediate seepage	2
		Damage that has resulted in seepage flow that could lead to dam failure	3
		Breach, uncontrolled water release	4
		Lowering of the dam crest, water level on the reservoir remains below the crest	2
		Lowering of the dam crest, results in overtopping which may lead to failure	3
		Lowering of the dam crest, results in overtopping leading to imminent failure	4

6.2.2 Spillway Failure Modes

Sample of failure modes associated with the Nenskra spillway are presented in Table 3.

Table 3: Sample of possible failure modes for the Nenskra spillway and guidance for determining emergency level (preliminary and incomplete assessment).

Possible failure modes	Situations	Resulting impacts	Level
Blocking at the spillway inlet	Flood event, with low amount of driftwood	No risk of blocking	1
	Flood event, with significant amount of driftwood, risk of blocking	Blocking of the spillway would not induce water level increase in the reservoir leading to overtopping	1
	Flood event, with significant amount of driftwood, risk of blocking	Blocking of the spillway raise a significant risk of water level increase and dam overtopping	2
	Flood event, inlet blocked by driftwood	No risk of imminent overtopping	2
	Flood event, inlet blocked by driftwood	Overtopping will occur, low risk of imminent breach	3
Cavitation damage	To be completed	To be completed	

6.2.3 Bottom Outlet Failure Modes

Failure modes related to the bottom outlet can be initiated, e.g., by blockage due to debris flows in the reservoir or to turbidity currents.

6.2.4 Gates Failure Modes

Gates failure modes, both at Nakra inlet and at Nenskra dam and appurtenant structures, may be initiated by earthquake, or mechanical or electrical failures.

6.2.5 Penstock Failure Modes

Penstock failure modes, for instance, can be initiated by the presence of flaws at the steel liner welded joints. In case of lining failure, water release will reach the surface and may cause mudflow or landslide.

7 Inundation Mapping

Inundation maps are a necessary component of the EPP (and therefore of the Emergency Action Plan, EAP). Their purpose is to determine the areas that would be flooded and travel times for wave front and flood peaks at critical locations if a dam failure occurs or if there are operational releases during flooding conditions. Inundation maps are the basis of the emergency management, allowing timely notification and evacuation of areas potentially affected by a dam failure or flood condition.

For the elaboration of the EPP of Nenskra HPP, the following methodology could be used.

7.1 Definition of Initial Conditions and Failure Modes

Initial conditions refer to the conditions which prevail before dam break, such as:

- Reservoir level;
- Tailwater discharge.

The initial conditions are linked to the failure modes which will be considered, both in construction and operation phases:

- Construction phase:
 - Piping (internal erosion, cracking, etc) of the cofferdam,
 - Earthquake,
 - Overtopping of the cofferdam during flood;
- Operation phase:
 - Piping (internal erosion, cracking, etc),
 - Earthquake,
 - Overtopping due to an impulse wave (e.g., landslide in the reservoir),
 - Overtopping during flood.

In addition of dam break events, release through the bottom outlet will also be studied.

7.2 Definition of Scenarios

Based on the identified failure modes, three types of scenarios should be studied, correspondingly to the initial conditions and failure modes:

1. The worst case scenario of instant dam break;
2. The more realistic scenario of a progressive and partial breach of the dam;
3. Opening of the bottom outlet gate.

7.3 Data and Hypotheses

The following main data will be necessary for the dam break and opening of the bottom outlet modeling:

- Topographical data (downstream of the dam and reservoir);
- Land cover data in order to define roughness coefficients in the hydraulic model;
- Hypotheses concerning the geometry and evolution of the breach;
- Floods and bottom outlet opening hydrographs.

7.4 Hydraulic Modeling

2D hydraulic modeling could be performed, e.g., with packages such as TELEMAC-2D (TELEMAC-MASCARET software suite) or HEC-RAS (USACE), both widely used in many fields of application.

7.5 Results

The results obtained with the 2D hydraulic model will be presented on a set of various maps:

- Inundation mapping (maximal extension of the flooded areas);
- Water depth and depth x velocities (maximum values);
- Flood hydrographs at several critical locations (discharge in function of time);
- Flood progression (time of arrival of the impacting wave);
- Consequences (identification of the main settlements reached by the flood).

8 Early Warning System (EWS)

8.1 Construction Phase

At this project phase, a preliminary EWS concept is only provided for the operation phase, see below.

8.2 Operation Phase

8.2.1 General Concept

The proposed EWS will be based on the following non-exhaustive instrumentation (Monitoring Units, MU) that will be used in the alarm system (see also Section 13.1):

- Drainage measurements;
- Dam foundation pore pressure (e.g., measurements with piezometers);
- Water level in the reservoir;
- Alarm cable on the crest: an electrical cable connected on both extremities of the dam— if the cable brakes, it generally means that the dam is subject to important sudden settlements or differential horizontal movement;
- Flood sensor downstream from the dam (detection of flood wave);
- Automatic turbidity measurements in the total drainage measurements (allows to detect in advance if any seepage flow starts to create significant erosion in the foundation or in the embankment).

The proposed preliminary EWS concept is sketched in Figure 2, in the framework of a so-called SCADA system (Supervisory Control And Data Acquisition), in which a management system of Siren network will be integrated.

