

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	<p>Gender inclusive IWT and Trade Facilitation Study carried out to provide recommendations that can be integrated into the project design.</p> <p>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:</p> <p>Provision of clean, gender segregated, well-lit wheelchair accessible toilets.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>Provision of signage of appropriate visibility and provision for audio announcements- This implies (a)</p>	<p>Equity of access to key services through IWT (including health, education and economic centres)</p> <p>Beneficiaries (sex disaggregated, senior citizens, and differently abled) satisfied with [specified dimensions e.g. access, quality of services, responsiveness to needs, quality of facilities] (%)</p> <p>No. of vessels operating that have:</p> <ul style="list-style-type: none"> •Seats for all passengers •Life Jackets for all passengers •Safety instructions, •Secure spaces for goods <p>No. of vessels that have disability access</p> <p>No. of long distance vessels with toilet facilities with disability access</p>	ISDP Consultant; DPR Consultant

	<p>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.</p>		
Preparation	<p>Gather gender disaggregated data during the SIA and organise consultations with users to incorporate their suggestions while planning and designing the Ghats/vessels.</p> <p><u>LA and R&R:</u></p> <p>Ensure payment of compensation on joint names;</p> <p>One-time assistance to women headed households;</p> <p>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</p>	<p>No. of payments disbursed on joint names.</p> <p>No. of women headed households who’ve received one-time payment assistance</p> <p>No. of women who’ve received training on skill development</p>	Revenue officers and AIWTDS
Construction	<p>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.</p> <p>Trainings and awareness camps on prevention and protection against GBV and HIV/AIDS</p> <p>Developing a code of conduct/SHW policy and setting up of ICC as per the mandate of SHW Act, 2013.</p>	<p>No. of skilled/ unskilled/ professional women employed in the project construction works.</p> <p>No. of female employees who have accessed employee welfare schemes and benefits under labour laws.</p> <p>No. of trainings and awareness camps on GBV and HIV/AIDS organised at the construction sites.</p> <p>ICC constituted at all establishments related to the</p>	Construction contractors Supervision Consultant AIWTDS

		project.	
Operation	<p>Strict and regulated scheduling (timing and price) of IWT services.</p> <p>Security personnel deployed at the terminals for safety and security of passengers, particularly women.</p> <p>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.</p> <p>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</p> <p>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</p>	<p>Display boards about boat schedules and strict adherence to the same.</p> <p>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.</p> <p>No. of SHG applicants availing the Jibondinga Scheme</p> <p>No. of women entrepreneur applicants availing the Jibondinga Scheme</p>	<p>E&S cell</p> <p>AIWT Regulatory Authority</p> <p>Crew Training Centre</p>
GRM	<p>Display the penal consequences of sexual harassment at a conspicuous place in the workplace.</p> <p>Display of the "citizen charter" at the terminals.</p> <p>Project helpline no. along with existing hotlines for women's safety to be advertised on board the vessels and the terminals.</p>	<p>No. of SHW cases adjudicated by ICC and resolved.</p> <p>Dedicated helpline for the project established and working.</p> <p>No. and nature of complaints received from women.</p> <p>MoU with exiting women</p>	<p>AIWTD/GRM system</p>

		helpline nos. and/or prominent NGOs to report complaints of harassment.	
M&E	<p>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.</p> <p>Monitoring of safety and security of passengers as per the SOP by the vigilance team.</p> <p>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.</p>	<p>% of women respondents interviewed for the satisfaction survey.</p> <p>No of operators refused licences to operate because of non-compliance of safety provisions (percentage of total applicants) under the SOP.</p>	<p>AIWTD</p> <p>AIWT Regulatory Authority</p>

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 7 th
	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	<p>Rate of poverty and periodic floods in the area has an adverse impact on the livelihood of the tribe who mostly dwell near the bank of the river.</p> <p>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</p>

