ANNEXURE IV

ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING PROGRAMME – NEAMATI

1. GENERAL

The Environment and Social Management Plan (ESMP) is required to ensure sustainable development of the proposed terminal on river Brahmaputra both during the construction as well as operational phases. The ESMP is site and time specific. In order to effectively implement ESMP, an institutional framework has been developed and roles and responsibilities of various relevant agencies have been worked out. Capacity development program are also identified and part of the ESMP.

In general, Assam Inland Water Transport Development Society (AIWTDS), (with assistance from Contractor, Third Party Monitoring Consultant /Technical Support & Supervision Consultant) is the responsible entity for ensuring that the mitigation measures as suggested in the ESMP are carried out. A detailed ESMP has been prepared for Neamati terminal. The list provides reference implementing organisation and responsible entity.

COMPONENTS OF EMP

Key components of the EMP are summarized below and explained in detail in the following subsections:

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

Site-specific environment and social riverine infrastructure along with the roles and responsibilities of the key persons involved at different phases of the proposed development are described below:

The Environmental and Social Management Plan for Neamati Terminal for construction phase is given in **Table 1.1 and Table 1.2** respectively.

Table 1.1: Environment Management Plan (Construction Phase)

Component	Environmental Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Design					
Development of the Final Design	The design of the infrastructure must be resilient to the Floods	The design must take into consideration the projected rainfall levels as in the Assam State Action Plan on Climate Change (2015- 2020). The Annual rainfall is likely to increase by 10-25 %, and the extreme rainfall days will increase by 5-38%, with the extreme rainfall increase projected to increase between 25 and 150 mm.	Assessment of Design for Resilience	Contractor	TSSC & PMU (AIWTDS +GC)
	Design of the Riverbank Protection	The design of any riverbank protection must be carefully assessed so that the hazards due to Bank failure do not affect the stability of the structure.	Assessment of Design for Resilience	Contractor	TSSC & PMU (AIWTDS +GC)
	Collection and Treatment of Solid and Liquid Waste	The design of bio-digesters at the Terminal must be an adequate size to meet the regular passenger demand. Additional space needs to be made available for setting up additional bio-toilets for the pilgrim / festival. Adequate space must be made available to store municipal solid waste.	Assessment of Capacity of Bio-Digestor Assessment of space for the setting up bio-toilets, Adequate space for storage of Municipal Solid Waste	Contractor	TSSC & PMU (AIWTDS +GC)
	Energy Efficiency	Energy-efficient measures in the terminal buildings will be implemented; Solar power will be used in potential area	Use of Energy efficient Fitting and fixtures	Contractor	TSSC & PMU (AIWTDS +GC)
Pre-Construction Activities					
Field Verification Surveys	Requirement for felling of trees	**Permission of tree(s) removal from non-forest area** -The GC/ AIWTDS and the Contractor will carry out joint field verification to ascertain whether any tree would be affected and needs to be felled either for the construction activities or for safety purpose. In case any tree must be felled. -Permissions must be obtained from the Forest Department, Government of Assam. No tree would be felled without permission. At present there is no requirement for felling of trees	Copy of the Permit of the Forest Department, Government of Assam	Contractor	PMU (AIWTDS +GC)and TSSC
Assessment of Impacts due to Changes/Additions in the Project	Additional Impacts	**Site-specific EMP before the commencement of construction** -In case of any change in the event of changes/revisions (including addition or deletion) in the project's scope of work or change in the site	Approved copy of the C-EMP	Contractor	PMU (AIWTDS +GC)and TSSC

		condition. the impacts of the changes need to be assessed. **-**The Contractor will also prepare site-specific EMP to address these additional impacts. The Site Specific EMP has to be submitted to the PMC for approval. The Construction activities must not start before the approval of site-specific EMP by the PMC.			
Setting up of Plant and Machinery(Batching Plants or concrete mixer location)	Potential source of pollution (air quality, water quality, soil)	**Location of Batching Plants** -Batching plants will be sited sufficiently away from settlements, agricultural operations, or commercial establishments. Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -Concrete mixers and batching plants will comply with the requirements of the relevant emission control legislations and -Consent/NOC for all such plants obtained from the State Pollution Control Board will be submitted to the PIU. -The Contractor will not initiate plant/s operation till the required legal clearances are obtained and submitted. In case the concrete is procured from a third party, a valid consent of the plant, along with the latest copy of the Annual report, will be submitted to the PIU before the procurement of any material	Consent to Establish and Operate	Contractor	PMU (AIWTDS +GC)and TSSC
Procurement of Other Construction Vehicles, Equipment and Machinery	Potential for air pollution and noise	**Statutory Compliance:-**All Construction equipment[1] and machinery to be used in the project will conform to BS IV standards to be adopted by the Ministry of Road Transport and Highways. The discharge standards promulgated under the Environment Protection Act, 1986, will be strictly adhered to. -Noise limits for construction equipment to be procured, such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws, will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986. The Contractor will maintain a record of PUC for all vehicles and machinery used during the contract period.	Certification by Manufacturer of emission and noise levels/ Pollution under Control Certificates, Insurance and Driving License of the driver to be submitted for all vehicles	Contractor	PMU (AIWTDS +GC)and TSSC

[1] *Every agricultural tractor, construction equipment vehicle and combine harvester shall be so manufactured that it complies with the following standards of gaseous pollutants as per rule 115A,after sub-rule (8), of the Central Motor Vehicle Rules, 1989.*

Sourcing of construction material	Unsustainable mining practices	-Contractor will finalise the stone quarry /sand mine / borrow area for procurement of construction materials after assessment of the availability of sufficient materials and other logistic arrangements. The --Contractor will provide a copy of the Environmental Clearance Certificate of the quarry/sand mine and the Consent to Establish and Operate along with the recent compliance report to the PMU before any such quarry is engaged. -In case the contractor decides to use new quarries then the contractor will obtain the environmental clearance and all other permits and licenses and submit the same to the PMU before extracting any material. The contractor will submit a copy of the approval and the rehabilitation plan to the PIU and the Environmental Expert of the PMU Consultant. -Contractor will also work out haul road network and report to the Environmental Expert of the PMC. They will inspect and in turn report to PMU before approval.	Permission for mining/ quarrying of materials from the Mining Department, District Administration and District Level Environment Appraisal Committee	Contractor	PMU (AIWTDS +GC)and TSSC
Identification of water sources for construction	Adverse impact on water resources	If the contractor will source water requirements for construction form groundwater, prior permission from the Ground Water Board is required. A copy of the permission will be submitted to PIU prior to the initiation of construction. A flow meter must be installed, and the records of water used for construction must l be maintained. The usage of groundwater must be recorded. The contractor can use fresh groundwater sources after the required treatment for drinking. Even if water is sourced from third parties, the above provisions must be followed. -If the river water is used, the permission of the Irrigation department must be obtained	Permission from the Ground Water Board for Groundwater usage Permission of the Irrigation /Water Resources Department in case of River water is used.	Contractor	PMU (AIWTDS +GC)and TSSC
Environmental monitoring of baseline conditions of air, noise, water, and soil	To establish baseline environmental conditions and ascertain the impacts during the construction phase	Environmental monitoring to be carried out through recognised[2] Laboratory as per the locations specified in the environmental monitoring plan in **Table 2.1**	Submission of test results to PMU	Contractor	PMU (AIWTDS +GC)and TSSC
EMP Implementation Training	Lack of awareness of EMP can lead	-Project manager and all key workers will be required to undergo EMP implementation, including	-Certificate of Completion (Safeguards	Contractor	PMU (AIWTDS

[2] (National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited /Ministry of Environment Forest and Climate Change (MoEF&CC) / respective State Pollution Control Board (SPCB's)).

