

**DAM REHABILITATION AND IMPROVEMENT PROJECT (DRIP) II**  
(Funded by World Bank)

**SINGDA DAM**

**ENVIRONMENTAL AND SOCIAL DUE DILIGENCE REPORT**



**March 2020**

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## ABBREVIATIONS AND ACRONYMS

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AIDS	:	Acquired Immunodeficiency Syndrome
BOQ	:	Bill of Quantities
CA	:	Conservation Area
CAT	:	Catchment Area Treatment
CCA	:	Culturable Command Area
CC	:	Cement Concrete
CPMU	:	Central Project Management Unit
CWC	:	Central Water Commission
DD	:	Due Diligence
DSRP	:	Dam Safety Review Panel
DRIP	:	Dam Rehabilitation and Improvement Project
EAP	:	Emergency Action Plan
EMC	:	Engineering and Management Consultant
ESCP	:	Environmental and Social Commitment Plan
ESDD	:	Environmental and Social Due Diligence
ESMP	:	Environment and Social Management Plan
ESMF	:	Environment and Social Management Framework
ESF	:	Environmental and Social Framework
ESIA	:	Environmental and Social Impact Assessment
EMP	:	Environmental Management Plan
E&S	:	Environment & Social
ESS	:	Environmental and Social Standard
GBV	:	Gender Based Violence
GCA	:	Gross Command Area
GIS	:	Geographic Information System
GRM	:	Grievance Redressal Mechanism
HIV	:	Human Immunodeficiency Virus
IA	:	Implementation Agency
LMP	:	Labour Management Procedure
LMC	:	Left Main Canal
MCM	:	Million Cubic Meters
MDDL	:	Minimum Draw Down Level
MWL	:	Maximum Water Level
NH	:	National Highway
OHS	:	Occupational Health & Safety
PDO	:	Project Development Objective
PA	:	Protected Area
PAP	:	Project Affected Person
PE	:	Physical Environment
PMC	:	Project Management Consultancy
PPE	:	Personal Protective Equipment
PST	:	Project Screening Template
RMC	:	Right Main Canal
RET	:	Rare Endangered and Threatened

SEP	:	Stakeholder Engagement Plan
SEA	:	Sexual Exploitation and Abuse
SIA	:	Social Impact Assessment
SC	:	Scheduled Castes
SF	:	Screening Format
SH	:	Sexual Harassment
SH	:	State Highway
SCADA	:	Supervisory Control and Data Acquisition
SEAH	:	Sexual Exploitation Abuse and Harassment
SPMU	:	State Project Management Unit
ST	:	Scheduled Tribes
WQ	:	Water Quality
WB	:	World Bank
WRD	:	Water Resources Department

## 1.1 PROJECT OVERVIEW

---

The proposed Dam Rehabilitation and Improvement Project (DRIP-2) would complement the suite of ongoing and pipeline operations supporting India's dam safety program. The project would continue to finance structural improvements but would break with the prevailing build-neglect-rebuild approach by giving greater emphasis to establishing sustainable mechanisms for financing regular O&M and dam rehabilitation, enhancing State capabilities to manage these critical assets through institutional strengthening, and introducing risk-informed dam safety management. The project development objective (PDO) is to increase the safety of selected dams and to strengthen institutional capacity for dam safety in participating States. Project Components include:

**Component 1: Institutional Strengthening (US\$ 40 million):** This component supports further strengthening of dam safety management in the country through institutional modernization. A major focus of activities under this component will be increasing the oversight of dam safety by developing dam safety guidelines and by strengthening the capacity of various dam safety actors to carry out the regulatory functions defined in the proposed Dam Safety Bill, which has been passed by the Lok Sabha.

**Component 2: Risk-informed Asset Management and Sustainable Financing (US\$ 25 million):** This component supports identifying long-term funding needs for dam safety based on asset management and risk assessment financing for dam safety. This component would focus on: (i) improving the efficiency of public financing; (ii) generating alternative revenue streams. Alternative revenue streams that could be developed include tourism and water recreational activities, fisheries, and other innovative schemes such as floating solar panels; and (iii) establishing financing arrangements for dam safety (e.g., dedicated budget lines).

**Component 3: Rehabilitation of Dams and Appurtenant Structures (US\$ 200 million):** This component supports improving the safety of dams through structural and non-structural interventions. Structural measures could include measures for seepage reduction (e.g., grouting, geomembranes), hydrological and structural safety measures (e.g., additional spillways, fuse plugs), enhancing the reliability of operational facilities (e.g., gates), rehabilitating foundation deficiencies, strengthening dam concrete/embankment structures, and improving basic dam facilities (e.g., access roads). Non-structural measures could include standardized dam safety instrumentation, monitoring, assessment and reporting protocols for dam health; flood forecasting and early warning systems; integrated reservoir operations including streamflow forecasting for climate resilient dam management; preparation and implementation of EAPs; preparation and implementation of sediment management plans; and revised operational rule curves to account for climate change.

**Component 4: Project Management (US\$ 15 million):** This component will ensure effective

implementation of project activities and monitoring and evaluating project implementation progress, outputs and outcomes. The component will support: (i) establishment of the Central Project Management Unit (CPMU), which will oversee and coordinate activities of the implementing agencies of the project, supported by a Engineering and Management Consultant (EMC), which is currently being procured; (ii) establishment and operations of State level Project Management Units (SPMUs) within State implementing agencies, which can hire experts in various fields as and when needed on a contractual basis; (iii) setting up of a monitoring and evaluation system; and (iv) establishment of a Quality Assurance and Quality Control system. This component will also finance consultancies, as well as related material, office equipment and incremental operating costs. The project will provide investment and technical support for the establishment of a Management Information System and Information and Communication Technology systems.

## 1.2 SUB-PROJECT DESCRIPTION – SINGDA DAM

The construction of Singda Dam Project across Singda river was completed in the year 1995. The dam is located in Singda village of Kangpokpi district of Manipur to provide the Irrigation, hydropower and domestic water supply. The dam supplies Irrigation water to 5666 ha Gross Command Area (2428 ha CCA), 0.75 MW hydropower installed capacity and 6.64 MCM annual water supply. Salient features of the project area as reported below:

<b>Project</b>	Singda Dam Project
River	Singda River
Lat/Long	24 <sup>0</sup> 52' 30"/ 93 <sup>0</sup> 48' 24"
GCA	5666 ha
CCA	2428 ha
Catchment Area	25.3 sq km
<b>Main Dam</b>	
Type	Earthen Dam
Length	490 m
Top elevation	914.50 m
Height of dam above lowest river bed level	60 m
Lowest river bed level	854.50 m
<b>Spillway</b>	
Type	Chute spillway
Length	136 m
Location of spillway	Left flank
Crest level	909.50 m
Number of bays	1
Discharge capacity at MWL	363 cumec
Revised flood	395 cumec
<b>Reservoir</b>	
Maximum water level	912.10 m
Full Reservoir Level	909.50 m
MDDL	878.00 m
Live storage	8.51 MCM
Gross storage	9.72 MCM
Reservoir spread area	51 ha
Seismic zone	V
Year of start of construction	10/1/1975

Date of completion	12/05/1995
Year of first impoundment	June 1996



**View of Dam and Submergence**

### **Proposed Interventions/ Activities and Intended Outcomes**

Dam Safety Review Panel (DSRP) constituted by CWC, Government of India has made a visit to Singda dam on 18/08/2019 and recommended measure to improve the safety and performance of dam and associated appurtenances in a sustainable manner, and also to strengthen the dam safety institutional set-up.

The objectives of the project are to be achieved through investments for physical and technological improvement activities, managerial upgrading of dam operations, management and maintenance, with accompanying institutional reforms. The project will improve the safety and operational performance of dam and mitigate risks to ensure safety of downstream population and property. The following rehabilitation proposals as described in the PST have been formulated based on DSRP recommendations and these proposals form the basis for preparation of present ESDD report.