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	<ul style="list-style-type: none">• Loss of vegetation.• Loss of top soil.• Loss of natural resource (Earth/soil)	<ul style="list-style-type: none">• 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	<p>Solid Waste Management Rules, 2016, Hazardous & Other Waste (Management and Transboundary) Rules, 2016</p> <p>C & D waste Rules, 2016.</p> <p>The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.</p>	<p>Construction site</p> <p>Labour and construction Camp Locations</p>	<p>During design and</p> <p>Construction Stage</p>	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		<p>removed and stored with remaining excavated soil.</p> <ul style="list-style-type: none"> Shore protection works like stone pitching along the bank shall be undertaken. 					
1.2 Setting of Labour & Construction Camps:	Contamination of land and water resources from waste generation.	<ul style="list-style-type: none"> 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. 	<p>Solid Waste Management Rules, 2016, Hazardous & Other Waste (Management and Transboundary) Rules, 2016</p> <p>C & D waste Rules, 2016.</p> <p>The Water (Prevention & Control of Pollution) Act, 1974 and amendments thereof.</p>	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.	<ul style="list-style-type: none"> 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
		<p>local regulations.</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
		<p>authority</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
		<p>Disaster Management Authority, State Disaster Response Force (SDRF) & National Disaster Response Force (NDRF) during emergency situation</p> <ul style="list-style-type: none"> • 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	<p>Dust Generation due to construction activities and material handling.</p> <p>Emission from machinery, DG and vehicular movement.</p>	<ul style="list-style-type: none"> • 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 PM₁₀, PM_{2.5}, SO_x, NO_x, and CO shall be carried out quarterly at construction site • Regular water sprinkling/fogging to suppress the dust generated at 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. 	<p>Environmental Protection Act, 1986 and amendments thereof;</p> <p>The Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof</p>	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
		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Noise generation from construction activity. • Noise generation from operation of vehicle, equipment and machinery. 	<ul style="list-style-type: none"> • Protection devices (earplugs or ear muffs) 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 <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<p>making a proper drainage network in project site.</p> <ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> • 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
		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> Loss of terrestrial flora & fauna. Loss of Aquatic Fauna including Dolphins and macrophytes 	<ul style="list-style-type: none"> 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 accidentally 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
		<ul style="list-style-type: none"> 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 piling 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
		<p>like mufflers, enclosures shall be fitted with the equipment as much as feasible.</p> <ul style="list-style-type: none"> • 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	<p>To prepare Dredging plan including timeframe</p> <p>To stop dredging during breeding & spawning season (June to August)</p> <p>To use turtle & Dolphin deflectors at sensitive location</p> <ul style="list-style-type: none"> 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 		<p>Terminal site/construction camps</p> <p>Around Piling/dredging Area</p>	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	<ul style="list-style-type: none"> • 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; 	<ul style="list-style-type: none"> • 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 scaffolding put thereof 		Near the Heritage Site	During design and construction stage	Contractor	TSC & PMU
Labour Influx	<ul style="list-style-type: none"> • Influence in the demographic composition • Increased 	<ul style="list-style-type: none"> • 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
	<p>demand and competition for local social and health services</p> <ul style="list-style-type: none"> • 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 	<p>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</p> <ul style="list-style-type: none"> • 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
		<p>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.</p> <p>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.</p>					

Component	Environmental Attribute and potential impacts	Remedial Measure	Relevant laws and Contract Documents	Approximate Location	Time Frame	Institutional Responsibility	
						Implementation	Supervision
		<ul style="list-style-type: none"> 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 extends 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 repairing 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	<ul style="list-style-type: none"> Wastewater will be passed through oil and grease trap and treated in STP. The contaminated waste will be segregated 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 contaminated 	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. <ul style="list-style-type: none"> 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	
						Implementat ion	Supervision
1.0 Climate							
Climate Change	Project is unlikely to cause negative effect on climate. However, project can contribute positively for climate	<ul style="list-style-type: none">Greenbelt shall be developed all along the terminal premises.Energy efficient measures in the terminal buildings will be implementedSolar power will be used in potential area	Kyoto Protocol, Forest Conservation Rules & National Forest Policy	Terminal site	Operation and maintena nce	IWT	IWT
2.0 Air Quality							

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
Air Pollution	Emission from machinery, ferry, DG and vehicular movement.	<ul style="list-style-type: none"> 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 	Environment al Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981	Terminals	Operation and maintena nce	IWT	IWT
3.0 Soil Erosion							
Soil Erosion and manageme nt.	<ul style="list-style-type: none"> Soil erosion of embankment during heavy rainfall. 	<ul style="list-style-type: none"> 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 Embankme nt	Regular surveillan ce during operation	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
		any. Necessary measures for repair shall be followed wherever there are failures					
4.0 Wastewater Management							
Water pollution	<ul style="list-style-type: none"> • Surface water pollution. • Siltation and erosion and contamination due to disposal of domestic waste 	<ul style="list-style-type: none"> • 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	
						Implementat ion	Supervision
		be carried out to check the level of pollutants and effectiveness of EMP					
5.0 Noise Control							
Noise Pollution	<ul style="list-style-type: none"> Noise generation from operation of vehicle, equipment and machinery. 	<ul style="list-style-type: none"> 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	Operationa l phase	IWT	IWT
6.0 Accidental Risk							
Accident and Incident.	Accident risks associated with	<ul style="list-style-type: none"> Traffic control measures, including speed limits 	Project requirement	Access Road	Operationa l phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
	traffic movement.	should be enforced strictly.					
	Accidents due to Movement of Vessels and other hazards associated with site	<ul style="list-style-type: none"> • 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	Operationa l phase	IWT	IWT
7.0 Vessel Repairing							
Water pollution and waste management	Generation of wastewater and hazardous waste	<ul style="list-style-type: none"> • 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	Operationa l phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
		<p>allowed to discharge to river</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Propeller shall have net system to avoid any accident with dolphins and 	Forest Conservation Act 1980, Wild	Project tree plantation sites.	Operationa l phase	IWT	IWT

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
		<p>other aquatic animals.</p> <ul style="list-style-type: none"> • 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	
						Implementat ion	Supervision
		<ul style="list-style-type: none"> 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 repairing 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	<ul style="list-style-type: none"> Wastewater will be passed through oil and grease trap and treated in STP. The contaminated waste will be segregated 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 & Constructio n Phase	Contractor	TSC & PMU

Component	Environmental Attribute and potential impacts	Remedial Measures	Relevant laws/ Contracts	Approximate Location	Time Frame	Institutional Responsibility	
						Implementat ion	Supervision
	contaminated cotton, paint waste etc. in addition to this, used engine oil and oily sludge are likely to be generated.	<p>disposable.</p> <ul style="list-style-type: none"> • 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

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 drinking 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 for 3 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 for 12 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 for 12 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 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
	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 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	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 for 3 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 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

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 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 for 12 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 for 12 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 drikng 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 for 3 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