	to irresponsible behaviour resulting in an Irreversible impact to the environment, workers, and community.	spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labour laws, applicable environmental laws, etc. Additional modules for Dolphin Protection. - All new personnel joining the work need to undergo induction training. All personnel joining work after a break of more than 15 days need to undergo refresher.	Compliance Orientation) -Posting of EMP at worksites. -Maintaining Records of training both induction and refresher -Submission of the Training records to the PIU every month		+GC)and TSSC
	Deployment of EHS Officer and OHS Officer	Deploy qualified personnel and management committee. - Contractor must depute qualified EHS personnel in the start of the project to conduct training to all the personnel and effective monitoring of mitigation measures during construction. The name and functions of the responsible EHS persons and their relevant expertise must be notified in the Quarterly Report -If an EHS person resigns/ replaced/replaced or the team has been enlarged, the same must be reported to the Bank within 15 days of the incident	Submission of records of the availability of the EHS personnel onsite in the Monthly Report and Quarterly Report	Contractor	PMU (AIWTDS +GC)and TSSC
Legal compliance	Environmental legal noncompliance may	-Obtain all consents, clearances (CTE/CTO from ASPCB), permits NOCs etc., before start of construction works. -Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (Refer Table 3.1 in this report) -Following consents are required- -Tree cutting-local authority -Storage, handling, and transport of hazardous materials-ASPCB. -Sand mining, quarries, borrow areas- Department of mines and Geology. .-Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. -Include in detailed design drawings and documents all conditions and provisions; if necessary	Copy of the Permit/ Consent to be submitted with QPR to PMU	Contractor	PMU (AIWTDS +GC)and TSSC
Preparation of Method Statement	Occupational Health Safety and Community Health Safety Impacts	Carry out a Hazard Identification and Risk Assessment for all tasks presented in the Method Statement Prepare occupational health and safety plan, including COVID-19 H&S Plan Prepare Community Health Safety Plan to ensure that the community/ are segregated from the construction area Prepare a Debris/spoils management plan, Waste Management Plan.	- Occupational Health and Safety Plan (including HIRA) to be integrated with Method Statement - Community Health Safety Plan - Debris/spoils management plan, Waste Management Plan	Contractor	PMU (AIWTDS +GC)and TSSC

	Impact of Aquatic Species and Dolphins	Construction Planning must be carried out so that No-construction (stop the construction activities) in the water part between Mid- March to Mid-June) Construction activities must not be planned on the waterside during the monsoon period.	Construction Scheduling	Contractor	PMU (AIWTDS +GC)and TSSC
Construction Stage					
Clearing and grubbing for site Preparation (Terminal Site, Base camp, Construction Camp & Labour camp)	Landscape and Aesthetics	Permission of tree(s) removal from non-forest area -Vegetation will be removed from the construction zone before the commencement of civil works. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is avoided or minimized. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert of the Consultant. The contractor, under any circumstances, will not cut or damage trees. Trees identified under the project and have received permission of felling from the Forest Dept will only be felled. - Compensatory afforestation must be carried out per the Tree Felling permission provisions.	Verification of number of trees felled; Copy of NOC from forest dept.	Contractor	PMU (AIWTDS +GC)and TSSC
	Loss of topsoil. Loss of natural resources (Earth/soil) in area where the Constrctionca mp is setup	•Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • At least 10% of the acquired area for construction purposes must be kept for stockpiling of fertile topsoil •Precautions must be taken while stockpiling. The slope of the stockpile shall not exceed 1:2 (V:H) to retain soil & allow percolation of H_2O and the edges of the pile shall be protected by silt fencing. The piles shall be covered with gunny bags/ tarpaulin. The maximum height of the stockpiles shall be kept less than 2 m •Excavated materials would be preferably used for site filling for land reclamation to construct the terminal	Site verification	Contractor	PMU (AIWTDS +GC)and TSSC
Transporting Construction Materials and Haul Road Management	Impacts on air quality and safety	-Contractor will maintain all hauls roads (existing or built for the project), which are used for transporting construction materials, equipment, and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials or being blown away during the transportation. -Only major roads will be used by the contractor's vehicles or any of his sub-contractor or materials	Complaints from local community Visual observation in Site reports Monitoring of the air quality in the worksite and material storage area	Contractor	PMU (AIWTDS +GC)and TSSC

		suppliers. --Roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. -Contractor will arrange for regular water sprinkling for dust suppression of all roads and surfaces. -The unloading of materials at construction sites in/close to settlements will be restricted to daytime only. -All stockpiles will be covered/protected to prevent dust generation			
	Impacts on Water Quality	- Boats/ Vessels carrying construction material must not be overloaded. - Loading and unloading activities must ensure that spillage does not occur. - loose and friable material transported by boat must be covered - Construction material must not be stored at the Neamati Site	Site Reports	Contractor	PMU (AIWTDS +GC)and TSSC
	Community Safety due to movement of Constriction Vehicles	- Construction material shall be stored within the construction area to prevent accessibility issue with the community - Schedule transportation of the construction material so that heavy vehicles do not cause inconvenience to the local population and people on site ; - Drive vehicles in a considerate manner; - Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids - Notify affected area by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.	Site Reports Complaints form Local people on disturbance	Contractor	PMU (AIWTDS +GC)and TSSC
Storage of Construction Material	Potential for waterlogging	-The contractor will ensure that no construction materials like earth, stone, sand, or appendage are disposed of so as not to block the flow of water of any water course and cross drainage channels. -The contactor must not dump any excavated material into the river. -The contractor will take all necessary measures to prevent the blockage of water flow. -The stockpiled material must be prevented from erosion and deposition in the drainage channel from sites where these are stocked for construction.	Complaints of water logging	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Storage	Run-off from a material stockpile can also contaminate water. To prevent the contamination of the	-Site visit Report	Contractor	PMU (AIWTDS

	of Construction Material	construction material, the following measures must be adopted; - The quantum of construction material at the Neamati site must be minimal as possible -The runoff from the construction material storage yard must be channelled through peripheral drains -The peripheral drains must be connected to sedimentation tanks (holding tanks excavated in the ground) of adequate capacity All sedimentation tanks and peripheral drains must be cleaned before the monsoon.	-Number of sedimentation tanks installed. - Records of surface water quality Monitoring. -No visible Sedimentation to nearby drainages, nallahs or waterbodies due to civil works		+GC)and TSSC
	Water Pollution from Fuel and Lubricants	- The contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery, and equipment maintenance are in accordance with the provisions stated in (Annexure 19 : Environmental Codes of Practice & Other Plans) -Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refuelling areas as per the design provided.	-Number of Oil interceptors installed. -Records of surface water quality Monitoring. - No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC
	Pollution of water bodies from domestic activities	**-Wastewater from domestic activities such as bathing and washing at the camp site must be treated.** -The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering streams, water bodies or the irrigation system. -- The liquid waste from the construction camp must be treated and disposed of. -In the absence of construction camp if the contractor takes a rental accommodation must be channelized to the nearest municipality drain. In the absence of a municipality drain, a septic tank and a soak pit system of adequate capacity must be constructed. -Stagnation of water should not be allowed at any place near the campsite as a precaution against vector-borne disease. Wastewater from the Neamati Worksite An adequate number of toilets must be provided Bio-toilets of adequate capacity must be provided for the workers based on no of users.	-Adequate number of toilets as per no of labours - Records of surface water quality Monitoring; -No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC

		The supernatant from the Bio-digestor must be discharged into the soak pits. The Supernatant from the. bio-toilets must be tested at periodic intervals to meet discharge standards **Collection of Food waste and kitchen waste from Construction Camp** -All waste arising from the project is to be stored and disposed of as per the provisions of Annexure 19-Environment Codes of Practices & other Plans or as directed by EHS Specialist of the PMU In the case of rented accommodation, arrangements must be made with the Municipal corporation for the disposal of the waste. **Collection and Disposal of Food Waste from the Neamati Construction Site** Adequate space must be provided in the Construction Site for the storage of Solid Waste No Solid waste should be discharged into the river Mechanisms of transporting and disposing of the Solid waste to Guwahati must be carried out.			
Construction activities in Waterside	Impact on aquatic life and dolphins	-Construction Planning must be carried out so that No-construction Period (stop the construction activities in the water part between Mid- March to Mid-June) .-Noise-reducing devices like mufflers ,enclosures baffles must be fitted with the equipment as much as feasible. -Geo Textile synthetic sheet curtains &turbidity traps must be placed around construction areas to prevent the movement of sediments and construction waste -Aquatic ecology monitoring must be carried out before the start of construction and after completion of construction to assess the impact of construction activities on aquatic life. -If, despite the introduction of preventive measures, fish kills or impact on aquatic life is observed, then the work will stop immediately, and the methods will be reviewed and corrected. -If drilling is carried out Polymer-based mud instead of bentonite to be used as drilling fluid with proper storage of polymer at designated storage areas. Drill cutting and spent drilling mud must not be disposed in the river	Preparation of the Dolphin / Aquatic Manal Management Plan 2. Logs for recording watch dolphins / turtles during the construction 3. Log for aquatic fauna monitoring	Contractor	PMU (AIWTDS +GC)and TSSC