### **Structural Rehabilitation Works**

#### **Civil Work including Paint**

1. Restoration of Rip-Rap at upstream slope of Singda Dam
2. Construction of parapet wall at Singda Dam
3. Restoration of boulder apron at plunging pool outlet at Singda Dam
4. Restoration of Drainage System at the downstream face of Singda Dam
5. Construction of check dam on the upstream nallah\*
6. Desilting of Reservoir Area\*
7. Construction of inspection paths on the upstream and downstream slope of Singda Dam

#### **Electro-mechanical Work**

8. Replacement and installation of Butterfly Valves and lift for operational service in the control shaft of Singda Dam

9. Construction of generator shed i/c supplying, fixing, and commissioning of generator for operating the butterfly valve
10. Construction of Stainless Steel railing at Spillway and Top of Dam

**Basic Facilities Enhancement:**

11. Clearing of range vegetation, grass, bushes etc. Singda Dam
12. Restoration of side drain along the approach roads
13. Improvement of approach roads
14. Construction of Temporary roads
15. Construction of compound wall fencing
16. Construction of site office building, quarters, control room, etc.
17. Restoration of retaining wall approach road
18. Construction of water tank and distribution system
19. Construction of hard stand for parking
20. Electrification of dam area
21. Plantation of tree samplings

**Instrumentation, SCADA, Surveillance system, etc**

Supply and installation of Geodetic equipment (ETS, GNSS, digital levels), Geotechnical equipment (Piezometer, tilt meters), Seismic equipment, Hydro meteorological equipment, Surveillance system, Flood Monitoring and Command and Control Room Hardware/Software and Network Communication of Singda Dam.

**Tourism/Fisheries/Hydropower Development**

Construction of recreational park along with water sports\*

**Other Investigations, design study and consultancy**

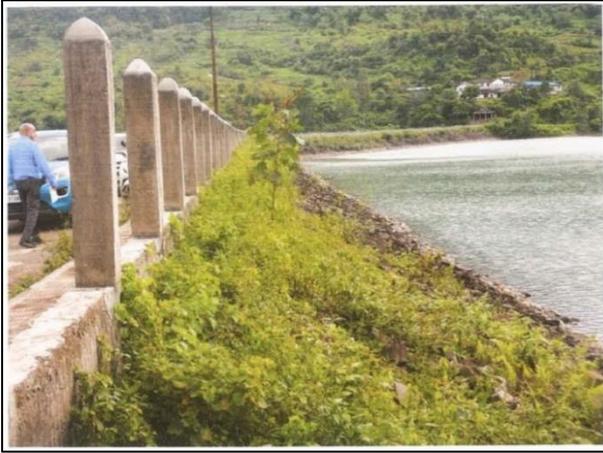
Bathymetric survey, seismic design review, LIDAR Survey by drone for flood plains, dam break analysis and EAP

*\*Out of above activities, desilting measure shall be taken up only after carrying out Bathymetric survey to know the present capacity of the reservoir, thereafter a detailed proposal on the desilting measures including check dams, desilting in the upstream Nalla (small stream), soil conservation measures/catchment area treatment shall be submitted by the state Government for examination. Therefore, these are not considered as part of present DD.*

*Similarly, the above tourism components are not considered as part of present ESDD as state government shall prepare a detailed proposal incorporating the tourism facilities to be provided along with expected tourists who will be visiting and the revenue being generated and submit for examination before taking up on the ground.*

**Conducting of ESDD/ESIA on these sub-components is a pre-requisite in the Environment and Social Commitment Plan (ESCP) before issuance of bids.**

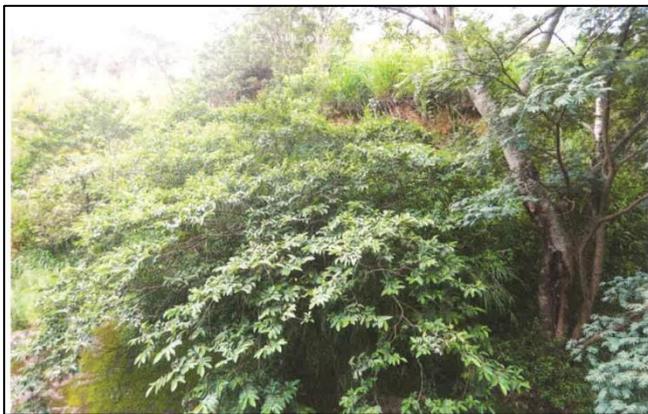
Some pictures of the above interventions area are given at **Figure 1.1**. Project area on google map with major intervention locations marked is given at **Figure 1.2**.



