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EXECUTIVE SUMMARY

ENVIRONMENTAL MANAGEMENT FRAMEWORK

1. Background

Governments of Assam intend to upgrade the existing Inland water transport system in state. To modernize and transform IWT in Assam, the World Bank is assisting the GoA through a phase-wise project which includes up gradation of ferry Infrastructure, last mile connectivity. Fleet modernization, institutional capacity development etc. for total 11 identified Terminal / Jetty / Landing point locations. However, in phase-I, three ghats/ landing points have been selected.The projectincludes civil works along with new construction activity; for which it has been categorized as Environment Category-A according to World Bank classifications.

Project development / civil intervention works during development may have interface with various physical, social and biological components of the environment, i.e. water quality, aquatic and terrestrial flora & fauna, air quality, noise levels etc. at all project development stages. All these environmental components will get affected due to development and operation of the terminals and a detailed environment and social impact assessment has been carriedout toassess all the potential impacts of the project. Further the impacts of development can be due to its location or due to the nature of activities to be performed during its development and operation phase thus both these aspects should be looked into while carrying out EIA study.

As thecomplete lists of project activities and locations havenot been finalized, a framework approach has been adopted. Under this approach, the present Environmental ManagementFramework (EMF) has been prepared to identify all the potential but generic negative environmental and social impacts, propose mitigation measures, provide basic screening criteria for selecting subprojects, implementation and provide institutional arrangements, grievance redressal mechanismsand monitoring, reporting and documentation measures for environmental and social safeguards compliance. The EMFcovers all physical works activities as well as feasibility and other studies to be carried out under the project.

2. Project Description

2.1 Strategic Components and Action Plan of the Project

2.1.1 Project Development Objective (PDO)

The Project's Development Objectives are to: (a) Improve passenger ferry infrastructure and services in Assam, and (b) to improve the institutional capacity and framework.

2.1.2 Project Components

The project is focused primarily on improving ferrying of cross-river passengers on the Brahmaputra, and seeks to use the opportunity to establish a tenable foundation for development of a modern IWT sector in Assam. The long absence of adequate policy response and piecemeal investments in IWT in the state (as also nationally) have resulted in somewhat unorganised and weak condition for the sector, which is not predisposed to a linear scale-up. Despite the odds however, Assam manages to provide ferry services to about 5 million people annually, usually along with their vehicles/livestock/goods. In order to support the functioning but ill-equipped IWT sector therefore requires a more granular approach encompassing a range of supply and demand side factors. As such, the project is guided by a binding philosophy that admits wider, and even incremental interventions as long as they contribute to strengthening institutions and planning; operational efficiency and safety; and importantly sustainability. Estimated cost of the project is USD 150 million. Broadly, the project is structured through the following three components:

2.1.2.1 Component 1: Institutional and Safety Strengthening

a. Technical assistance in sector planning;

An Integrated Strategic Development Plan (ISDP) for the state is being prepared. The exercise involves preparing an overall transport strategy for Assam, and more specifically preparing investment plan to help mainstream Water Transport in the state including multi-modal

integration and last mile connectivity. Detailed Project Report is also under preparation for three priority terminals which will incorporate the EMP to be prepared for all the specific priority ghats.

b. Technical assistance in design and roll-out of new regulatory authority;

Complementing the investments in infrastructure, the project aims to strengthen the AIWT Sector through a supportive institutional framework. A wide-ranging consultancy on Institutional Strengthening and Business Plan (ISBP) is assigned to study the apparent system weaknesses in detail and develop prescription for more effective institutions. In doing so, the study has already provided the basis for legislation for an Independent IWT regulatory authority (RA) to carry out the safety, environmental and economic regulation of the sector (shipping, ports, and shipbuilding). An important emphasis of the sub-component while assessing sector laws and regulations is particular attention to Safety regulations for vessel and passenger movement, even more specifically for women and children. Recently, the bill has been passed by the state in November 2018 for establishing an independent regulatory authority for Inland Water Transport.

c. Business Planning for Assam Shipping Company and Assam Ports Company;

The operational and commercial functions of the government's shipping operations and terminal services have been decided to be vested in two new corporations, the Assam Shipping Company Limited (ASCL) and the Assam Ports Company Limited (APCL) respectively. The two new corporations will be constituted under the Companies Act (2013), subject to rigors of the market. The ISBP will develop a business plan for the two companies and guide them through the initial period of independent operation.

d. Navigation aids, including night navigation on some routes;

The sub-component would draw on national / international experience in assessing appropriate aids to navigation, their procurement and deployment to allow 24-hour services / night navigation on most vulnerable / trafficked routes / crossing points. Beginning with pilots at 2-3 crucial locations, deployment of navigation aids will be scaled up based on the investment strategy for the sector.

e. Establishment of an emergency response system (policy, procedures, equipment, and management);

An important objective will be to support establishment of a Search and Rescue (SAR) organization/piloting emergency response system (policy, procedures, equipment, and management) as well as improving systems for emergency preparedness including climate and natural disasters.

2 Training of staff for roles in restructured industry.

The ISBP consultancy will also undertake a detailed assessment of capacity building needs of DIWTA staff from the point of view of their professional development, re-skilling and job mapping needs.

3 Component 2: Fleet Modernization

This will include financing of an incentive scheme (known as Jibondinga) to drive private sector fleet upgrading by scrapping of unsafe or obsolete vessels and replacement with new vessels or retrofitting newer vessels with new marine engines and safety equipment.

The objective of supporting an incentive scheme is to encourage investment in modern shipping technology including adoption of greener and safer technologies, through review of fiscal and other barriers affecting quality of boat construction and maintenance. GoA has prepared a draft proposal entitled '*Jibondinga*' – meaning water as source for life/livelihood for private country boat operators, which provides incentive both for new vessel acquisition as well as for retrofitting. The scheme considers special incentive to encourage women entrepreneurs and women self-help groups. Vessels design and specifications for procurement and retrofitting will be standardized to have better regulation as well as for ease of repair and maintenance.

The project will facilitate condition surveys of the existing govt. fleet, hull & machinery, deck and outfit items to trade suitability, impact stability (for the area of operation), loading and other conditions. Select vessels may be retrofitted. This will also include measures to "green" the vessel fleet, including on waste management practices, as well as fuel efficiency and fuel mix.

Potential pilot development of a CNG refuelling station for vessels, likely in Guwahati, will also be explored.

The project would also like to improve connectivity between the many islands, villages and far-off chars by inducing additional floating stock which is customized to the specific demands. Discussion with the district administration and local governments during early preparation missions, particularly to the upper reaches of Brahmaputra (Dibrugarh, Jorhat, Majuli), had revealed serious connectivity constraints between numerous small islands and remote chars. These have had profound impacts on health (high maternal and infant mortality), education, jobs and trade. For example, many inhabited islands do not have medical facilities and people have to travel to other nearby bigger towns to access the services, which become critical during emergencies. Similarly there are several riverine islands that are used by people only for their livelihood - cultivation and to keep their livestock, requiring people to travel between their village and the island on a daily basis, while the ferry services are limited and irregular. The project therefore will prepare specifications and support procurement of appropriate Vessels (preferably smaller and high speed) to operate as water ambulance emergency services, school ferry / regular ferry services, search and rescue boats.

4 Component 3: Improvement in terminal infrastructure

This would involve developing modern, scalable floating terminal (a mix of fixed and floating) infrastructure at major urban and rural ferry ghats; road accesses, terminal buildings and other amenities that is user friendly, specifically for physically challenged, women, children, old and infirm and passengers travelling for health facilities. Given the limited bridges / land connection across the banks and the regular demand to access markets to trade local produce etc., the project will also consider providing a few RO-RO / RO-Pax (about 5 pairs) landing stations.

In particular, the component will finance the design and construction of eight new priority terminals at four busy crossings plus approximately 20 terminal (10 routes) at other locations where upgrading is urgent. It would also provide standard designs for scalable infrastructure that can be adapted for other urban and rural ferry terminals (Ghats). The infrastructure improvements / designs will in particular adopt a 'working with nature' approach which ensures that project objectives are satisfied in a way that places natural ecosystem at centre stage thereby making solutions non-damaging and sustainable (limit dredging, utilize portable / modular infrastructure design adaptation for landing stations to enhance climate change resiliency, low draft vessel designs, etc.). The developments would offer opportunities for ecotourism development, rejuvenating the river waterfront and integration of quality ferry terminals in the urban context.

This EMF lays out the requirements to ensure that appropriate screening, and implementation of relevant environment management and mitigation measures as necessary, will be carried out for all the project components (1, 2 and 3).

5 Summary of Works

The components of the project that may potentially cause environmental and social impact and therefore relevant for the present analysis are the physical works. The summary list of potential physical activities is provided below:

- Up gradation of Terminals / Ghats / Ferry locations as per ISDP

In addition, the present EMF covers the feasibility and other studies to be carried out under the project.

Most of the proposed activities comprise rehabilitation, maintenance or repair works.The works on flood protection structures would not involve any structure large enough to trigger the dam safety policy. The activities will be screened to ensure none of the activities result in any irreversible or significant environmental or social, negative impact. Hence all the activities carried out under the project will fall under WB Environment Category A.

6 Safeguards Policies Triggered

Based on an assessment of the civil works involved the following safeguards policies are relevant for the project:

Name	Key Requirements	Project Applicability
OP 4.01 Environmental Assessment	Ensures sustainability and environmental feasibility of the project. Projects are classified into A, B & C category depending on the nature and extent of the impact.	Triggers
OP 4.04 Natural habitats	Ensures conservation of natural habitats and discourages disturbance of nay natural habitat due to project development by recommending adoption of alternative method/route/approach or adopting management measures	Triggers
OP 4.36 Forests	Ensures that project activities do not disturbs/interfere with the forest, forest dwellers activities, fauna and flora of the forest. Prevents and discourages deforestation and impacts on rights of forest dependent people.	May be triggered for Forest Triggers for tree cutting
WBG Environmental, Health and Safety (EHS) Guidelines (general)	The applicability of the EHS guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment	Applicable
WBG sector-specific EHS guidelines for Jetty, Harbours and Terminals.	The EHS Guidelines for ports, Harbours, and Terminals are applicable to marine and freshwater jetties, harbours, and terminals for cargo and passengers.	Applicable

7 Environmental and Social Safeguards Screening

As part of environmental and social assessment process, environmental and social safeguards screening exercises have been conducted. The screening exercise has identified the following potential impacts from the project activities:

Positive Impacts:

- Improvement in IWT and north south connectivity in Assam
- Protection of human lives
- Poverty reduction through protection of livelihood and productive assets
- Protection of vulnerable population from extreme poverty, deprivation, social and economic inequalities that would impact positively on economic growth and human development index.
- Well-being of children
- Improvement in income and living standards.
- Protection of vulnerable groups from disasters
- Protection of villages and settlement from damages to housing and other physical assets.
- Reduction in temporary displacement.
- Decrease in area of land lost due to erosion.
- Improvement in local environmental and social conditions.
- Decrease in public health risk by reducing incidence of water borne and other disaster related diseases, and mental fears
- Protection against damages to crop and livestock.
- Increase in agricultural production and economic gain.
- Reduction in poverty through generation of employment opportunities for the locals.

Negative Impacts:

- Water pollution
- Use of water for construction
- Elimination of washing areas/sites
- Leakages of chemicals etc.
- Land pollution may happen when solid waste material, camp site area, stone stacking area and removed vegetative cover is left unattended
- Noise and vibration due to use of machinery and movement of vessels
- Air pollution due to smoke and dust

- Traffic and public nuisance
- Removal of vegetation (mostly herbs and shrubs) during site clearance
- Land use change
- Health and safety issues of subprojects professional staff/labor and communities residing near project areas
- Access issues for communities residing near projects areas
- Threat to cultural environment due to influx of work force, may have impact on gender
- Risk hazard
- Terrestrial and aquatic ecology

The EMF assess all of these potential negative environmental and social impacts and provide mitigation measures to address these impacts as well as lists down institutional arrangements to ensure that the mitigation measures are implemented.

A Social Management Plan (SMP) as a part of sub-project specific ESMP will be prepared to address construction related social impacts of the sub-projects. A Resettlement Policy Framework (RPF) will be developed as a part of SMFto allow application of OP 4.12 requirements. RPF defines objectives and principles of resettlement, including a screening mechanism for sub-projects to ensure that no such sub-projects would be selected, which involve acquisition of private land and significant resettlementimpacts. In case the land is required from government departments, common community land and private titleholders; it will be acquired as voluntary donation.Inaddition to this, RPF includes mechanism for preparation of Resettlement Action Plans(RAPs) to efficiently mitigate and compensate low to moderate level social impacts, institutional arrangements to implement RAPs, monitoring and reporting of RAPs implementation and funding mechanism for them. During preparation of RAPs and ESMPs consultations will be conducted with potentially affected persons and other stakeholders, to ensure support of potentially affected and beneficiary communities, and other stakeholders. These stakeholders will be engaged during implementation of RAPsand ESMPs and monitoring of subproject results will be done via development of a citizen's engagement mechanism such as access to information, education and communication, feedback and grievance redressalmechanisms. These mechanisms will ensure transparency and accountability of project implementers and enhance positive impacts of the project.

The EMF identifies and categorizes all potential activities (subprojects) that may require physical works, identifies the instrument type that will be used to screen, assess, and mitigate the negative environmental impacts, details and extent of the stakeholder consultation that shall be needed for each assessment type, the disclosure requirements and the institutional, reporting and monitoring measures that shall be needed to ensure implementation of mitigation measures.

The EMF includes identification of all possible project-environment interactions, categorization of environmental impacts, identification of mitigation measures, a comprehensive environmental and social baseline, identification of stakeholders and details and results of a comprehensive stakeholder consultation exercise, institutional arrangements needed to ensure implementation of mitigation measures, monitoring, reporting and documentation regimes and table of costs associated with implementation of the EMF.

8 ScreeningSafeguards

The EMFcategorizes subprojects on the basis of nature of activities, potential impacts on environment and or people. The EMF specifies types and extent of environmental and social assessments that will need to be carried out before initiating each subproject. The EMF includes social and environmental checklists that will be used to assess the potential impacts of each subproject on the basis of its scale/size, nature and potential negative impacts. These checklists prescribe further screening and environmental and social management instruments to be prepared for subprojects which might have more expansive impacts.

9 Monitoring and Reporting

The project will employ a three tiered monitoring structure with focal persons nominated from the construction staff to monitor impacts during works phase. The environmental and social

safeguards specialist will compile the monitoring checklists to prepare and collate regular environmental progress reports. In addition to this, annual third party validation will also be conducted to validate compliance with the EMF and RPF, and implementation of safeguard instruments such as RAPs, ESMP.

10 EMF Disclosure

The EMF shall be released on the IAs and project website, hard copies shall be sent to all institutional stakeholders and all their regional offices. The EMF shall be disclosed internally within the World Bank and shall be released on info shop. The EMF and RPF will be translated into local language and disclosed on the websites of IAs and the projects, and distributed among institutional stakeholders and affected and beneficiary communities at the early stage of sub-projects.

11 Stakeholder Consultations

Stakeholder consultations have been carried out while finalizing the project details and during the preparation of EMF and RPF. These consultations have been carried out with institutional as well as grass-root stakeholders. The consultations have revealed that the project is considered to have a number of positive social and environmental impacts. However, in particular, the stakeholders suggested that mechanisms in EMF should ensure selection of sub-projects on the basis of community needs, regular consultations, participation, communication, access to information, grievance redressal of project affected and beneficiary communities and other stakeholders; and mitigation of environment and social/resettlement impacts in an effective manner.

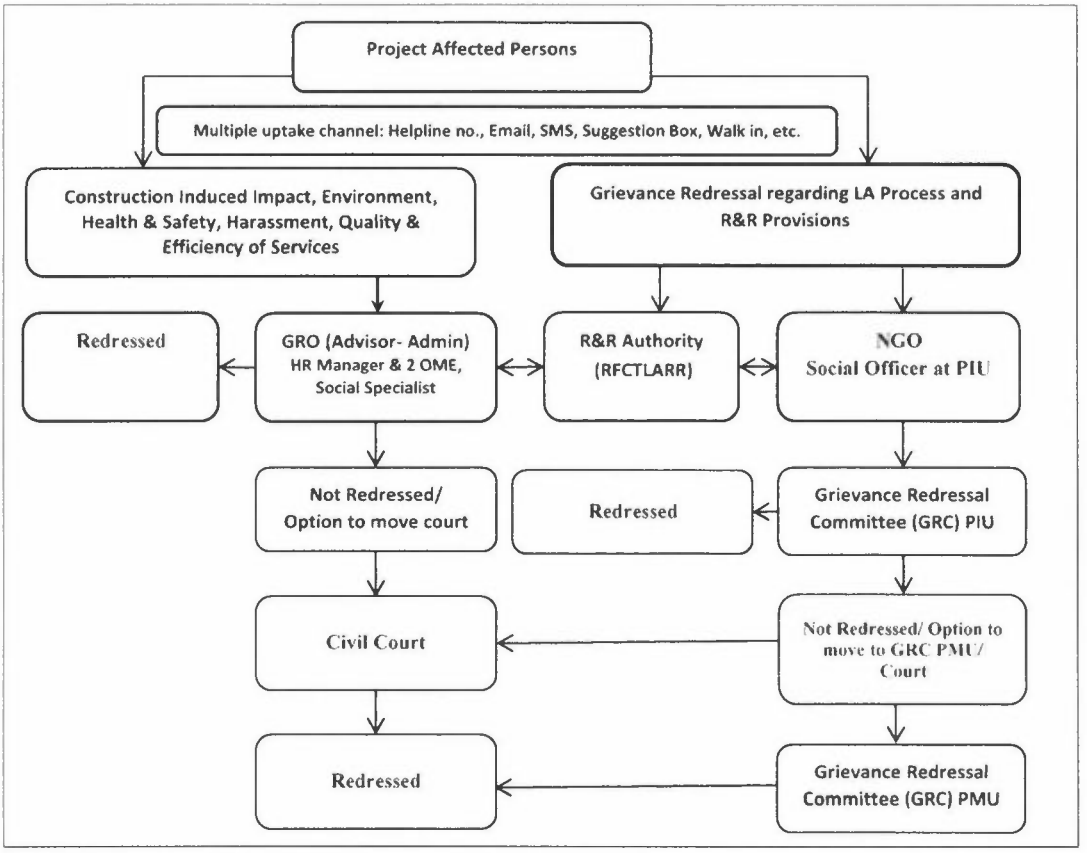
12 Grievance Redress Mechanism (GRM)

Complaints can be registered through multiple grievance uptake channels, such as a dedicated helpline, email, by letter to the GRCs (a divisional level or upper level GRC) or walk-ins and registering a complaint on grievance logbook to be provided at each project site/ghat or suggestion box. There will be specific procedures for Gender Based Violence (GBV) including confidential reporting with safe and ethical documenting of GBV cases. An SOP/Guidebook will be developed which will lay down procedures for handling grievances in a timely and effective manner.

A divisional level Grievance Redressal Committee (GRC) will be set up to resolve the complaints from the field. The GRC will comprise of Divisional Executive Engineer; Additional Deputy Commissioner of concerned district; Social Officer-PIU, representatives of the concerned Village Panchayat/Council President or his/her authorized representative and supporting NGOs for implementing the RAP. Grievances of PAPs in writing will either be brought to GRC for redressal by the supporting NGO or through multiple uptake channels. The GRC will respond to the grievance within 7 days. Grievances brought to the GRC shall be redressed within a period of one month (30 days) from the date of receipt of grievance. The decision of the GRC will not be binding to PAPs i.e., decision of the GRC does not debar PAPs taking recourse to court of law.

Petitioners who wish to submit an appeal to the higher authorities can directly appeal to the GRC at the PMU, which will comprise of the Project Director, Advisor (Administration),Social Development Specialist, member of the Assam IWT Regulatory Authority, representative from the Revenue Department and a recognised NGO. On receiving the complaint, the Advisor (Administration), designated as the Officer in charge of GRM at the PMU will issue an acknowledgement to the petitioner within 7 days. The case will be disposed by the PMU within 30 days of receiving the complaint. Details of the resolved cases will be documented and published on the website.

As per the provisions of the Assam Right to Fair Compensation and Transparency in Land Acquisition Resettlement and Rehabilitation Rules 2015 (Section 45) the state Government will designate a Rehabilitation & Resettlement Authority to handle the disputes related to the payment of compensation for L.A and R&R issues.