		- All equipment will be adequately maintained to prevent potentially hazardous or toxic products from leaking or spilling. This includes hydraulic fluid, diesel, gasoline and other petroleum products. -Refer Annexure Dolphin Conservation Plan			
	Degradation of water quality due to construction activity	Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition. Schedule construction works to complete the construction work before the onset of the monsoon. Schedule the construction works during the low water level period – ensure that works are completed during the same period before the onset of monsoon. - Inspection and maintenance of disturbed areas where mobilisation and barrier installation occur for sediment control measures. -Washing of vehicles and equipment must not be carried out in rivers or nearby places.	(i) Construction methodology for waterside construction -Schedule of construction works to ensure completion of the works before monsoon/ develop a Monsoon Management Plan -Records of inspection of the sedimentation chamber -Effectiveness of water management measures. -No visible degradation of water quality	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Fuel and Lubricants and hazardous waste	- Avoid/minimise storage of fuels, chemicals, and lubricants near the river/water; ensure no spillage - A temporary secured hazardous material handling and waste storage area must be provided at the construction site. As part of a design feature, a permanently secured ('bunded') impermeable surface and dykes capable of carrying 110% volume of materials for accidental spills or leakage must be constructed and maintained. Fuel transfer through decanting is prohibited. The use of a transfer pump with the proper fitting is suggested. -The storage area should be covered. - Dispose of any wastes generated by construction activities as per the guidance presented in Annexure 19 Environment Codes of Practices & other Plans and - Conduct surface quality inspection and monitoring according to the EMP. - Contractors will have emergency spill equipment available whenever working near or on the water.	- No of spills reported -Field observation -Water quality monitoring reports	Contractor	PMU (AIWTDS +GC)and TSSC
Construction on the landside	Deterioration of air quality from fugitive sources	**Prevent Dust Generation** -The soil/earth must be transported by covering the haulage vehicles with tarpaulin or any other good quality material.	- Complaints from sensitive receptors. - Quarterly environmental monitoring report for	Contractor	PMU (AIWTDS +GC)and TSSC

		-Dust suppression measures by water sprinkling on worksites and temporary service and access roads. -All construction workers must be provided with pollution masks to mitigate the effect of dust generation on the health of workers. -Construction Material must be transported in covered dump trucks to the project site. This must not be stockpiled at the project site - Clean wheels and undercarriage of haul trucks before leaving the construction site. - Loading and unloading of construction materials must be made at designated locations with provisions of water sprinkling. -Construction vehicles, machinery & equipment must be regularly serviced and maintained and would have a valid PUC certificate -Don't allow non-project vehicle access in the work area, limit soil disturbance and prevent access by barricading and security personnel. -Traffic detours and diversions must be designed to minimise bottlenecks and ensure smooth traffic. -Air pollution monitoring must be carried out at specified locations as described in the monitoring plan to verify that the contractor follows air pollution norms and that the air quality at the construction site does not exceed the prescribed limits.	ambient air, noise, water, and soil		
Use of Plant, Equipment Machinery and Vehicle	Emissions from Construction Vehicles, Equipment and Machineries (Generation of Exhaust Gases) lead to the deterioration of air quality	-The contractor will take every precaution to reduce the level of dust from batching Plant/Cement Storage/, construction sites involving earthwork by a sprinkling of water, encapsulation of dust source and by the erection of screens/barriers. -All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. -The contractor will provide necessary certificates to confirm that all Plants, equipment, machinery, and vehicle used in construction conform to relevant dust emission control legislation. -No open burning of bitumen or preparation of hot mix is allowed. -No burning of firewood is allowed in the construction camp. The Contractor must make provisions for LPG cylinders. -Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -All vehicles, plants and machinery used during construction must conform to the emission standards promulgated under the Environment	- Heavy equipment and machinery with air pollution control devices. - Latest Six-Monthly Compliance Report to ASPCB - Valid Consent to Establish and Consent to Operate. - Certification that vehicles are compliant with Air Act - Quarterly environmental monitoring report for ambient air, noise, water and soil	Contractor	PMU (AIWTDS +GC)and TSSC

		(Protection) Act, 1986. The contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB. -The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Valid PUC must be maintained throughout the construction period Monitoring results will also be submitted to PMU Consultant and PIU as per the monitoring plan. -Contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB emission standards			
	Noise pollution leads to inconvenience for the people	The Contractor will confirm the following: - All plants and equipment used in construction (including third-party plants and equipment) must conform to the MoEF&CC/ CPCB noise standards. - All vehicles and equipment used in construction will be fitted with exhaust silencers. - Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked, and if found defective will be replaced. -The activities must be carried out during the daytime. Night-time activities may be carried out in an emergency, but all measures mentioned in the mitigation measures for night work must be strictly adhered to. - Limits for construction equipment used in the project, such as concrete mixers, cranes (moveable), vibrators and saws, must not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. -Maintenance of vehicles, equipment and machinery must be regular and up to the satisfaction of the Environmental Expert of the PMU Consultant to keep noise levels at a minimum. - No noisy construction activities will be permitted around educational institutes/health centres (silence zones) up to 100 m from the	- Complaints from sensitive receptors. - Use of silencers in noise-producing equipment and sound barriers.	Contractor	PMU (AIWTDS +GC)and TSSC

		sensitive receptors, i.e., schools, health centres and hospitals between 9.00 am to 6.0 pm. -Restriction on Honking at the project site -Traffic management plans prepared during the construction mobilization period must also be implemented during the construction stage. Effective traffic management must be taken care of in sensitive locations, major built-up areas, and along important highway junctions. - Barricading (Temporary noise barrier) around the construction site to minimize the noise level -Monitoring must be carried out at the construction sites as per the monitoring schedule, and results will be submitted to PMC and PMU. -The Environmental expert of PMC will be required to inspect regularly to ensure the compliance of EMP.			
	Vibration from the works.	-No explosives should be used in construction activities. -Only mechanical equipment must be used to prevent Chances of damage from vibration.	-Site verification	Contractor	PMU (AIWTDS +GC)and TSSC
	Contamination of Soil	-Ensure all equipment, vehicles and other sources of fuels and lubricants will be collected and contained to avoid soil/ groundwater contamination. -Fuel must be stored in proper bounded and covered areas. -All spills and collected petroleum products must be disposed of in accordance with the provisions mentioned in **Annexure** on Emergency Spill Control Procedure -Maintenance and refuelling of vehicles, machinery and other construction equipment must be carried out on an impervious surface so that spillage of fuels and lubricants does not contaminate the ground. -The runoff from the maintenance yard must lead to a peripheral drain and pass through an oil-water Separator		Contractor	PMU (AIWTDS +GC)and TSSC
Safety aspects during the execution of works	Community Health Safety risks in Work Zones	The Contractor must ensure that : -The construction zone is hard Barricaded with MS Barricades of a height of 3.0 m. -The construction site must be access controlled, and the workers must be provided valid identification cards to allow entry. -Construction material must be stored in the barricaded area. If temporary storage is required (for 1-2 days) outside the demarcated construction area, the same must be discussed with the community. Hard Barricading with proper signages	-Barricading of the worksites -Traffic management Plan construction works, including number of permanent signages, barricades and flagmen on the worksite -Number of signages placed at the project location.	Contractor	PMU (AIWTDS +GC)and TSSC

		must be put to prevent the entry of commuters in the areas. The permission of the Environmental Officer is essential. -To prevent the dust from the construction area affecting the sensitive receptor/ commuters' green screens may be used over and above the Hard Barricading at the advice of the Environment Officer of the PMC -Refer **Annexure for details of safety practices for construction Phase**	-Regular reporting of the measures in the Quarterly Report		
	Occupational Health Safety: Personal Safety Measures for Labour	The contractor will provide: -Comply with all national, state and local labour laws (refer **Table 1A:** Social Management Plan -Develop and implement site-specific occupational health and safety (OHS) plan, which will include measures such as (a) excluding the public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents -Barricading of all excavation carried out for construction. For deep excavation -shoring and bracing must be provided Movement of equipment and machinery near the deep excavation of soft soil must be prohibited. - Flagmen must accompany all movement of equipment and vehicle inside. -All vehicles and equipment must be fitted with reverse horns, alarms etc. -Protective clothing as may be appropriate to the risk involved in the activities being undertaken by the labour. -Protective clothing must be as per the BIS standards -Earplugs for workers exposed to loud noise, and workers working in concrete mixing operations and other high-noise-generating operations -Adequate safety measures for workers during the handling of materials at the site are taken up. -All tools, tackle, lifting instruments, and cranes must have valid load certification. The tools and tackle must be regularly inspected by the Environment Officer / OHS officer of the PMU. -The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangways, stairwells,	-Site-specific OHS Plan. -Equipped first-aid stations. -Medical insurance coverage for workers. -Number of accidents. -Supplies of potable drinking water. - Clean eating areas where workers are not exposed to hazardous or noxious substances. - record of H&S orientation trainings - personal protective equipment. - % of moving equipment outfitted with audible back-up alarms; -permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. -Compliance to core labour laws	Contractor	PMU (AIWTDS +GC)and TSSC

