

**ENHANCING COASTAL AND OCEAN  
RESOURCE EFFICIENCY  
PROGRAM**

**ENCORE**

**ENVIRONMENTAL AND SOCIAL  
MANAGEMENT FRAMEWORK including  
RESETTLEMENT POLICY FRAMEWORK,  
INDEGENOUS PEOPLES PLANNING FRAMEWORK,  
LABOUR MANAGEMENT FRAMEWORK AND  
GENDER ACTION PLAN**

**Volume II: Guidance Manual**

**FINAL REPORT**

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This is the **Environmental and Social Management Framework (ESMF) – Volume II** for the proposed Enhancing Coastal and Ocean Resource Efficiency (ENCORE) Project with financial assistance from the World Bank. This is hereby disclosed after incorporating the comments/suggestions of the public/stakeholders on the Draft ESMF disclosed on 7 June 2019.

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## List of Abbreviations

<i>Abbreviation</i>	<i>Expansion</i>
<b>A&amp;N</b>	Andaman and Nicobar (Islands)
<b>AEWA</b>	African-Eurasian Migratory Water Birds
<b>AMASR</b>	Ancient Monuments and Archaeological Sites and Remains Act
<b>APD</b>	Assistant Project Director
<b>ASI</b>	Archeological Survey of India
<b>BOQ</b>	Bill of Quantities
<b>BP</b>	Bank Procedures
<b>BPL</b>	Below Poverty Line
<b>CAA</b>	Coastal Aquaculture Authority
<b>CBD</b>	Convention on Biological Diversity
<b>CBO</b>	Community-Based Organization
<b>CC</b>	Climate Change
<b>CESIA</b>	Cumulative Environmental Impact Assessment
<b>CIA</b>	Coastal Environmental Impact Assessment
<b>CMS</b>	Conservation of Migratory Species
<b>CMR</b>	Coastal and Marine Resources Conservation
<b>CoI</b>	Corridor of Impact
<b>CPCB</b>	Central Pollution Control Board
<b>CPR</b>	Common Property Resource
<b>CRZ</b>	Coastal Regulation Zone
<b>CSD</b>	Commission on Sustainable Development
<b>CVCA</b>	Critically Vulnerable Coastal Areas
<b>CZMP</b>	Coastal Zone Management Plan
<b>DCZMA</b>	District Coastal Zone Management Authority
<b>DLI</b>	Development Linked Indicators
<b>DPC</b>	District Planning Committee
<b>DPR</b>	Detailed Project Report
<b>DTP</b>	Directorate of Town Panchayats
<b>E&amp;S</b>	Environmental and Social
<b>EA</b>	Environmental Assessment
<b>EAfM</b>	Ecosystems Approach to Fisheries Management
<b>EAP</b>	Externally Aided Project
<b>EAR</b>	Environmental Assessment Report
<b>ECOP</b>	Environmental Codes of Practice
<b>EEZ</b>	Exclusive Economic Zone
<b>EHS</b>	Environmental Health and Safety
<b>ESHS</b>	Environmental, and Social Health & Safety
<b>ESCAP</b>	Economic and Social Council for Asia and Pacific
<b>ESZ</b>	Ecosensitive Zone
<b>EIA</b>	Environmental Impact Assessment
<b>ESIA</b>	Environmental Impact Assessment
<b>ESMF</b>	Environmental Management Framework

<b><i>Abbreviation</i></b>	<b><i>Expansion</i></b>
<b>ESMP</b>	Environmental Management Plan
<b>ENCORE</b>	Enhancing Coastal and Ocean Resource Efficiency
<b>ESA</b>	Environmentally Sensitive Areas
<b>ESAR</b>	Environmental and Social Assessment Report
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ESF</b>	Environmental and Social Framework
<b>ESMF</b>	Environmental and Social Management Framework
<b>ESR</b>	Environmental and Social Report
<b>ESSM</b>	Environmental and Social Safeguards Manager
<b>ESSO</b>	Earth System Sciences Organization
<b>ETP</b>	Effluent Treatment Plant
<b>FAR</b>	Floor Area Ratio
<b>FAQ</b>	Frequently Asked Questions
<b>FGD</b>	Focus Group Discussions
<b>FSI</b>	Floor Space Index
<b>GDP</b>	Gross Domestic Product
<b>GEF</b>	Global Environment Facility
<b>GEO</b>	Geospatial Sciences
<b>GHG</b>	Greenhouse Gas
<b>GIIP</b>	Good International Industry Practice
<b>GIS</b>	Geographic Information System
<b>GoI</b>	Government of India
<b>GRC</b>	Grievance Redressal Committee
<b>HL</b>	Hazard Line
<b>HR</b>	Human Resources
<b>HTL</b>	High Tide Line
<b>ICB</b>	International Competitive Bidding
<b>ICMOD</b>	International Centre for Integrated Mountain Development
<b>ICRZ</b>	Island Coastal Regulation Zone
<b>ICZMP</b>	Integrated Coastal Zone Management Plan
<b>IDU</b>	Internal Documents Unit (The World Bank)
<b>IEC</b>	Information Education Communication
<b>IFC</b>	International Finance Corporation
<b>IIMP</b>	Integrated Islands Management Plans
<b>INCCA</b>	Indian Network for Climate Change Assessment
<b>INCOIS</b>	Indian National Centre for Ocean Information Services
<b>IP</b>	Indigenous People
<b>IPF</b>	Investment Project financing
<b>IPPF</b>	Indigenous People Policy Framework
<b>IPZ</b>	Island Protection Zone
<b>ISR</b>	Initial Screening Report
<b>ITEWS</b>	Indian Tsunami Early Warning System
<b>IT</b>	Island Territories
<b>IUCN</b>	International Union for Conservation of Nature
<b>KGP</b>	Knowledge, Governance and Policy

<b><i>Abbreviation</i></b>	<b><i>Expansion</i></b>
<b>LB</b>	Local Body (Urban or Rural)
<b>LTL</b>	Low Tide Line
<b>LULC</b>	Landuse and Land Classification
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MA</b>	Multilateral Agencies
<b>MADA</b>	Modified Area Development Approach
<b>MoEFCC</b>	Ministry of Environment, Forests and Climate Change
<b>MPA</b>	Multi-phase Programmatic Approach
<b>NCB</b>	National Competitive Bidding
<b>NCSCM</b>	National Centre for sustainable Coastal Management
<b>NCZMA</b>	National Coastal Zone Management Authority
<b>NDZ</b>	No Development Zone
<b>NEP</b>	National Environmental Policy
<b>NGO</b>	Non-Governmental Organization
<b>NIOT</b>	National Institute of Ocean Technology
<b>NMA</b>	National Monuments Authority
<b>NOC</b>	No Objection Certificate
<b>NPD</b>	National Project Director
<b>NPDM</b>	National Policy on Disaster Management
<b>NPMU</b>	National Project Management Unit
<b>O&amp;M</b>	Operations and Maintenance
<b>OD</b>	Operational Directives
<b>OHS</b>	Occupational Health and Safety
<b>OP</b>	Operational Policies
<b>PAF</b>	Project Affected Family
<b>PAP</b>	Project Affected Person
<b>PAP</b>	Program Action Plan
<b>PCB</b>	Pollution Control Board
<b>PCR</b>	Physical Cultural Resources
<b>PCRMP</b>	Physical Cultural Resources Management Plan
<b>PD</b>	Project Director
<b>PDO</b>	Program Development Outcome
<b>PEA</b>	Project implementation Agency
<b>PESA</b>	Panchayats (Extension to the Scheduled Areas) Act
<b>PMC</b>	Project Management Consultant
<b>PMU</b>	Project Management Unit
<b>POP</b>	Persistent Organic Pollutants
<b>PPP</b>	Public-Private Partnership
<b>PPR</b>	Preliminary Project Report
<b>PWD</b>	Public Works Department
<b>QA</b>	Quality Assurance
<b>RAP</b>	Resettlement Action Plan
<b>R&amp;R</b>	Resettlement and Rehabilitation
<b>RMP</b>	Risk Management Plan
<b>ROB</b>	Road Over Bridge



<b><i>Abbreviation</i></b>	<b><i>Expansion</i></b>
<b>RoHS</b>	Restriction of Hazardous Substances
<b>RoW</b>	Right of Way
<b>RP/RAP</b>	Resettlement Plan/ Resettlement Action Plan
<b>RTFCTLARR</b>	Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement
<b>RUB</b>	Road Under Bridge
<b>SACEP</b>	South Asia Cooperative Environment Program
<b>SAR</b>	Social Assessment Report
<b>SAARC</b>	South Asian Association for Regional Co-operation
<b>SAICM</b>	Strategic Approach to International Chemicals Management
<b>SCZMA</b>	State Coastal Zone Management Authority
<b>SDGs</b>	Sustainable Development Goals
<b>SEIAA</b>	State Environmental Impact Assessment Authority
<b>SESA</b>	Strategic Environmental and Social Assessment
<b>SEC</b>	Sensitive Environmental Components
<b>SHC</b>	Stakeholder Consultations
<b>SIA</b>	Social Impact Assessment
<b>SICOM</b>	Society of Integrated Coastal Management
<b>SoI</b>	Survey of India
<b>SPMU</b>	State Project Management Unit
<b>SSR</b>	Social Status Report
<b>STP</b>	Sewage Treatment Plant
<b>SWD</b>	Storm Water Drains
<b>SWM</b>	Solid Waste Management
<b>TA</b>	Technical Assistance
<b>ToR</b>	Terms of Reference
<b>TSP</b>	Tribal Sub Plan
<b>ULB</b>	Urban Local Body
<b>UNCED</b>	United Nations Conference on Environment and Development
<b>UNEP</b>	United Nations Environment Program
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>UT</b>	Union Territories (of the Government of India)
<b>WB</b>	The World Bank
<b>WLPA</b>	Wildlife Protection Act
<b>WTP</b>	Water Treatment Plant

# ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK: GUIDANCE MANUAL

## SECTION 01. INTRODUCTION TO THE GUIDANCE MANUAL

### 1.1 About ESMF for ENCORE Project

ENCORE aims to strengthen integrated coastal zone management in coastal States and Union Territories of India. The Project seeks to assist the Government of India (GoI) in enhancing coastal resource efficiency and resilience, by building collective capacity (including communities and decentralized governance) for adopting and implementing integrated coastal management approaches. Recognizing Integrated Coastal Zone Management (ICZM) as a continuous process rather than a one-off investment action, ENCORE will build upon and draw from the experience of the ongoing World Bank-supported Integrated Coastal Zone Management Project (ICZMP), including the linkages between coastal conservation, climate resilience, and poverty reduction.

The proposed financing mechanism of the World Bank (Investment Project Financing (IPF)) for the ENCORE Project requires the application of World Bank safeguard policies for the project.

ESMF<sup>1</sup> is an instrument that examines the issues and impacts associated when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. Depending on the nature and location, the project initiatives such as coastal protection measures, waste management, tourism infrastructure, livelihood support interventions, development of smart villages, etc. are likely to result in positive and negative impacts on the project area during their construction, operations and maintenance phases. These impacts would assume importance when the project locations are in proximity to sensitive areas. Hence, there is a need for systematic safeguards management with a pre-defined framework for risk mitigation. As the locations for all subprojects and activities are not finalized, in order to identify and manage associated environmental risks, it is required to prepare an ESMF for the project. The ESMF would also draw from the past experience of environmental safeguards management as part of the implementation of the earlier World Bank-funded ICZMP project in three Coastal States of Odisha, West Bengal, and Gujarat and thus mandates well-informed mitigation measures and procedures for effective environmental management and safeguards.

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<sup>1</sup>As per WB safeguard policy OP/BP 4.01 Environmental Assessment, an ESMF is an instrument that examines the issues and impacts associated when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. The ESMF sets out the principles, rules, guidelines and procedures to assess the environmental and social impacts. It contains measures and plans to reduce, mitigate and/or offset adverse impacts and enhance positive impacts, provisions for estimating and budgeting the costs of such measures, and information on the agency or agencies responsible for addressing project impacts.

ESMF is used as a safeguards instrument when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified. ESMF manages potential adverse impacts through a guide consisting of a set of methodologies, procedures, and measures to facilitate adequate environmental and social management (risk management and impacts) related to the works financed under the project and whose specific location is unknown or may change during project implementation.

Thus, the purpose of the ESMF is to describe a framework or a step-wise process for the management of the environmental issues including: (i) procedures for screening the environmental aspects related to the programs, (ii) identification of impacts, regulatory mechanisms and management/mitigation measures, (iii) details on the institutional roles and responsibilities for environmental management(including contract provisions and budget), (iii) strategy and plan for capacity building of key stakeholders, (iv) plan for monitoring the implementation of safeguards/mitigation measures, (v) strategy for public consultation.

## **1.2 Structure of the ESMF Report**

ESMF for ENCORE Program is presented in two Volumes; Volume I and Volume II. The structure of the document is as follows:

### **Volume I**

- Chapter 1 is the Introductory Chapter; describing ENCORE Program, its components and the need for a framework approach for environmental and social management,
- Chapter 2 presents the detailed Baseline and Assessment of Environmental and Social characteristics of coastal India; the program region,
- Chapter 3 presents the Regulatory Framework for the project; including National, State and local level regulations and policies in addition to applicable World Bank Safeguard policies,
- Chapter 4 is the Assessment of Probable Impacts due to Subprojects,
- Chapter 5 presents the ESMF for this project, proposed screening framework for categorization of projects, process for carrying out subproject environmental assessment, and preparation of ESMPs and monitoring plan,
- Chapter 6 presents the Resettlement Policy Framework,
- Chapter 7 presents the Indigenous Peoples Planning Framework which would be applicable in case of subprojects in locations with the presence of Indigenous Population,
- Chapter 8 is the Gender Action Plan for the project,
- Chapter 9 presents the Labor Management Framework,
- Chapter 10 identifies the institutional mechanism and its budgetary requirements for implementing the ESMF, and

Chapter 11 details out the Grievance Redress Mechanism, Consultations and Information Disclosure for ESMF and Subprojects.

## **Volume II**

- a) Documentation formats to be used for screening of projects
- b) Sample terms of references, for Impact Assessment and Specialists to manage ESMF and for auditing compliance to ESMF
- c) Guidance materials for licenses, permits, clearances under various regulations, site selection, public consultation and consensus, indicative environmental and social Management plans and monitoring plans for typical types of projects, grievance management. It also presents a comprehensive set of Environmental Codes of Practices for guiding various project types.

**This Report is the Volume II of ESMF for ENCORE Program.**

### **1.3 Layout of Volume II: The Guidance Manual**

- Section 1: presents the introduction to this Volume II of ESMF and its Layout
- Section 2: presents the Documentation Formats
- Section 3: presents Sample Terms of References,
- Section 4: presents Guidance for subprojects.

**SECTION 02.****DOCUMENTATION FORMATS****2.1 Environmental Screening Form**

**INITIAL ENVIRONMENTAL EXAMINATION**  
(to be prepared for each subproject)

Project Name :

Project Details in Brief :

Project location/s :

(City / Town/ Village with ward numbers)

Project Details		
Sl.no	Components	Details
1	Project components	
2	Details of Alignment / Components (main components including construction activities, environmental infrastructure like STP/ETP and pipelines, waste disposal mechanism)	
3	Location of the Project Sites & Current Landuse (Provide information for all sites involved in the project), any historic landuse (related to heritage, or contamination)  Site Survey No:/s (with ownership), Geographical co-ordinates of the site location [including any off-site sub components [attach map] Also mention disaster zones? (Earthquake, Cyclone etc.)	
4	Coastal Regulation Zone (as per CRZ 2019 notification)	

***Proposed Resource Use***

Resource Use				
Sl.no	Proposed Resources	Area/ Quantity	Unit	Details
(i).	Land Area proposed to be used: Location wise (in sq km / sq m)			

	Also, provide area of land proposed to be used in various CRZ zones			
(ii).	Estimated energy consumption for the project activities – Source wise			
(iii).	Estimated usage of water quantity for the project: Ground Water and Surface water?			

### ***Baseline Environmental Conditions***

Sl.no	Environmental Aspects	Yes	No	Details
1	Is the project site located <b>on</b> or <b>adjacent to</b> any of the following (Provide information for all sites and alignment of the project components/subcomponents, associated activities; mention distance to these features in meters/kilometers)			
i)	Critically Vulnerable Coastal Areas (CVCAs), Eco-sensitive Areas (ESAs)			
ii)	Cultural Heritage site, Protected monuments- listed by ASI/State			
iii)	Natural Forests / Protected Areas / Bio-Reserves Is the sub project in an eco-sensitive or adjoining an eco-sensitive area, with any schedule 1 species? If Yes, which is the area?			
iv)	Other Wetlands/ Mangrove/ Estuarine Region			
v)	Natural Habitat areas, areas with natural features like waterfalls, sacred groves			
vi)	Other Sensitive Environmental Components listed in ESMF			
vii)	Residences, schools, hospitals, sensitive receptors			
viii)	Culturally – socially important paths, areas/religious occupancies, burial grounds, tourist or pilgrim congregation areas, borders etc			
ix)	Drinking water source, upstream and downstream uses of rivers etc			
x)	Low-lying areas prone to flooding/areas of Tidal Influence (provide CRZ details)			
xi)	Areas affected by other disasters			

Sl.no	Environmental Aspects	Yes	No	Details
2	Is the site in Critical / Over Exploited Ground Water Block			
3	Is the area disaster-prone? If yes; list all disaster zone categories applicable			
4	Describe the soil and vegetation on site			
5	Is the site area and condition suitable for proposed development?			
6	Existing pollution or degradation on site			
7	Any other remark on baseline condition			

***Anticipated Environmental Impacts:***

***Impacts on Land, Geology and Soils***

Sl.no	Impacts	Yes/ May create	No	Details
8.	Will the proposed project cause the following on Land / Soil:			
i)	Impact on Surrounding Environmental Conditions including Occupation on Low lying lands/flood plains			
ii)	Substantial removal of Top Soil (mention area in sqm)			
iii)	Any degradation of land / eco-systems expected due to the project?			
iv)	Loss or impacts on Cultural/heritage properties			
v)	Does the project activity involve cutting and filling/ blasting etc?			
vi)	Will the project cause physical changes in the project area (e.g., changes to the topography) due to excavation, earthwork or any other activity?			
vii)	Will the project involve any quarrying/ mining etc?			
viii)	Will the project / any of its component contaminate or pollute the Land?			

Sl.no	Impacts	Yes/ May create	No	Details
ix)	Will the project contribute to any long-term significant adverse (negative), large scale, irreversible, sensitive impact at a regional scale or area broader than the project sites?			

### ***Impacts on Water Environment***

Sl.no	Impacts	Yes/ May Create	No	Details
9	Will the subproject or its components cause any of the following impact on Water sources: Quantity or Quality:			
i)	Will this sub-project involve the creation/use of water storage structures in any way? Is this structure above 15m height?			Reject if Yes
ii)	Is the performance of the proposed water supply scheme dependent on the performance of an existing dam (above 15m height)?			
iii)	Will the activities proposed at the site(s) impact water quality (surface or ground) and water resource availability and use? Will this sub-project involve the dredging of water bodies, sea, canals, etc.			
iv)	Impacts on Water Resources			
v)	Pollution of Water bodies/ground water nearby or downstream			
vi)	Will the project affect the River flow pattern, stream pattern or any other irrigation canal?			
vii)	Will the project result in Stagnation of water flow or pondage or weed growth			

### ***Impacts on Biodiversity and Host Communities***

Sl.no	Environmental Impacts	Yes/ May Create	No	Details
10	Will the subproject or its components cause any of the following impacts on Biodiversity or the neighborhood			
i)	Will the project necessitates cutting of Trees / Loss of Vegetation			



Sl.no	Environmental Impacts	Yes/ May Create	No	Details
ii)	Will the project result in Health & Safety Risks in the neighborhood including the release of toxic gases, accident risks			
iii)	Potential risk of habitat fragmentation due to the clearing activities? (eg. Hindrance to the local biodiversity like disturbing the migratory path of animals/ birds etc.)			
iv)	Potential Noise and Light Pollution or disturbance to surrounding habitats/communities			
v)	Potential disruption to common property, accessibility, traffic disruptions, conflicts or disruption to the local community within the subproject area?			

***Impacts due to Storage and Wastes: Pollution and Hazards***

	Type	Yes	No	Details
11	Will the subproject or its components cause any impact due to storage of materials, wastes or pollution due to releases during various project activities			
i)	Will the project use or store dangerous substances (e.g., large quantities of hazardous chemicals/ materials like Chlorine, Diesel, Petroleum products; any other?			
ii)	Will the project produce solid or liquid wastes; including construction/demolition wastes (including dredging, de-weeding wastes, muck/silt, dust); polluted liquids?			
iii)	Will the project cause or increase air pollution or odor nuisance?			
iv)	Will the project generate or increase noise levels which will impact surrounding biodiversity or communities?			
v)	Will the project generate or increase visual blight or light pollution?			
vi)	Will the project generate water pollution (waterbodies/ groundwater)?			
vii)	Will the project involve dangerous construction activities which may be a			

	Type	Yes	No	Details
	safety concern to workers/ host communities			
viii)	Is there a potential for release of toxic gases or accident risks (eg: potential fire outbreaks)			
12	Describe any other features of the project that could influence the ambient environment			
13	Were the probable environmental impacts discussed with stakeholders?			

### *Suggested Environmental Enhancement Measures*

	Enhancement Measures	Yes	No	Details
14	Has the subproject design considered the following enhancement measures?			
i)	Energy conservation measures/ energy recovery options incorporated in subproject design			
ii)	Considered waste minimization or waste reuse/recycle options			
iii)	Rainwater harvesting, water recycling and other water resource enhancement measures			
iv)	Considerations for extreme events, drought, flood, other natural disasters			

### *Clearances and Permits Required*

	Type	Yes	No	Details
14	Will the subproject or its activities require and prior clearances such as the following:			
i)	Environmental Clearance (mention State / Centre)			
ii)	CRZ Clearance (mention State / Centre)			
iii)	Consent from SPCB for establishment and operation of STP/WTP			
iv)	NOC Forest Department for either the conversion of forest land or for tree-cutting			
v)	NOC for establishment of water supply intake			

	Type	Yes	No	Details
vi)	NOC for water withdrawal from surface water source			
vii)	Mining Permit (for dredging)			
viii)	Labor License and related			
ix)	Permit for Batching Plant			
x)	NOC for transportation and storage of diesel, oil and lubricants, etc.			
xi)	Others (Mention)			

This Screening sheet must be completed for each of the proposed sites by respective cities/towns and forwarded to the Environment Specialist in Respective SPMU along with the following enclosures.

**Enclosures:** Provide maps with the geographical location of the project; and an appropriately-scaled map clearly showing the project area and project sites with land use, existing buildings, infrastructure, vegetation, adjacent land use, utility lines, access roads and any planned construction, and any other information to describe the project, locations and possible impact as required.

***Project Categorisation and Need for Safeguards Instruments, Oversight***

<b>Project Category</b>	<input type="checkbox"/> <i>E1</i> <input type="checkbox"/> <i>E2</i> <input type="checkbox"/> <i>E3</i>
<b>Key Reasons</b>	
<b>Safeguards Instruments Required</b>	<input type="checkbox"/> <i>Detailed ESIA and ESMP</i> <input type="checkbox"/> <i>ESMP</i> <input type="checkbox"/> <i>Generic ESMP</i> <input type="checkbox"/> <i>Any other (describe)</i>
<b>Additional Responsibilities Expected</b> (such as i) Specialists to be hired for Physical/Cultural resources, Natural Habitats/others etc for ESIA preparation, and/or supervision), ii) Consultations, iii) any other aspect	

<b>Status</b>	<b>Agency / Official</b>	<b>Name, Signature with Date and Seal</b>
<b>Prepared by</b>	PEA / PIA	
	Environmental - in – charge	

<b>Checked and Categorised as ____ (E1, E2, E3) by</b>	SPMU	
	Environmental Specialist	
<b>Reviewed &amp; accepted by</b>	NPMU	
	Environmental Specialist	

## 2.2 Social Screening Form

### INITIAL SOCIAL EXAMINATION

(to be prepared by the borrower for each subproject)

Name of the Borrower :

Project location :

Project :

Land Use, Resettlement, and/or Land Acquisition				
Sl.no	Components	Yes	No	Details
1	Does the project involve acquisition of private land?			
2	Alienation of any type of Government land including that owned by Urban Local Body?			
3	Clearance of encroachment from Government/ Urban Local body Land?			
4	Clearance of squatters/hawkers from Government/ Urban Local Body Land?			
5	Number of structures, both authorized and/or unauthorized to be acquired/ cleared/			
6	Number of households to be displaced?			
7	Details of village common properties to be alienated Pasture Land (acres) Cremation/ burial ground and others specify?			
8	Describe existing land uses on and around the project area (e.g., community facilities, agriculture, tourism, private property)?			
9	Will the project result in construction workers or other people moving into or having access to the area (for a long-time period and in large numbers compared to permanent residents)?			
10	Are financial compensation measures expected to be needed?			
Loss of Crops, Fruit Trees, Household Infrastructure and livelihood				
Sl.no	Components	Yes	No	Details
11	Will the project result in the permanent or temporary loss of the following?			
11.1	Crops?			
11.2	Fruit trees/coconut palms? Specify with numbers			
11.3	Petty Shops/ Kiosks			
11.4	Vegetable/Fish/Meat vending			

11.5	Cycle repair shop			
11.6	Garage			
11.7	Tea stalls			
11.8	Grazing			
11.9	Loss of access to forest produce (NTFP)			
11.10	Any others - specify			
Welfare, Employment, and Gender				
Sl.no	Components	Yes	No	Details
12	Is the project likely to provide local employment opportunities, including employment opportunities for women?			
13	Is the project being planned with sufficient attention to local poverty alleviation objectives?			
14	Is the project being designed with sufficient local participation (including the participation of women) in the planning, design, and implementation process?			
Historical, Archaeological, or Cultural Heritage Sites				
Sl.no	Components	Yes	No	Details
Based on available sources, consultation with local authorities, local knowledge and/or observations, could the project alter:				
15	Historical heritage site(s) or require excavation near the same?			
16	Archaeological heritage site(s) or require excavation near the same?			
17	Cultural heritage site(s) or require excavation near the same?			
18	Graves, or sacred locations or require excavations near the same?			
Tribal Population/Indigenous People				
19	Does this project involve acquisition of any land belonging to Scheduled Tribes?			
Beneficiaries				
20	Population proposed to be benefitted by the proposed project			
21	No. of Females proposed to be benefitted by the proposed project			
22	Vulnerable households /population to be benefitted			
23	No. of BPL Families to be benefitted			

This Screening sheet must be completed for each of the proposed sites by respective cities/towns and forwarded to the Social Specialist in Respective SPMU along with the following enclosures.

(**Enclosures:** Land details for the project sites, location, survey numbers, extent available and required, land use classification, current use of the site, land ownership, alienation/acquisition status, FMB extracts, as required along with a certificate giving availability of sites required for the project by the borrower.)

***Project Categorisation and Need for Safeguards Instruments, Oversight***

<b>Project Category</b>	<input type="checkbox"/> <i>S1</i> <input type="checkbox"/> <i>S2</i> <input type="checkbox"/> <i>S3</i>
<b>Key Reasons</b>	
<b>Safeguards Instruments Required</b>	<input type="checkbox"/> <i>Detailed ESIA and ESMP</i> <input type="checkbox"/> <i>ESMP</i> <input type="checkbox"/> <i>Generic ESMP</i> <input type="checkbox"/> <i>Any other (describe)</i>
<b>Additional Responsibilities Expected</b> (such as i) Specialists to be hired for Physical/Cultural resources, Natural Habitats/others etc for ESIA preparation, and/or supervision), ii) Consultations, iii) any other aspect	

<b>Status</b>	<b>Agency / Official</b>	<b>Name, Signature with Date and Seal</b>
<b>Prepared by</b>	PEA	
	Social Expert / in – charge	
<b>Checked and Categorised as ____ (S1, S2, S3) by</b>	SPMU	
	Social Specialist	
<b>Reviewed &amp; accepted by</b>	NPMU	
	Social Specialist	

## 2.3 ESMF Compliance Documentation Forms

### 1) Model Format For Preparation of ESMF Compliance Report (for Management of Environmental and Social / R&R issues)

- The objective of these guidelines is to assist the PEA or the borrower in preparing the project compliance report, the clearly documents the Environmental and social issues encountered in the sub-project and the compliance of the EAR and SAR recommendations.
- The sub-project compliance report shall have an exclusive section on Environmental and Social / R&R issues of the projects and provide the following information.

<b>Project Name :</b>				<b>Loan / Disbursement No :</b>	
<b>Borrower / State/UT</b>				<b>PMC Consultant :</b>	
<b>Environmental and Social Issues Encountered</b>	<b>Mitigation Measures</b>			<b>Residual Issues Any</b>	
A. Environmental Issues	As per EAR / SAR	Implemented	Cost in Rs.	Description	Responsibility
1.					
2.					
3.					
4.					
5.					
Issues not identified in EAR a. b.c.					
<b>B. Social Issues</b>					
1.					
2.					
3.					
4.					
5.					
Issues not Identified in SAR a. b. c.					
C. Status of the Regulatory Clearances	Obtained	Not Obtained	Remarks		
1.					
2.					



## 2) Format for Quarterly Reporting on ESMF Compliance Status

<i>Sl No:</i>	<i>Projects which will be financed during the Quarter</i>	<i>Status of Detailed Project Report (Ex: Final / Expecting Design Change)</i>	<i>E&amp;S Classification as per ESMF</i>	<i>Proposed Safeguard Instrument (Ex: Independent EIA, EIA by DPR Consultant, Generic ESMP)</i>	<i>Status of Stakeholder Consultations</i>	<i>Status of Approval of SG Instrument</i>	<i>Remarks (incl. issues/ probable delay in finalizing etc)</i>	<i>Next Steps</i>
1								
2								
3								
4								
5								
<b>Status of agreed Actions on Environmental and Social Safeguards</b>								
<b>1</b>	Action 1	Responsibility	Time Schedule	Status				
<b>2</b>	Action 1	Responsibility	Time Schedule	Status				

## 3) EHS Details for Reporting

(Fill blanks)

The project has reported \_\_ (**no:s**) Occupational Health and Safety (OHS) incidents since its start. Of these, \_\_ (**no:s**) are classified as SEVERE, \_\_ (**no:s**) as SERIOUS, and \_\_ (**no:s**) as INDICATIVE. All incidents are confirmed accounted through the SIRT. During this mission period, the Task Team checked with all PIUs and relevant contractors and consultants if any OHS incidents occurred, either reported or not yet reported. The mission found (**EITHER**) (i) no new incidents occurred during this supervision period, or (ii) \_\_ (**no:s**) incidents occurred (include classification, brief description of event and follow-up actions, and confirmation event was reported via SIRT – attach additional sheets if required).

Sample format:

Sl No	Project	Severe Incidents (No:s)	Serious Incidents (No:s)	Indicative Incidents (No:s)
1				
2				
3				
4				
5				
6				
7				

### 3.1 Terms of Reference for Preparing Environmental Impact Assessment Report for Category E1 Projects

#### ***Brief Introduction***

*A brief introduction to the project shall be provided in this section*

*A brief description of the project area / city and salient features of the city shall be presented in this section, such as geographic location, climate, rainfall, soil profile, wind direction, existing drainage system, need for the proposed project etc.*

#### ***The Project Objectives and Need***

A brief profile of the status of existing infrastructure in the project city with respect to the proposed project, service levels, problems & issues and salient features of the proposed project shall be discussed in this section along with the environmental implications of the proposed project by covering the following objectives.

- Establish the environmental baseline in the study area
- identify and assess the adverse environmental impacts, and provide requisite measures to address these impacts
- identify the opportunities for environmental enhancements in the project area and provide requisite guidance/plans in this regard
- Identify and assess the climate change-related aspects of the project
- Wherever relevant integrate the measures (mitigation and enhancement related) in the project planning and design;
- Develop appropriate management plans and codes of practices for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested.

The EA shall be carried out in line with the Government of India (GoI)'s regulations (including EIA Notification and CRZ Notification 2019), and to suit ESMF. The EA shall comprise filling the screening format, Environmental screening, Project EA, and the Environmental Management Plans (ESMPs) & Mitigation measures. The EA shall be carried out in a consultative manner through "Stakeholder Consultations", at various stages, with the affected communities, NGOs, selected government agencies and other stakeholders.

#### ***Scope of Work***

*The following are the tasks to be performed by the consultants while conducting Environmental Assessment for the project including nature, scale and magnitude of impacts that the project is likely to cause on the environment.*

#### ***Task 1 Project Overview***

A succinct description of the proposed project shall be provided covering: (a) status analysis of the baseline scenario and existing infrastructure (b) description of each of the proposed

components, activities and sub-activities. The task shall also bring out the rationale, the need for the proposed project and list out the various benefits of project implementation. As part of this activity, the consultant shall provide necessary maps to scale.

#### Task 2 Review of Earlier Studies

The consultants shall review various earlier studies such as feasibility and detailed project reports, etc., of the project and understand the project and various aspects associated with the same. This shall provide a base to formulate the environmental surveys necessary for the project and assessing the impacts of the same.

#### Task 3 Legislative and Regulatory Considerations

A review of the legal and regulatory provisions applicable for the project shall be carried out in this task. The objective of the review is to bring out the legal and policy issues to be addressed in the project at various stages of project development such as planning, design, execution and operation. In addition to the environmental laws such as EP Act, Water Act, Air Act, EIA notification, CRZ Notification 2019 etc., the consultants shall review applicable operational policies/directives of the EFA.

The review shall thus provide a complete list of regulatory formalities required for the project and various clearances required from different regulatory agencies including the State Pollution Control Board.

#### Task 4 Preparation of Environmental Profile

An environmental profile of the project influence area shall be prepared, based on appropriate primary & secondary surveys and field investigations. The objective of this profile is to establish existing environmental conditions of the project area, in terms of air, water, noise, soil and other environmental parameters, which should form the basis for the prediction of impacts due to proposed project activities. As part of this, the environmentally sensitive land uses (protected natural areas, areas of ecological value, sensitive receptors like schools, hospitals etc) would also be identified and plotted on a map to scale.

The extent and duration (at least one season for rapid assessment and the three seasons for full detailed assessment) of surveys shall be judiciously decided by the consultant as per requirements of the environmental regulations applicable in India and guidelines of international funding agencies. The profile prepared shall be adequate enough to predict the impacts of the project and shall cater to the requirements of obtaining necessary environmental clearances from the authorities.

The profile shall essentially include all physical, ecological and socio-economic components of the project environment and bring out the salient and sensitive features of the same. Important aspects such as reserve forests, national parks, major water bodies, structures of archaeological/historic importance, and other environmental resources (if any) shall be

identified and salient features of the same shall be presented.

In addition to the basic environmental profile, quality of water supplied by the present water supply system, potential points of cross contamination and health profile of the project area population shall also be brought out in detail through appropriate sampling surveys and field investigations.

***Detailed activities to be carried out under environmental assessment is given under section 4.0.***

#### ***Task 5 Determination of Potential Impacts***

Based on the environmental profile of the project area prepared above and the proposed project activities discussed under Activity 1, the consultants shall carry out environmental screening to determine the nature of impacts and level of Environmental Assessment to be carried out (Section 5.0 provides the details to be carried out).

- In case of a low or insignificant level of impacts, where an ESMP will suffice, the consultant shall review the recent versions of generic ESMPs available with TNUIFSL and carry out necessary changes to suit the project requirements.
- As part of screening, if medium to high impacts, requiring a detailed EA and standalone ESMP, the consultant shall carry out detailed impact analysis. The consultant shall predict environmental impacts of the project components, activities and sub-activities on various environmental attributes (bio, geo and physical) through appropriate analytical tools and techniques such as modeling techniques, overlays, etc. Significant or insignificant, permanent or temporary, reversible or irreversible, negative or positive impacts shall be categorized separately and presented for each phase of project development.
- Based on the outcome of the screening, if subsequent relevance to climate change is envisaged in the project implementation or during operation, then the consultants shall collect relevant information and appraise the climate change impact. The consultants shall identify the adaptation needs of the project, review for greenhouse gas reduction potential and identify necessary measures for implementation.

All identified impacts shall be summarised in an easily understandable format and the magnitude and significance of each impact shall be explained in detail.

An analysis of various project alternatives, including the 'Project' and 'No Project' scenario shall be brought out and impacts shall be analyzed for each scenario. Based on the above analysis the best alternative that causes minimum or no impact shall be recommended for implementation.

#### Task 6 Stakeholder Consultations

The consultants shall carry out consultations with experts, NGOs, Forest Department (if applicable) and other selected Government Agencies and other stakeholders to (a) collect baseline information, (b) obtain a better understanding of the potential impacts (c) appreciate the perspectives/concerns of the stakeholders, and (d) secure their active involvement during subsequent stages of the project as appropriate.

Consultations shall be preceded by a systematic stakeholder analysis, which would (a) identify the individual or stakeholder groups relevant to the project and to environmental issues, (b) include expert opinion and inputs, (c) determine the nature and scope of consultation with each type of stakeholders, and (d) determine the tools to be used in contacting and consulting each type of stakeholders. A systematic consultation plan with attendant schedules will be prepared for subsequent stages of project preparation as well as implementation and operation, as required. Where community consensus is required in respect of proposed mitigation measures for impacts on community assets including water bodies, places of worships etc., specific plan for modification/relocation etc have to be disclosed and consensus obtained.

#### Task 7 Development of an Environmental Management Plan / Determination of Mitigation measures

The consultants using outputs of the above tasks shall develop an implementable Environmental Management Plan (ESMP) for the project. Development of an Environmental Management Plan is detailed under Section 5.0 below

#### ***Methodology to be adopted***

##### **Environmental Screening**

1. Environmental screening shall be undertaken to identify the environmental hot spots along the project corridors, project relevance to climate change and determine the level of environmental analysis required for the EA. The consultant shall carry out a preliminary analysis to assess the nature, scale and magnitude of the impacts that the project is likely to cause on the environment. In case of significant environmental impacts encountered (may be applicable to the entire project/specific project interventions/specific locations), The consultants shall explore possible alternatives to the project and/or project components in a consultative manner. The deliverable at this stage will be the **Environmental Screening Report**.
2. The screening exercise shall be supported through secondary and primary information collection and, stakeholder consultations on the existing environment scenario. As part of the screening exercise the consultants shall:
  - Identify sensitive locations in the project area including regionally or nationally recognized environmental resources and sensitive receptors including manmade land uses and activity areas like hospitals, schools, etc.

- Establish baseline environmental quality with regard to air, water and noise at sensitive receptors.
  - List and map common property resources such as roadside trees; forests, large water bodies; and major physical cultural properties, etc.
  - Identify Human settlement, physical infrastructure and project activities that would result in severance.
3. The consultants shall also appraise the project in terms of substantial greenhouse gas reduction potential and substantial need of adaptation to possible climate change effects.

### **Project Environmental Assessment**

1. Existing Environment and Baseline Conditions: Baseline assessment shall be carried out based on the outcome of Environmental Screening carried out for the project. The baseline conditions shall be established through detailed primary level field surveys. At this stage, the consultants shall prepare detailed maps showing candidate sites for environmental improvements. The specific tasks under this include the following:

2. Data Collection: Data shall be collected on relevant physical, biological and socio-economic conditions to establish the current environmental status of the project area. The data collection should be undertaken to arrive at meaningful information that will facilitate the assessment of impacts and preparing a management plan. Broadly, the following form of the data categories shall be covered (the consultant is also encouraged to use professional judgment and local knowledge in defining other data requirements):

The current land uses at the proposed project site and the study area using maps plotted to appropriate scale, covering lakes/ponds and their uses, forests and its classification, ecologically sensitive areas (sanctuaries, national parks, wildlife corridors, identified areas of nesting, mangroves and / or of interest of migratory birds, etc.), prominent landmarks, sensitive receptors, community severance, village settlements, agricultural lands, pasture and barren lands, various categories of CRZ areas if any, etc.

Physical – Geology/hydrogeology, topography, soils, climate and meteorology (with emphasis on critical season considering water bodies and air quality), ambient air quality, surface and groundwater hydrology, existing sources of air emissions, existing water quality status of water bodies of importance.

3. Biological and Ecological assessment covering water bodies, fauna, flora, ecologically sensitive areas (perceived as well as officially listed).
4. Based on the outcome of the screening report, the consultants shall carry out additional air and noise quality monitoring, which in the future may depict the baseline conditions for ESMP monitoring.

Critical areas of environmental importance shall be identified as an output of the current environmental status of the project sites

5. Impact Prediction: The Consultant shall identify positive and negative impacts likely to result from the proposed project, interpreting “environmental” throughout the EA to include socio-economic impacts as well as impacts on the natural environment. All the project activities during pre-construction, construction and operation phases shall be

considered to assess the impacts. The impact assessment shall necessarily cover the “no action” alternative in the analysis. The consultants shall regularly interact with the technical and social team of the project to share the findings of the impact assessment. The assessment of environmental impacts shall necessarily cover (but not limited to) the following:

- (a) Impacts on the water bodies (including, but not limited to the impacts on water source proposed to be developed for the project in case of a water supply scheme)
- (b) Impacts on topography and surface drainage due to the proposed project activities in the project area,
- (c) Community and cultural severance identified through consultations
- (d) Expected impacts on the land use patterns at and around the proposed project facilities/components
- (e) Impact on ecologically sensitive features including spawning areas in creeks/estuarine areas, etc.
- (f) Detailed assessment of impacts on receiving water bodies (including source of water bodies and downstream impacts on riparian rights)
- (g) Assess the change of stream course due to diversion channels to construction intake structures and its impact on downstream users
- (h) Impact on Socio-economic aspects of the projects area
- (i) The noise and air quality-related impacts during the construction period on sensitive receptors shall be assessed
- (j) Impact on Trees, public utilities and other community structures, cross overs, etc to be assessed.
- (k) Any impacts that are irreversible and/or cannot be avoided or mitigated should be identified
- (l) The consideration of the aspects in terms of **climate change adaptation** (Climate Proofing) should ensure that the desired developmental impacts of the strategy or measure are not endangered despite the forecasted effects of climate change. Furthermore, the assessment should analyze whether the capacity for adaptation can be further increased in the framework of the strategy or measure. In this regard, the expected climate changes and their consequences for the strategy or measure will be analyzed. This includes both direct effects (e.g. more frequent flooding or drying out of water sources) and indirect effects of climate change. The analysis will also examine the longer targeted period of impacts beyond the formal period of the strategy or measure. On this basis, options will be developed and implemented to increase the capacity of the project to adapt.
- (m) The assessment and consideration of the potential for **greenhouse gas reduction** (Emission Saving) to avoid substantial greenhouse gas emissions. First, the expected development of greenhouse gases in the project area/sector will be assessed, followed by a review of the planned strategy or measures for their contribution to greenhouse gas emissions and if there are potentials for reducing greenhouse gas emissions. On

this basis, options to contribute to greenhouse gas reduction shall be developed, and if applicable taking into consideration the developmental impacts.

### **Environmental Management Plan**

The ESMP should suggest ways/options for mitigating the negative impacts of the project, the preventive measures necessary. Where required, ESMP shall include community consensus for the mitigation measures proposed. The ESMP shall identify the means/agency responsible for the implementation of the same and recommend a suitable monitoring mechanism for the ESMP. The ESMP shall be in the form of contract covenants and shall provide detailed cost estimates converted into BOQ items wherever necessary and applicable for implementation of the same. The consultant shall also recommend an appropriate institutional mechanism as per the requirements of ESMP.

The above-referred activity shall be applicable for Generic ESMPs as well as specific ESMPs developed as an outcome of detailed EAs.

The consultant shall prepare a detailed ESMP covering the measures to mitigate and/or minimize the negative impacts, including the implementation arrangement and a monitoring plan for the same with site-specific requirements. ESMP shall cover the following details:

- Management/Mitigatory / Enhancement measures:
  - a) For each of the significant negative impacts, the consultant should recommend measures to eliminate or mitigate the impact. In case it is not possible to mitigate an impact, the cost of damage shall be estimated and adequate compensatory measures shall be recommended.
  - b) Consultants shall recommend enhancement measures for incorporation in the design for attaining energy efficiency, reuse of treated water, control of water leakage, energy generation etc.
  - c) The cost (capital and recurring) of all the mitigation measures and the responsible parties for implementation should be clearly identified and shall be translated into BOQ items. Wherever possible the measures should be drafted as contract clauses, which can be incorporated in construction/operational phase agreements
  - d) The mitigatory measures should necessarily contain conceptual designs wherever necessary. Project interventions including civil works shall be planned to take into account climate change effects. (for example; buildings will be built above maximum probable tide levels, and designed to withstand high wind, storm surge and rising sea levels). The consultants should also specify neighborhood committees to supervise the effective implementation of the proposed mitigatory measures.
- Landscape plan: Wherever necessary, the Landscaping plan should be prepared considering the project area as a whole and shall meet project-specific requirements. Considering the nature of the project area, the EA should provide a conceptual landscape plan for all the project components while considering the special environmental and social needs.



- Budget Estimates: The ESMP budget estimates shall be prepared for each of the project component and the shall be integrated with the overall project cost estimates and the relevant costs shall be included in the BOQ provisions
- Monitoring Plan: The Consultant should specify the types of monitoring needed for potential environmental impacts during construction and operation. As in the case of the mitigation plan, requirements should be specific as to what is to be monitored, how and by whom along with reporting formats and recommendations if any Cost estimates are necessary and where monitoring reports are to be prepared, the recipient responsible for review and any corrective action should be identified. The monitoring plan should be supplemented with a detailed schedule of implementation of ESMP measures.
- Institutional Arrangement to Manage Environment Impacts Effectively: The consultants shall identify institutional/organizational needs to implement the recommendations of the project EA and to propose steps to strengthen or expand if required. This may extend to new agency functions, inter-sectoral arrangements, management procedures and training, staffing, operation and maintenance, training and budgeting.

### ***Public Disclosure***

The consultants are to provide support and assistance to the Client in meeting the disclosure requirements, which at the minimum shall meet the WB policy on public disclosure. The consultants will prepare a plan for in-country disclosure, specifying the timing and locations; translate the key documents, such as the EA Summary in local language; draft the newspaper announcements for disclosure, and help the client to place all the EA reports in the client's website.

The consultants shall prepare a non-technical EA Summary Report in both English and vernacular language for public disclosure.

### ***Inputs to be provided by the Client***

The client shall make available all relevant documents, reports in connection to the project area/study area and facilitate procurement of data to the consultants.

### ***Outputs and Estimated Time Schedule***

The study shall be completed within a period of \*\*\*\*\* months from date of contract and the schedule of deliverables shall be as specified below.

- |                    |   |
|--------------------|---|
| • Inception Report | within ** month of date of award of contract. Includes Initial Site Assessment  |
| • Interim Report   | within *** months of date of award of contract. Includes baseline parameters, environmental profile and analysis of the level of impacts, stakeholders' consultation.             |
| • Draft Report     | within *** months of date of award of contract<br>Includes detailed EA and/or site-specific ESMP Climate Assessment and Adaptation and Mitigation measures and Social Assessment. |
| • Final report     | within *** months of date of award of contract  |

***Procedure for review of reports***

The review committee will review the reports and offer its comments, decisions/ suggestions. The comments or views on the various reports shall be given to the consultants within 7 days of review of the respective reports/documents/designs. Commensurate to this, a revised report shall be prepared, which will be reviewed in the next review meeting.

***List of key professional positions whose CV and experience would be evaluated***

<b><i>Sl. No.</i></b>	<b><i>Key Professional</i></b>	<b><i>No: of Persons</i></b>	<b><i>Experience</i></b>
1.	Environmental Specialist	1	A post-graduate in Environmental Engineering/Environmental Science / Environmental Planning / Public Health Engineering with about 5 years' experience in preparation of Detailed Environmental, and Social Impact Assessment Reports for infrastructure projects. (Shall be NABET / MoEFCC accredited if the project require Environmental / CRZ Clearance)
2.	Infrastructure Specialist	1	A graduate in Civil Engineering with about 10 years' experience in the provision of respective infrastructure/facilities. (Shall be NABET / MoEFCC accredited if the project require Environmental / CRZ Clearance)
3	Biodiversity Specialist	1	Post Graduate in Biology / Biodiversity with experience working on projects in marine / coastal area (Shall be NABET / MoEFCC accredited if the project require Environmental / CRZ Clearance)
4	Consultation specialist	1	Post Graduate in Community Consultations with experience in EIA / SIA studies and consultations (Shall be NABET / MoEFCC accredited if the project require Environmental / CRZ Clearance)

### **3.2 Terms of Reference for Environmental Expert at SPMUs**

#### **Introduction**

ENCORE aims to strengthen integrated coastal zone management in all coastal States and Union Territories of India. The Project seeks to assist the Government of India (GoI) in enhancing coastal resource efficiency and resilience, by building collective capacity (including communities and decentralized governance) for adopting and implementing integrated coastal management approaches. Recognizing Integrated Coastal Zone Management (ICZM) as a continuous process rather than a one-off investment action, ENCORE will build upon and draw from the experience of the ongoing World Bank-supported Integrated Coastal Zone Management Project (ICZMP), including the linkages between coastal conservation, climate resilience, and poverty reduction.

*(State PMU to Provide a brief write up on Geographical Coverage of subprojects in respective State)*

#### **Activities under the Programme**

##### ***Proposed Project Components***

Project activities focus on (i) State/UTs Institutional Development for ICZM, (ii) Information and science for evidence-based decision-making, and (iii) Climate-Smart Growth of the Indian Coast, focusing on Sustainable Utilization of coastal land for economic growth, Revitalizing Coastal Resources & biodiversity for services, livelihoods and climate adaptation; Investment to support transformative approaches for coastal and green infrastructure; and Coastal ‘smart’ village conglomerates.

Exact locations of all project investment activities are not known at this stage. The Project investments are expected to enhance and support coastal resources, minimize coastal pollution and improve the livelihoods of coastal communities. It is envisaged that the project would lead to positive impacts, including marine and coastal conservation, pollution prevention and effective utilization of coastal resources, and promotion of sustainable coastal livelihoods. In addition, the project is expected to provide a scientific basis and an effective coastal management framework (including institutional capacity) for resource-efficient and integrated coastal management. Rather than ad-hoc placing and implementation of project investments in time and space without adequate planning considerations, the ICZM Plan which would be prepared as part of the project would set the stage for investments, with a scientific basis; considering the environmental, social and disaster-related sensitivities among others. The expected adverse environmental impacts and/or risks of temporary nature could be due to: (i) activities related to civil works which have potential to cause environmental pollution, and pose risks to health and safety, (ii) nature of coastal conservation / protection interventions which could have local impacts if the overall coastal dynamics are not considered, (iii) occupational and public safety risks for workers and the communities.

Project activities considered relate to improving the coastal environment; leveraging the concepts of resource efficiency. Investments proposed by the States/UTs include erosion protection through soft measures including mangrove afforestation / shelter beds, waste management in the villages and towns in the watersheds of major rivers leading to the polluted coastal stretches, pollution monitoring activities, preparation of ICZM Plans, institutional development and capacity building, integrated rice-fish rotational cultivation, embankment strengthening etc. The project investments or locations are not finalized yet. Considering the nature and spread of project activities, Safeguards Category is considered as “A” as per the World Bank’s Safeguards Policy OP 4.01 Environmental Assessment; and hence an ESMF will be prepared by the borrower and all subprojects under ENCORE will be implemented following the guidelines in the ESMF.

*(State PMU to add a brief write up / one para on Proposed Project Components)*

### **Objectives of engaging Environmental Expert / Specialist**

The Environmental Expert at the State Project Management Unit would manage all the environmental aspects associated with all subprojects in the State under the program; during all stages right from Project Planning, Designing, Implementation, Operation and Monitoring. All requisite inputs on environmental safeguards and good practices will be provided during the planning and design stages. Inputs to environmental screening of projects, environmental categorization of subprojects, provide guidance to consultants and Project executing agencies / Project Management Consultants on preparing Environmental Impact assessment (EIAs) / Environmental Management Plans (ESMPs), and review of the same will be conducted following the ESMF. The environmental expert will also supervise implementation of ESMF / EIAs during implementation, O&M and work closeout stages as per guidance in the ESMF / EIAs. Adequate training on environmental aspects and ESMF will be provided by the Environmental expert. Roles and responsibilities of Environmental expert are detailed below:

### **Roles and Responsibilities**

- ✚ Co-ordinate the Preparation of ESMF / EIAs / ESMPs
- ✚ Guide all other project agencies and stakeholders on environmental aspects of ESMF and its applicability to the subprojects in the State.
- ✚ Co-ordinate with National Project Management Unit/s, support agencies, Project Execution Agencies, PEAs, Government agencies, communities, other stakeholders, the World Bank on environmental aspects of all subprojects (as applicable), including permits /licenses/consents and clearances.
- ✚ Prepare and Disclose ESMF including guidelines for impact identification (for goods, works and consultancy contracts), project screening, broad mitigation plans, guidance to prepare detailed impact assessment for projects, training to implementing agencies and other stakeholders, supervision mechanisms, monitoring requirements, training/capacity building

needs, and budgetary provisions in contracts. This shall comply with all National / State regulations, local bylaws and guidance and World Bank Operational Policies and Safeguards requirements.