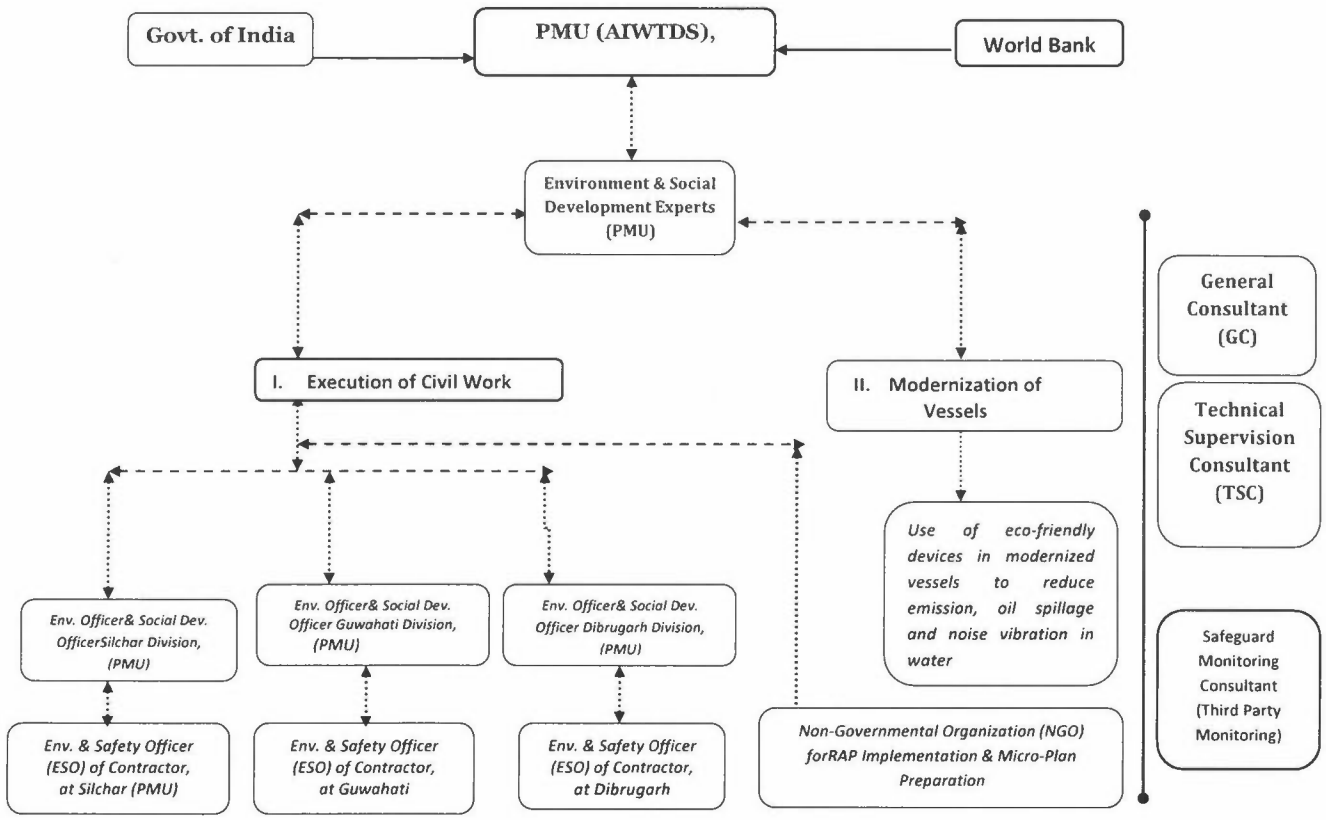


13 Institutional Arrangements

The Project implementation will be led by the Project Implementation Unit (PIU) that will be established within AIWTDS. The PIU will be headed by the Project Director (PD). The PIU consist of Environmental & Social Development Expert. These experts will assist PIU on issues related to environmental and social management and also provide trainings to the field personnel of PIU & DIWT responsible for monitoring of environmental compliance during both construction and O&M phases of the project.

The overall responsibility of environmental performance including EMP implementation of the Project will rest with the PIU. The Technical Supervision Consultant (TSC) will take up the role of supervision and monitoring of the Project activities during the implementation phase. An independent third party monitoring will be done on a quarterly basis, engaging independent Consultants as Safeguard Monitoring Consultants (SMC)' further for monitoring the safeguard aspects.

Organization Structure for Implementation of EMP



Environmental Management Plan

The key components of EMP are summarized below and each of thiscomponents are explained in detail in the following subsections:

- Mitigation Measures
- Monitoring Measures
- Institutional Arrangement
- Reporting Requirements
- EMP Budget

Impact identification and EMF application for the development interventions are carried out to set the management framework

The Environmental Management Plan, covering project activities and relevant environmental components for proposed Terminal Project for both constructional and operational phase has been worked out and approximate timeframe and institutional responsibilities have been specified. The same has been presented in Tabular form.

A three-tier monitoring program has been proposed:

- Compliance monitoring,
- Effects monitoring, and
- External monitoring.

The main purpose of this monitoring program is to ensure that the various tasks detailed in the EMP are implemented in an effective manner, and also to evaluate program impacts on the key environment and social parameters.

Institutional Set-up for Effective EMP Implementation and its Monitoring

The Project implementation will be led by the Project Implementation Unit (PIU) that will be established within AIWTDS. The PIU will be responsible for engagement of consultants for carrying out the various studies related to EMP. The PIU will be headed by the Project Director (PD).

The PIU consists of an Environment and Social (E&S) Cell with environmental & social expert. E&S Cell will assist the PMU on issues related to environmental and social management and oversee the Construction Supervision Consultant (CSC) and contractors .Quarterly monitoring reports on EMP compliance is to be sent to the Project Director and also shared with the World Bank, throughout the construction period. The CSC will supervise and monitor the contractors for effective EMP implementation. The contractors in turn will also have HSE supervisors who will ensure EMP implementation during construction activities

Environmental Codes of Practices and Performance Indicators

The contractor will be required to follow the environmental codes of practice (ECoPs) by preparing site-specific management plans. For evaluating the performance of the environmental management and monitoring plan, performance indicators are identified to evaluate the efficiency. The indicators are defined both for construction and operation phase.

Capacity Building / Training and environmental awareness

Capacity building for effective implementation EMP is highly essential. Capacity building on environmental and social safeguard will be taken up for all levels stakeholders, including AIWTDS,

E&S Cell of AIWTDS, supervisor, and contractors. At the construction site, supervisor will take the lead in capacity building plan. The contractors will also be responsible to conduct trainings for their own staff and workers. During the O&M phase of the project, these trainings will continue to be conducted by AIWTDS staff for all relevant O&M personnel and community.

It is vital that all personnel are adequately trained to efficiently perform their designated tasks. In addition to training, general environmental awareness must be fostered among the project's workforce and general public to encourage the environmentally sound practices.

Documentation and Record Keeping

A document handling system will be established to ensure updating of EMP documents, and availability of documents for the effective functioning of the EMP. The document handling system have been suggested

Stakeholder Engagement

It is expected that the stakeholders would have opportunity to comment on the content of the EIA report.

Environment Monitoring Plan Budget

Tentative Environment budget has been prepared for design, construction and operation phase of the project. The Environmental budget includes the cost of environmental structures like septic tank &soak pit, Air Pollution Control System at terminals, monitoring, enhancement measures, training and awareness and technical support for establishment, enhancement measures and environmental guidelines. EMP cost estimates of North Guwahati Terminal, Gateway Guwahati Terminal and Aphalamukh ghat are Rs .30,58,650/-, Rs 30,58,650/- and Rs .31,42,650/- respectively.

Summary and Conclusion

Environmental impact assessment is carried out pertaining to the up-gradation proposals of Ghats and other components of the project. The investigation is taken into account both national and international legal requirements (as per WB).The EIA is prepared based on field investigation, secondary data/information, environmental quality monitoring and feedback from the stakeholders.

Both positive and negative environmental impacts are evaluated.

The positive environmental impacts of the Project are development of all weather navigation routes for transportation of passengers and generation of employment opportunities during construction, operation and maintenance stages. The project will induce economic growth in the region. The negative environmental impacts are not significant. However, the positive impact of the project will improve the sanitary condition, proper waste management and over all aesthetics of the area.

EMP has been formulated to mitigate the negative impacts during various phases (pre-dredging/construction, during dredging/ construction and Post dredging/O&M).The main monitoring parameters include monitoring of dredging and dredge material disposal, biological monitoring and enhancement, environmental quality monitoring (air, noise, surface water, river bed sediment), health and safety, etc. Most of the potential impacts are short-term that can be addressed by adopting mitigation measures and relevant ECoPs. To keep the project influence area environmentally friendly, AIWTDS should ensure that the Contractor prepare site specific EMPs including Emergency response plan, Oil Spill Contingency Plan and Workers Health and Safety plan and Environmental Pollution Abatement and Mitigation Measures Plan. Regular and effective monitoring of environmental quality parameters as indicated in this EIA report.AIWTDS should follow the EMP for improvement of navigation and environment quality of the area.

EXECUTIVE SUMMERY

SOCIAL MANAGEMENT FRAMEWORK (SMF), RESETTLEMENT POLICY FRAMEWORK (RPF), INDIGENOUS PEOPLE DEVELOPMENT FRAMEWORK (IPDF)

1. Project Context

The Project's Development Objectives are to (a) improve passenger ferry infrastructure and services in Assam, and (b) to improve the institutional capacity and framework. The Project has three main components and eight sub-components collectively intended to tackle the regulatory, operational and infrastructure challenges of the sector. The three main components are:

1. Institutional, regulatory and safety strengthening (estimated cost USD 20 million). This component will include:

a. Technical assistance: sector planning, design and roll-out of new Regulatory Authority, business planning for Assam Shipping Company and Assam Ports Company; training of staff to fulfill new roles in the restructured industry (USD 8 million);

b. Safety management: river navigation aids, night navigation technology on some routes, and emergency response system (policy, procedures, vessel and equipment) (USD 12 million).

2. Fleet safety improvements and modernization (estimated cost USD 25 million). This will include financing of:

a. GoA incentive scheme (known as Jibondinga) to assist industry transition to the new regulatory regime; it is designed to support the scrapping and replacement of unsafe or obsolete private vessels and replace them with new vessels, or retrofit existing but acceptable vessels with modern marine engines and safety equipment (USD 10 million);

b. procurement of new vessels for the Assam Shipping Company (USD 15 million).

3. Improvement in terminal infrastructure (estimated cost USD 105 million). This will finance:

a. provision of priority terminals for the Guwahati and Majuli Island ferry routes (USD 70 million); and

b. provision of terminals on several other mainly rural routes, to be selected (USD 35 million).

This report comprises of the Social Management Framework (SMF), Resettlement Policy Framework (RPF), Indigenous People Development Framework (IPDF) and Gender Development Strategy for all project investments. The RPF has been prepared for construction of terminals and ancillary infrastructure such as road access, terminal buildings and other amenities for differently abled, women, children, old and infirm (Component 3).

5 priority terminals have been identified under Component 3(a) of the project. Site identification and planning for 3 priority terminals sites namely LachitGhat, North Guwahati and Aphalamukh is completed which will be developed in the first 18 months of the project. The remaining two priority sites, namely Kamlabari and Neamati are still under consideration for finalization and planning of design at initial stage. Other terminal sites under Component 3 (b) are yet to be identified and construction will be undertaken during phase two of the project. Thus, a consolidated RAP/IPDP has been prepared for the 3 identified locations in phase 1: Lachit Ghat, North Guwahati and Aphalamukh.

1.1. Project Area of Influence

Project Area of Influence includes both the area of direct impacts (physical footprint of the project) and the area of indirect impacts (10 km radius from each of the landing ghats).

Villages that fall within the 10 km radius from each of the landing centre/Ghats were found to be dependent on IWT facilities for socio-economic activities, particularly the rural communities living in the northern bank of the river. Hence, the 10 km radius helps capture all indirect or cumulative risks associated with the project. Area falling within 50 metres of the landing centre/ghats, where people using the IWT services, and those directly impacted (loss of livelihood, structure/land and other assets) by the project were identified. This area includes the physical footprint of the project such as the terminal and access road, work staging areas, and areas likely to be affected during the operational phase. 100% survey was done among PAPs within this area to generate information on the socio-economic baseline for the SIA.

1.2. Socio Economic Profile of Assam

The population of Assam is about 31,169,272 of which 15,954,927 are males and 15,214,345 are females. The sex ratio is 954 which is better than national average of 940 and under 6 years sex ratio is 957, again slightly better than national average of 914. The literacy rate in Assam is 73.18 percent (male 78.81, female 67.27) which is lower than India average of 74.04 percent (male 82.14, female 65.46). Almost 86 per cent of state's population still live in rural areas (85.92 %) far higher than national average (68.84%) while urban population is only 14.08 %. The high growth rate of population, partly due to heavy influx of cross border migrants, poses another set of challenges for the states planned development.

1.3. Summary of Social Safeguard Impacts and Risks

This section details out the potential social impacts of the project which were identified during the SIA of three pre-identified sub-projects namely LachitGhat, North Guwahati and Apahlamukh.

Name of/ type of sub-project	Amount of land required (in Acres)	Type of Land (private, government, community)		
		Private	Government	Community
LachitGhat	0.0378 Acres	Nil	0.0378 Acres	Nil
North Guwahati	0.0341 Acres	Nil	0.0341 Acres	Nil
Apahlamukh	0.3188 Acres	Nil	0.3188 Acres	Nil

The estimated no. of PAPs/squatters whoare likely to be impacted are 13 in the three priority sub-projects. The RAP-cum-IPDP will provide a detailed assessment of the no. of PAPs affected and the type of losses incurred due to the project.

2.1. Relevant Policies and Social Legislations

Relevant GoI and GoA rules and regulations and applicable World Bank policies on social safeguard triggered under the project are listed below:

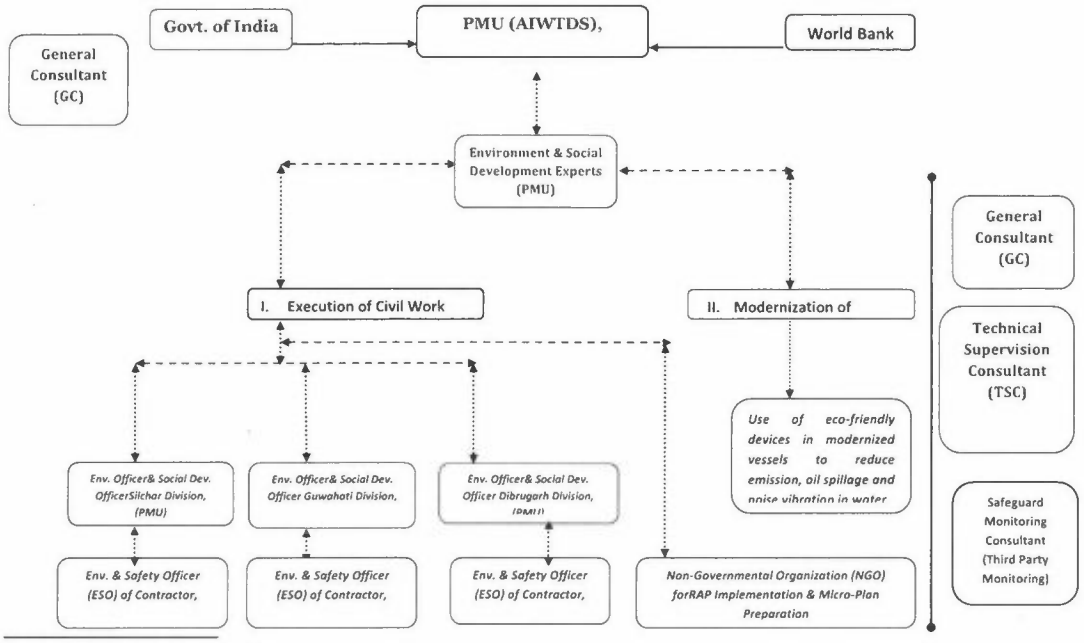
World Bank Policies on Social Safeguard	GoI&GoA Rules and Regulations
OP/BP 4.12: Involuntary Resettlement OP/BP 4.10: Indigenous People OP/BP 4.11: Physical Cultural Resources ESSE Note on Adverse impacts of labour influx	RFCTLAR&R Act, 2013. Assam Right to Fair Compensation and Transparent Land Acquisition and Rehabilitation and Resettlement (RFCTLAR&R) Rules 2015.

3.1. Implementation Arrangement for Social Management at PMU

The project implementation will be led by the Project Management Unit (PMU), established within AIWTDS. The State Project Director (PD) will be the Head of the PMU and he will be assisted by an Additional State Project Director and a Deputy Director to discharge the functions of the PMU. The Social Development Specialist at PMU will be responsible for overall coordination and monitoring of the implementation of social safeguard instruments-SMF/RPF/IPDF and sub-project SMP/RAP cum IPDP. The PMU will monitor the activities of the social specialist at the Divisional office (E.&S Cell) in-charge of coordinating the field level activities related to the implementation of the SMP/RAP cum IPDP, with the assistance from a RAP Implementation Agency (supporting NGO), deployed for the purpose.

Organogram:

Flow Chart - B: Institutional Arrangements for Environmental & Social Safeguards Management [1]



[1] Flow Chart- --- to be followed for GRM procedure

4.1. Capacity Building Strategies

Capacity development and training is critical for successful implementation of the Project. All capacity building and training initiatives needs to secure social and economic advantages from improved operations, enhancing the quality of service to IWT users, and lastly, promoting decent work and sustainable jobs. In order to increase the competency of the IWT staff and vessel crew, ISBP prescribes an approach for capacity development and a three-year training plan for the IWT sector. In line with the identified approach, the AIWTDS will undertake: Upgrading of curriculum followed by the Crew Training Centre (CTC) to include certain aspects of social management and safeguards: such as GRM including RTI, labour standard compliance including HR policies, safety and security of women users (including gender sensitization), disaster management, and passenger services for differently abled, senior citizens, women and children. Develop training calendar and modules for land acquisition and R&R process, grievance redressal and livelihood restoration for AIWTDS staff, supporting NGOs and other officials linked to these activities etc.

5.1. Citizen Engagement

Citizen Engagement Plan aims to operate through suggestive measures /consultations with the community, especially the users of the IWT. Hence, it is important to understand the scope and purpose of the citizen engagement process. It helps to:

- Identify or prioritise the needs of the community at the planning stage itself which can be integrated into the project design.
- Inform the design of the engagement mechanism through an understanding of interests, incentives, and objectives of key stakeholders.
- Inform the decision-making or service delivery needs of the community
- Develop new or collaborative ways of implementing elements of the project
- Review progress on the project, through **feedback mechanisms**.

During the project preparation, consultations were carried out with all significant stakeholder groups including the project affected persons (PAP). Stakeholder Mapping has been done to list the key stakeholders, and project details were explained to them and their feedback recorded in such consultations which gives several valuable suggestions for the project design. KII and Focus Group Discussions were organised in all the Ghat areas with different social groups including indigenous people, women, livelihood groups, elected representatives and officials in the villages, and ferry operators. Several valid suggestions obtained from these PAPs were incorporated in the draft framework (SMF, RPF, IPDF) and the site-specific plans (SMP, RAP cum IPDP).The revised documents will be disclosed at a place accessible to displaced persons and other stakeholders in a form, manner, and language that are understandable to them. Details of consultation held with various stakeholders detailed in ***Attachment-2***.

5.2. Community Monitoring of Incentivisation Scheme for Improvement of Country Boat Services (Jibondinga Scheme)

As per the proposed scheme, a vigilance body comprising of AIWT staff *(Jalsarathis)* or volunteers from local communities in the villages at each Jetty/Ghat will monitor the implementation of the Jibondinga scheme. The vigilance body will also monitor compliance to Standard Operating Procedures (SOPs) for ferry terminals to ensure convenience, safety and security of passengers, particularly women. They will report any incident or non-compliance of Scheme/SOP related to safety of passengers or use of any boat not compliant to safety standards as specified by nodal agency at respective jetty/ghat.The members from local communities will also be trained and deployed to act as search & rescue team personnel, if required.

5.3. Citizen's charter

The 'Citizens Charter' published at the website of AIWTD will be appropriately revised to ensure that the charter reflects the organisation's commitment towards its citizen with regard to the standard of service, participation, inclusion, grievance redressal, transparency and accountability in the AIWT sector.