**Photo showing disintegration of Rip-Rap**



**Profuse vegetation growing on the slope**



**Landslide the sloping portion of Spillway**



**Landslide at the upstream of the Reservoir**



**Lifting arrangement for operating platform of valve**



**Winch for lift cage operation**



**Distressed approach road to the top of dam**



**Distressed approach road to Inspection Bungalow**

**Figure 1.1: Selected Photographs of Improvement/Intervention area**

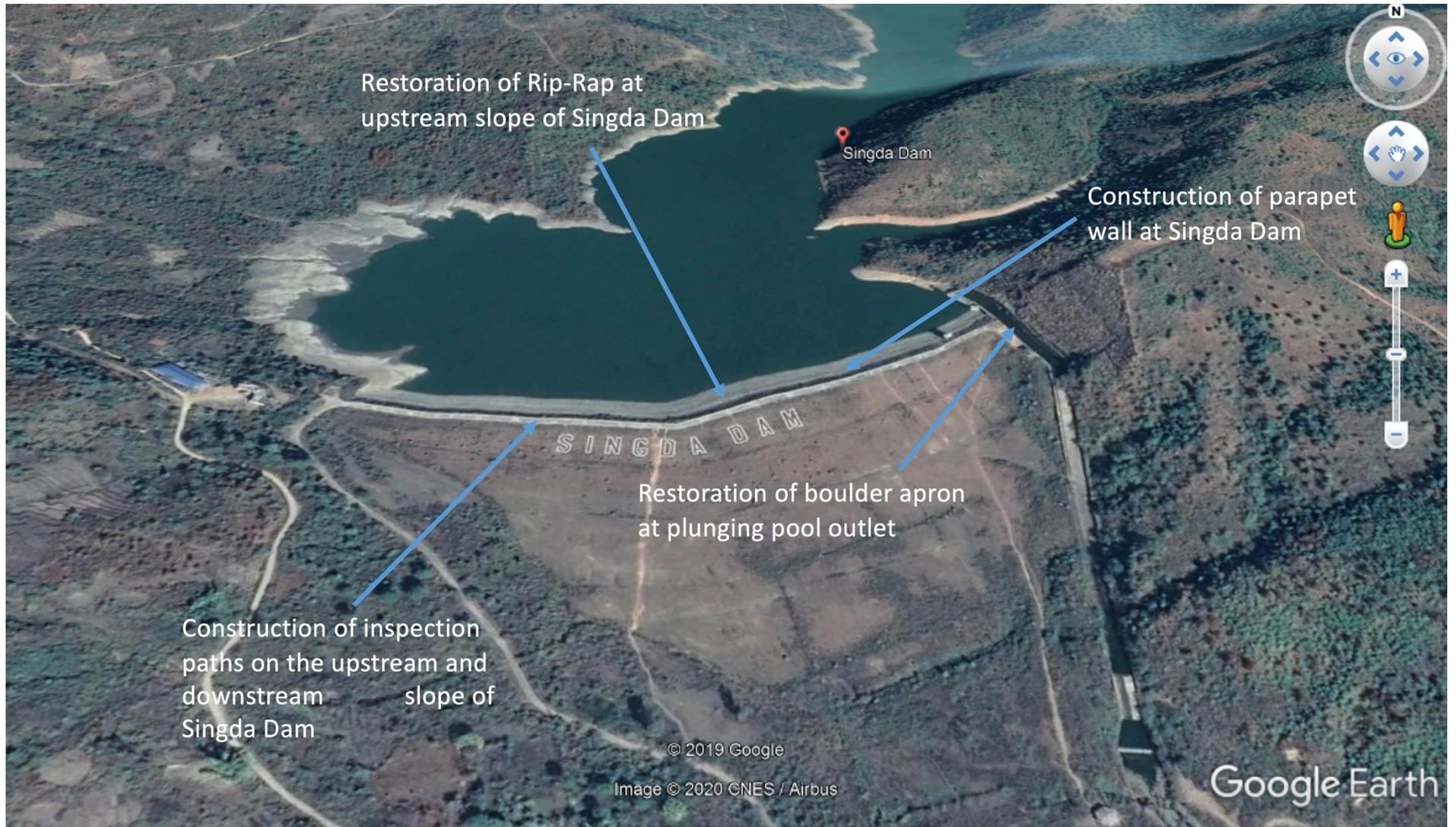


Figure 1.2: Project Area showing major intervention locations

### **1.3 IMPLEMENTATION ARRANGEMENT AND SCHEDULE**

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As can be seen from the list of activities proposed under dam rehabilitation project; these activities can be divided into civil work, electro-mechanical work, instrumentation and non-structural measures such as Emergency Action Plan and Early Flood Warning with a view to improve dam safety.

Civil work will be carried out by contractor(s) and would be completed over a period of 5 years in phased manner. SPMU will hire contractor(s) based on item rate and get the work executed. A detailed work schedule will be prepared keeping in view the weather dependency of certain activities. Monsoon period will be avoided for execution of most of activities. Non-structural intervention such as preparation of EAP, will be done through expert consultants.

### **1.4 PURPOSE OF ESDD**

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The overall project (DRIP II) was categorized as **High Risk** as per the internal Environment and Social Risk Classification of the Bank. The Environment and Social Due Diligence has been conducted to use it as a tool for decision-making on the sub-project with the following specific objectives:

- i. To identify, evaluate and manage the environment and social risks and impacts of the sub-project in a manner consistent with the ESSs;
- ii. To adopt a mitigation hierarchy approach to the project's E&S risks i.e. a) anticipate and avoid risks and impacts; b) minimize or reduce risks and impacts to acceptable levels, if not avoidable; c) once risks and impacts have been minimized or reduced, mitigate; and (d) where significant residual impacts remain, compensate for or offset them, where technically and financially feasible;
- iii. To help identify differentiated impacts on the disadvantaged or vulnerable and to identify differentiated measures to mitigate such impacts, wherever applicable;
- iv. To assess the relevance and applicability of environmental and social institutions, systems, laws, regulations and procedures in the assessment, development and implementation of projects, whenever appropriate; identify gaps, if any exist, and
- v. To assess borrower's existing capacity, gaps therein, and identify areas for enhanced capacity towards management of E&S risks.
- vi. based on the categorization of Environment and Social risks and impacts of the Dam sub-project, to determine whether ESIA is to be carried out using independent third-party agency or a generic ESMP customized to mitigate E&S risks and impacts will suffice.

### **1.5 APPROACH AND METHODOLOGY OF ESDD**

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The following approach has been adopted for ESDD:

- i. Study sub-project information, proposed interventions, their magnitude and locations and carry out assessment of each proposed intervention to identify the magnitude of E&S risk and impacts;
- ii. Review relevance and applicability of national and state legal requirements and Bank's ESF policy, standards and directives and preliminary assessment of applicability of legal requirement and ESS framework (2-8)

- iii. Conduct site visit to understand baseline environment and social settings, proposed activities under the sub-project, their location and sensitivity, if any.
- iv. present key baseline data essential for impact assessment in immediate vicinity area of proposed interventions from secondary sources, such as land-use, protected areas in vicinity, ascertain presence of indigenous (schedule tribe)/vulnerable people, etc.
- v. Undertake institutional assessment to identify existing capacities & relevant gaps to manage E&S risks and impacts
- vi. Conduct preliminary stakeholder consultations to help identify potential stakeholders; to provide information on the proposed interventions; to identify issues and concerns; and ascertain appropriate mechanisms for continued engagement
- vii. Carry out activity wise environment and social screening and identify risks and impacts. Classify the sub-project based on risk level (low, moderate or substantial and high) and recommend commensurate plans/measures to meet identified risks and impacts.

## 2.1 POLICY AND LEGAL FRAMEWORK

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India has well defined environmental and social regulatory framework. The regulation applicability depends on nature of work and location of work. Broadly legislation can be divided into four categories viz environmental, forests, wildlife conservation and social. The applicability analysis of regulations pertaining to all the above four categories was carried out. The applicability of World Bank ESF comprising, 10 ESSs (ESS1 to ESS10) to the proposed rehabilitation proposals and Standard specific requirements were analyzed. Further, a comparison of national environmental and social regulations versus World Bank's ESS was been carried out along with the gap analysis. Applicability of Indian regulations, World Bank's ESS along with comparison and gap analysis is discussed in ESMF.

Central Water Commission, Ministry of Jal Shakti, Government of India has prepared "Operational Procedures for Assessing and Managing Environmental Impacts in Existing Dam Projects" as a guiding document for the dam owners to systematically address in advance the environmental safeguard requirements and have discussed in detail all applicable legal requirement. Reference has been drawn from this document as well, while carrying out applicability analysis.

Indian environmental regulation requiring environment clearance is for new dam projects specifically for the purpose of hydropower generation and/or irrigation projects and vary with generation capacity for hydropower projects and culturable command area served by irrigation projects. Forest related clearances becomes applicable, if new or any modification in any existing project require diversion of forest land for non-forestry purposes. Wildlife Clearance process gets triggered if the project is in proximity to protected area or activities are proposed within protected or conservation areas

Therefore, for the proposed dam rehabilitation activities at Singda dam, regulatory clearances will not be applicable as per Indian regulation. Other applicable regulatory requirement is discussed in ESMF.

## 2.2 DESCRIPTION OF INSTITUTIONAL FRAMEWORK

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The sub-project will be implemented by Water Resources Department (WRD), Manipur. The mandate of WRD is:

- All matters relating to Medium and Major Irrigation Projects
- All matters relating to Lift Irrigation Projects
- All matters relating to management of floods, including construction of major dams and drainages
- All matters relating to Management and Preservation of Water Resource
- All matters relating to investigation of Ground Water Resources

For implementation of the sub-project, SPMU has been set up to be headed by Chief Engineer (Project) as Nodal Officer. Project Director (SE Irrigation Circle No. II) and 3 Asstt. Project Directors (Executive Engineers) will report to him. In addition, technical, finance and safeguard sections have been created under Project Director for implementation of the project. Safeguard section will appoint Environment and Social Expert to enable preparation of management plans as well subsequent implementation of mitigation measures during implementation. They will hire experts from outside department or seek deputation of staff with relevant experience.