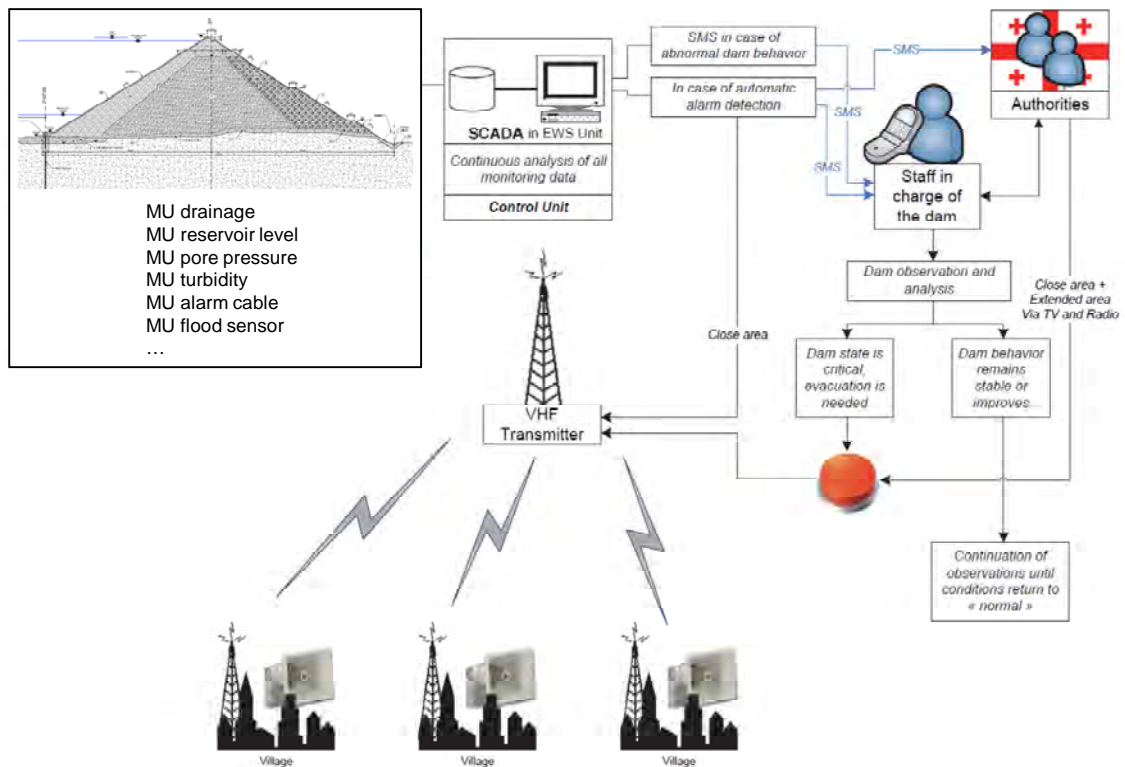


Figure 2: Proposed preliminary EWS.

In case of total evidence of dam failure (with redundant measurements showing the failure), the system will activate the close area sirens and send at the same time SMS to the persons in charge of the dam Operator and the Emergency Management Authorities. The number of measurements showing dam failure should be limited to the most relevant parameters since too many parameters incorporated in the EWS could increase the risk of a false alarm triggering.

An important matter will be to determine where to install the EWS Unit (which should be an easily accessible building, out of the potential inundation zone, where data can be received to supervise the dam behavior and from which, if possible, the dam can be observed visually). From the EWS Unit, in case of potential dam failure (in case, e.g., at least one MU records values beyond threshold), the EWS personal from the dam Operator will have to supervise the dam visually and with the help of remote readings 24/7 until the emergency situation ends or the evacuation plan is activated. The EWS personal must work in close collaboration and coordination with the Emergency Management Authorities.

8.2.2 Definition of Alarm Thresholds and Triggering

The definition of the alarm thresholds to be configured for each instrument is a crucial issue of the EWS in order to avoid unwanted triggering, and at the same time not to miss abnormal behavior which would lead to an emergency or potential failure.

Basic concept of triggering process is presented in Figure 3, which will be developed in depth in the next project phase.

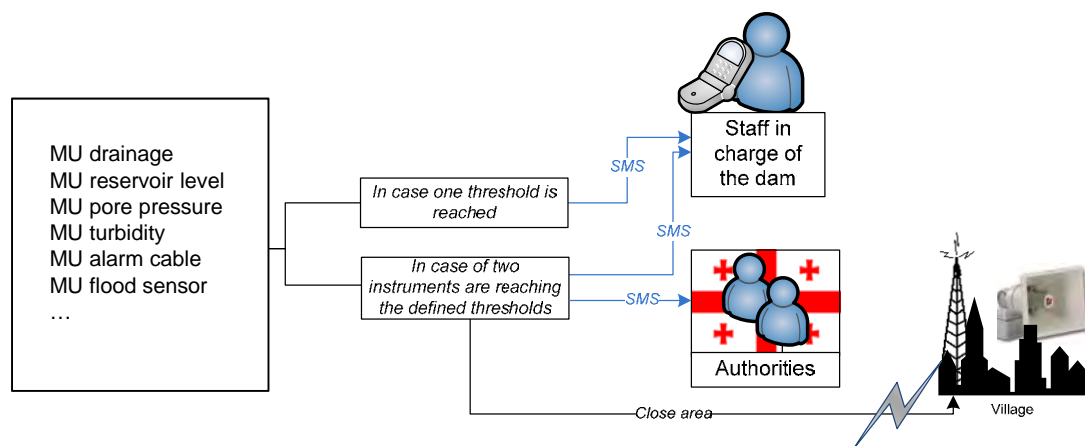


Figure 3: Basic concept of triggering process.

8.2.3 Responsibilities

The entities that should be involved in the surveillance and the EWS are enumerated hereafter.

- The EWS team of the Operator;
- The regional/local Emergency Management Authorities:
 - Head of the concerned Municipality;
- National/regional Expert Authorities:
 - Georgian Ministry of Internal Affairs—Emergency Situation Management Agency,
 - Legal Entity of Public Law.

A summary of the main responsibilities is given in Figure 4. A more general discussion addressing the responsibilities and duties is proposed in Section 11.