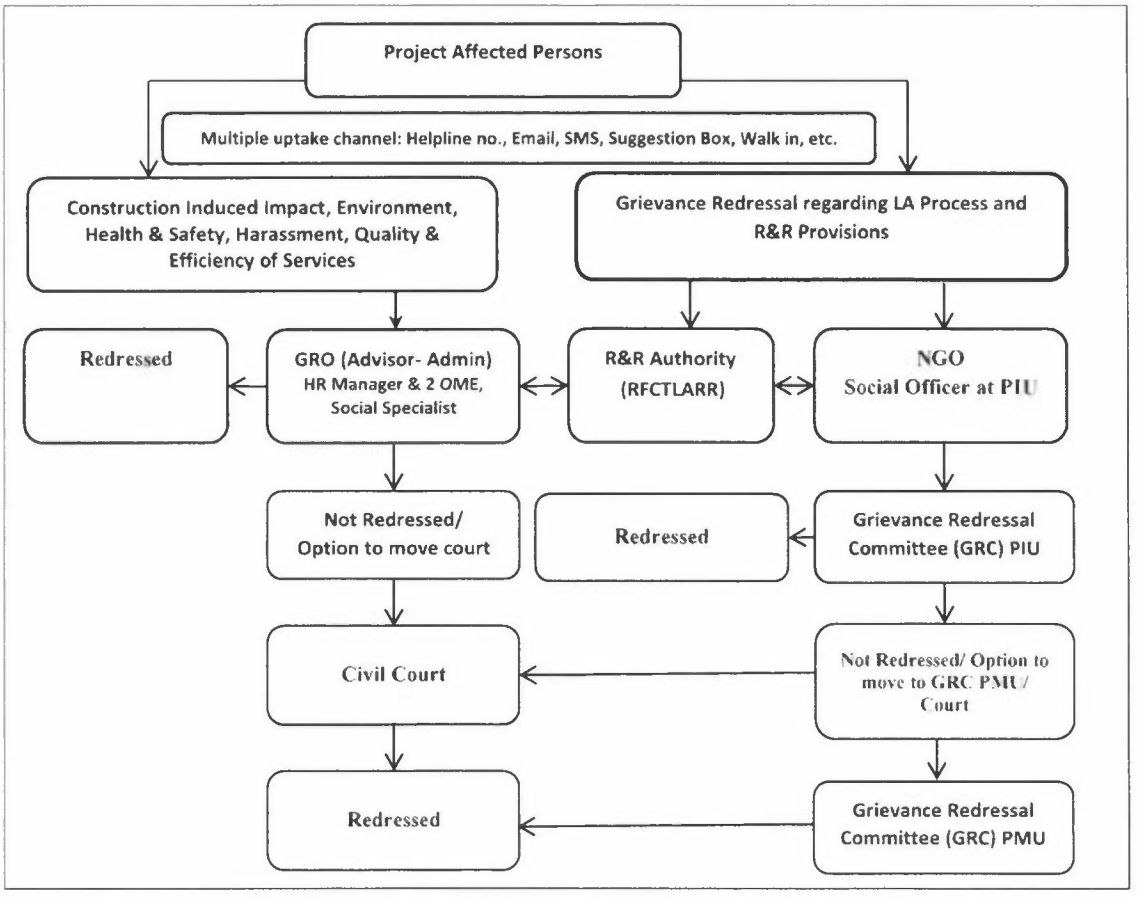
5.4. Grievance Redress Mechanism (GRM)

Complaints can be registered through multiple grievance uptake channels, such as a dedicated helpline, email, by letter to the GRCs (a divisional level or upper level GRC) or walk-ins and registering a complaint on grievance logbook to be provided at each project site/ghat or suggestion box. There will be specific procedures for Gender Based Violence (GBV) including confidential reporting with safe and ethical documenting of GBV cases. An SOP/Guidebook will be developed which will lay down procedures for handling grievances in a timely and effective manner.

A divisional level Grievance Redressal Committee (GRC) will be set up to resolve the complaints from the field. The GRC will comprise of Divisional Executive Engineer; Additional Deputy Commissioner of concerned district; Social Officer-PIU, representatives of the concerned Village Panchayat/Council President or his/her authorised representative and supporting NGOs for implementing the RAP. Grievances of PAPs in writing will either be brought to GRC for redressal by the supporting NGO or through multiple uptake channels. The GRC will respond to the grievance within 7 days. Grievances brought to the GRC shall be redressed within a period of one month (30 days) from the date of receipt of grievance. The decision of the GRC will not be binding to PAPs i.e., decision of the GRC does not debar PAPs taking recourse to court of law.

Petitioners who wish to submit an appeal to the higher authorities can directly appeal to the GRC at the PMU, which will comprise of the Project Director, Advisor (Administration),Social Development Specialist, member of the Assam IWT Regulatory Authority, representative from the Revenue Department and a recognised NGO. On receiving the complaint, the Advisor (Administration),designated as the Officer in charge of GRM at the PMU will issue an acknowledgement to the petitioner within 7 days. The case will be disposed by the PMU within 30 days of receiving the complaint. Details of the resolved cases will be documented and published on the website.

As per the provisions of the Assam Right to Fair Compensation and Transparency in Land Acquisition Resettlement and Rehabilitation Rules 2015 (Section 45) the state Government will designate a Rehabilitation & Resettlement Authority to handle the disputes related to the payment of compensation for L.A and R&R issues.



6.1. Gender Development Strategy

The Gender Development Strategy for the project will ensure social inclusion, by providing women with an enabling environment to exercise their rights and equal access to opportunities and resources within the project. Inclusive and effective transport development can only be achieved if these gender differences in demand and impact are properly identified and addressed.

6.1.2. Gender Based Violence (GBV)

There are increasing instances of domestic violence and sexual assault/ harassment in the state of Assam. As per NCRB 2016, Assam has reported the highest crime rate under Section 498A 'Cruelty by Husband or His Relatives' (58.7%). Women also report feeling unsafe in public spaces, further reducing their mobility. As per the study conducted by the Centre for Urban Equity, women in Guwahati listed - general harassment by co-passengers, driver or conductor (47 %), eve-teasing (10 %), and stalking (7 %), as major constraints to use of public

transportation. Assam is also a major source and transit point for human trafficking, accounting for 21.7 per cent of all cases relating to human trafficking recorded across the country (NCRB 2015).

The SIA studies revealed that most IWT terminals and vessels had limited seating; while waiting areas were mostly overcrowded. Few, if any had clean toilets or drinking water facility. Potential for sexual harassment of women and girls on IWT can be addressed by limiting overcrowding, providing sufficient seats and well-lit spaces. A Gender Action Plan has been prepared to address these challenges through a set of activities, specifying the roles of different implementing agencies, including indicators to track its progress. Some of the key activities are:

- To encourage women's economic participation and mobility, certain measures such as proper approach road to the terminals, ramps for differently-abled, old and infirm, toilet facilities, adequate seating, dedicated facilities for patients/nursing mothers, storage, convenient boat operating schedules and pricing regulations, among others will be incorporated in the project design.
- In addition to deployment of a security personnel at every terminal, dedicated project helpline no. and state-run women helpline nos. will be displayed at the terminals & ferries.
- Regular user satisfaction survey will be conducted to evaluate how passengers, particularly women and girls experience IWT travel in terms of their safety, security and convenience.
- The upgraded GRM system for AIWT project will have specific procedures for GBV, including confidential reporting with safe and ethical documenting of GBV cases. Parallel GRM outside of the project GRM may be warranted for substantial to high risk situations.
- To address sexual harassment at the workplace, Internal Complaints Committees will be established, capacity building and awareness will be generated at the PIUs, PMUs and among contractors as per the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013.

7.1. Indigenous People Development Framework

The IPDF is intended to guide selection and preparation of subprojects under this project where impacts on ST are identified. The framework is prepared in accordance with the WB's OP/BP 4.10 on IP. The main objective of IPDF will be to ensure that the project activities do not adversely affect ST, and that they receive culturally compatible social and economic benefits. The framework will be applied, and the focus will be to carefully select and screen all subprojects and their locations and sites, to determine whether ST are present in the subproject area, and also to ensure their participation in the civil works selection and implementation processes. The screening of the ST will be undertaken with the help of the community leaders and local authorities. If the results of the screening indicate the presence of ST households in the zone of influence of the proposed subproject, a social impact assessment and IPDP will be undertaken for those areas. While conducting the SIA studies and preparing site-specific IPDPs for prioritised terminals (Phase- 1 and 2) under the project the following strategies will be adopted to avoid, mitigate or minimise adverse risks to the affected tribal communities within the project:

Stages	Procedures	Activities & Outcome
Preparation	• Identify concerns/issues in relation to the project activities through Participatory Rural Appraisal (PRA) exercises	• Preparation of a list of issues during the social screening and scoping process
	• Communicate with Autonomous District Councils/Gaon Panchayat to carry out Free, Prior, Informed Consultation at the village level	• Information dissemination on the project and brief account of project implementation plans and framework held on February 7th
	• Organize consultation with STs to inform about the project activities and benefits	• Stakeholders' consultations and FGDs held at Majuli during the SIA.
	• Identify key areas of constraints that may be improved through the project and develop detailed plan for tribal development	• List areas of constraints • Number of consultations & signed minutes • Prepare a site specific IPDP listing risks and mitigation measures specifically targeting tribal development
Implementation	• One-time additional financial assistance of Rs. 50,000 to SC/ST PAFs who are displaced and require to relocate due to the project.	• List the no. of PAFs accruing the benefit.
	• Employment to members from tribal community in carrying out actual construction work	• Number of STs employed
Operation	• Improvement of terminals and ferry services to attract and promote tourism • Free Prior and Informed Consultation with the tribal communities.	• % of tourists visiting historic sites, areas, museums, other heritage attractions using the ferry
	• Capacity building of ST/SC and other vulnerable groups, and skill up-gradation for institutional strengthening. •	• Training calendar to be prepared • Number of trainings undertaken • Number of tribal members trained
	• Employment generation for ST in related sub project activities	• Number of ST employed undertaking various activities under the project
	• Help build linkages with major government schemes for skill enhancement and improvement of ferry services (Jibondinga scheme).	• Number of STs that have availed the Jibondinga scheme or similar incentivization schemes.

Stages	Procedures	Activities & Outcome
GRM	• Including a member of the ADC in the sixth schedule area in the GRC, to address R&R and land related disputes.	• Number of grievances brought forward in ST areas and addressed.

7.1.2. GRM for IPP

The grievance redress mechanism will be the same as mentioned in the main chapter, with an additional emphasis to include a member of the Autonomous District Council in the GRC for project investments in the sixth scheduled areas.

8.1. Resettlement Policy Framework (RPF)

The main purpose of the RPF is to clarify resettlement principles, eligibility criteria, compensation entitlements, and organizational arrangements for land acquisition, asset loss, and resettlement of people that may be necessary during project implementation.

The RPF has been prepared for construction of terminals and ancillary infrastructure such as road access, terminal buildings and other amenities for differently abled, women, children, old and infirm (Component 3).

5 priority terminals have been identified under Component 3(a) of the project. Site identification and planning for 3 priority terminals at Lachit, North Guwahati and Aphlamukh is completed. The remaining two priority sites, namely Kamlabari and Neamati are still under consideration for finalization and planning of design at initial stage. The location of other terminal sites under Component 3 (b) which will be undertaken during phase two of the project are yet to be identified.A consolidated RAP-cum-IPDP with full details of all affected people for 3 priority terminals (Lachit, North Guwahati and Aphlamukh) have been prepared. The purpose of the RPF, therefore, is to clarify resettlement principles and compensation, as well as organizational arrangements, to be applied for proposed sub-projects financed during phase two of the project. As per the provisions of the RFCTLARR Act, 2013, State Revenue Department will oversee the LA and R&R process for any private land to be acquired under the project.

8.1.2. Objective of RPF

In accordance with the World Bank Operational Policy on Involuntary Resettlement (OP 4.12) and relevant central and state laws (RFCTLARR, 2013 and Assam LARR Rule, 2015), the RPF has been prepared with the objective to:

- Avoid or minimize adverse impacts and to conceive and execute resettlement activities for sustainable development of the project.
- Give affected person's opportunities to participate in the design and implementation of resettlement process.
- Assist affected persons in their efforts to improve their livelihoods and standards of living, or at least to restore these to pre-project levels.
- Develop Indigenous Peoples' Development plan along with RAP. Land for land for is an option across all sectors.

8.2. Entitlement Matrix

The entitlement framework designed for various categories is based on RFCTLARR 2013 and RTFCTLARR Rules, 2015 of GoA and World Bank Policy guidelines. Both, non-titleholders and titleholder will be compensated as per their eligibility and detailed in the entitlement matrix summarised below:

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
PART I. TITLE HOLDERS - Compensation for Loss of Private Property				
1	Loss of Land (agricultural, homestead, commercial or otherwise or assets attached to the land)	1.1	Compensation for land at Replacement Cost or Land for land, where feasible.	Land will be acquired by the competent authority in accordance with the provisions of RFCTLARR Act, 2013. Replacement cost for land will be: (i) market value as per Indian Stamp Act, 1899 for the registration of sale deed or agreements to sell, in the area where land is situated; or (ii) average sale price for similar type of land, situated in the nearest village or nearest vicinity area, ascertained from the highest 50% of sale deeds of the preceding 3 years; or (iii) consented amount paid for PPPs or private companies (whichever amount is higher). Plus 100% solatium and 12% interest from date of notification to award. The multiplied factor adopted by the GoA for land in rural area, based on the distance from urban area to the affected area, will be applied. In case only a part of any land plot is affected and its owner desires that the whole plot be acquired on the grounds that the plot has been rendered uneconomic or has been severed due to LA, the competent authority any make additional award as per section 94 of RFCT-LARR Act, 2013 for the remaining part of

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
				land without initiating the land acquisition process afresh. Value of Assets attached to the land/building: Compensation for trees/crops etc. a. Cash compensation as estimated u/s 29 (3), RFCT-LARR Act, 2013 by: i. Forest Department for timber trees ii. State Agriculture Department for crops iii. Horticulture Department for horticulture, perennial trees iv. Cash assistance to title holders and non-squatters for loss of trees, crops and perennials at market value. b. Three months' advance notice to affected parties to harvest fruits, crops. In case standing crops, the affected parties shall receive three months' advance notice to salvage crops, or compensation in lieu thereof as determined above.
2	Loss of Structure (house, shop, building or immovable property)	2.1	Compensation at replacement cost	The market value of structures and other immovable properties will be determined based on relevant basic Schedule of Rates (SR) as on date without depreciation. Plus 100% solatium For partly affected structures, the PAP will have the option of claiming compensation for the entire structure, if the remaining portion is unviable.
PART II. REHABILITATION AND RESETTLEMENT – Both Land Owners and Families Whose livelihoods are primarily dependent on Land Acquired				
3	Loss of Land	3.1	Employment to at least one member per affected family in the project or arrange for a job in such other project as may be	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
			required after providing suitable training and skill development in the required field and at a rate not lower than the minimum wages. or One-time payment of Rs. 5,00,000/- for each affected household or Annuity policy that shall pay Rs. 2000/- per month for 20 years with appropriate indexation to CPIAL	
		3.2	Subsistence allowance of Rs. 3,000/- per month for a period of one year to affected households who require to relocate due to the project	
		3.3	Transportation assistance of Rs. 50,000/- for affected households who require to relocate due to the project	
		3.4	One-time assistance of not less than Rs. 25,000/- to all those who lose a cattle shed or a petty shop.	Cattle shed or petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of twenty-five thousand rupees for construction of cattle shed or petty shop as the case may be. Petty shop will include commercial kiosk, vendor where business is carried out. PIU and the implementation support

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
				NGO / agency will consult such PAPs and assess the requirement of subsistence allowance for kiosks and vendors receiving this cash assistance under the petty shop category. Cattle shed shall mean any permanent, semi-permanent structure or makeshift shed erected on long term basis for keeping cattle.
		3.5	One-time Resettlement Allowance of Rs. 50,000/- for affected household who have to relocate	
		3.6	Additional one-time assistance of Rs. 50,000/- for scheduled caste and scheduled tribe families who are displaced from scheduled areas and are required to relocate due to the project	
4	Loss of Residence	4.1	An alternative house for those who have to relocate, as per PMAY-G specifications in rural areas and a constructed house/flat of minimum 50 sq. m. in urban areas; or Cash in lieu of house if opted, for those who do not have any homestead land and who have been residing in the affected area continuously for a minimum period of 3-years.	An alternative house for those who have to relocate, as per PMAY-G (*IAY has been restructured*) specifications in rural areas and a constructed house / flat of minimum 50 sq. m. in urban areas or cash in lieu of house if opted (the cash in lieu of house will be Rs.1,20,000/- (plain) and 1,30,000/- (difficult terrain) in line with GoI PMAY-G standards in rural areas and Rs.1,50,000 in case of urban areas). The benefits listed above shall also be extended to any affected family which is without homestead land and which has been residing in the area continuously for a period of not less than three years preceding the date of notification of the affected area and which has been involuntarily

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
				displaces from such area. This assistance shall be extendable to mixed-use structures fulfilling residential and commercial purposes in owner as well as un-titled categories.
		4.2	Employment to at least one member per affected family in the project or arrange for a job in such other project as may be required after providing suitable training and skill development in the required field and at a rate not lower than the minimum wages. or One-time payment of Rs. 5,00,000/- for each affected household or Annuity policy that shall pay Rs. 2000/- per month for 20 years with appropriate indexation to CPIAL	
		4.3	Monthly subsistence allowance of Rs. 3,000/- per month for a period of one year to affected households who require to relocate due to the project	
		4.4	Transportation assistance of Rs. 50,000/- for affected households who require to relocate due to the project	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
		4.5	One-time assistance of not less than Rs. 25,000/- to all those who lose a cattle shed or a petty shop.	Cattle shed or petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of twenty-five thousand rupees for construction of cattle shed or petty shop as the case may be. Petty shop will include commercial kiosk, vendor where business is carried out. PIU and the implementation support NGO / agency will consult such PAPs and assess the requirement of subsistence allowance for kiosks and vendors receiving this cash assistance under the petty shop category. Cattle shed shall mean any permanent, semi-permanent structure or makeshift shed erected on long term basis for keeping cattle.
		4.6	One-time assistance of Rs. 25,000/- for each affected family of an artisan or self-employed and who has to relocate	
		4.7	One-time Resettlement Allowance of Rs. 50,000/- for affected household who have to relocate	
		4.8	Additional one-time assistance of Rs. 50,000/- to scheduled caste and scheduled tribe families who are displaced from scheduled areas and are required to relocate due to the project	
		4.9	Right to salvage affected materials	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
5	Loss of shop/ trade/ commercial structure	5.1	Employment to at least one member per affected family in the project or arrange for a job in such other project as may be required after providing suitable training and skill development in the required field and at a rate not lower than the minimum wages. or One-time payment of Rs.5,00,000/- for each affected household or Annuity policy that shall pay Rs. 2000/- per month for 20 years with appropriate indexation to CPIAL	
		5.2	Monthly subsistence allowance of Rs. 3,000/- per month for a period of one year to affected households who require to relocate due to the project	
		5.3	Transportation assistance of Rs. 50,000/- for affected households who are required to relocate due to the project.	
		5.4	One-time assistance of Rs. 25,000/- for each affected family of an artisan or self-employed or small trader and who has to relocate.	
		5.5	One-time Resettlement Allowance of Rs.	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
			50,000/- for affected household who have to relocate	
		5.6	Additional onetime assistance of Rs. 50,000/- to scheduled caste and scheduled tribe families who are displaced from scheduled areas and who require to relocate due to the project	
		5.7	Right to salvage affected materials	
PART III. IMPACT TO SQUATTERS AND ENCROACHERS – Those in the Right of Way where no Land Acquisition is done				
6	Impact to Squatters	6.1 6.1.1	**Loss of House** Compensation at scheduled rates without depreciation for structure with 1-month notice to demolish the affected structure	Only those directly affected squatters who live there will be eligible for all assistance. Structure owners in government lands who do not live there and have rented out the structure will be provided compensation for structure and no other assistance will be provided to them. The occupier (squatter-tenant) will be eligible for other assistances.
		6.1.2	Right to salvage the affected materials	
		6.1.3	House construction grant of Rs. 1,20,000/- for all those who have to relocate and who do not have a house. Additional house site grant of Rs. 50,000/- to those who do not have a house site	
		6.1.4	One-time subsistence allowance of Rs. 18,000/-	
		6.1.5	Shifting assistance of Rs. 10,000/-	
		6.2 6.2.1	**Loss of Shop** Compensation at scheduled rates without depreciation for structure with 1-month notice to demolish affected structure	Only those directly affected squatters who do business there will be eligible for all assistance. Structure owners in government land who do not do the business and have rented out the structure will be provided compensation for structure
		6.2.2	Right to salvage the	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
			affected materials	and no other assistance will be provided to them. The occupier (squatter-tenant) will be eligible for other assistances.
		6.2.3	One-time rehabilitation grant of Rs. 25,000 for reconstruction of affected shop.	
		6.2.4	One-time subsistence allowance of Rs. 18,000/-	
		6.2.5	Shifting assistance of Rs. 10,000/-	
		6.3 6.3.1	**Kiosks / Street Vendors** 1-month advance notice to relocate to nearby place for continuance of economic activity.	Petty shop will include commercial kiosk, vendor where business is carried out. Petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of twenty-five thousand rupees for construction of petty shop. PIU and the implementation support NGO / agency will consult such PAPs and assess the requirement of subsistence allowance for kiosks and vendors receiving the cash assistance under the petty shop category.
		6.3.2	For temporary loss of livelihood during construction period, a monthly subsistence allowance of Rs. 3,000/- will be paid for the duration of disruption to livelihood, but not exceeding 3-months	
		6.3.3	If relocation to nearby place and continuance of economic activity in the same place is not possible, then one time rehabilitation grant of Rs. 25, 000/-.	
		6.4 6.4.1	**Cultivation** 3-month notice to harvest standing crops or market value of compensation for standing crops	
7	Impact to Encroachers	7.1 7.1.1	**Cultivation** 3-month notice to harvest standing crops or market value of compensation for standing crops, if notice is not given	Market value for the loss of standing crops will be decided by the PIU in consultation with the Agriculture or Horticulture Department
		7.2 7.2.1	**Structure** 1-month notice to demolish the encroached structure	
		7.2.2	Compensation at	The value of commercial structures

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
			scheduled rates without depreciation for the affected portion of the structure	and other immovable properties will be determined on the basis of relevant Basic Schedule of Rates (SR) as on date without depreciation
PART IV. IMPACT TO VULNERABLE HOUSEHOLDS				
8	Vulnerable Households	8.1	One-time assistance of Rs. 25,000/- to DHs who have to relocate	One adult member of the affected household, whose livelihood is affected, will be entitled for skill development. The PIU with support from the NGO will identify the number of eligible vulnerable displaced persons during joint verification and updating of the **RAP** and will conduct training need assessment in consultations with the PAPs so as to develop appropriate training programmes suitable to the PAP's skill and the region. Suitable trainers or local resources will be identified by PIU and NGO in consultation with relevant training institutes
PART V. IMPACT DURING CIVIL WORKS				
9	Impact to structure / assets / tree / crops	9.1	The contractor is liable to pay damages to assets / trees / crops in private / public land, caused due to civil works	The PIU will ensure compliance to these provisions.
10	Use of Private Land	10.1	The contractor should obtain prior written consent from the land owner and pay mutually agreed rental for use of private land for storage of material or movement of vehicles and machinery or setting up of camps or diversion of docking areas during civil works.	
PART VI. COMMON PROPERTY RESOURCES				
11	Impact to common property resources	11.1	Relocation or restoration, if feasible, or cash	

Sl. No.	Impact Category	Entitlements		Implementation Guidelines
	such as places of worship, community buildings, schools, etc.		compensation at replacement cost.	
12	Utilities such as water supply, electricity, etc.	12.1	Will be relocated and services restored prior to commencement of civil works.	The PIU will ensure that utilities are relocated prior to commencement of civil works in accordance with the civil works schedule.
PART VII. UNFORESEEN IMPACTS				
Unforeseen impacts encountered during implementation will be addressed in accordance with the principles of RFCTLAR 2013 / World Bank Safeguards Policies.				