		excavations, trenches and safe means of entry and egress. -All precautions must be taken for working at heights. -The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. -Ensure that qualified first aid is always provided. Equipped first-aid stations must be easily accessible throughout the site. - Provide medical insurance coverage for workers. -The Contractor will not employ ad-hoc work procedures, follow best & acceptable work practices -The contractor will document work-related accidents. Provide qualified & easily accessible first-aid facilities all times at all sites. -Secure all installations from unauthorised intrusion and accident risks. -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 with drinking water and protected from the elements of nature - Barrier structures are of sufficient height to prevent waves or overflows from flooding in the enclosed area. Regular inspection must be carried out for the coffer dam to ensure no water leakage in the construction area. -During working in River, workers must be made aware of risks of water depth, currents, and dangerous areas of water must be properly marked by fixed or floating barricades and signage of danger. Workers must also be made aware of the protection of the biodiversity of the water, and fishing must be strictly prohibited. A boat must be made available at the site to transport labour and materials and be well-maintained for emergencies. Workers must not be allowed to dip or bathe in rivers. A suitable working platform must be provided during construction works in water. -Life-saving equipment and lifeguards must be made available during the period of working in water. -The Contractor will mark 'hard hat' and 'no smoking' and other 'high-risk areas and enforce non-compliance of the use of PPE with		

		zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilisation and will be approved by the Safety Officer of PIU.			
	Injuries/fatalities to the employees	Accident/Incident Reporting for SHE -The PIU must carry out an awareness campaign for the Do's and Do nots in construction sites. -Near misses must be recorded and reported on a regular basis • -Fortnightly meetings must be held with employees to make them aware of unsafe acts and practices.	-Record of near misses - Record of fatalities - No of workers' meetings -Labour Law Compliance Report generated through Labour Law Compliance system	Contractor	PMU (AIWTDS+GC)and TSSC
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. • 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 • Working hours of labourers would not exceed the standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated. Septic tanks/soak pits would be provided for its disposal.	Site Verification	Contractor	PMU (AIWTDS+GC)and TSSC

Table 2.2 Social Management Plan

Component	Social Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Health & Safety	Accident and Incident risk from construction activities and safety of workers Impact on Social life of nearby community	-Local labour would preferably be employed for construction. -Site would be barricaded and would have security guards. -Register 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 -Rest area for workers would be provided. -Contractors would adopt and maintain safe working practices. SOPs would be prepared and followed for all activities under supervision of site engineer -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 -Maintenance and repair of any local village road used for the project activities should be carried out both before and end of construction by contractor.	-Regular health check-up of the workers -Training on communicable diseases.	Contractor	PMU (AIWTDS+ GC)and TSSC
Labour Influx	- STD, HIV/AIDS to local community Increased demand and competition for local social and health services -Social conflicts between the local community and the construction migrant workers. -Increased illicit behaviour and crime against women, which is a real threat for Assam where gender-	-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 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	- Awareness training for applicable regulatory regulations. -The Indian Factories Act, 1948 and State Rules,	Contractor	PMU (AIWTDS+ GC)and TSSC

	based violence is rampant -Increase competition for jobs and have an impact on wage distribution	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. -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. - 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 shifts.			
Gender Based Violence	There might be a possibility of gender-based violence arising from the inflow of migrant workers/ labours.	- Code of Conduct shall be signed by the workers. - Integration of GBV into existing strategy, Grievance Redressal Mechanism, safety talks, tool box meeting and regular trainings for the workers. - Identification of GBV focal points through community consultations. - Trainings shall be arranged for the workers on Occupational Health and Safety. - Identification of Hot Spots for GBV within the project including construction sites and labour camps alongside local communities, schools, vocational training centers, liquor shops, migrant laborers' residing in rented accommodations within	-Regular Training shall be conducted. -IEC material should be displayed at site -Awareness Campaign	Contractor	PMU (AIWTDS+ GC)and TSSC

		the villages. - Both men and women labours shall be made aware about the applicable rules and regulations. - Formation of a committee comprising of representatives from local NGOs/ CBOs, police, academia, advocate, etc. with at least 70% women members. The committee shall meet every quarter in order to address the problems faced by the labours/ locals. Consultation with women's groups should also be held during construction and operation phases to listen to their issues and concerns regarding labour, health and safety etc. as well as to solicit their ideas on various community initiatives.			
Community Health and Safety	With the inflow of migrant workers and their interaction with the local population, health issues among the local community might emerge. Health problems like STIs, HIV/AIDS, Hepatitis B&C, Tobacco chewing, Tuberculosis etc. might spread in the area because of this floating population	- Regular medical camps can be conducted amongst the labours and the local population to make them aware about HIV/AIDS and associated factors. - Awareness on health issues like HIV/AIDS, Tuberculosis, Hepatitis B & C, Sexually Transmitted Infections, Dengue, Chikungunya, Malaria, Tobacco control, etc., shall be conducted periodically. - District AIDS and Prevention Control Unit (DAPCU), District level Agency for the implementation of National Health Mission and Employee's State Insurance Corporation (ESIs) Hospital shall be liasoned for the same. - Community based meetings, consultations in camp, distribution of leaf lets, IEC tools (outreach programmes, campaigns, awareness through newspapers, TV's, etc.), posters, banners. Use of mobile phones shall be banned during driving and construction activities.	- Regular health check-up of the workers -Training on communicable diseases	Contractor	PMU (AIWTDS+ GC)and TSSC

2. ENVIRONMENT MONITORING PLAN

Environmental Monitoring Programme is to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The same will be included in tender / bid document. The broad objectives of the environment monitoring program are:

- To monitor impacts on the surrounding environment and the effectiveness of mitigation measures during the construction and operation phase.
- To ensure that the environmental control systems, installed are effective.
- Comply to the provisions of relevant environmental regulations.

The parameters to be monitor, frequency of monitoring, number of samples, locations and responsibility of monitoring is given in **Table- 2.1.**

Table 2.1: Summary of Environmental Monitoring Programme : Construction andOperation Phase

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
1.	**River Water**					
	Physico-chemical parameters	pH, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides.	For three seasons in construction phase; Turbidity, DO and salinity will be monitored once every week at 3 locations: near the Berth, channel and records of monitoring will be maintained during construction phase If DO level goes 4.0 mg/l, then its causes will be investigated, and corrective actions will be taken	Surface Water Upstream- 2 • Downstream-2 • Near Project site- 1 Ground water-2 near the project site	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			
	Biological Parameters	Light penetration, Chlorophyll, Primary Productivity, Phytoplankton's, Zooplanktons	For three seasons in construction phase	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			
2.	**Sediments**					
	Physico-Chemical Parameters	Texture, pH, Sodium, Potassium, Phosphate, Chlorides, Sulphates, Hg, Pb, Fe, Cu, Zn, Cd	For three seasons in construction phase	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
	Biological parameters	Benthic Micro-fauna, Benthic Macro-fauna	For three seasons in construction phase. For two seasons in operation phase except monsoon	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
3.	**Ambient Air Quality**	$PM_{2.5}$, PM_{10}, SO_2 and NO_2	- For three seasons in construction phase and one season for operation phase. - Twice a week for four consecutive weeks per season.	Upwind- 2 Downwind- 2 Near Project site- 1	As per AIWTDS directions	Contractor
4.	**Noise Quality**	Equivalent Noise Level	During peak construction activities	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
5.	**Soil Quality**	N, P, K and Heavy metals	2 samples pre-monsoon season and 2 samples post-monsoon in construction phase and one season during operation phase	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
6.	**Dolphin study**	Assessment and presence of Dolphins, survival etc.	Once per year	--	As per AIWTDS directions	AIWTDS

*Note: All the Samples to be collected as per standard norms. Parameters and components may vary as per requirement.