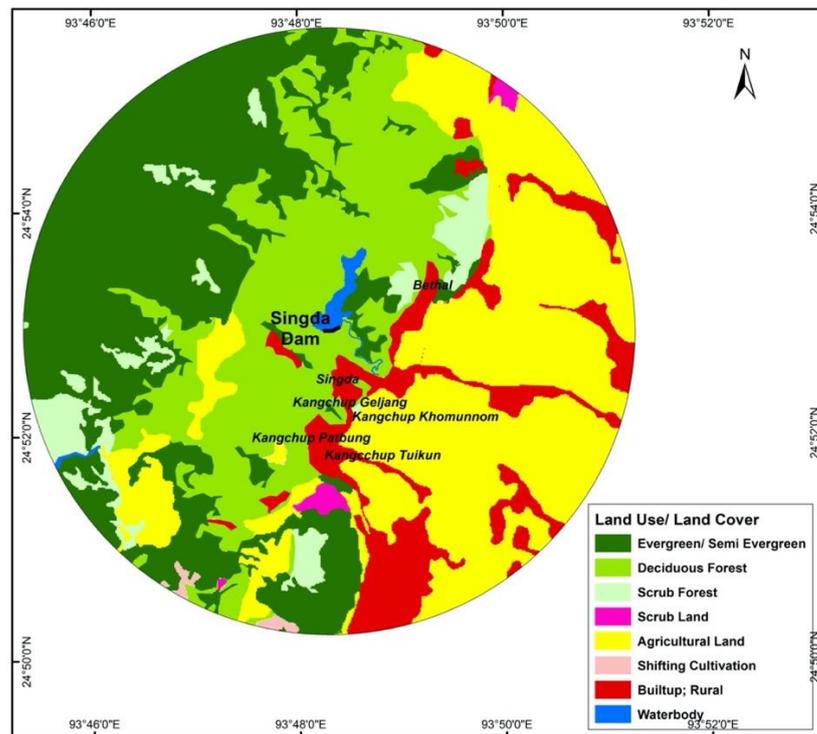
Presently, no formal system is established for dealing with external complaint or a formal GRM. There is no internal complaint committee as per Sexual Harassment Act either at dam level or SPMU level, however, such complaints can be made to the head of the department.

Assessment of physical, ecological and socio-economic conditions at dam site and immediate surrounding has been carried out based on secondary information and site observations; as discussed below.

## 3.1 PHYSICAL ENVIRONMENT

### Land Use/ Land Cover

The project surrounding area's land use and environmental sensitivity was analysed using GIS techniques. Land use/ land cover map of 5 Km radius area around the dam site is presented at **Figure 3.1**. As can be seen from the map, the reservoir is very small (only 51 ha), major land use upstream of dam is forest – evergreen/semi-evergreen and deciduous. Downstream of dam, patches of built up area can be seen as well large area under agriculture. Nearest habitation is at around 3 Km from the dam.



**Figure 3.1: Land Use and Land Cover Map of 5 Km radius around Dam**

### Natural Hazards

Potential of natural hazards such as flooding and earthquake cannot be ruled out. Flooding in Singda river especially during sudden release or emergency situation of dam break, downstream area will be affected. Project falls in earthquake zone V, i.e. the most active zone. Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones, viz. Zone II, III, IV and V. Zone II is the least active and Zone V is the most active.

Being in Zone V, the most active zone, earthquakes of low to moderate intensity are recorded here regularly. The state of Manipur, has experienced dozens of large earthquakes; the biggest in recent times being the 1988 (magnitude 7.2) earthquake. Most earthquakes in western Manipur are shallow. But some, especially those recorded in the eastern parts and along and across the Myanmar border have greater depths. Other earthquakes in recent times include:

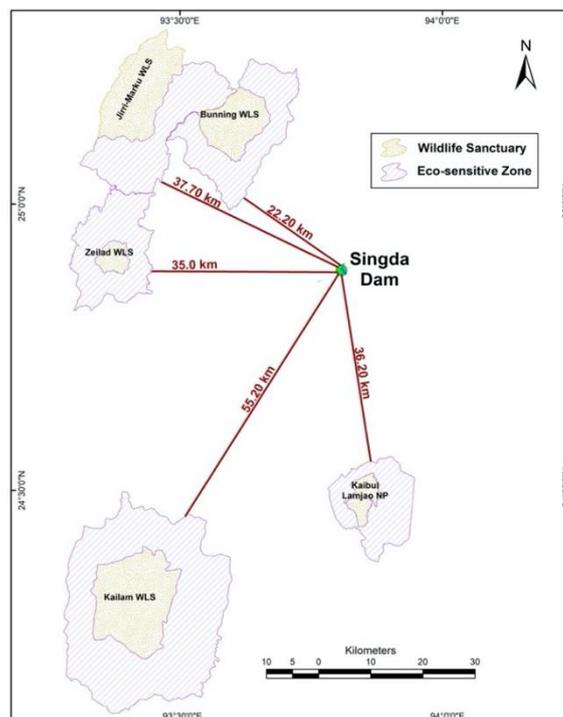
- 18 September 2005 (magnitude 5.7) - A moderate earthquake at Myanmar-Manipur border, caused isolated minor damage to property in some parts of Manipur.
- 4 September 2009 (magnitude 5.9) - A moderate earthquake at Myanmar-Manipur border, felt widely in north-east India and in Bangladesh. No reported damage.
- 4 January 2016 (magnitude 6.7) - Imphal earthquake with epicenter in the Tamenglong district; about 30 km west of Imphal. At least eleven people were killed, 200 others were injured and numerous buildings were damaged. The quake was also strongly felt Bangladesh and eastern and north-eastern India

Keeping in view the seismic activity on the region, Dam Safety Review Panel has already recommended carrying out a site-specific design earthquake parameters study to ascertain the requirement of additional safety measures, if any.

### 3.2 PROTECTED AREA

#### Nearest Protected Area

There is no protected area within 10 Km distance from the dam. Nearest protected area is Bunning WLS at a distance of 22.2 Km from the dam. The location of protected areas in relation to dam is shown below at **Figure 3.2**.



**Figure 3.2: Map showing location of Protected Areas wrt Dam**

### 3.3 SOCIAL ENVIRONMENT

The dam is located in the district Kangpokpi. Six villages namely Singda, Kangchup Geljang, Kangchup Patbung, Kangchup Khomunnom, Kangchup Tuikon and Bethel have been identified as falling in 5 km area on the downstream side of the dam. The State of Manipur does not have any 'Schedule V1' areas. Though there are ST households in the vicinity of the dam, these are well mainstreamed into general society and do not exhibit any of the characteristics outlined in ESS 7. The district has nine sub-divisions i.e. nine Tehsil Headquarters. The brief demographic characteristic of the district is given in the table below:

<b>No. of Households</b>	<b>36,000</b>	<b>Household Size</b>	<b>5</b>
<b>Total Population</b>	<b>1,93,744</b>	<b>Population (0-6 age)</b>	<b>26,232</b>
Male	98,908	Boys (0-6 age)	13,679
Female	94,836	Girls (0-6 age)	12,553
Sex Ratio	959	Sex Ratio (0-6)	918
<b>Population (SC)</b>	<b>714</b>	<b>Population (ST)</b>	<b>1,54,528</b>
Male	387	Male	77,127
Female	327	Female	77,401
<b>Literates</b>	<b>1,24,182</b>	<b>Literacy Rate</b>	<b>74.1</b>
Male	68,169	Male	80.0
Female	56,013	Female	68.1
<b>No. of Workers</b>	<b>88,065</b>	<b>Cultivators</b>	58,987 (67.0%)
Male	50,198	<b>Agricultural Labours</b>	7,353 (8.3%)
Female	37,867	<b>Household Industrial Workers</b>	3,117 (3.5%)
<b>No. of Main Workers</b>	1,66,009	<b>Other Workers</b>	18,608 (21.1%)
<b>No. of Marginal Workers</b>	47,378		

*Source: Census of India, 2011 (District Handbook)*

### 3.4 CULTURAL ENVIRONMENT

List of Monuments of National Importance in Manipur and list of State Protected monuments in Manipur have been reviewed. There are no protected monuments in the project vicinity.