8.2.1. Implementation Process and Arrangements:

The implementation of RAP is the responsibility of the AIWTDS along with the Revenue Department (in case of private land acquisition). A Social Development Specialist at PMU will be responsible for overall coordination of the implementation of SMP/RAP. The Social Specialist at the E&S Cell, PIU at the divisional level will coordinate the field level activities with the support of an NGO (RAP implementation agency).

8.2.2. Rehabilitation and Resettlement Award:

In accordance with the provisions of the RFCTLARR Act [Sec31 (1)], the competent authority will pass a Rehabilitation and Resettlement (R&R) Award. All the affected titleholders who are eligible for R&R assistance will be notified along with details of eligible assistance as per the provisions of RFCTLARR Act. Initially a draft list will be notified by giving minimum of 15 days' time inviting objections, if any, regarding discrepancies on the nature and quantum of assistance. The final list will be notified after taking into account the objections, if any. Similarly, the list of those affected non- title holders will also be notified along with the details of R&R assistance and a separate R&R award enquiry will be conducted for the non-titleholders. Non-title holders who settle in the affected areas after the cut-off date (start date of the project census survey) will not be eligible for compensation. They will however be given sufficient advance notice (60 days) to vacate the premises and dismantle affected structures prior to project implementation.

8.2.3. Micro plan:

The implementation support NGO will prepare the draft micro plan, milestone wise for each of the sub-project detailing the type of loss, tenure of the PAP, vulnerability status and the entitlements as per the provisions of the Entitlement Matrix (EM) in the RPF. The draft micro plan will be disclosed in the jurisdictional village panchayat where the PAPs are living/having business, and 1-week after the disclosure, the R&R award enquiry will be held by the jurisdictional Additional Collector (R&R Administrator).

Based on the R&R award enquiry outcome, the NGO will submit the final micro plan to the Executive Engineer, PIU for verification and onward transmission to Project Director, PMU. The Project Director, PMU, after scrutiny of the micro plan will accord approval for the same and submit to the jurisdictional Additional Collector (R&R Administrator) with necessary funds for disbursement.

8.2.4. R&R Award Process

The Additional Collector (R&R Administrator) will hold R&R award enquiry in the project area and will send prior intimation to all concerned PAPs through the jurisdictional Patwaris and the NGO.

During the R&R award enquiry, each PAP will be informed about the type of loss and tenure as recorded during census and socio-economic survey and verified subsequently, and the entitlements due to the PAP as per the provisions contained in the Entitlement Matrix of the RPF. All the PAPs will be given an opportunity to be heard and concerns if any, will be addressed. The R&R proceedings will be recorded and copy of the R&R award will be issued to the PAP then and there.

8.2.5. Livelihood Restoration and Income Generation Plan

Majority of the eligible families for income restoration earn their livelihood through petty businesses and agricultural activities (marginal/small) therefore, it is imperative to ensure that the PAPs can reconstruct their livelihood. The NGOs engaged in the implementation of the RAP will ensure that the PAPs are facilitated to obtain plots near their existing habitation to minimize disruption to their social network and normal work pattern, wherever possible.

Other short-term strategies for restoring their income during periods immediately before and after relocation/vacating includes providing the PAPs with adequate compensation prior to relocation/vacating the premises, along with transit allowances, one-time relocation allowance, free transport to resettlement areas or assistance for transport, transitional/subsistence allowances or grants until adequate income is generated, special allowances for vulnerable groups. With consideration of PAPs skills and the project's workforce requirement, PAPs access to project-related employment opportunities will be encouraged.

The PAPs are required to participate in developing feasible long- term income generating strategies. The long- term options are expected to be developed during the implementation of the RAP and supported by the government assistance. Central andAssam state government runs various poverty alleviation and livelihood programmes. Partnering NGO can facilitate PAPs to participate in these programmes as per their choices and skill requirement.

9.1. Monitoring and Evaluation Framework:

The social development specialist at the PMU is responsible for overall monitoring of social safeguards, with the assistance of the General Consultant during preparation and Technical Supervision Consultant at the construction phase. Internal monitoring and supervision of the

project activities will be done by the General Consultant, at the time of implementation of the Project, to ensure that the set milestones of the project are met with and in line with the requirements of the SMF/RPF/IPDF and sub-project specific RAP/IPDP.
The PMU will carry out concurrent monitoring of RAP implementation through the PIU and prepare monthly and quarterly progress report in terms of physical and financial progress. Additionally, the monitoring process will also look at: grievance management; public consultation and information dissemination to PAPs on benefits; income restoration activities, community monitoring of the Jibondinga Scheme and compliance of safety measures; citizen engagement to assess users' satisfaction; labour standard compliance of all physical investments; training and capacity building; prevention of GBV and gender mainstreaming. The subsequent calendar month. The progress report will be reviewed by the PMU and feedback if any, will be communicated to PIU for immediate action. PMU will conduct periodic site visits to identify potential challenges faced in the project implementation and provide support to take timely corrective measures, if needed.

A third party monitoring will be carried out on a quarterly basis to review social and environmental safeguard activities being implemented in the project, and provide specific recommendations to mitigate the issues identified during the review period.

10.1. Labour Standard Compliance and Labour Influx Mitigation Framework:

The influx of workers and followers can lead to adverse social and environmental impacts on local communities, especially if the communities are rural, remote or small. However, the current project for development of IWT involves both rural and urban areas of Assam. While some Ghats are in typical urban centres like Guwahati and Jorhat, others are located in remote rural settings of Majuli. Furthermore, IWT services offers one of the most important modes of connectivity for multiple sections of population, especially in rural areas.

Based on this assessment, potential adverse impacts of labour influx have been enumerated below: -

- Labour influx may influence the demographic composition of the existing mass of population in riparian areas, where there already seems to be a decline of man-land ratio, shortage of food, settlement pattern, and ethnic differences.
- Increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers. SIA of three priority sites indicated low capacity of the community to manage and absorb the incoming labour force. This is particularly relevant for Assam, as it already deals with such risk from cross border and interstate migration.
- Bearing in mind the present socio-political environment, temporary labour influx due to the project may amplify social conflicts between the local community and the construction migrant workers.
- Project may result in increased rates of illicit behaviour and harassment, which is a real threat for Assam where incidence of crime against women is reportedly high.
- SIA of three priority sites revealed that the project will directly impact the livelihood of affected families who earn their living through petty businesses and agricultural activities

(marginal/small) in the project area. It is therefore imperative to ensure that the PAPs can reconstruct their livelihood. The temporary labour influx may increase competition for jobs and have an impact on wage distribution.

10.1.2.Recommended Mitigating Measures

- The contractor is responsible for recruitment of labourers for construction work. Specifications on employment of local workforce including women should be reflected in the civil works bidding documents and subsequent contracts to ensure that the contractors fulfil these commitments. Locals including women may be screened further for skills, and adequate orientations can be provided to recruit for the work. AIWTDS can prepare a roster of interested workers and their skills. The lists can be provided to contractors at the pre-bid meetings for recruitment consideration.
- The project contractor needs to prepare a site-specific Labour Influx Management Plan and/or a Workers' Camp Management Plan. This plan will include specific measures that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, grievance redressal, skills development, training programs and awareness generation on HIV/AIDS and gender-based violence (GBV) for the workers and host community. A Workers' Camp Management Plan will also address specific aspects of the establishment and operation of the workers' camps in compliance with relevant labour laws. The plan should include appropriate screening and monitoring mechanisms for addressing non-compliance.
- Adequate measures will be taken to ensure safety and security of women within the community and at the construction site. A security personnel will be deployed at the construction sites, and emergency nos. including contact details of local law enforcement officers, project's helpline no., existing state-run women helpline nos. will be prominently displayed at the site. The contractors will ensure that an Internal Complaints Committee (ICC) for each establishment is set-up to meet their corporate requirement and legal mandate under the Sexual Harassment at the Workplace Act, 2013.
- Welfare measures, such as canteens, first–aid facilities, creche, ambulance, housing accommodations for workers near the work place, as per the Building and Other Construction Workers (regulation of employment and conditions of service) act, 1996 is the contractor's responsibility.
- Awareness camps on HIV/AIDS and GBV for both, construction workers and neighbouring villages must be organised at regular intervals by NGOs.
- PMU must prepare and disseminate IEC materials on labour welfare and compliance.

11.1. Budgetary Allocation

The estimated budget is about INR173millionwhich covers institutional cost, awareness program and training, grievance redressal mechanism, compensation for land, structure, and other assets and resettlement and rehabilitation assistances, etc.

EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT

MAY 2019

1. Background

Governments of Assam intend to upgrade the existing Inland water transport system in state. To modernize and transform IWT in Assam, the World Bank is assisting the GoA through a phase-wise project which includes up gradation of ferry Infrastructure, last mile connectivity. Fleet modernization, institutional capacity development etc. for total 11 identified Terminal / Jetty / Landing point locations. However, in phase-I, three ghats/ landing points have been selected. The project includes civil works along with new construction activity; for which it has been categorized as Environment Category-A according to World Bank classifications.

Project development / civil intervention works during development may have interface with various physical, social and biological components of the environment, i.e. water quality, aquatic and terrestrial flora & fauna, air quality, noise levels, soil, project affected families, persons, cultural and historical monuments etc. at all project development stages. All these environmental& social components may get affected due to development and operation of the terminals and a detailed environment and social impact assessment has been carried out toassess all the potential impacts of the project.

2. Project Description

Project Development Objective (PDO)

The Project's Development Objectives are to (a) improve passenger ferry infrastructure and services in Assam, and (b) to improve the institutional capacity and framework. The Project has three main components and intended to tackle the regulatory, operational and infrastructure challenges of the sector. The three main components are:

1. Institutional, regulatory and safety strengthening (estimated cost USD 20 million). This component will include:

a) Technical assistance: sector planning, design and roll-out of new Regulatory Authority, business planning for Assam Shipping Company and Assam Ports Company; training of staff to fulfill new roles in the restructured industry (USD 8 million);

b) Safety management: river navigation aids, night navigation technology on some routes, and emergency response system (policy, procedures, vessel and equipment) (USD 12 million).

2. Fleet safety improvements and modernization (estimated cost USD 25 million). This will include financing of:

a) GoA incentive scheme (known as Jibondinga) to assist industry transition to the new regulatory regime; it is designed to support the scrapping and replacement of unsafe or obsolete private vessels and replace them with new vessels, or retrofit existing but acceptable vessels with modern marine engines and safety equipment

b) Procurement of new vessels

3. Improvement in terminal infrastructure (estimated cost USD 105 million). This will finance:

c) Provision of priority terminals for the Guwahati and Majuli Island ferry routes (USD 70 million); and

d) Provision of terminals on several other mainly rural routes, to be selected (USD 35 million).

The project components in 1st phase are summarized below-

Project Component	Sub Component	Physical Investments planned
Component1:	a. Technical assistance: sector planning,	Up-gradation of crew

Project Component	Sub Component	Physical Investments planned
Institutional, regulatory and safety strengthening	design and roll-out of new Regulatory Authority, business planning for Assam Shipping Company and Assam Ports Company; training of staff	training centre
	b. Safety management: river navigation aids, night navigation technology on some routes, and emergency response system (policy, procedures, vessel and equipment)	
Component 2: Fleet safety improvements and modernization	a. GoA incentive scheme (known as Jibondinga) to assist for up-gradation of country boats	Vessel improvement works for private boat operator (engine, hull etc.)
	b. Procurement of new vessels and retrofitting of existing public vessels	• Procurement of 20 new vessels • Retrofitting of few govt. vessels
Component 3: Improvement in terminal infrastructure	a. Infrastructure Development of terminals at Guwahati and Majuli Island ferry routes	• 2 terminals at Guwahati (Gateway Guwahati Ghat and North Guwahati) • 1 terminal at Majuli (Aphalamukh)
	b. Development of terminals on several other rural routes, to be selected	---

3. Objective of theEIAStudy

The objectives of the study include:

- Identification of potential environmental relating to the Project through Environmental Management Framework (EMF)
- Assessment of possible environmental impact during stages of implementation of the project (construction and operation phase) through Environmental Impact Assessment (EIA)
- Mitigation measures suggested in accordance with World Bank's operational policies, WB Guideline, MoEF&CC Notification & Guidelines
- Environmental Management Plan (EMP) as per EMF followed by effective implementation.
- Incorporate environmental consideration during design

The EMF has been prepared considering all the 11 priority ghats for Assam Inland Water Transport Project. The EIA is prepared for Phase I locations, which include 2 Ghats in Guwahati Division i.e. Gateway Guwahati Ghat (GGG) on South Bank at about 100m upstream of Existing GG Ghat of the Brahmaputra River at Kamrup (Metro) district and North Guwahati Ghat on North Bank of the Brahmaputra River at Kamrup district and one Ghat in Dibrugarh Division i.e. Aphalamukh Ghat at Majuli district on North Bank of Brahmaputra River.

4. Administrative and Legal (Regulatory) Framework

The national environmental legislations are broadly discussed. The MoEF&CC, Central Pollution Control Board (CPCB), Dept. of Environment& Forest, GoA and State Pollution Control Board, Assam (SPCB) together forms the regulatory authorities for implementation of provisions of environmental legislations. World Bank has also defined its Environmental and Social Safeguard

Operational Policies. World Bank's operational policy categorize the project into Category A, B & C on the basis of nature and extent of the impacts anticipated. This project is classified as **Category A** as per WB policy and therefore comprehensive environment assessment studies are required. The project is likely to impact quality of life, livelihood, terrestrial and aquatic ecology, air quality, water quality, economy, noise levels etc. The anticipated impacts are both positive and negative. MOEF&CC, GOI has notified standards under EP Act, 1986 for disposal of effluents, National Ambient Air Quality Standard (NAAQS) and surface water body, which would be complied with.

5. Planning considerations for Terminals and vessels

The terminals are planned considering ease accessibility and passenger comfort. Environmental& social consideration such as solid waste management, sewage treatment, vessel wastewater management, noise control devices, landscaping, green belt, solar energy, special provision for elderly, women & differently-able passengers have been taken into account during the designing and layout of the terminals.

6. Project Benefits

The major benefits from the project are outlined below.

- Higher quality ferry service with wider transport network
- Improve the infrastructure for better public convenience.
- Accommodate the enhance traffic volume by systematic and timely operation
- Have greater positive impact on socio-economy of the area
- Improve the safety and environment aspects
- Comfortable passenger vessels with all amenities
- Minimum impact on existing environmental status
- Improve connectivity to many regions / areas.

7. Environmental Safeguards Screening

As part of environmental and social assessment process, environmental and social safeguards screening exercises have been conducted. The screening exercise has identified the following potential impacts from the project activities:

Positive Impacts:

- Improvement in IWT and north south connectivity in Assam
- Protection of human lives
- Well-being of children
- Improvement in income and living standards.
- Protection of vulnerable groups from disasters
- Protection of villages and settlement from damages to housing and other physical assets.
- Reduction in temporary displacement.
- Decrease in area of land lost due to erosion.
- Improvement in local environmental and social conditions.
- Decrease in public health risk by reducing incidence of water borne and other disaster related diseases, and mental fears
- Protection against damages to crop and livestock.
- Increase in agricultural production and economic gain.
- Reduction in poverty through generation of employment opportunities for the locals.

Negative Impacts:

- Water pollution
- Elimination of washing areas/sites
- Leakages of chemicals etc.
- Land pollution may happen when solid waste material, camp site area, stone stacking area and removed vegetative cover is left unattended

- Noise and vibration due to use of machinery and movement of vessels
- Air pollution due to smoke and dust
- Traffic and public nuisance
- Removal of vegetation (mostly herbs and shrubs) during site clearance
- Land use change
- Health and safety issues of subprojects professional staff/labour and communities residing near project areas
- Risk hazard
- Terrestrial and aquatic ecology

The EMF assesses all of these potential negative environmental and social impacts and provide mitigation measures to address these impacts as well as lists down institutional arrangements to ensure that the mitigation measures are implemented.

The EMF identifies and categorizes all potential activities (subprojects) that may require physical works, identifies the instrument type that will be used to screen, assess, and mitigate the negative environmental impacts, details and extent of the stakeholder consultation that shall be needed for each assessment type, the disclosure requirements and the institutional, reporting and monitoring measures that shall be needed to ensure implementation of mitigation measures.

The EMF includes identification of all possible project-environment interactions, categorization of environmental impacts, identification of mitigation measures, a comprehensive environmental and social baseline, identification of stakeholders and details and results of a comprehensive stakeholder consultation exercise, institutional arrangements needed to ensure implementation of mitigation measures, monitoring, reporting and documentation regimes and table of costs associated with implementation of the EMF.

8. Screening Safeguards

The EMF categorizes subprojects on the basis of nature of activities, potential impacts on environment and or people. The EMF specifies types and extent of environmental and social assessments that will need to be carried out before initiating each subproject. The EMF includes checklists that will be used to assess the potential impacts of each subproject on the basis of its scale/size, nature and potential negative impacts. These checklists prescribe further screening and environmental management instruments to be prepared for subprojects which might have more expansive impacts.

9. Monitoring and Reporting

The project will employ a three tiered monitoring structure with focal persons nominated from the construction staff to monitor impacts during works phase. The environmental safeguards specialist will compile the monitoring checklists to prepare and collate regular environmental progress reports. In addition to this, third party safeguards monitoring will also be conducted to validate compliance with the EMF and implementation of safeguard instruments like the EMP.

10. EMF Disclosure

The EMF shall be released on the IAs and project website, hard copies have been sent to all institutional stakeholders and all their regional offices. The Executive Summary of the EMF has been translated into local language and disclosed on the websites of IAs and the projects, and distributed among institutional stakeholders and affected and beneficiary communities at the early stage of sub-projects.

11. Stakeholder Consultation

Key findings from the public consultations were mostly on improvement and extension of terminals, safety and security of passengers, impact on livelihood, dredging, river ecology and environmental issues including management of dredged materials. All the stakeholders and community overall appreciated the project. Stakeholders also expressed their concern on ecology of river, safety of passengers, special facilities for women & senior citizen at terminals & ferries, facilities for differently-able passengers. The stakeholders also suggested to ensure selection of sub-projects on the basis of community needs, regular consultations, participation, communication, access to information, grievance redressal of project affected and beneficiary communities and other stakeholders.

12. Grievance Redress Mechanism (GRM)

An integrated grievance mechanism has been created to handle any complaints related project performance on environmental aspects, along with social aspects. Complaints can be registered through multiple grievance uptake channels, such as a dedicated helpline, email, by letter to the GRCs (a divisional level or upper level GRC) or walk-ins and registering a complaint on grievance logbook to be provided at each project site/ghat or suggestion box.

13. Current Environmental Scenerio

For the activities identified for execution until now, detailed Environmental Impact Assessment had been completed. Baseline environmental status around 10 km radius of the proposed terminals is considered and relevant primary and secondary data with respect to various environmental components were collected, compiled, analysed and presented. Environmental monitoring was carried out to understand the baseline status. Various environment monitoring conducted in the study area for relevant parameters.