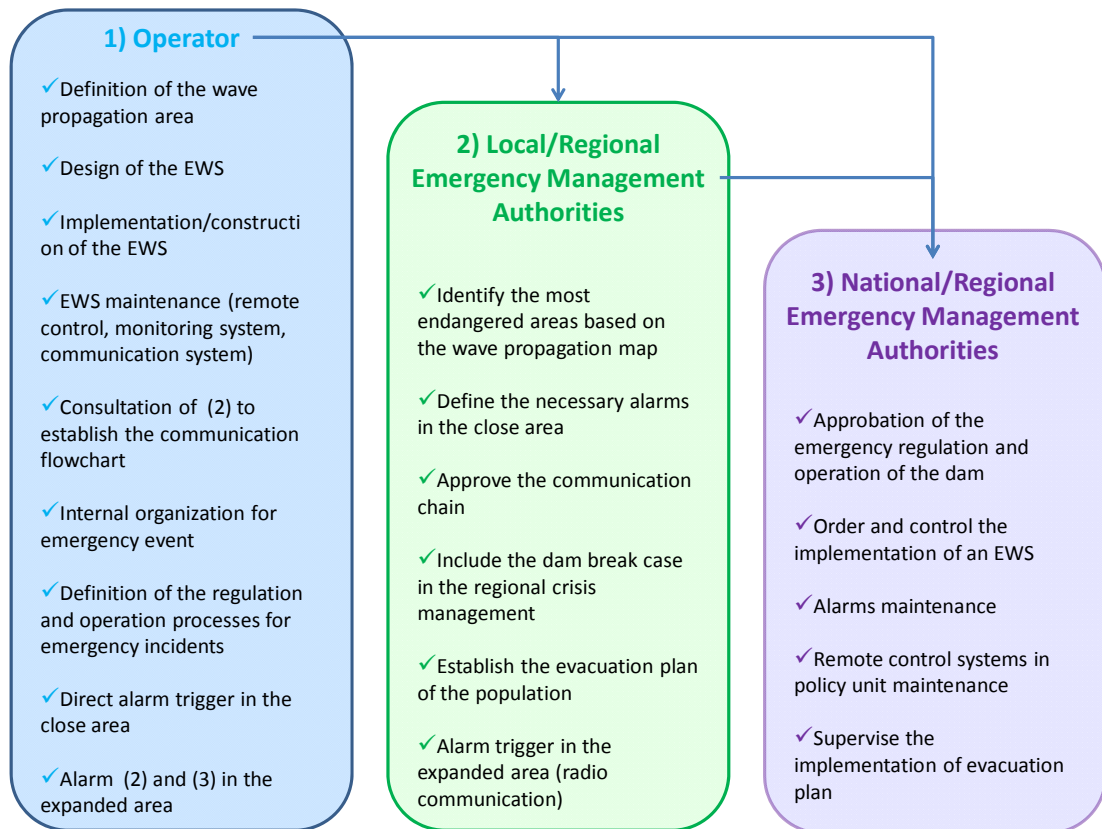


Figure 4: Main responsibilities of the entities involved in the EWS.

8.2.4 Communication Chain

Two areas should be distinguished to implement the alarm system:

1. The close area reached by the wave within 2 hours;
2. The expanded area reached by the wave in more than 2 hours.

The main entities that should be included in the communication chain are:

- The Director of the Operator and the Manager of the EWS and his Deputy;
- The Manager of the regional/local Emergency Management Authority and his Deputy;
- The Manager of the regional police and his Deputy;
- The Manager of the regional firemen and his Deputy;
- The representative (and his Deputy) of the national and regional services Expert for the catastrophe events and the representative (and his Deputy) of the national and regional services Expert for energy;
- The representatives of the downstream operators of dams and drinking reservoir systems;
- The population (via alarm, radio, local TV channels, etc).

In the close area, sound alarms are triggered directly by the EWS responsible and/or by the regional Authorities: the population must be immediately evacuated. The police and firemen regional units implement the evacuation immediately.

In the expanded area, the responsible of the EWS notifies the regional Emergency Management Authority and the National Expert Authority. He also informs the representatives of the downstream dams. Depending on further analyses, a sound alarm may also be necessary.

The regional Emergency Management Authority informs the population continuously via the radio and gives instructions for evacuation/behaviors.

Communication means, system testing and training will be further developed in the next project phase. In order to achieve this goal, meetings with the Authorities will be organized in the next step of the study.

9 Responses to Emergencies

After the initial notifications/communication have been made, the Operator will act to save the dam and minimize consequences. During this step, there is a continuous process of taking actions, assessing the status of the situation, and keeping the Authorities and the population informed through communication channels established in the EPP/EAP. The EAP may go through multiple emergency levels as the emergency situation improves or deteriorates.

The EAP will provide spreadsheets and/or event trees to guide the Operator in his task of minimizing impacts of the emergency situation. Some preliminary samples are presented below under the form of spreadsheets.

9.1 Construction Phase

To be completed subsequently to PFMA.

9.2 Operation Phase

Correspondingly to Table 2, the format of a spreadsheet describing the actions to be taken in emergency situations is proposed in Table 4 for the Nenskra AFRD.

10 Evacuation

10.1 Population Potentially Subject to Consequences of Dam Failure

The project area is located in the South Caucasus on the Nenskra River in Svaneti District of NW Georgia, located between earth coordinates N42°59' E42°11' and N43°08' E42°24'. The Nenskra River is the largest right tributary of the Enguri River (see Figure 5).

Table 4: Sample of actions to be taken in some emergency situations for the Nenskra AFRD (preliminary and incomplete assessment).