<sup>1</sup> **Scheduled Areas** are areas in India with a preponderance of tribal population subject to a special governance mechanism wherein the central government plays a direct role in safeguarding cultural and economic interests of **scheduled** tribes in the **area**.

## 4.1 SUB-PROJECT SCREENING

The subproject screening was undertaken based on site visits and followed a set methodology. Process of risk /impacts identification was done using two step Screening process. Firstly, at Step I, by identifying the applicable sub-project activities, preconstruction stage and construction stage's major auxiliary or interventions related risks and impacts within the impact zone. Secondly, at Step II, by conducting an analysis of extent of risk viz low, moderate, substantial and high associated with various sub activities related to each activity that was identified through Step I. All these were then summarized to arrive at overall dam sub-project risk category. Description of each step of screening as per formats, and the outcome of each step is given below.

**Step I Screening (using Form SF-1):** Sub-Project Component, Construction Support Preparatory Intervention related vs Nature of risk/impact

Scoping exercise was carried out to select the applicability of each activity based on the interventions proposed in the sub-project PST. Applicable interventions were further classified based on the location i.e. within dam area or outside the dam area and for each applicable intervention likely nature of risks and impacts has been listed. Each activity was reviewed for the applicability location of applicable activity as within dam area or beyond dam area for likely risks and impacts.

Screening indicated that all Project components related activities are limited to within the dam area/premises. Due to nature of these activities, there will be likely impacts will be on physical environment in terms of air pollution, noise pollution and waste generation. Hence, none of the proposed structural interventions, does not involve acquisition of private land and/or private assets. These activities in no way cause restriction on access to land or use of resources by local communities and there is no economic displacement envisaged due to the sub-project. Activities interfacing with water bodies – river/reservoir will have risk of spillage of chemicals, construction material, and debris leading to water pollution and impacts on fishes.

Pre-construction and construction stage major auxiliary or preparatory intervention are within dam area as well as beyond dam area. Deployment and haulage of heavy machinery, setting up of workshop, operation of concrete mixture and heavy pumps will be within dam area. Other activities such as labour camps and debris disposal will be beyond dam area. Activities involving machinery and equipment will have OHS risks and impacts on physical environment. Transportation of material, debris disposal and labour camps are likely to generate pollution and impact on physical environment.

Project will involve project managers and supervisors, contracted workers – these would also include Migrant workers as all the required labor will not be fully supplied locally for a number of reasons, such as worker unavailability and lack of technical skills and capacity. Construction contractors are expected to stay at/near dam, set up construction equipment and machinery near work location at pre-determined /approved sites. Influx of skilled migrant labour, albeit few in numbers, for construction works is likely, the labour will operate outside the dam premises, hence risk of SEA/SH is likely.

Proposed non-structural interventions include Emergency Action Plan, Early Warning System and Flood Forecasting System, etc. In case of these interventions relating to early flood warning systems having siren systems, broadcasting facilities and Emergency Action Plans, project will reach out to the disadvantaged and vulnerable persons and groups and involve them mainly during implementation. During preparation of EAP, dam break scenario will be simulated and inundation map prepared to delineate the potential risk area in case of an emergency situation. Similarly, during flood release scenario by gate opening, area inundated will be delineated by simulation. Population in vulnerable areas under different release scenario will be identified and contacted through public consultation meetings. Communities will be made aware about the warning systems and do's and dont's during such scenarios.

Output of this screening is enclosed as **Annexure I**.

**Step II Screening (using Form SF-2):** All applicable activities identified as having potential risk /Impacts that were identified through Step I screening, are further screened for associated sub-activity and evaluated for the extent of risk. Sub- activity's Risk/Impact intensity is further categorised as Low (L), Moderate (M), Substantial (S) or High (H) based on following criteria:

Low: Localized, temporary and negligible  
Moderate: Temporary, or short term and reversible under control  
Substantial: Medium term, covering larger impact zone, partially reversible  
High: Significant, non- reversible, long term and can only be contained/compensated

Occupational Health and safety is treated as Moderate by default as its risk effect can be managed by adopting defined guidelines. Analysis of extent of risk/impact for sub- activities resulted in identification of following activities as having Moderate Risk/impact.

1. Restoration of Rip-Rap at upstream slope of Singda Dam
2. Construction of parapet wall at Singda Dam
3. Restoration of boulder apron at plunging pool outlet at Singda Dam
4. Construction of Stainless Steel railing at Spillway and Top of Dam
5. Labour Camps involved (location within dam premises or outside)
6. Major Debris Disposal involved

All other activities are categorized as low risk activities. E&S risks in none of the sub-activities for this sub-project is categorized as either Substantial or High risk. **The outcome of Screening is enclosed as Annexure II.** In case of GBV/SEAH, this site assessment fed into the

Risk Assessment Tool that was used for Dam specific GBV/SEAH risk assessment and score came to 10.5 – Low risk.

Based on consideration of all the above, summary of Risk/Impact (as per outcome of SF-2) is summarised for major sub-project activities under **Table 4.1 below**:

**Table 4.1 : Summary of Identified Risks/Impacts in Form SF-3**

Project Activity	Environment Risks						Social Risks					
	Air, water, noise, land use, Soil, Resource use	Pollution downstream and upstream	General Ecology	Protected Area (Wild Life Sanctuaries, National Park and other natural habitat even if not protected)	Other RET species (flora and fauna) outside protected areas	Fish and Aquatic life within dam water body	Land	Tribal	Labor	Cultural heritage	SEAH/GBV	OH and Safety to Labour/ Community
Civil (within Dam Boundary )	M	M	L	None	None	M	L	L	M	L	L	M
Electro Mechanical	M	L	L	None	None	L	L	L	M	L	L	M
Instrumental SCADA, surveillance	L	L	L	None	None	L	L	L	L	L	L	L
Painting	M	M	L	None	None	M	L	L	M	L	L	M
Road work	M	L	L	None	None	L	L	L	M	L	L	M
Safety measures (Siren, Lighting)	L	L	L	None	None	L	L	L	L	L	L	L
Major Civil Work extending beyond Dam Area Like training Structure	L	L	L	None	None	L	L	L	M	L	L	M
Major debris disposal	M	L	L	None	None	L	L	L	M	L	L	M

**Criteria for Risk Evaluation :**

**Low :** Localized, temporary and Negligible

**Moderate :** temporary, or short term and reversible under control

**Substantial :** medium term , covering larger impact zone, partially reversible

**High :** significant , non- reversible, long term and can only be contained/compensated

**Occupational Health and safety:** it will be treated as Moderate by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines,

## 4.2 STAKEHOLDERS CONSULTATION

Stakeholder consultations were conducted as part of environmental and social impact assessments. The purpose was to:

- a. provide initial information to the communities on the proposed project interventions and particularly the non-structural interventions;
- b. help identify potential stakeholders who are involved at this stage and will be involved a later stage.
- c. ascertain if there are any legacy issues relating to displacement, resettlement, etc.
- d. elicit their responses in relation to key non-structural interventions such as early warning systems, emergency action plans
- e. identify mechanisms that would be deployed to engage with different stakeholders and particularly communities living downstream

A stakeholder consultation meeting was conducted at dam site on 02/02/2020 and later at WRD office on 03/02/2020. It was attended by permanent staff of the borrower (WRD) working at dam, workers from nearby villages, locals, elected representatives and local welfare groups. Town planning department was also consulted on 03/02/2020.



Following is the outcome of the stakeholder consultation meetings:

1. The dam is main source of water supply to Imphal and nearby areas and the participants expressed that improvement works shall be taken up.
2. As it is a spillway without a gate, the participants opined that early warning and alerting measures be provided.
3. The Rip rap work is damaged and shall be attended to protect from erosion
4. The dam is visited by many tourists and it is requested to provide safety and security measures including fencing, lighting.