13.1Physiography

The Brahmaputra Valley has a uniform level alluvial Plain interspersed with low elevated hillocks scattered along the banks of the River. The alluvial fans formed by the coarse alluvial debris in the northern fringe of the Valley have given rise to semi-tame conditions where water percolates down resulting in wet soil and dense forest. In the South Brahmaputra plain the meandering course of the tributaries is conspicuous only in the eastern part where there are numerous beels and oxbow lakes. The most physical characteristic of the Brahmaputra is that the river itself is highly braided due to its gradient. As a result, there are innumerable Chars or riverine islands.

13.2 Landuse pattern

The existing land use pattern of the area was analysed from the Satellite data: The Indian Remote Sensing satellite data RESOURCESAT-2, LISS III and Topographical maps of the study area. Land use pattern of study area of three proposed terminals with respect to Agricultural crop, Fallow land, Settlement, Forest, Open Scrub/Grazing Land, Wetland, Water body, river are analysed. It is observed that settlement in the study area of GGG (18.76%) and NG (17.04%) is higher than Aphalamukh (0.21%). There is no forest area in the study area of Aphalamukh, where as in GGG and NG the forest over are 48% and 45.43 % respectively. Agricultural in Aphalamukh (20.17%) are higher than GGG (8.31%) and NG (9.23%). River and sandy areas comparable (GGG-8.85%, NG-9.51 and Aphalamukh-11.92%)

13.3. Water Environment

Surface Water Quality

Brahmaputra river water quality has been monitored by Central Pollution control Board (CPCB). As per Water quality Monitoring data of CPCB, pH, DO and Total Coliforms meet the water quality criteria, Class (C) for drinking water source after conventional treatment and disinfection at most of the monitoring locations except samples at Jogijhoga. The BOD ranges from 0.3 to 9.2 mg/l. The maximum BOD was recorded at Brahmaputra at Kherghat. Faecal Coliform ranges from 0 to 1500 MPN/100 ml at Sualkuchi. Total coliform ranges from 0 to 15000 MPN/100 ml at Jogighopa. This may be due to domestic wastewater discharge from urban bodies. Surface water sample were collected from the upstream and downstream of the proposed terminals/ jetty / landing points.

The water samples were analysed for Physico-chemical parameters and bacteriological parameters. It is revealed from the analysis that water quality meets with BDU Class C Criteria of CPCB. Parameters pH & DO which meets A class criteria of CPCB.

Ground Water Quality

Ground water samples were collected from 3 different locations of each proposed terminals/ jetty / landing points. The water samples were examined for physico-chemical parameters and bacteriological parameters. The results of samples are compared and found that all the parameters are within the permissible limits of drinking water Standard (IS: 10500).

13.4 Climate & Hydrometeorology

The climate of the project area is sub-tropical in nature with four distinct seasons. The southwest monsoon lasts from June to September. Almost 90% of the annual rainfall occurs during this timeframe.The annual average rainfall in the area is about 1722mm. Mean daily temperatures reach a minimum of about 18^0C in January, occasionally dropping in some cold years below 10^0C. In April, maximum daily temperatures often exceed 35^0C.Wind speeds & directions are of primary importance in the diffusion and transport of atmospheric pollutants. The wind rose for Guwahati shows that the predominating Wind direction is from East-Northeast to West-Southwest (WSW).Humidity is an indicator of water vapor content of air. It is observed that monsoon season has the highest humidity level.

13.5. Air Environment

Ambient air quality monitoring was conducted in the study area of the proposed project sites during August –September, 2018 for PM10, PM2.5, SO_2, NOx, COand compared with National Ambient Air Quality standards(NAAQS,2009), notified under EP Act, 1986 by MOEF&CC. Three monitoring stations were located within 5.0 km radius of each sites for baseline air quality of the area. The monitoring was carried out following CPCB guideline. The ambient air quality monitoring was carried out for Particulate Matter (PM10& PM2.5), Sulphur dioxide (SO_2),Oxides of Nitrogen (NOx), CO& all parameters as per NAAQS,2009. Sampling was carried out on 24hourly twice a week for one week. It is observed that ambient air quality for the monitored parameters in all locations well within the NAAQMS.

13.6 Noise Environment

Noise levels in three project sites were monitored for 24 hrs. Monitoring was conducted at three locations in each site by using Sound Level Meter. Noise level was monitored for day time (06.00

AM to 10.00 PM) and night time (10.00 PM to 06.00 AM) for comparison with the standard. The noise monitoring results show that the day and night time noise level at all locations meet the norms for commercial zone. However, the noise level exceeds the standard (45 dBA) during day time for residential zone. The major source of the noise in the study area is vehicular movement as well as commercial activities.

13.7 Ecology & Biodiversity

Ecology & biodiversity study is an important aspect of EIA. Existing status covers the following:

- Study of the ecology & biodiversity (Terrestrial & Aquatic) of the project area along with identification of Rare, Endangered & Threatened (RET) species if any.
- Identification of Protected areas/Ramsar sites.
- Identification of IBAs near project influence areas.
- Identification of breeding ground of Fishes & Avifauna near project locations.

Ecology and Biodiversity Study is carried out in 10 km radius of individual proposed terminals including stretches of Brahmaputra River. Detail studies were conducted on followings:

- Floral & Faunal diversity both Aquatic & Terrestrial
- Phytoplankton's & Zooplanktons, Benthos
- Forest Area and endangered species

Gangatic /River Dolphin were spotted in project locations. The active breeding period of sensitive aquatic fauna is during the monsoon period (June to August).

Endangered Species (Aquatic Fauna): Endangered (EN) has been categorized by the International Union for Conservation of Nature (IUCN). No aquatic species is found endanger in the study area. Dolphin which is a schedule-I species is reported in Brahmaputra River. Dolphins were spotted at the Gateway Guwahati Ghat (GGG)area during site visit and also dolphin movement were reported in and around the proposed site. Secondary data on dolphin presence in stretches of the river have been relied on. However, the number of Dolphins in the project area was not estimated. A fresh study on Dolphin has been initiated[1].

13.8 Soil Quality

Three samples of soils were collected from each proposed terminal site and analysed for Physical-chemical parameters. The soil analysis results of Gateway Guwahati Ghat, North Guwahati Ghat and Aphalamukh Ghat indicate that the soil in all three terminals are acidic and is sandy loam. Clay percentage varies from 67.2% to 72.4%. Heavy metals content is to soil is negligible.

13.9 River Bed Sediment Quality

The riverbed sediment is an integral component of the aquatic ecosystem. The sediment quality influence benthic organisms, vegetative communities, and the aquatic food web. Organisms and plants, particularly those living in the sediment, can get affected. Secondary data on sediment quality from IIT, Guwahati was collected for all three proposed terminals. From the study report, it is concluded that the sediment is non-hazardous and not contaminated.

14. Current Social Scanerio

[1]Dolphin survey for 'dry season' has been completed in March, 2019 and for 'wet season' it is proposed on June-July'2019. Final estimated numbers of dolphin in project location will be ensured after the 'wet season' Dolphin Survey which will be incorporated in the Final EIA.

14.1 Land Requirement for the Project (Phase-I)

Three Ghats viz. Gateway Guwahati Ghat and North Guwahati Ghat in Guwahati Division and Aphalamukh Ghat in Dibrugarah Division were selected for the 1st phase implementation of the of the project. The extent of land required for the construction of these Ghats is shown below:

Name of/ type of sub-project	Amount of land required (in Acres)	Type of Land (private, government, community)		
		Private	Government	Community
Gateway Guwahati Ghat	0.0378 Acres	Nil	0.0378 Acres	Nil
North Guwahati	0.0341 Acres	Nil	0.0341 Acres	Nil
Apahlamukh	0.3188 Acres	Nil	0.3188 Acres	Nil

N.B.: Construction of approach road and the requirement of land are not considered in this.

14.2. The Socio-Economic Profile of the PIA[2]

- **Gateway Guwahati Ghat** is in Ward No 02 of Guwahati Municipal Corporation, is the 7th most populous ward in the city and as per 2011 census report, have a population of 16613 persons,8780 (53%) males and 7833 (47%) females(2011 census). Sex ratio is 892.Average Literacy rate is 91%with 94% male and 88% female literates. 6317persons (38%)in Guwahati Ward No.-2 are engaged in main or marginal works. Male work participation rate is 55% and female work participation is 19%. 47% of male workers are engaged in Main works and 8% of the men are engaged in marginal works. Among working women 14% are main workers and 6% are marginal workers.
- **North Guwahati** has a Town Committee in Kamrup district of Assam. The city is divided into 4 wards. As per 2011 census data, it has a population of 10,328 persons with 5,088 males and 5,240 females. Sex Ratio is of 1030 against state average of 958. Literacy rate 93.68 %, higher than state average of 72.19 %, with 96.51%male literates and 90.97% female literates.

  Aphalamukh Ghat is in the Majuli Island where there are 144 villages .Total population of the island is 150,000 with a population density of 300 individuals per square km. **The total literacy rate is 78.56% with 74.56%** male literates and 61.34% female literates. Four villages viz. GaramurJugi Pathar, AtoiChuk, Dakhinpat Satra and Borboka Pathar are the core area villages falling in the PIA of this Ghat.

15. Environmental Impact & Mitigation Measures

This chapter describes the environmental impacts that are likely to result from the project activities. The interaction between various project components and environmental elements are being analysed to identify and evaluate impacts. Mitigation measures proposed to be taken to minimize environmental impacts are also discussed. EMF Guideline, public consultation and observations during field survey of the project sites were important inputs and incorporated in the mitigation measures. Impact during construction and operational phases are separately dealt. Impact due to maintenance dredging of channels is typical to the project activities and discussed separately. Dolphins in the river are endangered species and therefore special emphasis has been given for their conservation and least impact.

Major environmental factors, covered are as follows:

[2] For details on Social Aspects summarized here in Section 14 and 16, please refer to the SMF and RAP which have been prepared for the porject and disclosed separately.

- Impact due to solid and liquid waste disposal
- Sanitation, health and safety facilities
- Impact on Ambient Air Quality due to emission during construction and operational phase
- Impact on river water quality due to proposed amenities
- Impact on noise level
- Impact due to Dredging Activities
- Impact on environmental aesthetics and cultural values
- Impact on Biological Environment
- Impact due to Climate Change
- Impact on Social Environment (Project Affected People)
- Labour Influx, Gender Based Violence, Community Health & Safety.

All the project activities and relevant environmental parameters are covered in the study. It is concluded that the environmental impact during construction phase will be temporary and with the mitigation measures, it will be localised. All the dredged materials shall be disposed off-shore since the river bed sediment is not contaminated. The overall impact during this phase will be within the acceptable limit. Due to integration of environmental factors in the project, the environmental impact during operational phase will be negligible and overall environmental quality of the area will improve with better infrastructure and amenities.

16. Social Impact & Mitigation Measures

The project has direct and indirect impact on the people and their families as summarized below. A detailed analysis of social impact and mitigation measures has been highlighted in the Executive Summary of the SIA, SMF/RPF-cum-IPDF and consolidated RAP-cum-IPDP for three priority terminals prepared under the project.

Land required for the project is limited as the constructions of the Ghats mostly happen in the River portion. Still some land is required especially for approach road and parking etc and in these 3priority Ghats, Government land is available and no private land need to be acquired, during the 1st phase. Some commercial squatters occupying government land will be impacted and they will be resettled providing compensation for their loss as per the entitlement matrix. Some other people occupying the Ghat vicinity may also be affected during construction phase and they will be compensated for their livelihood loss as per the entitlement matrix, prepared in line with the World Bank OP 4.12 and RFCTLARR Act, 2013 and Assam LARR Rule 2015.

Major and Minor Impacts Impact on the affected properties

Major impact: The land proposed for the construction of the 3 Ghats are Government properties and some commercial squatters are running small tea shops / pan shops in temporary sheds and kiosks. 13 such structures were identified to be shifted to adjacent places and their livelihood will be impacted.

Minor impact: Some Common Property Resources such as a potable water kiosk, parking area and a ticket counter etc. will be impacted in Lachit Ghat area, which can be shifted or allowed to continue as per the technical design proposed for the Ghat. After the construction phase the possibility of repositioning some of these shops can be considered by the authorities, as these services are required for the passengers as well.

Details of major/minor impacts of the project are shown below

Category of PAPs	Type of Impact	Unit of Entitlement	Nos. affected
Titleholder – Agriculture Land / Non-agriculture land / Homestead Land	Loss of Land and Assets	Nil	Nil

and assets			
Titleholder – Residential Structure	Loss of Structure	Nil	Nil
Titleholder-Commercial/ industrial Structure	Loss of Structure	Nil	Nil
Titleholder-Residential cum-commercial/ industrial structure	Loss of Structure	Nil	Nil
Tenants-Residential / commercial / industrial Structure	Loss of Structure	Nii	Nil
Squatter-Residential / Commercial / Residential cum-commercial	Loss of Structure	4Nos	4
Encroacher	Loss of Structure/ Assets	Nil	Nil
Additional support to vulnerable groups	Nil	Nil	Nil
Employees in shops, agricultural labourers, sharecropper	Loss of Livelihood	9 structures	9
Community Assets	Loss of Community Assets	Water kiosk Ticket counter	1 1
Scheduled Tribes	Loss of Land, Structure or both	Nil	Nil
Disruption	Temporary Impact	9 structures	9

Type of Structures affected

Structure	**Total Affected Structure**	**Major Impact**			**Minor Impact**		
		Pucca	Semi Pucca	Kutcha	Pucca	Semi Pucca	Kutcha
Residential	Nil	NA	NA	NA	NA	NA	NA
Commercial	4	Nil	4	Nil	Nil	Nil	Nil
Mixed	Nil	NA	NA	NA	NA	NA	NA
Other(cattle-shed)	Nil	NA	NA	NA	NA	NA	NA

Loss of other Assets

Types of Assets	**Nos.**
Trees	2
Open Well	Nil
Boundary Wall	1
Cattle shed	Nil
Water Tank/kiosk	1
Others	Park

Impact on cultural properties and community assets

Some Community assets such as water kiosk, park, ticket counter etc in a closed premise owned by the Inland Water authority and used by the public will be impact by the Gateway Guwahati Ghat Project. But these structures can be shifted to an appropriate place in the premises, for continued use of public. No cultural properties will be impacted.

17. Environmental Monitoring Programme

Environmental Monitoring Programmeis to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The monitoring programme on each environmental parameter with frequency of monitoring for individual project site has been worked out for both construction as well as operational phase. The same will be included in tender / bid document. This has been done as per CPCB guideline.

18. Additional Environmental Studies

Flood Assessment and Erosion Control

Flooding in river Brahmaputra is observed almost every year. From 1953 -2003 the Flood Control Department of Assam has so far constructed 105.2 km. of embankments on the bank of the Brahmaputra, Kherkotia and Subansiri Rivers.

No substantial changes on the embankment cope line observed in Guwahati Gateway Ghat (GGG) and North Guwahati Ghat. However, it is observed in Aphalamukh that, between 2009 and 2014, substantial changes on position of river have occurred (October 2012 and February 2014 vary between 100 - 190m westwards). Additional studies have been conducted on flood assessment and river bank erosion control. Erosion control measures have also been suggested.

19. Risk Assessment

Hazard Identification: Following hazard potentials are identified and .emergency response and preparedness plan suggested-

- Damage of Fuel tanks and oil leaks into the river.
- Fire hazard from Fuel Storage
- Emergency during ship manoeuvring
- Vessel or boat collision

The degree of damage depends on-

- Nature of hazardous substances (gas, liquid or vapour);
- Pathway of release (boat, vessel etc.);
- Dispersion of released gas or vapour in atmosphere or liquid in river water.

Oil spill disaster management due to vessel collision and/or accidental oil leakage has been discussed in greater detail. Coordination and control emergency have also been suggested. Safety standards are applied during all phase of project activities. The personnel would be periodically undergoing medical check to identify anybody suffering from occupational health hazard.Special emphasis has been given to Training and Awareness, which cover the following-

- Types of emergencies with potential threats, hazards, and protective actions
- Components of emergency preparedness and response plan
- Individual roles and responsibilities
- Relevant standards and Codes
- Notification, Warning, and Communications procedures
- Evacuation, Shelter, and Head Count procedures
- Location and use of common emergency equipment
- Mock Drill procedure and accounting for personnel
- Techniques of accident investigations

20. Entitlement Matrix

The entitlement framework specified in the RPF-cum-IPDF and consolidated RAP-cum-IPDP for three priority terminals has been designed for various categories, based on the central RFCTLARR Act, 2013 and RTFCTLARR Rules, 2015 of GoA and World Bank OP 4.12 on Involuntary Settlement. Each category of loss for the purpose of R&R entitlements is classified under two major categories-

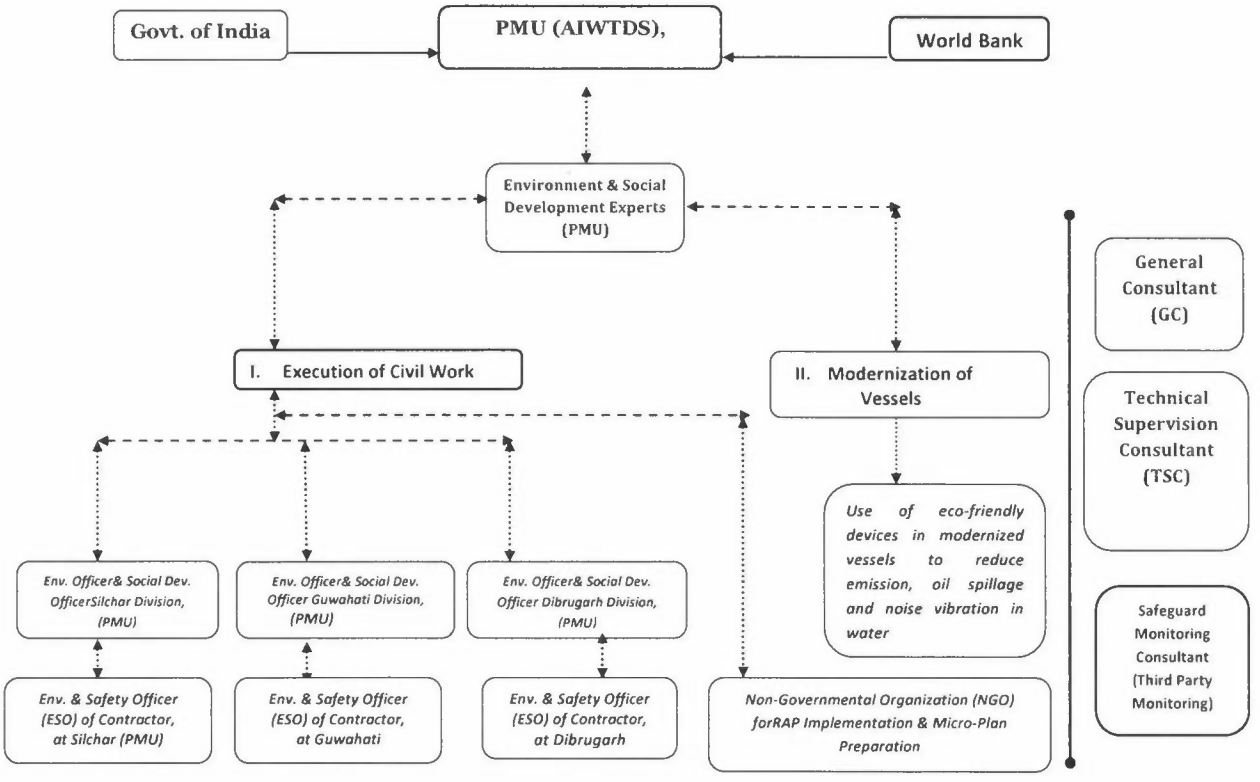
1. Titleholders (owners)
2. Non-titleholders (Tenants in the commercial/residential properties, Encroachers and Squatters).

The entitlement matrix will be informed to the PAPs, to ensure that their interests are protected and if not, to submit their grievances to the appropriate authorities and get it resolved in the right time.

21. Implementation of Environmental Management Plan (EMP)

The proposed organogram for the implementation and monitoring of EMP is presented below:

Figure-1: Organization Structure for Implementation of EMP



21.1 Environmental Management Plan

The key components of EMP are summarized below and each of these components is explained in detail in the following subsections:

- Mitigation Measures
- Monitoring Measures
- Institutional Arrangement
- Reporting Requirements
- EMP Budget

Impact identification and EMF application for the development interventions are carried out to set the management framework

The Environmental Management Plan, covering project activities and relevant environmental components for proposed Terminal Project for both constructional and operational phase has been worked out and approximate timeframe and institutional responsibilities have been specified. The same has been presented in Tabular form.

A three-tier monitoring program has been proposed:

- Compliance monitoring,
- Effects monitoring, and
- External monitoring.

The main purpose of this monitoring program is to ensure that the various tasks detailed in the EMP are implemented in an effective manner, and also to evaluate program impacts on the key environment and social parameters. The same has been presented in Tabular form as ***Attachment 1*** to the Summary.