3. BUDGET FOR EMP

Tentative Environment budget has been prepared for design, construction and operation phase of the project which includes the cost of environmental structures like septic tank & soak pit, Air Pollution Control System at terminal, environmental monitoring, training, awareness and technical support for establishment, enhancement measures and environmental guidelines. Environmental budget for Neamati terminal with detailed break-up of costs for construction phase is given in **Table-3.1.**

Table 3.1: Summary of Environmental Budget- Construction Stage

S. No.	Particulars	Stages	Costs Covered By
A.	**Monitoring Measures**		
1	Water Quality Monitoring	Pre –Construction	Contractor
		Construction	Contractor
2	Biological Monitoring	Pre –Construction	Contractor
		Construction	Contractor
3	Sediments: Physico Chemical	Pre –Construction	Contractor
		Construction	Contractor
4	Sediments: Biological	Pre –Construction	Contractor
		Construction	Contractor
5	Ambient Air Quality	Pre –Construction	Contractor
		Construction	Contractor
6	Noise Quality	Pre –Construction	Contractor
		Construction	Contractor
7	Soil Quality	Pre –Construction	Contractor
		Demobilisation	Contractor
8	Groundwater	Pre –Construction	Contractor
		Construction	Contractor
		Camp/Kitchen During Construction	Contractor
		Decommissioning	Contractor
	Subtotal (A)		
B.	**Capacity Building**		
1	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Plans and Protocols Social and cultural values of the area. (1 day)	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators (at the beginning of Contract)	TSSC
2	Training for Ghat management'	Section officers/ Vessel operators/ Masters/ Khalasi , Ghat officers, Ghat Maintenance workers etc.(At Beginning of Construction)	Contractor
3	Community issues; Awareness of transmissible diseases; social and cultural values.	Construction Crew (once every six months)	Contractor
4	EMP; Waste disposal, Cultural values and social sensitivity.	Once every year or as directed by the PIU	Contractor
5	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers; boat/launch crew, (once every year)	Contractor
6	Camp operation; Waste disposal; Natural resource conservation; Housekeeping.	Camp staff (once every quarter)	Contractor

S. No.	Particulars	Stages	Costs Covered By
7	Construction Implementation requirements; handling situations for important flora / fauna especially Dolphin; Physical Cultural resources;	PIU; supervisor Selected crew members and contractors (once every six months)	Contractor
8	Health and safety equipment on board and in terminals	Selected crew members and Vessel operators/ Masters/ Khalasi etc.	Contractor
9	Environment Management tracking System	AIWTDS	Contractor
	Subtotal (B)		
C.	**Construction Contractor EMP Implementation**		
5.	Water Sprinkling Measures for Dust Suppression	Construction	The cost is integrated as part of the civil work cost
6	Development and Implementation of the Dolphin Management Plan of Contractor	Construction	The cost is integrated as part of the civil work cost
7	Providing, fixing, maintaining, shifting & refixing, barricading of minimum 2.0m height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initially, painting, lettering & border with reflective paint at the time of every shifting, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project	Construction	The cost is integrated as part of the civil work cost
8	Supplying and fixing of cautionary and or informative signs boards including the cost of posts, fixtures, fixing, foundation, fitting and fixing. Sheeting will be made of encapsulated lens type of retro-reflective type and message / borders will be screen printed complete as per screen specification in IRC SP 55: 2001. To be made available at all time at the work sites as required and directed by the engineer	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
9	Supplying and fixing of flashing beacon warning lights including the cost of posts, fixtures, fixing, foundation, fitting and fixing, cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc. and as per specification in IRC SP 55: 2001	Construction	The cost is integrated as part of the civil work cost
10	Provision and maintenance of Bio toilets with 1 male and 1 female units including cost of material , labour, loading, unloading, lead, lift, transportation, shifting etc. And shall be made available at worksite at the direction of the PIU. The facility shall complete with water arrangement, privacy, lighting arrangement. The WC and /urinals should be made of stainless Steel and the partitions should be made of aluminium framework with FRP panels. The bio-digester tank should be approved by Defence Research & Development Organisation (DRDO)or any other competent agency. The whole toilet shall be mounted on MS framework with skids; Overhead water tank shall be made of HDPE with proper arrangement of ball cock and mosquito proof cover. These should also be provided with two dustbin for wet and dry waste. The bio-digester toilets shall be mounted on skids and shall not require any creation of permanent structure so that they can be shifted from one worksite to another	Construction	The cost is integrated as part of the civil work cost
11	Provision of Helmets (IS CODE 2925 : 1984) , Safety Shoes (IS CODE 5852 : 1996), Googles (•IS CODE 5983 : 1980), Reflective Jackets, mitten/ gloves (IS 2573) , safety nose masks to all personnel (including temporary labour) involved in the worksites	Construction	The cost is integrated as part of the civil work cost
12	Provision of First Aid Kits for worksites	Construction	Civil works contract
13	Provision and maintenance of waste collection bins in sets of 2 (blue and green) for collection of municipal solid waste generated at the worksite including cost of material , labour, loading,	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
	unloading, lead, lift, shifting, transportation etc.		
14	Environment, Health & Safety Engineer/Supervisor having Bachelors in Env Science / Management/ B. Tech (Env Eng.)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
15	Diploma in Central Labour Institute / Regional Labour Institute (Mandatory)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
	River bank protection through plantation (Erosion management)	Construction	Contractor
	Subtotal (C)		
D	**PIU EMP Implementation cost**		
1	EMP Supervision Cost	Construction	PIU/AIWTDS Cost
2	Equipment	Construction	PIU /AIWTDSCost

4. BUDGET FOR SMP

The various activities for social management under the subproject which needs to be undertaken by the contractor are given in **Table 4.1.**

Table 4.1: Summary of Social budget (construction phase)

Item of SMP	Duration
Training for contractor staff on labour laws such as Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Bonded Labour System (Abolition) Act, 1976; The Workmen's Compensation Act, 1923; The Contract Labour (Regulation & Abolition) Act, 1970 and Rules; The Child Labour (Prohibition and Regulation) Act, 1986; The Indian Factories Act, 1948 and State Rules; Public Liability and Insurance Act, 1991; The new labour Act like The Code on Social Security, 2020 and The Code on Wages, 2019,	Actual, before and during the project implementation time

Item of SMP	Duration
Social safeguards training including training of staff on GRM. GBV training (SEA and SH)	Actual, before and during the project implementation time
Environmental Health and Safety Officer and Social Development Specialist hired by contractor, for on-site supervision	Actual, during the project implementation

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING PROGRAMME - APHALAMUKH

1. GENERAL

The Environment and Social Management Plan (ESMP) is required to ensure sustainable development of the proposed terminal on river Brahmaputra both during the construction as well as operational phases. The ESMP is site and time specific. In order to effectively implement ESMP, an institutional framework has been developed and roles and responsibilities of various relevant agencies have been worked out. Capacity development program are also identified and part of the ESMP.

In general, Assam Inland Water Transport Development Society (AIWTDS), (with assistance from Contractor, Third Party Monitoring Consultant /Technical Support & Supervision Consultant) is the responsible entity for ensuring that the mitigation measures as suggested in the ESMP are carried out. A detailed ESMP has been prepared for Aphalamukh terminal. The list provides reference implementing organisation and responsible entity.

COMPONENTS OF EMP

Key components of the EMP are summarized below and explained in detail in the following subsections:

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

Site-specific environment and social riverine infrastructure along with the roles and responsibilities of the key persons involved at different phases of the proposed development are described below:

The Environmental and Social Management Plan for Aphalamukh Terminal for construction phase is given in **Table 1.1 and Table 1.2** respectively.

Table 1.1: Environment Management Plan (Construction Phase)

Component	Environmental Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Design					
Development of the Final Design	The design of the infrastructure must be resilient to the Floods	The design must take into consideration the projected rainfall levels as in the Assam State Action Plan on Climate Change (2015- 2020). The Annual rainfall is likely to increase by 10-25 %, and the extreme rainfall days will increase by 5-38%, with the extreme rainfall increase projected to increase between 25 and 150 mm.	Assessment of Design for Resilience	Contractor	TSSC & PMU (AIWTDS +GC)
	Design of the Riverbank Protection	The design of any reclamation and riverbank protection must be carefully assessed so that the hazards due to Bank failure do not affect the stability of the structure.	Assessment of Design for Resilience	Contractor	TSSC & PMU (AIWTDS +GC)
	Collection and Treatment of Solid and Liquid Waste	The design of bio-digesters at the Terminal must be an adequate size to meet the regular passenger demand. Additional space needs to be made available for setting up additional bio-toilets for the pilgrim / festival. Adequate space must be made available to store municipal solid waste.	Assessment of Capacity of Bio-Digestor Assessment of space for the setting up bio-toilets, Adequate space for storage of Municipal Solid waste	Contractor	TSSC & PMU (AIWTDS +GC)
	Energy Efficiency	Energy-efficient measures in the terminal buildings will be implemented; Solar power will be used in potential area	Use of Energy efficient Fitting and fixtures	Contractor	TSSC & PMU (AIWTDS +GC)
Pre-Construction Activities					
Field Verification Surveys	Requirement for felling of trees	**Permission of tree(s) removal from non-forest area** -The GC/ AIWTDS and the Contractor will carry out joint field verification to ascertain whether any tree would be affected and needs to be felled either for the construction activities or for safety purpose. In case any tree must be felled. -Permissions must be obtained from the Forest Department, Government of Assam. No tree would be felled without permission. At present there is no requirement for felling of trees	Copy of the Permit of the Forest Department, Government of Assam	Contractor	PMU (AIWTDS +GC)and TSSC
Assessment of Impacts due to Changes/Addition	Additional Impacts	**Site-specific EMP before the commencement of construction**	Approved copy of the C-EMP	Contractor	PMU (AIWTDS +GC)and