- ✚ Review the investment proposals (sub-projects) and ensure that environmental issues are properly addressed by development of a project-specific environmental analysis including (but not limited to) landuse, natural habitats, pest management, physical/cultural resources, forests, safety of dams, public consultations, and occupational health and safety
- ✚ Ensure full incorporation of environmental considerations / good practices in the preparation of ICZM Plans, studies, database creation, surveys and all project activities
- ✚ Oversee the preparation of EIA with ESMPs, Monitoring Plan and Training needs and inclusion of Environmental Management Plan and budget requirements in Contract documents so as to facilitate implementation of mitigation measures.
- ✚ Provide expert guidance to the beneficiaries in the preparation and successful implementation of the project environmental assessment instruments/documentation, including preparation of environmental impact/risk assessments and environmental management plans;
- ✚ Provide expert advice to the PMU team with regard to strategies and approaches to effectively and efficiently comply with relevant World Bank environmental safeguard operational policies and requirements
- ✚ Coordinate and share information with World Bank project staff and consultants providing environmental safeguard cross-support
- ✚ Carry out site supervision visits during implementation of sub-projects and of other activities related to the Project;
- ✚ Ensure that safeguards documents are prepared on time and disclosed well in time before start of works and that all required clearances / permits / licences are obtained for projects. This shall comply with all National / State regulations, local bylaws/ guidance and world Bank Safeguards requirements.
- ✚ Conduct / co-ordinate Stakeholder consultations and consensus building as outlined by the ESMF and required by National / State regulations and World Bank guidelines
- ✚ Manage the environmental consulting firms engaged for specific projects.
- ✚ Ensure contractor has environmental experts in their team, prepare and follow Contractors Environmental Management Plans (C-ESMP); as outlined in ESMF and maintain required permits / licenses / incident and grievance registers
- ✚ Monitor the fulfillment of the project-specific environmental requirements and environmental safeguards policies with respect to all project activities, in all direct and indirect contracts; ensure proper reporting by monitoring agencies at various levels (district/site), and maintain database and follow-up
- ✚ Assist and advise local bodies / PEAs from time to time in monitoring and managing contractors' activities that may have environmental impacts, if any. Conduct random audits for ESMF compliance during various project stages
- ✚ Develop, undertake and support training programs on Environmental monitoring and management arrangements developed in the Project;

- ✚ Report the status and progress of institutional arrangements and functioning of environmental arrangement along with any impacts that should be addressed. These should be reflected in the Project Progress Report to be submitted to the Project Director / Deputy Project Director.
- ✚ Ensure that environmental assessment is an integral part of the planning of all project supported schemes
- ✚ Ensure development/procurement and availability of IEC materials supporting the environmental management framework to selected LSGs, relevant functionaries and community institution partners.
- ✚ Ensure including the necessary activities related to the environmental safeguards, such as training, studies, etc. in the project procurement plan if relevant;
- ✚ Assist PMU/Municipalities / PEAs in operationalizing the methods, procedures, and systems for introduction of environment compliance practices into the existing systems of respective agencies;
- ✚ Ensure that all legal and regulatory provisions relevant to the environmental safeguards are satisfactorily met through the project processes.
- ✚ Facilitate the creation and documentation of experiences, lessons learned, case studies, success stories etc.

### **Reporting Requirements**

The Environment Expert will report to the Project Director / Deputy Project Director at the SPMU. She/he will effectively:

- ✚ Maintain full documentation of safeguards requirements and status of the same; for projects under different stages of planning and implementation,
- ✚ Submit report on random audits on ESMF Compliance during various project stages to the Project Director / Deputy Project Director of the SPMU,
- ✚ Prepare and submit monthly progress report containing the list of activities planned for the reporting period, progress towards the target and the result of targeted activities shall be furnished to Project Director / Deputy Project Director, which could be used for further reporting to the NPMU / the World Bank
- ✚ Carry out any other project-related tasks assigned by the Deputy Project Director / Project Director from time to time.

### **Duration of Project**

6 years (Phase I: 3 years)

### **Qualification**

- Master's Degree in Civil / Environmental Engineering, Environmental Planning / Natural Resources Management, Environmental Studies/ Environmental Sciences/ Ecology or related field

## Experience

- + The environmental expert must have at least 10 years of working experience of which 5 years in the field of environmental activities as consultant or working in an institution which deals with environmental concerns.
- + The environmental expert must be fully conversant with the National / State / Local regulatory requirements on environment and infrastructure provision and aware of the environmental rules and regulations of the World Bank and must have completed, or involved in the preparation of, environmental impact study of at least two infrastructure projects. The expert must have preferably demonstrated sound technical expertise in international good practices on environmental safeguards.
- + Work experience, especially in environment related activities for World Bank / ADB or other Multilateral Development Banks, will be an added advantage.
- + Proficiency in computer applications including MS office.
- + Excellent written and oral communication skills in English, and local language. Communication Skills in Hindi as well; will be desirable.
- + Ability to work efficiently and effectively in a multidisciplinary team. Good interpersonal skills and prior experience in efficient stakeholder consultations and consensus building in India would be an added advantage.

## Duty Headquarters

The duty headquarters of the Environment Expert will be at Project Management Unit, --- (***write Location***). The Expert will be required to travel frequently within and outside the State for project purposes.

## Duration

Appointment to the post will be on a contract basis initially for a period of one year and likely to be extended based on the performance. Engagement of Environment Expert will be on a full-time basis.

### 3.3 Terms of Reference for Social / Rural Development Specialist at SPMU

#### A. Project Background

*(SPMU to Provide Project Description here)*

#### B. The Social Context

1. The project is not just about managing the coastal resources but also the integration of the people in the communities that impact and depend on the resources in the coastal zone. The community/stakeholders have a significant impact on coastal resources through their day-to-day activities. They stand to lose the most if coastal resources are not managed in a sustainable manner, therefore their participation in the planning and implementation of coastal resource management efforts is critical. Coastal resource management is best accomplished by a participatory process of planning, implementing and monitoring sustainable uses of coastal resources through collective action and sound decision making. The current degraded conditions of many of the coastal areas, low levels of public awareness and the socio-economic situation of the coastal community's present challenges.
2. The coastal community faces a higher risk of poverty and social exclusion compared to the general population many of whom are vulnerable and marginalized. The inclusion of these vulnerable groups is one of the priorities of the project. The project design ensures wider participation of coastal community, stakeholder consultations for priority investments in the states and includes all categories specifically vulnerable groups. Outputs from the consultation process were integrated into the design where technically feasible. The priority investments of the project in all the three states also have a livelihood improvement focus in order to provide financial and social security to the local community. The beneficiaries will be selected based on need assessment and gender study. As part of the subproject preparation, gender sensitization and capacity building will be carried out. Gender-related baseline data will be collected which will help in identifying gender issues that need to be incorporated in the designs of priority investments and will also help in ensuring gender equity in resource allocation.
3. The project has adopted strategically designed social accountability mechanisms within the implementation and monitoring processes of its priority investments. The first and foremost determinant is the community participation and civic engagement in planning, implementation and monitoring of the priority investments in the three states. Communities will be engaged through stakeholder consultations in implementing the pilot investments, and in preparing ICZM plans. Additionally, civic oversight on project implementation will be ensured using tools such as social audits. SPMUs will appoint independent consultants from civil society, who can facilitate community participation/social audits, monitor project processes on a day-to-day basis to ensure that they include and address community concerns, and report findings to the concerned project execution authority.



### **C. Key Role and Responsibilities**

4. The key role of the specialist is as under:

- To ensure that potential social risks arising out of the project's support have been adequately addressed for each of the state-level priority investments by identifying the gaps if any and addressing the same.
- To ensure that the (i) consultation process at various levels includes all possible stakeholders as part of consultations and has access to the benefits and opportunities; (ii) key issues that has been identified and addressed in terms of socio-cultural, historical, institutional and political context; (iii) grievance redress mechanism is accessible, functional and useful to the aggrieved person.
- To ensure that the selection process of beneficiaries has been transparent and the intended goal has been achieved and project implementation secured positive social development outcomes and minimized the negative effects.

### **D. Scope of Work**

The Specialist will have the following scope of work:

5. Review the project documents to understand the rationale behind the interventions; the process adopted for the selection; choice of intervention and implementing agency; and feedback mechanism.
6. Finalize terms of reference for hiring agency for social assessment, social impact assessment and preparation of safeguard tools.
7. Assist SPMU/consultants in identifying stakeholders and draw up a stakeholder's table delineating the interest in terms of expectation, benefits, and ability to commit resources, goal conflicts, etc. Engage with all stakeholders and identify tailor-made activities that are relevant in the project area / region. Finalize stakeholder engagement plan for coastal zone management plan.
8. Advice SPMU on various national and state-level laws and regulations; relevant World Bank environmental safeguard operational policies and requirements that are applicable in the context of the project interventions related to land acquisition/land taking; vulnerable community such as women-headed households, tribal population; scheduled caste, etc. if any.
9. Help implement ESMF. Specifically, screen all proposed interventions to identify any adverse impact on the community, if any. In case of any adverse impact, suggest instruments (such as SIA, RAP, GAP, etc.) and measures to address adverse social impacts in line with project ESMF. Guide preparation of safeguard documents and disclose the same at SPMU level before the start of civil works.
10. Review the adequacy and impact of project interventions on livelihood enhancement opportunities and make suggestions accordingly. Ensure that social assessment is an integral part of the planning of all project supported schemes
11. Supervise implementation of social safeguard measures in project interventions and ensure that social development goals are met.

12. Liaise with various Central and concerned State Government agencies on land and other regulatory matters
13. Be part of grievance redress cell and review types of grievance and the functioning of grievance redress mechanisms by reviewing appeals at all levels and interviewing aggrieved PAPs.
14. Periodical updating of data on social issues including grievance redressal
15. Prepare periodical social monitoring reports to be submitted to SPMU and provide a summary of the same to the NPMU for necessary follow-up actions.
16. Prepare TOR for any activities or studies required and other social safeguard documents as and when required.
17. Facilitate appointment of and co-ordination with consultants/agencies to carry out activities or studies if required and co-ordinate them.
18. Develop, organize and deliver training/capacity building programs on social issues and plans for the staff of implementing agency, the contractors and others involved in the project implementation.
19. Carry out other responsibilities as required from time to time.

**E. Required Qualification:**

20. The candidate must hold a master's degree in social science (namely sociology; social anthropology; any other subject field) from a recognized university.
21. Should have at least 15 years of experience working independently as a social development specialist in large infrastructure projects in India.
22. Must have worked in at least two World Bank-funded large infrastructure projects
23. Must have experience of both national regulations as well as multi-lateral agency's policies related to land acquisition, resettlement and indigenous community. The candidate should also have experience of carrying out and managing community consultations; preparation and implementation of livelihood enhancement strategy and plans; working with rural and peri-urban communities, and managing large scale socio-economic databases.
24. The candidate should be willing to travel across the country

### **3.4 Terms of Reference for Environmental and Social Audit**

#### ***1. Background***

(Provide brief background of the ENCORE project)

To facilitate the process laid down within its ESMF, NPMU intends to appoint consultants to audit projects taken up under ENCORE.

#### ***2. Objectives***

- To audit the conformity of environmental and social categorization of projects with respect to the categorization prescribed in the ESMF.
- To audit the compliance of the environmental, climate and social aspects of approved projects, which are under implementation; and,
- Review and comment on how the recommendations of the previous audit have followed so far.

#### ***3. Scope of Work***

- To carry out environmental and social audit with respect to the subprojects taken up under this project
- The various departments involved in the implementation are .....The list of sub-projects to be audited is provided in the Annexure.

#### ***4. Outline of the tasks to be carried out:***

The selected Consultant will essentially provide services to NPMU as required, for the following tasks.

##### ***a) Audit the Environmental and Social Categorisation of Projects:***

The consultants will audit the conformity of the environmental and social categorization of projects based on the ESMF. The consultants will also review the adequacy of screening procedures to identify the possible issues; considerations of incorporating the social and environmental issues identified during the screening process into the engineering designs and action plans.

This audit will cover all the E1 category projects and 25 percent of the E2 projects (or E2 projects of special importance), and all those projects involving land acquisition and resettlement & rehabilitation.

##### ***b) Auditing the compliance of the Projects:***

The consultants will

- Cover the compliance aspects with reference to the agreed process at different stages of project development as well as the technical content of the EAs/ESMPs and RAPs/TSPs. Such an exercise shall include the effectiveness in translating the ESMPs into contract conditions and technical specifications.

- Critically review and report the compliance on Bank's recommendations during various supervision missions;
- Undertake field visits to ascertain actual level of compliance in implementing the ESMPs and RAPs;
- Audit and confirm that the payment of compensation and assistance has been paid in accordance with ESMF procedures wherever payment of compensation and assistance is involved for the projects affected people,
- Undertake field visits to interact with the beneficiaries on a sample basis to assess their levels of satisfaction with the process followed in delivering the entitlements;
- Review the process followed for redressing the grievances filed by the affected people with regard to compensation, R&R assistance or any other related complaints.
- Review and confirm that the disclosure of documents has been carried out in accordance with the established procedures; and,
- Review the internal monitoring followed by NPMU / SPMUs in managing the social and environmental impacts during the implementation of the sub-projects and suggest suitable measures for improving the process as needed.

The consultant will audit the compliance of environmental and social aspects during construction, operation and maintenance of projects approved under ENCORE, across all categories and different sub-project locations. The selection of sub-project shall be approved by NPMU before the commencement of the Audit. The audit will be carried out in the presence of the representatives of SPMUs/ Implementing Agencies.

***c) Adequacy of the ESMP/SMP***

The consultant will audit the adequacy of the ESMP/SMP and recommend practicable measures to include/improve the management measures and the agency responsible for carrying out the measures wherever found inadequate. The consultant will also document the best practices and possible environmental and social enhancement measures with respect to the audited projects. Apart from documenting the good practices, it shall discuss the deviations in following the ESMF and corrective measures (project level and in overall process).

***d) Reporting***

The consultant shall review the status report submitted by the SPMUs / Implementing Agencies on the implementation of ESMP / SMP and the process adopted by design consultants in identification and mitigation measures while preparing the DPRs. To report on the adequacy and timely submission of the Quarterly Progress Reports including the process involved in addressing the risk management.

***e) Documentation***

The consultant shall document the good practices and lessons learned with respect to Environmental and Social Safeguards implementation and management in the sub-projects.

***f) Preparation of Audit Report***

The findings of the review and audit should be summarized in a tabular form to include compliance, noncompliance, best practices and enhancement measures along with the name of the agency responsible for each of the above. This matrix should be provided as an attachment to the main report. In case of non-compliance, the consultants need to undertake a follow-up visit after giving sufficient time (depending on the type of corrective measures) for the agency responsible to take corrective actions.

***5. Data, services, and facilities to be provided by the Client:***

A copy of the ESMF and details of the projects sanctioned, Copy of ESIAs / RAP/TSP available, monitoring reports if any will be shared by the client.

***6. Composition of review committee to monitor consultants' work***

- 1.
- 2.
- 3.
- 4.
- 5.

The consultant would be required to submit \_\_copies of each of the reports besides providing a soft copy of all reports, etc. All the pages in reports shall be printed in duplex mode except for A3 pages.

***7. Procedure for review of reports:***

The review committee will review the progress of work during each stage of the assignment and as and when required. The decision/suggestion of the review committee will be communicated in the form of minutes, for taking action.

***8. Outputs, Payments and Time Schedule***

<b>Reports</b>	<b>Duration</b>	<b>Payment</b>
On submission and acceptance of Initial Report on Compliance	Within 3 weeks from the date of award of contract.	15 percent of the contract value
On submission and acceptance of the Draft Audit Report	Within 10 weeks from the date of award of contract	55 percent of the contract value

On submission and acceptance of Submission of Final Report	Within 12 weeks from the date of award of contract	30 percent of the contract value
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***9. List of key positions, whose CV and experience would be evaluated.***

<b>Sl. No</b>	<b>Key Professional</b>	<b>No. of persons</b>	<b>Experience</b>
1.	Environmental Specialist	1	Post Graduate in Environmental or Public Health Engineering, Environmental Planning/ Environmental Science with about 5 years of experience in preparation of EIA Reports, carrying out Environmental Audit, experience on Climate Change Adaptation and Mitigation etc.
2.	Social Development Specialist	1	Post Graduate in any of Social Sciences work with 5 years of experience preferably in social auditing, experience in land acquisition and resettlement issues in development projects

Necessary support staff as required shall be engaged by the consultant in order to achieve the objective of the assignment.

***Annexure: List of Sub-projects to be audited.***

### 3.5 Terms of Reference for Social Impact Assessment for S 1 category projects

This assignment is designed to assess the impact of the proposed ENCORE program and recommend a set of measures and criteria for managing impacts in the project area and its surroundings; as per the requirements of the Government of India and the World Bank, as applicable for the proposed program.

#### 1. Background:

ENCORE aims to strengthen integrated coastal zone management in all coastal States and Union Territories of India. The Project seeks to assist the Government of India (GoI) in enhancing coastal resource efficiency and resilience, by building collective capacity (including communities and decentralized governance) for adopting and implementing integrated coastal management approaches. Recognizing Integrated Coastal Zone Management (ICZM) as a continuous process rather than a one-off investment action, ENCORE will build upon and draw from the experience of the ongoing World Bank-supported Integrated Coastal Zone Management Project (ICZMP), including the linkages between coastal conservation, climate resilience, and poverty reduction.

*(Please add geographical spread in each of the state)*

#### 2. Objective:

The key objective of this study is to conduct Social Impact Assessment (ESIA) with a view to identify the critical social concerns and address them as an integral part of project design.

##### **The specific objective includes:**

- To assess the existing socio-economic and cultural status in the study area and to identify threats and issues which have the potential to adversely impact social features in the project area.
- Carry out social analysis of project area and potential activities envisaged under the project.
- Identification of the project affected families; assessment of loss of livelihood/property resources for people living within the proposed site and in its immediate vicinity through primary census surveys covering all project affected families/ consultations.
- Assess impacts on the indigenous/marginalized communities within the site and its influence area.
- Develop a social exclusion list that needs to be followed during planning and construction.
- To undertake consultations with potentially affected people to understand their views, obtain their input regarding social issues, and to take these into account during the preparation of the management framework and plans that would be executed.

### 3. Scope of the SIA

The Social Impact Assessment (SIA) study (and the report) will specifically cover the following:

- **Defining the Project/Project Description:** Providing a Project description with a focus on understanding the social setting and sensitivities for the proposed project, including an overview of the land acquisition/lease/purchase process and resettlement requirements and its impacts on indigenous peoples and other marginalized families, if any.
- **Laying down Policy, legal, and administrative framework:** Discussing the policy, legal and administrative framework within which the assessment is carried out, national and state-specific regulations, and The World Bank's Operational Policies. Reviewing the Social compliance requirement with respect to the above; present an overview of *Government of India's and State Government's social policies, legislations, regulatory and administrative frameworks* in conjunction with the World Bank's safeguard policies. Where gaps exist between these policies, make recommendations to bridge the gaps in the context of the proposed project.
- **Generating Data for Social Assessment:** Collection and generation of relevant social data (primary & secondary) within the study area. This data should be relevant to decisions about project location, design, construction, or mitigation measures.

The data generation should specifically focus on issues related to

- **Socio-economic profile** in terms of demographic characteristics, land use pattern, economic profile, occupational pattern and other socio-economic parameters.
- Identify and **analyze the issues of vulnerable communities and gender**
- Land, access requirements, land use, and involuntary resettlement, if any
- Assess the likely impacts of the sub-project, in terms of land taking (loss of lands, houses, livelihood, etc.), and resultant involuntary resettlement, if any and undertake the census of potential project affected people;
- Based on the assessment of potential social and economic impacts, the SIA should establish criteria that will assist in the formulation of strategies; to the extent possible maximize project benefits to the local population and minimize adverse impacts of the project interventions on the affected communities;
- The consultants would study the living patterns of a vulnerable population (including tribal, scheduled castes, women, landless, households below the poverty line, etc.) in the project area and assess whether they are involved in the community decision making process. If the findings reveal that certain groups are excluded in the development process, then the consultants should develop a strategy for their inclusion in project development and operation as well as in preparing a social risk management plan.
- Identify likely loss of community assets including the religious structures and common property resources (e.g. forest, grazing land, drinking water source, etc); the impacts of their loss on the local population, and prepare mitigation plans
- Physical or cultural heritage (if any)



- **Information Disclosure, Consultation and Participation:** Describe the consultation and participation mechanisms adopted, including the activities undertaken to disseminate project and resettlement information during project design and engaging stakeholders. The results of consultations with affected persons, the host communities, civil society organizations and other stakeholders to be summarized along with measures to address their concerns.
- **Conduct stakeholders' consultation** that ensures that all key stakeholders are aware of the objectives and potential social impacts of the proposed project and that their views are incorporated into the projects' design as appropriate. Stakeholders' will include all those who are directly or indirectly dependent on the project site(s). **Therefore, identify the key stakeholders** (Government, NGOs, CSOs, Academicians, etc.) in the project area; analyze their perspectives of the project. The analysis shall be carried out for both primary and secondary stakeholders at project level through structured discussions on the (a) importance of addressing social issues (b) impressions of past efforts, if any (c) suggestions for what to do differently in future (d) key issues (goals and safeguards) to be addressed; and (e) issues of co-ordination and / or conflict among various stakeholders. The analysis shall be summarized in a structured manner and shall clearly bring out the implications for project design.
- **Mitigation Measures:** Assessing the social impacts (both positive and negative), with potential assessment of cumulative impacts, if relevant and as appropriate. Identify mitigation measures and any residual negative impacts that cannot be mitigated. The mitigation measures shall be presented in the form of RAP / TPP as applicable, which shall include but not limited to:
  - Labour working conditions
  - Construction labor management
  - R&R entitlement framework in consultation with the affected people and other stakeholders and prepare a resettlement action plan (RAP) or social management plan (SMP) which is acceptable to the project affected people;
  - Description of the entitlements for various categories of impacts, mitigation measures to address livelihood impacts, etc.
  - Interventions needed for skill development and overall social upliftment of the communities in the project influence area
  - To develop a consultation framework for participatory planning and implementation of the proposed mitigation plan;
  - Capacity assessment of institutions and mechanisms for implementing social development aspects of the project implementation including the social safeguard plans and recommend capacity-building measures; and,
  - Monitoring and evaluation mechanism to assess social development outcomes
  - Gender action Plan and Tribal Peoples Plan (if required)
- **Analyzing the Alternatives:** Comparing reasonable alternatives to the proposed project site, technology, design, and operation in terms of their potential social impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local

conditions; and their institutional, training, and monitoring requirements. It would also state the basis for selecting the particular site and project design.

- **Grievance Redress Mechanism:** Description of the community grievance redress framework/mechanism (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental and social performance.
- **Conclusion and Recommendation** - Providing conclusions drawn from the assessment and providing recommendations.

#### 4. OUTPUTS

The following outputs are expected during the course of the assignment

Report Title	Printed Copies	Time Frame from start of assignment
Inception report	2	3 weeks
Draft SIA and Consultations Report	3	12 <sup>th</sup> week
Final SIA and Consultations Report	3	2 weeks after receiving comments

#### 5. EXPERTISE needed

The following indicative expertise is suggested for the assignment. The consultant is expected, however, to undertake their own assessment and propose their best team to successfully deliver the above scope of work.

Sl. No.	Expertise	Qualification	Input required
1	Social Development Expert	<ul style="list-style-type: none"> <li>• A post-graduate/doctoral degree holder in Social Sciences, or a related field with at least 15 years of undertaking (E)SIA studies, preferably for development projects, with funding support from multilateral agencies like World Bank</li> <li>• S/he should have experience of organizing consultations with potentially affected persons</li> <li>• Familiarity with the relevant regulations of GOI and participating state would be an advantage</li> </ul>	14 weeks
2	Community Consultation Expert	<ul style="list-style-type: none"> <li>• A post-graduate/doctoral degree holder in Social Sciences, or a related field with at least 15 years of organizing and undertaking consultations with community at large and potentially affected persons</li> <li>• Experience of working with multilateral agencies like World Bank</li> <li>• Familiarity with the local language</li> </ul>	6 weeks

## **SIA OUTLINE FOR S-1 CATEGORY PROJECTS**

### **Executive Summary**

- Provide an outline of the magnitude of potential impacts, significant findings of census and socio-economic survey and provide a brief account of proposed mitigation measures including the timetable, budget and its sources and institutional arrangements for implementation.

### **Introduction about the project**

- Brief introduction about the project and its location
- Description of project components causing land acquisition and resettlement. Overall estimates of land acquisition and resettlement

### **Minimizing resettlement**

- Describe alternatives considered for minimizing resettlement
- Describe the mechanism to minimize resettlement to the extent possible, during project implementation

### **Objective**

- Objectives of the resettlement plan

### **Census and socio-economic surveys**

- Identify all categories of impacts (loss of land and assets; loss of livelihood; impacts on groups and communities)
- Socio-economic characteristics of the PAPs
- Magnitude of impact
- Details of vulnerable group
- Provision to update information on the PAPs
- Inventory of common property resources to which PAPs have access
- Details of common property resources that will be affected
- Details of community organization
- Summarize process for consultations on the results of the census surveys
- Describe need and mechanism to conduct updates, if necessary

### **Legal framework**

- Describe the legal and administrative procedures adopted

### **Resettlement policies and framework**

- Describe the policy and approach in ESMF
- Describe eligibility criteria and cut-off date
- Describe the method of valuation used for affected structures, land, trees and other assets

- Describe entitlements category wise
- Provide entitlement matrix

### **Resettlement sites (if any)**

- Does the project need residential/commercial (small businesses) relocation sites? Have these been identified in consultation with the PAPs and Hosts?
- Give layouts and designs of residential sites
- Describe the specific process of showing the sites to the PAPs and obtaining their opinion on them.
- Describe the technical and feasibility studies conducted to determine the suitability of the proposed sites.
- Is the land quality/area adequate for allocation to all of the PAPs eligible for allocation of agricultural land, under land for land option?
- Describe mechanisms for (i) procuring, (ii) developing and (iii) allotting resettlement sites
- Provide a detailed description of the arrangements for site development for agriculture, including funding of development costs.
- Provide time table for relocation
- Provide details of services requiring augmentation in host communities and how it would be addressed

### **Institutional arrangements**

- Identify and discuss the institutions responsible for the delivery of each item/activity in the entitlement policy
- Describe the project resettlement unit -- functions and organizational structure of the unit and coordination relationship
- State how coordination issues will be addressed in cases where resettlement is spread over a number of jurisdictions.
- Identify who will coordinate all agencies -- with the necessary mandate.
- State when the project resettlement unit will be staffed and appointment of NGOs, to assist in project implementation, will take place
- Describe plans for training and development of staff in the resettlement unit/local agencies / NGOs.
- Discuss initiatives taken to improve the long term capacity or resettlement institutions

### **Income restoration**

- Briefly spell out three main income restoration strategies for each category of impacts, and describe the institutional, financial and technical aspects
- Describe the process of consultation with project affected persons (PAPs) to finalize strategies for income restoration.
- How do these strategies vary with the area/locality of impact?

- Are the compensation entitlements sufficient to restore income streams for each category of impact? What additional economic rehabilitation measures are necessary?
- Does income restoration require change in livelihoods, development of alternative farmlands, etc., or involve some other activities which require a substantial amount of time for preparation and implementation?
- How are the risks of impoverishment proposed to be addressed?
- Are choices and options built into the entitlements? If so, what is the mechanism for risk and benefit analysis of each option? What is the process of ensuring that PAPs have knowledge about alternatives and can make informed decisions? Is there a mechanism to encourage vulnerable groups among PAPs to choose lower-risk options, such as support in kind rather than cash?
- What are the main institutional and other measures taken for the smooth implementation of the resettlement programs?

### **Implementation schedule**

- List and briefly describe the chronological steps in implementation of the resettlement, including identification of agencies responsible for each step of the program
- Prepare a month-wise implementation schedule of activities to be undertaken as part of the resettlement implementation (Gantt chart).
- Describe the linkages between resettlement implementation and initiation of civil works for each of the project components.

### **Costs and budgets**

- Clear statement of financial responsibility and authority.
- Ensure that the cost of resettlement is included in the overall project costs.
- Identify components, if any, to be funded by the Bank.
- Resettlement costs should be a part of annual involvement plans.
- Prepare a cost-wise, item-wise budget estimate for the entire duration of resettlement implementation, including administrative expense, monitoring and evaluation and contingencies.
- List the sources of funds and describe the flow of funds.
- Describe the specific mechanisms to adjust cost estimates by the inflation factor.
- Describe provisions to account for physical and price contingencies.

### **Participation and consultation**

- Describe the process of consultation/participation in resettlement preparation and planning.
- Describe the various stakeholders.
- Describe the plan for disseminating information to project affected persons (PAPs), such as provisions for a booklet to inform PAPs and other stakeholders.
- Describe examples of outcomes of participation and consultation, such as how local beneficiaries' views have influenced the design process, entitlements and support mechanisms, or other issues.

- Have workshops been conducted, or are they planned? Who are the participants, and what are the expected outcomes?

### **Grievance redressal**

- Describe the step-by-step process for registering and addressing grievances.
- Provide specific details regarding registering complaints, response time, communication modes, etc.
- Describe the mechanism for appeal.
- Describe the provisions to approach civil courts in case other provisions fail.

### **Monitoring and evaluation**

- Describe the internal monitoring process
- Define key monitoring indicators. Provide a list of monitoring indicators that would be used for internal monitoring.
- Describe institutional (including financial) arrangements.
- Describe the frequency of reporting and content for internal monitoring.
- Describe the process for integrating feedback from internal monitoring into implementation.
- Describe financial arrangements for external monitoring and evaluation, including the process for awarding and maintenance of contracts for the duration of resettlement.
- Describe the methodology for external monitoring.
- Define key indicators for external monitoring, focusing on outputs and impact.
- Describe the frequency of reporting and content for external monitoring.
- Describe the process for integrating feedback from external monitoring into implementation.

## **SECTION 04. GUIDELINES ON CONSULTATION AND CONSENSUS PROCESSES**

### **4.1 Guidelines for Public Consultation and Consensus Process**

Public consultation shall be carried out at various stages of the project preparation. As part of the environment and social assessment consultations will be held by appropriate instruments including focus group meetings, stakeholder consultations, etc. Specific consultations will be held around the sites proposed for different facilities to seek the resident's support for those sites. The outcome of consultations will be incorporated as appropriate in the designs and mitigation plans. As part of such consultations, the draft Mitigation Plans will also be presented and explained to the people on the content and process of the implementation of the plans. For all the projects prepared by other agencies that are proposed to be funded under ENCORE, public consultation shall be carried out with the public and other stakeholders prior to initiating the bidding process and NPMU will monitor whether such consultations are carried out.

Public consultation for consensus building is typically a four-stage process of:

- (1) Awareness generation
- (2) Perceptions assessment
- (3) Consensus building, and
- (4) Agreement finalization

At the first stage of awareness generation, the affected communities are provided information and made aware of the project activities and their likely impacts. The team responsible for the consultation process may suggest at this stage itself some of the options available to address these impacts. There are several methods and techniques that can be adopted for public consultations. Some of these include:

- (1) Public hearings
- (2) Public meetings
- (3) Informal small group meetings
- (4) General public information meetings
- (5) Operating field offices
- (6) Local planning visits
- (7) Information brochures and pamphlets
- (8) Field trips and site visits
- (9) Public displays
- (10) Model demonstration projects
- (11) Material for mass media
- (12) Response to public inquiries
- (13) Press release inviting comments
- (14) Workshops
- (15) Advisory committees

- (16) Task forces
- (17) Employment of community residents
- (18) Community interest advocates
- (19) Ombudsman or representative
- (20) Environmental impact statement reviews by public

The project team responsible for the consultation process has to determine which technique or a consultation is most appropriate at a particular stage or the consultation and consensus building process.

At the second stage, the views and perceptions of the affected communities regarding the project activities, its implications and also the options to address them is carefully assessed and documented. Due to the discussions within and outside the communities, unforeseen impacts, and mitigation options emerges. By this time the opinions of the local communities become quite evident. The opinion leaders also become visible and the areas of agreement and disagreement also start emerging. The next step of consensus building is critical and has to be delicately handled. In most projects it will be found that while most people agree on a majority of the issues, it is the few issues of disagreement that can create maximum problems. Sometimes these few points of disagreement even decides the fate of a project. The team responsible for the consultation process has to very carefully ensure that each of the points of disagreement is resolved in the most amicable manner. Sometimes, if a point of disagreement does not have major implications it may be useful to just leave it as unresolved and document it. The unresolved issue may also be left to be addressed at a later date when more information, experience, and understanding is available. Finally, the consensus built has to be translated into commitments and allocation of responsibilities. These commitments may be recorded in any form of agreement that the concerned stakeholders are comfortable with.

## PUBLIC CONSULTATION

<b>Purpose</b>	<ul style="list-style-type: none"> <li>• To discuss and seek opinion/suggestion from the public/ stakeholders / their representatives</li> <li>• To avoid future problems and ensure smooth implementation of the project</li> </ul>
<b>Projects</b>	<ul style="list-style-type: none"> <li>• All projects involving site requirements (pumping stations, lift stations, STPs, etc), and resettlement.</li> </ul>
<b>Responsibility</b>	<ul style="list-style-type: none"> <li>• To be jointly conducted by SPMU and PEA</li> </ul>
<b>Timeline</b>	<ul style="list-style-type: none"> <li>• For Sites – before finalizing the site/ before bidding.</li> <li>• For resettlement - prior to the preparation of Resettlement Action Plans</li> </ul>
<b>Methodology</b>	
<b>Intimation to public</b>	<ul style="list-style-type: none"> <li>• Notice (to be published in any National/ vernacular newspaper)</li> <li>• Notice at the Municipal office</li> <li>• Display boards (at important junctions)</li> <li>• Pamphlets (hand distribution)</li> </ul>
<b>Information for intimation</b>	<ul style="list-style-type: none"> <li>• Sub- Project scheme and area of extent</li> <li>• date and venue of the meeting,</li> <li>• last date for receiving objections/suggestions.</li> </ul>



	<ul style="list-style-type: none"> <li>• Contact person and Venue where project information material will be available</li> </ul>
<b>Participants</b>	<ul style="list-style-type: none"> <li>• General Public, Project affected Persons (PAPs), Stakeholders, Local leaders, NGOs etc</li> </ul>
<b>Materials to be distributed/ circulated:</b>	<ul style="list-style-type: none"> <li>• A non-technical executive summary may be prepared containing the following:</li> <li>• Brief description of project activities and components involved</li> <li>• Sub-project benefits, area and extent of project activities</li> <li>• Expected impacts from the sub-project/ component</li> <li>• Proposed management measures</li> </ul>
<b>Post public consultation action:</b>	<ul style="list-style-type: none"> <li>• Review of suggestions and opinions from the public</li> <li>• Suitable incorporation either in the design or in the management measures.</li> <li>• Recording the meeting and the proceedings and forward to the O/o SPMU in the format provided.</li> </ul>

## 4.2 Guidance Format for reporting on Public Consultations

### Consultation Stage:

*Name of the town* :

*Project* :

*Date* :

*Venue* :

*Advertisement published in Newspapers* :

*National* :

*Vernacular* :

*Date of Advertisement* :

*Composition of the Stakeholder Consultation Panel:*

*Number of Stakeholders / Participants* :

*Discussion during the public hearing* :

<i>Sl.No</i>	<i>Issues raised</i>	<i>Response of the borrower to the issues</i>	<i>Comments</i>
1)			
2)			
3)			
4)			
5)			

Action taken based on the opinion received during public consultations:

Signature of the Borrower

Enclosures.

1. Scanned copy of the newspaper clippings, attendance

### 4.3 Guidance on Permits required as per Environmental Legislation

Guidance on permits, and clearances for various works is presented here. However, certain requirements may vary from State to State. PEA is hence advised to update the clearance/permit requirements and standards applicable for the project area/activity at the start of the subproject preparation.

#### *Application for Major Environmental Permits / Licences for all works*

#### **4.3.1 No Objection Certificates for Work / Activities (to be obtained before initiating respective activities)**

<i>Sl No:</i>	<i>NoC Requirement</i>	<i>Process</i>
1	NOC for National Highway (NH)	PEA/PMU to take permission for NH cutting; through application/letter to NH Division, Executive Engineer
2	NOC from Road / Public Works Department	PEA/PMU to take permission for road cutting; through application to RCD Division or RBD, Executive Engineer
3	NOC for Water Source	Application to Water Resource Department/Water Authority, Ground Water Board, or Irrigation Department (as applicable) of corresponding State depending on jurisdiction.
4	NOC for Railway division	PMU to take NoC for crossing Railway lines; by submitting application to Divisional Railway Manager
5	NOC for Electricity Division	Application to Executive engineer, Electricity supply division/ Electricity Board
6	NOC for Forest land/ Tree Cutting	Application to concerned Divisional Forest Officer
7	Construction of Road (Road Sub project, haul/service roads)	RCD, PWD (R&B) or NH regarding construction of road
8	Shifting of Water Supply Pipeline	Application to Drinking Water & Sanitation Department or Water authority, Water Resources Department - Chief engineer or GM / MD Application to Municipality / Panchayat as the case may be
9	Shifting of BSNL tower (telecommunications)	Application to General Manager, BSNL
10	NOC for water	Obtain permit from Regional Director of CGWA (Groundwater Authority) <a href="http://cgwanoc">http://cgwanoc</a> .

<b>Sl No:</b>	<b>NoC Requirement</b>	<b>Process</b>
	abstraction	gov.in/LandingPage/GuidelinesonlineFilling/steps_for_online_filling_of_application-19012015.pdf
11	Use of Diesel Generator sets at any stage during project cycle.	Contractor to take consent from SPCB under Air Act
12	Using Forest Land	Contractor to take necessary Approvals from the State Forest Department in case of land appropriation of forest land
13	Permission for temporary traffic diversions, hindrances	PMU / PEA to take Permission from Traffic Police Commissioner office for traffic management
14	Permission for Storage of Chlorine	Water Supply Operator to take permission from SPCB under MS&H Rules, 1989 for Storage and Handling of Chlorine
15	PUC for Vehicle	Obtain Pollution under Control certificate from the motor vehicle department of respective State through its authorized agents, for all construction machinery and vehicles.
16	Tree Cutting Permission	SPMU/Line Department to get permission from the State Forest Department under the Forest Conservation Act, 1980
17	Plants such as Crushers and/or Batching Plants	Concerned Contractor to ensure that crushers / batching plants used for construction purposes under this project have permit from SPCB under Air (Prevention and Control of Pollution) Act, 1981 and Noise Pollution (Regulation and Control) Rules, 2000
18	Storage, handling and transport of hazardous material/s	Concerned Contractor to ensure that requisite permit is sourced from SPCB under Hazardous Waste (Management and Handling) Rules, 1989 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989
19	Location/ layout of workers camp, equipment and storage yards	Concerned Contractor to get approval from SPCB under Environment Protection Act, 1986 and Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989
20	Discharges from Labour Camp	Concerned Contractor to get approval from SPCB under Water (Prevention and Control of Pollution) Act, 1974
21	Permission for sand mining from river bed	Concerned Contractor to get permission from State Mines and Geology Department under Environment Protection Act, 1986

### 4.3.2 Consents and Licences to be Obtained

<i>Sl No</i>	<i>Regulation</i>	<i>Process to be followed</i>	<i>References</i>
1	Consent to Establish (CTE)	<p>Consent means the sanction of the authority of the Pollution Control Board for the discharge of the effluent (sewage or trade effluent into a stream or well or sewer or on land) or emission of air pollutants into the atmosphere. The consent is issued by respective State PCB under section 25/26 of the Water (Prevention and Control of Pollution) Act 1974 is known as water consent and under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 is known as air consent.</p> <p>As per section 25 of the Water (Prevention and Control of Pollution) Act 1974, no person shall without the previous consent of the State Board, Establish or take any steps to establish any industry, operation or process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land; or Bring into use any new or altered outlets for the discharge of sewage; or Being to make any new discharge of sewage. previous consent of the State Board, Establish or take any steps to establish any industry, operation or process, or any treatment and disposal system or any extension or addition thereto, which is likely to discharge sewage or trade effluent into a stream or well or sewer or on land; or Bring into use any new or altered outlets for the discharge of sewage; or Being to make any new discharge of sewage.</p> <p>As per section 21 of the Air (Prevention and Control of Pollution) Act, 1981, no person shall without previous consent of the State Board, establish or operate any industrial plant in an air pollution control area.</p> <p>Obtaining consent to establish is one-time activity.</p>	<p>As per Water (Prevention And Control of Pollution) Cess Act, 1977; and The Air (Prevention And Control of Pollution) Act, 1981, three types of consents are to be obtained.</p> <p>I. Consent to Establish II. Consent to Operate III. Renewal of Consent to Operate</p> <p>Consents should be applied through Respective State Pollution Control Board (SPCB) Online Consent Management &amp; Monitoring System portal. Upon submission of the application, online SPCB will review it and provide the consent or if</p>

<b>Sl No</b>	<b>Regulation</b>	<b>Process to be followed</b>	<b>References</b>
			any clarification is needed the same will be communicated through the same portal.
2	Consent to Operate	As per the Water Act 1974 and Air Act 1981, it is mandatory to obtain Consent to Operate (CTO) from respective State Pollution Control Board prior to the commencement of activities. Consent to operate can be renewed for every 1 to 5 years depending on the category	
3	Labor license from the Department of Labor	Registration of Establishments: Application for registration of Establishment Employing Contract Labor shall be submitted online. The application shall be accompanied by a treasury receipt showing payment of registration fee. Grant of certificate of registration: On receipt of the application a Certificate of Registration is issued online.	Contract Labor (Regulation & Abolition) Central Rules, 1971
4	Contractor who employs or who employed five or more Inter-State migrant workmen need to register and obtain interstate Workmen migrant license from labor commissioner	The contractor should apply for license for recruitment in Form IV, should apply for license to employment in Form V. Details of migrant workers should be maintained in Form VI by the contractor. The Principal Employers and the contractors are required to maintain registers and other records with particulars of Inter-State Migrant workmen employed along with the nature of jobs performed by such workmen and the rate of wages paid to them.	The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979
5	Obtain NOC for transportation and storage of diesel, oil and lubricants etc.	As per Petroleum rules	Petroleum Rules, 2002 PESO Website: <a href="http://peso.gov.in/index.aspx">http://peso.gov.in/index.aspx</a>
6	Environmental Clearance (necessary for a few categories of infrastructure	All category A proposals (as per GoI category A) should be submitted in the Online Submission and Monitoring of Environment Clearance (Category – A Proposals) portal. Link: <a href="http://environmentclearance.nic.in/deiaa.aspx">http://environmentclearance.nic.in/deiaa.aspx</a> <a href="http://">http://</a>	<a href="http://environmentclearance.nic.in/">http://environmentclearance.nic.in/</a>

<b><i>Sl No</i></b>	<b><i>Regulation</i></b>	<b><i>Process to be followed</i></b>	<b><i>References</i></b>
	projects, construction projects and area development projects under the new EIA Notification, 2006)	environmentclearance.nic.in/deiaa.aspx Online Submission and Monitoring of Environment Clearance (Category – B Proposals) portal.	
8	Transport of petroleum by tank lorry	License (form IX)	Sub Circle Office Deputy Chief Controller of Explosives
9	Storage of petroleum class A in barrels up to 300 liters.	License (form X)	District Authority
10	Storage of petroleum class B in barrels up to 25000 liters.	License (form XI)	District Authority
11	Storage of petroleum in tanks in installations	License (form XIII)	Chief Controller of Explosives A Block CGO Complex Fifth floor Seminary Hills Nagpur, Maharashtra 440006; Phone: 0712-2510248 Email: <a href="mailto:explosives@explosives.gov.in">explosives@explosives.gov.in</a>
12	Storage of petroleum	In barrel for petroleum class A exceeding 300ltrs, petroleum class B exceeding 25000 liters & petroleum class C exceeding 45,000 liters in barrels License (form XIV)	Respective Sub Circle Office

<i><b>Sl No</b></i>	<i><b>Regulation</b></i>	<i><b>Process to be followed</b></i>	<i><b>References</b></i>
13	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.	<p>Applicable to building or other construction work : means the construction, alteration, repairs, maintenance or demolition- of or, in relation to, buildings, streets, roads, railways, tramways, airfields, irrigation, drainage, embankment and navigation works, flood control works (including stormwater drainage works), generation, transmission and distribution of power, waterworks (including channels for distribution of water), oil and gas installations, electric lines, wireless, radio; television, telephone, telegraph and overseas communication dams, canals, reservoirs, watercourses, tunnels, bridges, viaducts, aqueducts, pipelines, towers, cooling towers, transmission towers and such other work as may be specified in this behalf by the appropriate Government, by notification but does not include any building or other construction work to which the provisions of the Factories Act, 1948 (63 of 1948), or the Mines Act, 1952 (35 of 1952), apply. The registering officer shall register the establishment and issue a certificate of registration to the employer thereof in such form and within such time and subject to such conditions as may be prescribed. After the registration of an establishment under this section, any change occurs in the ownership or management or other prescribed particulars in respect of such establishment, the particulars regarding such change shall be intimated by the employer to the registering officer within thirty days of such change in such form as may be prescribed.</p> <p>Every employer of an establishment to which this Act applies and to which this Act may be applicable at any time is required to make an application in the prescribed form with prescribed fee for the registration of his establishment within a period of sixty days of the commencement of the Act or within sixty days from the date on which this Act becomes applicable to the establishment. Every building worker who is between the age of eighteen and sixty and who has been engaged in any building or other construction work for not less than ninety days during the last 12months is eligible for registration as a beneficiary of the Building and Other Construction Workers' Welfare Fund. Application for registration is to be made in the prescribed form and is to be accompanied by prescribed documents and a fee of not more than fifty rupees. A building worker who has been registered as a beneficiary under this Act shall cease to be as such when he attains the age of sixty years or</p>	<p>Register within 60 days from commencement of work.</p> <p>Registering Officer in the respective State.</p> <p>Contact Labor Commissioner</p>

<i>Sl No</i>	<i>Regulation</i>	<i>Process to be followed</i>	<i>References</i>
		when he is not engaged in building or other construction work for not less than ninety days in a year:	

#### **4.4 Guidelines for Site Selection**

Guidelines for Selection of Sites for various infrastructure facilities

- Follow the landuse / sites suggested in ICZM Plan and review siting guidelines
- Avoid structures/works at fish breeding grounds and other ecologically sensitive locations
- Ensure that the projects site requires minimum or no cutting of trees and other vegetative cover
- Ensure that sites are not in a low-lying or flood-prone area
- Conform to the siting guidelines by CPHEEO waste treatment facilities.
- Ensure that, no dense habitations or sensitive features such as schools, religious places or institutions are located in the vicinity of facilities like STPs, pumping/booster stations, lift stations, etc.
- For STPs, Landfills, SWM sites, SPCB / MOEF siting criteria shall be conformed to.
- Avoid land acquisition in the forest areas, private lands or damage to structures
- Ensure that no existing landuse is affected.
- Ensure that the pipe alignment will not pass through ecologically sensitive areas such as forest areas, national parks or sanctuaries, cultural properties, etc.
- Ensure that the alignment will not require the acquisition of private agriculture lands or properties
- Ensure that the laying and operation of alignment does not affect the agriculture lands, farming operations, standing crops and their yield.
- Avoid a site that requires relocation of population (pucca or kutcha houses or slums/squatters or encroaches)
- Avoid selection of waterbody as sites for establishing any project facility.
- Any permanent structure above ground shall be established in a demarcated site with direct access to the site.