21.2 Institutional Set-up for Effective EMP Implementation and its Monitoring

The Project implementation will be led by the Project Implementation Unit (PIU) that will be established within AIWTDS. The PIU will be responsible for engagement of consultants for carrying out the various studies related to EMP. The PIU will be headed by the Project Director (PD).

The PIU consists of an Environment and Social (E&S) Cell with environmental & social expert. E&S Cell will assist the PMU on issues related to environmental and social management and oversee the Construction Supervision Consultant (CSC) and contractors .Quarterly monitoring reports on EMP compliance is to be sent to the Project Director and also shared with the World Bank, throughout the construction period. The CSC will supervise and monitor the contractors for effective EMP implementation. The contractors in turn will also have HSE supervisors who will ensure EMP implementation during construction activities.

21.3 Environmental Codes of Practices and Performance Indicators

The contractor will be required to follow the environmental codes of practice (ECoP's) by preparing site-specific management plans. For evaluating the performance of the environmental management and monitoring plan, performance indicators are identified to evaluate the efficiency. The indicators are defined both for construction and operation phase.

Integrated Grievance Redressal Mechanism

A formal grievance redress process will be outlined in the project's operational manual and a protocol will be set up. The grievance submission mechanism should be online or though toll-free communication system. The GRM is based on four guiding principles of the company which include: Transparency, Fairness, Response, Accountability

Capacity Building / Training and environmental awareness

Capacity building for effective implementation EMP is highly essential. Capacity building on environmental and social safeguard will be taken up for all levels stakeholders, including AIWTDS, E&S Cell of AIWTDS, supervisor, and contractors. At the construction site, supervisor will take the lead in capacity building plan. The contractors will also be responsible to conduct trainings for their own staff and workers. During the O&M phase of the project, these trainings will continue to be conducted by AIWTDS staff for all relevant O&M personnel and community.

It is vital that all personnel are adequately trained to efficiently perform their designated tasks. In addition to training, general environmental awareness must be fostered among the project's workforce and general public to encourage the environmentally sound practices.

Documentation and Record Keeping

A document handling system will be established to ensure updating of EMP documents, and availability of documents for the effective functioning of the EMP. The document handling system have been suggested

Stakeholder Engagement

It is expected that the stakeholders would have opportunity to comment on the content of the EIA report.

21.4 Environmental Monitoring Plan & EMP Budget

Tentative Environment budget has been prepared for design, construction and operation phase of the project. The Environmental budget includes the cost of environmental structures like septic tank &soak pit, Air Pollution Control System at terminals, monitoring, enhancement measures, training and awareness and technical support for establishment, enhancement measures and environmental guidelines. EMP cost estimates of North Guwahati Terminal, Gateway Guwahati Terminal and Aphalamukh ghat are Rs .30,58,650/-, Rs 30,58,650/- and Rs.31,42,650/- respectively.

22 Summary & Conclusion

Environmental impact assessment is carried out pertaining to the up-gradation proposals of Ghats and other components of the project. The investigation is taken into account both national and international legal requirements (as per WB).The EIA is prepared based on field investigation, secondary data/information, environmental quality monitoring and feedback from the stakeholders.

Both positive and negative environmental impacts are evaluated.

The positive environmental impacts of the Project are development of all weather navigation routes for transportation of passengers and generation of employment opportunities during construction, operation and maintenance stages. The project will induce economic growth in the region. The negative environmental impacts are not significant. However, the positive impact of the project will improve the sanitary condition, proper waste management and over all aesthetics of the area.

EMP has been formulated to mitigate the negative impacts during various phases (pre-dredging/construction, during dredging/ construction and Post dredging/O&M).The main monitoring parameters include monitoring of dredging and dredge material disposal, biological monitoring and enhancement, environmental quality monitoring (air, noise, surface water, river bed sediment), health and safety, etc. Most of the potential impacts are short-term that can be addressed by adopting mitigation measures and relevant ECoPs. To keep the project influence area environmentally friendly, AIWTDS should ensure that the Contractor prepare site specific EMPs including Emergency response plan, Oil Spill Contingency Plan and Workers Health and Safety plan and Environmental Pollution Abatement and Mitigation Measures Plan. Regular and effective monitoring of environmental quality parameters as indicated in this EIA report. AIWTDS should follow the EMP for improvement of navigation and environment quality of the area.

Budget estimates for Social Management Plan including R&R costs

Resettlement and Rehabilitation Assistance Budget for 3 Priority Sites					
Sl. No.	Items	Unit @	Total Units	Cost / unit in Rs.	Amount in Rs.
	Structure (Residential, Commercial, Res-cum-Comm) of Non - Titleholders				
1	Compensation at scheduled rates without depreciation for structure	100000	11	100000	1100000
2	One-time rehabilitation grant of Rs. 25,000 for reconstruction of affected shop.	25000	11	25000	275000
3	One-time subsistence allowance of Rs. 18,000/-	18000	13	18000	234000
4	Shifting assistance of Rs. 10,000/-	10000	13	10000	130000
5	Temporary loss of livelihood during construction (kiosks/vendors)	50000	20	50000	1000000
6	One-time rehabilitation grant of Rs. 25,000/- for relocation of kiosk/vendors	25000	2	25000	50000
7	Assistance to Tenant (Residential, Commercial and Res-Commercial Structure)	No.	0	0	0
8	**Loss of Employment (Wage-earners, workers/ employees)**				
	Subsistence allowance of Rs. 3000/- for each employee equivalent to 25 days of MAW for a period of 3 months	3000 x3	10	9000	90000
	Training Cost for vocation skill improvement	10000	13	10000	130000
9	**Loss of livelihood**				
	Provision of vocation training	10000	13	10000	130000
10	**Additional amount for vulnerable group**				
	One-time financial assistance	50000	10	50000	500000
11	**Loss of CPR**				
	Replacement cost	Sq.mtr	NIL		0
Sub-Total					36,39,000
					3.37million

RAP & IPDP Implementation Budget for 3 priority sites			
Sl. No.	**Items**	**Cost**	**Amount in Rs.**
1	Institutional Cost (RAP & IPDP)	Lump sum	3360000
2	Awareness on HIV/AIDS and GBV	Lump sum	300000
3	Capacity building of implementing agency	Lump sum	500000
4	Cost of External M&E agency	Lump sum	300000
5	Dissemination of project information and project progress by PIU	Lump sum	1000000
	Sub-total		5460000
			5.46 million

Total Costs for Social Management Plan = 3.37 + 5.46 = INR8.83 million.

Gender Action Plan

Stages of the Project	Activities	Indicators	Responsibility
Planning	Gender inclusive IWT and Trade Facilitation Study carried out to provide recommendations that can be integrated into the project design. Modification of fleet and terminal design features to accommodate requirements of women, children, infirm and differently abled from the perspective of quality, reliability, safety and security such as: Provision of clean, gender segregated, well-lit wheelchair accessible toilets. Specific women rest room (Nursing rooms) to accommodate facilities for women to breast feed and to look after infants and small children at the terminals. Provision within the terminal and vessels of an adequately covered area and seating keeping in view the volumes of passengers, at peak hours, particularly for women, differently abled and elderly persons. Standard Ramp with protective hand rail for barrier free entry-design consideration (ramp configuration, width, slope and landings, handrail, surface and tactile markings) for access to wheelchair users and people with mobility problems Provision of signage of appropriate visibility and provision for audio announcements- This implies (a)	Equity of access to key services through IWT (including health, education and economic centres) Beneficiaries (sex disaggregated, senior citizens, and differently abled) satisfied with [specified dimensions e.g. access, quality of services, responsiveness to needs, quality of facilities] (%) No. of vessels operating that have: •Seats for all passengers •Life Jackets for all passengers •Safety instructions, •Secure spaces for goods No. of vessels that have disability access No. of long distance vessels with toilet facilities with disability access	ISDP Consultant; DPR Consultant

	use of different modes (pictorial, verbal, tactile) for redundant presentation of essential information. (b) Maximizing "legibility" of essential information. (c) Differentiating elements in ways that can be described (i.e., make it easy to give instructions or directions). (d) Providing compatibility with a variety of techniques or devices used by people with sensory limitations.		
Preparation	Gather gender disaggregated data during the SIA and organise consultations with users to incorporate their suggestions while planning and designing the Ghats/vessels. **LA and R&R:** Ensure payment of compensation on joint names; One-time assistance to women headed households; Ensure training for skill development to women (and other vulnerable groups) whose livelihood is affected, including cost of training and financial assistance for travel/conveyance and food	No. of payments disbursed on joint names. No. of women headed households who've received one-time payment assistance No. of women who've received training on skill development	Revenue officers and AIWTDS
Construction	Measures such as compliance with various labour welfare legislations which mandate the contractor to provide facilities, which would encourage more women to join the workforce, such as those pertaining to creches, working conditions and remuneration. Trainings and awareness camps on prevention and protection against GBV and HIV/AIDS Developing a code of conduct/SHW policy and setting up of ICC as per the mandate of SHW Act, 2013.	No. of skilled/ unskilled/ professional women employed in the project construction works. No. of female employees who have accessed employee welfare schemes and benefits under labour laws. No. of trainings and awareness camps on GBV and HIV/AIDS organised at the construction sites. ICC constituted at all establishments related to the	Construction contractors Supervision Consultant AIWTDS

		project.	
Operation	Strict and regulated scheduling (timing and price) of IWT services. Security personnel deployed at the terminals for safety and security of passengers, particularly women. Training of vessel crew and IWT staff on GRM including RTI, labour standard compliance including HR policies, safety and security of women users (including gender sensitization), and passenger services for differently abled, senior citizens, women and children. Under the Jibondinga scheme, registered women self-help groups shall be provided an additional 10% or equivalent in absolute terms, of the benefit amount for encouraging them to expand their target market Under the Jibondinga scheme, individual women entrepreneurs shall be eligible for an additional 5% or equivalent in absolute terms, of the benefit amount for encouraging them to expand their business	Display boards about boat schedules and strict adherence to the same. No. of trainings for vessel crews and IWT staff on GRM including RTI, labour standard compliance including HR policies, safety and security of women users (including gender sensitization), and passenger services for differently abled, senior citizens, women and children. No. of SHG applicants availing the Jibondinga Scheme No. of women entrepreneur applicants availing the Jibondinga Scheme	E&S cell AIWT Regulatory Authority Crew Training Centre
GRM	Display the penal consequences of sexual harassment at a conspicuous place in the workplace. Display of the "citizen charter" at the terminals. Project helpline no. along with existing hotlines for women's safety to be advertised on board the vessels and the terminals.	No. of SHW cases adjudicated by ICC and resolved. Dedicated helpline for the project established and working. No. and nature of complaints received from women. MoU with exiting women	AIWTD/GRM system

		helpline nos. and/or prominent NGOs to report complaints of harassment.	
M&E	Satisfaction survey shall be carried out to assess the feedback of beneficiaries and other citizens (50% women respondents) on the implementation of the project activities. Monitoring of safety and security of passengers as per the SOP by the vigilance team. Regular reporting on all social safeguard activities including training and capacity building, GRM, Labour Compliance, R&R, citizen engagement and other project activities related to gender mainstreaming and prevention of GBV.	% of women respondents interviewed for the satisfaction survey. No of operators refused licences to operate because of non-compliance of safety provisions (percentage of total applicants) under the SOP.	AIWTD AIWT Regulatory Authority

Indigenous Peoples Plan for various stages of Project Cycle

Stages	Procedures	Activities & Outcome
Preparation	Identify concerns/issues in relation to the project activities through Participatory Rural Appraisal (PRA) exercises	Preparation of a list of issues during the social screening and scoping process
	Communicate with Autonomous District Councils/GaonPanchayat to carry out Free, Prior, Informed Consultation at the village level	Information dissemination on the project and brief account of project implementation plans and framework held on February 7th
	Organize consultation with STs to inform about the project activities and benefits	Stakeholder consultations and FGDs held at Majuli during the SIA.
	Identify key areas of constraints that may be improved through the project and develop detailed plan for tribal development	Rate of poverty andperiodic floods in the area has an adverse impact on the livelihood of the tribe who mostly dwell near the bank of the river. Project will facilitate access to short-term and long-term economic opportunities, particularly to women weavers. Both sites, in North Guwahati and Majuli has huge potential for tourism. It is likely that tourism will expand more in these

Stages	Procedures	Activities & Outcome
		areas with the improvement of IWT.
Implementation	One-time additional financial assistance of Rs. 50,000 to SC/ST PAFs who are displaced and require to relocate due to the project.	13 no. of PAFs (SC) accruing the benefit.
	Employment to members from tribal community in carrying out actual construction work	Number of STs employed
Operation	Improvement of terminals and ferry services to attract and promote tourism Free Prior and Informed Consultation with the tribal communities.	% of tourists visiting historic sites, areas, museums, other heritage attractions using the ferry
	Capacity building of ST/SC and other vulnerable groups, and skill up-gradation for institutional strengthening.	Training calendar to be prepared Number of trainings undertaken Number of tribal members trained
	Employment generation for ST in related sub project activities	Number of ST employed undertaking various activities under the project
	Help build linkages with major government schemes for skill enhancement and improvement of ferry services (Jibondinga scheme).	Number of STs that have availed the Jibondingascheme or similar incentivization schemes.
GRM	Including a member of the ADC in the sixth schedule area in the GRC, to address R&R and land related disputes.	Number of grievances brought forward in ST areas and addressed.

Environment Management Plan for proposed Terminal Project (Construction Phase)

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
1. Site Preparation: Levelling of Terminal Site, Base cap, Construction Camp & Labour camp							
1.1 C & G and levelling of site	• Loss of vegetation. • Loss of top soil. Loss of natural resource (Earth/soil)	• Tree cutting, if any would be carried out only after obtaining NOC from Forest Department • Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • Excavated materials would be preferably used for site filling/low lying area filling and the surplus material would be disposed as per norms. • Green belt/landscaping would be developed at the site and as per the Green Belt management Plan. • Survival rate of tree would be regularly monitored. It should be minimum of 70%. • Sedimentation tanks shall be provided for storm water drain to arrest the sediments and these sediments shall be	Solid Waste Management Rules, 2016, Hazardous & Other Waste (Management and Transboundary) Rules, 2016 C & D waste Rules, 2016. The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.	Construction site Labour and construction Camp Locations	During design and Construction Stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		removed and stored with remaining excavated soil. • Shore protection works like stone pitching along the bank shall be undertaken.					
1.2 Setting of Labour & Constructio n Camps:	Contamination of land and water resources from waste generation.	• Construction camp location would be as per proposed Construction & Labour Camp Management Plan. • Labour camps would be located close to the construction sites to the extent possible. • Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • Excavated materials would be preferably used for site filling/low lying area filling and the surplus material would be disposed as per norms.	Solid Waste Management Rules, 2016, Hazardous & Other Waste (Management and Transboundary) Rules, 2016 C & D waste Rules, 2016. The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.	Labour and construction Camp Locations	Construction Stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
1.3 Sanitation, Health & Safety:	Unhygienic and unsafe living and working condition.	• Hygiene in the camps would be maintained by providing good sanitation and cleaning facilities. • Camp would be well ventilated with adequate provision for illumination, kitchen and safe drinking water. Proper drainage to be maintained around the sites to avoid water logging. • Proper sanitation with toilet and bathing facilities would be provided at the sites and labour camps. Wastewater generated from these facilities would be disposed through septic tanks and soak pit • Preventive medical care to be provided to workers • Segregated solid waste would be disposed of at municipal solid waste disposal location. If municipal solid waste site not available then waste should be land fill following					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		local regulations. • LPG will be used for cooking in construction camps • Provision would be made for day crèche for children • First aid facilities, with room, personnel and ambulance would be available at the site. Also, tie-up with local hospitals would be done to handle emergency case, if any • Rest area would be provided at the site where workers can rest after lunch and should not lie on site anywhere • Working hours of labourers would not exceed than standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated as it may lead to breeding of mosquitoes. Septic tanks/soak pits would be provided for its					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		disposal • Temporary storm water drainage system would also be provided at camp site so that no water logging takes place					
1.4 Waste Management	Generation of solid, liquid and hazardous waste	• Arrangement should be made for segregation of waste into recyclable and non-recyclable waste • Non-recyclable waste generated should be disposed regularly through authorized agency. Recyclable waste should be sold to authorized vendors. • Construction waste generated should be segregated at site into recyclable, reusable & rejected fraction. Recyclable should be sold to authorized vendor, reusable waste should be stored at site for usage and rejected fraction should be disposed at designated sites of the municipal					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		authority • If no debris or waste disposal site exists in the area then a site would be identified with approval of AIWTDS and would be used & manage for the same as per the Debris Management Plan. • Any waste oil generated from construction machinery, should be stored on concrete platform and disposed off to authorized recyclers.					
2. Climate							
2.1 Climate Change	Project is unlikely to cause negative effect on climate. However, project can contribute positively for climate	• Daily monitoring of the CWC Gauge data at Pandu Ghat (for North Guwahati & GGG Ghat) &Neamati Ghat (for Aphalamukh Ghat) • Regular interaction mechanism with Indian Meteorological Department (IMD) for early forecasting to avoid casualties • Working jointly with State	Kyoto Protocol, Forest Conservation Act & National Forest Policy	Construction site	During Design and construction stage.	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		Disaster Management Authority, State Disaster Response Force (SDRF) & National Disaster Response Force (NDRF) during emergency situation • Awareness programme with staff, passengers and contractors on Climate Change. • Project would be designed in a way to minimize the tree cutting. As far as possible trees along the terminal boundary will be retained as part of greenbelt. • If any tree cutting will be required at any terminal it shall be carried out only after obtaining NOC from Forest Department. • Shifting to alternative energy options like solar energy • Adoption of best practices to cut down resources and energy requirement					
3. Air Quality							