5. The stakeholders informed that the extent of silting is unknown and it may have an effect on the storage capacity. Desilting may be taken up.
6. The participants at the old quarters urged for immediate construction of quarters as the present place is in dilapidated condition
7. The WRD engineers are fully aware of the interventions but need training on ESF and related standards.
8. No formal fishing is noticed.
9. The participants informed that largescale greening is lost and greening works may be considered as part of the project.
10. About 15000 tourists visit the dam during the year.
11. The WRD team indicated the proposed labour camp site within the vacant area of the WRD site abutting the dam. The present landuse is vacant.
12. The WRD office maintains RTI process through which the public is provided with requested information. The WRD will set up 3 levels of GRM for the project – at site, at WRD and at Govt of Manipur.

Based on these findings relating to both structural and non-structural interventions, potential stakeholders were categorized as follows: Affected, Other interested stakeholders, and disadvantaged and vulnerable stakeholders

Affected parties: There are no affected persons who shall be directly or indirectly adversely affected by the proposed interventions

Other interested stakeholders: In relation to structural interventions, these would be potential contractors, Project Management consultants, either regulatory bodies/institutional stakeholders such as Revenue, Environmental Authorities, etc. In relation to non-structural interventions, these would include: communities living downstream including farmers; village heads (Sarpanchs), community leaders; district administration; police, state disaster management authority, revenue department; electronic and print media, etc. These communities would be key stakeholders requiring to be involved in the preparation and implementation of EAP.

Disadvantaged and vulnerable persons and groups: Illiterate persons, physically challenged, women and elderly would be key stakeholders – requiring special focus and outreach to ensure that they are well informed about the provisions of the EAP.

Communities welcomed such interactions and indicated that they would prefer Dam authorities conduct one such face -to- face meeting once a month at a convenient location to inform of developments/interventions relevant to them. They welcomed other means of information such as advertisements in the local papers etc, but preferred to have face to face interactions at least once a month.

### **4.3 DESCRIPTIVE SUMMARY OF RISKS AND IMPACTS FROM ACTIVITIES BASED ON SCREENING**

Based on the above screening analysis, potential impacts and risks from the sub-project are summarised below:

#### ***Environmental Impacts and Risks***

1. Environment risks and impacts, as assessed above, for various project activities under this sub-project are categorised as Low and Moderate due to localised nature of proposed activities i.e. activities remain limited to dam area except for labour camp , transportation of material and muck/debris disposal.
2. Execution of civil and electromechanical work within dam body will generate localised impacts on physical environment and resource use; pose risk of exposure of workers requiring personal protective equipment (PPE) use.
3. Civil work interfaced with water body such as work on upstream face of dam pose risk of water pollution and impact on fish fauna.
4. Generation of hazardous waste such as empty paint containers from paint work pose risk of exposure of workers while handling and require careful disposal at authorised sites.
5. Construction and demolition waste and muck from excavation require careful disposal at pre-identified and approved site (by E&S Experts of IA) to minimise the risk of pollution on this count.

#### ***Social Impacts and Risks***

1. As the interventions are within the dam premises and on the dam structure, there shall be no adverse impacts on land and assets due to any sub-component or sub-activities
2. Though are Scheduled Tribes households in the vicinity, these are mainstreamed into the overall society and do not meet the characteristics outlined in ESS 7. There will be no physical interventions
3. Influx of migrant labor will be low as these works require only few e.g. 30-50 but very skilled labor Also these workers will mostly operate from labor camps within the dam premises and hence there would be minimal interface with communities and therefore significantly lower SEAH/GBV risks
4. Also waste generation from labour colony can pollute drinking water sources of community
5. Labor related risk would include:
  - Safety issues while at work like injuries/accidents/ fatalities leading to even death, while at work; Occupational health and safety risks due to exposure of workers to unsafe conditions while working at heights, working using lifts, handling of equipment and machinery, exposure to air and noise pollution etc. will be addressed through OHS guidelines.
  - Short terms effects due to exposure to dust and noise levels, while at work
  - Long term effects on life due to exposure to chemical /hazardous wastes
  - Inadequate accommodation facilities at work force camps, including inadequate sanitation and health facilities
  - Non-payment of wages
  - Discrimination in Employment (e.g. abrupt termination of the employment, working conditions, wages or benefits etc.)

- Sexual harassment at work
- Absence or inadequate or inaccessible emergency response system for rescue of labour/workforce in situations of natural calamities.
- Health risks of labour relating to HIV/AIDS and other sexually transmitted diseases

In addition, other risks that would be applicable for all types of workers would be as follows:

- Unclear terms and conditions of employment
- Discrimination and denial of equal opportunity in hiring and promotions/incentives/training opportunities
- Denial for workers' rights to form worker's organizations, etc.
- Absence of a grievance mechanism for labour to seek redressal of their grievances/issues
- No impacts are envisaged on cultural heritage as works shall not be undertaken in their vicinity or result in any impact.

## 5.1 CONCLUSIONS

### 5.1.1 Risk Classification

As per the ESDD exercise, risk/impacts that have been identified relate to Water Quality, Fisheries, Occupational Health, Physical Environment, labor related and SEAH/GBV risks. The summarised environmental and social risks of identified activities with level or risk is presented in previous chapter. These risks are low to moderate order and localised, short term and temporary in nature which can be managed with simple ESMP and guidelines. . Environment risks of air, water, noise, land use, soil and resource use for most of the activities as well as social risks of labour and OHS to labour/community are Moderate. Environment risks of pollution downstream and upstream along with that of fish and aquatic life are categorised as Moderate for paint work due to interface with water bodies. Environmental risk relating to Labour camp has been flagged as Moderate on environment and land.

Hence the overall risk of this sub-project Dam is categorized as Moderate.

### 5.1.2 National Legislation and WB Environmental and Social Standard Applicability Screening

The applicability analysis of GoI legal and regulatory framework indicates that while, there are various legislation which will have to be followed by the contractor for the protection of environment, occupational health and safety of workers and protection of workers and employment terms. None of Indian legislation is applicable warranting obtaining clearance prior to start of construction/improvement work.

Four ESS standards are found relevant to this sub-project as per reasons given in **Table 5.1** below:

**Table 5.1: WB ESF Standards applicable to the sub-project**

Relevant ESS	Reasons for Applicability of the standard
ESS2: Labour and Working Conditions	Direct workers, Contracted workers and Community workers (likely for EAP and other non-structural interventions)
ESS3: Resource Efficiency, Pollution Prevention and Management	Civil and electro-mechanical work including resource consumption requiring protection of physical environment and conservation of resources
ESS 4: Community Health and Safety	Transportation of material, labour camp near habitation; and accidental risk during repair /improvement work and also leading to SEA/SH GBV risk
ESS 10: Stakeholder Engagement Plan	For engagement of stakeholders in all structural and non-structural interventions e..gEarly flood Warning system, siren systems, broadcasting facilities, Emergency Action Plan etc.

## 5.2 RECOMMENDATIONS

### 5.2.1 Mitigation and Management of Risks and Impacts

Since risks and impacts are low to moderate category, a generic and standard guidance in accordance with the ESMF shall be followed. It shall cover: the following aspects

- a. SPMU shall customise the generic Environmental and Social Management plan (ESMP) that has been provided in the Environmental and Social Management Framework (ESMF) and make it part of bid document for effective adherence by contractors.
- b. It is recommended that ESMP provides due measures for protection of environment quality and resource conservation (during handling of resources) in line with ESF standard ESS3 requirements. Similarly, any impacts identified on fisheries has to be conserved. Likewise, due attention has to be given to Occupational Health and Safety of workers and community in line with the requirements of ESS4 and World Bank Group guidelines on Occupational Health and Safety (OHS). Hence SPMU shall develop following plans in line with outline provided in the ESMF and ensure its adherence by contractor:
  - i. Resource Conservation Plan (RCP)
  - ii. Labour Management Plan (LMP)
  - iii. Occupational Health and safety Management Plan (OHSP)
  - iv. Emergency Action Plan (EAP)
  - v. Muck Management Plan (MMP)
  - vi. Plan for GBV/SEAH (Gender based violence/ Sexual exploitation, abuse and harassment) Risks
  - vii. Stakeholder Engagement Plan (SEP)
- c. Contractor shall submit BOQ as per ESMP of the sub project and will also include environmental and social budget as part of bid submission.