s in the Project		-In case of any change in the event of changes/revisions (including addition or deletion) in the project's scope of work or change in the site condition. the impacts of the changes need to be assessed. **-**The Contractor will also prepare site-specific EMP to address these additional impacts. The Site Specific EMP has to be submitted to the PMC for approval. The Construction activities must not start before the approval of site-specific EMP by the PMC.			TSSC
Setting up of Plant and Machinery(Batching Plants or concrete mixer location)	Potential source of pollution (air quality, water quality, soil)	**Location of Batching Plants** -Batching plants will be sited sufficiently away from settlements, agricultural operations, or commercial establishments. Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -Concrete mixers and batching plants will comply with the requirements of the relevant emission control legislations and -Consent/NOC for all such plants obtained from the State Pollution Control Board will be submitted to the PIU. -The Contractor will not initiate plant/s operation till the required legal clearances are obtained and submitted. In case the concrete is procured from a third party, a valid consent of the plant, along with the latest copy of the Annual report, will be submitted to the PIU before the procurement of any material	Consent to Establish and Operate	Contractor	PMU (AIWTDS +GC)and TSSC
Procurement of Other Construction Vehicles, Equipment and Machinery	Potential for air pollution and noise	**Statutory Compliance:-**All Construction equipment[1] and machinery to be used in the project willconform toBS IV standards to be adopted by the Ministry of Road Transport and Highways. The discharge standards promulgated under the Environment Protection Act, 1986, will be strictly adhered to. -Noise limits for construction equipment to be procured, such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws, will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986.	Certification by Manufacturer of emission and noise levels/ Pollution under Control Certificates, Insurance and Driving License of the driver to be submitted for all vehicles	Contractor	PMU (AIWTDS +GC)and TSSC

[1]*Every agricultural tractor, construction equipment vehicle and combine harvester shall be so manufactured that it complies with the following standards of gaseous pollutants as per rule 115A,after sub-rule (8), of the Central Motor Vehicle Rules, 1989.*

		The Contractor will maintain a record of PUC for all vehicles and machinery used during the contract period.			

Sourcing of construction material	Unsustainable mining practices	-Contractor will finalise the stone quarry /sand mine / borrow area for procurement of construction materials after assessment of the availability of sufficient materials and other logistic arrangements. The -- Contractor will provide a copy of the Environmental Clearance Certificate of the quarry/sand mine and the Consent to Establish and Operate along with the recent compliance report to the PMU before any such quarry is engaged. -In case the contractor decides to use new quarries then the contractor will obtain the environmental clearance and all other permits and licenses and submit the same to the PMU before extracting any material. The contractor will submit a copy of the approval and the rehabilitation plan to the PIU and the Environmental Expert of the PMU Consultant. -Contractor will also work out haul road network and report to the Environmental Expert of the PMC. They will inspect and in turn report to PMU before approval.	Permission for mining/ quarrying of materials from the Mining Department, District Administration and District Level Environment Appraisal Committee	Contractor	PMU (AIWTDS +GC)and TSSC
Identification of water sources for construction	Adverse impact on water resources	If the contractor will source water requirements for construction form groundwater, prior permission from the Ground Water Board is required. A copy of the permission will be submitted to PIU prior to the initiation of construction. A flow meter must be installed, and the records of water used for construction must l be maintained. The usage of groundwater must be recorded. The contractor can use fresh groundwater sources after the required treatment for drinking. Even if water is sourced from third parties, the above provisions must be followed. -If the river water is used, the permission of the Irrigation department must be obtained	Permission from the Ground Water Board for Groundwater usage Permission of the Irrigation /Water Resources Department in case of River water is used.	Contractor	PMU (AIWTDS +GC)and TSSC
Environmental monitoring of baseline conditions of air, noise, water, and soil	To establish baseline environmental conditions and ascertain the impacts during the construction phase	Environmental monitoring to be carried out through recognised[2] Laboratory as per the locations specified in the environmental monitoring plan in **Table2.1**	Submission of test results to PMU	Contractor	PMU (AIWTDS +GC)and TSSC

[2](National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited /Ministry of Environment Forest and Climate Change (MoEF&CC) / respective State Pollution Control Board (SPCB's)).

EMP Implementation Training	Lack of awareness of EMP can lead to irresponsible behaviour resulting in an Irreversible impact to the environment, workers, and community.	-Project manager and all key workers will be required to undergo EMP implementation, including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labour laws, applicable environmental laws, etc. Additional modules for Dolphin Protection. - All new personnel joining the work need to undergo induction training. All personnel joining work after a break of more than 15 days need to undergo refresher.	-Certificate of Completion (Safeguards Compliance Orientation) -Posting of EMP at worksites. -Maintaining Records of training both induction and refresher -Submission of the Training records to the PIU every month	Contractor	PMU (AIWTDS +GC)and TSSC
	Deployment of EHS Officer and OHS Officer	Deploy qualified personnel and management committee. - Contractor must depute qualified EHS personnel in the start of the project to conduct training to all the personnel and effective monitoring of mitigation measures during construction. The name and functions of the responsible EHS persons and their relevant expertise must be notified in the Quarterly Report -If an EHS person resigns/ replaced/replaced or the team has been enlarged, the same must be reported to the Bank within 15 days of the incident	Submission of records of the availability of the EHS personnel onsite in the Monthly Report and Quarterly Report	Contractor	PMU (AIWTDS +GC)and TSSC
Legal compliance	Environmental legal noncompliance may	-Obtain all consents, clearances (CTE/CTO from ASPCB), permits NOCs etc., before start of construction works. -Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (Refer Table 3.1 in this report) -Following consents are required- -Tree cutting-local authority -Storage, handling, and transport of hazardous materials-ASPCB. -Sand mining, quarries, borrow areas- Department of mines and Geology. .-Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. -Include in detailed design drawings and documents all conditions and provisions; if necessary	Copy of the Permit/ Consent to be submitted with QPR to PMU	Contractor	PMU (AIWTDS +GC)and TSSC
Preparation of Method Statement	Occupational Health Safety and Community Health Safety	Carry out a Hazard Identification and Risk Assessment for all tasks presented in the Method Statement Prepare occupational health and	- Occupational Health and Safety Plan (including HIRA) to be	Contractor	PMU (AIWTDS +GC)and TSSC

	Impacts	safety plan, including COVID-19 H&S Plan Prepare Community Health Safety Plan to ensure that the community/ are segregated from the construction area Prepare a Debris/spoils management plan, Waste Management Plan.	integrated with Method Statement - Community Health Safety Plan - Debris/spoils management plan, Waste Management Plan		

	Impact of Aquatic Species and Dolphins	Construction Planning must be carried out so that No-construction (stop the construction activities) in the water part between Mid- March to Mid-June) Construction activities must not be planned on the waterside during the monsoon period.	Construction Scheduling	Contractor	PMU (AIWTDS +GC)and TSSC
Construction Stage					
Clearing and grubbing for site Preparation (Terminal Site, Base camp, Construction Camp & Labour camp)	Landscape and Aesthetics	Permission of tree(s) removal from non-forest area -Vegetation will be removed from the construction zone before the commencement of civil works. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is avoided or minimized. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert of the Consultant. The contractor, under any circumstances, will not cut or damage trees. Trees identified under the project and have received permission of felling from the Forest Dept will only be felled. - Compensatory afforestation must be carried out per the Tree Felling permission provisions.	Verification of number of trees felled; Copy of NOC from forest dept.	Contractor	PMU (AIWTDS +GC)and TSSC
	Loss of topsoil. Loss of natural resources (Earth/soil)) in area where the Constrctioncam p is setup	•Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • At least 10% of the acquired area for construction purposes must be kept for stockpiling of fertile topsoil •Precautions must be taken while stockpiling. The slope of the stockpile shall not exceed 1:2 (V:H) to retain soil & allow percolation of H_2O and the edges of the pile shall be protected by silt fencing. The piles shall be covered with gunny bags/ tarpaulin. The maximum height of the stockpiles shall be kept less than 2 m •Excavated materials would be preferably used for site filling for land reclamation to construct the terminal	Site verification	Contractor	PMU (AIWTDS +GC)and TSSC
Transporting Construction Materials and Haul	Impacts on air quality and Safety	-Contractor will maintain all hauls roads (existing or built for the project), which are used for	Complaints from local community Visual observation	Contractor	PMU (AIWTDS +GC)and