## 4.5 Generic Environmental and social Management Plans and Monitoring Plans for Various Project Activities / Components

### 4.5.1 Generic Environmental and Social Management Plan (ESMP) for All Construction Activities

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency														
DESIGN / PRE-CONSTRUCTION STAGE																		
1	Design to incorporate environmental sensitivities	Designs shall take into account topography / environmental and social sensitivities and regulations; especially National / State building rules and Fire Safety Codes  Rainwater harvesting, topsoil preservation, and green measures shall be adopted																
2	Clearances, Approvals, Permits/NOCs etc. to be secured /complied with.	<table><tr><td colspan="2">List of clearances required prior to start of construction activity</td></tr><tr><td>Type of Clearance</td><td>Applicability</td></tr><tr><td>NOC and consent under Air, Water &amp; Environment Act and noise rules from SPCB</td><td>For establishment of construction camp</td></tr><tr><td>NOC and consent under Air, Water &amp; Environment Act and noise rules from SPCB</td><td>For operating construction plant, crusher, batching plant and others as applicable</td></tr><tr><td>Explosive License from Chief Controller of Explosives</td><td>For storage of fuel oil, lubricants, diesel etc.</td></tr><tr><td>Permission for storage of hazardous chemicals from CPCB</td><td>For storage and handling of Hazardous Chemicals</td></tr><tr><td>Borrow area approval from district collector, Consent letter, lease agreement with the owner of land</td><td>Borrow area for excavation of earth</td></tr></table>	List of clearances required prior to start of construction activity		Type of Clearance	Applicability	NOC and consent under Air, Water & Environment Act and noise rules from SPCB	For establishment of construction camp	NOC and consent under Air, Water & Environment Act and noise rules from SPCB	For operating construction plant, crusher, batching plant and others as applicable	Explosive License from Chief Controller of Explosives	For storage of fuel oil, lubricants, diesel etc.	Permission for storage of hazardous chemicals from CPCB	For storage and handling of Hazardous Chemicals	Borrow area approval from district collector, Consent letter, lease agreement with the owner of land	Borrow area for excavation of earth	Pre-construction stage (Prior to initiation of any work)  The time period suggested for getting permission is 2-3 months.	PEA & Contractor
List of clearances required prior to start of construction activity																		
Type of Clearance	Applicability																	
NOC and consent under Air, Water & Environment Act and noise rules from SPCB	For establishment of construction camp																	
NOC and consent under Air, Water & Environment Act and noise rules from SPCB	For operating construction plant, crusher, batching plant and others as applicable																	
Explosive License from Chief Controller of Explosives	For storage of fuel oil, lubricants, diesel etc.																	
Permission for storage of hazardous chemicals from CPCB	For storage and handling of Hazardous Chemicals																	
Borrow area approval from district collector, Consent letter, lease agreement with the owner of land	Borrow area for excavation of earth																	

Sl. No.	Environmental Issues	Specifications		Time frame	Regulation and coordinating agency
		Quarry Lease Deed and Quarry License from State Department of Mines and Geology	Quarry operation (for new quarry)		
		Permission for Storage and Disposal of Silt / Muck/dredged material	Revenue Authority, Department of Geology (if applicable) and Local Bodies (for disposal if in waste disposal site)		
		Permission/NOC from State Ground Water Department	For extraction of groundwater		
		Permission/NOC from State Irrigation department	For taking/using river, canal water		
		Labour license from labor commissioner office	Engagement of Labor		
		Provide a copy of all necessary clearances to the PEA <ul style="list-style-type: none"> <li>Adhere to all clearance terms and conditions</li> <li>Obtain written permission from private landholders to use their land for support activities, prior to commencing any works</li> </ul>			
3	Dismantling of structures	Land acquired: the compensation will be as per the RFCTLARR – or as per Social Management Plan  Dismantled public utilities & structures shall be planned to be reconstructed in discussion with stakeholders (as specified in Social Management Plan)		Post design to Pre-construction.	PEA & Contractor
4	Relocation of Utilities	All underground and overhead utilities are to be shifted as per utility shifting plan, prior permission is to be obtained from regional offices of concerned departments		Post design to Pre-construction	PEA & Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		like Electricity, Telecommunications, Waterworks etc. Relocated utilities shall be suitably placed considering the probable impacts due to climate change.		
5	Clearing and Grubbing & Tree Felling	<ul style="list-style-type: none"> <li>Clearing and grubbing to be done only on the required surface &amp; just before the start of the next activity on that section. In case of a time gap, water should be sprinkled regularly until the start of the next activity.</li> <li>Avoid tree felling as much as possible. Follow national regulation / applicable procedures for the replanting of trees. Tree felling permission shall be obtained from the forest department / local body under applicable Acts.</li> <li>Compensatory plantation shall be planned to be undertaken at prescribed rates</li> <li>Plan to use native species in consultation with the communities, Forest Department, Local Bodies</li> </ul>	Prior to the start of construction activity	PEA & Contractor
6	Relocation of drinking Water sources	Alternate water supply arrangements, meeting required quality standards, shall be made to that affected people (people who lost opportunity to utilize the existing water sources due to pollution, decrease incapacity, lack of access, etc).	Prior to the start of construction activity	PEA & Contractor
7	Sensitive Physical/ Cultural Properties	Construction activities shall be done in a manner to avoid damage to cultural properties In case of an impact on the cultural properties, location-based property preservation shall be done in consultation with the community as per the Physical Cultural Resources Management Plan.	Prior to start of construction activity	PEA & Contractor
8	Environmental Management and Monitoring facility equipment for ESMP (meters, vehicle and Buildings)	Monitoring is to be carried out regularly as per the frequency and at locations specified as per the environmental monitoring plan	Plan for monitoring shall be prepared during design itself; monitoring shall be for during and after construction (Five Years)	PEA & Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
<b>AIR ENVIRONMENT- CONSTRUCTION PHASE</b>				
1	Gaseous Emissions	<p>Vehicles and machinery are to be maintained so that emission conforms to National Ambient air quality standards.</p> <p>All vehicles and machineries should obtain Pollution Under Control Certificates</p>	Beginning with & throughout construction	PEA/Contractor
2	Dust Generation	<ul style="list-style-type: none"> <li>▪ In the case of small road constructions, asphalt mixing plants should be sited over 1000 m from any community.</li> <li>▪ Mixing equipment should be well sealed and be equipped with a dust-removal device.</li> <li>▪ Operators should wear dust masks, ear protection and hard hats.</li> <li>▪ Vehicles delivering materials should be covered to reduce spills and dust blowing off the load.</li> <li>▪ Clearing and grubbing to be done, just before the start of the next activity on that site. In case of the time gap, water should be sprinkled regularly until the start of the next activity.</li> <li>▪ Water to be sprayed during the construction phase, at mixing sites, approach road &amp; temporary roads.</li> <li>▪ Labor to be provided masks / PPEs.</li> <li>▪ Embankment slopes to be covered with turfing/stone pitching immediately after completion</li> <li>▪ Construction site prone to dust generation shall have fencing to arrest dust spreading into neighboring sensitive land uses</li> </ul>	Beginning with & throughout construction until asphaltting / dust-generating activities are completed, and side slopes are covered.	PEA/Contractor
3	Equipment selection and maintenance and operation	Construction plant and equipment will meet recognized international and national standards for emissions and will be maintained and operated in a manner that ensures that relevant air, noise, and discharge regulations are met.	During construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
<b>LAND ENVIRONMENT – CONSTRUCTION PHASE</b>				
4	Soil Erosion and sedimentation control	<p>Plan the activities so that no bare/loose earth surface is left out before the onset of monsoon.</p> <p>For minimizing soil erosion, the following preventive measures are to be taken:</p> <ul style="list-style-type: none"> <li>▪ Embankment slopes to be covered, soon after completion</li> <li>▪ Next layer/activity to be planned, soon after completion of, clearing and grubbing, laying of embankment layer, sub-base layer, scarification etc.</li> <li>▪ Topsoil from borrow area, debris disposal sites, construction site to be protected /covered for soil erosion.</li> <li>▪ Debris due to excavation of foundation, dismantling of existing cross drainage structure will be removed from the watercourse immediately.</li> <li>▪ Diversions for bridges will be removed from the watercourse before the onset of monsoon.</li> </ul>	<p>During construction</p> <p>Upon completion of construction activities at these sites.</p>	PEA/Contractor
5	Loss of agricultural topsoil	<p>All areas of cutting and all areas to be permanently covered will be stripped to a depth of 150mm and stored in stockpile. (Refer to ECoP on Top Soil Management)</p> <p>Topsoil shall be safeguarded from erosion and will be reused as follows.</p> <ul style="list-style-type: none"> <li>▪ Covering all borrow areas after excavation is over</li> <li>▪ Dressing of slopes of embankment</li> <li>▪ Development of greenery</li> </ul>	During construction	PEA/Contractor
6	Compaction of Soil and Damage to Vegetation/ Diversions	<p>Construction vehicles should operate within the Corridor of Impact avoiding damage to soil and vegetation.</p> <p>Diversions, access roads used will be redeveloped by the contractor, to the satisfaction of the owner/ villagers.</p>	During construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
7	Contamination of soil	<p>Hazardous Waste Rules, 2016 will be complied with.</p> <ul style="list-style-type: none"> <li>Crushing /Batching/ Hot Mix Plants if any required; to be setup 500m away from surface water bodies</li> <li>The oil interceptor will be installed at the planned site and Truck lay bye.</li> <li>Bio-toilets shall be provided (at construction site) for safe disposal of waste.</li> <li>Scarified bituminous waste shall be reused for base course in crossroads and junction improvement of gravel roads.</li> </ul>	During construction	PEA/Contractor
8	Borrow pits	<p>No borrow pit will be opened without the permission of the supervision consultant.</p> <ul style="list-style-type: none"> <li>Written approval from the owner to be submitted to PEA.</li> <li>Borrow pits shall be identified outside the worksite.</li> <li>Before opening additional borrow pits, operating pits shall be closed according to IRC specification.</li> </ul>	During construction	PEA/Contractor
9	Quarrying and / or Sourcing of materials	<ul style="list-style-type: none"> <li>Quarrying will be carried out at approved and licensed quarries only. Copy of licenses to be submitted to the PEA.</li> <li>The contractor will use materials from the approved sources.</li> </ul>	During construction	PEA/Contractor
<b>WATER ENVIRONMENT – CONSTRUCTION PHASE</b>				
10	Loss of water bodies (surface/ ground)	<ul style="list-style-type: none"> <li>No excavation from the bund of the water bodies.</li> <li>No debris disposal near, any water body.</li> <li>Water for construction activity shall be from the approved water bodies only.</li> <li>Construction labor should be restricted from polluting the source or misusing the source.</li> <li>Shifting of source to be completed prior to disruption of the actual source.</li> <li>Alternate arrangements shall be made to all the water users prior to the construction activity for the identified (during Design stage) water sources (surface and ground sources) that fall in the project site</li> </ul>	During construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		<ul style="list-style-type: none"> <li>To avoid any damage to the constructed areas, drainage to be provided along and across the with proper engineering structures.</li> <li>Enhancement/de-silting of existing surface water bodies</li> <li>Encourage rainwater harvesting</li> </ul>		
11	Reduction in water spread area	<ul style="list-style-type: none"> <li>Avoid infrastructure which reduces water spread area / alternate placement of facilities shall be preferred</li> <li>De-silting of existing water bodies.</li> <li>Prepare and follow Disaster Management Plan Watershed Management &amp; Recharge</li> </ul>		
12	Alternation of drainage	<ul style="list-style-type: none"> <li>Diversions should be constructed during dry season, with adequate drainage facility, and will be completely removed before the onset of monsoon.</li> <li>Debris generated due to the excavation of foundation or due to the dismantling of the existing structure should be removed from the watercourse.</li> <li>Silt fencing has to be provided on the mouth of discharge into natural streams.</li> <li>Continuous drain (lined/unlined) is provided obstruction if any, to be removed immediately.</li> </ul>	Whenever encountered during construction	PEA/Contractor
13	Runoff and drainage	<ul style="list-style-type: none"> <li>Throughout monsoon uninterrupted continuous drain to be functional.</li> <li>Lined drain to be provided at build-up locations for quick drainage.</li> <li>Increased runoff due to increased impervious surface is countered through increased pervious surface area through soak pits.</li> </ul>	During Construction	PEA/Contractor
14	Water requirement for project	<ul style="list-style-type: none"> <li>The contractor has to provide a list of sources (surface/ground) for approval from PEA.</li> <li>Prior to the use of the source, the contractor should obtain written permission from authority, to use the water in construction activity, and submit a copy to PEA.</li> </ul>	During Construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency															
		<ul style="list-style-type: none"><li>During construction only permitted quantity (quantity for which permission is accorded) from approved sources should be used in construction activity.</li><li>Contractor to ensure optimum use of water; discourage labor from wastage of water.</li></ul>																	
15	Silting/sedimentation	<ul style="list-style-type: none"><li>Measures suggested under ‘Soil Erosion and Sedimentation control’ has to be enforced.</li><li>Silt fencing to be provided in the following places:<table><tr><th>Sl.No</th><th>Location</th><th>Remarks</th></tr><tr><td>1.</td><td>Topsoil storage</td><td>Around the periphery of the storage yard</td></tr><tr><td>2.</td><td>Borrow area site</td><td>Along the length of the borrow area in the downslope direction</td></tr><tr><td>3.</td><td>Surface Water bodies</td><td>Equals to diameters/length or as instructed by PEA/Local Body.</td></tr><tr><td>4.</td><td>Plant sites</td><td>In down slop direction final material</td></tr></table></li><li>Construction activities should be stopped near water bodies during monsoon.</li></ul>	Sl.No	Location	Remarks	1.	Topsoil storage	Around the periphery of the storage yard	2.	Borrow area site	Along the length of the borrow area in the downslope direction	3.	Surface Water bodies	Equals to diameters/length or as instructed by PEA/Local Body.	4.	Plant sites	In down slop direction final material	Throughout the construction period.	PEA/Contractor
Sl.No	Location	Remarks																	
1.	Topsoil storage	Around the periphery of the storage yard																	
2.	Borrow area site	Along the length of the borrow area in the downslope direction																	
3.	Surface Water bodies	Equals to diameters/length or as instructed by PEA/Local Body.																	
4.	Plant sites	In down slop direction final material																	
16	Contamination of water	<ul style="list-style-type: none"><li>Measures suggested under the ‘Contamination of soil’ have to be enforced.</li><li>Construction work close to water bodies should be avoided during monsoon.</li><li>Labour camps are to be located away from water bodies.</li><li>Car washing/workshops near water bodies are to be avoided.</li></ul>	Throughout the construction period.	PEA/Contractor															
NOISE ENVIRONMENT – CONSTRUCTION PHASE																			
17	Noise	<ul style="list-style-type: none"><li>Noise standard at processing sites, e.g. aggregate crushing plants, batching plants, hot mix plants are to be strictly monitored to prevent exceeding GOI noise standards.</li><li>Workers in the vicinity of strong noise to wear protectors and their working time should be limited as a safety measure.</li></ul>	Beginning and throughout construction	PEA/Contractor															



Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		<ul style="list-style-type: none"> <li>▪ In construction sites within 150 m of sensitive receptors and settlement areas construction to be stopped from 22:00 to 06:00.</li> <li>▪ Machinery and vehicles should be maintained to keep their noise to a minimum.</li> <li>▪ Noise barrier shall be constructed at all noise-sensitive locations.</li> <li>▪ HORN PROHIBITION signpost to be erected.</li> <li>▪ Rumble strips/speed breaker to be provided.</li> </ul>		
<b>FLORA &amp; FAUNA – CONSTRUCTION PHASE</b>				
18	Loss of trees and Avenue planting	<ul style="list-style-type: none"> <li>▪ Trees felled should be cut in logs and stacked species wise as instructed by PMU.</li> <li>▪ Avenue plantation has to be taken up soon after the completion of civil works.</li> <li>▪ All the realignment sections are to be enhanced with landscaping and peripheral tree plantation.</li> <li>▪ Community structure has to be enhanced with plantation.</li> <li>▪ The contractor has to ensure that no trees/branches to be fell by laborer for fuel, warmth during winter. Enough provision of fuel to be ensured.</li> </ul>	After completion of construction activities	PEA/Contractor
19	Vegetation clearance	<ul style="list-style-type: none"> <li>▪ Clearing and grubbing should be avoided beyond that which is directly required for construction activities.</li> <li>▪ The next activity to be planned/started immediately, to avoid dust generation and soil erosion during monsoon.</li> <li>▪ Turfing/ re-vegetation to be started soon after completion of the embankment.</li> </ul>	Cleaning operations as part of the construction stage	PEA/Contractor
20	Fauna	<ul style="list-style-type: none"> <li>▪ Construction workers must protect natural resources.</li> <li>▪ The contractor shall allow suitable means to prevent disturbance to birds/animals and their nests.</li> </ul>	During construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
SOCIO – ECONOMIC ENVIRONMENT-CONSTRUCTION PHASE				
21	General Issues – Related to Users		During Construction	PEA/Contractor
	Fear of uncertainties regarding future	Public participation sessions should be conducted in different stages of project construction.		
	Public Health and Safety	Debris (C&D) will be disposed to the satisfaction of the Engineer. Monitoring of air, water, noise and land during construction and operation phase. Project interventions including civil works shall be planned to take into account climate change effects. (for example; buildings will be built above maximum probable tide levels, and designed to withstand high wind, storm surge and rising sea levels).		
	Loss of access	At all times, the Contractor shall provide safe and convenient passage for vehicles, pedestrians and livestock to and from side roads and property accesses connecting the project road. Work that affects the use of side road existing access shall not be undertaken without providing adequate provision to the prior satisfaction of the Engineer. The works shall not interfere unnecessarily or improperly with the convenience of public or the access to, use and occupation of public or private road, railways and any other access footpaths to or of properties whether public or private.		
	Traffic jams and Congestion	Detailed Traffic Management Plans shall be prepared and submitted to the Engineer for approval 5 days prior to commencement of maintenance works on/near any section of the road. The traffic control plans shall contain details of temporary diversions, details of arrangements for construction under traffic and details of traffic arrangements after cession of work each day temporary diversion (including scheme of temporary and acquisition ) will be constructed		

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		with the approval of the Engineer after due consideration to the local environment and economy The temporary diversion shall not compromise on the issues of public safety. Special consideration shall be given in the preparation of the traffic control plan to the safety of pedestrians and workers at night The contractor shall ensure that the running surface is always properly maintained, particularly during the monsoon so that no disruption to the traffic flow occurs The temporary traffic detours in settlement areas shall be kept free of dust by frequent application of water.		
	Traffic control and safety	The Contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades, including signs, markings, flags, lights and flagmen as may be required by the Engineer for the information and protection of traffic approaching or passing through the section of the highways under improvement. For roads, the provision of traffic safety measures shall be considered incidental to work as per the Ministry of Road Transport and Highways (MoRTH) specification and Indian Road Congress (IRC) guidelines. For roads, all signs, barricades, pavement markings shall be as per MoRTH specification.		
	General Issues- Related to Labours			
	Pressure on Existing Infrastructure due to labor camps.	Contractors should recruit the local people as labourer at least for unskilled and semi-skilled jobs Basic facilities should be ensured at labour camp including first aid emergency medical response teams, Regular general health check-ups, canteen toilets with proper disposal facilitate education to the children by tying up with schools in the Neighbourhood, to prevent the spread of disease and pressure on existing infrastructure. Contractor is responsible for enforcing /adhering to the minimum requirements as per the bid document conditions.		

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		Camps if any; shall be planned to take into account climate change effects to ensure the safety of workers housed. (for example; buildings will be built above maximum probable tide levels, and designed to withstand high wind, storm surge and rising sea levels).		
	Accidents and Safety	The contractor is responsible for enforcing /adhering to the minimum requirements given in bid documents w.r.t Workers safety during Construction Environment and Safety Manager will report, on the enforcement of the above at regular time intervals.		
	Payment of wages	<ul style="list-style-type: none"> <li>This shall follow Social management Plan</li> </ul>		
	Rehabilitation of labor and Construction camp	<p>At the completion of construction, all construction camp facilities shall be dismantled and removed from the site. The site shall be restored to a condition in way inferior to the condition prior to commencement of the works. Various activities to be carried out for site rehabilitation include: the following aspects shall be included in the bid document as part of Contractor responsibility.</p> <ul style="list-style-type: none"> <li>Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas. In case transportation is not possible, the treatment of polluted areas has to be done.</li> <li>Soak pits, septic tanks shall be covered and effectively sealed off.</li> <li>Debris (rejected material) should be disposed off suitably</li> <li>Ramps created camp should be leveled.</li> <li>Underground water tank in a barren/non-agricultural land, topsoil shall be taken for utilized for plantation.</li> <li>Proper documentation of rehabilitation site is necessary. This shall include the following: <ul style="list-style-type: none"> <li>Photograph of rehabilitated site;</li> <li>Landowner consent letter for satisfaction in measures taken for rehabilitation of site;</li> <li>Undertaking from contractor; and</li> <li>Certification from Engineer in-charge</li> </ul> </li> </ul>		

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
22	Sensitive Community Structure	<ul style="list-style-type: none"> <li>Any loss during construction will be the sole responsibility of the contractor and the damage will be repaired immediately up to the satisfaction of people at the contractor's own cost.</li> </ul>	During construction	PEA/Contractor
23	Roadside amenities	<ul style="list-style-type: none"> <li>Bus shelter if affected shall be provided as required</li> <li>Pedestrian crossing is provided at major settlement locations, providing zebra crossing, signposts and speed breakers. However, this should be properly planned</li> <li>Landscaping at junctions</li> <li>Hedging at boundary with non-palatable shrubs, all along the non-urban stretch</li> </ul>	During construction  Plantations (Herbs/shrubs), immediately after completion of construction	PEA/Contractor
24	Construction & Demolition waste management	<ul style="list-style-type: none"> <li>Construction &amp; Demolition Wastes shall be covered and stocked within clearly demarcated areas, transported in covered vehicles, and disposed as suggested by PEA/local body after requisite permissions</li> </ul>	During Construction	PEA / Contractor
<b>ROAD SAFETY – CONSTRUCTION PHASE</b>				
24	Accident with hazardous materials	<p>Compliance with Environmental (Protection) Act, 1986, including:</p> <ul style="list-style-type: none"> <li>For the delivery of hazardous substances, three certificates issued by the transportation department are required permit license, driving license and guarding license.</li> <li>Vehicle delivering hazardous substances will be printed with standard signs.</li> <li>Persons operating the vehicles should be trained personnel and should carry Material Safety Data sheets.</li> <li>These vehicles can only be parked at designated parking lots.</li> <li>The list of hazardous materials for construction activity has to be identified in advance and the same has to be informed to the PEA. Accident Management shall be the responsibility of the Contractor and the Regulating Agencies.</li> </ul>	During Construction	PEA/Contractor

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		<ul style="list-style-type: none"> <li>In case of a spill of hazardous materials, relevant departments will be informed at once &amp; dealt with it in accordance with the spill contingency plan.</li> </ul>		
<b>OPERATION PHASE</b>				
<b>AIR ENVIRONMENT-OPERATION PHASE</b>				
1	Dust Generation	<ul style="list-style-type: none"> <li>Dust Generation due to vehicle wheel will be reduced due to increased/ widened paved surface.</li> <li>Avenue plantation and other plantations will include species having dust and pollutant absorption characteristics.</li> <li>Community properties and realignment locations will have peripheral plantation and landscaping.</li> <li>Maintenance of roads/paths to be ensured.</li> </ul>	After completion of construction activity	PEA/Local Authority
2	Air pollution	<ul style="list-style-type: none"> <li>With the reduction in journey time and idle engine running time air pollution will reduce.</li> <li>Avenue plantation is proposed throughout the corridor.</li> <li>Avenue plantation includes species having air-purifying characteristics.</li> <li>Enforce Pollution Under Control (PUC) programs.</li> <li>The public will be informed about the regulations on air pollution of vehicles.</li> <li>The air pollution monitoring program has been devised for checking pollution levels and suggesting remedial measures.</li> </ul>	After completion of construction activity	PEA/Local Authority
<b>LAND ENVIRONMENT – OPERATION PHASE</b>				
3	Temporary land acquisition	<ul style="list-style-type: none"> <li>Borrow area redevelopment plan to be completed/ enforced.</li> <li>All temporary acquired land for construction of diversion, transportation of material, etc., should be redeveloped as per standard specifications.</li> <li>Affected productive area to be rehabilitated with topsoil.</li> </ul>	After completion of construction	PEA/Local Authority

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
4	Soil erosion	<ul style="list-style-type: none"> <li>Embankment slopes to be re-vegetated</li> <li>Residual spoils to be disposed of properly in compliance with construction and Demolition Waste Management Rules, 2016.</li> </ul>	After completion of construction	PEA/Local Authority
5	Soil Contamination	<ul style="list-style-type: none"> <li>The public should be informed about the regulations on land pollution.</li> <li>Compliance with Construction and Demolition Waste Management Rules, 2016.</li> <li>Monitoring of soil quality to be done regularly as per frequency and location mentioned in the Environment Monitoring Plan.</li> </ul>	After completion of construction	PEA/Local Authority
WATER ENVIRONMENT – OPERATION PHASE				
6	Sitting / sedimentation	<ul style="list-style-type: none"> <li>Measures suggested under ‘soil erosion’ to be enforced.</li> <li>De-silting of existing water bodies.</li> <li>Silt fencing to be provided.</li> </ul>	After completion of construction	PEA/Local Authority
7	Decreased water spread area	<ul style="list-style-type: none"> <li>De-silting of water bodies to ensure more water retention.</li> <li>Prepare and follow Disaster Management Plan</li> <li>Follow Watershed management approaches and effective recharge &amp; drainage practices</li> </ul>		
8	Contamination of water	<ul style="list-style-type: none"> <li>The public to be informed about the regulations on water pollution.</li> <li>Monitoring of water pollution to be done regularly as per the frequency and location mentioned in the Environmental Monitoring Plan.</li> </ul>	After completion of construction	PEA/Local Authority
9	Maintenance of Storm Water Drainage System	<ul style="list-style-type: none"> <li>The urban drainage systems should be maintained to accommodate stormwater flow.</li> <li>Cleaning/ removing spoils should be ensured before/during the monsoon rains.</li> </ul>	Especially at the start & end of rains	PEA/Local Authority
NOISE ENVIRONMENT- OPERATION PHASE				
10	Noise	<ul style="list-style-type: none"> <li>‘Horn Prohibited’ signpost will be enforced.</li> <li>Maintenance of noise barriers.</li> <li>Discouraging the establishment of sensitive receptors near the road.</li> </ul>	After completion of construction	PEA/Local Authority

Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		<ul style="list-style-type: none"> <li>The public to be informed about the regulations on noise pollution.</li> </ul>		
FLORA & FAUNA – OPERATION PHASE				
11	Loss of trees and Avenue Planting	<ul style="list-style-type: none"> <li>The avenue plantation should be properly maintained preferably through Communities, NGOs or CSR of corporate groups</li> <li>Discourage cutting trees/ branches.</li> <li>Educate people about the usefulness of trees</li> </ul>	After completion of construction	PEA/Local Authority
SOCIO-ECONOMIC ENVIRONMENT – OPERATION PHASE				
12	General Issues	<ul style="list-style-type: none"> <li>Public consultation to be organized after completion of construction to assess the people's opinion/ grievance from the project intervention.</li> <li>Remedial measures to mitigate the impact due to project intervention to be incorporated in the operation phase.</li> </ul>	Operation phase	PEA/Local Authority
ROAD SAFETY ENVIRONMENT – OPERATION PHASE				
13	Protection of high road embankments	<ul style="list-style-type: none"> <li>Stabilization of altered (especially high) embankments.</li> <li>Although stone pitching is provided, vigilance to be maintained.</li> </ul>	Immediately after construction	PEA/Local Authority
14	Safety and noise disturbance	<ul style="list-style-type: none"> <li>Further construction near infrastructure provided shall be as per the zoning regulations as well as the Environmental guidelines.</li> </ul>	Throughout and after project development period	PEA/Local Authority
15	Ensure Safe Traffic	<ul style="list-style-type: none"> <li>Road surface if affected, to be maintained and proper road markings to be provided, pot holes to be filled immediately.</li> <li>Regular maintenance of sign post, painting/removal of bills.</li> <li>Traffic rules / safety awareness to people</li> <li>Speed limit &amp; speed breakers / traffic calming to be enforced at sensitive locations.</li> <li>Lighting of major junctions</li> </ul>	During Operational stage	PEA/Local Authority



Sl. No.	Environmental Issues	Specifications	Time frame	Regulation and coordinating agency
		<ul style="list-style-type: none"> <li>Intimation to communities including sensitive landuses (like Hospitals, Schools etc) regarding works</li> </ul>		

#### 4.5.2 Environmental Monitoring Plan for General Construction Works

Sl.No.	Type	Locations	Parameters	Period and frequency	Responsibility *
Construction Phase					
1	Ambient Air Quality	15 locations as selected during the baseline study	PM10, PM <sub>2.5</sub> , Sulfur dioxide (SO <sub>2</sub> ), Oxides of nitrogen (NO <sub>2</sub> ), Carbon monoxide (CO), Hydrocarbon (HC), Volatile Organic Compound (VOC's)	24-hr (8hr for CO) Average samples every quarter	Contractor/PEA through MoEFCC approved agency
2	Ground Water	20 locations as selected during the baseline study	pH, TSS, TDS, DO, BOD, Salinity, Total Hardness, Fluoride, Chloride and MPN (No. of coliforms / MPN (No. of coliforms/ 100ml), Heavy Metals	Quarterly	Contractor/PEA through MoEFCC approved agency
3.	Surface water	20 locations as selected during the baseline study	pH, TSS, TDS, DO, BOD, Salinity, Total Hardness, Fluoride, Chloride and MPN (No. of coliforms / MPN (No. of coliforms/ 100ml), Heavy Metals	Quarterly	Contractor/PEA through MoEFCC approved agency
4.	Noise	15 locations as selected during the baseline study	24hrly Day and Night time Leg level	Quarterly	Contractor/PEA through MoEFCC approved agency
5.	Soil	20 locations as selected during baseline study	Organic matter, C,H,N, Alkalinity, Acidity, heavy metals and trace metal, Alkalinity, Acidity	Quarterly	Contractor/PEA through MoEFCC approved agency
Operation Phase					
1.	Ambient Air Quality	15- to be selected after consultation with PCB	PM10, PM <sub>2.5</sub> , Sulfur dioxide (SO <sub>2</sub> ), Oxides of nitrogen (NO <sub>2</sub> ), Carbon monoxide (CO), Hydrocarbon (HC), Volatile Organic Compound (VOC's)	24-hr (8hr for CO) Average samples every quarter	PEA/Local Authority through MoEF&CC approved agency

Sl.No.	Type	Locations	Parameters	Period frequency and	Responsibility *
2.	Ground Water	20- to be selected after consultation with PCB	pH, TSS, TDS, DO, BOD, Salinity, Total Hardness, Fluoride, Chloride and MPN (No. of coliforms / MPN (No. of coliforms/ 100ml), Heavy Metals	Quarterly	PEA/Local Authority through MoEF&CC approved agency
3.	Surface water	20- to be selected after consultation with PCB	pH, TSS, TDS, DO, BOD, Salinity, Total Hardness, Fluoride, Chloride and MPN (No. of coliforms / MPN (No. of coliforms/ 100ml), Heavy Metals	Quarterly	PEA/Local Authority through MoEF&CC approved agency
4.	Noise	15 locations covering the project site and in the surrounding to be identified in consultation with PCB	24hrly Day and Night time Leg level	Quarterly	PEA/Local Authority through MoEF&CC approved agency
5.	Soil	20- to be selected after consultation with PCB	Organic matter, C, H, N, Alkalinity, Acidity, heavy metals and trace metal, Alkalinity, Acidity	Quarterly	PEA/Local Authority through MoEF&CC approved agency
6.	Treated potable water quality	1 sample from all 4 Water Treatment Plant	Parameters for horticulture use-BOD, pH, S.S, Coliforms	Half Monthly	PEA/Local Authority through MoEF&CC approved agency
7.	Treated Sewage Water Quality	1 sample from all 4 STP	Parameters for horticulture use-BOD, pH, S.S, Coliforms	Half Monthly	PEA/Local Authority through MoEF&CC approved agency
8.	Treated Effluent Quality	1 sample from ETP	As per IS 10500- potable water Standards	Half Monthly	PEA/Local Authority through MoEF&CC approved agency

**\* In case of projects near Natural Habitat areas; community shall be also involved in monitoring and reporting**

### 4.5.3 Indicative ESMP for Cyclone Shelters

<b>Activity</b>	<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>ESMP Measures</b>	<b>Responsible Agency for Mitigation</b>	<b>Monitoring Agency</b>
<p style="text-align: center;"><b>PLANNING &amp; DESIGN PHASE:</b> Measures that should be considered by the respective Line Departments while preparing the Detailed Project Report (DPR)</p>					
Initiative of construction prior to receipt of all clearances	Legal non-compliance	Temporary	<ul style="list-style-type: none"> <li>All clearance/ approvals required for Environmental aspects and CRZ Clearance if applicable during construction shall be ensured and made available before the start of work.</li> </ul>	Contractor & PEA	SPMU
Siting and design	<ul style="list-style-type: none"> <li>Use of unapproved site.</li> <li>Land acquisition</li> <li>Destruction of disturbance to wildlife habitat</li> <li>Flooding and waterlogging</li> <li>Tree felling</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Ensure that the designated Environmental Expert of the State has authorized and approved the screening checklist for the concerned activity at each proposed site.</li> <li>Apply siting criteria               <ul style="list-style-type: none"> <li>Avoid unfavorable geologic conditions. A site above the likely inundation level (preferably 100-year flood line) should be preferred.</li> <li>In case of non-availability of high elevation natural ground, construction should be done on stilts with no masonry or bracings up to maximum surge level or raised earthen mounds to avoid flooding/ inundation.</li> <li>To avoid floods, build at least 250 m away from the sea cost and take guidance on hazard lines</li> <li>Avoid construction of sites within forests, wildlife parks/habitats, breeding grounds, wetlands, common properties and within or adjacent to archaeological sites or monuments.</li> </ul> </li> <li>In order to make them cyclone resistant, special engineering/ design considerations should be followed.</li> </ul>	Contractor & PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<ul style="list-style-type: none"> <li>Location of the shelter considering storm tide heights, river or creek flood levels, access and the location of existing significant hazards.</li> <li>Site should be selected based on ICZM Plans, in consultation with local communities/tribes to check for socially sensitive, conflict-prone areas and usage of such sites for construction should be avoided</li> <li>Avoid/minimize tree felling</li> </ul>		
<p style="text-align: center;"><b>CONSTRUCTION PHASE:</b></p> <p>The following section contains instructions to the contractors, which should be adhered to while carrying out the construction activity. This section should be appended into the relevant bid document.</p>					
Tree felling	<ul style="list-style-type: none"> <li>Soil erosion</li> <li>Destruction of, or disturbance to habitat</li> <li>Loss of canopy</li> <li>Global warming</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Tree felling shall be minimized;               <ol style="list-style-type: none"> <li>Cutting of trees with specific medicinal, religious, archaeological, environmental importance should be avoided.</li> <li>Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area. Use indigenous species, as guided by the communities, Forest Department / Local Bodies</li> <li>Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department. Care should be provided for fauna dependent on the cut trees</li> </ol> </li> </ul>	Contractor/PEA	SPMU
Construction	<ul style="list-style-type: none"> <li>Topsoil erosion</li> <li>Dust during construction and due to transport</li> <li>Noise pollution</li> <li>Clogging of drainage by soil</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Prior to groundbreaking, the Line Department shall take authorization from the designated Environmental &amp; Social Experts to initiate the construction activity that the outcome of the screening process holds good at the time of construction.</li> <li>The activities of construction shall be scheduled taking into consideration factors such as the growing of crops,</li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<p>run-off, increasing the chances of flooding</p> <ul style="list-style-type: none"> <li>• Waterlogging and creation of mosquito breeding grounds</li> <li>• Possible groundwater contamination (by oil and grease), especially during the construction phase</li> <li>• Air pollution</li> <li>• Exploitation of potable water sources due to construction activities</li> <li>• Noncompliance with regulations</li> <li>• Quarrying for materials</li> </ul>		<p>harvesting, availability of labor during particular periods and other site-specific conditions, possible restrictions to accessways and other disturbances to the local community.</p> <ul style="list-style-type: none"> <li>• Temporary and permanent drainage systems should be designed to minimize soil erosion and adverse impact.</li> <li>• Deploy silt fences to avoid/reduce soil erosion and run-off.</li> <li>• Vehicles delivering materials should be covered to reduce spills.</li> <li>• Locally available materials should be used as much as possible so as to avoid long-distance transportation, especially that of earth and stone.</li> <li>• Avoid developing new quarries, use existing quarries.</li> <li>• Mixing equipment should be well sealed, and vibrating equipment should be equipped with the device to keep off dust and shall be installed in places where vibration can be absorbed/contained without disturbing the ecosystem.</li> <li>• Maintenance of machinery and vehicles shall be ensured. Noise emissions shall be kept at a minimum. It shall be ensured that all machinery, equipment and vehicles comply with existing Central Pollution Control Board emission norms.</li> <li>• Water should be sprayed during the construction phase, at the mixing sites, and temporary roads.</li> <li>• Storage of petrol/oil/lubricants: Brick on edge flooring or flooring with absorbent material (including sand on impervious surface) should be provided at the storage sites to avoid soil and/or water contamination due to spillage. Such absorbent material shall be discarded only in hazardous waste disposal facility</li> </ul>		

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<ul style="list-style-type: none"> <li>• Storage of cement: Damp proof storage shall be provided as per IS codes (stacking and enclosure to be well planned so that strength of material is also not affected)</li> <li>• Proper waste management and disposal of oil and other hazardous wastes as per Hazardous Wastes (Management and Handling) Rules, 1989. <ul style="list-style-type: none"> <li>○ Solid/liquid/construction/ domestic waste, contaminants (oil/grease etc.) shall not be disposed of in water bodies /open lands. Suitable waste treatment and disposal shall be arranged and permits shall be arranged from local bodies / other agencies as applicable before the start of construction activities.</li> <li>○ Construction debris shall be stored well on site (maximum for two days) in safe containment, and disposed of properly as arrange with the local body.</li> </ul> </li> <li>• Employment opportunities may be provided to the dependents of the project affected families if any/ local communities, particularly in the category of workmen &amp; supervisors, subject to vacancies and their meeting the necessary laid down qualifications and experience requirements</li> <li>• Use brackish water for support activities wherever possible following standards (However, proper due diligence shall be exercised while using brackish water for concrete mixing/curing. It shall be used for these purposes only if there is no availability of plain water. The seawater can be used provided the concrete is made of marine, sulfate resistant cement etc., and steel is coated with epoxy and chemical to resist corrosion).</li> </ul>		

<b>Activity</b>	<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>ESMP Measures</b>	<b>Responsible Agency for Mitigation</b>	<b>Monitoring Agency</b>
			<ul style="list-style-type: none"> <li>• Use water resources without conflict and obtain permits before extraction and use</li> </ul>		
Laborcamps	<ul style="list-style-type: none"> <li>• Soil contamination.</li> <li>• Pollution of drinking water sources.</li> <li>• Stress on water sources</li> <li>• Surface water contamination from washing, bathing, and waste disposal</li> <li>• Tree felling for firewood and tents</li> <li>• Air pollution from burning of toxic materials like tires and plastic waste</li> <li>• Unhygienic work environment</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• All relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and respective State Laws if any shall be followed for construction and maintenance of labor camp.</li> <li>• Avoid Irrigated agriculture lands/forest land/grazing land</li> <li>• Avoid Lands within 100m of community water bodies &amp; water sources as rivers</li> <li>• Avoid lands near Municipal waste dumping yard/sewage treatment plant etc; which are not liveable</li> <li>• The contractor shall also guarantee the following:               <ol style="list-style-type: none"> <li>a) The location, layout and basic facility provision of each labor camp will be submitted to Site / Project Engineer prior to their construction</li> <li>b) The construction will commence only upon the written approval of the Engineer.</li> <li>c) The Contractor shall construct and maintain all labor accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>d) Supply of sufficient quantity of potable water (as per IS) in every workplace/labour camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>e) The sewage and solid waste management for the camp are designed, built and operated in such a fashion that no health hazards occur and no pollution to the air, ground water or adjacent water course take place.</li> </ol> </li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<ul style="list-style-type: none"> <li>f) Separate latrines and urinals with roof and proper door and fastenings should be provided for male &amp; female workers. Signboard displays outside latrines and urinals reading “For Men Only” and “For Women Only” as the case may be.</li> <li>g) Latrines and urinals shall be well lit and shall be maintained in a clean sanitary condition at all times with adequate water supply.</li> <li>h) Regular collection and proper disposal of Solid Waste Management (SWM) (according to SWM Rules 2016).</li> <li>i) Toxic materials like tyres and plastic shall not be burnt by the labour for any purpose.</li> <li>j) Trees shall not be cut for firewood or tents. As far as possible onsite cooking shall not be allowed. Else, cooking fuel and arrangements shall be provided</li> <li>k) Camps shall be planned to take into account climate change effects. (for example; buildings shall be built above maximum probable tide levels, and designed to with stand high wind, storm surge and rising sea levels). There shall be provisions for emergency escape and fire safety.</li> <li>l) Materials of camp construction shall be suitable for local temperatures to ensure better stay conditions</li> <li>m) Rooms shall be adequately cross-ventilated and shall be treated for pest/fly menace</li> <li>n) Proper arrangements for bedding and safe stay (including electricity) shall be ensured</li> <li>o) Primary health care facilities shall be arranged in tie-up with nearby Primary Health Centres/clinics</li> </ul>		



<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
Working condition	<ul style="list-style-type: none"> <li>Impact on workers' health and safety</li> <li>Impact on public safety</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>The contractor will make sure that during the construction work all relevant provisions of the factories Act, 1948 and the Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 are adhered to.</li> <li>The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</li> <li>All machines to be used in the construction will conform to the relevant Indian standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.</li> <li>Where loose soil is met with, shoring and strutting shall be provided to avoid the collapse of soil.</li> <li>The contractor shall supply all necessary Personal Protective Equipment (PPE) such as safety goggles, helmets, safety belts, earplugs, mask etc to workers and staff. They shall ensure the replacement of PPEs as and when required and train the workers to use them.</li> </ul> <p>13. The contractor shall arrange for:</p> <ol style="list-style-type: none"> <li>A readily available first aid unit with a person adequately trained in administering first aid in every work zone.</li> <li>The first aid unit must have and adequate supply of sterilized dressing materials and appliances as per the Factories Rules.</li> <li>Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital</li> </ol>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<p>14. Firefighting arrangement:</p> <ul style="list-style-type: none"> <li>a) Demarcation of area susceptible to fires should be provided, along with cautionary signage</li> <li>b) Portable fire exchangers and/ or sand baskets shall be provided at easily accessible locations in the event of fire</li> <li>c) The workers should educate on the usage of these equipment's in case of emergency</li> <li>• The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.</li> <li>• No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>• All necessary fencing and lights will be provided to protect the public and moving workers in construction zones.</li> <li>• Suitable signages and work enclosures shall be ensured for heavy moving parts/machinery. Suitable Standard Operating Protocols shall be followed including placement of additional support personnel to guide and direct the operators regarding any imminent danger and moving people</li> </ul>		
<p style="text-align: center;"><b>POST CONSTRUCTION /OPERATION PHASE:</b></p> <p>The following section contains instructions to the respective Lines Departments/ Local community entrusted with the operation and maintenance of the sub-project activity to ensure long term sustainability.</p>					
Site restoration	<ul style="list-style-type: none"> <li>• Soil contamination</li> <li>• Soil erosion</li> <li>• Injury to personnel</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• All the construction camps and facilities shall be dismantled and removed from the site unless otherwise desired by the local community/Panchayats. The site shall be restored to a condition in no way inferior to the condition</li> </ul>	Local Authority/ PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<p>prior to the commencement of work. The following activities may be carried out for restoration</p> <ul style="list-style-type: none"> <li>a) Oil, fuel or paint contaminated oil shall be removed, transported and buried in properly identified waste disposal areas</li> <li>b) At the construction campsite, sapling of plants similar to that of cut trees shall be planted. The maintenance of these samplings should be delegated to the local community or the landowner</li> <li>c) Soak pits and septic tanks should be covered and effectively sealed off</li> <li>d) Safe disposal of wastes in locations permitted by the local body</li> <li>e) Deploy silt fences to avoid/reduce soil erosion and run-off.</li> </ul>		
Sewerage, drainage and sanitation	<ul style="list-style-type: none"> <li>• Water contamination</li> <li>• Soil contamination</li> <li>• Adverse effect on human health</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Proper design and siting of latrines/septic tanks.</li> <li>• Proper disposal of liquid waste, construction debris, and other solid wastes.</li> <li>• Proper containment of wastes and /or materials (which are only temporarily stored on-site) to avoid its carriage through rainwater runoff</li> <li>• Appropriate and good use of sanitation/drainage/sewage facilities</li> </ul>	Local Authority/ PEA	SPMU
Maintenance	<ul style="list-style-type: none"> <li>• Flooding</li> <li>• Soil erosion</li> <li>• Waterlogging and creation of mosquito breeding grounds</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Regular inspection and cleaning of drain to remove any debris or vegetative growth that may interrupt the flow.</li> <li>• The local communities may be permitted to form associations/ SHGs to participate in the maintenance of cyclone shelter and its regular maintenance</li> <li>• Silt fences to avoid /reduce solid erosion and run-off.</li> </ul>	Local Authority/ PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<ul style="list-style-type: none"> <li>Deterioration of the facilities created</li> </ul>		<ul style="list-style-type: none"> <li>Mark and treat areas of water logging with gravels, planted mounds/landscaping, levelling</li> </ul>		

#### **4.5.4 Indicative ESMP for plantation/regeneration of Mangroves and Shelter Belts**

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of Impact</i>	<i>Mitigation Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
<p align="center"><b>PLANNING &amp; DESIGN PHASE:</b></p> <p align="center">Measures that should be considered by the respective Line Departments while preparing the Detailed Project Report (DPR)</p>					
Initiation of construction prior to receipt of all clearances	<ul style="list-style-type: none"> <li>Legal non-compliance</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>All clearance/ approvals required for Environmental aspects during plantation shall be ensured and made available before start of work.</li> </ul>	Contractor & PEA	SPMU
Siting	<ul style="list-style-type: none"> <li>Use of unapproved site.</li> <li>Biodiversity impacts/ impact</li> <li>On rare, endangered and threatened species of flora and fauna as well as nesting and breeding grounds of turtles/horseshoe crabs</li> <li>Impact of change of drainage pattern and</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Ensure that the designated Environmental Expert of the SPMU has authorized and approved the screening checklist for the concerned activity at each proposed site.</li> <li>Ensure community consultation and participation during identification of the sub-project</li> <li>Nesting/ breeding grounds of threatened or endangered species must be avoided for any activity (including support activities). Biodiversity impact should be assessed and plan prepared to avoid and minimize impacts before initiation of the activities.</li> </ul>	Contractor & PEA	SPMU
		Permanent			

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of Impact</i>	<i>Mitigation Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	diversion of freshwater/ marine water supply		<ul style="list-style-type: none"> <li>▪ Ensure all stresses to mangrove/shelterbelt plantations shall be addressed prior to the initiation of plantation activity.</li> <li>▪ No developmental / construction activities should be permitted in the mangrove areas/shelterbelt plantations.</li> <li>▪ Activities that may lead to a change in the drainage pattern and diversion of freshwater/marine water flow should be avoided to ensure the healthy growth of mangroves.</li> </ul>		
Species selection	<ul style="list-style-type: none"> <li>▪ Poor survival rate</li> <li>▪ Unsuccessful mangrove generation</li> <li>▪ Susceptibility to insect breeding</li> <li>▪ Invasive species</li> </ul>	Permanent	<p>The nursery must be located based on:</p> <ul style="list-style-type: none"> <li>▪ Species type to be used</li> <li>▪ Extent of water availability and availability of other favorable conditions for its survival and growth</li> <li>▪ Drainage pattern and Size of the area</li> <li>▪ The hydrology, depth, duration and frequency of tidal inundation and tidal flooding.</li> <li>▪ Species for shelterbelts with good foliage cover should be selected for better wind resistance</li> <li>▪ The hydrology, depth, duration and frequency of tidal inundation/tidal flooding and salinity shall be considered while choosing mangrove species.</li> <li>▪ Local /indigenous species should be used as far as possible in consultation with the community and Forest Department / Local bodies</li> <li>▪ Monoculture and the introduction of exotic species shall be avoided.</li> </ul>	Contractor & PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of Impact</i>	<i>Mitigation Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<ul style="list-style-type: none"> <li>▪ Species used should not support the growth of weeds / other invasive species detrimental to the ecosystem and habitats it naturally support</li> <li>▪ Should not call for usage of pesticides, fertilizers or weedicides</li> </ul>		
<p style="text-align: center;"><b>PLANTATION/REGENERATION PHASE:</b></p> <ul style="list-style-type: none"> <li>▪ The following section contains instructions to the contractors, which should be adhered to while carrying out the plantation/ regeneration activity.</li> </ul>					
Planting	<ul style="list-style-type: none"> <li>▪ Soil erosion</li> <li>▪ Destruction or disturbance to habitat</li> <li>▪ Soil contamination</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>▪ Avoid cutting any existing mangroves or plants or trees</li> <li>▪ Do not destroy or disturb existing nests or eggs in mangrove areas or nearby</li> <li>▪ Avoid introduction of foreign soil and synthetic materials</li> <li>▪ Ensure minimum disturbance to topsoil</li> <li>▪ Deploy silt fences to avoid/reduce soil erosion and runoff</li> <li>▪ Ensure that all activities and movements are restricted to the sub-project area</li> <li>▪ Ensure safe plantation activities and safe work environment/equipment/ PPEs in slushy soils</li> </ul>	Contractor/PEA	SPMU
Use of chemical fertilizers and pesticides	<ul style="list-style-type: none"> <li>▪ Water pollution</li> <li>▪ Soil contamination</li> <li>▪ Air pollution</li> <li>▪ Contamination of habitats/nesting grounds</li> <li>▪ Eutrophication</li> <li>▪ Soil erosion</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Minimize the use of pesticides and chemical fertilizers.</li> <li>▪ Prefer the use of biological/organics</li> <li>▪ Avoid or minimize the runoff of pesticides and fertilizers</li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of Impact</i>	<i>Mitigation Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
Management	<ul style="list-style-type: none"> <li>▪ Poor growth of shelterbelt/ mangrove</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Adopt appropriate Management techniques in consultation with the Environmental Expert of the state PMU and communities / Forest Department for:</li> <li>▪ Preparation of soil</li> <li>▪ Germination techniques</li> <li>▪ Maintenance of seedlings/saplings</li> <li>▪ Proper shading and watering</li> <li>▪ Weeding</li> <li>▪ Protection from pest, diseases and stray animals.</li> </ul>	Contractor/PEA	SPMU
<p style="text-align: center;"><b>POST PLANTATION/REGENERATION PHASE:</b></p> <p style="text-align: center;">The following section contains instruction to the respective Line Department/ Local community entrusted with the maintenance of the sub-project activity to ensure long term sustainability.</p>					
Use of chemical fertilizers and pesticides	<ul style="list-style-type: none"> <li>▪ Water pollution</li> <li>▪ Soil contamination</li> <li>▪ Air pollution</li> <li>▪ Contamination of habitats/nesting grounds</li> <li>▪ Eutrophication</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Minimize the use of pesticides and chemical fertilizers.</li> <li>▪ Prefer the use of biological /organic methods, products preferably locally prepared</li> <li>▪ Avoid or minimize the runoff of pesticides and fertilizers</li> <li>▪ Mechanical removal of weeds, preferably using small machines or indigenous technology adopted by locals (suitably modified to ensure health and safety of workers and the community)</li> <li>▪ PPEs and cleaning facilities/ health check-ups and precautions for laborers</li> </ul>	PEA/ Community members if in charge of maintenance	SPMU
Maintenance/ Management	<ul style="list-style-type: none"> <li>▪ Poor growth of shelterbelt/mangrove</li> <li>▪ Soil erosion</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Remove all foreign materials used for props, support, etc. from the plantation area at the appropriate time</li> <li>▪ Deploy silt fences to avoid/reduce soil erosion and runoff.</li> </ul>	PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of Impact</i>	<i>Mitigation Measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<ul style="list-style-type: none"> <li>Impact on grazing by cattle</li> </ul>		<ul style="list-style-type: none"> <li>Adopt appropriate management techniques in consultation with the Environmental Expert of the state PMU and communities / Forest Department for:               <ul style="list-style-type: none"> <li>Proper shading and watering</li> <li>Weeding</li> <li>Protection from pests, diseases and stray animals</li> </ul> </li> </ul>		

#### 4.5.5 *Indicative ESMP for Saline Embankments and Coastal Canals*

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
PLANNING & DESIGN PHASE: Measures that should be considered by the respective Line Department while preparing the Detailed Project Report (DPR)					
Initiation of construction prior to receipt of all clearances	<ul style="list-style-type: none"> <li>Legal non-compliance</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>All clearance/ approvals required for Environmental aspects during construction shall be ensured and made available before the start of work.</li> </ul>	Contractor & PEA	SPMU
Siting and designing	<ul style="list-style-type: none"> <li>Use of unapproved site</li> <li>Flooding or waterlogging in the project area</li> <li>Siltation during construction</li> <li>Saltwater intrusion</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Ensure that the Environmental and Social Experts of the State has authorized and approved the screening checklist for the concerned activity at each proposed site.</li> <li>Ensure community participation during the identification of sub-project sites</li> <li>Ensure that such projects are taken up only if suggested by ICZM Plan</li> <li>Apply siting criteria and design criteria</li> </ul>	Contractor & PEA	SPMU



<b>Activity</b>	<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>ESMP measures</b>	<b>Responsible Agency for Mitigation</b>	<b>Monitoring Agency</b>
	<ul style="list-style-type: none"> <li>▪ Flooding of low-lying areas</li> <li>▪ Erosion and soil run-off</li> <li>▪ Tree felling</li> <li>▪ Destruction of, or disturbance to habitats</li> </ul>		<ul style="list-style-type: none"> <li>a) Avoid unfavorable geological and hydrogeological conditions.</li> <li>b) Drainage patterns should not be altered as this may lead to flooding of the low-lying area on the landward side of the embankment.</li> <li>c) Physical provision to improve stability (e.g. turfing/pitching).</li> <li>d) Adequate number of sluices of proper size and design must be provided for better drainage.</li> <li>e) Site should be based on ICZM Plan prepared, in consultation with local communities/tribes to check for socially sensitive, conflict-prone areas and usage of such sites for the construction should avoid</li> <li>f) Avoid/minimize tree felling</li> </ul>		
Construction schedule	<ul style="list-style-type: none"> <li>▪ Soil erosion</li> <li>▪ Flooding</li> <li>▪ Saline water intrusion</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>▪ Avoid/minimize construction during monsoon</li> <li>▪ The activities of construction shall be scheduled taking into consideration factors such as the sowing of crops, harvesting, availability of labor during a particular period and other site-specific conditions.</li> </ul>	Contractor & PEA	SPMU
<p style="text-align: center;"><b>CONSTRUCTION PHASE:</b> The following section contains instructions to the contractors, which should be adhered to while carrying out the construction activity.</p>					
Tree felling	<ul style="list-style-type: none"> <li>▪ Soil erosion</li> <li>▪ Destruction of and disturbance to habitat</li> <li>▪ Loss of canopy</li> <li>▪ Global warming</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Tree felling shall be minimized;</li> <li>a) Cutting of trees with specific medicinal, religious, archaeological, environmental important should be avoided.</li> <li>b) Mangrove plants shall not be cut for any purpose</li> <li>c) Compensatory plantation (indigenous species to be used; carefully avoiding the introduction of any alien species) by way of Re-plantation of at least twice the</li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<p>number of trees cut should be carried out in the project area.</p> <p>d) Follow national guidelines/procedures if replanting</p> <p>e) The tree shall be removed from the construction sites before the commencement of construction with prior permission from the concerned department.</p>		
Construction	<ul style="list-style-type: none"> <li>▪ Topsoil erosion</li> <li>▪ Dust during construction, and due to transport</li> <li>▪ Noise pollution</li> <li>▪ Clogging of drainage by soil run-off, increasing the chances of flooding</li> <li>▪ Water-logging in borrow areas</li> <li>▪ Water-logging and creation of mosquito breeding grounds</li> <li>▪ Possible groundwater contamination (by oil and grease), especially during the construction phase</li> <li>▪ Improper siting and rehabilitation of borrow areas.</li> <li>▪ Air pollution</li> <li>▪ Human health and safety</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>▪ Prior to groundbreaking, the Line Department shall take authorization from the designated Environmental Expert that the outcome of the screening process holds good at the time of construction.</li> <li>▪ Vehicles delivering materials should be covered to reduce spills.</li> <li>▪ Locally available material should be used as much as possible so as to avoid long-distance transportation, especially that of earth and stone.</li> <li>▪ Avoid developing new quarries, use existing quarries.</li> <li>▪ Maintenance of machinery and vehicles should ensure keeping the noise and vibration at a minimum. It shall be ensured that all machinery, equipment and vehicles comply with existing Central Pollution Control Board emission norms.</li> <li>▪ Management of borrow areas. <ul style="list-style-type: none"> <li>a) Borrow areas must be located at a distance of <math>10h</math> (where; <math>h</math> is the height of the embankment) or 30 meters whichever is greater.</li> <li>b) The soil used for preparing the embankment should be tested for usability and devoid of any invasive species</li> <li>c) Borrow areas should be selected such that irrigated/agricultural/grazing land and land close to settlement are avoided.</li> </ul> </li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<ul style="list-style-type: none"> <li>▪ Loss of vegetation in the borrow areas</li> <li>▪ Exploitation of potable water sources due to construction activities.</li> <li>▪ Quarrying for materials</li> </ul>		<ul style="list-style-type: none"> <li>d) Immediate rehabilitation of borrow areas should be adopted.</li> <li>e) Private land may be used for borrows if the owners' volunteers so. (However, suitable safety precautions must be ensured to prevent slippage, water ponding in dangerous levels etc.)</li> <li>▪ Proper waste management and disposal of oil, bitumen and other hazardous wastes should be adopted as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016               <ul style="list-style-type: none"> <li>a) Solid/liquid/construction/domestic waste, contaminants (oil/grease etc.) shall not be disposed of in water bodies/open lands.</li> <li>b) Construction debris shall be disposed of separately and properly.</li> <li>c) In the case of bituminous waste, discuss with local body and arrive at a suitable place for disposal of this. Disposal should be carried out over a 60mm thick layer of rammed clay so as to eliminate any chances of leaching. Scarified bituminous waste shall be reused for base course in crossroads and junction improvement of gravel roads.</li> </ul> </li> <li>▪ Water should be sprayed during the construction phase, at the mixing sites, and temporary roads.</li> <li>▪ Storage of petrol/oil/lubricants: Impervious floors shall be provided at the storage sites to contain soil and /or water contamination due to spillage</li> <li>▪ Storage of cement (if application)- damp proofing of storage area shall be ensured as per IS codes</li> </ul>		

<b>Activity</b>	<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>ESMP measures</b>	<b>Responsible Agency for Mitigation</b>	<b>Monitoring Agency</b>
			<ul style="list-style-type: none"> <li>▪ In slopes and other suitable places along the landward side, grass (preferably local wear and tear-resistant varieties) should be planted.</li> <li>▪ Deploy silt fences to avoid/reduce soil erosion and run-off.</li> <li>▪ Strengthening of weaker areas of the embankments by laying stones, geotextiles</li> <li>▪ Adequate number of sluices of proper size and design must be provided for better drainage</li> <li>• Use brackish water for construction support activities wherever possible (However, for concrete mixing/curing, use only if there is no availability of plain water. The seawater can be used provided the concrete is made of marine, sulphate resistant cement etc., and steel is coated with epoxy and chemical to resist corrosion).</li> <li>▪ Use water resources without conflict and get applicable permits before withdrawal of water</li> </ul>		
Labor camps	<ul style="list-style-type: none"> <li>▪ Soil contamination.</li> <li>▪ Pollution of drinking water sources.</li> <li>▪ Stress on water sources</li> <li>▪ Surface water contamination from washing, bathing, and waste disposal</li> <li>▪ Tree felling for firewood and tents</li> <li>▪ Air pollution from the burning of toxic</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>▪ All relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 shall be followed for construction and maintenance of labor camp.               <ul style="list-style-type: none"> <li>a) Avoid Irrigated agricultural lands/forest land/grazing land</li> <li>b) Avoid Lands within 100m of community water bodies &amp; rivers</li> </ul> </li> <li>▪ The contractor shall also guarantee the following:               <ul style="list-style-type: none"> <li>a) The location, layout and basic facility provision of each labor camp will be submitted to Site / Project Engineer and got approved prior to their construction.</li> </ul> </li> </ul>	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	material like tyres and plastic waste.		<ul style="list-style-type: none"> <li>b) The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>c) Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>d) The sewage system for the camp are designed, built and operated in such a manner that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is provided in all toilets and urinals.</li> <li>e) Separate enclosed latrines and urinals with proper doors and fastenings should be provided for male and female workers. Signboard displays outside latrines and urinals reading “For Men Only” and “For Women Only” as the case may be.</li> <li>f) Latrines and urinals shall be well it and ventilated and shall always be maintained in a clean sanitary condition with adequate water supply.</li> <li>g) Regular collection and proper disposal of Solid Waste Management (SWM) (according to SWM Rules 2016).</li> <li>h) Toxic materials like tyres and plastic are not burnt by the labour for any purpose.</li> <li>i) Trees are not cut for firewood or tents. Ensure fuel and electricity to labourers. Avoid cooking as far as possible in construction site or areas near storage of hazardous materials</li> </ul>		
Working condition	▪ Impact on workers’ health and safety	Permanent	▪ The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (Regulation	Contractor/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<ul style="list-style-type: none"> <li>Impact on public safety</li> </ul>		<p>of Employment and Conditions of Services) Act, 1996 are adhered to.</p> <ul style="list-style-type: none"> <li>The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</li> <li>All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the Engineer.</li> <li>Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</li> <li>The contractor shall supply all necessary Personal Protective Equipment (PPE) such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs. Special safety equipments and PPEs to work on water/slushy areas shall be ensured and cleaning facilities, health checkups shall be provided</li> <li>The contractor shall arrange for: <ul style="list-style-type: none"> <li>a) A readily available first aid unit with a person adequately trained in administering first aid in every work zone.</li> <li>b) The first aid unit must have an adequate supply of sterilized dressing materials and appliances as per the Factories Rules.</li> <li>c) Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital</li> </ul> </li> <li>Firefighting arrangement: <ul style="list-style-type: none"> <li>a) Demarcation of area susceptible to fires should be provided, along with cautionary signage</li> </ul> </li> </ul>		

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			<ul style="list-style-type: none"> <li>b) Appropriate portable fire exchangers and/or sand baskets shall be provided at easily accessible locations in the event of fire</li> <li>c) The workers should be educated on the usage of these equipment's in case of emergency</li> <li>▪ The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with a product containing lead in any form.</li> <li>▪ No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>▪ All necessary fencing and lights will be provided to protect the public in construction zones. Lighting or fencing so provided shall not disturb the (visual obstructions/glare; a hindrance to movement pathways etc.) marine / coastal biodiversity / habitats.</li> <li>▪ Provide onsite signages for emergency contact and rest areas for workers</li> </ul>		
<p style="text-align: center;"><b>POST CONSTRUCTION/ OPERATION PHASE:</b></p> <p style="text-align: center;">The following section contains instructions to the respective Line Departments/Local community entrusted with the operation and maintenance of the sub-project activity to ensure long term sustainability.</p>					
Maintenance	<ul style="list-style-type: none"> <li>▪ Poor drainage or flooding due to clogging</li> <li>▪ Water logging and creation of mosquito breeding grounds</li> <li>▪ Flooding</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>▪ Inspection and cleaning of sluices shall be done regularly to remove any debris or vegetative growth that may interrupt the flow.</li> <li>▪ The local communities may be permitted to form groups and participate in regular maintenance of the project site.</li> <li>▪ Deploy silt fences to avoid/reduce soil erosion and run-off.</li> </ul>	Local authority/PEA	SPMU

<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
	<ul style="list-style-type: none"> <li>▪ Deterioration of the sub-project</li> <li>▪ Soil erosion</li> </ul>				
Waste disposal and site restoration	<ul style="list-style-type: none"> <li>▪ Soil contamination</li> <li>▪ Soil erosion</li> <li>▪ Water contamination</li> <li>▪ Personnel injury</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>▪ All the construction camps and facilities shall be dismantled and removed from the site, unless otherwise desired by the local community/Panchayats. The site shall be restored to a condition in no way inferior to the condition prior to the commencement of work. The following activities may be carried out for restoration               <ol style="list-style-type: none"> <li>a) Oil and fuel contaminated soil be removed, transported and disposed of in proper waste disposal areas permitted by respective local bodies</li> <li>b) At the construction campsite, saplings of plant similar to that of cut trees shall be planted. The maintenance of these saplings should be delegated to the local community or the landowner.</li> <li>c) Soak pits and septic tanks should be covered and effectively sealed off. If portable septic tanks were used, contents shall be disposed of in the nearest common Sewage/Septage Treatment and Disposal Plant (STP) and units may be reused on this or other sites (after proper washing/maintenance at the STP) if required.</li> <li>d) Solid/liquid/construction/domestic waste, contaminants (oil/grease etc.) shall not be disposed in water bodies/ open lands.</li> <li>e) Construction debris shall be disposed of separately and properly.</li> <li>f) In case of bituminous waste, discuss with local body and arrive at a suitable place for disposal of this. Disposal should be carried out over a 60mm thick layer of rammed clay so as to eliminate any chances of leaching. Scarified</li> </ol> </li> </ul>	Local authority/PEA	SPMU



<i>Activity</i>	<i>Potential Negative Impact/Concern</i>	<i>Duration of impact</i>	<i>ESMP measures</i>	<i>Responsible Agency for Mitigation</i>	<i>Monitoring Agency</i>
			bituminous waste shall be reused for base course in crossroads and junction improvement of gravel roads. g) Deploy silt fences to avoid/reduce soil erosion and run-off. h) Follow safety measures while disposing of wastes.		