Mitigation plans to meet requirements for relevant Standards with responsibility and stages are given in **Table 5.2** below:

**Table 5.2: List of Mitigation Plans with responsibility and timelines**

WB-ESS Triggered	Mitigation Instrument	Responsibility	Timelines
ESS2: Labour and Working Conditions	<ul style="list-style-type: none"> <li>• LMP</li> <li>• OHS</li> <li>• GBV/SEAH</li> </ul>	SPMU  CPMU for GBV/SEAH	Before mobilization of contractor  GBV/SEAH by appraisal
ESS3: Resource Efficiency, Pollution Prevention and Management	<ul style="list-style-type: none"> <li>• ESMP</li> <li>• Muck Management Plan</li> <li>• Resource Conservation Plan</li> </ul>	SPMU	Before mobilization of contractor
ESS 4: Community Health and Safety	<ul style="list-style-type: none"> <li>• EAP</li> </ul>	CPMU and SPMU	Within one year of commencement of work
ESS 10: Stakeholder Engagement Plan	<ul style="list-style-type: none"> <li>• SEP in accordance with project SEF</li> </ul>	SPMU	By negotiation (and to be updated once the EAP preparation is to commence

SPMU shall disclose the finalised ESDD, ESMP, ESCP and other related plans on its website after formal approval from CPMU. Executive summary of proposed ESMP based on ESDD shall be translated and disclosed in local language.

### **5.2.2 Institutional Management, Monitoring and Reporting**

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This ESMP will be developed by E and S experts of SPMU and will be part of the bid document of the sub project and shall be shared with CWC by SPMU for their review/ endorsement and approval. Since currently there is no staff available at SPMU on environmental and social, it is recommended that as part of institutional strengthening for implementation of sub-projects, dedicated Environment and Social staff will be appointed. Specifically, as included in the ESCP, every SPMU shall be strengthened from environmental and social risk perspective during implementation of the sub-projects. A dedicated Environmental and Social staff with requisite skill shall be placed in the SPMU and will be utilised to enable (a) development of ESDD of each sub project either through an agency or in house, (b) E and S staff will also coordinate to hire consultants where ESDDs suggest a high risk for undertaking detailed ESIA, (c) preparation of environmental and social management plans (ESMPs) based on type of risks as well subsequent implementation of mitigation measures during implementation. IA will hire experts from outside department with relevant experience. These E&S experts will work in coordination with Project Management Consultancy (PMC) contracted by CPMU – CWC.

SPMU shall advise contractors about applicable legislative requirements and ensure that contractors fully comply with applicable requirements and submit compliance reports to SPMU on quarterly basis. SPMUs, WRD will share regular implementation status of ESMPs to CWC and The World Bank in line with Environmental Social Commitment Plan (ESCP) on quarterly basis.

WRD shall establish and operationalize a grievance mechanism to receive and facilitate resolution of complaints and grievances, from the communities and other stakeholders including implementation partners. Grievance redress mechanism (GRM) will be designed to address concerns and complaints promptly and transparently with no impacts (for any complaints made by project affected people (PAPs)). GRM will work within existing legal and cultural frameworks and shall comprise project level and respective State level redress mechanisms. Details on the processes and procedures for the GRM is provided in the Stakeholder Engagement Framework.

PMC for the project will have sufficient staff with skills on Environment and Social aspects. Awareness raising and capacity building on the new Environmental and Social Framework (ESF) need to be carried out for the environment and social staff engaged and this will be an area of continued focus, with a view to generate awareness at to dam level. Project Management Consultancy (PMC) shall coordinate with CWC for approval, documentation, disclosure and implementation of these ESMPs in line with project ESMF and ESCP.

Overall, the proposed activities within this Dam sub-project have low to moderate risks resulting in the overall sub-project to be categorized as Moderate risk category. These risks and impacts can be effectively mitigated with effective implementation of mitigation plans by SPMU, Contractors and monitoring by PMC and CWC.

## Annexure - I: Form SF1

Sl. No	Project Component	Applicable (A) , Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE) , Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labor (L) GBV risks (G), (Write whichever is applicable)
1	2	3	4	5
<b>A</b>	<b>Nature of Project Component Related</b>			
1	Reservoir Disiltation	NA		
2	Major structural changes – Spill way construction (Improving ability to withstand higher floods including additional flood handling facilities as needed.)	NA		
4	Structural strengthening of dams to withstand higher earthquake loads	NA		
5	Structural Improvement/Repair work - upstream of Dam site (interfacing dam reservoir) ( like resetting of Rip-Rap, repair of training walls, treatment of Honeycombed etc.)	A	DI	WQ, F, OH, PE, L, G
6	Structural Improvement/Repair work - Downstream of Dam site (with no interfacing with dam reservoir) ( like repair of parapet walls, damage spillway crest, downstream training walls, etc.)	A	DI	OH, PE, L, G
7	Remodeling earth dams to safe, stable cross sections	NA		
8	Electro-mechanical activities with interface with dam reservoir	NA		
9	Electro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)	A	DI	OH, PE, L, G
10	Instrumentation, General lighting and SCADA systems	A	DI	OH, PE, L, G
11	Basic Facilities ( like access road improvement, renovation of office, etc.)	A	DI	OH, PE, L, G
12	Utility installation like standby generator, or setting up solar power systems	A	DI	OH, PE, L, G
13	Painting Work	A	DI	OH, PE, L, G
14	Water recreation activities	NA		
15	Tourism Development	NA		
16	Solar power/floating solar	NA		
17	List any other component not listed above			
<b>B</b>	<b>Pre-construction and construction stage major auxiliary or preparatory intervention</b>			
1	Acquisition of forest land involved	NA		

Sl. No	Project Component	Applicable (A) , Not Applicable (NA)	Environment and Social Risk Associated within dam area (DI), Beyond Dam Area (DE)	Likely Nature of Risk/Impact Water Quality (WQ), Fisheries(F), Conservation area(CA), Protected Area (PA), Ecological (E), Occupational Health (OH), Physical Environment (PE) , Cultural (C), Tribal presence (T), impact on private land/assets/encroachers/squatters (LA), Labor (L) GBV risks (G), (Write whichever is applicable)
1	2	3	4	5
2	Taking of private land (including physical or economic displacement, impact on livelihood; temporary loss of business)	NA		
3	Major Borrow materials requirement involved	NA		
4	Major Quarry materials requirement involved	NA		
5	Blasting involved	NA		
6	Resettlement and Rehabilitation	NA		
7	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	A	DE	L, G
8	Labour Camps involved (location within dam premises or outside)	A	DE	WQ, PE, L, G
9	Migrant labor likely to be involved	A	DE	L, G
11	Heavy machinery to be deployed and related maintenance workshop set up involved	A	DI	OH, PE, L, G
12	Hot mix plant Requirement	NA		
13	Concrete mixture and heavy pumps to be deployed	A	DI	OH, PE, L, G
14	Temporary land acquisition involved	NA		
15	Temporary disruption to access, livelihoods	NA		
16	Tree felling/ vegetation clearance involved	NA		
17	Haulage of machinery involved	A	DI	OH, PE, L, G
18	Major Debris Disposal involved	A	DE	PE, L, G
19	Major Transport of materials involved	A	DE	PE, L, G
20	Utility shifting involved	NA		
21	Discharge of reservoir water (lowering of reservoir water involved)	NA		
22	<b>List any other not listed above</b>			