Failure modes	Situations	Situation description	Actions to be taken	
Overtopping	Flooding event, water level in the reservoir is increasing at a rate of XX cm/h	Water level below crest level, no risk of overtopping foreseen	1. Trigger EWS according to emergency level. 2. Close the gate at Nakra inlet. 3. Open spillway and/or bottom outlet according to the flood mitigation procedure if necessary.	
	Flooding event, spillway and outlet discharge capacity is foreseen insufficient to maintain water level in the reservoir below the crest level	Water level below crest level, without imminent risk of overtopping	<i>To be completed</i>	
	Ongoing overtopping, limited depth of overflow (< XX m)	Low risk of imminent breach	<i>To be completed</i>	
	On going overtopping, significant depth of overflow (> XX m)	Breach or imminent breach	<i>To be completed</i>	
	Snow avalanche / debris flow (moderate risk for Nenskra dam)		Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope	1. Trigger EWS according to emergency level. 2. Inspection of the upstream surface of the dam. 3. Plan reparation if necessary.
			Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment	<i>To be completed</i>
			Impulse wave did overtopped, breach is observed and is rapidly increasing	<i>To be completed</i>
	Landslides (low risk for Nenskra dam)		Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope	<i>To be completed</i>
			Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment	<i>To be completed</i>
			Impulse wave did overtopped, breach is observed and is rapidly increasing	<i>To be completed</i>
	Rockfall (low risk for Nenskra dam)		Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope	<i>To be completed</i>
			Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment	<i>To be completed</i>
			Impulse wave did overtopped, breach is observed and is rapidly increasing	<i>To be completed</i>
	Glacial lake outburst (no risk for Nenskra dam)		Impulse wave did not overtopped, no damage observed or low damages observed on the upstream slope	<i>To be completed</i>
			Impulse wave did overtopped, low erosion damages on crest and the surface of the embankment	<i>To be completed</i>
			Impulse wave did overtopped, breach is observed and is rapidly increasing	<i>To be completed</i>

Internal erosion / seepage / Piping	New seepage areas in or near the dam	No immediate risk of breach	1. Trigger EWS according to emergency level. 2. Increase surveillance of seepage flow discharge and turbidity. 3. Contact geotechnical expert and provide all data collected.
	New seepage areas with cloudy discharge or increasing flow rate by XX m ³ /s/h	Low risk of imminent breach	1. Trigger EWS according to emergency level. 2. Lower reservoir water level. 3. Increase surveillance of seepage flow discharge and turbidity. 4. Contact geotechnical expert and provide all data collected.
	Seepage with discharge > XX m ³ /s	Imminent breach	<i>To be completed</i>
	New sinkhole resulting from localized settlement	No seepage observed, no progression of erosion	<i>To be completed</i>
	Minor sinkhole that developed slowly and do not change over time	Low risk of imminent breach	<i>To be completed</i>
	Rapidly enlarging sinkhole	Imminent breach	<i>To be completed</i>
	Cracks	<i>To be completed</i>	<i>To be completed</i>
Slope instability / slides	<i>Downstream</i>	<i>To be completed</i>	<i>To be completed</i>
	<i>Upstream</i>	<i>To be completed</i>	<i>To be completed</i>
Earthquake	Measurable earthquake, felt or reported on or within XX km of the dam	Low damage, no immediate seepage	<i>To be completed</i>
	<i>Slope instability</i>	<i>To be completed</i>	<i>To be completed</i>
	<i>Permanent deformations</i>	<i>To be completed</i>	<i>To be completed</i>
	<i>Fissures or cracking</i>	<i>To be completed</i>	<i>To be completed</i>
	<i>Differential settling</i>	<i>To be completed</i>	<i>To be completed</i>
	<i>Liquefaction</i>	<i>To be completed</i>	<i>To be completed</i>
Sabotage	<i>Purposeful misoperation</i>	<i>To be completed</i>	<i>To be completed</i>
	Physical attacks	Low damage, no immediate seepage	<i>To be completed</i>
		Damage that has resulted in seepage flow that could lead to dam failure	<i>To be completed</i>
		Breach, uncontrolled water release	<i>To be completed</i>
		Lowering of the dam crest, water level on the reservoir remains below the crest	<i>To be completed</i>
		Lowering of the dam crest, results in overtopping which may lead to failure	<i>To be completed</i>
		Lowering of the dam crest, results in overtopping leading to imminent failure	<i>To be completed</i>