#### **4.5.6      *Indicative ESMP for Sewage Treatment Plant (STP) & Faecal Sludge Management***

##### **Before Execution**

##### **I.      Specific activities to be performed by the contractor:**

- ESMP clearance and disclosure as required;
- Integrating the ESMP in the bid document of contractor;
- Tree plantation around the STP/FSTP;
- Obtain consent to establish from state pollution control board underwater act for the STP/FSTP;
- Implementation of other mitigation measures, as recommended in ESMP and DPR

##### **During Execution, Operation & Maintenance**

##### **II.      Implementation of ESMP**

The contractor shall be responsible to implement the ESMP primarily in assistance with the State Project Management Unit/Project Executing Agency (PEA) team. The Environmental Specialist from the Independent Engineer/Supervision Consultant shall monitor the compliance of the ESMP, and all the design drawings of various civil structures shall be implemented after his approval.

- The digested sludge from the STP having manure value may be used with a clear plan on how it can be stored or disposed of. The sale of digested sludge as manure may also be promoted after quality testing and ensuring it is free of hazardous chemicals or materials,
- Project design does not have provision for holding of untreated sewage in case of STP breakdown, this need to be included in the overall design; at least two-day storage provision shall be made available, and contingency/emergency plan shall be prepared and staff shall be suitably trained
- Specific site shall be identified for intermittent storage of biodegradable and non-biodegradable waste at each IPS and shall be disposed of in the designated site;
- Tree plantation shall be made on the periphery of the STP site which will help aesthetically as well as to control bad odor. Around 33percent of the STP area should be developed into a green belt preferably using indigenous tree varieties

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
<b>PLANNING &amp; DESIGN PHASE:</b> Measures that should be considered by the respective Line Departments while preparing the Detailed Project Report (DPR)						
Sewage Treatment plant	Treated water disposal into nearby stream	<ul style="list-style-type: none"> <li>Pollution of stream water and other water bodies receiving STP discharges due to reduction in efficiency or non- working of STP</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>The treated water quality needs to comply with the latest standards prescribed by the pollution control board.</li> </ul>	Contractor & PEA	SPMU
	STP Breakdown	<ul style="list-style-type: none"> <li>Otherwise, in case of STP breakdown there is a possibility that untreated sewage will flow to water body and pollute it.</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Provision to hold untreated sewage is required to be made so that during any STP breakdown / shutoff, the untreated sewage does not flow into the water body or nearby premises</li> </ul>	Contractor & PEA	SPMU
	Sludge disposal	<ul style="list-style-type: none"> <li>Disposal of sludge leading to contamination of land and water.</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>Plan to collect sludge at constant intervals, stored properly without contaminating any environmental components, and disposal in a scientific manner or sale of sludge as manure (only is found permissible after quality tests)</li> </ul>	Contractor & PEA	SPMU
	Provision for accidental leakages/ bursts	<ul style="list-style-type: none"> <li>Low lying areas in the site, which can get flooded during monsoons</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Provide proper drainage arrangements and landscaping to avoid water stagnation on the site.</li> </ul>	Contractor & PEA	SPMU
	Location of STP	<ul style="list-style-type: none"> <li>Noise/Odor/fly nuisance hazards to neighboring areas.</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>Pump station in STP to ensure minimum noise generation;</li> <li>Tree plantation and landscaping along the periphery of the STP site to prevent spread of bad odor (in addition to constant maintenance and prevention of waste accumulation)</li> <li>Accumulated sludge and solid waste to be</li> </ul>	Contractor & PEA	SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
				cleared within 24 hours or at suitable planned intervals <ul style="list-style-type: none"> <li>• Spraying of Bank / WHO approved herbicides on accumulated sludge/solid waste to reduce odor or usage of odor control filters/devices.</li> </ul>		
Sewerage Network (Trunk sewer line)	Accidental leakages/bursts	<ul style="list-style-type: none"> <li>• Flooding of nearby areas due to leakage/bursts</li> <li>• Backlogging due to unexpected heavy flow rates</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• Designing sewers with adequate capacity and flow velocity. Manhole / other required provisions to be ensured as per CPHEEO and other guidelines</li> <li>• Regular inspection and maintenance of the sewer lines.</li> </ul>	Contractor & PEA	SPMU
Construction of Intermediate Pumping Stations (IPSs)	Pumping of sewage from various zones through the proposed IPSs to the proposed STP	<ul style="list-style-type: none"> <li>• Noise and odor nuisance to surrounding areas.</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Pumping station to ensure minimum noise generation by locating within a noise containing structure or in an enclosed space (such as concrete/brick structure)</li> <li>• Use of less noise generating equipment such as submersible pumps, enclosed generators</li> <li>• Regular maintenance and switching off equipment when not in use;</li> <li>• Equipment's need to meet the noise standards as prescribed by CPCB.</li> <li>• Regular clearance of sludge and solid waste to minimize odor nuisance and its disposal in approved / permitted disposal areas in discussion with the local bodies</li> <li>• Spraying of Bank approved herbicides accumulated sludge/solid to reduce odor or use of odor control filters.</li> <li>• Use of energy efficient pumps, fixtures</li> </ul>	Contractor & PEA	SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
				<ul style="list-style-type: none"> <li>• Proper buffers and landscaping</li> </ul>		
<p style="text-align: center;"><b>CONSTRUCTION PHASE:</b></p> <p style="text-align: center;">The following section contains instruction to the contractors, which should be adhered to while carrying out the construction activity. This section should be appended into the relevant bid document.</p>						
Sewerage (laying of sewers)	Excavation, cutting, back filling and compaction operations	Generation of substantial debris, top soil and muck during construction of IPS and STP	Temporary	Instead of disposing top soil to low lying areas: <ul style="list-style-type: none"> <li>• Top soil may be stored properly and used for agricultural purpose or development of city parks.</li> <li>• Soil and debris may be managed for planned land filling and landscaping;</li> <li>• Debris may be suitably stored to filling back the excavated areas after placing the trunk sewer lines.</li> </ul>	Contractor/PEA	SPMU
		Accidents/ damages due to erosion/ sliding of vertical sides of excavated trenches while places the pipes	Temporary	<ul style="list-style-type: none"> <li>• Maintaining the excavation by shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, etc. Exposed surface will be resurfaced and stabilized.</li> </ul>	Contractor/PEA	SPMU
		Dust Generation due to excavation, cutting, back filling and compaction operations	Temporary	The ambient air quality is expected to be within the prescribed limits by MOEFCC. Following actions shall be taken during construction stage like: <ul style="list-style-type: none"> <li>• Water sprinkling to be done in the construction and excavation areas;</li> <li>• Additionally, it is recommended to wet and cover excavated material transported by trucks.</li> <li>• Provide dust containment enclosures to the site till appropriate height</li> </ul>	Contractor/PEA	SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
		Noise and vibration and other disturbances to residents and businesses	Temporary	<ul style="list-style-type: none"> <li>Construction activities to be done in day time after giving prior intimation to local residents/shop keepers;</li> <li>Construction near schools and hospitals colleges to be carried out during vacations with prior information;</li> <li>Use of low noise and low vibrating equipment and provision of enclosures for such equipment on-site to be encouraged;</li> <li>Instruments need to meet standards of CPCB. Provision of PPEs to construction workers; like ear muffs and plugs</li> <li>Ensure that while laying sewers, access to properties is not hindered. In case of any issues, it shall be discussed with project affected persons and local representatives and mutually agreeable solutions be reached; including provision of alternate facilities/arrangements.</li> </ul>	Contractor/PEA	SPMU
		Temporary flooding due to excavation during monsoons or blockage of surface drains  Erosion of stockpiles	Temporary	<ul style="list-style-type: none"> <li>Excavation to be restricted only to areas manageable at a time</li> <li>Cut off for surface drains in areas prone to receive runoff from excavated areas</li> <li>Stockpiled areas to be bordered by berms; Stockpiles to be done in high areas to avoid flow in stormwater run-off channels and erosion</li> </ul>	Contractor/PEA	SPMU
		Increased traffic inconvenience (emissions, congestions, longer travel times, blockage of	Temporary	<ul style="list-style-type: none"> <li>Alternate traffic routing to be adopted in consultation with traffic police authorities. This shall be properly displayed well ahead</li> </ul>	Contractor/PEA	SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
		access)		<p>of diversion areas. Communities shall be informed through signages, print and social media</p> <p>Construction works at business and market area must be completed earlier to minimize business loss.</p>		
		Settlement of backfilled area after construction	Temporary	<ul style="list-style-type: none"> <li>The backfilling material shall be free from petroleum products, slag, cinders, ash or other material.</li> <li>Backfilling activity should follow the construction schedule like completing 1 km stretch within 5 days.</li> <li>Proper compaction as per the soil condition and retain the original level/ alignment.</li> </ul>	Contractor/PEA	SPMU
		Spillage of fuel and oil	Temporary	<ul style="list-style-type: none"> <li>Care to be taken to store fuel and oil (if required) at a place away from any drainage channel/nalla preferably to be stored in drums mounted on a concrete paved / imperviable platform with slightly raised edges (or suitable arrangements) so that drums do not get overturned</li> <li>There shall be proper channels for any spill to flow to a secure containment</li> <li>There shall be regular checks to determine any spillage of oil or fuel.</li> <li>Mutually reactive / hazardous material shall be kept away from each other. Material Data Sheet shall be checked and precautions to be followed.</li> </ul>	Contractor/PEA	SPMU
Sewage	Excavation	Damage to nearby structures and topsoil due to excavation	Temporary	<ul style="list-style-type: none"> <li>Careful excavation is needed so that the existing structures does not get damaged;</li> </ul>		SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
treatment plant and Sewage pumping station		activities.		<ul style="list-style-type: none"> <li>Top soils to be stockpiled and may be reused for the preparation of green belt development.</li> </ul>	Contractor/PEA	
		Construction waste	Temporary	<ul style="list-style-type: none"> <li>All the associated construction waste should be properly managed by storing and disposing off at C&amp;D Waste Disposal facility or sites suggested by the local body.</li> </ul>	Contractor/PEA	SPMU
		Sludge Disposal	Temporary	<ul style="list-style-type: none"> <li>Regular clearance of sludge and solid waste to minimize odor nuisance and its disposal in approved/permitted disposal areas in discussion with the local bodies</li> <li>Spraying of Bank approved herbicides accumulated sludge/solid to reduce odor or use of odor control filters.</li> </ul>	Contractor/PEA	SPMU
		Dust Generation due to construction activities	Temporary	<ul style="list-style-type: none"> <li>Excavated material transported by trucks will be covered and/or wetted to prevent dust nuisance.</li> <li>Suppressing dust generation by spraying water on stockpiles</li> <li>Provide work site enclosures, PPEs for workers</li> </ul>	Contractor/PEA	SPMU
		<ul style="list-style-type: none"> <li>Temporary flooding due to uneven dumping of construction waste</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Waste materials to be stored on the high laying areas. Avoid storing near storm water run-off channels or any low lying areas</li> </ul>	Contractor/PEA	SPMU
Construction activities near water		<ul style="list-style-type: none"> <li>Ecological impacts including destruction of aquatic habitat</li> <li>Air quality and noise problem</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>Prevent discharge of leachate, chemicals into surface waters.</li> <li>Preservation of aquatic habitats by restricting movement of people/equipment into them and preventing entry of sediments into water bodies</li> </ul>	Contractor/PEA	SPMU



<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
				<ul style="list-style-type: none"> <li>• Keep noise level (e.g., from equipment) to a minimum level, as certain fauna are very sensitive to loud noise</li> <li>• Keep only appropriate light levels in areas near nesting sites / flight pathways</li> <li>• Locate plants away from the residential settlement</li> </ul>		
General: safety during construction		<ul style="list-style-type: none"> <li>• Safety hazards to labors and public. Workers are seen to working without any Personal protective equipment (PPE) or safety harness/gears even at height.</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• Comply with the Occupational health and Safety acts of India, WB EHS guidelines and OSHA guidance</li> <li>• Workers working at height need to be given proper PPE;</li> <li>• Workers near high noise equipment's to be provided with PPEs like ear plugs;</li> <li>• Handrails on both sides of walkways close to deeper tanks and STPs need to be ensured;</li> <li>• Ensure that the contact details of the police or security company and ambulance services are displayed on site (in languages which are comfortable for the workers) and workers are trained to look at them and reach out for help when required.</li> <li>• Smaller on and off switches at STP units to be installed with protection from rain water to minimize electrical short circuit.</li> </ul>	Contractor/PEA	SPMU
<p align="center"><b>POST CONSTRUCTION /OPERATION PHASE:</b></p> <p>The following section contains instruction to the respective Lines Departments/ Local community entrusted with the operation and maintenance of the sub-project activity to ensure long term sustainability.</p>						

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
Sewer line	Leakage/ overflows	<ul style="list-style-type: none"> <li>Water pollution and possibility of mixing with water supply line</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>Regular monitoring of sewer line and manholes for visible leakages/ overflows.</li> <li>Immediate repair operation for the damaged portion of sewer line.</li> <li>De-siltation of blocked sewers/ manholes with sewage pumping machines-storing and disposal at agreed refusal area after treatment.</li> <li>Ensure proper covering of manhole and avoid dumping of solid waste to prevent chocking of sewer line.</li> </ul>	Local authority/PEA	SPMU
Sewage treatment plant and Intermediate pumping station	Noise pollution from operation activities		Permanent	<ul style="list-style-type: none"> <li>Proper handling and regular maintenance of operating machines including pumps, generators, air diffusers, etc.</li> </ul>	Local authority/PEA	SPMU
	Treatment and Disposal	Impairment of receiving water quality in surface/sub-surface source due to inadequate /inefficient treatment. Contamination of groundwater supplies due to leaching and impact on soil and agriculture	Permanent	<ul style="list-style-type: none"> <li>Monitor the treated sewage/effluent quality and ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use.</li> </ul>	Local authority/PEA	SPMU
	Treatment and Disposal	<ul style="list-style-type: none"> <li>Problems arising due to bad odour, insects, polluted air, noise pollution, etc.</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>Ensure collection of fecal sludge only through mechanical means, and use of protective gear by all workers, fall prevention measures</li> <li>Provide buffer zones in the form of green belt around the STP; to be ensured during the design and construction phase itself.</li> </ul>	Local authority/PEA	SPMU

<b>Activity</b>		<b>Potential Negative Impact/Concern</b>	<b>Duration of impact</b>	<b>Mitigation Measures</b>	<b>Responsible agency</b>	<b>Monitoring Agency</b>
Operation of Fecal sludge management system (including FSTP)		<ul style="list-style-type: none"> <li>• Odor nuisance affecting nearby community</li> <li>• Health and safety of pit emptier</li> <li>• Ecological impacts including destruction of aquatic habitat due to poor quality effluent discharge, leachate from solid waste</li> <li>• Air quality and odor problem</li> <li>• Groundwater pollution due to FSTP</li> </ul>	Permanent	<ul style="list-style-type: none"> <li>• Proper training to all types of workers</li> <li>• Use of mechanical cleaning systems instead of manpower</li> <li>• Secured transport of fecal sludge (preferably using a manifest system as being used for Hazardous / Biomedical wastes)</li> <li>• Ensure proper treatment appropriate for disposal meeting the MOEFCC requirements</li> <li>• Prevent discharge of leachate, chemicals, and fecal sludge into surface waters</li> <li>• Restrict discharge of liquid effluent into shallow water table area</li> </ul>	Local authority/PEA	SPMU
General Safety	Workers exposed to toxic gases in sewers and hazardous materials	<ul style="list-style-type: none"> <li>• Serious/health/ safety hazards</li> <li>• The toxic gases are likely to contract communicable diseases from exposure to pathogens present in the sewage.</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• During cleaning/ maintenance operation, the sewer line will be adequately vented to ensure that no toxic or hazardous gases are present in the line.</li> <li>• Ensure no accumulation of solid / construction or hazardous wastes on site, following proper plan for each for collection, treatment and disposal as per applicable rules and as agreed by the local body and PCB</li> </ul>	Local authority/PEA	SPMU

#### 4.5.7 *Indicative Environmental Management Plan for Solid Waste Management*

Generic Environmental Management Plan for SWM is provided in the following Table. This shows the potential negative impacts of solid waste management projects, and the potential mitigation measures to reduce those impacts to acceptable levels. The table also shows mitigation activities, and project agencies responsible for implementation. This ESMP needs to be revised and updated based on the identified site.

A program of monitoring needs to be conducted to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary.

Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
<p style="text-align: center;"><b>PLANNING &amp; DESIGN PHASE:</b></p> <p style="text-align: center;">Measures that should be considered by the respective Line Department while preparing the Detailed Project Report (DPR)</p>					
Land acquisition	Loss of tree cover	Temporary	<ul style="list-style-type: none"> <li>Undertake afforestation programs in government/ school / public parks to compensate to loss of tree cover</li> </ul>	Contractor & PEA	SPMU
	Encroachment into sensitive areas such as forests, wildlife habitations etc especially in case of laying any power lines	Permanent	<ul style="list-style-type: none"> <li>Ensure proper Sites as per master plan / ICZM Plan. In case of encroachments, ensure minimum disturbance and destruction. Obtain permission from respective authorities such as Department of Ecology, Environment and Forests</li> <li>Identify appropriate government site to avoid land acquisition and resettlement impacts</li> </ul>	Contractor & PEA	SPMU
Design and Development	Contamination of groundwater due to leaching.	Permanent	<ul style="list-style-type: none"> <li>Ensure appropriate design provisions (based on hydrogeological aspects as well) are made for liners, leachate collection and treatment facilities to prevent percolation of leachate</li> </ul>	Contractor & PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
	Nuisance hazards to neighbouring areas	Temporary	<ul style="list-style-type: none"> <li>Ensure proper design and adequate buffer zones to comply with SWM Rules, 2016 and other PCB requirements</li> </ul>	Contractor & PEA	SPMU
	Reduced land values in nearby areas and impacts aesthetics affected.	Permanent	<ul style="list-style-type: none"> <li>Adequate buffer zones shall be planned</li> <li>Discuss with town Planning Department and Local Body for demarcating a no-development zone around the facility</li> </ul>	Contractor & PEA	SPMU
<p style="text-align: center;"><b>CONSTRUCTION PHASE:</b></p> <p>The following section contains instruction to the contractors, which should be adhered to while carrying out the construction activity. This section should be appended into the relevant bid document.</p>					
Excavation activities	Noise and dust due to vehicle movement and excavation activities.	Temporary	<ul style="list-style-type: none"> <li>Construction of pucca access roads, and provision of green cover on exposed soil; use of less noise generating equipment for all activities;</li> <li>The construction materials shall be properly maintained, and barricades shall be provided around the site for reducing the noise levels.</li> <li>All the workers shall be provided with personal protective equipment including ear plugs and other necessary provisions.</li> <li>Approach road shall be constructed before starting the work, to reduce the dust and vehicular pollution</li> </ul>	Contractor/ PEA	SPMU
Waste Collection bins	Nuisance due to location of waste collection containers. During the monsoon the waste may mix with the runoff and may potentially create	Temporary	<ul style="list-style-type: none"> <li>If bins / containers are used for secondary storage; they shall be located appropriately to avoid land use conflicts. Place the containers on a slightly elevated impervious platform. Waste shall be regularly collected at pre-determined timings, and no overflowing shall be allowed. The</li> </ul>	Contractor/ PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
	unhygienic conditions around the site		<p>collection, storage and transportation of solid waste shall conform with SWM Rules, 2016.</p> <ul style="list-style-type: none"> <li>▪ Bins shall be covered to prevent animal / birds</li> <li>▪ Ragpickers to be trained and integrated into the collection system to collect recyclables from sources rather than picking the bins</li> </ul>		
Ambient Quality Air	Impact due to methane gas emissions from landfill and the impact due to activities which involved in construction	Permanent	<ul style="list-style-type: none"> <li>▪ Provide preferably gas collection and reuse mechanisms or if not possible; gas control systems (gas vents and flaring system) to minimize/mitigate the impact. The design of landfill shall conform to SWM Rules, 2016.</li> <li>▪ Ambient air quality in and around the site shall meet the standards prescribed by SWM Rules, 2016</li> <li>▪ All the vehicles must have valid PUC certificates at all the time during construction phase of the project</li> <li>▪ Water sprinkling shall be done to suppress the dust emissions from the site.</li> <li>▪ All the DG sets used for construction shall have valid consents from pollution control authorities and shall have built-in arrangements to reduce air emissions.</li> <li>▪ Development of Green belts around the project site to minimize air pollution</li> <li>▪ Monitor local air quality and manage operations if unacceptable quality arises.</li> </ul>	Contractor/ PEA	SPMU
Safety hazards to labourers	Health and safety hazards to workers during waste collection, transportation	Permanent	<ul style="list-style-type: none"> <li>▪ Occupational Safety Plan shall be prepared. This shall include: (i) provision of appropriate personal protection equipment such as gloves, boots and plan to monitor its use</li> </ul>	Contractor/ PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
	and at compost and disposal site		and replace as an when required, (ii) Eliminating manual handling of waste; (iii) Training of workers on safe handling of waste, (iv) provision of emergency support facilities including emergency exits, cleaning mechanisms, fire extinguishers and fire management mechanisms		
<p style="text-align: center;"><b>POST CONSTRUCTION/ OPERATION PHASE:</b></p> <p style="text-align: center;">The following section contains instructions to the respective Line Departments/Local community entrusted with the operation and maintenance of the sub-project activity to ensure long term sustainability.</p>					
Reception of solid waste at site	Nuisance due to odour and influx of insects, rodents, flying birds	Temporary	<ul style="list-style-type: none"> <li>▪ Provide adequate buffer zone around the landfill site / treatment site and other facilities with thick vegetative cover.</li> <li>▪ Waste shall be deposited at the designated place and waste shall not be allowed to accumulate near the waste reception area.</li> <li>▪ Odour management measures including odour filters, aromatic buffers/ other buffers for preventing fly menace, PPEs for workers</li> <li>▪ Regular cleaning and approved pest control measures to be adopted</li> </ul>	PEA/ Local authority	SPMU
	Pollution of agricultural lands and entering of heavy metal traces into food chain due to application of compost	Permanent	<ul style="list-style-type: none"> <li>▪ The compost shall meet the specifications laid out in SWM Rules, 2016.</li> <li>▪ Compost (final product) exceeding the stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.</li> </ul>	PEA/ Local authority	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
	with heavy metal concentration.				
	Bird menace at the waste disposal facility.	Temporary	<ul style="list-style-type: none"> <li>▪ Avoid open dumping of waste including in and around the site premises. Inerts / rejects to go to landfill on a daily basis. Provision for safe storage of wastes on sites in case of emergencies to be arranged.</li> <li>▪ In case of breakdown or maintenance of treatment plant, waste intake shall be stopped and be diverted to the emergency waste containment area (preferably in the form of additional windrows or as per design for emergency facility);</li> <li>▪ Post-process rejects shall be sent to landfill on a regular basis and shall not be allowed to pile on site.</li> </ul>	PEA/ Local authority	SPMU
	Nuisance due to waste collection residue and waste spillage during transportation and dust generation	Temporary	<ul style="list-style-type: none"> <li>▪ Ensure regular waste collection. Bio-degradable waste shall be collected daily. Waste shall be disposed directly into the container or dumping yard and ensure no spillage in the surrounding area. 'No multiple handling of waste' and 'No waste in ground' shall be followed as cardinal principles</li> <li>▪ Waste shall be collected and transported as per SWM Rules 2016</li> </ul>	PEA/ Local authority	SPMU
	Nuisance to surrounding areas due to operation of other facilities including transfer stations.	Temporary	<ul style="list-style-type: none"> <li>▪ Ensure waste does not find its way into the surrounding areas due to wind. Develop a dust screen around the tipping area.</li> <li>▪ Ensure immediate clearing of waste spillages, as per contingency plan</li> </ul>	PEA/ Local authority	SPMU



Activity	Potential Negative Impact/Concern	Duration of impact	Mitigation Measures	Responsible Agency for Mitigation	Monitoring Agency
	Emission of toxic gases from landfill site	Permanent	<ul style="list-style-type: none"> <li>Provision of landfill gas management system</li> </ul>	PEA/ Local authority	SPMU
	Health and safety of workers due to the release of toxic gases and hazardous materials during the operation of the facility	Permanent	<ul style="list-style-type: none"> <li>Proper and timely compaction of waste and provision of protective material to landfill employees.</li> <li>Follow safety principles while operating the landfill facility including work at height, confined spaces (as required per design)</li> </ul>	PEA/ Local authority	SPMU
	Contamination of groundwater	Permanent	<ul style="list-style-type: none"> <li>Proper maintenance of leachate collection facilities shall be done. Leachate shall be treated to the standards of PCB before disposal</li> <li>Reuse leachate as far as possible</li> <li>There shall be cut off drain for the site along its lowest side, to divert all run offs from the site to the treatment plan</li> </ul>	PEA/ Local authority	SPMU
	Vehicular traffic	Temporary	<ul style="list-style-type: none"> <li>Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.</li> </ul>	PEA/ Local authority	SPMU
	Public health and safety hazards to workers from odour, smoke from fire and diseases transmitted by flies, rodents, etc.	Temporary	<ul style="list-style-type: none"> <li>Ensure proper compaction and regular covering of waste, and provide adequate green buffer from the nearby areas to avoid visual blight, odour, noise.</li> <li>No wastes / rejects or inerts shall accumulate at any part of the site or its surrounds</li> </ul>	PEA/ Local authority	SPMU

#### 4.5.8 Indicative Monitoring Plan for SWM

Environmental Component	Project Stage	Parameters	Frequency	Duration	Implementation
Air	Construction	PM <sub>10</sub> , PM <sub>2.5</sub> , Sox, NO <sub>x</sub> , Lead, CO	24 hourly-Quarterly	Continuous 24 hours/ for 1 full working day' (Sampling once in 8 hrs)	PEA/Contractor through approved monitoring agency
	Operation stage	PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>x</sub> , NO <sub>x</sub> , Lead, CO	Monitoring for 3 seasons (including one non- monsoon seasons)	3 eight hours sample for one full working day for 3 non consecutive days	PEA through approved monitoring agency
Water Quality	Construction	Groundwater samples pH, TDS, Salinity and Nutrients, Coliform Marine water samples (Depth wise) pH, Salinity, DO, BOD, TDS, Turbidity, Coliform, Plankton, Nutrients, Metals.	Thrice in a year – (Pre, Post Monsoon and summer)	Three samples at each location–Upstream, Downstream, settlement camp, drainage, hand pumps, wells	PEA/Contractor through approved monitoring agency
	Operation	Groundwater samples pH, TDS, Salinity and Nutrients, Coliform Marine water samples (Depth wise) pH, Salinity, DO, BOD, TDS, Turbidity, Coliform, Plankton, Nutrients, Metals.	Thrice in a year – (Pre, Post Monsoon and summer)	Three at each location–Upstream, Downstream, settlement camp, drainage, Hand pumps, wells	PEA through approved monitoring agency
Noise levels	Construction	Noise level on dB(A) scale	Monthly	Readings to be taken at 15 seconds interval for 15 minutes for every hour and then averaged	PEA/Contractor through approved monitoring agency
	Operation	Noise level on dB(A) scale	Quarterly	Readings to be taken at 15 seconds interval for 15 minutes for every hour and then averaged	PEA through approved monitoring agency

#### 4.5.9 Indicative ESMP for Road Improvements

Project Stage and Activity	Potential Negative Impacts	Mitigation Measures	Responsible Agency for Implementation	Responsible Agency for Monitoring
<b>Design and Pre Construction Stage</b>				
<b>Applicable Permits and Clearances for various activities like Hot mix plant, batching plant, alignment</b>	<ul style="list-style-type: none"> <li>Work delay / stoppage, and conflicts with the authorities and communities</li> </ul>	<ul style="list-style-type: none"> <li>Processing of clearances/permits on a timely basis maintaining a log / simple MIS of the clearances required and their status</li> <li>The contractor shall follow all stipulated conditions for pollution control as suggested by the PCB in the consent/ NoC for establishing and operating the Hot-mix and Batching Plant and any other activities.</li> </ul>	Contractor	PEA / PMC
<b>Planning the Location of Labor Camp, quarry / other material sourcing sites</b>	<ul style="list-style-type: none"> <li>Location in sensitive areas, unstable areas, agricultural land</li> <li>Side Slippage / issues with communities/owners</li> </ul>	<ul style="list-style-type: none"> <li>Quarries: Only stable areas and existing or new government approved sites may be considered</li> <li>Consent from PCB (Consent to establish (CTE) and Consent to operate (CTO)) is required for stone crushers and quarry sites if it is required to set up new unit for this project. In case sourced from third party then it shall be ensured that the construction materials are procured from approved/ licensed quarry sites and stone crushers</li> <li>Borrow pits: Shall be in area with stable soil and preferably away from agricultural land. PEA shall inspect every borrow area location prior to issuing an approval for use of such sites.</li> <li>Labor camp location shall be predetermined; away from any contaminated land / in appropriate landuse. Plan shall be prepared and got approved by Engineer in Charge</li> </ul>	Contractor	PEA / PMC
<b>Poor quality of pavement and alignment design</b>	<ul style="list-style-type: none"> <li>Water leakage/seepage through pavement and damage of road</li> <li>Poor alignment of road resulting in accidents</li> </ul>	<ul style="list-style-type: none"> <li>Ensure quality of designs of the road – its alignment and cross-sections; including visibility factors, maneuvering standards, pavement layer thicknesses, material content / proportions suggested by proper design and scrutiny with respect to IRC and other applicable standards</li> </ul>	Contractor	PEA / PMC
<b>Determination of ROW</b>	<ul style="list-style-type: none"> <li>Road widening requiring more land, leading to unnecessary</li> </ul>	<ul style="list-style-type: none"> <li>Cross sections for the project road shall be worked out to minimize resettlement impacts, and the proposed designs if for road</li> </ul>	Contractor	PEA / PMC

<b>Project Stage and Activity</b>	<b>Potential Negative Impacts</b>	<b>Mitigation Measures</b>	<b>Responsible Agency for Implementation</b>	<b>Responsible Agency for Monitoring</b>
<b>width</b>	geometric cuts, soil erosion, and destruction of plant and water resources	widening, shall be accommodated within the RoW that is available clear of any encroachments and encumbrances.		
<b>Drainage structures</b>	<ul style="list-style-type: none"> <li>▪ Poor drainage causing water stagnation, submergence zones</li> <li>▪ Damage to cross-drainage structures because of inadequacy to support water flows, leading to damage to road</li> </ul>	<ul style="list-style-type: none"> <li>▪ Drains to be well lined (Eg: with cement mortar)</li> <li>▪ Drainage structures designed in accordance with anticipated levels of water flows, proper slopes</li> </ul>	Contractor	PEA / PMC
<b>Geometric cuts</b>	<ul style="list-style-type: none"> <li>▪ Excessive excavation leading to unnecessarily large volumes of earthworks, and generation of excessive dust</li> <li>▪ Sediments deposited in nearby water bodies</li> </ul>	<ul style="list-style-type: none"> <li>▪ Designs to be based on scientific aspects especially in sharp curves where geometric adjustment is required</li> </ul>	Contractor	PEA / PMC
<b>Alignment/ road passing through sensitive areas (sanctuaries, Forests areas)</b>	<ul style="list-style-type: none"> <li>▪ Potential impact to the ecosystem (both biotic and abiotic) and migratory birds</li> </ul>	<ul style="list-style-type: none"> <li>▪ Alignment shall be properly designed to avoid habitat disruption and fragmentation</li> <li>▪ Roosting, nesting, breeding places and pathways used by animals (including aquatic) / birds should not be severed or disturbed</li> <li>▪ Areas of continual habitat of important flora (specially; indigenous varieties) shall not be severed</li> <li>▪ Noise generating construction activities shall be temporarily suspended during the migratory season (October till January). Hence the impact on the presence of forest area shall be managed with no harmful impacts to the fauna</li> <li>▪ Proper plan for disposal of construction / demolition waste, solid waste and leachate generated from it.</li> </ul>	Contractor	PEA / PMC

Project Stage and Activity	Potential Negative Impacts	Mitigation Measures	Responsible Agency for Implementation	Responsible Agency for Monitoring
<b>Construction Stage Impacts</b>				
<b>Establishment and shifting of construction camps</b>	<ul style="list-style-type: none"> <li>Deforestation and poaching by laborers</li> <li>Improper use of community resources such as non-timber forestry products by construction workers</li> <li>Visual blight due to poorly managed construction site</li> <li>Disturbance to nearby settlements</li> <li>Leaving dirty and waste material after shifting from one camp site to another</li> <li>Improper waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>Provision of cooking fuel to contractors' staff</li> <li>Guidance to contractor on contract documents regarding making the workers aware of impacts due to cutting trees, hunting and fishing, and other prohibited activities in community areas and monitoring them</li> <li>Provision of proper stay facilities, waste disposal facilities and health &amp; safety facilities</li> <li>Prior information to nearby communities, health centres regarding camp establishment</li> <li>Refer ECoP on Labour Camp Management</li> </ul>	Contractor	PEA / PMC
<b>Stockpiling of construction material</b>	<ul style="list-style-type: none"> <li>Obstruction to drainage, disturbance/safety hazard to road users</li> <li>Dust generation from stock pile area</li> </ul>	<ul style="list-style-type: none"> <li>Due consideration shall be given for material storage and construction sites such that it will not cause obstruction of drainage, disturbance/ safety hazard to road users, etc. Piles should be suitably contained and provided with signboards / markings. Proper storage with spill management considerations for oil, fuels and</li> <li>Stockpiles shall be covered to protect from dust and erosion, and to maintain quality of construction materials</li> </ul>	Contractor	PEA / PMC
<b>Removal of vegetation and uprooting of trees</b>	<ul style="list-style-type: none"> <li>Negative changes in micro-level wildlife habitat/environment</li> <li>Soil erosion</li> <li>Visual Impacts</li> </ul>	<ul style="list-style-type: none"> <li>Design shall be prepared to minimize the loss of avenue trees, plantation</li> <li>If impacts on trees become unavoidable, compensatory tree plantation shall be carried out at prescribed norms</li> <li>Refer ECoP on Plantations / Compensatory Afforestation</li> </ul>	Contractor	PEA / PMC
<b>Cutting of hill slope and earth</b>	<ul style="list-style-type: none"> <li>Soil erosion and landslides</li> </ul>	<ul style="list-style-type: none"> <li>Confine cutting activities to dry season with appropriate screens to contain dust. Cover exposed areas at the earliest</li> </ul>	Contractor	PEA / PMC

<b>Project Stage and Activity</b>	<b>Potential Negative Impacts</b>	<b>Mitigation Measures</b>	<b>Responsible Agency for Implementation</b>	<b>Responsible Agency for Monitoring</b>
<b>removal from borrow areas</b>	<ul style="list-style-type: none"> <li>▪ Visual Blight of landscape because of improper disposal of debris</li> <li>▪ Dust pollution</li> <li>▪ Disruption of local drainage</li> <li>▪ Siltation in nearby water bodies and consequent negative effects on aquatic ecology</li> <li>▪ Noise and disturbance to nearby communities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use standard / accepted methods for cutting and maintain proper repose</li> <li>▪ Disposal of debris at proper sites or reuse material for construction/landscaping</li> <li>▪ Proper restoration of borrow areas</li> <li>▪ Provision of appropriate drainage structures/facilities</li> <li>▪ Confine construction activities to daytime</li> </ul>		
<b>Quarrying / Borrow pits Operations</b>	<ul style="list-style-type: none"> <li>▪ Landslides (rock slides/falls)</li> <li>▪ Scarring of landscape</li> <li>▪ Disturbance to wildlife and nearby communities from blasting</li> </ul>	<ul style="list-style-type: none"> <li>▪ Adequate safety precautions shall be ensured during transportation of quarry material from quarries to the construction site (refer ECoPs on Borrow area, Quarry Management)</li> <li>▪ Vehicles transporting the material shall be covered to prevent spillage</li> <li>▪ Operations to be undertaken by the Contractor as per the direction and satisfaction of the PEA/PMC</li> <li>▪ All borrow areas shall be restored to the original condition, immediately upon completion of the use of such a source</li> </ul>	Contractor	PEA / PMC
<b>Crushing of stone and transport of stone/materials</b>	<ul style="list-style-type: none"> <li>▪ Dust pollution affecting construction laborers and local vegetation</li> <li>▪ Air pollution from machinery and vehicle exhausts</li> <li>▪ Noise pollution and disturbance to nearby wildlife and communities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Water sprinkling of stone crushing site</li> <li>▪ Proper covers for vehicles transporting stone and materials</li> <li>▪ Regular maintenance of machinery and vehicles</li> <li>▪ Confine stone crushing and transportation activities to daytime</li> <li>▪ Inform communities and consider their suggestions on reducing noise levels</li> <li>▪ Personal Protective Equipment (PPEs) such as masks, eye plugs, goggles etc. for laborers</li> </ul>	Contractor	PEA / PMC
<b>Road surfacing activities</b>	<ul style="list-style-type: none"> <li>▪ Air pollution from smoke and gaseous emissions affecting health of workers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provide masks to workers exposed to dust and smoke</li> <li>▪ Manage movement of vehicles during road surfacing work</li> </ul>	Contractor	PEA / PMC

<b>Project Stage and Activity</b>	<b>Potential Negative Impacts</b>	<b>Mitigation Measures</b>	<b>Responsible Agency for Implementation</b>	<b>Responsible Agency for Monitoring</b>
	<ul style="list-style-type: none"> <li>▪ Traffic disruptions</li> <li>▪ Disturbance to entry to nearby premises</li> </ul>	<ul style="list-style-type: none"> <li>▪ Plan traffic management and get approval from local authorities, traffic police</li> <li>▪ Arrange flagmen near sensitive receptors</li> <li>▪ Inform the communities regarding disturbance to entry to premises and provide mitigation measures at the earliest in case their access is hindered</li> <li>▪ Provide signboards with the work details with contact numbers of all concerned</li> </ul>		
<b>Construction of line and cross drainage structures</b>	<ul style="list-style-type: none"> <li>▪ Disruption of local stream/river courses and aquatic hydrology</li> <li>▪ Increased sediments in rivers or streams</li> </ul>	<ul style="list-style-type: none"> <li>▪ Provision of appropriate drainage facilities and river/stream diversion structures</li> </ul>	Contractor	PEA / PMC
<b>Operation of machinery and equipment and general activities of laborers earplugs, gloves, etc.</b>	<ul style="list-style-type: none"> <li>▪ Spillage/ leakage of chemicals and oil and contamination of soil and water resources</li> <li>▪ Injury to workers/others</li> <li>▪ Respiratory problems from dust and machinery emissions</li> <li>▪ Hearing problems due to high level of noise</li> </ul>	<ul style="list-style-type: none"> <li>▪ Proper storage and handling of chemicals and oil (refer ECoP on Construction Plants &amp; Equipment Management)</li> <li>▪ Provision of workers with appropriate PPEs such as construction hats, face masks</li> <li>▪ Provision of well-equipped first aid kits and health facilities at construction camp and work sites</li> </ul>	Contractor	PEA / PMC
<b>Water sourcing for domestic usage or construction work</b>	<ul style="list-style-type: none"> <li>▪ Misuse of community water resources</li> </ul>	<ul style="list-style-type: none"> <li>▪ Independent arrangements to be made for water requirements so that supplies to nearby communities remains unaffected</li> </ul>	Contractor	PEA / PMC
<b>Material Handling at Site</b>	<ul style="list-style-type: none"> <li>▪ Exposure of workers to dust and heat</li> <li>▪ Worker's safety in handling and storage of material</li> </ul>	<ul style="list-style-type: none"> <li>▪ All workers employed on mixing asphaltic material, cement, lime mortars, concrete etc., shall be provided with appropriate PPEs including protective footwear and protective goggles (refer ECoP and EMP on Labour and Worker's Health and Safety).</li> <li>▪ Workers, who are engaged in welding works, shall be provided with welder's protective eye-shields.</li> </ul>	Contractor	PEA / PMC

<b>Project Stage and Activity</b>	<b>Potential Negative Impacts</b>	<b>Mitigation Measures</b>	<b>Responsible Agency for Implementation</b>	<b>Responsible Agency for Monitoring</b>
		<ul style="list-style-type: none"> <li>Workers engaged in stone breaking activities shall be provided with protective goggles and clothing and shall be seated at sufficiently safe intervals. There shall be guidance to other workers on site regarding such activities</li> </ul>		
<b>Disposal of Construction Waste /Debris / Cut Material</b>	<ul style="list-style-type: none"> <li>Location impacts (including change in topography, landscaping etc.)</li> </ul>	<ul style="list-style-type: none"> <li>The waste generated shall be reused in the construction activities to the maximum extent possible. Cut and fill material shall be balanced so as not to have requirement for disposal.</li> <li>Remaining material if any shall be disposed off safely at the disposal sites (refer ECoP on Waste Management and Debris Disposal).</li> <li>Safe disposal of the extraneous material in the pre-identified and approved disposal locations shall be ensured. In no case, any construction waste shall be disposed around the sub-project locations indiscriminately.</li> <li>Cut material generated because of cutting of slopes shall be utilized for construction of retaining walls, embankments and as filling material</li> </ul>	Contractor	PEA / PMC
<b>Safety Measures During Construction</b>	<ul style="list-style-type: none"> <li>Accident impacts</li> </ul>	<ul style="list-style-type: none"> <li>PPEs for workers on the project and adequate safety measures for workers during handling of materials at site shall be taken up (refer ECoP and EMP on Labour and Worker's Health and Safety)</li> <li>The contractor has to comply with all regulations regarding occupational health and safety</li> </ul>	Contractor	PEA / PMC
<b>Chance finds of archaeological Property / remains</b>	<ul style="list-style-type: none"> <li>Damage to archaeological Property / remains in the performance of project activities</li> </ul>	<ul style="list-style-type: none"> <li>The Contractor shall immediately upon discovery of a chance find of archaeological remains or property shall stop the work and inform PEA/PMC of such discovery and carry out the PEA /PMC instructions for dealing with the same, awaiting which all work will be stopped.</li> <li>The PEA /PMC shall seek direction from the Archaeologist at the Department of Archaeology before instructing the Contractor to recommence work on the site.</li> </ul>	Contractor	PEA / PMC



Project Stage and Activity	Potential Negative Impacts	Mitigation Measures	Responsible Agency for Implementation	Responsible Agency for Monitoring
		<ul style="list-style-type: none"> <li>Refer guidance on chance finds in PCRMP (Annexure to Volume II)</li> </ul>		
<b>Operations Phase</b>				
<b>Maintenance of Drainage</b>	<ul style="list-style-type: none"> <li>Clogging of drains and silt fence near water bodies</li> <li>Damage of drainage structures</li> <li>Disruptions to traffic, failure to enable proper drainage, and increased sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>PEA shall plan periodic maintenance and ensure that all drains (side drains and all cross drainages) are periodically cleared especially before monsoon season to facilitate the quick passage of rainwater.</li> <li>PEA shall ensure that all the sediment traps/ silt fence set up at the water bodies are cleared once in every three months.</li> </ul>	Contractor	PEA / PMC
<b>Road Safety and Maintenance of Assets</b>	<ul style="list-style-type: none"> <li>Encroachment within RoW limits</li> <li>Removal and /or obstruction to road safety and other signage within RoW</li> </ul>	<ul style="list-style-type: none"> <li>No advertisement/hoardings shall be allowed within the Right of Way limits of the project road.</li> <li>Regular maintenance and cleaning of signage boards</li> <li>Regular pruning of trees / plants obstructing visibility or signage on Road</li> </ul>	Contractor	PEA / PMC
<b>General functioning of Road</b>	<ul style="list-style-type: none"> <li>Damage to riding surface and structure of road—formation of potholes, water seepage, and poor drainage</li> <li>Excessive landslides, erosion caused by improper maintenance of bioengineering works, wall construction</li> </ul>	<ul style="list-style-type: none"> <li>Periodic inspection and maintenance of roads at regular interval</li> <li>Regular improvements to landscaping, CD structures</li> </ul>	Contractor	PEA / PMC
<b>Impacts due to Pollution</b>	<ul style="list-style-type: none"> <li>Air, Noise pollution due to traffic</li> </ul>	<ul style="list-style-type: none"> <li>Periodic monitoring and mitigation measures especially near sensitive receptors</li> </ul>	Contractor	PEA / PMC

#### 4.5.10 *Indicative ESMP to redress Incidents/Emergency Management (contractor responsibility)*

Each contractor shall include as part of the Contractors ESMP an Incident and Emergency Response Plan that clearly defines triggers and procedures in case of an incident or emergency.