Road Management		transporting construction materials, equipment, and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials or being blown away during the transportation. -Only major roads will be used by the contractor's vehicles or any of his sub-contractor or materials suppliers. --Roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. -Contractor will arrange for regular water sprinkling for dust suppression of all roads and surfaces. -The unloading of materials at construction sites in/close to settlements will be restricted to daytime only. -All stockpiles will be covered/protected to prevent dust Generation	in Site reports Monitoring of the air quality in the worksite and material storage area		TSSC
	Impacts on Water Quality	- Boats/ Vessels carrying construction material must not be overloaded. - Loading and unloading activities must ensure that spillage does not occur. - loose and friable material transported by boat must be covered	Site Reports	Contractor	PMU (AIWTDS +GC)and TSSC
Storage of Construction Material	Potential for waterlogging	-The contractor will ensure that no construction materials like earth, stone, sand, or appendage are disposed of so as not to block the flow of water of any water course and cross drainage channels. -The contactor must not dump any excavated material into the river. -The contractor will take all necessary measures to prevent the blockage of water flow. -The stockpiled material must be prevented from erosion and deposition in the drainage channel from sites where these are stocked for construction.	Complaints of water logging	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Storage of Construction Material	Run-off from a material stockpile can also contaminate water. To prevent the contamination of the construction material, the following measures must be adopted; -The runoff from the construction material storage yard must be channelled through peripheral drains -The peripheral drains must be connected to sedimentation tanks (holding tanks excavated in the ground) of adequate capacity All sedimentation tanks and peripheral drains must be cleaned before the monsoon.	-Site visit Report -Number of sedimentation tanks installed. - Records of surface water quality Monitoring. -No visible Sedimentation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution	- The contractor will ensure that all	-Number of Oil	Contractor	PMU

	from Fuel and Lubricants	construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery, and equipment maintenance are in accordance with the provisions stated in (Annexure 19 : Environmental Codes of Practice & Other Plans) -Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refuelling areas as per the design provided.	interceptors installed. -Records of surface water quality Monitoring. - No visible degradation to nearby drainages, nallahs or waterbodies due to civil works		(AIWTDS +GC)and TSSC
	Pollution of water bodies from domestic activities	**-Wastewater from domestic activities such as bathing and washing at the camp site must be treated.** -The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering streams, water bodies or the irrigation system. -- The liquid waste from the construction camp must be treated and disposed of. -In the absence of construction camp if the contractor takes a rental accommodation must be channelized to the nearest municipality drain. In the absence of a municipality drain, a septic tank and a soak pit system of adequate capacity must be constructed. -Stagnation of water should not be allowed at any place near the campsite as a precaution against vector-borne disease. Wastewater from the Aphalamukh Worksite An adequate number of toilets must be provided Bio-toilets of adequate capacity must be provided for the workers based on no of users. The supernatant from the Bio-digestor must be discharged into the soak pits. The Supernatant from the. bio-toilets must be tested at periodic intervals to meet discharge standards **Collection of Food waste and kitchen waste from Construction Camp** -All waste arising from the project is to be stored and disposed of as per the provisions of Annexure 19-Environment Codes of Practices & other Plans or as directed by EHS Specialist of the PMU In the case of rented	-Adequate number of toilets as per no of labours - Records of surface water quality Monitoring; -No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC

		accommodation, arrangements must be made with the Municipal corporation for the disposal of the waste. **Collection and Disposal of Food Waste from the Aphalamukh Construction Site** Adequate space must be provided in the Construction Site for the storage of Solid Waste No Solid waste should be discharged into the river Mechanisms of transporting and disposing of the Solid waste to Guwahati must be carried out.			
	Impact on aquatic life and dolphins	-Construction Planning must be carried out so that No-construction Period (stop the construction activities in the water part between Mid- March to Mid-June) -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 piling starts, Dolphin Watch must be carried out in the river for one hour. Piling must commence if dolphins are not spotted. - Before starting piling, allow some time for aquatic fauna to displace from the piling area. -Piling must be stopped for some time if any dolphin/turtle/RET species are sighted in the activity area .-Noise-reducing devices like mufflers ,enclosures baffles must be fitted with the equipment as much as feasible. -Fish exclusion devices must be installed in the water column around the pile driving area to prevent fish access -Geo Textile synthetic sheet curtains &turbidity traps must be placed around construction areas to prevent the movement of sediments and construction waste -Aquatic ecology monitoring must be carried out before the start of construction and after completion of construction to assess the impact of construction activities on aquatic life. -If, despite the introduction of preventive measures, fish kills or impact on aquatic life is observed, then the work will stop immediately, and the methods will be reviewed and corrected. -If drilling is carried out Polymer-based mud instead of bentonite to be used as drilling fluid with proper	Preparation of the Dolphin / Aquatic Manal Management Plan 2. Logs for recording watch and ward for dolphins / turtles during the piling 3. Log for aquatic fauna monitoring	Contractor	PMU (AIWTDS +GC)and TSSC

		storage of polymer at designated storage areas. Drill cutting and spent drilling mud must not be disposed in the river - All equipment will be adequately maintained to prevent potentially hazardous or toxic products from leaking or spilling. This includes hydraulic fluid, diesel, gasoline and other petroleum products. -The piling activities must be carried out in the shortest possible timeframe.			
	Degradation of Water Quality due to land reclamation	-Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition. - The reclamation work in the river must be undertaken during the low flow period -Schedule construction works to complete the construction work before the onset of the monsoon. -Turbidity traps/curtains/ Geo-Textile synthetic sheet curtains would be placed around the piling and construction area to prevent the movement of sediments and construction waste.	-Regular monitoring of site - Water quality tests	Contractor	PMU (AIWTDS +GC)and TSSC
	Degradation of water quality due to construction activity	Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition. Schedule construction works to complete the construction work before the onset of the monsoon. Schedule the construction works during the low water level period – ensure that works are completed during the same period before the onset of monsoon. - Inspection and maintenance of disturbed areas where mobilisation and barrier installation occur for sediment control measures. -Washing of vehicles and equipment must not be carried out in rivers or nearby places.	(i) Construction methodology for waterside construction -Schedule of construction works to ensure completion of the works before monsoon/ develop a Monsoon Management Plan -Records of inspection of the sedimentation chamber -Effectiveness of water management measures. -No visible degradation of water quality	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Fuel and Lubricants and hazardous waste	- Avoid/minimise storage of fuels, chemicals, and lubricants near the river/water; ensure no spillage - A temporary secured hazardous material handling and waste storage area must be provided at the construction site. As part of a design feature, a permanently secured ('bunded') impermeable surface and dykes capable of carrying 110% volume of materials for accidental spills or leakage must be constructed and maintained.	- No of spills reported -Field observation -Water quality monitoring reports	Contractor	PMU (AIWTDS +GC)and TSSC

		Fuel transfer through decanting is prohibited. The use of a transfer pump with the proper fitting is suggested. -The storage area should be covered. - Dispose of any wastes generated by construction activities as per the guidance presented in Annexure 19 Environment Codes of Practices & other Plans and - Conduct surface quality inspection and monitoring according to the EMP. - Contractors will have emergency spill equipment available whenever working near or on the water.			
Construction on the landside	Deterioration of air quality from fugitive sources	**Prevent Dust Generation** -The soil/earth must be transported by covering the haulage vehicles with tarpaulin or any other good quality material. -Dust suppression measures by water sprinkling on worksites and temporary service and access roads. -All construction workers must be provided with pollution masks to mitigate the effect of dust generation on the health of workers. -Construction Material must be transported in covered dump trucks to the project site. This must not be stockpiled at the project site - Clean wheels and undercarriage of haul trucks before leaving the construction site. - Loading and unloading of construction materials must be made at designated locations with provisions of water sprinkling. -Construction vehicles, machinery & equipment must be regularly serviced and maintained and would have a valid PUC certificate -Don't allow non-project vehicle access in the work area, limit soil disturbance and prevent access by barricading and security personnel. -Traffic detours and diversions must be designed to minimise bottlenecks and ensure smooth traffic. -Air pollution monitoring must be carried out at specified locations as described in the monitoring plan to verify that the contractor follows air pollution norms and that the air quality at the construction site does not exceed the prescribed limits.	- Complaints from sensitive receptors. - Quarterly environmental monitoring report for ambient air, noise, water, and soil	Contractor	PMU (AIWTDS +GC)and TSSC
Use of Plant, Equipment Machinery and Vehicle	Emissions from Construction Vehicles, Equipment and Machineries	-The contractor will take every precaution to reduce the level of dust from batching Plant/Cement Storage/, construction sites involving earthwork by a sprinkling of water,	- Heavy equipment and machinery with air pollution control devices. - Latest Six-Monthly	Contractor	PMU (AIWTDS +GC)and TSSC