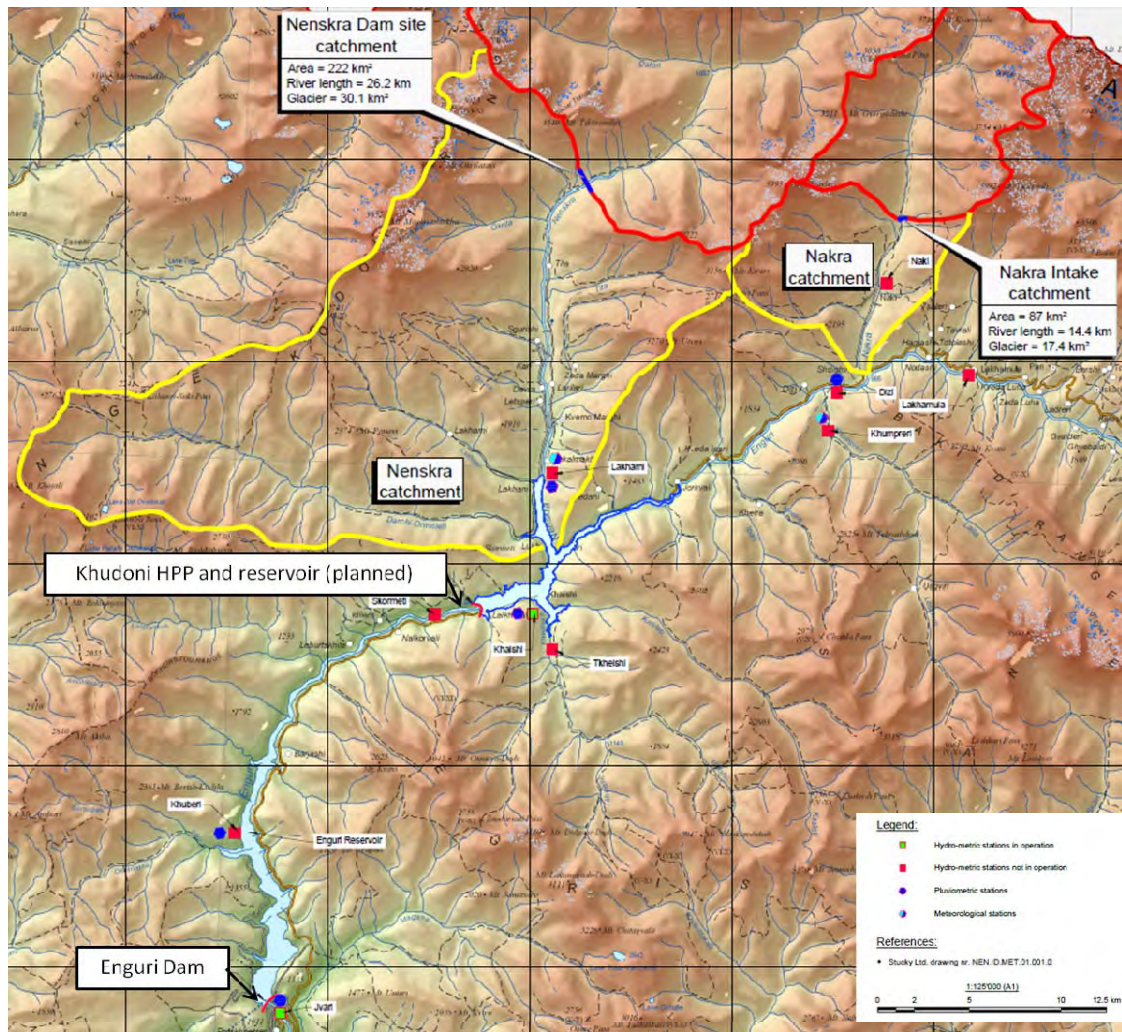


Figure 5: General project layout, adapted from project drawing L-6768-B-GE-GE-GE-DW-002_001: *General project layout—Catchments and hydrometeorologic stations.*

Populations and properties potentially subject to consequences in case of dam failure or high floods can only be identified with flood maps (see Section 7). However, within the scope of the present framework, a preliminary identification of populations potentially can be enumerated:

- The villages in the valley of the Nenskra River, downstream of the dam:
 - Lakhani;
 - Lekalmakhi;
 - Qvemo Marghi;
 - Letsperi;
 - Devra;
 - Larilari;
 - Kari;

- Sgurishi;
- Tita;
- The villages in the valley of the Enguri River, downstream of the confluence:
 - Kasleti;
 - Gaghma Khaishi;
 - Dakari;
 - Shgedi;
 - Khaishi;
 - Tsitskhvari;
 - Kvakva;
 - Barjashi;
- The villages in the valley of the Enguri River, upstream of the confluence (in case of consequences upstream of the confluence, which will depend on the results of the flood mapping):
 - Jorkvali;
 - Kveda Ipari.

During construction phase, the camp of the construction site will also be considered in the potentially affected population.

The effects of a Nenskra dam failure on the Enguri dam downstream in the valley of the Enguri River will also need to be assessed in detail. In case of consequences on the reservoir and the dam, the EPP would need to consider effects downstream of Enguri dam in coordination with the Operator of the latter.

In case of realization of the Khudoni HPP project in the future, the EPP and the EAP for the Nenskra HPP project may also need to be updated and coordinated.

In the next step of the study, the population of each village will be characterized, as well as the presence of infrastructures such as hospitals and bridges, police and fire departments, etc.

10.2 Evacuation Planning

According to FEMA [11], evacuation planning and implementation is typically the responsibility of national or local Emergency Management Authorities. Although the EAP (see Section 12) does not need to include an evacuation plan, it should indicate who is responsible for evacuation and whose plan will be followed.

The inundation maps that will be developed within the scope of the EPP (see Section 7) will be shared with Emergency Management Authorities in addition of being incorporated in the EAP. These maps may constitute the basis of the development of warning and evacuation plans.

Evacuation planning should be based on worst-case scenarios and address the following:

- Initiation of emergency warning systems;
- Pre-incident planning;
- Identification of critical facilities and sheltering;

- Evacuation procedures, including flood wave travel time considerations;
- Distances and routes to high ground (existing routes and routes constructed within the Nenskra HPP project should be considered);
- Traffic control measures and traffic routes;
- Potential impact of weather or releases on evacuation routes such as flooded portions of the evacuation route before the dam incident occurs;
- Vertical evacuation/sheltering in place;
- Emergency transportation;
- Safety and security measures for the perimeter and affected areas;
- Re-entry into affected areas.

11 Distribution of Responsibilities

11.1 Generalities and Conceptual Entities

In this section, entities that may be involved in the EPP/EAP are conceptually identified, in the following non-exhaustive list. This preliminary list is meant to be updated in collaboration with the relevant actors of the project, where entities will be identified to existing ones, created, or vanished or substituted from the list.

- **Owner and Operator, JSC Nenskra Hydro** (responsible groups or individuals to be determined):
 - Continuous monitoring, 24/7
 - Data collection and analysis
 - Verification of safety criteria
 - Determine emergency level within the framework of the EPP
 - Activation of the responses of the EAP
 - Adaptive emergency management in case of unexpected emergency situations
 - Communication with local, regional and central authorities, media and public
 - Communication with the Operator of Enguri Dam if a joint emergency management strategy is necessary
 - Termination, follow-up and reporting after an emergency situation
- **Central Government Administrations:**
 - State Supervision Authority (SSA) over the safety of hydraulic structures of the Government of the Republic of Georgia:
 - Approve EPP/EAP
 - Activate support to the CCECD by nominating a SE
 - National Incident Management System (NIMS):
 - Set up the government management organization