Risk situations/problems arising are very diverse, and a number of measures to react to situations arising may include:

SI No.	Situation	Action	Responsibility for implementing
1.	Historical artefacts encountered during excavation	<ul style="list-style-type: none"> <li>Contractor protects the site and reports to the Engineer/PEA, and refers to local museums and the SPMU for advice</li> <li>Hand over artefacts to museum/cultural management agency</li> <li>Review to determine if the excavation can be continued</li> <li>Director of Culture and Information office in the locality will be responsible for managing objects</li> </ul>	Contractors, Consultants, Department of Culture
2	Grave encountered during excavation	<ul style="list-style-type: none"> <li>Protect the site and notify the local authorities</li> <li>Identify solution to resolve the issue in discussion with the community / individuals concerned, including timing and locations to be earmarked for relocation</li> </ul>	Contractors, PEAs, Local Bodies and the concerned organizations.
3	Complaints from the community on environmental issues related to construction activities	<ul style="list-style-type: none"> <li>To immediately remedy if possible in consultation with the community</li> <li>Record the issue and resolution in the site report / register</li> <li>Talk with PEA / SPMU /local government if conflict and arrange a speedy resolution</li> </ul>	Contractor, PEA and Local authorities
4	Accident related to construction or operation	<ul style="list-style-type: none"> <li>Aid victims and transfer immediately to the nearest medical facility if necessary using the vehicles ready on site</li> <li>Support in getting required medical care</li> <li>Cordon the area and Place 'danger' signs</li> <li>Make formal record in an accident / incident book.</li> <li>Plan and implement measures to prevent repeat accidents</li> </ul>	Workers, People Contractors, PEA, Local authorities

Sl No.	Situation	Action	Responsibility for implementing
		<ul style="list-style-type: none"> <li>Arrange insurance as per labour laws (contractor should be prior registered as per existing laws) Inform relevant authorities and SPMU in accordance with Indian laws and regulations</li> </ul>	
5	Explosives found	<ul style="list-style-type: none"> <li>Protect the scene and set the danger signs preventing access</li> <li>Inform the local authorities</li> <li>Contact appropriate authorities / with military units in the locality to request support</li> </ul>	Contractor, Local government, PEA, Concerned organization

#### 4.5.11 Indicative ESMP for Embankments, Works on Waterways

Impact/ Issues	Mitigation Measures	Responsibility	
		Implementation	Monitoring
IMPACTS AND MITIGATION MEASURES FOR PROJECT SITING			
Land over and land use changes	Relevant ECoPs of site selection, follow ICZM Plan	PEA/ Contractor	SPMU
Loss of natural vegetation and trees	Compensatory tree plantation along reconstructed embankment	PEA/ Contractor	SPMU
Loss of aquatic habitat	Avoid nesting, spawning, breeding areas for any infrastructure installation or placement, promote projects involving small community based habitat improvement projects	PEA/ Contractor	SPMU
Drainage congestion and water logging	Installation of culverts, landscaping, soft measures for drainage channelising	PEA/Contractor	SPMU
IMPACTS AND MITIGATION MEASURES FOR IMPLEMENTATION PERIOD			
Impact of burrowing of material from river beds, agriculture land and wetlands (if required)	Compliance with relevant ECoPs of sand extraction, agricultural top soil management and wetland digging. Follow applicable rules	PEA/Contractor	SPMU

Impact/ Issues	Mitigation Measures	Responsibility	
		Implementation	Monitoring
Air pollution	Pollution prevention by providing buffers for work zone, allowing vehicle movement only through well topped roads so as to prevent dust emission, using well maintained vehicles adhering to pollution standards, cover for vehicles carrying construction sand and dusty materials, and implementation of ECoPs	PEA/Contractor	SPMU
Noise	Noise control measures including buffers, enclosures for noisy machinery, PPES for workers and following relevant ECoPs	PEA/Contractor	SPMU
Water pollution	Prevent oil / fuel, material, waste disposal / overflow into waterbodies. Arrange containment, spill prevention means, cut off drains. Prepare Pollution prevention and control plan	PEA/Contractor	SPMU
Soil contamination Solid wastes and hazardous wastes	Prevent spill of hazardous materials, wastes, oils, fules on soils. Provide raised impervious platforms to store hazardous materials and wastes. Dispose soiled materials in hazardous wastes / other disposal facilities arranged or in appropriate sites suggested by the local bodies  Pollution prevention and control plan to be prepared and followed	PEA/Contractor	SPMU
Impact on aquatic habitat	Treatment of waste effluents, Cut-off work area / disposal areas from habitat areas by means of physical separation	PEA/Contractor	SPMU
Impact of wildlife habitats	No construction related activities on sensitive wildlife habitat, use of low wattage lights at construction sites in case near around nesting breeding, flight paths	PEA/Contractor	SPMU
Site clearance and restoration	Site restoration and landscaping. No wastes / materials shall remain on site after close out	PEA/Contractor	SPMU
Occupational health and safety	Implement health and safety, and emergency response plan	PEA/Contractor	SPMU

Impact/ Issues	Mitigation Measures	Responsibility	
		Implementation	Monitoring
IMPACTS AND MITIGATION MEASURES FOR POST PROJECT / OPERATION & MAINTANANCE PERIOD			
Changes in water courses (canal)	Long term monitoring and biodiversity conservation measures	PEA / Operator	DoF
Generation of solid waste	Implementation of Healthy Safety Environment Plan & SWM Plan	PEA / Operator	DoF
Air and noise pollution	Air and noise quality monitoring for 5 years and appropriate mitigation / management measures to be followed	PEA / Operator	DoF
Water pollution	Follow organic means for growing plantations / buffers, deweeding etc.	PEA / Operator	DoF
Ecological connectivity	Follow ICZM Plan. Implementation of relevant ECoPs for ensuring proper siting and wetland connectivity	PEA / Operator	DoF
Loss of vegetation, habitats	Arrange implementation of best practices for plantation, habitat rejuvenation	PEA / Operator	DoF
Impact of avifauna	Implementation of related ECoPs for fauna / flora management	PEA / Operator	DoF

#### 4.5.12 Indicative Monitoring Plan for Marine Species conservation, livelihood improvement / works on Waterbodies / Canal sides

Parameter/Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Monitored By
Sediment Quality for heavy metals	Canal/riverbed sediment at 5 locations	Laboratory analysis for metals and oil/grease (lead, cadmium, chromium, copper, manganese, mercury and zinc)	Before sand extraction	Contractor/ PEA through a nationally recognized laboratory	SPMU
Soil Pollution	Canal, construction site, camp	Visual Inspection that filling is through several compartments	Beginning of earth filling works	PEA/Contractor	SPMU
	Canal, construction, and material storage sites	Ensure no contamination effluent is leaving from the filling area to the nearby agriculture lands	Weekly	PEA/Contractor	SPMU

Parameter/Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Monitored By
Stability of slopes	Side slopes of sluice gates, canal dyke, pond dyke, and resettlement sites	Compaction as per contract specifications, visual inspection of erosion prevention measures and occurrence of erosion	Monthly	PEA/Contractor	SPMU
Hydrocarbon and chemical storage	Construction camps and yards, aquaculture farms, mariculture, sites	Visual inspection of storage facilities	Monthly	PEA/Contractor	SPMU
Traffic safety	Construction Access Roads	Visual Inspection to see whether proper traffic signs are placed and flag-men for traffic management are engaged	Monthly	PEA/Contractor	SPMU
Air Quality (dust, smoke)	Construction sites	Visual inspection to ensure good standard equipment is in use and dust suppression measure (e.g., spraying of waters) are in place	Daily	PEA/Contractor	SPMU
	Material storage sites	Visual inspection to ensure dust suppression work plan is being implemented	Monthly	PEA/Contractor	SPMU
Air quality	Sensitive receptors along construction corridor	24 hours continuous monitoring with the help of appropriate instruments and analysers (particulate matter, carbon dioxide, sulphur and nitrogen oxides)	Quarterly	PEA/Contractor	SPMU
Noise	Construction sites	Noise measurement using noise meter; Ensure work restriction between 21:00-06:00 close to the sensitive locations	Weekly	PEA/Contractor	SPMU
Surface water quality	At the baseline monitoring sites at five sites	Sampling and analysis of surface water quality (TDS, Turbidity, pH, dissolved oxygen, biological and chemical oxygen demand)	Quarterly	PEA/Contractor through a nationally recognized laboratory	SPMU
Groundwater quality	Location of tube-well installation (for workers camps), shrimps farm, other buildings, fish	Depth of tube well should be more than 30m. Test water for arsenic iron and manganese before installing of casing. If the quality is found not suitable further deepening will be done	During drilling of wells	PEA/Contractor through a nationally recognized laboratory	SPMU

Parameter/Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Monitored By
	landing centres, markets, etc.				
	Water wells to be used by contractors for drinking	Laboratory analysis of all drinking water parameters specifies in national standards	After development of wells	PEA/Contractor through a nationally recognized laboratory	SPMU
Planation	Canal slopes, building construction sites, affected mangroves forest sites	Visual inspection to ensure plantations are taken care of	Monthly	PEA/Contractor	SPMU
Waste management	Construction camps and construction sites, shrimp farms area, maricultural area, hatcheries, other infrastructure sites, laboratory research vessels, etc	Visual inspection that solid waste is disposed at designated site	Monthly	PEA/Contractor	SPMU
Drinking water and sanitation	Construction camps and construction sites, shrimp farm area, mariculture area, hatcheries, other infrastructure sites, research vessels, etc	Ensure the construction workers are provided with safe water and sanitation facilities in the site	Weekly	PEA/Contractor	SPMU
Flora and fauna	Sensitive habitats in project influence area	Survey and comparison with baseline environment. Ensure use of lighting at construction sites conforms with requirement to limit impacts to wildlife	Six-monthly	PEA/Biodiversity Conservation and monitoring consultants	SPMU, DoF
Fish migration	Regulators, mariculture area, canal re-excavation, etc	Sample fish catch	Monthly after installation of regulators	PEA/Local authority	SPMU, DoF

Parameter/Activity	Location	Means of Monitoring	Frequency	Responsible Agency	
				Implemented By	Monitored By
Restoration of Work Sites	All work Sites	Visual Inspection	After completion of all works	PEA/Contractor	SPMU, DoF
Safety of workers Monitoring and reporting accidents	At work sites	Usage of personal protective equipment and implementation of contractor OHS plan	Monthly	PEA/Contractor	SPMU, DoF
Grievances (environment issues)	In the project	Number of grievances registered and addressed	Monthly	PEA/Contractor	SPMU, DoF
During Post Project Period					
Stability of protection works	Canal slopes, regulators, sites, and resettlement sites	Visual inspection of erosion prevention measures and occurrence of erosion	Monthly	DoF	DoF
Plantation	Construction sites, canal slopes, pond dyke, shrimp, farms, etc	Visual inspection to ensure plantations are taken care of	Monthly	PEA/Contractor	PEA/SPMU
Fish migration	Regulators, mariculture area, canal re-excavation, etc	Sample fish catch	Monthly during migration season	PEA/Contractor	PEA/SPMU, DoF
Waste effluents	Construction camps and construction sites, shrimp farm area, mariculture area, hatcheries, other	Visual inspection that solid and liquid waste effluents are properly managed during post project period	Six-monthly	DoF/PEA/Contractor	DoF



#### 4.5.13 Indicative ESMP for Small Land Development, Infrastructure Works

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
<b>Design Phase Measures</b>				
1	Low attention on Considerations for Labor & Community Safety in Designs	<ul style="list-style-type: none"> <li>Layout, Designs, sourcing of materials, phasing and work plan to consider labor and community safety as priorities</li> <li>Follow Operations Manual, applicable works manuals, to ensure safety (structural and work) and stability</li> <li>Follow Health and safety guidelines, Fire Safety provisions, Building and Other Construction Workers Act, Labor Acts / Laws applicable to prepare work plan, scheduling, monitoring and estimate preparation</li> <li>Prepare emergency preparedness and evacuation plans as / if applicable to work sites</li> </ul>	High likelihood Permanent Impact	DPR preparation agency / Implementing Agency
<b>Pre-construction &amp; Construction Phase</b>				
2	Clearances	<ul style="list-style-type: none"> <li>All clearances required from other departments shall be ensured and made available before start of work.</li> <li>Consent for Extracting / Procuring Building Materials, labor license for the project, etc.</li> </ul>	High likelihood Permanent Impact	Implementing agency / Contractor
3	Tree Cutting & Site Clearance	<ul style="list-style-type: none"> <li>In case any removal of trees is required, follow SOPs for careful uprooting</li> <li>Inform communities and barricade the site while uprooting to ensure safety</li> <li>Plan tree cutting based on local ecological aspects, erosion aspects which will be aggravated during monsoons etc.</li> </ul>	High likelihood Permanent Impact	Implementing agency / Contractor
4	Utility Relocation	<ul style="list-style-type: none"> <li>Identify the common utilities that would be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc.</li> <li>Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts. Plan to be discussed with such agencies and adequate precautions (such as switching off electric supply, water supply etc.) to be taken to avoid any danger to communities, laborer. Prior information shall be provided to affected communities and adequate info boards / signages shall be arranged on sites with contact details of concerned officials</li> </ul>	Low likelihood (may be in peri-urban) Temporary Impact	Implementing agency / Concerned departments/ Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
		<ul style="list-style-type: none"> <li>Where ever the entry and exit to houses/ establishments are affected due to construction activities, alternate temporary arrangement for crossing over shall be provided. Any grade changes (for human / vehicular movement) shall be suitably remediated at the earliest</li> <li>Water Supply Lines crossing the drains are identified and Contractor shall take care of these lines while the time of construction.</li> </ul>		
5	Planning of temporary Traffic arrangements	<ul style="list-style-type: none"> <li>Temporary diversion for traffic shall be provided with the approval of the Traffic Police Department. Traffic control plans shall be prepared and submitted to the engineers for approval, one week prior to commencement of works.</li> <li>The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, signages, safety measures for transport of materials and arrangement of flagmen especially in areas close to sensitive receptors including schools, hospitals, commercial areas.</li> </ul>	Low likelihood (may be in peri-urban) Temporary Impact	Implementing agency / Contractor
6	Temporary flooding during Construction activity	<ul style="list-style-type: none"> <li>De-silting activity shall be scheduled during non-flooding season.</li> <li>Proper drainage arrangements to be made, to avoid the overflowing of existing drains due to construction activity.</li> </ul>	Low likelihood Temporary Impact	Implementing agency / Contractor
7	Prevention of accidents	<ul style="list-style-type: none"> <li>Proper barricading, signage boards and lighting shall be ensured to prevent of accidents involving human beings, animals or vehicles falling or accidents during construction period. The construction area should be barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians. For night time visibility of barricades, reflectors shall be provided, in discussion with community. Lighting height, type and intensity shall consider impacts on fauna as well especially when work is near biodiverse areas/ movement paths/ nesting / spawning / breeding areas of fauna</li> <li>The project engineer will plan and direct the contractor to execute the work progressively so that the length of the open excavated trench [if any] is minimized in order to reduce possible accidents</li> </ul>	High likelihood Permanent Impact	Implementing agency / Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
8	Drainage flow	<ul style="list-style-type: none"> <li>• Alternate arrangements like diversion of the drainage shall be ensured to allow the natural flow.</li> <li>• It shall be ensured that none of the construction activities affect the natural flow of the drainage.</li> <li>• Adequate cut off drains shall be provided as and when necessary</li> </ul>	Low likelihood Possible permanent Impact	Implementing agency / Contractor
9	Storage of materials	<ul style="list-style-type: none"> <li>• The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. No construction materials should be stored on the road, on top of or beside drains and footpaths, or on any other public area as this may restrict public access to these utilities, or in such a way that such storage would not be dangerous for moving people or traffic.</li> <li>• Site for storage of construction materials to be identified without affecting the traffic and other common utilities, and the quality of the construction materials.</li> <li>• Construction materials should only be stored and prepared on the site if they do not obstruct the road or any surrounding public utility. Construction materials should only be transported to the worksite as and when required for construction</li> <li>• Storage space shall be well defined and marked / with signboards/berms.</li> </ul>	High likelihood Temporary Impact	Implementing agency / Contractor
10	Safety issues [communities esp. children] while the use of modern machinery	<ul style="list-style-type: none"> <li>• Modern machinery such as JCBs, backhoes etc., may be used to minimize the construction period. SOPS for heavy equipment like excavators, JCBs shall be prepared and implemented carefully on site</li> <li>• Adequate cordoning and guides / flag men shall be arranged while operating such equipment. Community including children, and workers shall be warned against moving parts.</li> </ul>	High likelihood Permanent Impact	Contractor
11	Dust pollution near settlements	<ul style="list-style-type: none"> <li>• All earth work will be protected in manner acceptable to the engineer to minimize generation of dust. If it is expected that minor activities would generate ample amount of dust, such construction shall be covered.</li> <li>• Construction material shall be covered or stored in such a manner so as to avoid being affected by wind flow.</li> <li>• Unpaved haul roads near / passing through residential and commercial areas to be watered thrice a day.</li> <li>• Trucks carrying construction material or wastes/soil, to be adequately covered to avoid the dust pollution and to avoid the material spillage.</li> </ul>	Low likelihood Temporary Impact	Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
12	Protection of residential /Sensitive receptors	<ul style="list-style-type: none"> <li>• Sprinkling of water to be done at regular intervals at places of work to protect the nearby inhabitants and road users.</li> <li>• Noisy construction operations in residential and sensitive areas should be done only between 7.30 am and 6.00 pm.</li> <li>• Preventive maintenance of construction equipment and vehicles to meet emission standards and to keep them with low noise.</li> <li>• Provision of enclosing generators and concrete mixers at site [for construction of check dams, others involving concrete work].</li> <li>• Sound barriers shall be installed during the construction phase to protect the inhabited areas from the noise from construction activities.</li> <li>• Adequate barricading and safety measures to protect dust pollution and noise impacts on sensitive receptors like schools and hospital etc. due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction and operation phase.</li> </ul>	Low likelihood Temporary Impact	Contractor
13	Vehicular noise pollution at residential /sensitive receptors.	<ul style="list-style-type: none"> <li>• Idling of temporary trucks or other equipment should not be permitted during periods of loading/unloading or when they are not in active use. The practice must be ensured especially near residential /commercial/sensitive areas.</li> <li>• Stationary construction equipment will be kept at least 500m away from sensitive receptors.</li> <li>• All possible and practical measures to control noise emissions during drilling shall be employed. The implementing agency may direct to take adequate control measures depending on site conditions.</li> </ul>	Low likelihood Temporary Impact	Contractor
14	Noise from vehicles, plants and equipment	<ul style="list-style-type: none"> <li>• Use of less noise-generating cutting equipment's, provide personal protective equipment such as ear plugs/muffs and other safety measures to laborer. In addition, the concrete mixture to be used for construction works will be prepared in a location away from the locality to minimize the noise generated from the machinery.</li> <li>• Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced.</li> </ul>	Low likelihood Temporary Impact	Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
		<ul style="list-style-type: none"> <li>Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum.</li> </ul>		
15	Impacts on labor and community health due to poor Labor camp & facilities	<p>Preference to be given for local skilled / unskilled man power. Setting up of labor camps needs to be done as per the procedures and with all permits. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labor laws shall be ensured.</p> <p>The contractor shall also guarantee the following:</p> <ul style="list-style-type: none"> <li>The location, layout and basic facility provision of each labor camp will be submitted to Site / Project Engineer prior to their construction.</li> <li>The construction will commence only upon the written approval of the Engineer.</li> <li>The Contractor shall construct and maintain all labor accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>The sewage system for the camp shall be designed, built and operated in such a fashion that no health hazards occur and no pollution to the air, groundwater or adjacent watercourses take place. Ensure adequate water supply is to be provided in all toilets and urinals.</li> <li>The contractor shall provide garbage bins in the camps and ensure that these are regularly emptied and disposed of in a hygienic manner as approved by the Engineer.</li> <li>At all workplaces, temporary arrangements for drinking water, snacks, rest rooms / shades and toilets separate for male/ female] laborer shall be arranged. Special PPEs, and facilities to be arranged in case of work in hot sun and contaminated water. Health check-ups shall be arranged.</li> </ul>	Low likelihood Permanent Impact	Contractor
16	Pollution from Construction Wastes	<ul style="list-style-type: none"> <li>All waste arising from the project is to be stacked and disposed of in the manner that is acceptable by the Engineer.</li> <li>The engineer shall certify that all liquid wastes disposed of from the sites meet the discharge standard.</li> </ul>	High likelihood Permanent Impact	Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
17	Pollution from Fuel and Lubricants	<ul style="list-style-type: none"> <li>The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites will be located at least 500 m from sensitive receptors.</li> <li>Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground.</li> <li>Contractor shall arrange for collection, storing and disposal of oily wastes to the pre identified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed of in accordance with MOEFCC and state PCB guidelines.</li> <li>Engineer will certify that all arrangements comply with the guidelines of PCB/MOEFCC or any other relevant laws.</li> </ul>	Low likelihood Permanent Impact	Contractor
18	Chance found Flora & Fauna	<ul style="list-style-type: none"> <li>Training to Project Officials and workers on site recce for PCRs prior to Site clearance and excavation</li> <li>The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.</li> <li>If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same.</li> <li>The Engineer will report to the nearby forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.</li> </ul>	Possible likelihood High Permanent Impact	Implementing agency / Contractor
19	Chance found archeological property	<ul style="list-style-type: none"> <li>Training to Project Officials and workers on-site recce for PCRs prior to Site clearance and excavation</li> <li>Chance find Procedures to be followed.</li> <li>The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing.</li> </ul>	Possible likelihood High Permanent Impact	Implementing agency / Contractor
20	Work Safety Issues	<ul style="list-style-type: none"> <li>Adequate precautions shall be taken to prevent accidents and from the machinery. All machines used shall conform to the relevant Indian standards Code and shall be regularly inspected by the Engineer-in-charge.</li> </ul>	High likelihood	Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
		<ul style="list-style-type: none"> <li>Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</li> <li>All excavations shall maintain 'safe' slope</li> <li>Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc.</li> <li>Welder's protective eye-shields shall be provided to workers who are engaged in welding works.</li> <li>Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing compaction, or concrete mixing operation.</li> <li>The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, earplugs, mask etc. to workers and staffs and replace as required</li> <li>The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</li> <li>The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 and other relevant State/ Central Acts are adhered to.</li> <li>The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.</li> <li>Use of hazardous materials such as Asbestos is not permitted for any work</li> </ul>	Possible Permanent Impact	
21	Risk from Electrical Equipment	<p>The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that</p> <ul style="list-style-type: none"> <li>No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>All necessary fencing and lights will be provided to protect the public in construction zones.</li> <li>All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good</li> </ul>	High likelihood Possible Permanent Impact	Contractor

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
		working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.		
22	Lack of provisions for First Aid	<p>The contractor shall arrange for appropriate First Aid.</p> <ul style="list-style-type: none"> <li>• A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone</li> <li>• Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital and display of project details and emergency contact numbers near work sites in local language/language understandable by the workers</li> <li>• Training of community/laborer on First aid</li> </ul>	High likelihood Possible Permanent Impact	Contractor
23	Lack of Informatory Signs and Hoardings	The contractor shall provide, erect and maintain information/safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer. All emergency details to be in local language/language understandable by the workers	High likelihood Possible Permanent Impact	Implementing agency / Contractor
24	Disposal of de-silted / Excavated material, Construction and other waste.	<p>The excavated /de-silted material shall be disposed of without any accumulation. The soil excavated from any canal and river or ponds where waste has accumulated, shall be tested for quality, adequately treated with methods like bioremediation and proper reuse option explored. The rest may be safely disposed of as agreed with the local authority.</p> <p>The following shall be ensured during silt disposal</p> <ul style="list-style-type: none"> <li>• The dumping does not impact natural drainage courses</li> <li>• No endangered / rare flora is impacted by such dumping</li> <li>• Settlement area located at least 1.0 km away from the site.</li> <li>• It should be located in nonresidential areas located in the downwind side located at least 100m from the designated forest land.</li> <li>• Avoid disposal on productive land. Disposal site should be agreeable by the local community, in consultation with the local authority and engineer</li> <li>• All vehicles delivering material to the site shall be covered to avoid material spillage and dust emissions.</li> </ul>	High likelihood Possible Permanent Impact	Implementing agency / Contractor
25	Accidents and health safety issues due to poor	<ul style="list-style-type: none"> <li>• Contractor to prepare work close out strategy and site restoration plans, the plan is to be implemented by the contractor prior to demobilization.</li> </ul>	High likelihood	Contractor



Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
	clearance of construction camps, restoration and work exit	<ul style="list-style-type: none"> <li>On completion of the works, all temporary structures will be cleared away, all rubbish cleared, and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer. This shall be certified by the engineer in the works register maintained on site and handed over to the Engineer of the PEA upon closure</li> </ul>	Possible Permanent Impact	
26	Accidents due to poor Slopes for excavations, poor stacking of materials/housekeeping, improper scaffolding, slippages and enclosed spaces	<ul style="list-style-type: none"> <li>Contractor to adopt safe work practices based on guidelines</li> <li>Regular monitoring</li> <li>Keep record of accidents and near misses</li> </ul>		
27	Grievance Redressal	Any grievance arising during implementation of the project shall be redressed by the Implementing agency through mechanism identified and a committee shall be established prior to start of work.	High likelihood Possible Permanent Impact	Implementing agency / Contractor
<b>Operation Phase</b>				
28	Health and Operational issues due to Poor Maintenance	<p>The following practices should be adopted in maintaining stormwater drains, water channels, ponds:</p> <ul style="list-style-type: none"> <li>No clogging of drains, channels or waste accumulation in ponds</li> <li>Water bodies/channels shall be regularly inspected and cleaned especially prior to monsoons.</li> <li>Rubbish and silt removed from the water bodies created should not be left alongside the water body and shall be immediately disposed of in pre-identified site with necessary precautions</li> <li>It shall be ensured that the Environmental, Health and Safety guidelines of World Bank (Generic and Water &amp; Sanitation) are adhered to relevant activities during operation and maintenance.</li> </ul>	High likelihood Possible Permanent Impact	Implementing agency
29	Nuisance due to clogging of channels, formation of	<ul style="list-style-type: none"> <li>Ensure timely de-silting of drains, water bodies, ponds</li> <li>Create awareness among the people not to throw garbage and other waste into water bodies created. This would in turn ensure community health and safety</li> </ul>	High likelihood	Implementing agency

Sl. No.	Potential Impact	Mitigation Measures	Likelihood & importance	Responsible Agencies
	mosquito breeding areas etc.,		Possible Permanent Impact	
30	Lack of Emergency Response arrangements	<ul style="list-style-type: none"> <li>• Ensure First Aid facilities &amp; emergency contact details in local language</li> <li>• Prepare and train workers and communities for emergency support/First aid</li> <li>• Neighborhood committees shall watch over any emergencies / issues related to facilities created and shall be trained to report and respond at the earliest</li> </ul>	High likelihood Possible Permanent Impact	Implementing agency

#### 4.5.14 Indicative ESMP for Fish Landing Site

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
PLANNING & DESIGN PHASE: Measures that should be considered by the respective Line Department while preparing the Detailed Project Report (DPR)					
Initiation of construction prior to receipt of all clearances	Legal non-compliance	Temporary	<ul style="list-style-type: none"> <li>▪ All clearance/ approvals required for Environmental aspects during construction shall be ensured and made available before start of work.</li> </ul>	Contractor & PEA	SPMU
Siting and designing	Use of unapproved site, Flooding or waterlogging in the project area, Siltation during construction, Saltwater intrusion	Temporary	<ul style="list-style-type: none"> <li>▪ Ensure that the designed Environmental and Social Experts of the State has authorized and approved the screening checklist for the concerned activity at each proposed site.</li> <li>▪ Ensure community and participation during the identification of sub-project sites</li> <li>▪ Apply siting criteria and design criteria</li> <li>▪ Avoid unfavorable geological and hydro geological conditions.</li> </ul>	Contractor & PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
	Flooding of low-lying areas Erosion and soil run-off Tree felling Destruction of, or disturbance to habitats		<ul style="list-style-type: none"> <li>Drainage patterns should not be altered as this may lead to flooding of low-lying area on the landward side of the embankment.</li> <li>Physical provision to improve stability (e.g. turfing/pitching).</li> <li>Adequate number of sluices of proper size and design / or other arrangements as appropriate must be provided for better drainage.</li> <li>Site should be selected in consultation with local communities/tribes to check for socially sensitive, conflict-prone areas and usage of such sites for the construction should avoid</li> <li>Avoid/minimize tree felling</li> </ul>		
Construction schedule	Soil erosion Flooding	Temporary	<ul style="list-style-type: none"> <li>Avoid/minimize construction during monsoon</li> <li>The activities of construction shall be scheduled taking into consideration factors such as sowing of crops, harvesting, availability of labor during a particular period and other site-specific conditions.</li> </ul>	Contractor & PEA	SPMU
CONSTRUCTION PHASE: The following section contains instruction to the contractors, which should be adhered to while carrying out the construction activity.					
Tree felling	Soil erosion Destruction of and disturbance to habitat Loss of canopy Global warming	Temporary	<ul style="list-style-type: none"> <li>Tree felling shall be minimized;</li> <li>Cutting of trees with specific medicinal, religious, archaeological, environmental important should be avoided.</li> <li>Mangrove plants or indigenous vegetation of importance shall not be cut for any purpose</li> <li>Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area.</li> <li>Trees shall be removed from the construction sites before commencement of construction with prior permission from the concerned department.</li> </ul>	Contractor/ PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
Construction	Topsoil erosion during construction, and due to transport Noise pollution Water pollution Waterlogging and creation of mosquito breeding grounds Possible groundwater contamination (by oil and grease), especially during the construction phase Air pollution Human health and safety Loss of vegetation in the borrow areas Exploitation of potable water sources due to construction activities. Quarrying for materials	Temporary	<ul style="list-style-type: none"> <li>▪ Prior to ground-breaking, the Line Department shall take authorization from the designated Environmental Expert that the outcome of the screening process holds good at the time of construction.</li> <li>▪ Vehicles delivering materials should be covered to reduce spills.</li> <li>▪ Locally available material should be used as much as possible so as to avoid long-distance transportation, especially that of earth and stone.</li> <li>▪ The construction materials shall be properly maintained, and barricades shall be provided around the site for reducing the noise levels and the workers will be provided with personal protective equipment including earplugs and other necessary provisions by the contractor</li> <li>▪ All the DG sets used for construction shall have valid consents from SPCB and shall have built-in stacks to reduce the air emission impacts.</li> <li>▪ Maintenance of machinery and vehicles should be enhanced to keep their noise at a minimum. It shall be ensured that all machinery, equipment and vehicles comply with existing Central Pollution Control Board emission norms.</li> <li>▪ The quality of water (marine, river and wastewater discharged from the camps) shall be analyzed once in three months during construction, for its compliance to the disposal standards of SPCB</li> <li>▪ Proper waste management and disposal of oil, bitumen and other hazardous wastes should adopt as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016</li> </ul>	Contractor/ PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
			<ul style="list-style-type: none"> <li>▪ Solid/liquid/construction/domestic waste, contaminants (oil/grease etc.) shall not be disposed of in water bodies/open lands.</li> <li>▪ Construction debris shall be disposed of separately and properly.</li> <li>▪ In case of bituminous waste, discuss with local body and arrive at a suitable place for disposal of this. Disposal should be carried out over a 60mm thick layer of rammed clay so as to eliminate any chances of leaching. Scarified bituminous waste shall be reused for base course in crossroads and junction improvement of gravel roads.</li> <li>▪ Water should be sprayed during the construction phase, at the mixing sites, and temporary roads.</li> <li>▪ Storage of petrol/oil/lubricants: Impervious floors shall be provided at the storage sites to contain soil and /or water contamination due to spillage</li> <li>▪ Storage of cement (if application)- damp proofing of storage area shall be ensured as per IS codes</li> <li>▪ In slopes and other suitable places along the landward side, grass (preferably local wear and tear-resistant varieties) should be planted.</li> <li>▪ Deploy silt fences to avoid/reduce soil erosion and run-off.</li> <li>▪ Use brackish water for support activities wherever possible following standards (However, proper due diligence shall be exercised while using brackish water for concrete mixing/curing. It shall be used for these purposes only if there is no availability of plain water. The sea water can be used provided the concrete is made of marine, sulphate resistant cement etc., and steel is coated with epoxy and chemical to resist corrosion).</li> <li>▪ Use water resources without conflict</li> </ul>		

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
			<ul style="list-style-type: none"> <li>All the vehicles must have valid PUC certificates at all at the time during the construction phase of the project</li> </ul>		
	Greenbelt development		<ul style="list-style-type: none"> <li>Green belt with adequate number of trees shall be developed as per the specifications detailed out in the DPR and shall be maintained to ensure at 80percent survival rate.</li> </ul>	Contractor/P EA	SPMU
	Marine Environment		<ul style="list-style-type: none"> <li>Dredging shall not be undertaken during fish breeding season (fishing- ban period) and extreme weather situations</li> <li>Vessels operating during construction phase such as dredger shall be equipped with spill response kits</li> <li>Dredging shall be carried out in such a way that the loss of sediments into the neighboring water column is minimized and causes minimum disturbance to the marine ecology of the area. This shall be ensured by using Grab dredger/ Cutter section Dredger for grabbing and using a sufficient number of barges for dumping transporting and disposal of the dredged material.</li> <li>To assess the impacts on marine environment marine water and benthic samples shall be analysed on a quarterly basis during the construction phase and necessary mitigation measures shall be implemented, as directed by the engineer in charge</li> <li>Suitable fences will be erected for near water construction areas as to minimize rockfall/spillage of construction waste into the marine environment;</li> <li>Dredging and construction activities to be scheduled and planned to minimize impacts on fishermen and their livelihood activities;</li> </ul>	Contractor/P EA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
			<ul style="list-style-type: none"> <li>Total Suspended Solids (TSS) in seawater to be monitored at various locations in and around the dredging/ construction work areas in order to assess the sediment transport and the resultant impacts;</li> <li>Waste consignment shall be maintained to ensure that the dredged material is disposed at the designated site as per the procedures stipulated in the EIA/ESMP of the project.</li> </ul>		
Labour camps	Soil contamination. Pollution of drinking water sources. Stress on water sources Surface water contamination from washing, bathing, and waste disposal Tree felling for firewood and tents Air pollution from burning of toxic material like tyres and plastic waste.	Temporary	<ul style="list-style-type: none"> <li>All relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 shall be followed for construction and maintenance of labour camp.</li> <li>Avoid Irrigated agricultural lands/forest land/grazing land</li> <li>Avoid Lands within 100 m of community water bodies &amp; water sourced as rivers</li> <li>The contractor shall also guarantee the following:</li> <li>The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction.</li> <li>The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is provided in all toilets and urinals.</li> </ul>	Contractor/ PEA	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
			<ul style="list-style-type: none"> <li>Separate latrines and urinals with roof and proper door and fastenings should be provided for male and female workers. Signboard displays outside latrines and urinals reading “For Men Only” and “For Women Only” as the case may be.</li> <li>Latrines and urinals shall be adequately lighted and shall always be maintained in a clean sanitary condition with adequate water supply.</li> <li>Regular collection and proper disposal of Solid Waste Management (SWM) (according to SWM Rules 2016).</li> <li>Toxic materials like tyres and plastic are not burnt by the labour for any purpose.</li> <li>Trees are not cut for firewood or tents.</li> </ul>		
Working condition	Impact on workers’ health and safety Impact on public safety	Permanent	<ul style="list-style-type: none"> <li>The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 are adhered to.</li> <li>The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract.</li> <li>All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and reported to the Engineer.</li> <li>Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</li> <li>The contractor shall supply all necessary Personal Protective Equipment (PPE) such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs.</li> </ul>	Contractor/P EA	SPMU



Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
			<ul style="list-style-type: none"> <li>▪ The contractor shall arrange for: <ul style="list-style-type: none"> <li>- A readily available first aid unit with a person adequately trained in administering first aid in every work zone.</li> <li>- The first aid unit must have an adequate supply of sterilized dressing materials and appliances as per the Factories Rules.</li> <li>- Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital</li> <li>- Firefighting arrangement:</li> <li>- Demarcation of area susceptible to fires should be provided, along with cautionary signage</li> <li>- Portable fire exchangers and/or sand baskets shall be provided at easily accessible locations in the event of fire</li> <li>- The workers should be educated on the usage of these equipment's in case of emergency</li> <li>- The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with product containing lead in any form.</li> <li>- No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>- All necessary fencing and lights will be provided to protect the public in construction zones.</li> </ul> </li> </ul>		
<p style="text-align: center;"><b>POST CONSTRUCTION/ OPERATION PHASE:</b></p> <p style="text-align: center;">The following section contains instructions to the respective Line Departments/Local community entrusted with the operation and maintenance of the sub-project activity to ensure long term sustainability.</p>					
Maintenance	Water & Wastewater	Permanent	<ul style="list-style-type: none"> <li>▪ Surface water, ground water, marine water and treated /untreated wastewater quality shall be analyzed by on a quarterly basis</li> </ul>	PEA/Local Authority	SPMU

Activity	Potential Negative Impact/Concern	Duration of impact	ESMP MEASURES	Responsible Agency for Mitigation	Monitoring Agency
	Air Environment	Temporary	<ul style="list-style-type: none"> <li>▪ Ambient air quality and DG stack monitoring shall be done once in a quarter.</li> <li>▪ Water sprinkling for dust suppression and Greenbelt development shall be carried out in the premises.</li> <li>▪ Proper maintenance of boats shall be ensured to reduce the emissions.</li> </ul>	PEA/Local Authority	SPMU
	Noise	Temporary	<ul style="list-style-type: none"> <li>▪ DG sets with acoustic enclosures shall be deployed.</li> </ul>	PEA/Local Authority	SPMU
Waste Management	Solid Waste		<ul style="list-style-type: none"> <li>▪ Solid waste from the site should be source segregated and collected into biodegradable &amp; non-biodegradable waste.</li> <li>1. The biodegradable waste to be treated suitably and used as manure, whereas the non-biodegradable waste shall be sent to authorized recyclers.</li> </ul>	PEA/Local Authority	SPMU
Safety measurements	Emergency Management		<ul style="list-style-type: none"> <li>▪ First aid kits and emergency treatment facilities shall be maintained by the local authority.</li> <li>▪ Adequate fire extinguishers shall be provided in the premises with clear fire exit signals and sign boards are displayed for evacuation.</li> </ul>	PEA/Local Authority	SPMU

#### 4.5.15 Indicative ESMP for Coastal Protection, Other Infrastructure

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
Coastal erosion protection works involving plantation/ regeneration of mangrove, shelter bed plantations	Improper siting	Siting to follow ICZM Plans, if prepared. Nesting/breeding grounds of threatened or endangered species must be avoided	The PEA shall ensure that site criteria have been adopted	PEA/SPMU	Before final selection of the site
	Species Selection	The Hydrology, depth, duration and frequency of tidal inundation, tidal flooding shall be considered while choosing mangrove species. Monoculture and introduction of exotic species shall be avoided.  Communities shall be consulted to select the best suited species, locally preferred and available; which supports the marine life and their livelihoods	PEA shall maintain documentation to ensure species selection procedure adopted, Consultation conducted with the local community during species selection	PEA/SPMU	Before starting the planting
	Biodiversity Impacts	Proper planning measures for addressing issues related to habitats and impacts on bio diversity. Address the arrival of new species and changes in habitat food chain	Regular monitoring by PEA	PEA/SMU	Entire project period
	Health and survival of plantation	Ensure all stresses to mangrove regeneration have been addressed prior to initiation of plantation activity. Plantation should be undertaken in the appropriate season in consultation with the Environmental Expert of the State to ensure maximum survival.	Approval of PEA before start of the plantation Consultation with the local community before start of the plantation	PEA/SPMU	Before starting the planting

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Soil Contamination	Minimize the use of pesticides and fertilizers	Regular monitoring during plantation by PEA /CBO's	CBO/PEA	Entire project period
	Water pollution	Minimize the use of pesticides and fertilizers. Excessive use of fertilizers may lead to eutrophication of water bodies. Avoid or minimize the run off of pesticides and fertilizers	Regular monitoring during plantation by PEA/ CBO's	CBO/PEA	Entire project period
	Impact due to grazing	Adopt proper planning measures /Adequate provisions of alternate grazing lands	Establishment of the fodder requirements and controlled grazing in selected areas	CBO/PEA	Entire project period
Coastal erosion protection works (Hard / Soft)	Impact on ecologically sensitive areas, coastal geomorphology and accretion in nearby areas	<p>Shall be permitted only if ICZM Plan recommends so. Survey is to be carried out to study the impacts on environmentally sensitive areas like mangrove forests/coral reefs/agricultural lands, coastal geomorphology etc. Design should be location sensitive; taking due care of materials and technology available and usable for the identified stretch.</p> <p>Corrective measures during operation phase, with community participation</p> <p>Adequate information disclosure and participation of communities to be ensured.</p> <p>Detailed analysis of the present species composition to be conducted. Avoid removal of existing native species and planting to be done without affecting the native species</p>	<p>Regular monitoring and implementation of corrective actions</p> <p>Continuous monitoring of wave impacts</p>	PEA	Before starting the protection work

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Improper Construction Schedule	The activities of construction shall be scheduled taking into consideration factors such as sowing of crops, harvesting, availability of labor during particular periods and other site specific condition	Consultation with the local community and approval of PEA for start of the activity	PEA	Before starting the protection work
	Soil erosion	In slopes and other suitable places along the landward side, grass should be planted. Strengthening of site sides by laying stones.	Regular monitoring and corrective actions in disturbed areas prone to erosion	Contractor/PEA	Entire project period
	Transportation of construction materials	Local materials should be used as much as possible so as to avoid long distance transportation, especially that of earth and stone borrow areas for sand filling should not be from the same sediment cell. Borrow areas should be selected such that irrigated/agricultural/ grazing land and land close to settlements are avoided.	To be incorporated in the contract document of the respective works. Monitoring during construction stage of the project	Contractor /PEA	Entire project period
	Waste management	The construction site must be restored. Any construction related waste must be cleared and transported to waste disposal sites.  Use of non-biodegradable materials shall be allowed only if necessary and proven by detailed studies on storage, use, disposal after use	Waste related impacts to be scrutinized and mitigation plan to be prepared at design stage  Wastes to be properly stored, collected and disposed as per existing regulations	Contractor	Entire project period

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Impacts on Communities	<ul style="list-style-type: none"> <li>• Bye laws to be developed for the CBOs</li> <li>• PEA to ensure adequate representation of gender and vulnerable group in CBOs</li> <li>• Information dissemination and awareness campaigns during implementation</li> <li>• Clear guidelines to be developed for beneficiary selection.</li> <li>• Ensuring community participation and oversight;</li> <li>• Ensuring strong grievance redress mechanisms</li> <li>• PEA to ensure adequate representation of gender and vulnerable group in CBOs</li> <li>• Species selected should be such as to ensure suitability for plantation in the given area and ensuring biodiversity.</li> <li>• Strategy to avoid/ mitigate resource misuse through controlled access.</li> <li>• To ensure that land donation is documented by way of either gift deeds or affidavits.</li> <li>• Loss of income to be compensated as per the policy</li> <li>• PEA to ensure that access to coast especially for fishing community is maintained</li> <li>• Species selection criteria shall be adopted to ensure biodiversity in the area and no alien species are introduced.</li> </ul>	Continuous monitoring and support to CBOs with their participation	PEA	Entire Project period
Involving works for infrastructure development	Destruction of or disturbance to habitat	Wildlife habitat areas/ESAs, areas restricted as per national legislations shall not be used.	Regular monitoring by PEA	PEA/SPMU	Before selection of land

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Flooding	Proper siting-select less vulnerable site	Adoption of a well-defined site selection criteria	PEA/SPMU	Before selection of land
	Tree felling	Tree felling shall be minimized, afforestation/reforestation measures should be adopted. Cutting to trees with specific medicinal, religious, archaeological, environmental importance should be avoided. Use indigenous tree varieties	Regular Monitoring by PEA	Contractor/ PEA	Before selection of land
	Waste disposal	Solid/liquid/construction/domestic waste contaminants (oil/grease etc.) shall not be disposed in water bodies/open lands. Construction debris shall be disposed separately and properly.	To be incorporated in the contract document of the respective works and monitored	Contractor / PEA	Entire project period
	Transport of construction materials	Local materials should be used as much as possible so as to avoid long distance transportation, especially that of earth and stone.	To be incorporated in the contract document of the respective works and monitored	Contractor/PEA	Before assigning the works
	Water pollution	Run off from the construction site must be diverted to proper drains. Wastes should be properly disposal off.	To be incorporated in the contract document of the respective works and monitored.	Contractor/PEA	Before assigning the works
	Soil erosion	The stockpiles for preserving top soil should be designed such that the slope does not exceed 1:2 (vertical to horizontal) and the height of the pile is restricted to 2m. Containment measures should be undertaken to avoid soil wash off	To be incorporation in the contract document of the respective works and monitored	Contractor /PEA	Before assigning the works

Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Occupational health and safety	Workers shall be educated about personal safety measures and location of safety devices. Personal Protective Equipment shall be provided	To be incorporation in the contract document of the respective works and monitored	Contractor/PEA	Before assigning the works
	Water pollution operations stage	Adequate sewerage and sanitation facilities Proper disposal of liquid waste, construction debris, and other solid wastes Proper containment to avoid water runoff carrying wastes and/or materials	Regular monitoring by PEA	CBO's/PEA	Entire project
	Solid Waste Management	Adequate provision and transportation to existing facilities	Regular monitoring by Community	CBO's/PEA	Entire project period
	Sewerage and sanitation facilities	Proper design and siting of latrines/septic tanks Adequate provision and connection to existing facilities	Regular monitoring by Community	CBO's/PEA	Entire project period
	Drainage Flow	Regular inspection and cleaning of drain to remove any debris or vegetation growth that may interrupt the flow	Regular monitoring by Community	CBO's/PEA	Entire project period
	Setting up of Construction camps and other facilities	Selection of site for various construction facilities such as camp site, plant sites, project office, etc at places without sensitive environmental features	Monitoring by PEA	Contractor/PEA	Entire project period
Priority investments involving civil work for alternate energy supply	Land use impacts due to transmission line RoW and other facilities	Environmentally sensitive areas and areas with dense population pockets shall be avoided	Alignment finalization adopting a well-defined criteria	PEA	Before starting project activities



Activity	Key Issues	Mitigation Measures	Monitoring measures proposed	Responsible Agency	Timeline
	Cleaning and control of vegetation in RoW areas	The cleaning of vegetation shall be restricted to the required width within the RoW	Areas cleared of vegetation cover within RoW	PEA/Contractor	Before starting project activities
	Erosion during construction stage	Adequate temporary protection measures to control erosion shall be implemented including slope terracing ground cover vegetation etc as applicable	Adopted erosion control measures	PEA/Contractor	Entire project period
	Damage due to natural disaster s	The alignment shall be finalized avoiding hazard prone areas, wherein such areas are not available adequate protection measures need to be implemented. Adequate weather protection (civil) especially against cyclones and storm surges shall be provided	Alignment and hazard zone map; protection measures to be implemented	PEA/SPMU	Before starting project activities and during project period
	Waste Management	Construction and demolition wastes to be managed as per Construction and Demolition Waste Management Rules, 2016. Plastic Wastes, Hazardous Wastes and E-wastes to be managed as per respective Rules. (Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016; E-Waste (Management) Rules, 2016, Plastic Waste Management (Amendment) Rules, 2018) Collection, Disposal and treatment system to be planned / integrated with City/regional level facilities. If not available suitable tie-ups shall be made with recyclers/Hazardous Waste facilities, manufacturers under extended Producer Responsibilities as per Rules	Waste management measures from start to end	Contractor to arrange treatment/disposal PEA/SPMU to monitor	Entire Project Period

**4.5.16 Indicative ESMP for Conservation, Ecotourism, Beach Beautification and Cleaning, Fish Auction Centre, Research and Capacity Building**

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
Conservation and Management of Corals/regeneration	<ul style="list-style-type: none"> <li>• Loss of livelihood and/ or loss of access to livelihood sources for the fishing community in regenerated areas</li> <li>• Impacts on the basic ecology of the present reef systems.</li> <li>• Loss of biodiversity due to one species dominance.</li> <li>• Impacts due to anthropogenic activities</li> <li>• Survival of the transplanted coral in changed condition (root cause is pollution and is still continuing)</li> </ul>	<ul style="list-style-type: none"> <li>• Poor species selection process adopted may lead to loss of biodiversity and change in the ecological conditions</li> <li>• The transplantation may subside the growth of present reefs and loss of biodiversity due to the dominance one species</li> <li>• As the condition which is detrimental to the growth of the coral species still prevail the transplanted specie will survive</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct detailed study and analysis before introduction of any species/ transplantation and follow applicable regulations</li> <li>• Loss of livelihood to be compensated as per the entitlement framework.</li> <li>• Reducing adverse impacts due to anthropogenic activities in vicinity which lead to degradation of the coral reefs.</li> <li>• Conduct detailed study on the reason for the loss of this species and take measures to rectify</li> </ul>
Eco-tourism Development	<ul style="list-style-type: none"> <li>• Conflicts during beneficiary selection</li> <li>• Elite group capture</li> <li>• Impacts during the construction stage of the project</li> <li>• Impacts due to Waste generation, collection and disposal.</li> <li>• Impacts on wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of transparency in selection of beneficiaries – village or individual will lead to inter village and intra community conflict. This could also lead to capture of CBOs by the powerful community in the village and thus marginalization of vulnerable community.</li> <li>• The movement of vehicles and use of mechanized speed boats will cause air and noise and water pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Siting, designs to be appropriate considering the local ecology, sensitivities, community's preference</li> <li>• Bye laws to be developed for the CBOs</li> <li>• Clear guidelines to be developed for beneficiary selection.</li> <li>• Ensuring transparency through adequate disclosure;</li> <li>• Ensuring community participation and oversight;</li> <li>• Ensuring strong grievance redress mechanisms</li> </ul>

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
			<ul style="list-style-type: none"> <li>• Executing Agency to ensure adequate representation of gender and vulnerable group in CBOs</li> <li>• Waste management plan to be formulated to ensure minimum adverse impacts</li> <li>• Short term impacts due to construction stage activities shall be mitigated by adopting Generic ESMP provisions.</li> <li>• Regulate tourist inflow using tools like carrying capacity analysis / Limits of Acceptable Change, use electric vehicles, energy conservation and restriction on use of mechanized boats.</li> <li>• Proper housekeeping and emergency plan</li> </ul>
Improved Livelihood of Coastal Communities Socio-Economic Development	<ul style="list-style-type: none"> <li>• Elite capture of CBOs</li> <li>• Conflict during beneficiary selection</li> <li>• Depletion of natural resource base due to increased exploitation and / or over dependence on single resource.</li> <li>• Environmental and ecological impacts due to certain activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of transparency in the selection of beneficiaries – village or individual will lead to inter village and intra community conflict. This could also lead to capture of CBOs by the powerful community in the village and thus marginalization of vulnerable community.</li> <li>• The natural resources collection for improvement of livelihood activities; if not well planned, will result in depletion of some important species</li> </ul>	<ul style="list-style-type: none"> <li>• DPR shall provide an assessment of the existing resource base which can be exploited in a sustainable manner and guidance on sustainable management, periodic monitoring.</li> <li>• Bye laws to be development for the CBOs</li> <li>• Clear guidelines to be developed for beneficiary selection.</li> <li>• Ensuring transparency through adequate disclosure;</li> <li>• Ensuring community participation and oversight;</li> <li>• Ensuring strong grievance redress mechanisms</li> <li>• PEA to ensure adequate representation of gender and vulnerable group in CBOs</li> </ul>
Capacity Building for Pollution Monitoring	<ul style="list-style-type: none"> <li>• Lack of compliance to regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Time / cost overruns, and safety issues may arise in case of not following</li> </ul>	<ul style="list-style-type: none"> <li>• The DPR shall include Environmental Health Risk Management Plan</li> </ul>

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
Research and Activities	<ul style="list-style-type: none"> <li>• Disposal of waste being generated from the various testing laboratories</li> <li>• Occupational and / or Community Health and Safety</li> </ul>	<p>environmental and safety regulations followed in India</p> <ul style="list-style-type: none"> <li>• Wastes from research facilities and labs may contain harmful substances, mixtures and species (in case of biology labs), and improper disposal of these may become an environmental threat</li> <li>• Host communities near the lab or research facility or near the point of collection of samples may be adversely affected due to sample collection, waste disposal etc. Researchers and other workers in the labs may be impacted due to waste accumulation in the facility, improper handling and storage of chemicals and combustibles, lack of attention to Personnel Protection Equipment, fire safety etc.,</li> </ul>	<p>(EHRMP) and using the same; ensure adequate mitigation measures for storage, treatment and safe disposal of wastes generated from the testing laboratories, manage occupational community health and safety aspects (for safety at work) and guiding on Good Lab Practices</p> <ul style="list-style-type: none"> <li>• Adequate care while selecting/arranging Lab premises</li> <li>• All consents, clearances and their guidelines to be followed (PCB, Fire, Work safety and others)</li> <li>• Follow regulatory guidelines, International Good Lab Practices and WBG EHS while carrying out sample collection and storage of procedures (for samples, chemicals, others)</li> </ul>
Beach Cleaning and Sanitation	<ul style="list-style-type: none"> <li>• Temporary loss of business opportunities</li> <li>• Conflict among vendors</li> <li>• Conflicts during allotment of shops</li> <li>• Conflict in upkeep and maintenance of toilets</li> <li>• Adverse environmental impacts on land/ air/ water during the construction stage of the project.</li> <li>• Impacts due to waste disposal</li> <li>• Short term impacts due to construction related activities</li> </ul>	<ul style="list-style-type: none"> <li>• Temporary loss of business opportunities during shifting phase</li> <li>• Conflict among vendors relocated and those who are not affected</li> <li>• Lack of willingness to shift from present location-probable loss of advantage may result in conflicts</li> <li>• Willingness and attitude to pay for toilet usage, upkeep and maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Shifting to be done in a phased manner. Loss of income to be compensated as per the policy.</li> <li>• Define cut off distance to avoid conflict among vendors relocated and those who are not. Develop mechanism to ensure that individual agreements are signed with vendors</li> <li>• Conduct consultation with the vendors prior to relocation and ensure transparency in selection of shops in vendor market</li> </ul>