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
3.1 Air Pollution	Dust Generation due to construction activities and material handling. Emission from machinery, DG and vehicular movement.	• No crushers or Batching plants will be located at the sites. Ready mix concrete will be used. These considerably reduce the emission. • Low sulphur diesel would be used for operating DG sets and construction equipment. • Periodic monitoring of air quality for PM_{10}, $PM_{2.5}$, SOx, NO_x, and CO shall be carried out quarterly at construction site • Regular water sprinkling/fogging to suppress the dust generatedat site, approach road & haulage roads. • Proper servicing and maintenance of earth moving vehicles and other machinery to minimize the emission generation • Vehicles transporting the loose and fine materials like sand and aggregates shall be covered.	Environmental Protection Act, 1986 and amendments thereof; The Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof	Construction sites, Loading areas, storage areas,	During the Construction phase	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Masks and other PPE shall be provided to workers in high dust generation area • Loading and unloading of construction materials shall be made at designated locations with provisions of water sprinkling. • Construction vehicle, machinery & equipment shall be regularly serviced and maintained and would have valid PUC certificate • Monitoring of air quality shall be carried out on quarterly basis to check the level of pollutants and effectiveness of mitigative measures					
4. Noise							
4.1 Noise Pollution	• Noise generation from construction activity. • Noise generation from operation of vehicle, equipment and machinery.	• Protection devices (earplugs or ear muffles) shall be provided to the workers operating near high noise generating machines. • Barricading (Temporary noise barrier) around the construction site to	Noise Pollution (Regulation and Control) Rules, 2000 and amendments thereof	Terminal site and access roads.	During the Construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		minimize the noise level • Restriction of high noise generating activity between 10:00 PM to 6 AM. • Restriction on Honking at the project site • Job rotations systems for workers, working in high noise level areas • Periodic monitoring of noise levels to check the level of pollutants and effectiveness of proposed EMP					
5. Water Quality							
5.1 Water pollution	Surface water pollution and Depletion of Groundwater due to abstraction for construction purpose.Siltation due to construction of terminal and contamination due to disposal of	• Preference would be given to use river water for construction with permission from concerned authorities • In case of use of ground water, permission will be obtained from CGWA/CGWB • Water monitoring to be carried out as per monitoring plan. • Natural Drainage pattern of area shall be maintained by	Water Act, 1974	Terminal site	During Construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
	domestic waste	making a proper drainage network in project site. • Washing of vehicle and equipment shall not be carried out in river or nearby place. Washing area would be in a designated area with oil & grease trap. • Storage of debris and raw materials would be in designated area clearly demarcated. • Site would be regularly cleaned • Septic tank/soak pit shall be provided for the toilets at both construction site as well as workers camp. Adequate toilets & bathrooms shall be provided to prevent open defecation. Use of mobile toilets with anaerobic digestion facility would be explored. No domestic wastewater shall be allowed to be discharged to river.					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Wastewater, generated from the washing/cleaning area after passing through oil & grease trap shall be re-used for water sprinkling. • Fuel shall be stored in leak proof containers and containers shall be placed on paved surface under shed. • The piling work in river shall be undertaken during low flow period. • Turbidity traps/curtains/ Geo-Textile synthetic sheet curtain would be placed around piling and construction area to prevent movement of sediments and construction waste. • Sedimentation tanks shall be provided for treating run-off from site before discharging into the river. • Proper collection, management and disposal of construction and					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		municipal waste from site shall be made to prevent mixing of the waste in run-off and entering the water bodies • Monitoring of surface water quality shall be carried out on quarterly basis to check the level of pollutants and effectiveness of proposed EMP					
6. Accident, Incident and Safety Risks							
6.1 Health & Safety	Accident and Incident risk from construction activities and safety of workers Impact on Social life.	• Local labour would preferably be employed for construction. • Site would be barricaded and would have security guards. • Resister would be maintained for entry to the construction sites. No unauthorized person would be allowed to enter the site. • A board in local language at entrance of site would display name of project, area and hazards associated for public awareness	BOCWA & BOCWR Central Motor Vehicle Act 1988 EP Act 1986 Noise Rules 2002	Terminal Site and the material source areas and haulage roads Construction sites	During Construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Adequate illumination would be provided at site during evening and night time till the work is being carried out • Rest area for workers would be provided. • Personal protective equipment like helmet, gum boots, safety shoes, safety jackets, ear plugs, gloves etc to be provided to workers. Fines would be levied if they are found not using PPE • Noise level in the work zone would be maintained and followed as per OSHAS norms • Contractors would adopt and maintain safe working practices. SOPs would be prepared and followed for all activities under supervision of site engineer • Training would be given to workers to handle the heavy equipment so as to prevent accidents					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Complete medical check-up would be done for workers prior to joining and after six months of joining • Emergency telephone nos.of hospitals, ambulance and doctors would be displayed in first aid room. • Working hours of labour should not exceed norms as per state factory law • Speed limit of vehicles would be restricted at site to prevent any accidents and fines would be imposed for violation. All construction vehicles would follow the designated routes & timings. • Arrangement of fire-fighting would be made at site and workers would be trained on their use. • Maintenance and repair of any local village road used for the project activities should be carried out both before and end of					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		construction by contractor.					
7. Protection of Flora and Fauna							
7.1 Loss of Biodiversity	• Loss of terrestrial flora & fauna. • Loss of Aquatic Fauna including Dolphins and macrophytes	• Caution sign shall be placed to prevent hunting of animals • Construction activities shall be restricted to 6:00 Am-10:00 Pm especially noise generating activities. • No hazardous material or waste shall be disposed in the land or nearby area as it may harm the animals, if consumed accidently • Site should be barricaded to prevent entry of the animal in the site • Illumination at the night time should be reduced (if no activity is going on) as it may disturb the nocturnal animals • Workers should not use any timber or firewood as fuel for any purpose	Wild Life (Protection) Act, 1972, Bio-diversity Conservation Act, 2002	Terminal site/construction camps Around Piling/dredging Area	During design and construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• The river area in which the piling is planned, advisable to carefully determine drop sites before anchor placement to ensure that Dolphin and fish communities that could locally still be present in the area are not unnecessarily damaged. • Before starting piling allow some time to aquatic fauna to displace from the piling area. • Bubble curtains can be provided at the time of pilling to displace the aquatic fauna prior start of construction activities • The piling activities must be carried out in shortest possible timeframe. • All the debris should be disposed away from river course. • Noise reducing devices					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		like mufflers, enclosures shall be fitted with the equipment as much as feasible. • Fish exclusion devices shall be installed in water column around the pile driving area to prevent fish access • Geo Textile synthetic sheet curtain &turbidity traps shall be placed around piling and construction area to prevent movement of sediments and construction waste • Piling/dredging should be stopped for some time, if any dolphin/turtle/RET species is sighted in activity area • Aquatic ecology monitoring should be carried out prior to start of construction and after					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		completion of construction to assess the impact of construction activities on aquatic life.					
Dredging	Generation of suspended sediments causing an increase in turbidity, destruction of benthic environment and change in river morphology & spillage during transportation	To prepare Dredging plan including timeframe To stop dredging during breeding & spawning season (June to August) To use turtle & Dolphin deflectors at sensitive location • Contractors need to submit SOPs and action time chart with risk management plan prior to any dredging work. Dredging sub-contractor should follow the defined safety procedures to avoid accidents and spills, and AIWTDS will ensure that other vessel users are		Terminal site/construction camps Around Piling/dredging Area	During design and construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		provided with adequate information and instruction to avoid conflict with the dredgers.					
Cultural & Heritage Resources	• Temporary diversion of access towards cultural resources, temples; • Safety issues to devotees during the construction stage various construction activities. etc. • Chances of vibration impact to these cultural resources during the construction work;	• Adequate diversion signs shall be displayed in the access route for the devotees towards these cultural heritage and temples. • Warning signs shall be given if there is any large excavation work done or scaffoloing put thereof		Near the Heritage Site	During design and construction stage	Contractor	TSC & PMU
Labour Influx	• Influence in the demographic composition • Increased	• Specifications on employment of local workforce including women should be reflected in the civil works		Construction Area	During design and construction stage	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
	demand and competition for local social and health services • Social conflicts between the local community and the construction migrant workers. • Increased rates of illicit behaviour and crime against women, which is a real threat for Assam where gender-based violence is rampant • Increase competition for jobs and have an impact on wage distribution	bidding documents and subsequent contracts to ensure that the contractors fulfil these commitments. Locals including women may be screened further for skills, and adequate orientations can be provided to recruit for the work. AIWTDS can prepare a roster of interested workers and their skills • The project contractor needs to prepare a site-specific Labour Influx Management Plan and/or a Workers' Camp Management Plan. • Security personnel will be deployed at the construction sites, and emergency nos. including contact details of local law enforcement officers, project's helpline no., existing state-run women helpline nos. will be prominently displayed at the					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		site. The contractors will ensure that an Internal Complaints Committee (ICC) for each establishment is set-up to meet their corporate requirement and legal mandate under the Sexual Harassment at the Workplace Act, 2013. Health problems of the workers should be taken care of by providing basic health-care' facilities through health centres temporarily set up for the construction camp. The health centre should have the requisite staff, free medicines and minimum medical facilities to tackle first-aid requirements or minor accidental cases, linkage with nearest higher order hospital to refer patients of major illnesses and critical cases.					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Awareness camps on HIV/AIDS for both, construction workers and neighbouring villages must be organised at regular intervals by NGOs empanelled with NACO. • It is expected that among the women workers there will be mothers with infants and small children. The provision of a day care crèche as per the Building and Other Construction Workers (regulation of employment and conditions of service) act, 1996 is the contractor's responsibility. The crèche should be provided with trained women to look after the children. • In case work schedule extents up till night, it should be ensured that women workers are exempted night					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		shifts. •					
		•					
Social		•					
8. Repairing & Retrofitting of vessels of IWT:							
Repairing & Retrofitting of vessels of IWT	The reparing and retrofitting of vessels involve replacement of old machineries with latest one. In the process the waste water is likely to be generated from the washings and contaminated with oil and grease. The waste generated from repairing will be asbestos, ferrous and non ferrous scraps, plastics, packings, oil contaminated	• Wastewater will be passed through oil and grease trap and treated in STP. • The contaminated waste will be seggregated and kept in separate drums/bins under shed. • The used oil will be collected in leak proof drums and kept under shed. • The waste will be categorised as recycleable, incinerable and land disposable. • Used oil and mettalic waste will be sold to authorised recyclers. • The incinerable waste such as oil contminated	Hazardous & Other Waste (Management and Transboundary) Rules, 2016 The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.	Pandu	Design & Construction Phase	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
	cotton, paint waste etc. in addition to this, used engine oil and oily sludge are likely to be generated.	cottons, filters, waste oil sludge, paint waste etc will be disposed of in authorised common incinerator. • Land disposable waste such as wood, fibers etc will be disposed of in authorised common hazardous waste treatment, storage and disposal facilities (TSDF).					

Environment Management Plan for proposed Terminal Project (Operation Phase)

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
1.0 Climate							
Climate Change	Project is unlikely to cause negative effect on climate. However, project can contribute positively for climate	• Greenbelt shall be developed all along the terminal premises. • Energy efficient measures in the terminal buildings will be implemented • Solar power will be used in potential area	Kyoto Protocol, Forest Conservation Rules & National Forest Policy	Terminal site	Operation and maintenance	IWT	IWT
2.0 Air Quality							

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
Air Pollution	Emission from machinery, ferry, DG and vehicular movement.	• Only Passenger ferry will be handled in the terminal hence no dust pollution anticipated. • Green belt shall be developed and maintained as per lay out • Local Species selected for development of green belt. • Water sprinkling would be provided in dust generating areas • DG exhaust will be minimised by regular maintenance in AMC • Monitoring of air quality shall be carried out on quarterly basis to check the level of pollutants and effectiveness of EMP • Ferries, deployed, will have efficient fuel combustion system with minimum emission	Environmental Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981	Terminals	Operation and maintenance	IWT	IWT
3.0 Soil Erosion							
Soil Erosion and management.	• Soil erosion of embankment during heavy rainfall.	• Periodic checking of the slope stabilization measures (stone pitching or otherwise) would be carried to assess the damage if	Project requirement	Along river bank and Embankment	Regular surveillance during operation	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		any. Necessary measures for repair shall be followed wherever there are failures					
4.0 Wastewater Management							
Water pollution	• Surface water pollution. • Siltation and erosion and contamination due to disposal of domestic waste	• STP (10KLD) would be provided to treat the sewage generated. Treated water would be used for horticulture and plantation purpose at the site • Storm water drainage system would be provided at the site. • Rain water harvesting facility would be developed and maintained • Oil interceptors shall be provided with the storm water drains in the parking lots & loading &unloading areas • Fuel shall be stored in leak proof containers and containers shall be placed on paved surfaces so that no spill occurs • Fuelling of vessels will be leak proof system • Quarterly Monitoring of surface water quality shall	Project requirement	Terminal and vessels	Operational Phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		be carried out to check the level of pollutants and effectiveness of EMP					
5.0 Noise Control							
Noise Pollution	• Noise generation from operation of vehicle, equipment and machinery.	• Timely maintenance and servicing of transportation vehicles and the machinery/pumps/vessels to be used during operation phase to reduce the noise generation. • Honking shall be prohibited at the project site • Hearing test for the workers shall be undertaken before employing them and thereafter shall be done after every six months • DG sets shall be provided with acoustic enclosure • Monitoring of Noise levels shall be carried out on quarterly basis to check the level of pollutants and effectiveness of proposed EMP	Noise Pollution (Regulation and Control) Rules, 2000	Access Road & Terminal Site	Operational phase	IWT	IWT
6.0 Accidental Risk							
Accident and Incident.	Accident risks associated with	• Traffic control measures, including speed limits	Project requirement	Access Road	Operational phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
	traffic movement.	should be enforced strictly.					
	Accidents due to Movement of Vessels and other hazards associated with site	• Further encroachment of squatters within the ROW of approach road will be prevented. • Monitor/ensure that all safety provisions included in design and construction phase are properly maintained • Adequate illumination should be provided at the site during evening	Project requirement	Throughout the Project route	Operational phase	IWT	IWT
7.0 Vessel Repairing							
Water pollution and waste management	Generation of wastewater and hazardous waste	• Wastewater generated from washings is normally contaminated with oil. Therefore, wastewater will be passed through oil water separator and treated in STP. • Bilge and other water will be treated as above • Wastewater evacuation system would be leak proof and no untreated wastewater would be	HW Rules, 2016. EP Act, 1986	Vessel Maintenance Unit	Operational phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		allowed to discharge to river • Treated wastewater will be used for plantation, lawn and garden to the maximum extent possible • Used and waste oil will be collected separately by adopting leak proof arrangements • Used oil will be stored under shed and will be auctioned to authorised recycler. • Hazardous waste will be stored separately under shed and disposed in Common TSDF • Non-hazardous scraps, plastics will be collected separately and sold as scrap • Domestic waste will be segregated and hand over to facility of local body					
8.0 Flora & Fauna							
Biodiversity loss	Loss of Aquatic Fauna including Dolphins and other macrophytes	• Propeller shall have net system to avoid any accident with dolphins and	Forest Conservation Act 1980, Wild	Project tree plantation sites.	Operational phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		other aquatic animals. • No wastewater or waste shall be disposed in river from terminal site or from vessel into the water. Penalty shall be imposed on the vessels reported disposing waste/wastewater in the river • Run-off from stockpile area, storage yards, parking areas & roads shall not be disposed directly in to river. • Instruction should be given to all vessels and all employee and staff that no dolphin or any other endangered species shall be harmed due to any reason • Instruction shall be given to vessel operator that in case any accident with dolphin occurs that should be reported immediately to terminal authority	Life Protection Act, 1972	Terminal site and surrounding area			

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		• Waiting time of vessels shall be reduced at the terminal/lock sites by providing the adequate loading and unloading equipment and vehicles. • Vessels shall be instructed for not using sharp lights and sounds all the time as they may disturb aquatic organisms.					
9.0 Repairing & Retrofitting of vessels of IWT:							
Repairing & Retrofitting of vessels of IWT	The reparing and retrofitting of vessels involve replacement of old machineries with latest one. In the process the waste water is likely to be generated from the washings and contaminated with oil and grease. The waste generated from repairing will be asbestos, ferrous and non ferrous scraps, plastics, packings, oil	• Wastewater will be passed through oil and grease trap and treated in STP. • The contaminated waste will be seggregated and kept in separate drums/bins under shed. • The used oil will be collected in leak proof drums and kept under shed. • The waste will be categorised as recycleable, incinerable and land	Hazardous & Other Waste (Management and Transboundary) Rules, 2016 The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.	Pandu **Repairing &Retrofitting of vessels of IWT**	Design & Construction Phase	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
	contaminated cotton, paint waste etc. in addition to this, used engine oil and oily sludge are likely to be generated.	disposable. • Used oil and mettalic waste will be sold to authorised recyclers. • The incinerable waste such as oil contminated cottons, filters, waste oil sludge, paint waste etc will be disposed of in authorised common incinerator. • Land disposable waste such as wood, fibers etc will be disposed of in authorised common hazardous waste treatment, storage and disposal facilities (TSDF).					

EMP Cost Estimates North Guwahati Terminal

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
CONSTRUCTION STAGE					
Technical Support	Technical support for preparation of guidelines, conservation action plan for turtle and dolphin areas and performance indicators	1	Lump sum	65000	65000
Drainage congestion & disposal of accumulated water	Provision of adequate surveillance	To be covered in project design and engineering cost			
Covered in project design and engineering cost	Embankment and River Bank Protection Measures	To be covered in project design and engineering cost			
Measures to reduce dredging requirement	River training works, Bandalling, Catchment treatment	To be covered in project design and engineering cost			
Land	Compensation against land	As required for specific site and is included separately under SIA/RAP reports.			
Soil	Soil contamination protection(Septic tanks, grease traps etc.) and rehabilitation of borrow	To be covered in project design and engineering cost			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	areas/debris disposal site/plant site & labour camps				
Noise	Canopy for DG sets PPEs like ear plug	To be covered in project design and engineering cost			
	Timely maintenance of the machinery, equipment and vehicles Barricading the site				
Water	Provision of storm water and wastewater management system	To be covered in project design and engineering cost			
	Construction of soak pits at construction sites & labour camps	To be covered in project design and engineering cost			
	Provision of clean drinking & domestic water facility at labour camps and construction site	To be covered in project design and engineering cost			
	STP construction, Zero Discharge management (collection of storm water and its distillation and use, and rain water harvesting	Including in project design and engineering costs			
Air Quality – Dust	Water Sprayer / Watering for	To be covered in project design and engineering cost			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Management during construction	Dust suppression				
	Green belt development, dust control system, mechanized material handling systems for material loading and unloading at terminal and vessel.	To be covered in project design and engineering cost			
Safety	Appointment of Safety Officers	To be covered in project design and engineering cost			
	Safety signage, fire-fighting measures& water ambulance etc.	To be covered in project design and engineering cost			
	Provision of trainings and PPE to workers	To be covered in the responsibility of the Contractor			
Health	Health check-up camps for construction workers	To be covered in the responsibility of the Contractor			
Reparing and Retrofitting of vessels of IWT, Assam	Improvement of old vessels of IWT with modern gadgets	To be covered in project design and engineering cost			
Enhancement Measures	Institutional Support for ecology awareness through reputed institutions	No		Lump sum	25000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Bath shelter for women along the stretch for maintaining privacy from vessel movement	No			
	Support for cleanliness at Ghats and improvement of Ghats	To be covered in the responsibility of the Contractor		Lump sum	0
Environmental Monitoring in the construction phase	Terrestrial and Aquatic Fauna (Including Dolphin Conservation Management Plan)	50,000 per season. Once in six month for 3 years			300000
	Ambient Air Quality	Monitoring at along the stretch	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000
		Monitoring at construction sites	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000
	Surface Water Quality	Surface water resources	As per the standard norms, sample may be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence,	12,000/ sample	108000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			3samples each location in one year & 9 samples each location for 3years. Then costing @12000/sample will be 12000*9 i.e 108000		
Environmental Monitoring in the construction phase	Surface Water Quality	Ground water bodies	As per the standard norms, sample may be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence, 9 samples each location for 3years. Then costing @12000/samples will be 12000*9 i.e 108000	12,000/ sample	108000
	Drinking Water Quality	There will be strict instruction to all the contractors to supply filtered driking water to the labours. Hence, it is not required to anyalysis drinking water quality since the project activities have no direct impact on drinking water in the nearby area.			0
	Noise & Vibration	At monitoring locations identified in the Environmental management plan 1 site for	24 hourly/season for pre and post monsoon at 3 locations per site for 3 years for 1 ghat. Number of sample per year per location is 2. Total number of samples is 18	4,000/ sample	72000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
		3 years			
		Underwater noise Monitoring	Per month for 3years i.e. 36 samples during construction stage	4,000/ sample	144000
	Soil Quality, Erosion & Siltation and River Bed	At terminal and landing construction site for 3 years	As per the standard norms, sample to be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence 9 samples each location for 3years. Then, 9X8000will be total cost per terminal.	8,000/ sample	72000
	River Bed Sediment	At dredging sites	2 times per year for three years	8,000/ sample	48000
SUB TOTAL (CONSTRUCTION STAGE)					1302000
OPERATION STAGE					
	Erosion Control and landscaping	Visual Check	To be part of Regular maintenance and operation costs		

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Water	Waste Water Management (compact STP cost in NBC) based on number of people/hour	STP Operation, rainwater harvesting management and maintenance	To be part of Regular maintenance and operation cost		0
	Storm Water Management System	Maintenance of Storm water drains	To be part of Regular maintenance and costs		
	Provision of drinking water facilities	There will be strict instruction to all the contractors to supply filtered drinking water to the labours. Hence, it is not required to analysis drinking water quality since the project activities have no direct impact on drinking water in the nearby area.			0
	Waste Management System	Collection, segregation and disposal of municipal waste, hazardous waste (used oil) and dredged soil	To be part of Regular maintenance and operation cost		

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Environmental Monitoring in the operation phase	Terrestrial and Aquatic Fauna including surveillance audit & Dolphin Conservation Management Plan	During operation stage, surveillance audit of Aquatic ecology to be conducted on quarterly basis for 3years @ Rs. 25000/-		300000
		Ambient Air Quality	4 samples/location/year @15000/samples for 1 location will be 4X1X15000 i.e. 60000 For 3years it will be 180000	15,000/ sample	180000
		Surface Water Quality	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) @12000/- will be 3X1X3X12000 i.e. 1,08,000/- . For three years, it will be 3,24,000/-	12,000/ sample	324000
Environmental Monitoring during Operation Stage		Ground water	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) at 1 location @12,000/sample will be Rs36000 . For three years it	12,000/ sample	108000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			will be 108000		
		Noise & Vibration	24 hourly/season for3 season per year at 3 locations per site for 1 year for 1 ghat i.e. 3X3X3X4000	4,000/ sample	1,08,000
		Soil Quality, River Bed Sediments, Soil Erosion & Siltation, Integrity of embankments	4 samples/location/year @8000/samples for 1 location will be 4X1X8000 i.e. 32000. For 3years it will be 96000	8,000/ sample	96000
Electricity	Solar Panels	Cost of solar panels for priority ghats	Provision of installing solar panels to be covered in design & engineering cost		0
SUB TOTAL (OPERATION PHASE)					1116000
ESTABLISHMENT, TRAINING & MANAGEMENT SYSTEM					
Training	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Social and	Selected staff of AIWTDS, supervisor, and contractors	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel	Lump sum	15000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	cultural values of the area.		Operators		
	Training for Ghat management via training for Ghat/section officers/ vessel operators/masters/ khalasi etc.	Ghat officers, Ghat Maintenance workers		Lump sum	50000
	General environmental and awareness; Environmental and social sensitivity of the project influence area; Mitigation measures; Community issues; Awareness of transmissible diseases; Social and cultural values.	PIU; supervisor; selected contractors' crew		Lump sum	5000
	EMP;Waste disposal, Cultural values and social sensitivity.	Construction crew	Contractors		10000
	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers; boat/launch crew,	Contractors		10000
	Camp operation; Waste	Camp staff	Contractors		10000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	disposal;Natural resource conservation;Housekeeping.				
	Restoration requirements; Waste disposal.	Restoration teams	Contractors		10000
	Construction Implementation requirements;handling situations for important flora / fauna especially Dolphin;Physical Cultural resources;	PIU;supervisor; selected contractors' crew	Contractors, Supervisor and E&S cell		10000
	Management Systems	Health and safety equipment on board and in terminals	1	Lump sum	25000
		Management Information and tracking system	1	Lump sum	350000
SUBTOTAL (ESTABLISHMENT & TRAINING and MANAGEMENT SYSTEM)					495000
SUB TOTAL (Construction, and Operation and mobilization)					2913000
CONTINGENCIES @ 5 % on total Environmental Costs					145650
GRAND TOTAL for one ghat (in Rs)					3058650