- Define the role and responsibilities across the national Incident Command System (ICS)
- State System of Prevention and Actions in Emergency Situations (SSPAES):
 - Define the permanent prevention organization and its activities
- National Alarm Center (NAC):
 - Permanent organization deputed to collect information about emergencies, comprising the first notice of a dam safety emergency from the Operator, activating the reaction according to the provisions of SSPAES
- Central Committee for Emergencies and Civil Defense of Georgia (CCECD):
 - Permanent Government Committee and Panel of Experts that is activated by NAC at the first emergency notice from the Operator
 - Manage all the government resources to support the regional and local management of the crisis, and its composition is defined according to SSPAES
- Central Military Authority of Georgia (CMA):
 - Activated by NAC according to the level of emergency
 - Supply the resources defined by SSPAES to limit the emergency situation effects
- Central Environmental Protection Authority (CEPA):
 - Informed by NAC
 - Mobilize its resources according to SSPAES to deal with the environmental effects of the emergency situations
- Central Dispatchment Office of HV National Network (CDO):
 - Intend to grant the continuity of energy and power supply to the national territory
- National Seismic Service of Georgia (SSG):
 - Informed by NAC only in case of an emergency situation due to earthquake
 - Contacted by the Operator to whom it will supply information to be used to evaluate the response of the dam to the seismic loading
- National Meteorological Service (MSG):
 - Informed by NAC only in case of an emergency situation due to hydrological origins (heavy rain, sudden snow melt, etc) inducing extreme flood
 - Contacted by the Operator to whom it will supply information to be used to evaluate the flood entering into the basin and its hydrograph, to be used for the management of lamination for downstream discharges
- **Regional Administrations:**
 - Regional Committee for Emergencies and Civil Defense (RCECD):

- Coordinated with the Operator during the emergency situation
- **Local Administrations:**
 - Head of Local Municipalities (HLM):
 - Implement the responses established by the EAP
 - Local Police Department (LPD):
 - Collaborate with HLM to implement responses of the EAP
 - Local Fire Department (LFD):
 - Collaborate with HLM to implement responses of the EAP
 - Collaborate with CCECD to support and succor affected populations and recover the efficiency of local infrastructures
- **National Office for Dam Safety:**
 - State Expert (SE)
 - Move immediately on site, according to the emergency level
 - Support the Operator in evaluating the technical situation
 - If reaching the site is impossible, the SE collaborates directly with the CCECD
- **Third Parties:**
 - To be completed where applicable.

11.2 Preliminary Identifications

Some of the conceptual entities listed in the previous section could potentially be identified to actual Authorities in the Republic of Georgia, as presented in Table 5.

Table 5: Preliminary identifications of the some of the entities listed in Section 11.1.

Listed in Section 11.1	Authorities in Republic of Georgia
CCECD	State Security and Crisis (under Prime Minister management)
SSA	Technical and Construction Supervision Agency (under Ministry of Economy)
RCECD	Emergency Management Agency of Georgia (under Ministry of Internal Affairs of Georgia)
NAC	The Emergency Response Center (under Ministry of Internal Affairs of Georgia)

CMA	Ministry of Defense of Georgia
CEPA	Ministry of Environment and Natural Resources Protection of Georgia
SSG	Natural Environmental Agency (under Ministry of Environment)
MSG	National Environment Agency (under Ministry of Environment)

12 Emergency Action Plan (EAP)

The EAP, within the EPP, will be a formal document with clear and concise information distributed to the dam Owner and the Emergency Management Authorities who work together in the response to dam safety emergencies.

The EAP will guide the reader (Operator and Emergency Management Authorities) through a 5-step procedure of response to dam safety emergencies:

1. **Step 1:** Event Detection and Evaluation:

Interpretation of monitoring measures (see Section 13.1). In further analyses threshold values of the various measured quantities will be determined and incorporated under the form of graphs/spreadsheets.

2. **Step 2:** Emergency Level Determination:

Guidance for determining the emergency level will be provided through, e.g., spreadsheets and/or event trees based on the potential failure mode analysis and the definition of the emergency levels (see Sections 6 and 5).

3. **Step 3:** Notification and Communication:

Implementation of the EWS (see Section 8).

4. **Step 4:** Emergency Actions:

Guidance for the actions that should be taken in response to the emergency (see Section 9) through, e.g., spreadsheets and/or event trees also based on the potential failure mode analysis.

5. **Step 5:** Termination and Follow-up.

A follow-up procedure will be provided.

The content of these steps will be elaborated based on the guidelines provided in this document in the corresponding sections as aforementioned in the enumeration of the steps.

Two distinct EPP will be prepared, namely the EPP for the construction phase, and the EPP for the operation phase.

13 Preparedness

In the scope of the EPP, preparedness consists of activities and actions to be taken permanently during construction and operation phases in order to facilitate response to an incident, as to prevent, moderate or alleviate the effects of an incident.

At a minimum and according to FEMA [11], the EPP will address the following issues related to preparedness, enumerated in the next subsections. Some of these subsections contains generalities that may relate to previously introduced sections.

13.1 Surveillance and Monitoring

The EPP will contain provisions for surveillance and monitoring at the dam and appurtenant structures. Prompt detection and evaluation of the information from instrumentation and physical monitoring is critical to the effectiveness of the EPP, and thus the EAP, and timely emergency response. The monitoring systems must be able to deliver clear, concise and reliable information so that Emergency Management Authorities may be promptly alerted.

The instrumentation at the Nenskra HPP shall be able to monitor the following physical quantities (preliminary non-exhaustive list) during operation:

- At Nenskra dam:
 - Reservoir water level;
 - Nenskra River water level;
 - Groundwater and uplift pressure in grouting gallery;
 - Seismic loads;
 - Seepage flow:
 - Trough embankment (drainage system in the inspection gallery),
 - Through foundation;
 - Movements and deformations (surface, internal, joint/crack, foundation);
- Appurtenant structures:
 - Water level at the spillway (indirect measurement of discharge);
 - Discharge at the bottom outlet;
 - Discharge of the ecological flow;
 - Discharge of the turbines;
 - Discharge at the Nakra inlet and weir.