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
			<ul style="list-style-type: none"> <li>• Create awareness among vendors and users to generate funds for upkeep and maintenance of toilets</li> <li>• The short term impacts during the construction stage shall be mitigated by adopting generic ESMP provisions including waste management plan.</li> </ul>
Beach Beautification and Illumination	<ul style="list-style-type: none"> <li>• Loss of access to coast</li> <li>• Impacts of works, illumination and landscaping on the marine species, migratory species, nesting grounds</li> <li>• Impacts due to improper waste disposal</li> <li>• Short term impacts related to construction activity</li> </ul>	<ul style="list-style-type: none"> <li>• There could be temporary hindrance to fishing / host community during the implementation stage</li> <li>• Due to works, access to coast may be blocked for short duration for the fishermen</li> <li>• Community should be consulted before selecting the species / scheme for plantation, illumination, kiosk selection, other activities</li> <li>• Occupational and community health and safety impacts of cleaning and civil works</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid ESA for Installation of beach infrastructure and the beach layout plan should prepare by keeping all the aspects by which there should no harm to the natural environment of the beach or disturbing and ESA before installation of infrastructure on the beach.</li> <li>• In case of presence of ESAs like sanddunes on beach, avoid running of any machinery and adopt manual/traditional method on ESA for cleaning purpose</li> <li>• Ensure access to coast for fishermen and communities</li> <li>• Work should be planned considering usage of beach space by communities for their livelihoods</li> <li>• The short term impacts during the construction stage shall be mitigated by adopting generic ESMP provisions including waste management plan.</li> <li>• Proper waste collection and disposal arrangements in coordination with local bodies and line departments; preferably with local community participation</li> </ul>

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
			<ul style="list-style-type: none"> <li>Local community participation in related activities, including commercial facility development and operations, ensuring safety patrolling, etc.</li> <li>Proper lighting plan to be made part of DPR; including maintenance and operation of solar/alternate energy means</li> <li>Ensure safe and clean activities during operation stage</li> </ul>
Fish Auction Centre	<ul style="list-style-type: none"> <li>Inadequate land ownership record</li> <li>Loss of livelihood if land identified is encroached</li> <li>Short term impacts related to construction activity</li> </ul>	<ul style="list-style-type: none"> <li>Land earmarked could be private land</li> </ul>	<ul style="list-style-type: none"> <li>Review of land records to establish ownership of land</li> <li>If government land, establish that land is free of all encumbrances</li> <li>Replacement value, if land is private</li> <li>Loss of livelihood to be compensated as per the policy</li> <li>The short term impacts during the construction stage shall be mitigated by adopting generic ESMP provisions for small infrastructure works and comprehensive waste management plan for fish wastes.</li> </ul>
Afforestation-based Livelihood Improvement; Value addition activities such as handicrafts and cottage industry; Value addition for Aquaculture;	<ul style="list-style-type: none"> <li>Conflicts during beneficiary selection</li> <li>Marketing arrangements</li> <li>Long term sustainability of SHGs</li> <li>Participation of vulnerable</li> </ul>	<ul style="list-style-type: none"> <li>If the selection of beneficiary is not transparent and there are variations in return, this could lead to intra-community conflict.</li> </ul>	<ul style="list-style-type: none"> <li>Small works to follow generic ESMP for small infrastructure works</li> <li>Clear guidelines to be developed for beneficiary selection</li> <li>Ensuring transparency through adequate disclosure</li> <li>Ensuring community participation and oversight; and</li> </ul>

Activity	Potential Impacts	Description of Impacts	Proposed Mitigation Measures
Agroforestry; Semi Processing, processing, storage and transport; Local market development and skill enhancement			<ul style="list-style-type: none"> <li>Ensuring strong grievance redressal mechanisms</li> </ul>
Other Livelihood generation	<ul style="list-style-type: none"> <li>Conflicts in beneficiary selection</li> <li>Acquisition of private land</li> <li>Displacement of encroachers and squatters from government land</li> <li>Loss of livelihood or livelihood source</li> <li>Short term impacts related to construction activity</li> <li>Loss of critical habitat if any in vicinity of the proposed site</li> </ul>	<ul style="list-style-type: none"> <li>Loss of private land for construction of training centre</li> <li>If government land is available, chances of encroachment is high. Displacement of encroachers/ squatter could lead to loss of livelihood</li> <li>Lack of transparency in selection of beneficiaries may lead to conflict</li> </ul>	<ul style="list-style-type: none"> <li>Replacement value of land acquired</li> <li>Loss of income to be compensated as per the policy.</li> <li>Alternative income restoration scheme for loss of livelihood</li> <li>Consult community in beneficiary selection process and make adequate disclosure;</li> <li>Ensuring community participation and oversight; and</li> <li>Ensuring strong grievance redress mechanisms</li> <li>The short term impacts during the construction stage shall be mitigated by adopting generic ESMP provisions for small infrastructure works</li> </ul>

#### 4.5.17 Indicative ESMP for Marine Aquarium

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
PLANNING & DESIGN PHASE:						
Measures that should be considered by the respective Line Department while preparing the Detailed Project Report (DPR)						
1.	Clearances	Temporary	All clearance required for Environmental aspects during construction shall be ensured and made available before start of work.	Before construction	Contractor & PEA	SPMU
2	Tree Cutting	Temporary	a. Save the trees and any other vegetation b. Provide adequate protection to the trees to be retained if required with tree guards c. Identify the number of trees that will be affected with girth size & species type d. Trees identified for cutting shall be removed from the construction sites before commencement of construction with prior permission from the concerned department. e. Undertake tree plantation and compensatory plantation as per the tree cutting clearances f. Compensatory plantation of at least twice the number of trees cut should be carried out in the project area. g. Follow applicable National standards in case of replanting	Preconstruction & Construction phase	Contractor & PEA	SPMU
3	Utility Relocation (if any identified)		a. Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps if any, etc b. Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts. c. Provide advance notice (not less than 10 working days) to affected parties.	Preconstruction & construction	Contractor & PEA	SPMU
4	Baseline parameters		a. Adequate measures shall be taken and checked to control the Baseline parameters of Air, Water and Noise pollution. Baseline parameters shall be recorded and ensured conformance till the completion of the project.	Preconstruction, construction & post	Contractor & PEA	SPMU



Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
5	Planning of temporary Traffic arrangements		b. The Monitoring requirements, at a minimum shall comply with consent conditions by the pollution control board	construction phase	Contractor & PEA	SPMU
			a. Temporary diversion will be provided with the approval of the relevant state department at least two weeks prior to the commencement of works.	Preconstruction & construction		
			b. The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day.			
			c. Any accidents and/or risk of inconveniences caused to the community shall be corrected by the Contractor			
6	STP		a. The construction activities at STP shall be initiated only after consent to establish certificate is secured from the PCB	Preconstruction & construction	Contractor & PEA	SPMU
			b. STP operations shall take place only after Consent to Contractor certificate is accorded by the PCB and the treated water quality shall comply with the tender conditions stipulated or at minimum shall meet the discharge standards depending on the type of receiving water body (stream/nalla/ open land/ irrigation purposes, etc)			
			c. Performance standards shall always be maintained, Ensuring efficient working condition of treatment plant			
7	Storage of materials		a. The Contractor shall identify the site for temporary use of land for construction sites/ storage of construction materials, etc. these sites shall be operated only after prior approval of the engineer.	Preconstruction & construction	Contractor & PEA	SPMU
8	Construction of labour camps		a. Contractor shall follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic	During the construction	Contractor & PEA	SPMU

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
			<p>facility provision of each labour camp will be submitted to Engineer prior to their construction.</p> <p>b. The construction will commence only upon the written approval of the Engineer. The Contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer.</p> <p>c. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer. The construction camp shall not be located within 500m from the nearest water stream, residential areas waste management related areas, in close proximity to hazardous landuses, and/or any sensitive land uses like schools, hospital, etc.</p>			
<p style="text-align: center;"><b>CONSTRUCTION PHASE:</b></p> <p>The following section contains instruction to the contractors, which should be adhered to while carrying out the construction activity. This section should be appended into the relevant bid document.</p>						
1	Compensatory plantation of tree		Compensatory plantation of at least twice the number of trees felled should be done in line with competent authority guidelines	Preconstruction and Construction	Contractor/P EA	SPMU
2	Protection of topsoil & Environmental enhancing		The topsoil/natural shoreline/ dune formation to be protected and compacted after completion of work. Topsoil when removed should be stored in stockpiles and that can be used for gardening purposes at site which will be an environmental enhancing measure.	During construction	Contractor/ PEA	SPMU
3	Disposal of construction debris and excavated materials.		A suitable site should be identified for safe disposal, in relatively low-lying areas, away from the water bodies, residential and agricultural fields etc., and got approved by the Engineer. Care should be taken that dumped material does not affect natural drainage system.	During construction	Contractor/ PEA	SPMU

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
4	Pollution from Fuel and Lubricants		<p>a. The Contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 500 m from rivers and irrigation canal/ponds.</p> <p>b. All location and lay-out plans of such sites shall be submitted by the Contractor prior to their establishment and will be approved by the Owner/State Government.</p> <p>c. Contractor shall ensure that spillage of fuels and lubricants does not contaminate the ground/sea</p> <p>d. Contractor will arrange for collection, storing and disposal of oily wastes to the pre-identified disposal site. All spills and collected petroleum products will be disposed off in accordant with MoEFCC, state PCB guidelines.</p>	Construction and O&M period	Contractor/ PEA/Local authority	SPMU
5	Contamination of ground water quality		<p>a. Groundwater quality may get contaminated due to leaching of wastewater. So, the treated water quality shall comply with the standards laid down by the PCB for disposal onto land, water body or for irrigation use.</p> <p>b. Regular monitoring is required for the treated sewage quality and also the ground water quality in the nearby areas and ensures compliance with PCB standards.</p>	During construction and operation	Contractor/ PEA/Local authority	SPMU
6	Water Pollution from Construction Wastes		The Contractor shall take all precautionary measures to prevent the wastewater generated during construction from entering into sea, streams, water bodies or the irrigation system. All waste arising from the project is to be disposed off in the manner that is acceptable by the standards and rules and regulations.	During Construction	Contractor/ PEA	SPMU
7	Impact surrounding areas		To avoid the problems of foul smell polluted air, insects, other issues; buffer zones to be provided in the form of green belt at appropriate treatment plants	During Construction	Contractor/ PEA	SPMU

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
8	Informatory Sign and Hoardings		The Contractor shall provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Owner.	During Construction	Contractor/ PEA	SPMU
9	Risk from Electrical Equipment(s)		<p>The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that-</p> <ol style="list-style-type: none"> <li>No material shall be stacked or placed as to cause danger or inconvenience to any person or the public.</li> <li>All the necessary fencing and lights will be provided to protect the public in construction zones. All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.</li> </ol>	Preconstruction/ construction and operation stage	Contractor/ PEA/Local authority	SPMU
10	Disposal of treated wastewater		<ol style="list-style-type: none"> <li>The treated water quality shall comply with the standards of PCB before letting out into the sea/ stream/ nullah/ open land/ irrigation purposes, and necessary permission to be obtained from the concerned department.</li> <li>Ensure efficient working condition of treatment plant.</li> <li>Prevent the pollution of seas water and other bodies receiving discharge.</li> </ol>	Preconstruction/ construction and operation stage	Contractor/ PEA/Local authority	SPMU
11	Sludge disposal		<ul style="list-style-type: none"> <li>A suitable site should be identified for the safe disposal of sludge generated at the treatment site and got approved by the Engineer. Prepare a sludge disposal plan and adheres to the same.</li> </ul>	During Preconstruction and construction	Contractor/ PEA	SPMU
12	Labour camp & facilities		<ol style="list-style-type: none"> <li>Setting up of labour camps needs to be done as per the procedures. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labour laws shall be ensured. The Contractor shall also guarantee the following:</li> </ol>	During Preconstruction and construction	Contractor/ PEA	SPMU

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
			<ul style="list-style-type: none"> <li>b. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction.</li> <li>c. The construction will commence only upon the written approval of the owner.</li> <li>d. The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing.</li> <li>e. Supply of sufficient quantity of potable water (as per IS) in every workplace/labor camp site at suitable and easily accessible places and regular maintenance of such facilities.</li> <li>f. The sewage system for the camp are designed, built and operated in such a fashion that no wealth hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.</li> </ul>			
13	Safety Aspects		<ul style="list-style-type: none"> <li>a. Adequate precautions shall be taken to prevent the accidents and from the machineries. All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the PIA.</li> <li>b. Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</li> <li>c. Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc.</li> <li>d. Welders protective eye shields shall be provided to workers who are engaged in welding works.</li> <li>e. Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.</li> <li>f. The Contractor shall supply shall supply all necessary safety appliances such as safety belts, ear plugs, mask etc to workers and staffs. The contractor will comply with all the</li> </ul>	During construction	Contractor/ PEA	SPMU

Sl. No.	Potential Negative	Duration of impact	Mitigation Measures	Time Frame	Responsible Agencies	Monitoring Agency
			precautions as required for ensuring the safety of the workmen as applicable to this contract. The Contractor will not employ any person below the age of 15 years for any work and no woman will be employed on the work of painting with products containing lead in any form.			
14	First Aid		<p>The Contractor shall arrange for:</p> <p>a. A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone</p> <p>b. Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital</p>	During construction	Contractor/ PEA	SPMU

Sl No.	Environmental enhancement and special issues				Implementing Agency
15	Flora and chance if found		The Contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. If any wild animal is found near the Contractor will immediately upon discovery thereof acquaint the Owner and carry out the Owner's instructions for dealing with the same. The Owner will report to the nearby forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.		Contractor/ PEA
16	Chance Archaeological Property (if any)	found	<p>All fossils, coins, articles of value of antiquity, structures and remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation.</p> <p>The Contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such articles or thing. He will, immediately upon discovery thereof and before removal acquaint the Owner of such discovery and carry out</p>		Contractor/PEA

Sl No. Environmental enhancement and special issues			Implementing Agency
		the SC's instructions for dealing with the same, waiting which all work shall be stopped. The Owner will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site	
17	Monitoring of environment parameters	The Contractor shall undertake seasonal monitoring of air, water, noise and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be prepared	Contractor/PEA
18	Sensitive Areas	The sensitive areas (if) like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked during operation phase.	Contractor/PEA
19	Clearing of construction of camps and restoration	On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expenses, to the entire satisfaction of the engineer.	Contractor/PEA
20	Tree Protection Tree Planting	<ul style="list-style-type: none"> <li>a. Giving due protection to the trees that fall in the shoulders/ corridor of impact shall be the prime focus during Construction /post construction</li> <li>b. Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars, use of plate compactors near trees may also be considered where necessary</li> <li>c. Re-plantation of at least twice the number of trees cut should be carried out along the project road. Since the major portion of the project road may pass through open lands, planting of trees along the entire stretch of the road is recommended as an enhancement measure.</li> <li>d. Saplings shall be selected in consultation with communities, forest department and authorities and saplings shall preferably be 1m high while planted on site. Growth and survival of trees planted shall be ensured and monitoring done at least for a period of 3 years.</li> </ul>	Contractor/PEA

#### 4.5.18 Monitoring Obligations for key infrastructure works

Project / Activity	Applicable Legislations	Obligations <sup>1</sup>	Responsibility <sup>1</sup>
Generators	Air Act, 1981 & Noise Rules as per EPA Act, 1986	Ensure Air and Noise quality is within the stipulated limits of respective PCB	Local Body / PEA Local Body / Operating Agency
<b>Sewerage / Sanitation</b>			
Sewerage Network and Pumping Stations	Air Act, 1981 & Noise Rules as per EP Act, 1986	Ensure Air and Noise quality is within the stipulated limits of PCB	Local Body / PEA/ operating agency
Sewerage Network, Pumping Station and Treatment Plant	Water (P&C) Act, 1974 Hazardous waste Management Rules 2008 Air (P&CP) Act, 1981 & Noise Rules as per EP Act, 1986	1. Secure the following from PCB for treatment plant <ul style="list-style-type: none"> <li>• Consent to Establish</li> <li>• Consent to Operate, and</li> </ul> 2. Ensure Air and Noise quality is within the stipulated limits of PCB	Local Body / PEA Local Body / Operating Agency Contractor during construction and Local Body / operating agency during operation
<b>Solid Waste Management</b>			
Landfill Sites	MSW Rules, 2000* Air (P&C) Act 1981, Water (P&CP) Act 1974 and EPA EIA Notification, 2006	Obtain Environmental Clearance from SEIAA Ensure Air, water (surface and ground) and Noise Quality is within stipulated limits of SPCBs/CPCB	ULB / PEA ULB / Operating Agency
Compost Yard	MSW Rules, 2000* Air (P&CP) Act 1981, Water (P&CP) Act 1974 and EP Act 1986	Secure NOC/ authorisation from PCB Ensure Air, water (surface and ground) and Noise Quality is within stipulated limits of SPCBs/CPCB	ULB / PEA ULB / Operating Agency
Vehicles	Vehicle emission norms	Ensure that the vehicles conform to the emission norms	ULB / PEA
<b>Inland Water Ways / Lakes / Water Bodies</b>	Water (P&CP) Act, 1974 & EP Act, 1986	Ensure water, air and Noise quality is within the stipulated limits of SPCB	Contractor during construction and ULB / operating agency during operation
1. For Category E1 or E 2 projects, the obligations and responsibilities as identified in the EAR shall be followed; for E3 generic ESMP shall be adhered to, by the respective agencies. This shall be discussed and updated suitably			



#### 4.5.19 Integrated Nutrient and Pest Management Plan (INPMP)

In case of projects which may necessitate the use of pesticides, an INPMP shall be prepared along with ESMP to deal with chance increased uses of pesticides and other agrochemicals. The plan consists of two parts:

**1. Guidance on proper management of pesticides.** Provides detailed guidance on procuring, storing, use and management as well as disposal of pesticides.

**2. Integrated Pest Management Strategy.** Detailed procedural IPM strategy given as under: All the methods (cultural, mechanical/physical, genetic, regulatory, bio-control and chemical) would be employed as per requirements. The chemical methods would be employed only when the pest attack exceeds the Economic Threshold Limit (ETL) and stand to cause severe damage to crops and selection of relatively environmentally friendly pesticides would be undertaken. In any case, banned would not be used and restricted pesticides would be used only as per state/national laws and provisions.

**Table 1: Integrated Pest and Nutrient Management Strategy**

Activity	Months												Action Points
	1				2				3				
Training of Agriculture/Horticulture/Animal Husbandry staff (project and line department) in IPNM													Select staff & Train at recognized national/state institutions and state universities
Training of Facilitators/ Paravets in IPNM for livestock													Will be useful to include an orientation of women stakeholders in IPNM approaches, as they are the main agricultural workers and attend to livestock needs
Developing relevant literature and pamphlets for distribution with list of banned chemicals (update the lists as required)													Should be in local language and appealing visually. Distribute these during awareness camps. Involve Panchayats in distribution and local practitioner level training in IPNM
Farmer and livestock owner’s awareness building													Organize awareness camps in villages on latest technology in production, organic farming, IPNM concept, safe use and disposal of insecticides/pesticides, fumigation of shelters, identification and distinction between predators and pests. Awareness to livestock owners for keeping animals in hygienic conditions
Provide technical inputs and support to identified farmers and													Arrange inputs in the form of bio-pesticides, bio-weedicides, bio-

Activity	Months												Action Points
	1			2			3						
later use them as models for replication by other interested farmers													fungicides, bio-fertilizers, bio-control agents (predators) etc. Converge with relevant departments of Agriculture, Livestock and Horticultural for this purpose
Develop and distribute guidelines on safe use of approved pesticides/insecticides and monitor													Emphasize avoiding use of broad-spectrum pesticides, chemicals that wipe out useful insects etc. Use recommended dose and concentration of pesticides. Do not support sale and use of banned fertilizers, pesticides, insecticides etc.
Conduct bench-mark survey and prepare checklist of pests/pathogens													Use local research institutions, agricultural universities and extension system workers for identifying major area-specific pests
Training and Tie-up for supply of vermi-compost													Will be required for farmers to immediately switch over to bio-fertilizers, as absence may diminish interest
Legume plantations in farm bunds and fields, promoting use of mulch, setting up of vermi-compost units													Link with other arable land development programmes. Plantations be raised simultaneously with vermi-compost units so that increase in productivity can be seen in fields. Long-term availability of vermi-compost is needed to sustain IPNM
Tap indigenous know-how on local biocontrol products (using natural-farm derived / vegetation derived materials such as Neem, Chilli mixture, cowdung etc)													Document, scale up producing such indigenous options with the help of NGOs, CBOs and participation of communities
Set up demonstration plots													Set up demonstration plots once farmer awareness and training has initiated and after setting up of vermin-compost units. This will reduce delays in adopting IPNM and will lead to quick results encouraging others to follow suit
Introduce and provide readily available IPNM packages													Available IPNM packages be provided to farmers for immediate adoption.

Activity	Months												Action Points
	1					2						3	
Provide, as required, available bio-control agents													Use existing provisions of line departments or state bio-control labs for this purpose.
Introduce organic farming													Organize training and exposure visits, supply bio-fertilizer mini-kits etc. and identify and select at least two bio villages for demonstrating organic farming
Document progress													Record changes in inputs and outputs and develop economic gains table for popularizing it among farming community

### Proposed Milestones to Achieve INPMP

The proposed milestones to achieve IPM / INPMP are presented in Table below.

**Table 2: Proposed Milestones: Integrated Pest Management Strategy**

Activity	Milestones
Awareness building	<ul style="list-style-type: none"> <li>▪ Cover at least 50 percent of total agricultural area / watersheds targeted in first year from project start</li> <li>▪ Cover 50 percent next year</li> </ul>
Identification of potential farmers	<ul style="list-style-type: none"> <li>▪ Identify at least three farmers in each village (which have been selected under the project) within 15 days of awareness building for training and taking up IPM as demonstration</li> </ul>
Training	<ul style="list-style-type: none"> <li>▪ Staff and line department training completed in first month</li> <li>▪ Farmer training completed within first month of identifying potential farmers</li> <li>▪ Training for other interested farmers completed in next month of awareness building</li> </ul>
IPM coverage	<ul style="list-style-type: none"> <li>▪ Provide IPM package to trained farmer within 30 days of training (by the end of second month)</li> <li>▪ Cover all farmers in a village – adopt IPM village/ farmland/watershed approach in 75 days</li> </ul>
Monitoring and evaluation	<ul style="list-style-type: none"> <li>▪ Formation of joint monitoring team (staff and community) within one month from project start</li> <li>▪ Monitoring schedule for each quarter prepared and implemented</li> <li>▪ Monitoring reports be prepared for each monitoring visit and compiled to show progress</li> </ul>
Process documentation	<ul style="list-style-type: none"> <li>▪ Annual progress reports on IPM status prepared giving coverage, replication and sustainability</li> <li>▪ Knowledge, practice and coverage change documented</li> </ul>

### Components of INPMP

**Cultural Methods:** With knowledge of crop production, biology and ecology of pests and their natural enemies, cultural methods of pest control innovatively improvise regular farm

operations to either destroy the pests or prevent them from causing economic losses. These may include, but not limited to the following:

- Preparation of nurseries or main fields free from pest infestation e.g. removal of plant debris, trimming of bunds, treating of soil and deep summer ploughing which kill various stages of insects.
- Testing of soil deficiencies for micronutrients on the basis of which fertilizers should be applied.
- Selection of clean and certified seeds and treating of seeds before sowing for seed borne diseases.
- Selection of seeds of relatively pest resistant/tolerant varieties.
- Crop rotation for pest suppression.
- Synchronized sowing and proper plant spacing.
- Proper water management (alternative wetting and drying to avoid water stagnation).
- Harvesting as close as to ground level.
- Proper weed management.
- Educate farmers with the ecology of crops and pests for adjusting of time of sowing and harvesting to escape peak season of pest attack. Explore and use traditional knowledge banks (old farmers) in the villages.

**Mechanical and physical methods:** In this process manual labour and tools are used. This involves:

- Collection of egg masses, larvae, pupae and adults where possible and either destroy them or place them in cage-cum-bird perches for conservation of natural enemies and withholding of pest species.
- Removal and destruction of diseased or pest infested portion of plant parts.
- Use of light traps and destruction of trapped pests.
- Use of pheromone traps for monitoring and suppression of pest population.

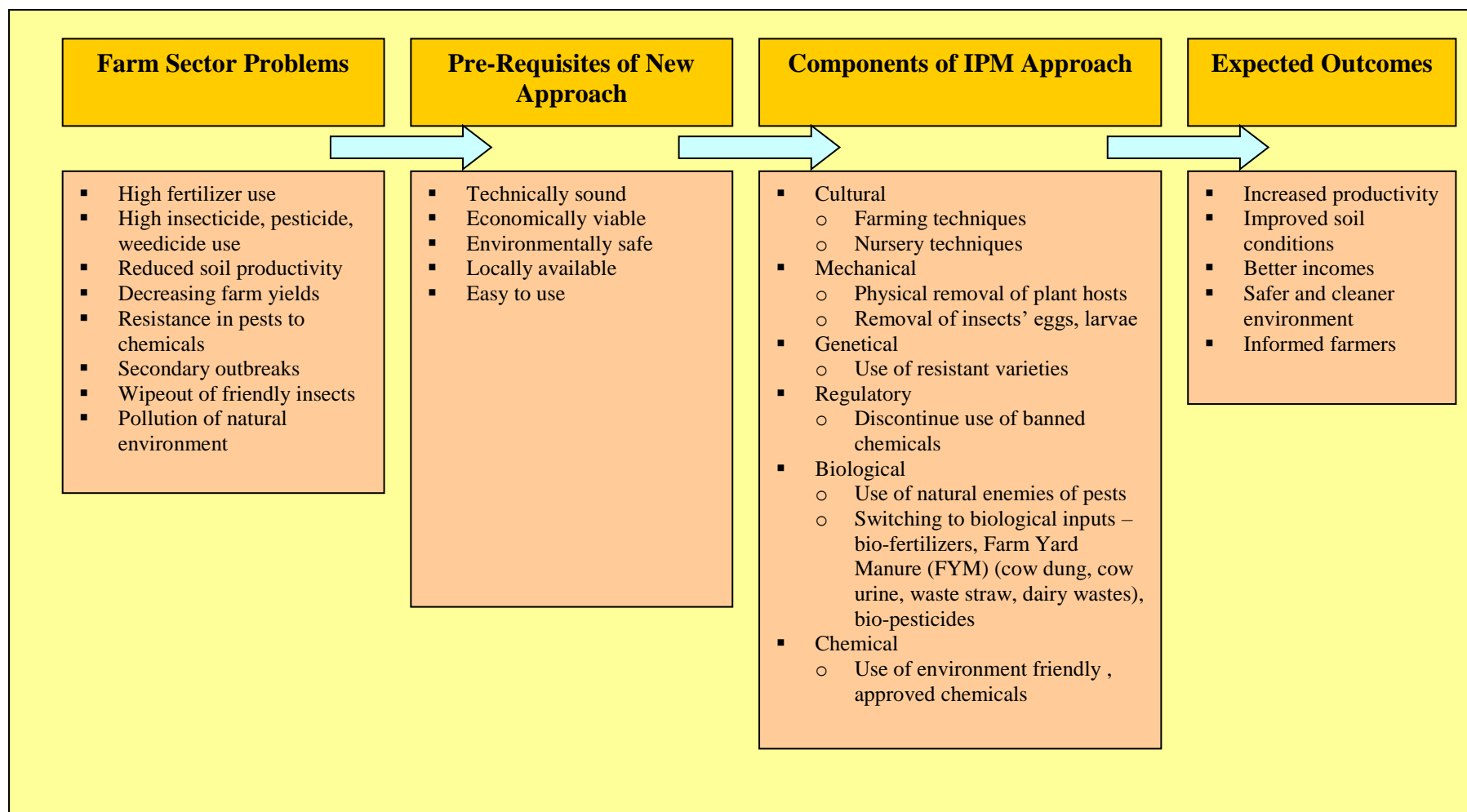
**Genetic methods:** This involves both use of genetically superior crop varieties that are resistant to various pests and also methods used to increase competition between pest populations.

**Regulatory methods:** Rules formed by various agencies and Governments are implemented under this method. Quarantine rules are enforced strictly disallowing infected materials to be imported and transported to other parts where there is no pest problem. Ban on certain dangerous chemicals is also enforced and regulated.

**Bio-control methods:** Control of insect pests and diseases through biological means is one of the most important components of IPM. Use of parasites, predators and pathogens to maintain pest population at a level below those causing economic losses either by introducing a new species into the environment or by increasing the effectiveness of those already present. The different types of biocontrol practices are grouped as under:

**Chemical methods:** The use of chemical pesticides is the last resort when other methods fail to keep the pest population below the Economic Threshold Level. Although there is advancement in pest management research, pesticides would continue to play an important role in crop protection. Therefore, the use of pesticides should be judicious, based on pest surveillance and ETL to minimize not only the cost but also reduce the associated problems. While going for chemical control the following points must be strictly followed:

- The economic threshold level should be observed.
- Selection of relatively environmental friendly pesticides.
- Ensure that farmers are sensitized to the use and safe disposal of insecticides, fertilizers etc and that these harmful chemicals are not used beyond their expiry.
- If the pest is present in strips or in isolated patches, the whole field should not be sprayed.
- Pest and defender ratio must be observed. If the ratio is 1:1, there is no need for pesticide spray.



*Figure 1: Flow Diagram: IPNM Approach and Outcomes*

## **Guidance on Safe Use of Pesticides**

General safety precautions while handling pesticides

- When handling the pesticide products during opening of the package, mixing and preparation of the spray
- When spraying the pesticide
- When disposing the pesticide solution and containers

### **General Precautions to be taken:**

#### **▪ Protective Gears**

- The operator should wear a protective hat and face shield or goggles.
- Do not eat, drink or smoke while working
- Wash hands and face with soap and water after spraying and before eating, smoking or drinking. Shower or bath at the end of every day's work and wear new clean clothes
- Wash overalls and other protective clothing at the end of every working day in soap and water and keep them separate from the rest of the family's clothes.
- If the insecticide touches the skin, wash off immediately with soap and water
- Change clothes immediately if they become contaminated with pesticides.
- Inform the supervisor immediately if one feels unwell.
- Absorption of pesticides occurs mainly through the skin, lungs and mouth. Specific protective clothing and equipment given below must be worn in accordance with the safety instructions on the product label.
- Protective clothing and equipment to be used
- Broad-brimmed hat (protects head, face and neck from spray droplets).
- Face-shield or goggles (protects face and eyes against spray fall-out).
- At the end of the days' work during IRS activities, the inside of the spray pump should be washed and any residual pesticides should be flushed from the lance and nozzle.
- Face mask (protects nose and mouth from airborne particles).
- Rubber Gloves
- The store room should have a prominently displayed mark of caution used for poisonous or hazardous substances. It should be kept locked.
- Boots (protected feet)

▪ **Storage**

- Pesticides storehouses must be located away from areas where people or animals are housed and away from water sources, wells, and canals.
- They should be located on high ground and fenced, with access only for authorized persons. Containers, bags or boxes should be well stacked to avoid possibility of spillage. The principle of first expiry first out should be followed.
- However, there should be easy access for pesticides delivery vehicles and, ideally access on at least three sides of the building for fire-fighting vehicles and equipment in case of emergency

▪ **Transportation**

- Pesticides should be transported separately. It should NOT be transported in the same vehicle as items such as agriculture produce, food, clothing, drugs, toys, and cosmetics that could become hazardous if contaminated.
- Pesticide container should be loaded in such a way that they will not be damaged during transport, their labels will not be rubbed off and they will not shift and fall of the transport vehicle onto rough road surface
- Vehicles carrying pesticides should predominantly display warning signs and notices
- The pesticides load should be checked at intervals during transportation, and any leaks, spills, or other contamination should be cleaned up immediately using accepted standard procedures. In the event of leakage while the transport vehicle is moving, the vehicle should be brought to a halt immediately so that the leak can be stopped and the leaked product cleaned up. Containers should be inspected upon

▪ **Disposal of leftover Pesticides:**

- The rinsing water should be collected and carefully containers in clearly marked drums with a tightly fitted lid. This should be used to dilute the next day's tank loads or disposed properly by the supervisor at disposal sites like pits or dugs, preferably in hazardous waste disposal facility .
- Never pour the remaining pesticides into rivers, pools or drinking water sources.
- Decontaminate containers where possible. For glass, plastic or metal containers this can be achieved by triple rinsing, i.e. part-filling the empty container with water three times and emptying into a bucket or sprayer for the next application.
- All empty packaging should be returned to the supervisor for safe disposal according to national guidelines.
- Never re-use empty insecticide containers.
- It shall be the duty of manufacturers, formulators of pesticides and operators to dispose of packages or surplus materials and washing in a safe manner so as to prevent environmental or water pollution.
- The packages shall be broken and buried away from habitation, but preferably disposed in a hazardous waste disposal facility
- The used packages shall not be left outside to prevent their re-use.
- The expired stock should be returned to the manufacturer for disposal as per guidelines preferably through incineration process.



- The chemical efficacy should be tested before the disposal of expired pesticides to find out the possibility of usage. The efficacy and active ingredient percentage of pesticides are tested and certified by the authorized testing laboratory.

**List of banned Pesticides, Pesticides Refused Registration in India and WHO Class 1A and B and Class II**

<b>A. Pesticides Banned for manufacture, import and use (28 Nos.)</b>			
1.	Aldrin	15.	Pentachlorophenol
2.	Benzene Hexachloride	16.	Phenyl Mercury Acetate
3.	Calcium Cyanide	17.	Sodium Methane Arsonate
4.	Chlordane	18.	Tetradifon
5.	Copper Acetoarsenite	19.	Toxafen
6.	Cibromochloropropane	20.	Aldicarb
7.	Endrin	21.	Chlorobenzilate
8.	Ethyl Mercury Chloride	22.	Dieldrine
9.	Ethyl Parathion	23.	Maleic Hydrazide
10.	Heptachlor	24.	Ethylene Dibromide
11.	Menazone	25.	TCA (Trichloro acetic acid)
12.	Nitrofen	26.	Metoxuron
13.	Paraquat Dimethyl Sulphate	27.	Chlorofenvinphos
14.	Pentachloro Nitrobenzene	28.	Lindane <sup>2</sup>
<b>B. Pesticide / Pesticide formulations banned for use but their manufacture is allowed for export (2 Nos.)</b>			
29.	Nicotin Sulfate	30.	Captafol 80percent Powder

<sup>2</sup> (Banned vide Gazette Notification No S.O. 637(E) Dated 25/03/2011)-Banned for Manufacture, Import or Formulate w.e.f. 25th March 2011 and banned for use w.e.f. 25th March, 2013.

<b>C. Pesticide formulations banned for import, manufacture and use (4 Nos)</b>			
1.	Methomyl 24percent L	3.	Phosphamidon 85percent SL
2.	Methomyl 12.5percent L	4.	Carbofuron 50percent SP
<b>D. Pesticide Withdrawn(7 Nos)</b>			
1.	Dalapon	5.	Paradichlorobenzene (PDCB)
2.	Ferbam	6.	Simazine
3.	Formothion	7.	Warfarin
4.	Nickel Chloride		
<b>List of Pesticides Refused Registration</b>			
1.	Calcium Arsonate	10.	Azinphos Ethyl
2.	EPM	11.	Binapacryl
3.	Azinphos Methyl	12.	Dicrotophos
4.	Lead Arsonate	13.	Thiodemeton / Disulfoton
5.	Mevinphos (Phosdrin)	14.	Fentin Acetate
6.	2,4, 5-T	15.	Fentin Hydroxide
7.	Carbophenothion	16.	Chinomethionate (Morestan)
8.	Vamidothion	17.	Ammonium Sulphamate
9.	Mephosfolan	18.	Leptophos (Phosvel)
<b>Pesticides Restricted for Use in India</b>			
1.	Aluminium Phosphide	8.	Monocrotophos
2.	DDT	9.	Endosulfan
3.	Lindane	10.	Fenitrothion
4.	Methyl Bromide	11.	Diazinon
5.	Methyl Parathion	12.	Fenthion
6.	Sodium Cyanide	13.	Dazomet
7.	Methoxy Ethyl Mercuric Chloride (MEMC)		

List of pesticides not permissible (WHO class Ia)			
Common name	Pesticide	Common name	Pesticide
Aldicarb	Ethoprophos	Chlormephos	Phenylmercury acetate
Brodifacoum	Flocoumafen	Chlorophacinone	Phorate
Bromadiolone	Hexachlorobenzene	Difenacoum	Phosphamidon
Bromethalin	Mercuric chloride	Difethialone	Sodium fluoroacetate
Calcium cyanide	Mevinphos	Diphacinone	Sulfotep
Captafol	Parathion	Disulfoton	Tebupirimfos
Chlorethoxyfos	Parathion-methyl	EPN	Terbufos
List of pesticides not permissible (WHO class Ib)			
Common name	Pesticide	Common name	Pesticide
Acrolein	Oxydemeton-methyl	Butoxycarboxim	Strychnine
Allyl alcohol	Paris green	Cadusafos	Tefluthrin
Azinphos-ethyl	Pentachlorophenol	Calcium arsenate	Thallium sulfate
Azinphos-methyl	Propetamphos	Carbofuran	Thiofanox
Blastidicin-S	Sodium arsenite	Chlorfenvinphos	Thiometon
Butocarboxim	Sodium cyanide	3-Chloro-1,2-propanediol	Triazophos
Coumaphos	Vamidotion	Edifenphos	Furathiocarb
Coumatetralyl	Warfarin	Ethiofencarb	Heptenophos
Common name	Pesticide	Common name	Pesticide
Zeta-cypermethrin	Zinc phosphide	Isoxathion	Methiocarb
Demeton-S-methyl	Famphur	Lead arsenate	Methomyl
Dichlorvos	Fenamiphos	Mecarbam	Monocrotophos
Dicrotophos	Flucythrinate	Mercuric oxide	Nicotine

Dinoterb	Fluoroacetamide	Methamidophos	Omethoate
DNOC	Formetanate	Methidathion	Oxamyl
<b>List of pesticides not permissible (Class II)</b>			
Alanycarb	Endosulfan	Cyhalothrin	Metam-sodium
Anilofos	Endothal-sodium	Cypermethrin	Methacrifos
Azaconazole	EPTC	Alpha-cypermethrin	Methasulfocarb
Azocyclotin	Esfenvalerate	Cyphenothrin [(1R)-isomers]	Methyl isothiocyanate
Bendiocarb	Ethion	2,4-D	Metolcarb
Benfuracarb	Fenazaquin	DDT	Metribuzin
Bensulide	Fenitrothion	Deltamethrin	Molinate
Bifenthrin	Fenobucarb	Diazinon	Nabam
Bilanafos	Fenpropidin	Difenzoquat	Naled
Bioallethrin	Fenpropathrin	Dimethoate	Paraquat
Bromoxynil	Fenthion	Dinobuton	Pebulate
Bromuconazole	Fentin acetate	Diquat	Permethrin
Bronopol	Fentin hydroxide	Phenthoate	Quizalofop-p-tefuryl
Butamifos	Fenvalerate	Phosalone	Rotenone
Butylamine	Fipronil	Phosmet	Spiroxamine
Carbaryl	Fluxofenim	Phoxim	TCA [ISO] (acid)
Carbosulfan	Fuberidazole	Piperophos	Terbumeton
Cartap	Gamma-HCH, Lindane	Pirimicarb	Tetraconazole
Chloralose	Guazatine	Prallethrin	Thiacloprid
Chlorfenapyr	Haloxypop	Profenofos	Thiobencarb
Chlordane	HCH	Propiconazole	Thiocyclam

Chlorphonium chloride	Imazalil	Propoxur	Thiodicarb
Chlorpyrifos	Imidacloprid	Prosulfocarb	Tralomethrin
Clomazone	Iminoctadine	Prothiofos	Triazamate
Copper sulfate	Ioxynil	Pyraclufos	Trichlorfon
Cuprous oxide	Ioxynil octanoate	Pyrazophos	Tricyclazole
Cyanazine	Isoprocab	Pyrethrins	Tridemorph
Cyanophos	Lambda-cyhalothrin	Pyroquilon	Xylcarb
Cyfluthrin	Mercurous chloride	Quinalphos	
Beta-cyfluthrin	Metaldehyde		

(Lists to be updated as per latest status while preparing sub project ESMPs)

#### 4.6 Generic SMP for Category S2 Projects

##### SOCIAL MANAGEMENT PLAN

##### FOR S-2 CATEGORY PROJECTS

Social Assessment	YES	NO	If Yes, Specify Details	Social Management Measure	Cost
1. Is there loss of dwelling land and structure?			i. Total area of land acquired ii. Total no.of HHs losing their dwelling land and structure	i. No.of HHs (with valid title) to be given developed plots and house ii. No.of HHs to be given cash compensation = iii. No. of squatters to be given developed plots and house = iv. No .of HHs to be given shifting allowance = v. No. of HHs to be given transitional assistance =	
2. Is there loss of agricultural land and structure?			i. Total agricultural area acquired ii. Total no.of HHs losing their land and structure iii.Total no.of tenant / leaseholder / sharecroppers losing their tenancy iv. Total no. of agricultural labourers losing their livelihood	i. No.of HHs (with valid title) to be given alternative land = ii. No.of HHs (with valid title) to be given cash compensation = iii. No. of individuals to be given cash compensation = iv. No. of individual tenants/leaseholder/ sharecroppers to be given cash assistance = v. No. of individuals to be given notice for harvesting = vi. No. of individuals to be given cash compensation for non perennial crops = vii. No. of individuals to be paid cash compensation for perennial crops = viii. No. of individuals to be paid cash assistance for loss of agricultural labour =	
3. Is there loss of commercial/ industrial/ Institutional land and structure?			i. No.of HHs (with valid title) losing their land and structure ii. No.of tenants/ leaseholders losing their land and structure iii.No.of squatters / encroachers losing their land and structure	i. No. of units (with valid title ) to be given alternative land = ... ii. No. of units (with valid title) to be given cash compensation = iii. No. of units (with valid title) to be given livelihood assistance =	

Social Assessment	YES	NO	If Yes, Specify Details	Social Management Measure	Cost
			iv. No. of employees losing their livelihood	iv. No. of tenants to be given livelihood assistance = ..... v. No. of tenants to be given shifting assistance = vi. No. of squatters to be given developed plot and built shop = vii. No. of squatters / encroacher to be given cash compensation = viii. No. of squatters to be given shifting assistance = ix. No. of squatters to be given livelihood assistance = ..... x. No. of employees to be given livelihood assistance =	
4. Is there loss of access to common resources and or facilities?			i. Specify type of CPR being lost ii. No. of HHs losing their access to CPRs	i. No. of HHs to be provided CPRs ii. No. of HHs to be provided amenities	
5. Are there losses to host communities?			i. Specify the type of losses ii. No. of communities losing their amenities/ services	i. Money to be spent on restoration of losses due to resettlement ii. Money to be spent on restoration of amenities	
6. Is there any impact on indigenous people?			i. No. of HHs		
7. Is there any induced development?					
1. Was the land acquired / bought / transferred prior to the present ownership of ULBs ?			i. When was this done ? ii. Total area of land acquired / bought / transferred iii. Usage of land earlier to ULBs possession iv. Amount paid as compensation v. Total no. of HHs from whom it was bought vi. No. of HHs evicted from the land	i. No. of HHs (with valid title) to be given land for land = ii. No. of HHs to be given cash compensation = iii. No. of HHs to be given livelihood assistance = iv. No. of squatters to be given developed plots and house / shop = v. No. of squatters/encroachers to be given cash compensation = vi. No. of squatters to be given livelihood assistance =	

## 4.7 Physical Cultural Resources Management Framework

It is important to adopt a precautionary approach to ensure that project activities do not affect important Physical Cultural Resources (PCRs). Hence, the provision of methodology for screening sites and incorporation of mitigation measures in ESMF are deemed important. In addition, it is possible that additional PCRs (chance finds) may be encountered during site clearance or excavation activities associated with the construction of small structures. At the project level, hence it is important to develop a PCR Management Plan (PCRMP) that identifies what measures shall be taken to protect these cultural resources, based on the framework provided in this section. The plan should also address measures to monitor downstream erosion of physical cultural sites and implement measures to protect these sites. Chance Find Procedures, which identify the measures be taken in the event that PCRs are encountered, are also outlined here.

### 4.7.1 Applicable policies

Various National and State level policies/laws and rules are applicable for heritage preservation. In addition, international guidance and world Bank operational policy on PCRs are applicable here.

#### National Policies

National-level policies applicable to monuments in all States and Union Territories are presented in Table below.

**Table 1: National Policies related to Heritage Conservation and Management of Archaeological Precincts**

<i>Policy / Act</i>	<i>Description</i>
Ancient Monuments and Archaeological Sites and Remains Act 1958 updated as per Ancient Monuments and Archaeological Sites and Remains (Amendments and Validation) Act, 2010  Responsible Agency: Ministry of Culture;  NMA with ASI	Declares certain monuments/sites as being of “national importance”. Stipulates conservation of cultural and historical remains found in India. Monuments are “protected” area.  (i) 100m radius is “prohibited” area – no construction or reconstruction. Repairs allowed. (ii) 200m radius is a “regulated” area (structures can be constructed by archaeological officers with due sanctions from competent authority).  Protection, maintenance and conservation managed by Archaeological Survey of India (ASI)
Ancient Monuments Protection Act, 1904  Responsible Agency: Ministry of Culture	Gives central government the authority to protect and conserve monuments, particularly those privately owned, through acquisition of rights.  Specifies agreements to be made between GoI and monument/site owner for transfer of rights for protection.



<i>Policy / Act</i>	<i>Description</i>
	Gives GoI right to intervene in potentially harmful activities near site (e.g. mining, quarrying).
The Antiquities and Art Treasures Act, 1972  Responsible Agency: Directorate of Culture, Govt. of UP	To ensure registration of antiquarian remains in personal possession of individuals and institutions. Registration of antiquities/remains/art is mandatory.

### **State Specific Policies**

In addition to following the National policies and laws, each state has its own set of special policies to manage heritage and archaeological features. Some of the State policies are as follows.

- (1) Tamil Nadu Ancient and Historical Monuments and Archaeological Sites and Remains Act 1966
- (2) Maharashtra Ancient Monuments and Archaeological Sites and Remains Act, 1960
- (3) The Andhra Pradesh Ancient and Historical Monuments and Archaeological Sites and Remains (Amendment) Act, 2001
- (4) Andhra Pradesh Tourism, Culture and Heritage Board Act, 2017
- (5) Gujarat Ancient Monuments and Archaeological Sites and Remains Act, 1965
- (6) Odisha Ancient Monuments Preservation Act of 1956
- (7) Kerala Ancient Monuments and Archaeological Sites and Remains Act, 1968
- (8) West Bengal Preservation of Historical Monuments and Objects and Excavation of Archaeological Sites Act, 1957
- (9) Karnataka Ancient and Historical Monuments and Archaeological Sites and Remains Act, 1961
- (10) Goa, Daman and Diu Ancient Monuments and Archaeological Sites and Remains Act, 1978

### **World Bank Operational Policy**

World bank OP/BP 4.11 states that PCRs may not be known or visible; therefore, it is important that a project's potential impacts on PCRs be considered at the earliest possible stage of the project planning cycle.

This policy addresses PCRs, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. PCRs may be located in urban or rural settings and may be above or below ground, or underwater. Their cultural interest may be at the local, provincial or national level, or within the international community. PCRs are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices.

### **Other International Guidance:**

<b><i>Guidance</i></b>	<b><i>Description</i></b>
UNESCO Operational Guidelines for the Implementation of the World Heritage Convention, 2013.  Responsible Agency: Ministry of Culture with ASI; NMA	To facilitate the implementation of the World Heritage Convention, Requires the establishment of boundaries, buffer zones (where necessary), management systems and sustainable use for effective protection of listed sites and to maintain their “Outstanding Universal Value”. In India, 16 cultural and 5 natural sites are listed under the Convention. Possibly, if any subproject is located near listed sites and may impact management systems.

#### ***4.7.2 Project Activities Impacts and Mitigation measures***

Some of the subproject activities may be proximal to locally or regionally important PCRs and may affect the cultural spirit of the communities. Some activities might require site clearance, minor excavations and construction closer to settlements and PCRs in the project areas.

This ESMF includes the screening framework, process to prepare PCRMP and guidance of key impacts and mitigation measures to be considered while finalizing the interventions at each location. The ESMF describes procedures to identify such properties, and mitigate and manage impacts in the case, such properties are impacted. Cultural resources (properties), if any would not be disturbed through avoidance of these. At the project preparation stage, it is important to prepare an inventory of PCRs and prepare the PCRMP in case project screening identifies such possibilities. The methodology to prepare the PCRMP is provided in the following section. This ESMF also includes procedures to handle chance finds.

#### ***4.7.3 Physical Cultural Resources Management Plan***

The objective of the PCRMP is to prevent any inadvertent loss of physical and cultural resources during project construction and operation. The development of a PCRMP is to be made an integral part of the Environmental Impact Assessment process. Typically, the plan includes measures for avoiding or mitigating any adverse impacts on physical cultural resources, provisions for the management of chance finds, any necessary measures for strengthening institutional capacity, a monitoring system to track progress of these activities, and takes into account the country’s overall policy framework, national legislation and institutional capabilities in regard to physical cultural resources.

The proposed monitoring system should cover the expected impacts, and the implementation of the mitigating measures recommended in the EA report, as well as impacts that were not included in the impact assessment, possibly because it was thought that such PCR would not be affected.

In the case of a major subproject in a culturally sensitive area, which requires substantial archaeological investigations during project implementation, consideration should be given to instituting a program of independent monitoring and review. Whenever it is considered possible for project-related activities to encounter archaeological or paleontological sites or artifacts, the contractors should be required to follow procedures outlined by the World Bank regarding chance finds.

#### Project Screening

1. Project activities in close proximity (200m radius) of the listed archaeological sites or important monuments shall not be permitted
2. For all other PCRs, culturally important tangible or intangible assets, PCRMP shall be prepared and mitigation hierarchy to be followed.

The PCRMP can constitute either (i) a section of the Environmental and Social Management Plan or (ii) may be part of the recommendations of the completed EA.

PCR component of the EA shall include (a) an investigation and inventory of PCRs likely to be affected by the project; (b) documentation of the significance of such PCRs; and (c) assessment of the nature and extent of potential impacts on these resources.

The Management Plan should clearly:

- Schedule the implementation of the proposed PCR mitigating measures and PCR monitoring, if any, taking into account the weather pattern, and identify roles and responsibilities for such implementation;
- Identify procedures for handling chance finds, including the role and responsibilities of the cultural authorities and the contractor;
- Identify procedures for addressing PCR impacts that may occur during implementation but were not predicted in the impact assessment.

*Sections of the PCRMP are as below:*

#### **4.7.3.1 Applicable Policy, Legal and Regulatory Framework**

This section should contain a reference to the following, including identification of any implications for the PCR component of the EA, such as special standards or requirements:

- The World Bank's EA policy OP/BP 4.01 and the PCR policy OP/BP 4.11;
- Sections of national EA laws, regulations and guidelines relating to PCR;
- Sections of the national environmental conservation strategy, if any, relating to PCR;
- National, state/provincial or local legislation and regulations relating to:

- Antiquities, including sale and export;
- Procedures for addressing chance finds, in terms of ownership and requirements by the contractor and cultural authorities;
- Archaeology, including the issue of permits;
- Relevant authorities charged with PCR identification, protection and management, their powers, the legal basis for their authority, and their actual capacity;
- PCR-related conventions and treaties to which India is signatory;
- Sites in the state / nearby areas listed as World Heritage Sites according to the UNESCO World Heritage convention, or included in UNESCO's 'tentative' list under the same convention;
- Sites currently listed by other international agency in the field of PCR such as the World Monuments Fund, or ICOMOS, as being of national or international importance;
- Any national or provincial registers of PCR maintained by accredited authorities in India.

#### **4.7.3.2 Baseline Data**

It is important to understand the baseline PCRs in the region and specifically the ear marked sites, while preparing the project specific Environmental Assessment. The Terms of Reference (TORs) for PCRMP or EA / EIA shall propose spatial and temporal boundaries for the on-site collection of baseline data on PCRs potentially affected by the project, and specify the types of expertise required for the PCR component of the EA.

The EA baseline data should include an investigation and inventory of physical cultural resources likely to be affected by the project. The data should consider all types of PCR that might be impacted, covering:

- a. Living-culture PCR, as well as historical, archaeological and paleontological PCR;
- b. Natural and human-made PCR;
- c. Movable and immovable PCR;
- d. Unknown or invisible PCR.

The baseline data section should include maps showing PCR baseline data within the potential impact areas. Since many local PCRs are not documented, or protected by law, consultation is an important means of identifying such resources, documenting their presence and significance, assessing potential impacts, and exploring mitigation options. The data collection activity should involve consultations with concerned authorities, potentially affected communities and non-governmental organisations. Potential data sources might include cultural authorities, national or provincial PCR registers, universities and colleges, public and private PCR-related institutions,

religious bodies and local PCR NGOs. Sources at the community level typically include, for example, community leaders and individuals, schools, religious leaders, scholars, PCR specialists, and local historians.