EMP Cost Estimate for Gateway Guwahati Ghat

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
CONSTRUCTION STAGE					
Technical Support	Technical support for preparation of guidelines, conservation action plan for turtle and dolphin areas and performance indicators	Lump sum	North Guwahati	65000	65000
Drainage congestion & disposal of accumulated water	Provision of adequate surveillance	To be covered in project design and engineering cost			
Covered in project design and engineering cost	Embankment and River Bank Protection Measures	To be covered in project design and engineering cost			
Measures to reduce dredging requirement	River training works, Bandalling, Catchment treatment	To be covered in project design and engineering cost			
Land	Compensation against land	As required for specific site and is included separately under SIA/RAP reports.			
Soil	Soil contamination protection(Septic tanks, grease traps etc.) and rehabilitation of borrow areas/debris disposal site/plant site & labour camps	To be covered in project design and engineering cost			
Noise	Canopy for DG sets PPEs like ear plug	To be covered in project design and engineering cost			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Timely maintenance of the machinery, equipment and vehicles Barricading the site				
Water	Provision of storm water and wastewater management system	To be covered in project design and engineering cost			
	Construction of soak pits at construction sites & labour camps	To be covered in project design and engineering cost			
	Provision of clean drinking & domestic water facility at labour camps and construction site	To be covered in project design and engineering cost			
	STP construction, Zero Discharge management (collection of storm water and its distillation and use, and rain water harvesting	Including in project design and engineering costs			
Air Quality – Dust Management during construction	Water Sprayer / Watering for Dust suppression	To be covered in project design and engineering cost			
	Green belt development, dust control system, mechanized material handling systems for material loading and unloading at terminal and vessel.	To be covered in project design and engineering cost			
Safety	Appointment of Safety Officers	To be covered in project design and engineering cost			
	Safety signage, fire-fighting measures& water ambulance etc.	To be covered in project design and engineering cost			
	Provision of trainings and PPE to workers	To be covered in the responsibility of the Contractor			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Health	Health check-up camps for construction workers	To be covered in the responsibility of the Contractor			
Enhancement Measures	Institutional Support for ecology awareness through reputed institutions	No		Lump sum	25000
	Bath shelter for women along the stretch for maintaining privacy from vessel movement	No			
	Support for cleanliness at Ghats and improvement of Ghats	To be covered in the responsibility of the Contractor		Lump sum	0
Environmental Monitoring in the construction phase	Terrestrial and Aquatic Fauna including Dolphin Conservation Management Plan	50,000 per season. Once in six month for 3 years			300000
	Ambient Air Quality	Monitoring at along the stretch	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000
		Monitoring at construction sites	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000
	Surface Water Quality	Surface water resources	As per the standard norms, sample may	12,000/ sample	108000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence, 3samples each location in one year & 9 samples each location for 3years. Then costing @12000/sample will be 12000*9 i.e 108000		
Environmental Monitoring in the construction phase	Surface Water Quality	Ground water bodies	As per the standard norms, sample may be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence, 9 samples each location for 3years. Then costing @12000/samples will	12,000/ sample	108000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			be 12000*9 i.e 108000		
	Drinking Water Quality	There will be strict instruction to all the contractors to supply filtered driking water to the labours. Hence, it is not required to anyalysis drinking water quality since the project activities have no direct impact on drinking water in the nearby area.			0
	Noise & Vibration	At monitoring locations identified in the Environmental management plan 1 site for 3 years	24 hourly/season for pre and post monsoon at 3 locations per site for 3 years for 1 ghat. Number of sample per year per location is 2. Total number of samples is 18	4,000/ sample	72000
		Underwater noise Monitoring	Per month for 3years i.e. 36 samples during construction stage	4,000/ sample	144000
	Soil Quality, Erosion & Siltation and River Bed	At terminal and landing construction site for 3 years	As per the standard norms, sample to be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each	8,000/ sample	72000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			location for three years. Hence 9 samples each location for 3years. Then, 9X8000will be total cost per terminal.		
	River Bed Sediment	At dredging sites	2 times per year for three years	8,000/ sample	48000
SUB TOTAL (CONSTRUCTION STAGE)					1302000
OPERATION STAGE					
	Erosion Control and landscaping	Visual Check	To be part of Regular maintenance and operation costs		
Water	Waste Water Management (compact STP cost in NBC) based on number of people/hour	STP Operation, rainwater harvesting management and maintenance	To be part of Regular maintenance and operation cost		0
	Storm Water Management System	Maintenance of Storm water drains	To be part of Regular maintenance and costs		
	Provision of drinking water facilities	There will be strict instruction to all the contractors to supply filtered drinking water to the labours. Hence, it is not required to analysis drinking water quality since the project activities have no direct impact on drinking water in the nearby area.			0

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Waste Management System	Collection, segregation and disposal of municipal waste, hazardous waste (used oil) and dredged soil	To be part of Regular maintenance and operation cost		
	Environmental Monitoring in the operation phase	Terrestrial and Aquatic Fauna including surveillance audit and Dolphin Consevation Management Plan	During operation stage, surveillance audit of Aquatic ecology to be conducted on quarterly basis for 3years @ Rs. 25000/-		300000
		Ambient Air Quality	4 samples/location/year @15000/samples for 1 location will be 4X1X15000 i.e. 60000 For 3years it will be 180000	15,000/ sample	180000
		Surface Water Quality	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) @12000/- will be 3X1X3X12000	12,000/ sample	324000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			i.e. 1,08,000/-. For three years, it will be 3,24,000/-		
Environmental Monitoring during Operation Stage		Ground water	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) at 1 location @12,000/sample will be Rs36000 . For three years it will be 108000	12,000/ sample	108000
		Noise & Vibration	24 hourly/season for3 season per year at 3 locations per site for 1 year for 1 ghat i.e. 3X3X3X4000	4,000/ sample	1,08,000
		Soil Quality, River Bed Sediments, Soil Erosion & Siltation, Integrity of embankments	4 samples/location/year @8000/samples for 1 location will be 4X1X8000 i.e. 32000. For 3years it will be 96000	8,000/ sample	96000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Electricity	Solar Panels	Cost of solar panels for priority ghats	Provision of installing solar panels to be covered in design & engineering cost		0
SUB TOTAL (OPERATION PHASE)					1116000
ESTABLISHMENT, TRAINING & MANAGEMENT SYSTEM					
Training	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Social and cultural values of the area.	Selected staff of AIWTDS, supervisor, and contractors	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators	Lump sum	15000
	Training for Ghat management via traing for Ghat/section officers/ vessel operators/masters/ khalasi etc.	Ghat officers, Ghat Maintenance workers		Lump sum	50000
	General environmental and awareness; Environmental and social sensitivity of the project influence area; Mitigation measures;Community issues;Awareness of transmissible diseases;Social and cultural values.	PIU; supervisor; selected contractors' crew		Lump sum	5000
	EMP;Waste disposal, Cultural values and social sensitivity.	Construction crew	Contractors		10000
	Road/waterway safety;Defensive driving/sailing;Waste disposal;	Drivers;boat/launch crew,	Contractors		10000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Camp operation; Waste disposal;Natural resource conservation;Housekeeping.	Camp staff	Contractors		10000
	Restoration requirements; Waste disposal.	Restoration teams	Contractors		10000
	Construction Implementation requirements;handling situations for important flora / fauna especially Dolphin;Physical Cultural resources;	PIU;supervisor; selected contractors' crew	Contractors, Supervisor and E&S cell		10000
	Management Systems	Health and safety equipment on board and in terminals	1	Lump sum	25000
		Management Information and tracking system	1	Lump sum	350000
SUBTOTAL (ESTABLISHMENT & TRAINING and MANAGEMENT SYSTEM)					495000
SUB TOTAL (Construction, and Operation and mobilization)					2913000
CONTINGENCIES @ 5 % on total Environmental Costs					1456000
GRAND TOTAL for one ghat (in Rs)					3058650

EMP Cost Estimate for Aphalamukh Ghat

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
CONSTRUCTION STAGE					
Technical Support	Technical support for preparation of guidelines, conservation action plan for turtle and dolphin areas and performance indicators	Lump sum	North Guwahati	65000	65000
Greenbelt development	Plantation along the access road to the terminal	No. of trees	50trees	50000 per terminal	50000
	provisional Monitoring and aftercare	No. of trees	50trees	10000 (once in a year for 1 terminal for 3yrs i.e., 10000x3)	30000
Drainage congestion & disposal of accumulated water	Provision of adequate surveillance	To be covered in project design and engineering cost			
Covered in project design and engineering cost	Embankment and River Bank Protection Measures	To be covered in project design and engineering cost			
Measures to reduce dredging requirement	River training works, Bandalling, Catchment treatment	To be covered in project design and engineering cost			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Land	Compensation against land	As required for specific site and is included separately under SIA/RAP reports.			
Soil	Soil contamination protection(Septic tanks, grease traps etc.) and rehabilitation of borrow areas/debris disposal site/plant site & labour camps	To be covered in project design and engineering cost			
Noise	Canopy for DG sets PPEs like ear plug	To be covered in project design and engineering cost			
	Timely maintenance of the machinery, equipment and vehicles Barricading the site				
Water	Provision of storm water and wastewater management system	To be covered in project design and engineering cost			
	Construction of soak pits at construction sites & labour camps	To be covered in project design and engineering cost			
	Provision of clean drinking & domestic water facility at labour camps and construction site	To be covered in project design and engineering cost			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	STP construction, Zero Discharge management (collection of storm water and its distillation and use, and rain water harvesting	Including in project design and engineering costs			
Air Quality – Dust Management during construction	Water Sprayer / Watering for Dust suppression	To be covered in project design and engineering cost			
	Green belt development, dust control system, mechanized material handling systems for material loading and unloading at terminal and vessel.	To be covered in project design and engineering cost			
Safety	Appointment of Safety Officers	To be covered in project design and engineering cost			
	Safety signage, fire-fighting measures& water ambulance etc.	To be covered in project design and engineering cost			
	Provision of trainings and PPE to workers	To be covered in the responsibility of the Contractor			
Health	Health check-up camps for construction workers	To be covered in the responsibility of the Contractor			

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
Enhancement Measures	Institutional Support for ecology awareness through reputed institutions	No		Lump sum	25000
	Bath shelter for women along the stretch for maintaining privacy from vessel movement	No			
	Support for cleanliness at Ghats and improvement of Ghats	To be covered in the responsibility of the Contractor		Lump sum	0
Environmental Monitoring in the construction phase	Terrestrial and Aquatic Fauna including Dolphin Consevation Management Plan	50,000 per season. Once in six month for 3 years			300000
	Ambient Air Quality	Monitoring at along the stretch	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000
		Monitoring at construction sites	Total sample per location for 3years is 12, Considering 15,000/sample, cost for12 samples will be 12X15000	15,000/ sample	180000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Surface Water Quality	Surface water resources	As per the standard norms, sample may be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence, 3samples each location in one year & 9 samples each location for 3years. Then costing @12000/sample will be 12000*9 i.e 108000	12,000/ sample	108000
Environmental Monitoring in the construction phase	Surface Water Quality	Ground water bodies	As per the standard norms, sample may be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence, 9 samples each location for 3years. Then costing @12000/samples will be 12000*9 i.e 108000	12,000/ sample	108000
	Drinking Water Quality	There will be strict instruction to all the contractors to supply filtered driking water to the labours. Hence, it is not required to anyalysis drinking water quality since the project activities have no direct impact on drinking water in			0

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
		the nearby area.			
	Noise & Vibration	At monitoring locations identified in the Environmental management plan 1 site for 3 years	24 hourly/season for pre and post monsoon at 3 locations per site for 3 years for 1 ghat. Number of sample per year per location is 2. Total number of samples is 18	4,000/ sample	72000
		Underwater noise Monitoring	Per month for 3years i.e. 36 samples during construction stage	4,000/ sample	144000
	Soil Quality, Erosion & Siltation and River Bed	At terminal and landing construction site for 3 years	As per the standard norms, sample to be collected for three season (Pre-monsoon, monsoon & post monsoon or winter) at each location for three years. Hence 9 samples each location for 3years. Then, 9X8000will be total cost per terminal.	8,000/ sample	72000
	River Bed Sediment	At dredging sites	2 times per year for three years	8,000/ sample	48000
SUB TOTAL (CONSTRUCTION STAGE)					1382000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
OPERATION STAGE					
	Erosion Control and landscaping	Visual Check	To be part of Regular maintenance and operation costs		
Water	Waste Water Management (compact STP cost in NBC) based on number of people/hour	STP Operation, rainwater harvesting management and maintenance	To be part of Regular maintenance and operation cost		0
	Storm Water Management System	Maintenance of Storm water drains	To be part of Regular maintenance and costs		
	Provision of drinking water facilities	There will be strict instruction to all the contractors to supply filtered drinking water to the labours. Hence, it is not required to analysis drinking water quality since the project activities have no direct impact on drinking water in the nearby area.			0
	Waste Management System	Collection, segregation and disposal of municipal waste, hazardous waste (used oil) and dredged soil	To be part of Regular maintenance and operation cost		
	Environmental Monitoring in the operation phase	Terrestrial and Aquatic Fauna including surveillance audit & Dolphin Conservation Management Plan	During operation stage, surveillance audit of Aquatic ecology to be conducted on quarterly basis for 3years @ Rs. 25000/-		300000
		Ambient Air Quality	4 samples/location/year @15000/samples for 1	15,000/ sample	180000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
			location will be 4X1X15000 i.e. 60000 For 3years it will be 180000		
		Surface Water Quality	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) @12000/- will be 3X1X3X12000 i.e. 1,08,000/-. For three years, it will be 3,24,000/-	12,000/ sample	324000
Environmental Monitoring during Operation Stage		Ground water	3 samples per location for one year (at pre-monsoon, monsoon & post-monsoon) at 1 location @12,000/sample will be Rs36000 . For three years it will be 108000	12,000/ sample	108000
		Noise & Vibration	24 hourly/season for3 season per year at 3 locations per site for 1 year for 1 ghat i.e. 3X3X3X4000	4,000/ sample	1,08,000
		Soil Quality, River Bed Sediments, Soil Erosion &	4 samples/location/year @8000/samples for 1	8,000/ sample	96000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
		Siltation, Integrity of embankments	location will be 4X1X8000 i.e. 32000. For 3years it will be 96000		
Electricity	Solar Panels	Cost of solar panels for priority ghats	Provision of installing solar panels to be covered in design & engineering cost		0
SUB TOTAL (OPERATION PHASE)					1116000
ESTABLISHMENT, TRAINING & MANAGEMENT SYSTEM					
Training	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Social and cultural values of the area.	Selected staff of AIWTDS, supervisor, and contractors	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators	Lump sum	15000
	Training for Ghat management via traing for Ghat/section officers/ vessel operators/masters/ khalasi etc.	Ghat officers, Ghat Maintenance workers		Lump sum	50000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	General environmental and awareness; Environmental and social sensitivity of the project influence area; Mitigation measures; Community issues; Awareness of transmissible diseases; Social and cultural values.	PIU; supervisor; selected contractors' crew		Lump sum	10000
	EMP; Waste disposal, Cultural values and social sensitivity.	Construction crew	Contractors		10000
	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers;boat/launch crew,	Contractors		10000
	Camp operation; Waste disposal; Natural resource conservation; Housekeeping.	Camp staff	Contractors		10000
	Restoration requirements; Waste disposal.	Restoration teams	Contractors		10000
	Construction Implementation requirements; handling situations for important flora / fauna especially Dolphin;	PIU;supervisor; selected contractors' crew	Contractors, Supervisor and E&S cell		10000

COMPONENT	ITEM	UNIT	QUANTITY	RATE	Amount (in INR)
	Physical Cultural resources;				
	Management Systems	Health and safety equipment on board and in terminals	1	Lump sum	25000
		Management Information and tracking system	1	Lump sum	350000
SUBTOTAL (ESTABLISHMENT & TRAINING and MANAGEMENT SYSTEM)					495000
SUB TOTAL (Construction, and Operation and mobilization)					2993000
CONTINGENCIES @ 5 % on total Environmental Costs					149650
GRAND TOTAL for one ghat (in Rs)					3142650

Attachment-2

S.No	Names of Ghats	FGDs	Categories of Participants	Total Count in a Particular FGD
1	Aloupatty	FGD 1	Gender fgd (combination of males & females)	20
		FGD 2	Indiginious (tribals)	0
		FGD 3	labour (ferry ghat labours)	15
		FGD 4	ferry (ferry opeartors)	4
		FGD 5	Village fgd (female residents, workimg and non-working)	15
2	Annapurna	FGD 1	gender fgd	18
		FGD 2	Indiginious	0
		FGD 3	labour	13
		FGD 4	ferry	3
		FGD 5	Village fgd	12
3	Aphalaghat	FGD 1	Gender FGD	15
		FGD 2	Indiginious	14
		FGD 3	Labour	10
		FGD 4	ferry	0
		FGD 5	Village FGD	18
4	Beranga	FGD 1	Gender FGD	20
		FGD 2	Indiginious	0
		FGD 3	Labour	10
		FGD 4	ferry	3
		FGD 5	Village FGD	20
5	Bhukhrodiya	FGD 1	Gender FGD	0
		FGD 2	Indiginious	0
		FGD 3	Labour	20
		FGD 4	ferry	0
		FGD 5	Village FGD	0
6	Dhubri	FGD 1	Gender FGD	20
		FGD 2	Indiginious	0
		FGD 3	Labour	15
		FGD 4	ferry	3
		FGD 5	Village FGD	10
7	Dudpatiel	FGD 1	Gender FGD	17
		FGD 2	Indiginious	10
		FGD 3	Labour	10
		FGD 4	ferry	4
		FGD 5	Village FGD	18
8	Fakirgunj	FGD 1	Gender FGD	10
		FGD 2	Indiginious	0

		FGD 3	Labour	20
		FGD 4	ferry	5
		FGD 5	Village FGD	10
9	Gandhi ghat	FGD 1	Gender FGD	19
		FGD 2	Indiginious	0
		FGD 3	Labour	10
		FGD 4	ferry	5
		FGD 5	Village FGD	15
10	Jaleshswar	FGD 1	Gender FGD	20
		FGD 2	Indiginious	0
		FGD 3	Labour	15
		FGD 4	ferry	5
		FGD 5	Village FGD	17
11	Kachari ghat	FGD 1	Gender FGD	15
		FGD 2	Indiginious	0
		FGD 3	Labour	15
		FGD 4	ferry	0
		FGD 5	Village FGD	13
12	Kamalabari	FGD 1	Gender FGD	20
		FGD 2	Indiginious	14
		FGD 3	Labour	10
		FGD 4	ferry	15
		FGD 5	Village FGD	20
13	Kanakpur	FGD 1	Gender FGD	10
		FGD 2	Indiginious	0
		FGD 3	Labour	10
		FGD 4	ferry	10
		FGD 5	Village FGD	10
14	ghatLachit	FGD 1	Gender FGD	5
		FGD 2	Indiginious	0
		FGD 3	Labour	5
		FGD 4	ferry	0
		FGD 5	Village FGD	15
15	Nagarbera	FGD 1	Gender FGD	20
		FGD 2	Indiginious	0
		FGD 3	Labour	20
		FGD 4	ferry	4
		FGD 5	Village FGD	20
16	Neemati ghat	FGD 1	Gender FGD	20
		FGD 2	Indiginious	20
		FGD 3	Labour	10
		FGD 4	ferry	9

		FGD 5	Village FGD	19
17	North Guwahati	FGD 1	Gender FGD	20
		FGD 2	Indiginious	0
		FGD 3	Labour	20
		FGD 4	ferry	0
		FGD 5	Village FGD	7
18	Rajaduwar	FGD 1	Gender FGD	15
		FGD 2	Indiginious	10
		FGD 3	Labour	16
		FGD 4	ferry	5
		FGD 5	Village FGD	13
19	Sonaram Ghat	FGD 1	Gender FGD	0
		FGD 2	Indiginious	0
		FGD 3	Labour	20
		FGD 4	ferry	0
		FGD 5	Village FGD	4
20	South Salmara	FGD 1	Gender FGD	15
		FGD 2	Indiginious	0
		FGD 3	Labour	10
		FGD 4	ferry	5
		FGD 5	Village FGD	20
21	Umananda	FGD 1	Gender FGD	11
		FGD 2	Indiginious	0
		FGD 3	Labour	10
		FGD 4	ferry	5
		FGD 5	Village FGD	15