The instrumentation during construction will also be further described in the EPP. A preliminary non-exhaustive list of the physical quantities that shall be measured can be given at this phase of development of the EPP as:

- At Nenskra dam:
 - Reservoir water level (during filling);
 - Nenskra River water level;
 - Groundwater and uplift pressure in grouting gallery;

- Seismic loads;
- Seepage flow:
 - Trough embankment (drainage system in the inspection gallery),
 - Through foundation (indirect measure by means of piezometers);
- Movements and deformations (surface, internal, joint/crack, foundation);
- At the cofferdam:
 - Reservoir water level;
 - Nenskra River water level;
 - Seismic loads;
 - Seepage flow;
 - Movements and deformations (surface, internal, joint/crack, foundation);
- Appurtenant structures:
 - Discharge at the diversion tunnel.

13.2 Evaluation of Detection and Response Timing

The entire implementation time from the initiation of an actual incident to the determination of an emergency situation and notification of appropriate individuals or Authorities should be evaluated and understood. Timely implementation of the EAP, as well as coordination and communication with the Emergency Management Authorities are crucial elements for an affective EPP.

13.3 Access to the Site

The description of access to the site will focus on primary and secondary routes using different transportation means (e.g., foot, helicopter, snowmobile, etc). The time of transportation should also be assessed. If some access route would be unusable in case of an emergency situation (e.g., flooded route or bridge), it should be identified and an alternate access option described. The access roads to the Nenskra dam and the power house known at this phase are shown in Figure 6.

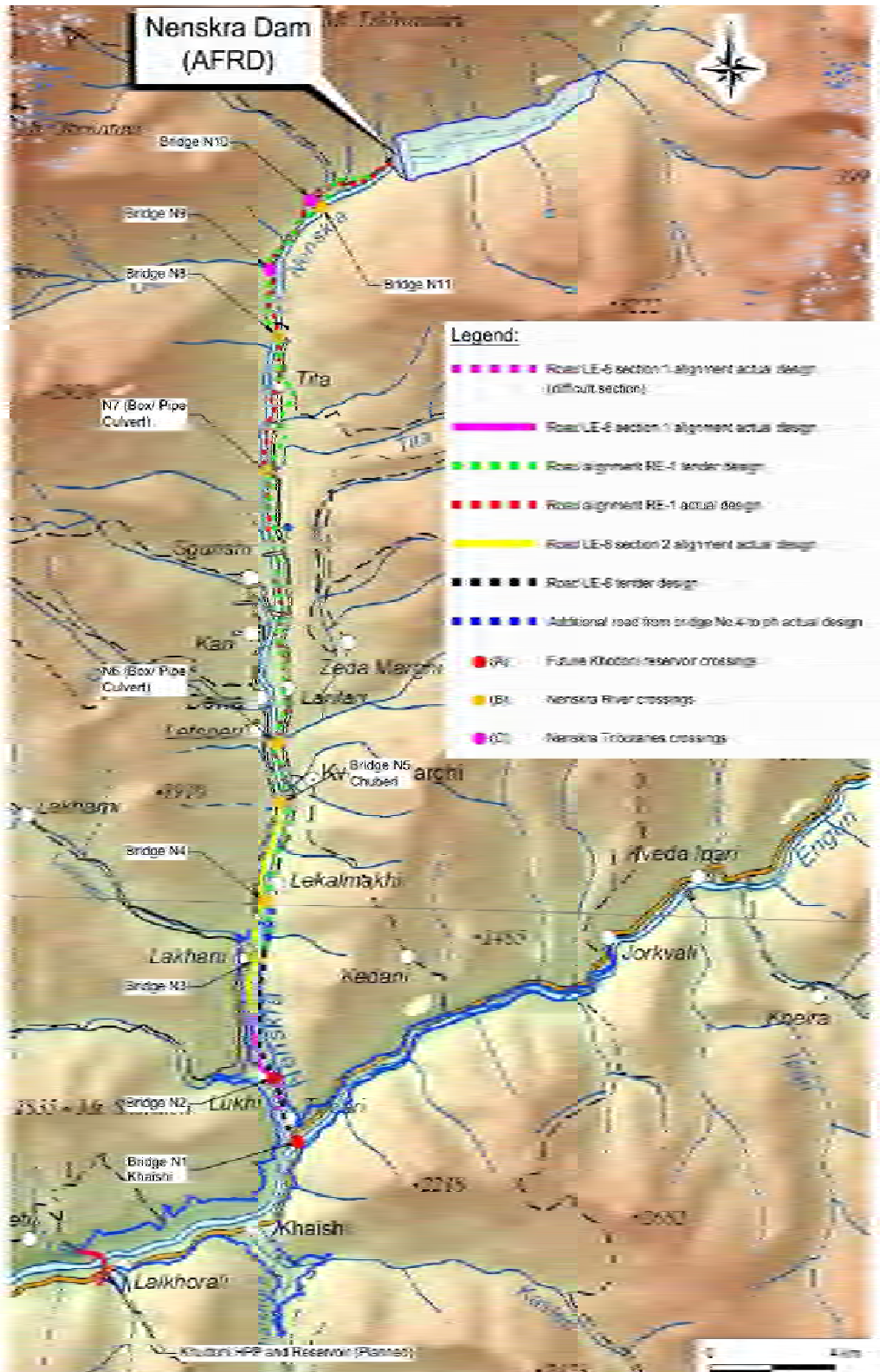


Figure 6: General layout of the access roads to dam site according to road alignment RE-1 and LE-8, for tender and actual design (see drawing T-6768-K-GE-RO-AR-DW-001_000).