In addition, the EA should detail the cultural significance or value attributed by the concerned or affected parties to the PCR identified in the baseline. This will normally not be expressed in monetary terms, but rather should explain the nature of the cultural significance, for example, whether it is religious, ethnographic, historic, or archaeological. In the case of PCR of archaeological, architectural, paleontological or other scholarly or scientific value, the EA should provide an assessment of the relative importance of the PCR in this regard locally, nationally and/or internationally.

#### **4.7.3.3 Component Planning and Design based on Analysis of Alternatives**

A detailed description of the project components, supported by location / layout / site maps, construction plans and operation details of each activity and development proposed is essential to evaluate the impacts. It should describe the activities associated with pre-construction, construction and operation phases including material sourcing and staking, transport, labour, work scheduling and impacts on nearby PCRs due to each activity.

Selection of alternate locations designs or arrangements shall be considered in case any PCR related issues are identified. Alternatives shall aim at avoiding or minimizing the impacts on PCRs.

#### **4.7.3.4 Impact Assessment**

The EA should specifically describe the nature and extent of the potential impacts. The PCR components of the EA must align with any PCR-related social impacts in the SIA, to ensure that elements of living culture are not overlooked in the assessment stage. The impact assessment should also consider the possibility of accidents during construction/rehabilitation and operations which might affect PCR, which might call for special precautionary measures and emergency responses.

##### *Capacity Assessment*

The EA should assess the borrower's capacity for implementing the proposed mitigating measures and managing chance finds, and where appropriate, recommend capacity building measures. Capacity to implement the Plan, particularly to identify and manage PCR related impacts, on-site training, institutional strengthening, inter-institutional collaboration, and rapid-response capacity for handling chance finds shall be augmented if found necessary.

#### 4.7.3.5 Mitigation Measures

It is particularly important that consultations with concerned and affected parties are conducted on the proposed mitigation measures relating to PCR impacts. Agreements must be reached, and evidence of such agreements should be included in the EA.

The following mitigation measure are essential: (i) Avoidance or mitigation of identified adverse impacts; (ii) Provisions for chance finds; (iii) Measures for strengthening institutional capacity; and (iv) Monitoring systems to track the progress of these activities. The EA process should check whether the recommended mitigation measures might themselves have environmental impacts (e.g. paved access roads). The cost implications of implementing proposed mitigation measures shall be included in the costing table and finally in the bid documents.

Sample Guiding Table on possible activities, resultant negative externalities on PCRs and mitigation measures are provided below. These impacts shall be considered (but not limited to) while preparing the detailed mitigation plan.

**Table 2: Guidance on Possible Impacts on PCRs and Mitigation Measures**

<i>Stage</i>	<i>Activity</i>	<i>Impact</i>	<i>Mitigation Measures</i>
Design Stage	Layout of structures/activities in proximity to PCR	Physical, Cultural disturbances to PCRs due to siting activities near or upstream	<ul style="list-style-type: none"><li>▪ PCR Inventorization and Consultation with Community and official stakeholders (including local bodies) during EA</li><li>▪ Prepare alternate design to avoid siting of structures /activities near PCR</li><li>▪ Prepare designs appropriate to nearby PCRs: (b) Prescribe the position, height, size, design, materials, color and screening and otherwise regulate the external appearance of structures and other works above ground within the controlled area</li><li>▪ Prepare mitigation measures in case unavoidable and consult and agree with the community and all relevant authorities</li></ul>
Pre-Construction Phase	Site Clearance	Physical and Cultural impacts of cleared material strewn around PCRs	<ul style="list-style-type: none"><li>▪ Follow proper stacking of cleared material in areas away from PCR and ensure site housekeeping</li></ul>

<i>Stage</i>	<i>Activity</i>	<i>Impact</i>	<i>Mitigation Measures</i>
		Dust pollution due to removal of cleared material from site	<ul style="list-style-type: none"> <li>▪ Transport cleared material from site to designated treatment/disposal points through routes which are well surfaced and away from PCRs</li> </ul>
		Chance Find of idols, histo-culturally important property	<ul style="list-style-type: none"> <li>▪ Site examination with user group/communities prior to initiating pre-construction activities</li> <li>▪ Chance find procedures to be followed</li> </ul>
		Disturbances due to culturally inappropriate labour and activity scheduling near PCRs	<ul style="list-style-type: none"> <li>▪ Labour and activity scheduling near PCRs to follow timelines and other aspects in consonance with any local beliefs/nuances</li> </ul>
		Disturbance to trees or important vegetation	<ul style="list-style-type: none"> <li>▪ Barricades and instructions to avoid disturbance to key / peripheral trees and vegetation.</li> <li>▪ Reforestation (at 4 times rate) in case of disturbance to vegetation in nearby areas outside the control area of PCR</li> </ul>
	Transport and stacking of materials and Tools	Stacking of tools and material around PCRs	<ul style="list-style-type: none"> <li>▪ Minimal stacking of materials</li> <li>▪ Follow proper stacking in areas away from PCR, and ensure site housekeeping</li> </ul>
		Dust pollution due to transport of material to site	<ul style="list-style-type: none"> <li>▪ Transport material to site through routes which are well surfaced and away from PCRs</li> </ul>
Construction Phase	Minimal excavation for construction or expansion of ponds, and other small structures or material sourcing (borrow / quarry sites)	Chance Find of histo-culturally important property (idols, structures, potteries, stone tools, fossils and bones etc)	<ul style="list-style-type: none"> <li>▪ Site examination with user group/communities prior to initiating construction activities</li> <li>▪ Chance find procedures to be followed</li> <li>▪ Barricading the area, watch and vigil till authorities are notified and taken charge</li> <li>▪ Photo documentation if allowed and directed by authorities</li> </ul>
		Structural and cultural disturbances to PCRs due to construction activities	<ul style="list-style-type: none"> <li>▪ Plan to minimize disturbances in consultation with communities and authorities</li> <li>▪ Repairs, provision of retaining walls and other supports</li> </ul>

<i>Stage</i>	<i>Activity</i>	<i>Impact</i>	<i>Mitigation Measures</i>
		Disturbances due to culturally inappropriate labour and activity scheduling near PCRs	<ul style="list-style-type: none"> <li>▪ Labour and activity scheduling near PCRs to follow timelines and other aspects in consonance with any local beliefs/nuances</li> </ul>
		Erosion and slippage affecting downstream PCRs	<ul style="list-style-type: none"> <li>▪ Adopting indigenous knowledge to prevent erosion and slippage</li> <li>▪ Protective measures like fencing / barricading of downstream PCRs</li> </ul>
		Impacts on downstream water-based culturally important activities due to construction upstream	<ul style="list-style-type: none"> <li>▪ Maintaining downstream ecological flow while constructing upstream</li> </ul>
	Transport and stacking	Physical and Cultural impacts of construction and Demolition waste material strewn around PCRs	<ul style="list-style-type: none"> <li>▪ Follow proper stacking of wastes in areas away from PCR and disposal at agreed points as per time chart, and ensure site housekeeping</li> </ul>
		Dust pollution due to transport of material to site and wastes from site	<ul style="list-style-type: none"> <li>▪ Transport material to sites and wastes to designated treatment / disposal points through routes which are well surfaced and away from PCRs</li> </ul>
	Community health and safety	Impacts on communities during PCR related religious / cultural activities due to noise levels, poor site housekeeping and activity management, labour influx	<ul style="list-style-type: none"> <li>▪ Scheduling of activities in consultation with communities</li> <li>▪ Preference to local community work force</li> <li>▪ Facilities (sanitary, stay) to labourers away from PCRs</li> <li>▪ Training to labourers to minimize impacts on PCRs and dependent communities</li> <li>▪ Barricades around construction sites, display of warning boards, reflectors, etc. for safety</li> <li>▪ Proper work close out strategy and its execution</li> </ul>
		Accidents affecting PCRs during construction (for eg: erosion affecting PCRs due to breakage of bunds)	<ul style="list-style-type: none"> <li>▪ Prepare and execute Emergency Response Plan and train communities, authorities</li> </ul>



<i>Stage</i>	<i>Activity</i>	<i>Impact</i>	<i>Mitigation Measures</i>
Operation Phase	Minimal site clearance or excavations for maintenance or operations	Chance Find of idols, histo-culturally important property during routine maintenance of operations	<ul style="list-style-type: none"> <li>▪ Chance find procedures to be followed</li> </ul>
	Operation of small water ponding structures and water storage facilities	Upstream downstream impacts	<ul style="list-style-type: none"> <li>▪ Community – authority reporting and supervision mechanism</li> </ul>
	Storage and Stacking	Storage of fertilizers, equipment / tools	<ul style="list-style-type: none"> <li>▪ Storage facilities away from PCRs, Proper transport and disposal away from PCRs</li> </ul>
	Accidents and emergencies	Accidents affecting PCRs during operations [such as erosion affecting PCRs due to breakage of bunds constructed under the project]	<ul style="list-style-type: none"> <li>▪ Prepare and execute Emergency Response Plan and train communities, authorities</li> </ul>

All necessary and adequate care shall be taken to minimize impact on cultural properties (which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines, etc., graveyards, monuments and any other important structures as identified during design and all properties/sites/remains notified under the Ancient Sites and Remains Act. No work shall spill-over to these properties, premises and precincts. All utilities and common property resources likely to be affected due to the project will be relocated with prior approval of the concerned agencies before start of construction. Similarly, cultural properties whose structure is likely to get affected will be relocated at suitable locations, as desired by the community before construction starts. Local community need to be contacted and discuss relocation aspects, siting as well as their maintenance.

#### **4.7.3.6 Chance Find Procedures**

Chance Finds Procedure to guide the management of any accidental discoveries of histo-cultural resources while implementing the project is presented here.

All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately

upon discovery thereof and before removal acquaint the Engineer (Officer in Charge of the site) of such discovery and carry out the Engineer's instructions for dealing with the same, waiting which all work shall be stopped. The Engineer will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work on the site.

If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractor shall:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a nightguard shall be arranged until the responsible local authorities or the designated authority of the Ministry of Culture take over;
- Notify the Project Environmental Officer who in turn will notify (in writing) the responsible local authorities and the designated authority of the Ministry of Culture immediately (within 24 hours or less);
- Responsible local authorities and the designated authority of the Ministry of Culture would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Ministry of Culture. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible authorities and designated authority of the Ministry of Culture. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
- Responsible authorities may also communicate to the project in-charge or Environmental Officer the emergency handling measures to collect and preserve certain PCRs even before they arrive at the location to plan a detailed preservation mechanism. (Eg: This may include directions to collect potteries / stone tools / fossils in cloth bags bearing the provenance of the find and its exact location, depth and the total area to which it is evidenced or to collect bones and organic materials collected by the help of a spoon / spool in steel and kept covered in aluminium foil; avoiding direct body contact; or as appropriate)
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities;

- Construction works could resume only after permission is granted from the responsible local authorities or the designated authority of the Ministry of Culture concerning safeguard of the heritage;
- These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered are observed.

#### **4.7.3.7 Timing/Schedule**

The PCRMP shall be in place two months prior to the onset of site construction works for the main project site.

#### **4.7.3.8 Responsibility**

- For the construction phase: The Construction Contractor shall coordinate the preparation and implementation of the PCRMP for review by the SPMU and the designated authority of the Ministry of Culture.
- For operation phase: The NPMU through SPMU shall coordinate the updation of the PCRMP for the operation phase and implementation of the PCRMP for review by the designated authority of the Ministry of Culture.
- For chance finds, Construction Monitoring Plan shall incorporate a provision to monitor excavation sites, borrow sites and construction sites for accidental discovery of culturally significant artifacts or sites daily.

#### **4.7.3.9 Disclosure**

Disclosure depends on whether the findings of the PCR component of the EA would jeopardize the safety or integrity of any of the PCRs involved or could endanger the source of information regarding the PCRs. In such cases, sensitive information relating to these particular aspects, such as the precise location or value of a PCR, may be omitted from the EA report.

#### **4.8 Guidance on Conservation, Protection And Management Framework For Ecologically Sensitive Areas**

This section is based on the framework provided as part of the CRZ Notification 2019 (THE GAZETTE OF INDIA : EXTRAORDINARY [PART II—SEC. 3(i)]) considering the applicability of this framework for multiple subproject activities.

The coastal and marine Ecologically Sensitive Areas (ESAs) and the geo-morphological features play a vital role in maintaining the functions of the coast. Mangroves, beaches, coral reefs, etc., aid in controlling coastal erosion, shoreline change, saltwater intrusion and also serve as natural defense against coastal hazards such as storm surges, cyclones and tsunamis. The ESAs maintain the biological integrity of the coast by providing direct and indirect ecosystem services to the coastal livelihood. In addition, several invaluable archaeological and heritage sites are also located along the coast. Hence conservation and protection of the above areas, features and sites become necessary.

Specific conditions shall be adopted for the conservation, protection and management of each of the ESAs as under:

##### **Mangroves:**

(i) Mangroves declared as forest under the Forest (Conservation) Act, 1980 (69 of 1980) by the concerned State Governments or Union Territory Administrations or Central Government as forest land under the Forest (Conservation) Act, 1980 (69 of 1980) shall attract the provisions of the said Act.

(ii) Mangroves not declared under the Forest (Conservation) Act, 1980:

(a) Mangroves in Government land shall be protected based on a detailed plan to be prepared by the concerned State Governments or Union territory administrations, and in case the mangrove area is more than 1000 square meters, a buffer of 50 metre along the periphery of mangrove area shall be provided. This buffer zone of 50 metre may be utilized for public facilities for developing parks, research facilities related to mangrove biodiversity, facilities for conservation and the like.

(b) Mangroves in private land will not require a buffer zone.

##### **Corals and coral reefs and associated biodiversity:**

(i) Destruction of coral and coral reefs and the surroundings is a prohibited activity.

(ii) All coral and coral reefs shall be protected except for those small quantities required for research purposes.

(iii) Coral and coral reefs transplantation activities shall be through recognized research institutions wherever required for regeneration after obtaining necessary approvals under the Wildlife (Protection) Act 1972 (53 of 1972).

(iv) The dead or destroyed or both coral areas shall be taken up for rejuvenation and rehabilitation. The conservation and protection of corals and coral reefs shall be taken up as follows:-

- a) active and live coral and coral reefs identified and delineated shall be declared and notified as ESA under Environment (Protection) Act 1986 (29 of 1986);
- b) it shall be ensured that no activities that are detrimental to the health of corals, coral reefs and its associated biodiversity, such as mining, effluent and sewage discharge,
- c) dredging, ballast water discharge, ship washings, fishing other than traditional non-destructive fisheries, construction activities and the like are taken up in and around the coral areas.

**The National Parks, marine parks, Sanctuaries,** reserve forests, wildlife habitats and other protected areas declared under the provisions of Wild Life (Protection) Act, 1972 (53 of 1972), the Forest (Conservation) Act 1980 (69 of 1980) or Environment (Protection) Act 1986 (29 of 1986); including Biosphere Reserves shall be conserved and protected as follows:-

- (i) Conservation and protection of the above-mentioned areas shall be as per the provisions of the respective Acts, notifications or guidelines as the case may be.
- (ii) Efforts shall be made to increase the forest area in the coastal region in order to prevent loss of life and property from increased storms, tides and floods.
- (iii) The concerned State Governments or Union territory administrations shall provide for adequate funds for such measures to undertake shelterbelt plantation or bio-shields with planting material suitable to the location.

**Salt marshes:**

The conservation and protection of salt marshes shall be as follows:-

- (i) The salt marsh areas shall be conserved and protected and efforts shall be made to promote the endemic biodiversity in the salt marshes.
- (ii) Only those activities required for overhead conveying or transmission of cables and underground laying of transmission line cables and so on shall be permissible.
- (iii) Traditional fishing shall be permissible in salt marshes.
- (iv) Temporary tourism facilities around the salt marsh areas may be considered subject to adhering to norms laid down in the guidelines.
- (v) Certain salt marshes that have less biodiversity, identified by NCSCM and demarcated in Coastal Zone Management Plan can be considered for salt pan activities.

**Turtle nesting grounds shall be protected and conserved as follows:**

- (i) Turtle nesting grounds identified by the concerned State Governments or Union territory administrations shall be protected as per the Wildlife (Protection) Act of 1972.

- (ii) No activities shall be permitted in and around the turtle nesting ground including those causing light and sound pollution except those required for conservation and protection of these sites.
- (iii) Strict management plans for protecting the turtle nesting grounds shall be undertaken and implemented by the concerned State or Union territory Authorities.

**Horseshoe crabs habitats shall be protected and conserved as follows:**

- (i) The habitat identified shall be taken up for conservation and protection.
- (ii) No activities shall be taken up in and around these habitats which affect the horseshoe crab ecosystem.

**Sea grass beds shall be protected and conserved as follows:**

- (i) Identified seagrass beds shall be conserved and protected.
- (ii) No developmental activities that have an adverse effects on the seagrass bed shall be undertaken.
- (iii) Efforts shall be made to propagate seagrass beds along the coastal waters where ever possible by States or Union territories as it acts as a carbon sink.

**Nesting grounds of birds shall be protected and conserved as follows:**

- (i) The nesting ground of birds including their local migratory route shall be protected. No developmental activities which have an adverse impact on the nesting grounds and the migratory routes shall be undertaken including the construction of windmills, transmission lines and the like in the locality.
- (ii) Efforts shall be made to increase the forest cover and mangrove cover including enriching the biodiversity of salt marsh and other coastal water bodies so as to provide for suitable habitat for the avifauna.

**Geo-morphologically Important Zones shall be protected and managed as follows:**

- (i) **Sand dunes** identified shall be conserved and protected as follows:
  - a) sand dunes identified shall be notified under the Environment (Protection) Act 1986;
  - b) no developmental activities shall be permitted except for providing eco-friendly temporary tourism facilities on stilts such as walkways, tents and the like;
  - c) mining of sand from sand dunes shall be prohibited activity except for the removal of atomic minerals with proper replenishment using the tailings or other suitable sand;
  - d) no activities on the sand dunes shall be taken up that would lead to erosion/destruction of sand dunes (for example; no dressing or altering of active sand dunes, no flattening of sand dunes shall be carried out);
  - e) afforestation, if any, on the sand dunes shall be done only with native flora;

- f) the States or Union territory shall prepare management plans for the demarcated sand dunes.

**(ii) Sandy beaches:**

- a) Mining of beach sand is prohibited except for manual mining of atomic minerals with proper replenishment using the tailings or other suitable sand.
- b) When the permissible developmental activities are taken up on the beaches if loss of beach in the neighbourhood is predicted, necessary beach nourishment to compensate for the losses shall be undertaken by the project authorities and its long term maintenance shall be ensured by them.
- c) The States or Union Territory shall prepare management plans for the demarcated beaches.

**In CRZ II and III areas**

- a. Temporary tourism facilities shall be permissible in the beaches which shall only include shacks, toilets or washrooms, change rooms, shower panels; walkways constructed using interlocking paver blocks, etc, drinking water facilities, seating arrangements, etc. and such facilities shall, however, be permitted only subject to the tourism plan featuring in the approved CZMP as per CRZ notification, 2019; framed with due consultative process or public hearing, etc. and further subject to environmental safeguards enlisted in the CZMP, however, a minimum distance of 10 meter from HTL shall be maintained for setting up of such facilities.
- b. Development of vacant plots in designated areas for construction of beach resorts or hotels or tourism development projects subject to the conditions or guidelines at Annexure-III (Guidelines for Development of Beach Resorts, Hotels and Tourism Development Projects in the Designated Crz Areas) to CRZ notification, 2019.

**In CRZ–III areas beyond NDZ:**

- a. Development of vacant plots in designated areas for construction of beach resorts or hotels or tourism development projects subject to the conditions or guidelines at Annexure-III to CRZ notification, 2019.
- b. Construction or reconstruction of dwelling units, so long it is within the ambit of traditional rights and customary uses such as existing fishing villages, etc. and building permission for such construction or reconstruction will be subject to local town and country planning rules, with an overall height of construction not exceeding 9 meters and with only two floors (ground + one floor).
- c. The local communities including fishermen may be permitted to facilitate tourism through ‘homestay’ without changing the plinth area or design or facade of the existing houses.

- d. Construction of public rain shelters, community toilets, water supply drainage, sewerage, roads, bridges, etc.

**(iv) Biologically active mudflats:**

- a. Biologically active mudflats shall be identified by NCSCM in association with State Governments or Union territory administrations.
- b. The States or Union territories shall prepare management plans for such demarcated biologically active mudflats.

**(v) Areas or structures of archaeological importance and heritage value sites:**

- i) State Archaeological agencies shall be responsible for conservation and protection of all archaeological structures and heritage sites identified by the Archaeological Survey of India, as per the provisions of the respective Acts, notifications or guidelines.
- ii) No activities that are detrimental to the identified areas or structures of archaeological and heritage value shall be permitted.
- iii) It shall be ensured that these structures or areas are preserved and activities undertaken without changing the façade/plinth of such structures. Such structures could be considered for use in accordance with the relevant norms after undertaking careful designing of the interiors without changing the exterior architectural design of the structure.



#### **4.9 Guidance on Strategic Environmental and Social Assessment (SESA) Approach**

For large plan preparation activities envisaged under ENCORE, such as watershed management plans and ICZMPs, it is suggested to follow SESA approach. This guidance is on SESA approach, to be incorporated / made part of ToR for such regional / multi sectoral plan preparation activities.

*Purpose:* SESA is a key means of integrating environmental and social considerations into policies, plans and programs, particularly in sector decision-making and reform. It is defined as a systematic process for evaluating the environmental and social consequences of proposed policy, program or plan initiative and their alternatives in order to ensure they are fully included and appropriately addressed at the earliest suitable stage of the decision-making process<sup>3</sup>. SESA consists of an assessment of policies, plans, projects, and programs from an environmental and social point of view.

*Contents:* A detailed SESA shall be undertaken for certain large regional/multi sectoral plan preparation activities/subprojects under the program to describe analytical and participatory approaches that aim to integrate environmental and social considerations into policies, plans and programs and evaluate the interlinkages with economic considerations. SESA shall aim to understand the baseline situation with respect to environmental characteristics, social aspects including gender, National / State regulatory mechanism, and institutional capacities for environmentally sound planning appropriate to the social conditions/acceptable to the communities, design, and management of proposed interventions. The SESA shall provide an understanding of the potential environmental and social issues associated with coastal planning as a whole, and particularly those which might specifically arise directly or indirectly by varied project activities in areas under consideration. The SESA shall also highlight the gaps in the sustainability framework and formulate alternatives/recommendations and guidelines to assess and address these issues and weaknesses in institutional and governance aspects at various levels. It can strongly contribute to weaving in sustainability principles into plans, programs, policies and projects. It shall recommend the way forward to address the sectoral concerns considering the impacts, exploring potential synergies and opportunities for mainstreaming environmental and social considerations and safeguards into the project. Its findings shall inform the sectoral policy, as well as the strategy for planning, and related activities to be undertaken as part of the project.

SESA does not substitute EIA at a project level, but it gives a basis for arriving at better-informed decisions on broader strategic aspects, like long term and range planning and cumulative effects.

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<sup>3</sup> The SESA takes in consideration the sustainability criteria by: 1. considering the environmental issues from very beginning of the decision-making process. 2. providing a framework for the chain of actions. 3. integrating policymaking, planning and program. 4. identifying the potential impacts in advance from sustainability point of view.

*Tools and Techniques:* SESA shall be undertaken in a participatory manner, through consultations with all stakeholders, using suitable quantitative and qualitative tools and prediction techniques. Mapping of key determining features of the State and review of technology used in urban sanitation, Demand – Supply Gap assessment and the environmental and social opportunities and scope for various development options are important. A review of all institutions/agencies/ departments partnering in the project shall be undertaken through Stakeholder mapping and Analysis.

The objectives of this SESA are twofold, namely:

- **at the sectoral level,** (i) identify the positive and negative environmental and social impacts and the risks associated with proposed sectors/interventions (or any attempt to bridge the demand-supply gap), (ii) assess the policy, legal and institutional framework and capacity to manage these issues, (iii) to propose a set of actionable recommendations by which these issues can be addressed so as to enhance sustainability of proposed planning, sectoral interventions continually; specifically focusing on regional environmental differentials, and
- **at the project level:** (i) prepare a set of detailed environmental and social guidelines for use in project activities and related investments.

### *Detailed Tasks and Activities*

#### **Task A1: Situational Analysis**

##### *Delineating the spatial extents/area of influence of the project:*

A logical area of influence for cumulative impacts shall be well ascertained at the onset of the study. This may include (a) the watersheds within which the sub-project/program is located; (b) the airshed (e.g., where airborne pollution such as smoke or dust may enter or leave the area of influence; (c) directly / indirectly affected wetlands, estuary and coastal zone; d) forested areas (e) migratory / movement routes of people, fauna / flora (including Piscean / avifauna), breeding habitats; and (f) social demarcations or areas used for livelihood activities (farming /other cultivation, hunting, fishing, grazing, gathering, agriculture, etc.) or religious or ceremonial purposes of a customary nature (refer WB OP 4.01: Environmental Assessment). This may also include indicative areas available for any related project activities.

##### *Establishing the Project Baseline*

Under this task, the baseline features and environmental and social conditions of the State/region with specific reference to the area of influence / spatial extent shall be established through assimilation and review of available data. Data gaps shall be assessed and surveys shall be planned to cover the data gaps if any. Environmental, social and disaster-related sensitivities of the area of influence shall be reviewed and presented.

### *Critical Review of Project Components and Past (similar) efforts*

All subproject components shall be reviewed with respect to their environmental and social sensitivities and impacts; so as to define applicable frameworks, tools, guidelines, ToRs and institutional structures for effective management of environmental and social impacts and risks. This task shall present the current status of planning and concerned sectors *viz a viz* the project components. Expected project investments, challenges and opportunities shall be reviewed. A review of various similar projects carried out over the past 20 to 30 years will be undertaken under this task. Status of these efforts/projects (in different stages of development/implementation/closeout/ suspension), any reason for success/failures directly or indirectly attributed to (or environmental reasons, social set up, sensitivities, or safeguards non-compliance, regulatory aspects shall be reviewed.

*Techniques and Tools: Marking the subproject areas of influence using the latest maps, literature review, data analysis using statistical tools, compiling area-based sensitivities and region of influence of such sensitivities. Provide maps and graphs as necessary to illustrate locations and physical context. Discussions with local bodies, line departments, state/city level other agencies, contractors, consultants, developers and host communities/beneficiaries if any involved in past attempts shall be undertaken through semi-structured questionnaires or focus group discussions.*

### **Task A2: Overview of Issues/Risks and Opportunities**

From the situational analysis above and through the application of appropriate analytical tools, this step aims at identifying environmental and social risks and impacts associated with the sectors under consideration. Under this task, a review of the physical and environmental/social diversity of the state /region shall be carried out. This shall identify the environmental/social issues and risks that may arise during various subproject stages. This shall also corroborate the safeguard policies that may be triggered and hence, need to be followed. This shall help in identifying critical issues and specific geographic areas vulnerable to varied environmental and social risks and impacts. This shall also mark the hot spots and areas under potential environmental stress and establish the baseline for monitoring of environmental and social aspects. Sectoral and subproject level impacts and risks and opportunities for improvement shall be compiled as part of this task.

*Techniques and Tools: This task shall be conducted using relevant methods/tools including spatial analysis, case studies, stakeholder consultations and participatory appraisals. Detailed analysis of secondary and primary data, literature review, case studies and site visits of existing similar facilities, and discussions with officials shall be conducted.*

### **Task A3: Consultations on priorities with respect to the project Components**

Based on the results of the Task 3, consultations shall be undertaken with all relevant stakeholders to identify environmental and social priorities with respect to the project

components. Proposed project components and options shall be assessed against the environmental and social impacts and risks that they may present during their implementation and operations/maintenance. Stakeholder analysis shall be undertaken to identify both primary and secondary stakeholders; direct-indirect stakeholders as per respective roles and responsibilities and interactions with project subcomponents/activities. These stakeholders shall be consulted and their views and suggestions documented. The need for co-ordination and functional overlaps and gaps among the various stakeholders, implementation agencies that may result in environmental or social impacts shall be identified. Document stakeholder views in a structured manner and indicate implications for project design. Opinions; concerns and suggestions of the stakeholders including project beneficiaries and hosts shall be well documented in a structured way and reviewed to draw information for subproject design, and environmental/social and safeguards management.

*Tools and Techniques: Stakeholder identification and mapping exercise, Stakeholder consultations on environmental aspects at sample participating local bodies in the region (selected appropriately to capture diversities in geographic space, environmental and social sensitivities, features, socio-economic characteristics and sites of known environmental and social issues, social importance, past unsuccessful efforts on similar projects) through individual / specialised area based open consultations, focus group discussions, semi-structured questionnaire based discussions of different socio-economic sections of the society, discussions with decision-makers), impact mapping and grading tools.*

#### **Task A4: Identification of Gaps in Sustainability Framework**

Critical institutional, legal, regulatory, policy and capacity gaps underlying the key environmental and social sustainability aspects shall be analysed to formulate alternatives/recommendations and guidelines to assess and address these issues and weaknesses in institutional and governance aspects at various levels. Under this task, review of available guidelines (manuals, available technical papers, guidance, standards) for environmental and social management and sustainability of project investments and gaps with respect to the State situation shall also be undertaken.

*Tools and Techniques: Desk based review of available data, statistical tools for analysis, gap analysis, Institutional Capacity analysis.*

#### **Task A5: Recommendations and Way forward**

The key recommendations emerging from the SESA shall be compiled under this task. These shall be impact centric; exploring potential synergies and opportunities for mainstreaming environmental and social considerations and safeguards into the project. This shall also suggest alternative options and directions for institutional / policy aspects for environmental/social aspects and safeguard management including preparation of guidelines to ensure sustainability proposed developments in the Plan and ToRs for required environmental and social specialists

in various tiers of implementation support units. Protocol for monitoring/auditing and continual review and improvement shall also be suggested.

*Tools and Techniques: Analysis, compilation and tabulation of results of the tasks above, Analysis of Alternatives acceptable to various stakeholders and geographic locations*

This approach can be built into all plan preparation activities, by incorporating these requirements into relevant ToRs. ICZM plan preparation followed under ICZMP (P097985) typically follows the SESA Approach.

#### **4.10 Environmental Codes of Practice**

This section presents the Environmental Codes of Practices (ECoP) developed to support the ENCORE program. The ECoPs provide guidelines for environmental management of certain project activities including which are seen to be of limited extent of impacts/risk, temporary and reversible, and readily managed with good practices during the implementation of the proposed project interventions. This Environmental Codes of Practice (ECoPs) sets out standards and procedures for managing the potential environmental impacts of project activities. The ECoPs will be included in bidding and contract documents as appropriate and its implementation will be closely monitored during implementation. The Contractors can use these while preparing and implementing Contractors ESMP at work start.

*In case of overlap of the provisions of this guidance with Indicative ESMPs, the more stringent among these most suitable to the site conditions and activities shall be adopted. The provisions of both ESMP and ECoPs shall be integrated while preparing site/activity specific ESMPs and design guidelines.*

This could be modified and changed in line with the changing situation or scope of the activities, and/or change or update of existing regulations/policies; subject to close consultation with the World Bank and clearance of the revised ECoPs.

##### **4.10.1 ECoP 01: Guidance on Tree Plantation and Green belt**

Tree plantation is advised for developing green belt for various environmental infrastructure and area development. It helps in overall environmental benefits in the area owing to its forward and backward linkages and environmental functions.

The Contractor shall:

- plant trees growing up to 10 m or above in height with perennial foliage around various appurtenances of the proposed subprojects,
- undertake planting of trees in appropriate encircling rows around the subproject site,

- grow fast-growing local tree species in consultation with the local communities, Forest Department and Local Bodies,
- compensatory Afforestation shall be at the rate of 2 to 4 times of the trees cut. Preferably same varieties of trees as are cut; shall be used for afforestation,
- plant shrubbery (preferably aromatic flowering in case of SWM facilities, STPs, Sewage Pumping Stations) in front of trees as the tree trunks are normally devoid of foliage up to a height of 3 m, and it may be useful to have shrubbery in front of the trees so as to give coverage to this portion,
- saplings with a height of around 1m shall be used for planting,
- farmyard manure / locally developed and in use pesticides/insecticides/weedicides may be used instead of chemicals,
- this activity will generate local employment opportunities as well for preparing such manure/pesticides and for maintaining the plantations.

The tree plantation shall be done at a spacing of 2.5 x 2.5 m. About 1600 trees per ha would be good. In addition, space-efficient multi-layered modern forestry options also may be tried. The maintenance of the plantation area shall also be done by the project proponent preferably with community participation. The treated wastewater and the manure generated by composting of solid waste generated by various facilities including labor camps will be used for the greenbelt development.

#### **4.10.2 ECoP 02: Guidance on Selecting Premises to be used as Offices and other centres**

Project Implementation Offices, Data centers and laboratories will be established in rented or own premises especially in the States. These guidelines are expected to improve the selection of these premises, keeping in view the health and hygiene of the surroundings, energy efficiency aspects, disabled-friendly features etc. It is understood that all these desirable features may not be available in existing premises. However, the buildings which would have many / most of these features may be considered for selection.

##### ***Location and Neighbourhood***

- Offices shall preferably be set up in Commercial or Mixed Landuses (Residential plus Commercial),
- Location should preferably be away from hazard / violence-prone areas and away from eco-sensitive areas (including Natural Habitat areas) as prescribed in applicable bye-laws / regulations,
- Activities within the premises shall not disturb the surrounding landuses or environment,
- All activities associated with the project shall be contained within its premises; without spillovers,

- Offices should be located in clean premises.

### ***Access and Parking***

- Access shall be good and well-defined to suit the movement of common vehicles and emergency service vehicles (fire service/ambulance) to and from the premises without obstruction during emergencies,
- Offices shall have good access roads, preferably topped to avoid dust / air pollution,
- Adequate parking facility shall be provided on the premises,
- Provide adequate boards (in a safe manner – without any impact also during extreme climatic events) for public information on the use of the premise, with contact details of ENCORE SPMU / NPMU Main Office,
- Any unauthorized entry to or exit from the sites should be controlled as much as possible,
- Details on features for Differently Abled persons are provided as a separate ECoP.

### ***Building***

- Selected building shall be of Good (Pucca) Structural Characteristics and functional, stable and with features to ensure its safety from hazards, cleanliness and climate resilience as per relevant Building Codes and Bye-laws,
- Building should have good thermal comfort and cross-ventilation,
- There shall be adequate appropriate furniture for the staff and visitors to sit and carryout business,
- Asbestos or other hazardous material must not be used / stored in the premises,
- The building should be compliant with all applicable National / State / Local regulations including Fire Codes,
- There shall be no dues on tax and other fees /duties applicable to the building or premises,
- Ensure that the building has suitable fire safety provisions including separate fire exit stairs as per National building Code or existing building bye laws,
- Building must be devoid of pests and pest control activities shall preferably use mechanical means or bio/organic pesticides and not banned pesticides.

### ***Prohibitions***

Following are prohibited in the premises

- Cutting of trees,
- Illegal dumping of material and debris,
- Use or storage of unapproved toxic materials, including lead-based paints, asbestos, dismantled solar panels (hazardous e-waste; also containing small quantities of heavy metals) etc.; There shall be tie-ups with disposal facility or the seller under Extended Producers Responsibility in case solar panels are used in the premises,
- Disturbance to anything with architectural or historical value;

- No burning of waste or open fires.

### ***Housekeeping***

Offices shall follow a ‘good housekeeping’ policy at all times. This will include, but not necessarily be limited to the following:

- Ensure considerate site behavior of the staff,
- Ensure appropriate provisions for maintaining the premises clean; Remove rubbish/wastes at frequent intervals leaving the site clean and tidy; Spills on floors to be cleaned up immediately,
- Work materials should be neatly stored,
- Walkways should be kept clear of obstructions,
- Repair and re-paint as necessary all site hoardings to comply with the local conditions and local regulations,
- Understand the probable hazards and integrate emergency preparedness including evacuation procedures with emergency exits,
- Ensuring that all electrical and mechanical service equipment is maintained in good working condition at all times.

### ***Community Health and Safety***

- Rented Premises shall comply with applicable building bye-laws and regulations and local arrangements for safe disposal of wastes/waste water/drainage and sewage if any,
- All permits, license to operate, and applicable tax regulations shall be met,
- Permits for operating Generators if required and as applicable for other equipment shall be arranged,
- Site activities/activities within the offices shall not cause any negative impact or disturbance on the surrounding environment or land use; especially on Natural Habitats,
- All reasonable precautions shall be taken to ensure that all equipment in the premises are operated in a manner so as not to cause safety risk and/or nuisance to the neighbourhood and occupiers,
- Details on Site Management, Access for Differentially-abled, and Water and Sanitation aimed at community health and safety are presented in subsequent ECoPs.

### ***Water Supply and Waste Water***

- The premise shall have assured water supply for all operational hours. Water must be available in all toilets and hand wash points,
- There should be adequate facilities for potable water for the visitors (portable water purifiers (with non-plastic drinking cups) as the premises are on rental).



### ***Toilets***

- Maintain adequate toilet facilities and other welfare facilities for its staff,
- Maintain adequate toilets as per local bye-laws for visiting rural women,
- All toilets shall be connected to proper septic tanks with Soakpits, as per applicable local building bye-laws.

### ***Waste Water and Drainage***

- All wastewater (from hand wash points) channels shall be connected to approved drain outlets or provided with basic onsite root-zone treatment (ditch around a tree with appropriate local plants or similar) within the premise. No wastewater shall be allowed to create cesspools which may result in fly menace or odor. Wastewater shall be recycled and reused as much as possible; for gardening or other such uses,
- All efforts are required to prevent discharge of wastes (solid and liquid) from premises to rivers and canals and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality,
- Water drainage must be designed to avoid stagnant conditions that could create a foul odor and unsanitary conditions in the premises or surrounding environment.

### ***Solid Waste Management***

- There should be adequate and appropriate waste receptacles in the offices,
- Solid Wastes from the premises shall be disposed of properly. It must be segregated and stored in color-coded bins: Separate storage for Biodegradables (closed) and Non-biodegradables,
- Hazardous / e-wastes if any; shall be stored separately,
- Wastes shall be handed over to the concerned/designated agency appointed by the local body,
- Small bio-bins to convert organic/biodegradable waste to compost shall be installed in the premise and compost can be used as manure; in case land is available within the premise. Such units shall be surrounded by plantations,
- No type of wastes from the premises shall be disposed of or dumped in any Natural Habitat areas.

### ***Emergency Procedures***

- Emergency procedures shall be developed to facilitate effective actions in case of medical/fire emergency as well as environmental pollution (usage of diesel generators). The emergency procedure shall contain emergency phone numbers and the method of notifying the statutory authorities,
- Contact numbers and emergency procedures shall be displayed in local language and English,

- Emergency ambulance service/doctor on call shall also be arranged and contact numbers shall be displayed well in the premises. All activities must be suspended during emergency situations.

### ***Fire Prevention and Control***

- All office spaces shall have in place appropriate plans and management controls to prevent fires with due regard to the Government of India regulations. Fire escape route must be displayed at easily visible locations,
- During operation and maintenance of equipment and vehicles, it shall be ensured that the workers are well aware of the procedures and have enough knowledge to comply with them,
- Portable fire extinguishers and other facilities for fire safety shall be available and well maintained as per regulations.

### ***Energy Efficiency in Premises***

- Select buildings which have sufficient natural lighting, tree shading and cross-ventilation; minimising the need for air-conditioning,
- Low Energy Consumption Lighting Fixtures, Fans and water pumps (if water supply is from ground water source) - (Electrical Appliances – BEE Star and Energy Efficient Appliances) shall be used,
- Desirable if Lighting of Common areas is by energy efficient devices
- The building services like electrical, plumbing and drainage have the potential in providing the necessary environmental efficiency. The electrical fittings can be high performance devices, energy efficient devices like LED Luminaries and other such devices.

### ***Differently-abled Friendly Access***

Differently-abled persons and the elderly need special arrangements in the environment for their mobility and independent functioning. Most of the buildings have architectural barriers that disabled persons find difficult for their day-to-day functioning. Guidelines on accessibility laid out by the office of the Chief Commissioner of Disabilities are as follows:

#### ***Pathways***

- Walks should be smooth, hard level surface suitable for walking and wheeling, Irregular surfaces as cobblestones, coarsely exposed aggregate concrete, bricks, etc. often cause bumpy rides,
- The minimum walkway width would be 1200 mm and for moderate two-way movement, it should be 1650 mm - 1800 mm,
- Longitudinal walk gradient should be 3 to 5percent (30 mm - 50 mm in 1 meter),

- Avoid grates and manholes in walks. If grates cannot be avoided then bearing bar should be perpendicular to the travel path and no opening between bearing bars greater than 12 mm in width,
- It is desirable that there is no difference in level. (If a difference is unavoidable, limit it to 20 mm or less).

#### *Access*

- Prefer buildings with access ramps (preferably with handrails),
- Access path from plot entry and surface parking to Building entrance shall be a minimum of 1800 mm. wide having even surface without any steps. Slope, if any, shall not have a gradient greater than 5percent. Finishes shall have a non-slip surface,
- Walkway should be constructed with a non-slip material & different from the rest of the area,
- Adequate space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, as well as those walking with the assistance of other persons,
- Installation of handrail to support the body weight at the critical places e.g. staircase, toilet, ramp, a passage with a change of level (800-850 mm).

#### *Waiting areas*

- Accessible entrances exits, aisles. For assembly halls, and other gathering areas of public assembly; accessible toilet facilities should be nearby. Seating for persons with disabilities to be accessible from the main entrances and lobbies. Various seating/viewing choices to be provided for persons in wheelchairs throughout the main seating area. A minimum of 2 wheelchair spaces for seating capacity up to 100 seats. A minimum of 4 wheelchair spaces for seating capacity from over 100 to 400 seats.

#### *Water and Sanitation facilities*

- Water Fountains (Drinking): Allow sufficient space around the water fountain to make it easily accessible for wheelchair users. Depending on the type of water fountain allow a space about 700 mm high and 350 mm deep under the fountain.
- Toilets: One special W.C. in a set of toilets shall be provided for the use of handicapped with essential provision of washbasin near the entrance for the handicapped. \* The minimum size shall be 1500 x 1750 mm. \* Minimum clear opening of the door shall be 900 mm. and the door shall swing-out. \* Suitable arrangement of vertical/horizontal handrails with 50 mm. clearance from the wall shall be made in the toilet. \* The W.C. seat shall be 500 mm. from the floor. Considering the low availability of desirable types of premises, it would be good to

dedicate one of the existing toilets as differentially – abled friendly; if the owner is not ready to do modifications.

#### *Telephone Counters*

- Allow a space about 700 mm high and 350 mm deep under the telephone stand. The telephone receiver must be placed at a height of 110 cm or less.

#### *Mailboxes*

- The mail slot must be located at a height of 1200 mm or less.

#### *Vending Machines*

- The coin slot must be located at a height of 1200 mm or less.

#### *General*

- Adequate space and handrails should be provided for persons using mobility devices, e.g. wheelchairs, crutches and walkers, as well as those walking with the assistance of other persons
- Remove any protruding objects and allot sufficient walking space for safe walking.

#### *Information Board*

- Installation of information board in braille, audible signages (announcements), illuminated signages, layout diagrams to help the persons easily reach the desired place.
- Signs should be designed and located so that they are easily legible by using suitable letter size (not less than 20 mm. high). For visually impaired persons, an information board in braille should be installed on the wall at a suitable height and it should be possible to approach them closely. To ensure safe walking there should not be any protruding sign which creates obstruction in walking.

### **4.10.3 ECoP 03: Guidance on Purchase and Use of Equipment and Furniture**

#### ***Pollution and Safety Related Aspects of Purchase and Transport of Furniture, Equipment***

To control nuisance, dust and noise due to the transport of goods (Computers, computer tables etc.):

- To meet these, the vendor/supplier shall be asked to
  - o follow an appropriate Logistics Plan including optimized selection of route to reduces the distance, time, fuel and hence the total gaseous emission and dust emissions to reduce air/noise pollution,
  - o route must be away from natural habitat areas,
  - o deploy vehicles which meet with the latest emissions norms,

- deploy vehicle not older than 15 years and shall be well maintained
- provide training / awareness to drivers regarding silent zones, no-honking areas, timings etc.,
- Maintain noise levels below 60 db. In sensitive areas (including residential neighbourhoods, hospitals, etc.) more strict measures may need to be implemented to prevent undesirable noise levels. Transportation contractors / vendors shall be informed to maintain low noise levels and use well maintained vehicles in good condition. Such activities shall take place during the day so as to minimise disturbance to residences if any around,
- All materials / equipment shall be transported through black topped roads to minimise dust pollution,
- Minimize production of dust and particulate materials during transport through untopped rural roads, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders). If such roads are not present, regulate vehicle speeds and spray water on untopped roads in areas near residences or near schools through which material will be transported,
- Vehicles used for transporting equipment / furniture must be in good condition and shall have all applicable permits and provisions of applicable labour laws shall be ensured to all workers involved,
- Equipment and furniture shall be suitably strapped to the vehicle to avoid fall. Loading and unloading shall follow safe practices
- Provide suitable instructions to vehicle operators/ vendors to prevent high noise levels including honking and during material unloading,
- Purchase or transport of furniture/equipment shall not cause any direct or indirect impact on Natural Habitat areas,
- During installation of electrical devices, follow safe procedures including use of Personnel Protective Equipment (PPEs) including rubber gloves, safety rubber-based shoes with hard toes, checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools and following safety procedures suggested in the manufacturers manuals. It is advisable to get the installation procedures carried out by the supplier/manufactures and to place the equipment on Annual Maintenance Contracts by the same agency/ies.

For more guidance on Occupational Health and Safety (OHS) aspects, offices shall follow World Bank Group's OHS guidelines available at:

<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Fin+--+General+EHS+Guidelines.pdf?MOD=AJPERES>

### ***Packaging Waste***

- Enforce clean-up procedures immediately after unpacking equipment, furniture

- Provide receptacles or demarcate areas to store packaging wastes; adequately protected from rains, winds and extreme weather,
- Encourage recycling and reuse of packaging wastes by converting to useful products through local agencies or recyclers,
- Disposal of plastics, inerts and rejects shall be at points suggested and approved by the respective local authorities,
- Agencies should ensure that these disposal sites: (a) are not located within designated forest areas or Natural Habitat areas; (b) do not impact natural drainage courses - under no circumstances shall these wastes be disposed-off in environmentally sensitive areas. In the event of any unintended/uninformed waste deposition in nearby premises or sensitive areas, the office shall arrange to immediately remove such wastes and restore the affected area to its original state to the satisfaction of concerned agencies and local communities.

### ***E-waste***

Electronic waste (e-waste) refers to broken or obsolete electronic components and materials. E-waste materials may be valuable and recyclable, such as random-access memory and reusable laptops. However, hazardous materials, such as cathode ray tube monitors, require special handling in disposal. Common discarded electronic products include computers, televisions, stereos, copiers and fax machines. An electronic item is considered end-of-life (EOL) once it becomes non-functional and beyond economic repair, or once the technology becomes so outdated that the item is no longer eligible for resale. E-waste shall be disposed in line with the E-waste (Management) Rules, 2016 and further E- Waste (Management) Amendment Rules, 2018. These rules are based on extended producer responsibility (EPR), a popular framework across the world for e-waste management. EPR makes manufacturers of electronic products responsible for the end-of-life management of their products. They have to set up collection centers and ensure that waste is recycled and disposed of in an environment-friendly manner. All collection centres, dismantling units and recyclers must register with state pollution control boards and comply with their norms.

Under this project, many computers, furniture and other equipment would be purchased. These are included under the e-waste rules as IT and telecommunication equipment and consumer electrical and electronics.<sup>4</sup>

Offices shall arrange to:

- Buy products from vendors who take back e-waste after end-of-life as per CPCB Norms, as part of EPR and use a certified recycler for E-Wastes. Purchase equipment from Producers who provide information on the implementation of Deposit Refund Scheme to ensure collection of end-of-life products and their

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<http://www.moef.gov.in/sites/default/files/EWMpercent20Rulespercent202016percent20englishpercent2023.03.2016.pdf>. Pg 17

channelization to authorized dismantlers or recyclers, if such scheme is included in the Extended Producer Responsibility Plan. The preferred producers/manufacturers shall confirm to Reduction of Hazardous Substances (RoHS) provision as per e-waste rules. Provided that the producer shall refund the deposit amount that has been taken from the consumer or bulk consumer at the time of sale, along with interest at the prevalent rate for the period of the deposit at the time of take-back of the end-of-life product. Many manufacturers of electronics and electrical equipment including mobile companies offer take back at end-of-life<sup>5</sup>

- Offices shall check the EPR Plan in Form 1 of the manufacturer and their tie-up with Treatment, Storage, Disposal Facilities (TSDFs), permits / licences, and authorisation Copy of authorisation issued by the SPCBs/PCCs earlier under E-Waste (Management & Handling) Rules, 2011 in case of those producers who are operating in the country prior to 01-10-2016.
- Ensure that e-waste generated by them is channelized to authorized collection center (s) or registered dismantler (s) or recycler (s) or is returned to the pick-up or take back services provided by the producers (to take to authorized dismantler or recycler). Transport of E-Waste should be carried out as per the manifest system as per the provisions made in rule 19 of the E-Waste (M) Rules, 2016 and the transporter will be required to carry a document (three copies) as per form 6 of the rules provided by the sender. The responsibility of safe transportation of E-waste shall be with the sender of E-Waste, as per E-Waste Rules.
- Maintain records of e-waste generated by them in Form 2 (for scrutiny by the concerned State Pollution Control Board if required).
- **Arrange to donate electronics to the needy who do not have access to it: Reusing is always better than recycling.**
- Consumers or bulk consumers of electrical and electronic equipment listed in Schedule I of E-Waste Rules 2016, shall ensure that such end-of-life electrical and electronic equipment are not admixed with e-waste containing radioactive material as covered under the provisions of the Atomic Energy Act, 1962 (33 of 1962) and rules made thereunder; bulk consumers of electrical and electronic equipment listed in Schedule I shall file annual returns in Form-3, to the concerned State Pollution Control Board on or before the 30th day of June following the financial year to which that return relates. In case of the bulk consumer with multiple offices in a State, one annual return combining information from all the offices shall be filed to the concerned State Pollution Control Board on or before the 30th day of June following the financial year to which that return relates

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<sup>5</sup> Examples: Samsung adopt eco-friendly innovations and practices. Acting responsibly towards the environment, Samsung has pledged to recycle electronic items, such as TV, refrigerator, washing machine and mobiles etc. that are no longer useful. 'Samsung Take-back And Recycling' (STAR) program is an initiative towards leading a more conscious life and taking an aware step towards conservation and optimization of resources.

- The Offices shall arrange safe storage receptacles for e-waste at all its training centers and head office for safe storage of end-of-life products, as per e-waste rules. Suitable agreement shall be made with the producer/manufacturer or collection center for safe collection/disposal of equipment at end-of-life. Storage of end of life products may be done in a manner that does not lead to the breakage of these products and safe to workers handling such products. The storage area should be covered and have a fire protection system in place.
- Storage can be for a period of 180days and respective office shall maintain record of collection, sale, transfer, and storage of wastes and the records shall be made available for inspection (such storage may be extended for up to 365 days, in case the waste need to be specifically stored for development of a process for its recycling or reuse.

#### **4.10.4 ECoP 04: Construction Materials Management (including Hazardous Substances)**

Construction Materials may be a source of contamination if not properly managed. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site may harm the environment and may endanger the health and safety of construction workers and host communities.

The Contractor shall

- Contingency management plan and spill management procedures shall be prepared and approved by Site engineer before start of work,
- Substitute material with high contamination potential with more environmentally friendly materials,
- Store hazardous goods in elevated platforms (preferably above flood level), strapped to prevent falls during extreme weather/natural and man-made disasters, with impervious flooring to contain spills. Put containers and drums in temporary storage in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill,
- Storage area for hazardous materials should be away from water bodies, habitats, and other hazardous landuses
- As far as possible, the transfer of materials shall be fully mechanical, with less direct human handling. Workers handling such materials shall be provided with adequate PPEs,
- Fuel storage at site shall be minimum and re-fueling shall be arranged at nearby pumps,
- Train the relevant construction personnel in handling of fuels and spill control procedures,



- Material Safety Data Sheets (MSDS) for hazardous materials shall be made available in the site office, during construction and clear manifests while transporting,
- Storage should not be in confines, and should allow the escape of gas which may get accumulated,
- Appropriate fire-fighting equipment shall be provided adjacent to the storage area,
- Provide absorbent and containment material (e.g., absorbent matting) where hazardous materials are used and stored and personnel trained in the correct use,
- Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use,
- All containers, drums, and tanks that are used for storage shall be in good condition, with data labels, expiry details, potential hazards and how to manage in case of an emergency. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur,
- Return the gas cylinders after use to the supplier. However, if they are not empty prior to their return, they must be labeled with the name of the material they contained or contain, information on the supplier, cylinder serial number, pressure, their last hydrostatic test date, and any additional identification marking that may be considered necessary.