## Annexure – II: Form SF2

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity ( as per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
1	2	3	4	5
A	<b>Project Component Related</b>			
1.	<b>Structural Strengthening/Improvement/Repair work -upstream of Dam site</b>			
a	Restoration of Rip-Rap at upstream slope of Singda Dam	<b>OH, PE, L, G, WQ, F</b>	Air pollution, noise pollution, risk of spillage of wastewater, risk of reservoir water contamination and impact on fishes, generation of construction debris, Occupational health and safety risk due to working on upstream face of dam Labor and GBV risk	<b>M</b>
b	Construction of parapet wall at Singda Dam	<b>OH, PE, L, G, WQ, F</b>	Air pollution, noise pollution, risk of spillage of wastewater and paint, risk of reservoir water contamination and impact on fishes, generation of construction debris and excavated earth, Occupational health and safety risk due to working on upstream face of dam and GBV risk	<b>M</b>
2	<b>Structural Improvement/Repair work - Downstream of Dam site (with no interfacing with dam reservoir) ( like repair of parapet walls, damage spillway crest, downstream training walls, etc.)</b>			
a	Restoration of boulder apron at plunging pool outlet at Singda Dam	<b>OH, PE, G, L, WQ</b>	Air pollution, noise pollution, risk of spillage of wastewater to river, generation of construction debris, Occupational health and safety risk Labor and GBV risk	<b>M</b>
b	Restoration of Drainage System at the downstream face of Singda Dam	<b>OH, PE, L</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labor exposure to high noise and air emissions,	<b>L</b>

<b>Sl. No</b>	<b>Applicable Sub-Project Component/ Construction preparatory Work related Sub activity ( as per SF-1)</b>	<b>Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity</b>	<b>Elaborate cause (risk) and its effect (Impact) on environment /social</b>	<b>Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)</b>
c	Construction of inspection paths on the upstream and downstream slope of Singda Dam	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor risk	<b>L</b>
d	Restoration of side drain along the approach roads	<b>OH, PE, G, L</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor and GBV risk due	<b>L</b>
e	Improvement of approach roads	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor and GBV risk	<b>L</b>
f	Construction of Temporary roads	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor and GBV risk	<b>L</b>
g	Construction of compound wall fencing	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor and GBV risk	<b>L</b>
h	Construction of site office building, quarters, control room, etc.	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, GBV risk	<b>L</b>
i	Restoration of retaining wall approach road	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and	<b>L</b>

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity ( as per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
			air emissions, labor, GBV risk due to labour involvement	
j	Construction of water tank and distribution system	<b>OH, PE, L, G</b>	Air pollution, noise pollution, waste generation from construction debris, Occupational health and safety risk for labour exposure to high noise and air emissions, Labor and GBV risk	<b>L</b>
3.	<b>Electro-mechanical activities Downstream of Dam site (with no interfacing with dam reservoir)</b>			
a	Replacement and installation of Butterfly Valves and lift for operational service in the control shaft of Singda Dam	<b>OH, PE, L,</b>	Noise pollution, Occupational health and safety risk due to working at heights, waste generation from removed parts	<b>L</b>
b	Construction of Stainless Steel railing at Spillway and Top of Dam	<b>OH, PE,</b>	Air pollution, noise pollution, Occupational health and safety risk due to working at heights and welding, grinding, buffing and polishing operations, waste generation from demolition works	<b>M</b>
4	<b>Instrumentation, General lighting and SCADA systems</b>			
a	Construction of generator shed i/c suppling, fixing, and commissioning of generator for operating the butterfly valve	<b>OH, PE, L,</b>	Occupational health and safety risk due to electrical work, waste generation from packing material,	<b>L</b>
b	Electrification of dam area	<b>OH, PE, L,</b>	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, Laborrisk	<b>L</b>
c	Supply and installation of Geodetic equipment (ETS, GNSS, digital levels), Geotechnical equipment (Piezometer, tilt meters), Seismic equipment, Hydro meteorological equipment, Surveillance system, Flood Monitoring and Command and Control Room Hardware/Software and Network Communication of Singda Dam.	<b>OH, PE, L, G</b>	Occupational health and safety risk due to electrical work, waste generation from removed parts and packing material, Labor and GBV risk	<b>L</b>
B.	<b>Pre-construction and construction stage major auxiliary or preparatory intervention</b>			

<b>Sl. No</b>	<b>Applicable Sub-Project Component/ Construction preparatory Work related Sub activity ( as per SF-1)</b>	<b>Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity</b>	<b>Elaborate cause (risk) and its effect (Impact) on environment /social</b>	<b>Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)</b>
1	Types of project workers (Direct, Contracted, Community Workers (or Volunteers i.e. for EAP implementation)	<b>L, G</b>	GBV risk due to involvement of workers, volunteers and local population	<b>L</b>
2	Labour Camps involved (location within dam premises or outside)	<b>WQ, PE, G</b>	Wastewater generation from domestic activities, waste generation, GBV risk within labour and involving community.	<b>M</b>
3	Migrant labor likely to be involved	<b>G, L</b>	Migrant labour having low degree of interface with community	<b>L</b>
4	Likely interface of Workers with communities	<b>G</b>	Risk of GBV due to labour interaction with community	<b>L</b>
5	Heavy machinery to be deployed and related maintenance workshop set up involved	<b>OH, PE, G, L</b>	Heavy machinery will be deployed for repair and maintenance work - OH risk due to machine handling, waste, wastewater and air emissions from machines operations, hazardous waste generation from oil waste, labor and GBV risk	<b>L</b>
6	Concrete mixture and heavy pumps to be deployed	<b>OH, PE, G, L</b>	Concrete mixture and pumps will be deployed for road repair and other civil works - OH risk due to machine handling, waste generation, wastewater and air emissions from operations, hazardous waste generation from oil waste, Labor and GBV risk	<b>L</b>
7	Haulage of machinery involved	<b>OH, PE, L</b>	Machines will be hauled from different location and brought to site; OHS risk during loading/unloading and air and noise pollution during transportation	<b>L</b>
8	Major Debris Disposal involved	<b>OH, PE, G, L</b>	Debris will be generated from various repair activities such as repair of roads, rip-rap replacement, training walls, etc. - OH risk during debris handling, air and noise emissions from debris handling and transportation, water pollution risk due to debris finding its way to water body, Labor and GBV risk	<b>M</b>
9	Major Transport of materials involved	<b>OH, PE, G, L</b>	Material will be transported from various vendors and	<b>L</b>

Sl. No	Applicable Sub-Project Component/ Construction preparatory Work related Sub activity ( as per SF-1)	Nature of Risk (Conforming to Column 5 of SF-1) and nature of sub activity	Elaborate cause (risk) and its effect (Impact) on environment /social	Risk/Impact intensity for each type of risk/impact Low (L), Moderate (M), Substantial (S), High (H)
			suppliers to site for civil, electromechanical work and instrumentation - OH risk during material handling, loading and unloading; air and noise emissions from transportation; Labor and GBV risk	

**Criteria for Risk Evaluation :**

**Low :** Localized, temporary and Negligible

**Moderate :** temporary, or short term and reversible under control

**Substantial :** medium term , covering larger impact zone, partially reversible

**High :** significant , non- reversible, long term and can only be contained/compensated

**Occupational Health and safety:** it will be treated as Moderate by default as OHS effect can be kept controlled and with negligible effect with adoption of defined guidelines