13.4 Response During Periods of Darkness

Response to potential or actual emergency conditions during periods of darkness will be addressed in the EPP. Special instructions for the dam Operator and/or Emergency Management Authorities will be addressed, such as:

- Response times, if different from daylight;
- Actions to be taken to illuminate the abutments, spillways, operating decks, non-overflow sections, or other areas where failures could occur;
- Other actions that may facilitate the operation of gates other emergency equipment if different from periods of daylight;
- Procedures during power failure.

13.5 Response During Weekends and Holidays

Response during weekends or holidays will be addressed in the EPP, assessing issues such as the availability of the dam Operator, special procedures for notification and communication with individuals and Authorities, if necessary.

13.6 Response During Periods of Adverse Weather

Response under adverse weather conditions will be addressed in the EPP, assessing issues such as the access to the site (e.g., foot, snowmobile). Special instructions, if necessary, will be discussed regarding the response time.

13.7 Alternative Sources of Power

Alternative sources of power for spillway gate operation or other emergency needs will be identified in the EPP. The plan should list the location of each alternate power source, its mode of operation and, if portable, a means of transportation with routes to be followed.

13.8 Emergency Supplies

For a safer and more efficient emergency management by the dam Owner and the local Emergency Management Authorities, the management of stockpiling materials and equipment for emergency use will be addressed in the EPP.

The availability of local resources will be predetermined through discussions with local Emergency Management Authorities and additional needs will be identified. The EPP will include the name and contact information (where applicable) for suppliers, additional personnel, contractors, consultants, and any other entities who may be needed to assist the dam Owner or Emergency Management Authorities in responding to an emergency.

Where applicable, the following will be documented:

- Materials needed for emergency repair and their location;
- Equipment needed for emergency response or repair, its location and its operators;
- Local contractors, vendors, and suppliers for dam-related equipment and supplies, including contact information and location;
- Justification of decision not to stockpile materials and equipment if stocking is not warranted.

13.9 Coordination of Information

For a safer and more efficient emergency management by the dam Owner and the local Emergency Management Authorities, the coordination of information will be addressed in the EPP. Where applicable, the following will be described:

- The need for coordination of information on flows based on weather, runoff forecasts, dam failure, and other emergency conditions, including how coordination is achieved and the chain of communication (names, contact information, etc).
- Actions to be taken to lower the reservoir water surface elevation, including when and how this action should be taken.
- Actions to be taken to reduce inflow to the reservoir from upstream dams or control structures (in the case of Nenskra HPP, the Nakra inlet). The EPP will provide instructions for contacting operators of these structures (if different from the operators of Nenskra dam structures) and how these actions should be taken.
- Actions to be taken to reduce downstream flows, such as increasing or decreasing outflows from downstream dams or control structures on the waterway on which the dam is located or its tributaries. The EPP will provide instructions for contacting operators of these structures and how these actions should be taken, where applicable.

13.10 Training and Exercising

An exercise schedule and plans for an EAP exercise program will be included in the EPP in order to ensure long-term efficiency of the plan in case of emergency.

13.11 Alternative Systems of Communication

The availability of alternative communications systems will be identified in the EPP. These may include, but are not limited to, emergency sirens, cellular phones, direct connect, e-mail, intranet, radios, social media, etc. Operating procedures and special instructions for the use of these systems will be described where applicable. Consideration will be given to the target audience involved and the best means for communicating with them.

13.12 Public Awareness and Communication

The Nenskra dam is located upstream of villages in the Nenskra valley, and of villages in the Enguri valley upstream of the Enguri dam. It will be necessary for the dam Owner to assist Emergency Management Authorities in developing public awareness measures. These measures typically explain the proximity with the dam, how people will be informed of an emergency, and the actions people should take during an emergency. The EPP will include a brief description of any public awareness measures that will be performed.

14 EPP Update

14.1 Revisions

After the EPP has been developed, approved and distributed, continual reviews and updates must be performed in order to avoid that it becomes outdated and/or ineffective.

In the EPP, a review process will be proposed, incorporating, but not only, the following aspects:

- Prompt update to address changes in personnel and contact information;
- Significant changes to the facility, or emergency procedures;

- Evaluation of any changes in flood inundation areas (e.g., downstream developments, sedimentation in the reservoir);
- Incorporation the outcome of the training and exercising programs;
- Update of the notification flowchart.

14.2 Training and Exercising

In order to promote prevention, preparedness and efficient response to incidents and emergencies, the dam Owner should exercise the EAP of the EPP in coordination with the national and local Authorities. This includes, but not limited to, entities listed in the notification flowchart.

Types, frequency and evaluation of exercises will be specified in the EPP. Preliminarily, one can enumerate the following types of exercises that the EPP may recommend:

- Discussion-based exercises:
 - Seminar;
 - Workshop;
 - Tabletop exercise;
 - Games;
- Operation-based exercises:
 - Drill;
 - Functional exercises;
 - Full-scale exercises.

15 Preliminary Table of Content of the EPP

A preliminary table of content for the EPP/EAP is presented hereafter.

- I. Statement of Purpose
- II. Project description
- III. EAP
 - A. Step 1: Event Detection and Evaluation
 - B. Step 2: Emergency Level Determination
 - C. Step 3: Notification and Communication
 - D. Step 4: Emergency Actions
 - E. Step 5: Termination and Follow-up
- IV. General responsibilities
- V. Preparedness
- VI. Revision and Training

VII. Annexes

- A. Notification flowcharts
- B. List of emergency contacts
- C. Emergency notification information and messages
- D. Persons in the immediate vicinity of the Nenskra dam to be evacuated
- E. Drawings of Nenskra dam and appurtenant structures
- F. Maps of the routes
- G. Inundation maps
- H. Evacuation plans
- I. Monitoring instrumentation and interpretation of measurements
- J. Guidance for determining the emergency level
- K. Emergency actions
- L. Emergency response resources and supplies
- M. Template for emergency incident log
- N. Template for emergency incident termination log
- O. Template for revision/training records

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Mining & Minerals



Oil & Gas



Planning & Development



Renewable & Low Carbon



Waste Management