#### **4.10.5      *ECop 05: Guidance on Management of Construction & Demolition Wastes and Hazardous wastes***

Construction & Demolition wastes and Hazardous wastes occupy available site space and hinder with safe movement of workers in and around the site. If not properly managed in designated sites, this often ends up in pristine environmental resources like wetlands, agricultural fields, and paddy fields. It is important to guide the storage, and reuse of construction wastes. It is also important to guide the storage and movement of hazardous waste for proper sanitary disposal.

The Contractor shall

- Inventorize the waste streams expected from the project site (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit a management plan to PEA's Site engineer for approval. The plan shall follow all applicable rules.<sup>6</sup>

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<sup>6</sup> <http://www.moef.gov.in/sites/default/files/Cpercent20&Dpercent20rulespercent202016.pdf>  
[http://moef.gov.in/content/gsr-395-e04-04-2016-hazardous-and-other-wastes-management-and-transboundary-movement-rules-2/?theme=moef\\_aqua](http://moef.gov.in/content/gsr-395-e04-04-2016-hazardous-and-other-wastes-management-and-transboundary-movement-rules-2/?theme=moef_aqua)

- Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodeling work and keep the concerned authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis. Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by them, apart from the payment for storage, collection and transportation. The rate shall be fixed by the concerned local authority or any other authority designated by the State Government.
- The contractor shall present proposed waste storage areas, transport arrangements, existing C&D / Hazardous waste management facilities in the region in the management plan.

#### ***Storage of Wastes***

- It is important to segregate the wastes at source and store them in separate well labelled and well confined areas. Safe storage is essential; broken parts shall not lie around the storage area. Adequate caution/signboards shall be provided,
- Provide separately labeled refuse containers at each worksite, separate for different waste streams,
- Contract conditions shall give preference to suppliers who deliver materials without packaging or buy back packaging as per EPR,
- Construction site and surrounds shall follow good housekeeping practices. No wastes shall be allowed to spill around and cause traffic disturbances or environmental risks.

#### ***Transport***

- Transport shall be in covered vehicles, without allowing spillovers on to roads

#### ***Disposal***

- Disposal of wastes shall be in an environmentally acceptable way, as per applicable rules. Preferably, C&D waste shall be sent to a facility where it is reused/recycled. The generator shall arrange to deposit it in the facility / collection area / dumping area suggested by the local body,

- Small amount of wet waste from the site shall be preferably converted into compost using bin composting technique and compost can be used for nurseries or green belt,
- Follow 4 Rs – Recover, Reduce, Recycle, Reuse; best would be to follow ‘zero waste’ approach by reusing all wastes within the premise,
- Prohibit burning of solid waste,
- Train and instruct all personnel in waste management practices and procedures,
- Entrust the site environmental engineer with the responsibility to take stock of waste situation every morning when work commences and evening at work closeout. It would be a good practice to keep a record of material and waste (type-wise quantities) movements in and out of the site.

### ***Hazardous Waste***

Hazardous waste means any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances

- Paints, pigments, flammable liquids, or mixture of liquids, or liquids containing solids in solution or suspension solvents, spent solvents, lacquer, varnishes), cement, glue, resins, textile pieces, Empty barrels/containers/liners contaminated with hazardous chemicals /wastes, Contaminated cotton rags or other cleaning materials, Sludge from treatment of waste water arising out of cleaning / disposal of barrels / containers, Chemical sludge from wastewater treatment, Oil and grease, chromium sludge from cooling water etc are typical hazardous wastes easily found in all construction sites. Certain types of batteries, electrical electronic wastes, wires, electric conduits, bituminous materials can also turn hazardous in certain circumstances. Examples of construction waste that are classified as hazardous include lead, tars, adhesives, sealants, asbestos<sup>7</sup>. Hazardous chemicals used in construction are materials with transdermal effects, carcinogens, embryotoxic, mutagens, and neurotoxins including solvents, primers, and adhesives, wood dust, plastic woods, sealing agents, wood protectants, insulation, and products used for structural engineering.
- In India, the management of Hazardous Wastes is governed by Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.<sup>8</sup>

The Contractor shall

- Follow the following steps, namely:

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<sup>7</sup> Guidelines on Environmental Management of Construction & Demolition (C & D) Wastes (Prepared in compliance of Rule 10 sub-rule 1(a) of C & D Waste Management Rules, 2016)

<sup>8</sup>

<http://www.moef.gov.in/sites/default/files/Finalpercent20HWMpercent20Rulespercent202016percent20percent28Englishpercent29.pdf>.

- (a) prevention;
- (b) minimization;
- (c) reuse,
- (d) recycling;
- (e) recovery, utilization including co-processing;
- (f) safe disposal.
- Be responsible for safe and environmentally sound management of hazardous and other wastes,
- The hazardous and other wastes generated shall be transported or sold to an authorized actual user or shall be disposed of in an authorized disposal facility, as per provisions of the rules,
- The contractor shall take all the steps while managing hazardous and other wastes to-
  - (a) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and
  - (b) provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.
- Collect chemical wastes inappropriately sized drums (or sealed container), appropriately labeled for safe transport to an approved chemical waste depot,
- Store, transport and handle all chemicals avoiding potential environmental pollution,
- Storage shall be in areas away from natural habitats, watercourses,
- Make available Material Safety Data Sheets (MSDS) for hazardous materials in the site office, during construction and clear manifests while transporting,
- Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations,
- Construct concrete or other impermeable flooring to prevent seepage in case of spills,
- Storage should not be in confines, and should allow the escape of gas which may get accumulated,
- Appropriate fire-fighting equipment shall be provided adjacent to the storage area.
- Storage, transport, recycling, disposal, manifest maintenance, accident reporting shall be as per rules.

#### **4.10.6 ECoP 06: Water Resources Management**

Construction and allied activities can cause changes in watercourses, pollution due to deposition of wastes, and sewage from site and camp. This may increase sediment loads, flooding or damage habitats.

### ***Depletion of water sources***

- Extraction of water from surface and Groundwater sources shall be after acquiring adequate permissions from State / Central Water Resources Department, Ground Water Boards as applicable,
- Install monitoring wells both upstream and downstream areas near construction yards and construction camps to regularly monitor the water quality and water levels,
- Protect groundwater supplies of adjacent lands.

### ***Siltation and Alterations in watercourses due to construction***

- Adequate attention must be paid to ensure that construction activities would not alter watercourses or hinder the normal water flow by deposition of wastes and construction materials,
- Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion,
- Ensure that roads used by construction vehicles are swept regularly to remove sediment,
- Water the material stockpiles, access roads and bare soils on an as-required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds),
- Avoid wherever possible clearing areas of highly erodible soils and steep slopes which are prone to water and wind erosion,
- Revegetate and mulch progressively as each section of works is completed. The interval between clearing and revegetation should be kept to an absolute minimum,
- Installation of rock structures on the site to retard water flows is an effective measure to reduce erosion in areas where high water flows are expected,
- It is desirable to minimize continuous slopes where flowing water can scour. To prevent scouring, drainage lines may need to be lined or velocity-reducing structures, such as crushed rock or geotextile placed in the drainage line,
- Plan in-stream works so that the contact time is minimized,
- Establish special practices so that impacts on the waterway and disturbance of its banks are minimized,
- Stabilize banks and in-stream structure so that they do not contribute to the sediment load,
- Maintain minimum flows to ensure the viability of aquatic communities and ensure that there are no barriers to the passage of fish up and downstream,
- Avoid times of the year when environmental damage is expected to be highest,
- Construct in-stream crossings during low flows, designed to be stable under expected vehicle loads and flow regimes, that do not contribute to the sediment load in the stream,
- Design crossings so that drainage of the crossing does not contribute sediment load to the stream,
- Prepare a contingency plan for high-rain events,
- Prepare a reinstatement plan if work in a stream is planned or the structure of a waterway will be altered.

### ***Pollution of Water Resources***

The Contractor shall

- Ensure that Hazardous Material and Waste shall be stored as per ECoPs provided above,
- Generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes) shall be minimal and should not enter any type of surface or groundwater source,
- Construction sites must have adequate sanitary toilets with septic tanks (may be portable) and ensure collection of septage for scientific treatment in suggested septage treatment plants periodically to prevent pollution of water bodies due to sewage,
- During construction, both surface and groundwater quality may be deteriorated due to construction activities in the river, sewerages from construction sites and work camps,
- Provide cut off drains in areas required for sediment and erosion control and storage areas for construction materials,
- Prepare temporary sediment basins, where appropriate, to capture sediment-laden run-off from site,
- Divert runoff from undisturbed areas around the construction site,
- Stockpile materials away from drainage lines,
- Plant a buffer of native vegetation to intercept runoff from site, before it enters streams, harbor areas or storm drains.
- Use porous surfaces such as bricks, flagstone, sand or gravel, for patios, walkways or paths. This reduces impervious surfaces, increases infiltration of rainwater into the ground, and reduces the volume that runs off into streams and harbors.
- Practice low impact boating to limit pollution from activities such as fuel spills and boat maintenance.
- Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot,
- Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off-site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This shall be done in every exit of each construction vehicle to ensure the local roads are kept clean,
- Locate stockpiles away from drainage lines, at least 10 meters away from natural waterways and where they will be least susceptible to wind erosion,
- Ensure that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical),
- Stabilize stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass,
- Establish sediment controls around unstabilized stockpiles and batters,
- Suppress dust on stockpiles and batters, as circumstances demand,

- Construction activities in water bodies,
- Construction works in the water bodies will increase sediment and contaminant loading, and effect the habitat of fish and other aquatic biology.

The Contractor shall

- Minimize the time during which work in a waterway is required, and the extent of works,
- Schedule works for the driest months of the year and the lowest flow of the waterway,
- Avoid times of the year when aquatic population may be under stress, such as during migration spawning, or when food may be scarce,
- Establish protocols to minimize downstream damage,
- Stabilize any disturbance to a levee or any other bank so that erosion is avoided. Measure turbidity continuously immediately downstream from the areas in which work is occurring, and modify work practices where continuous monitoring shows degraded water quality,
- If working in a concrete channel, use appropriate machinery to avoid damage to structures
- Ensure ecological flow during construction. If a cofferdam is used, minimum downstream flows should be maintained that will sustain the aquatic ecology,
- Dewater sites by pumping water to a sediment basin prior to release off-site – do not pump directly off-site,
- Monitor the water quality in the runoff from the site or areas affected by dredge plumes, and improve work practices as necessary,
- Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers
- Treat contaminated water pumped into the stormwater system or a natural waterway to remove sediment if the turbidity exceeds 30 nephelometric turbidity units (NTU),
- Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, stormwater systems or underground water tables,
- Use environment-friendly and nontoxic slurry during construction of piles,
- Reduce infiltration of contaminated drainage through stormwater management design,
- Do not discharge cement and water curing used for cement concrete directly into watercourses and drainage inlets,
- Decommissioning or work close out shall be closely monitored and all remaining / unused materials, temporary bunds, and wastes shall be carefully removed from the water body,
- Contingency plans should also be in place for storm events, particularly where works are planned to occur within a floodplain. The contingency plan should consider the consequences on the environment of 5, 10, 20 and 100-year-frequency floods.

### ***Disruptions to Water-based Transportation***

The presence of construction and dredging barges, pipelines and other construction activities in the river can cause hindrance and risks to the river traffic.

The Contractor shall

- Not obstruct other normal riverine transport while doing riverine transport and works
- Identify the channel to be followed clearly using navigation aids such as buoys, beacons, and lighting
- Provide proper buoyage, navigation lights and markings for bridge and dredging works to guide the other normal riverine transport
- Keep regular and close contacts with Inland Water Transport Authority of India, State Water Transport or Related Departments (such as Minor Irrigation Department under Public Works) and water transport service providers regarding their needs during construction of the project
- Plan the river transport and transportation of large loads in coordination with BIWTA to avoid traffic congestions.
- Provide signage for river traffic conforming to the requirements
- Position the dredge and pipeline in such a way that no disruption to the channel traffic will occur

#### *Accidents*

The Contractor shall

- Prepare an emergency plan for dealing with accidents causing accidental sinking of the vessels and boats
- Notify authorities in case any vessel is found near the site overloaded than permitted
- Ensure sufficient equipment and staffs available to execute the emergency plans
- Provide appropriate lighting to barges and construction vessels.

#### **4.10.7 ECoP 07: Site Drainage Management**

***Improper drainage management*** may result in erosion and siltation, water pondage and resultant health issues.

The Contractor shall

- Prepare site drainage plan and get approved by Engineer prior to construction,
- Reinstate damaged drainage lines on priority if the harm is caused by the contractors' vehicles or work practices,
- Prepare local drainage line with wide (rather than deep) drains, network of connected cut off drains, new drains, silt collectors, bunds, manholes attended to frequently,
- Check the quality of wastewater from the site before being let out into water bodies.

#### ***Ponding of water***

Health hazards due to mosquito breeding

The Contractor shall:

- Prevent ponding/storage of water especially near the waste storage areas and construction camps,



- Throw away all the storage containers that may store water after use. Do not store them in upright or open position,
- Drain or pump out collected water from newly constructed swimming pools, clogged rain gutters and ditches,
- Properly store any open containers in the work area, such as buckets and cans that are not being used,
- Create holes to drain water from containers that cannot be thrown out,
- Routinely remove garbage and other debris from drains,
- Ensure the topography of the final surface of all raised lands (construction yards, approach roads, access roads, bridge end facilities, etc.) are conducive to enhance natural draining of rainwater/flood water,
- Keep the final or finished surface of all the raised lands free from any kind of depression that insists water logging,
- Undertake mitigation measures for erosion control/prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that will change the shape of topography,
- Cover immediately the uncovered open surface that has no use of construction activities with grass-cover and tree plantation to prevent soil erosion and bring improved landscaping.

#### **4.10.8 ECoP 08: Top Soil Management**

Disturbance due to Land clearing and earth works

- Topsoil is that uppermost layer of soil capable of growing and supporting vegetation. Topsoil contains the essential microorganisms, nutrients, organic matter, and physical characteristics necessary to grow and sustain permanent vegetation. Stripping, stockpiling, and reusing topsoil on construction projects is essential for proper reclamation of disturbed areas.

The Contractor shall

- It is recommended to strip and store top soil for reusing. Topsoil is recommended on all disturbed sites and slopes 2H:1V or flatter, or as a planting medium for plantings or nursery stock. Topsoil may be added to a rock mulch to enhance slope protection and provide soil medium for seed germination and plant growth. Topsoil can be mixed with organic material such as compost or manufactured soil amendments to improve the growing capability of seeded and planted vegetation,
- Strip the top soil to a depth of 15 cm and store in stock piles of height not exceeding 2m,
- Stockpiling should be limited to less than 6 months' time so that there is no loss or disruption of microorganisms. The use of microorganism inoculates may be necessary to reestablish microorganisms in topsoil material that has been stockpiled for more than 9 months,

- To the extent practicable, aboveground vegetation, including litter, should be mixed or otherwise incorporated into the topsoil prior to excavation. Topsoil should be excavated from the existing roadway shoulder to a depth of 6 inches. For new alignments, topsoil should be excavated to the depth it exists and stockpiled,
- If topsoil is stockpiled prior to placement, the top 1 foot of the stockpile material should be mixed with the remainder of the stockpile to ensure that living organisms are distributed throughout the topsoil material at the time of final placement,
- Topsoil stockpiles shall not be made near / along drainage lines. It shall be protected from erosion,
- Provide cut-off drains channels and silt bunds around the topsoil stockpiles to prevent erosion of top soil,
- Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites,
- Prior to the re-spreading of topsoil, the ground surface will be ripped to assist the bunding of the soil layers for better water penetration and revegetation,
- Organic material such as wood bark or fiber, grass hay, or grain straw shall not be mixed in topsoil unless nitrogen fertilizer is included.

#### *Disturbance due to vehicular movement*

Vehicular movement outside the right of way of roads or temporary site access roads will disturb top soil and fertility.

The Contractor shall

- Vehicle access roads shall be marked clearly and movement shall be restricted to these roads.
- Topsoil of such accessways shall be collected and stored for reuse, before initiating movement.

#### **4.10.9 ECoP 09: Sand Extraction**

##### *Sand extraction*

Sand extraction can potentially impact the aquatic habitat, water quality, and key aquatic species and their food availability.

The Contractor shall

- Use alternatives to sand as far as possible

If sand extraction is permitted in a certain area; then also the contractor shall:

- obtain necessary permission from local bodies / revenue department, other responsible departments/agencies as applicable in respective States / UTs to extract sand,

- follow guidelines for extraction as applicable; including no extraction from no-go areas,
- not extract sand from the river bed in long continuous stretches; alternate patches of river bed will be left undisturbed to minimize the potentially negative impacts on the aquatic habitat,
- not collect large quantities of sand from any single location resulting in a depression on unsafe river bed / land condition,
- not excavate deeper than 3 m at any single location,
- not carry out sand extraction near chars that have sensitive Habitats,
- not carry out sand extraction during the night particularly near the chars,
- obtain approval from CSC before starting sand extraction from any location,
- carry out sand extraction from sand bars to the extent possible,
- maintain record of all sand extraction (quantities, location shown on map, timing, any sighting of key species),
- provide silt fences, sediment barriers or other devices around the extraction areas to prevent migration of sediment rich water in to the river channels,
- refuel of barges and motor boats with proper care to avoid any spills,
- make available spill kits and other absorbent material at refueling points on the barges,
- properly collect, treat and dispose the bilge water from barges, and boats used for extraction,
- store / spread extracted sand and drain it off in allowed / demarcated best use area before transporting.

#### **4.10.10 ECoP 10: Air Quality Management**

##### *Construction vehicular traffic*

Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.

The Contractor shall

- Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition,
- Operate the vehicles in a fuel-efficient manner,
- Cover haul vehicles carrying dusty materials moving outside the construction site,
- Impose speed limits on all vehicle movement at the worksite to reduce dust emissions,
- Control the movement of construction related traffic,
- Water construction materials prior to loading and transport,
- Service all vehicles regularly to minimize emissions and get PUC certificates on time,
- Limit the idling time of vehicles not more than 2 minutes.

##### *Construction machinery*

Air quality can be adversely affected by emissions from machinery and combustion of fuels.

The Contractor shall

- Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors,
- Focus special attention on containing the emissions from generators and get permits,
- Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites,
- Service all equipment regularly to minimize emissions,
- Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations.

#### *Construction activities*

Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.

The Contractor shall

- Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted,
- Minimize the extent and period of exposure of the bare surfaces,
- Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing offsite,
- Restore disturbed areas as soon as practicable by vegetation/grass-turfing,
- Store the cement in silos and minimize the emissions from silos by equipping them with filters,
- Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations,
- Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems.

#### **4.10.11 ECoP 11: Noise and Vibration Management**

##### *Construction vehicular traffic*

Noise quality will be deteriorated due to vehicular traffic

The Contractor shall

- Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures,
- Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.,
- Organize and schedule the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site,

#### *Construction machinery*

Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.

The Contractor shall

- Appropriately site all noise generating activities to avoid noise pollution to local residents
- Inform communities on schedule for high vibration / noise generating activities
- Use the quietest available plant and equipment
- Place vibrating equipment on absorbent platforms or provide buffers
- Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines)
- Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment.
- Install acoustic enclosures around generators to reduce noise levels.
- Fit high efficiency mufflers to appropriate construction equipment
- Avoid the unnecessary use of alarms, horns and sirens.
- Provide PPEs to workers

#### *Construction activities*

Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.

The Contractor shall

- Notify adjacent landholders prior any typical noise events outside of daylight hours
- Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions
- Employ best available work practices on-site to minimize occupational noise levels
- Install temporary noise control barriers where appropriate
- Notify affected people if major noisy activities will be undertaken, e.g. pile driving
- Plan activities on site and deliveries to and from site to minimize impact
- Monitor and analyze noise and vibration results and adjust construction practices as required.

- Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

#### ***Noise from Diesel Generator Sets***

It may be required to use DG sets for various power needs during construction / other activities under the project. The contractor shall take permissions from the State Pollution Control Board (SPCB) for DG set operations. The following Noise Standards for DG sets are recommended for the running of DG sets during the construction:

- The maximum permissible sound pressure level for new diesel generator sets with rated capacity up to 1000 KVA shall be 75 dB(A) at 1 m from the enclosure surface. Noise from the DG set should be controlled by providing an acoustic enclosure or by treating the enclosure acoustically,
- When required, acoustic enclosure should be made of CRCA sheets of appropriate thickness and structural/ sheet metal base. The walls of the enclosure should be insulated with fire retardant foam so as to comply with the 75 dBA at 1m sound levels specified by CPCB,
- The acoustic enclosure/acoustic treatment of the room should be designed for minimum 25 dB (A) Insertion Loss or for meeting the ambient noise standards, whichever is on the higher side,
- The DG set should also be provided with proper exhaust muffler,
- Proper efforts to be made to bring down the noise levels due to the DG set, outside its premises, within the ambient noise requirements by proper siting and control measures,
- A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

#### ***4.10.12 ECoP 12: Protection of Flora***

##### *Vegetation clearance*

Local flora is important to provide shelters for the birds, provide products like fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human living. As such, damage to flora will result in wide range of adverse environmental impacts.

The Contractor shall

- Reduce disturbance to surrounding vegetation,
- Use appropriate type and minimum size of machine for site clearance to avoid disturbance to adjacent vegetation,
- Get approval from supervision consultant for clearance of vegetation,
- Make selective and careful pruning of trees where possible to reduce need of tree removal,

- Control noxious weeds by disposing off at designated dump site,
- Clear only the vegetation that needs to be cleared in accordance with the plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill and construction of access roads, etc.,
- Do not burn off cleared vegetation; rather chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages regrowth and protection from weeds. It can also be composted as used as a good manure for landscaping works on site using bin composting.
- Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area it came from,
- Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil,
- Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible,
- Ensure excavation works occur progressively and revegetation done at the earliest,
- Provide adequate knowledge to the workers regarding nature protection and the need to avoid felling trees during construction,
- Follow national guidelines on replantation if this is suggested
- For landscaping the site or compensatory afforestation use indigenous plants and trees in consultation with local community, Forest Department and local authorities
- Supply appropriate fuel for labour camps to prevent fuel wood collection.
- During construction near existing plants and trees, use sheets or other lightweight cloth to cover plants and at the same time allow some light and air to enter. In the case of delicate plants, make a scaffold around the specimen to prevent the cloth from crushing foliage and stems.
- Prevent any spills or hazardous chemicals, paints or tools from harming the plants and trees
- Prevent the release of any materials or wastes into waterbodies which would cause eutrophication or harm the aquatic species

#### **4.10.13 ECoP 13: Protection of Fauna**

##### *Construction activities*

The location of construction activities can result in the loss of wild life habitat and habitat quality.

The Contractor shall

- Limit the construction works within the designated sites allocated to the contractors, and no activity shall spill over
- Limit work activities to day time; avoid nesting / breeding time for work while scheduling the work

- Check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal.

#### *Impact on migratory birds, its habitat and its active nests*

The Contractor shall

- Not be permitted to destruct active nests or eggs of migratory birds,
- Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and locate active nests,
- Minimize the release of oil, oil wastes or any other substances harmful to migratory birds to any waters or any areas frequented by migratory birds.
- Control light pollution of nesting / breeding areas and flight pathways of birds.
- Prevent the release of any materials (including plastics, construction materials) or wastes (solid / liquid from works or camps) into waterbodies which would cause eutrophication or harm the aquatic species
- Prevent sediments from flowing into waterbodies harming the biota.
  - Sediment may be washed into streams and the harbors from construction works, road-building or logging sites. It causes the water to turn turbid ("murky") and reduces light penetration.
  - Construction near streams and harbors must be carefully undertaken by a skilled professionals to limit sedimentation. Interceptor ditches, sediment fencing and sediment control ponds are some methods that can limit sediment that flows into waterways.
  - Cover exposed earth with a tarpaulin or geomembranes if rain is expected. Replant exposed areas with grass seed or other fast-growing plants as soon as possible.

#### *Vegetation clearance*

Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas

The Contractor shall

- Restrict the tree removal to the minimum required,
- Retain tree hollows on site, or relocate hollows, where appropriate,
- Leave dead trees where possible as habitat for fauna,
- Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality,
- Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.



#### *Construction camps: Illegal poaching*

The Contractor shall

- Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.

#### **4.10.14 ECoP 14: Protection of Fisheries**

##### *Construction activities in River and Marine Water*

- The main potential impacts to fisheries are hydrocarbon spills and leaks from riverine transport and disposal of wastes into the river and marine water.

The Contractor shall

- Ensure the riverine transports, and vessels are well maintained and do not have oil leakage to contaminate river water,
- Contain oil immediately on river in case of accidental spillage from vessels and ships and in this regard, make an emergency oil spill containment plan to be supported with enough equipment, materials and human resources. (Refer NCSCM Guidelines for Oil spill Management or contact NCSCM for additional quick support in managing the same)
- Do not dump wastes, be it hazardous or nonhazardous into the nearby water bodies or in the river,
- The main potential impacts to aquatic flora and fauna River are increased suspended solids from earthworks erosion, sanitary discharge from work camps, and hydrocarbon spills.

The Contractor shall

- follow mitigation measures proposed in ECoPs on Water Resources Management and Drainage Management, Protection of Flora and Fauna

##### *Construction activities on the land*

Filling of ponds for site preparation will impact the fishes

The Contractor shall

- Inspect any area of a water body containing fish that is temporarily isolated for the presence of fish, and all fish shall be captured and released unharmed in adjacent fish habitat
- Install and maintain fish screens etc. on any water intake with drawing water from any water body that contain fish.

#### **4.10.15 ECoP 15: Road Transport and Road Traffic Management**

##### *Construction vehicular traffic*

Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.

The Contractor shall

- Prepare and submit a traffic management plan to the Site Engineer for his approval at least 30 days before commencing work on any project component involved in traffic diversion and management. This shall be presented to Traffic Police Department and other line departments and permissions gathered before start of works.
- Include the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges, temporary diversions, necessary barricades, warning signs / lights, and road signs.
- Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Traffic Regulations. Arrange flagmen if required especially near sensitive receptors such as schools, hospitals, commercial areas.
- Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in local language:
  - o Location: Village name
  - o Duration of construction period
  - o Period of proposed detour / alternative route
  - o Suggested detour route map
  - o Name and contact address/telephone number of the concerned personnel
  - o Name and contact address / telephone number of the Contractor
  - o Following written “ Inconvenience is sincerely regretted”.

#### *Accidents and spillage of fuels and chemicals*

The Contractor shall

- Restrict truck deliveries, where practicable, to day time working hours.
- Restrict the transport of oversize loads.
- Operate road traffics/transport vehicles, if possible, to nonpeak periods to minimize traffic disruptions.
- Enforce on-site speed limit

#### **4.10.16 ECoP 16: Construction Camp Management**

##### *Siting and Location of construction camps*

Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.

The Contractor shall

- Locate the construction camps at areas which are acceptable from environmental, cultural or social point of view.
- Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities.
- Submit to the Site Engineer for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps.
- Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters

### *Construction Camp Facilities*

Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.

The Contractor shall provide the following facilities in the campsites:

- Adequate housing for all workers
- Safe and reliable water supply. Water supply from deep tube wells of 300 m depth that meets the national standards
- Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by wall or by location. The minimum number of toilet facilities required is one toilet for every ten persons or as per local building by laws.
- Treatment facilities for sewerage of toilet and domestic wastes
- Storm water drainage facilities. Both sides of roads are to be provided with shallow drains to drain off storm water to a silt retention pond which shall be sized to provide a minimum of 20 minutes retention of storm water flow from the whole site. Channel all discharge from the silt retention pond to natural drainage via a grassed swale at least 20 meters in length with suitable longitudinal gradient.
- Paved internal roads. Shall have grass/vegetation coverage to be made of the use of top soil that there is no dust generation from the loose/exposed sandy surface. Pave the internal roads of at least with bricks or porous materials to suppress dusts and to work against possible muddy surface during monsoon. This will help in water penetration and recharge as well.
- Provide child crèches for women working on large construction sites. The crèche shall have facilities for dormitory, kitchen, indoor and outdoor play area. Schools shall be attached to

these crèches so that children are not deprived of education while mothers are engaged in construction work

- Provide in-house community/common entertainment facilities dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
- Management of wastes is crucial to minimize impacts on the environment

The Contractor shall

- Ensure proper collection and disposal of solid wastes within the construction camps
- Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level.
- Store inorganic wastes in a safe place within the house and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed.
- Dispose organic wastes in a designated safe place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. If space is available away from water bodies, one may dig a large hole or use a bin to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition of wastes. Cover the bed of the pit with impervious layer of materials (clayey or thin concrete) to protect groundwater from contamination. Take care to prevent odor generation as well.
- Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children from entering.
- Do not establish site specific landfill sites in premises. All solid waste shall be collected and removed from the work camps and disposed in waste disposal sites approved by the local body.

*Fuel supplies for Cooking purposes*

- Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna

The Contractor shall

- Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass.
- Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking.
- Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punitive measures for wildlife protection.

### *Health and Hygiene*

- There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.

The Contractor shall

- Provide adequate health care facilities within construction sites,
- Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first-aid or nurse,
- Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals,
- Initial health screening of the laborers coming from outside areas/ migrant laborers, Provide health camps in coordination with nearby Primary Health Centre / Clinic,
- Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work,
- Provide HIV awareness programming, including sexually transmitted infections (STI) and HIV information, education and communication for all workers on regular basis,
- Complement educational interventions with easy access to condoms at campsites as well as voluntary counseling and testing,
- Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellent sprays during monsoon,
- Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers,
- Place display boards at strategic locations within the camps containing messages on best hygienic practices.

### *Safety*

- Inadequate safety facilities to the construction camps may create security problems and fire hazards

The Contractor shall

- Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry in to the camp area,
- Maintain register to keep a track on a head count of persons present in the camp at any given time,
- Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones,
- Provide appropriate type of firefighting equipment suitable for the construction camps,
- Display emergency contact numbers clearly and prominently at strategic places in camps,

- Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors,
- Encourage kitchen plantations or greenery around the camp.

#### *Site Restoration*

- Restoration of the construction camps to original condition requires demolition of construction camps.

The Contractor shall

- Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work,
- Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed,
- Give prior notice to the laborers before demolishing their camps/units,
- Maintain the noise levels within the national standards during demolition activities,
- Different contractors shall be hired to demolish different structures to promote recycling or reuse of demolished material,
- Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site,
- Handover the construction camps with all built facilities as it is if agreement between both parties (contractor and land-owner) has been made so,
- Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner,
- Not make false promises to the laborers for future employment in O&M of the project.

#### **4.10.17 ECoP 17: Cultural and Religious Issues**

##### *Construction activities near religious and cultural sites*

Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.

The Contractor shall

- Communicate to the public through community consultation, informing the peers and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction,
- Do not block access to cultural and religious sites and sites of importance for livelihood activities, wherever possible,
- Restrict all construction activities within the foot prints of the construction sites,
- Stop construction works that produce noise (particularly during prayer time) shall there be any mosque/religious/educational institutions close to the construction sites and users make objections,

- Take special care and use appropriate equipment when working next to a cultural/religious institution,
- Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the Site Engineer or SPMU. Provide separate prayer facilities to the construction workers,
- Show appropriate behavior with all construction workers and community especially women and elderly people,
- Monitor and be responsible for the behaviors of construction workers especially migrant workers towards the community and environment and take actions to stop their services after warning in case found necessary. The workers must be debrief well regarding local aspects and need to follow good behaviors, and informed regarding unexpected behaviors at the time of employing,
- Allow the workers to participate in prayers during construction time,
- Resolve cultural issues in consultation with local leaders and supervision consultants / PMC,
- Establish a mechanism that allows local people to raise grievances (directly and indirectly) arising from the construction process,
- Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters.

#### **4.10.18 ECoP 18: Worker Health and Safety**

Construction works may pose health and safety risks to the construction workers, hosts and site visitors leading to severe injuries and deaths.

Contractor shall

- Implement suitable safety standards for all workers and site visitors which shall not be less than those laid down on the international standards (e.g. International Labor Office guideline on ‘Safety and Health in Construction; World Bank Group’s ‘Environmental Health and Safety Guidelines’) and contractor’s own national standards or statutory regulations, in addition to complying with the national standards
- Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas,
- Provide appropriate personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection which they would use,
- Train the workers to maintain the PPE properly by cleaning dirty ones,
- Arrange mechanisms to replace damaged PPEs on time

- Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job,
- Appoint an environment, health and safety manager to look after the health and safety of the workers,
- Obtain all permits and clearances as per applicable national regulations,
- Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.

#### *Child labor and pregnant labor*

The Contractor shall

- not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the National Laws

#### *Accidents*

- Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims. Some workers shall be trained on first aid.
- Provide health care facilities and first aid facilities which are readily available. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work.
- Document and report occupational accidents, diseases, and incidents,
- Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice,
- Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures,
- Provide awareness to the construction drivers to strictly follow the driving rules,
- Provide adequate lighting in the construction area and along the roads. In case the work site is near around sensitive areas, consult PEA and PMC to arrive at appropriate lighting standards.

#### *Construction Camps*

- Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards,
- The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECoP on Construction Camp Management,
- Adequate ventilation and light,
- Safe and reliable water supply shall be assured. Water supply from deep tube wells that meets the national standards may be used,



- Hygienic sanitary facilities and sewerage arrangements shall be ensured. The sullage and sewage shall be properly disposed and not allowed to flow through open drains,
- Treatment facilities for sewerage of toilet and domestic wastes,
- Storm water drainage facilities,
- Recreational and social facilities,
- Safe storage facilities for petroleum and other chemicals,
- Solid waste collection and disposal system,
- Arrangement for trainings,
- Paved internal roads,
- Security fence at least 2 m height,
- Sick bay and first aid facilities,
- Water and sanitation facilities at the construction sites,
- Lack of water and sanitation facilities at construction sites cause inconvenience to the construction workers and communities around,
- The contractor shall provide normal or portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities shall be at least 6 m away from storm drain system and surface waters. Toilets shall be septic tank modules (which are easily available) and can be disposed at Common Septage / Sewage Treatment Plants,
- Contractor shall provide bottled drinking water facilities or good potable water to the construction workers at all the construction sites.

### *Trainings*

Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.

The Contractor shall

- Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS),
- Train all construction workers in general health and safety matters, and on the specific hazards of their work and all willing personnel on first aid,
- Training shall consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate,
- Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing,
- Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This shall be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

#### **4.10.19 ECoP 19: Muck Disposal**

Muck generation due to excavations need much attention as it would have good amount of moisture and wastes. To deal effectively with this waste; the contractor shall:

Select the disposal sites well in consultation with local authorities and line departments. Pile unused muck at an angle of repose at the proposed dumping areas. For the stabilization of dumped materials various engineering and phyto-remedial measures shall be detailed out in the environmental management plan.

Muck disposal plan with estimation of muck, quantities of muck in various layers to be excavated, disposal option and permits / licenses and operating protocols shall be prescribed.

**Phyto-remediation of Muck Disposal** Areas will be a good option, which follows Integrated Biological and Biotechnological Approach as follows:

- Depending upon the quality of muck material formulation of appropriate blends of organic waste and soil to enhance the nutrient status of rhizosphere,
- Isolation and screening of specialized strains of mycorrhizal fungi, rhizobium, azotobacter and phosphate solubilizers (bio-fertilizers inoculum) suitable for the dumped material.
- Mass culture of plant specific bio fertilizer and mycorrhizal fungi to be procured from different institutions/organizations which are engaged in the phyto-remediation activity of degraded areas.
- Plantation of dumping sites/areas using identified blend and bio fertilizer inoculum. The afforestation with suitable plant species of high ecological and economic value, which can adapt to local habitat, will be undertaken.
- Proper dumping shall be done over the designated dumping sites. The waste material dumped at spoil tips would comprise mainly of loose rock fragments that would be mechanically compacted and properly levelled with suitable safe slopes and retaining walls/crate walls shall be constructed so that in no case the dumped material is washed away into the river.
- Construction material like stones, sand, etc. required should be obtained mostly from the excavated material to minimize the environmental damage. The efforts shall be made to utilize maximum dumped material for the project activities and backfilling. In the streams, box culverts will be provided to prevent the erosion of stream bed.

#### **Re-vegetation of Spoil Tips**

After proper dumping of the muck sites shall be rejuvenated using biotechnological approach. The area shall be restored through plantation and turfing on the slope.

### **Soil Working and Plantation Techniques**

Isolation and screening of specialized strains of mycorrhizal fungi, rhizobia, azotobacters and phosphate solubilizers (biofertilizer inoculum) in accordance with the suitability for the spoil tips will be done at site, based on following:

- Inoculation of plants with specific biofertilizers and mycorrhizal strains,
- Periodical evaluation of rhizosphere development for physical, chemical and microbiological parameters,
- Monitoring of growth response in different plant species periodically and identification of corrective measures, if necessary. Mass culture of plant specific biofertilizers and mycorrhizal fungi.

The pitting details are as follows:

- Total No. of pits : 1800 per hectare
- Size of each pit : 0.6 m x 0.6m
- Spacing between pits : 2.5m x 2.0m

The excavated material from the pits will be mixed with 43.2 liter of external soil, 10 kg of apple peel and 5 kg of farmyard manure, and 2 kg of vermi-compost. The pit will be refilled with the mixture, 10-15 gm of mycorrhizal inoculum near the root system is to be added. After this, plant saplings already inoculated with biofertilizers (Rhizobium and Azotobacter bacteria) would be planted and refilling will be done to cover the entire plant root system.

Turfing (sodding) and suitable shrubs will be grown at slopes. About 5 cm of thick layer external soil will be spread on the slope area. Sod patches (40 cm x 20 cm) will be grown per square meter. Before sowing, the area will be properly amended with the manure @ of 2 kg/sqm.

#### ***4.10.20 ECoP 20: Restoration of Quarry and Borrow Areas***

##### **i) Measures to be adopted before quarrying**

The top soil, wherever, available in the quarry will be removed before starting the quarrying activity or any other surface disturbance. This top soil will be kept separate and stock piled so that it can be reused after quarrying is over for rehabilitation of sites.

##### **ii) Measures to be adopted after quarrying**

###### **Diversion of run off**

Effective drainage system will be provided to avoid the infiltration of run-off and surface waters into the ground of quarry sites. Garland drains around quarry site shall be constructed to capture the runoff and divert the same to the nearest natural drain.

###### **Filling of depressions**

Removal of rocks from quarry sites for different construction works will result in the formation of depression and/or craters. These will be filled by the dumping materials consisting of boulders, rock, gravel and soil from nearby plant/working sites.

### **Construction of retaining walls**

Retaining walls will be constructed at the filled up depressions of quarry sites to provide necessary support particularly where there are moderately steep slopes. In addition, concrete guards, shall be constructed to check the soil erosion of the area.

### **Rocks for landscaping**

After the quarrying activities are over, these sites will be splattered with the leftovers of rocks and boulders. These boulders and rocks can support the growth of mosses and lichens, which will act as ecological pioneers and initiate the process of succession and colonization. The boulders of moderate size will be used to line the boundary of a path.

### **Laying of the top soil**

The depressions/craters filled up with rock aggregates will be covered with top soil. Fungal spores naturally present in top soil will aid plant growth and natural plant succession. The top soil will be further enriched by organic manure and Vesicular-arbuscular mycorrhizal (VAM) fungi. This will help in the process of soil reclamation and the early establishment of juvenile seedlings.

### **Re-vegetation**

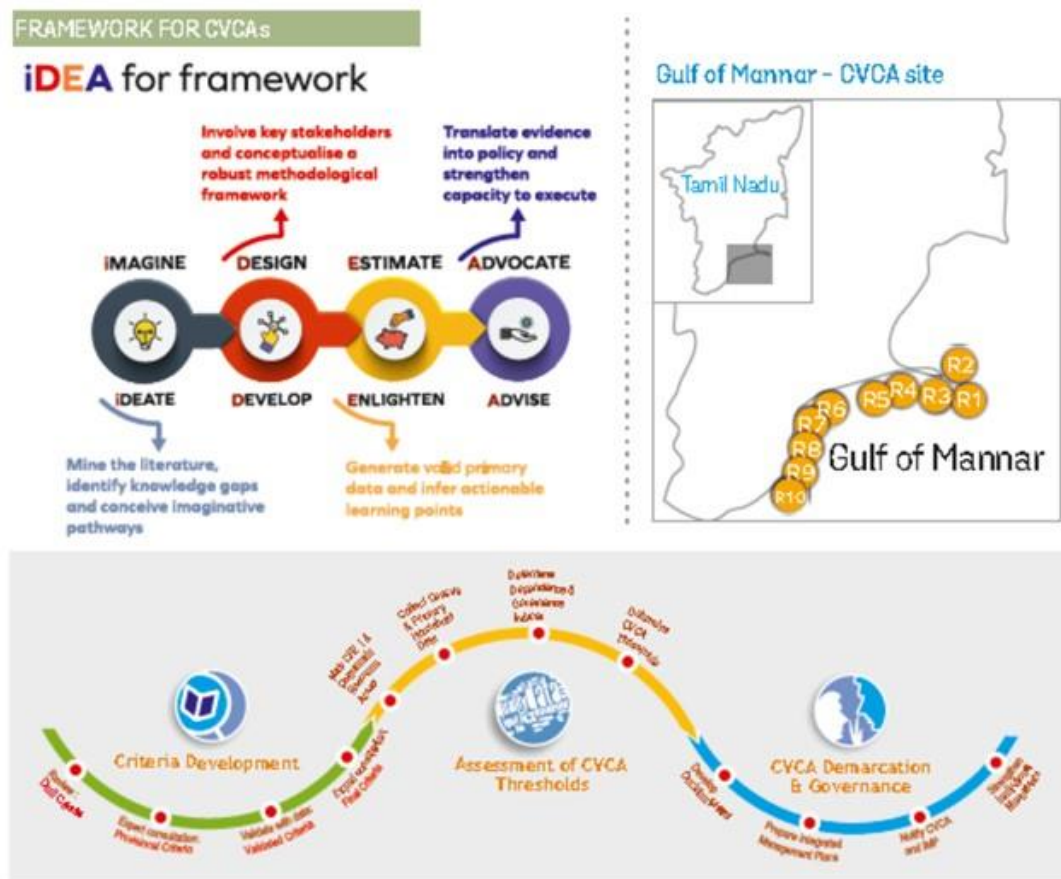
The work plan formulated for re-vegetation of the dumping sites through ‘Integrated Biological and Bio-technological Approach’ would be based upon the following parameters:

- Evaluation of rock material for their physical and chemical properties to assess the nutrient status to support vegetation.
- Formulation of appropriate blends of organic waste and soil to enhance the nutrient status of rhizosphere.
- Isolation and screening of specialized strains of mycorrhizal fungi, rhizobium, azotobacter and phosphate solubilizers (bio-fertilizers inoculums) suitable for the mined out sites.
- Mass culture of plant specific biofertilizer and mycorrhizal fungi to be procured from different institutions/organizations which are engaged in the phyto-remediation activity of degraded areas.
- Plantation at quarry sites/areas using identified blend and biofertilizer inoculum.

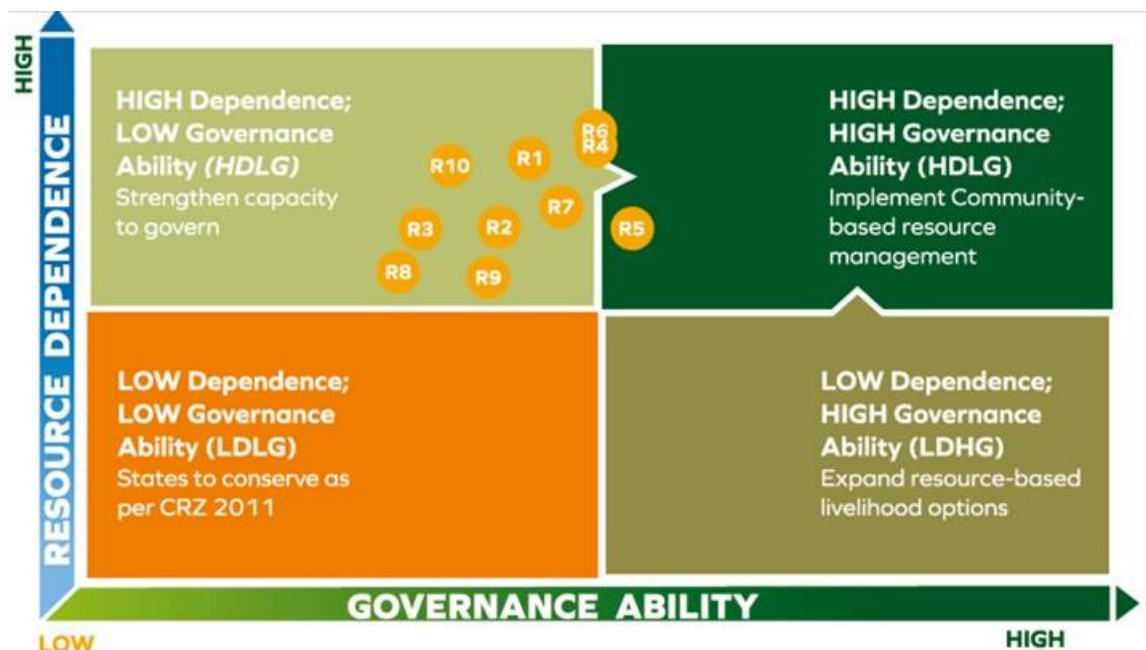
#### ***4.10.21 ECoP 21: CVCA & ESA Management and Coastal Deltas***

- For any management activities related to CVCAs and ESAs adequate planning shall be ensured through a Strategic Environmental and Social Assessment approach with appropriate stakeholder consultation and information disclosure,
- Development should be strictly as per an approved regional scale Integrated Coastal Management Plan and Marine Spatial Plan (long term) developed by experts in all related fields as required for the particular CVCA/ESA, based on Participatory Rural Appraisal with community involvement,
- Stakeholder identification and involvement is the key. Critical Vulnerable Coastal Areas (CVCA) shall be managed with the involvement of coastal communities including fisher folk who depend on coastal resources for their sustainable livelihood,

- Coastal Regulation Zone Rules and its guidance shall be strictly followed,
- Attention shall be on conservation of resources and limit-based utilisation if resources for economic improvement of the communities,
- It is preferable to adopt a cluster approach for village / community development around CVCA/ESAs,
- There shall be clear mechanisms, guidelines and monitoring for curtailing the introduction / use of materials and species which are not suitable for the region,
- CVCA Threshold for a given resource area is the summation of dependence index and governance index values, both of which when plotted against each other in the CVCA Decision Matrix aid in planning location-specific interventions. Following Figures present the Framework used to develop plan for CVCA and Decision Matrix for CVCA, developed by NCSCM.



**Framework used to develop plan for CVCA**



*Decision Matrix for CVCA*

#### 4.10.22 ECoP 22: Coastal Smart Villages

- Cluster of villages to be selected for better planning and economies of scale,
- Clustering shall be on the basis of overlapped / layered administrative (village boundaries, block boundary etc), plus geographic boundaries (watershed / river-basin, CVCA boundary) and community / social boundaries,
- Coastal Regulation Zone Rules and its guidance shall be strictly followed,
- Attention shall be on conservation of resources and limit-based utilisation if resources for economic improvement of the communities,
- There shall be clear mechanisms, guidelines and monitoring for curtailing the introduction / use of materials and species which are not suitable for the region,
- All smart villages shall have
  - Improved mechanisms to support traditional – geographically most suited livelihood activities,
  - Full coverage of Water Supply, Sanitation (toilets, sewage treatment and disposal systems, solid waste management) and demonstrate management and upkeep of a clean environment,
  - Alternate means of energy for life and livelihood support,
  - Preference for energy efficient fixtures,
  - Preference for local indigenous technology, art, craft; and efforts to develop and support branding / certification

- Demonstrate one or more community based eco-system improvement and conservation of an identified ESA, CVCA, wet land, natural forest, marine resource; preferably with efficient resource utilisation model,
  - Well planned, managed and monitored coastal – terrestrial interface such as beach or shoreline,
  - Demonstrate effective environment friendly management of social / religious events or mass gatherings,
  - Platform for Community Interactions,
  - Self-supportive infrastructure and services.
- Capacity and awareness building shall form part of coastal village planning

#### **4.10.23 ECoP 23: Preparation of Plans: Integrated Coastal Zone Management Plans**

Integrated Coastal Zone Management plan and other plan preparation process shall be interactive and participatory. Since the planning process involves wider region, with focus on sectors/subsectors and regions/subregions it is proposed to follow the Strategic Environmental and Social Assessment (SESA) approach to understand and integrate the wider environmental and social impacts early on in the planning process. Detailed ToRs for the plan preparation activities will clearly indicate the need for extensive stakeholder consultations, following a SESA Approach to integrate safeguard / environmental and social planning considerations right from plan preparation stage. ICZM Plans should ensure establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable use of coastal forest plantations and conservation of natural habitats in addition to interventions for coastal protection, pollution prevention and overall social, economic and community development. In addition, environmental and social safeguards specialists shall monitor and oversee the inclusion of environmental and social aspects, including regional and local environmental and social sensitivities, best practices, and intrinsic safeguards management in these plans during all stages. Environmental and social safeguards specialists at the SPMU, NPMU and the World Bank would review the draft plans to ensure full coverage of all relevant aspects.

Key Tasks involved in ICZM Planning include:

- Identifying coastal issues and stakeholders, strategic environmental and social assessment, temporal and spatial planning extents
- Concept Formulation: Formulating goals, objectives and defining the plan boundary (administrative, ecosystem, sediment cell), sub-regional area clustering for integrated planning
- Baseline Data Collation and Analysis
- Extensive Stakeholder Analysis and Consultations following a Strategic Environmental Assessment Approach
- Preparation of Coastal Profile of Selected Stretch
- Appraisal of existing plans and programs
- Preparation of a comprehensive base map for the area
- Preparation of ICZM Plan
- Detailing the Sub-plans including; but not limited to the following):
  - Shoreline Management Plan
  - Conservation Management Plan
  - Marine Spatial Plan
  - Disaster Management Plan
  - Livelihood Management Plan
  - Tourism Management Plan
  - Any other: considering the specific requirements or opportunities in the region considered



#### **4.10.24 ECoP 24: Small Efforts to Reduce Plastics in Ocean**

Small efforts to be followed in all projects and offices of ENCORE (of all National, State, Local level organisations/agencies /support agencies involved) to contribute to the cause of reducing plastics in ocean<sup>9</sup> are:

##### **1. Reduce Your Use of Single-Use Plastics**

Single-use plastics include plastic bags, water bottles, straws, cups, utensils, files, covers, bags, take-out containers, and any other plastic items that are used once and then discarded. Instead, use reusable steel wares, items / stationery / bottles, straws, cups, utensils, bags made of locally available natural alternatives (such as coir products, coconut shell products, dried-compressed leaf products etc), edible cutlery and such innovative locally available alternatives. Livelihood projects and smart villages shall integrate efforts to manufacture, market and use such products in the project as much as possible.

##### **2. Recycle Properly**

When single-use (and other) plastics that can be recycled are used, always make sure to recycle them. At present, just 9 percent of plastic is recycled worldwide. Recycling helps keep plastics out of the ocean and reduces the amount of “new” plastic in circulation. It is important have understand from local recycling centres about the types of plastic they accept and to have toe up to regularly collect and recycle such products if unavoidable.

##### **3. Participate In (or Organize) a Beach or River Clean-up**

Participate once a year in or organizing a clean-up of local beach or waterway by collecting plastic waste with friends or family or can join / support a local organization’s clean-up or a national event.

##### **4. Stop buying Water in Plastic bottles**

Each year, nearly 20 billion plastic bottles ends up in trash. Prefer using steel / glasses or containers for purified water in offices, for conferences and meetings. This is adopted already by many state governments for official meetings.

##### **5. Support Plastic Bans by the local bodies**

Follow the ban on single use plastic bags, takeout containers, and bottles; imposed by the local body where the office/facility is located.

##### **6. Avoid Products Containing Microbeads**

Tiny plastic particles, called “microbeads,” have become a growing source of ocean plastic pollution in recent years. Microplastics are pieces of plastic smaller than 5 millimetres. They enter the environment through the defragmentation of larger plastic that has been left in the environment or directly as microbeads through things like synthetic fibres from clothes or tire wear. Such fabric / other materials can be excluded from use in premises.

##### **7. Spread Awareness on Plastic Pollution**

Stay informed on issues related to plastic pollution and help make others aware of the problem. As part of subproject launch or completion, try to host a viewing party for one of the many

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<sup>9</sup> Adopted from <https://www.oceanicsociety.org/blog/1720/7-ways-to-reduce-ocean-plastic-pollution-today> and <https://www.nrdc.org/stories/10-ways-reduce-plastic-pollution> modified to suit project requirements.

plastic pollution focused documentaries, like Bag It, Addicted to Plastic, Plasticized, or Garbage Island, Plastic Ocean.

#### ***8. Support Organizations Addressing Plastic Pollution***

There are many non-profit organizations working to reduce and eliminate ocean plastic pollution in a variety of different ways. Make them part of the project capacity building exercises and sanitation projects. By incorporating this clause in bid documents we can ensure that a company which is smarter about its packaging i.e. ‘a sustainable competitor’ gets preference.