	(Generation of Exhaust Gases) lead to the deterioration of air quality	encapsulation of dust source and by the erection of screens/barriers. -All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. -The contractor will provide necessary certificates to confirm that all Plants, equipment, machinery, and vehicle used in construction conform to relevant dust emission control legislation. -No open burning of bitumen or preparation of hot mix is allowed. -No burning of firewood is allowed in the construction camp. The Contractor must make provisions for LPG cylinders. -Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -All vehicles, plants and machinery used during construction must conform to the emission standards promulgated under the Environment (Protection) Act, 1986. The contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB. -The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Valid PUC must be maintained throughout the construction period Monitoring results will also be submitted to PMU Consultant and PIU as per the monitoring plan. -Contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB emission standards	Compliance Report to ASPCB - Valid Consent to Establish and Consent to Operate. - Certification that vehicles are compliant with Air Act - Quarterly environmental monitoring report for ambient air, noise, water and soil		
	Noise pollution leads to inconvenience for the people	The Contractor will confirm the following: - All plants and equipment used in construction (including third-party plants and equipment) must conform to the MoEF&CC/ CPCB noise standards. - All vehicles and equipment used in construction will be fitted with exhaust silencers. - Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked, and if found defective will be replaced.	- Complaints from sensitive receptors. - Use of silencers in noise-producing equipment and sound barriers.	Contractor	PMU (AIWTDS +GC)and TSSC

		-The activities must be carried out during the daytime. Night-time activities may be carried out in an emergency, but all measures mentioned in the mitigation measures for night work must be strictly adhered to. - Limits for construction equipment used in the project, such as concrete mixers, cranes (moveable), vibrators and saws, must not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. -Maintenance of vehicles, equipment and machinery must be regular and up to the satisfaction of the Environmental Expert of the PMU Consultant to keep noise levels at a minimum. - No noisy construction activities will be permitted around educational institutes/health centres (silence zones) up to 100 m from the sensitive receptors, i.e., schools, health centres and hospitals between 9.00 am to 6.0 pm. -Restriction on Honking at the project site -Traffic management plans prepared during the construction mobilization period must also be implemented during the construction stage. Effective traffic management must be taken care of in sensitive locations, major built-up areas, and along important highway junctions. - Barricading (Temporary noise barrier) around the construction site to minimize the noise level -Monitoring must be carried out at the construction sites as per the monitoring schedule, and results will be submitted to PMC and PMU. -The Environmental expert of PMC will be required to inspect regularly to ensure the compliance of EMP.			
	Vibration from the works.	No explosives should be used in construction activities. -Only mechanical equipment must be used to prevent Chances of damage from vibration. -If a mechanical vibrator/ pneumatic hammer is used within 100 m of the archaeological property, advice must be obtained from the State archaeological department for precautions. -The Contractor must employee an archaeologist to monitor the sites during the rock-cutting and piling activities.	-Complaints from sensitive receptors, Archaeology dept. -Site verification -Availability of trained man-power (archaeologist) at site	Contractor	PMU (AIWTDS +GC)and TSSC

	Contamination of Soil	Ensure all equipment, vehicles and other sources of fuels and lubricants will be collected and contained to avoid soil/ groundwater contamination. -Fuel must be stored in proper bounded and covered areas. -All spills and collected petroleum products must be disposed of in accordance with the provisions mentioned in **Annexure on Oil & Waste Storage** -Maintenance and refuelling of vehicles, machinery and other construction equipment must be carried out on an impervious surface so that spillage of fuels and lubricants does not contaminate the ground. -The runoff from the maintenance yard must lead to a peripheral drain and pass through an oil-water Separator		Contractor	PMU (AIWTDS +GC)and TSSC
Safety aspects during the execution of works	Community Health Safety risks in Work Zones	The Contractor must ensure that : -The construction zone is hard Barricaded with MS Barricades of a height of 3.0 m. -The construction site must be access controlled, and the workers must be provided valid identification cards to allow entry. -Construction material must be stored in the barricaded area. If temporary storage is required (for 1-2 days) outside the demarcated construction area, the same must be discussed with the community. Hard Barricading with proper signages must be put to prevent the entry of commuters in the areas. The permission of the Environmental Officer is essential. -To prevent the dust from the construction area affecting the sensitive receptor/ commuters' green screens may be used over and above the Hard Barricading at the advice of the Environment Officer of the PMC	-Barricading of the worksites -Traffic management Plan construction works, including number of permanent signages, barricades and flagmen on the worksite -Number of signages placed at the project location. -Regular reporting of the measures in the Quarterly Report	Contractor	PMU (AIWTDS +GC)and TSSC
	Occupational Health Safety: Personal Safety Measures for Labour	The contractor will provide: -Comply with all national, state and local labour laws (refer **Table 1A:** Social Management Plan -Develop and implement site-specific occupational health and safety (OHS) plan, which will include measures such as (a) excluding the public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related	-Site-specific OHS Plan. -Equipped first-aid stations. -Medical insurance coverage for workers. -Number of accidents. -Supplies of potable drinking water. - Clean eating areas where workers are not exposed to hazardous or	Contractor	PMU (AIWTDS +GC)and TSSC

		accidents -Barricading of all excavation carried out for construction. For deep excavation -shoring and bracing must be provided Movement of equipment and machinery near the deep excavation of soft soil must be prohibited. - Flagmen must accompany all movement of equipment and vehicle inside. -All vehicles and equipment must be fitted with reverse horns, alarms etc. -Protective clothing as may be appropriate to the risk involved in the activities being undertaken by the labour. -Protective clothing must be as per the BIS standards -Earplugs for workers exposed to loud noise, and workers working in concrete mixing operations, piling and other high-noise-generating operations -Adequate safety measures for workers during the handling of materials at the site are taken up. -All tools, tackle, lifting instruments, and cranes must have valid load certification. The tools and tackle must be regularly inspected by the Environment Officer / OHS officer of the PMU. -The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangways, stairwells, excavations, trenches and safe means of entry and egress. -All precautions must be taken for working at heights. -The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. -Ensure that qualified first aid is always provided. Equipped first-aid stations must be easily accessible throughout the site. - Provide medical insurance coverage for workers. -The Contractor will not employ ad-hoc work procedures, follow best & acceptable work practices -The contractor will document work-related accidents. Provide qualified & easily accessible first-aid facilities all times at all sites. -Secure all installations from unauthorised intrusion and accident risks.	noxious substances. - record of H&S orientation trainings - personal protective equipment. - % of moving equipment outfitted with audible back-up alarms; -permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. -Compliance to core labour laws		

		-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 with drinking water and protected from the elements of nature - Barrier structures are of sufficient height to prevent waves or overflows from flooding in the enclosed area. Regular inspection must be carried out for the coffer dam to ensure no water leakage in the construction area. -During working in River, workers must be made aware of risks of water depth, currents, and dangerous areas of water must be properly marked by fixed or floating barricades and signage of danger. Workers must also be made aware of the protection of the biodiversity of the water, and fishing must be strictly prohibited. A boat must be made available at the site to transport labour and materials and be well-maintained for emergencies. Workers must not be allowed to dip or bathe in rivers. A suitable working platform must be provided during construction works in water. -Life-saving equipment and lifeguards must be made available during the period of working in water. -The Contractor will mark 'hard hat' and 'no smoking' and other 'high-risk areas and enforce non-compliance of the use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilisation and will be approved by the Safety Officer of PIU.			
	Injuries/fatalities to the employees	Accident/Incident Reporting for SHE -The PIU must carry out an awareness campaign for the Do's and Do nots in construction sites. -Near misses must be recorded and reported on a regular basis • -Fortnightly meetings must be held with employees to make them aware of unsafe acts and practices.	-Record of near misses - Record of fatalities - No of workers' meetings -Labour Law Compliance Report generated through Labour Law Compliance system	Contractor	PMU (AIWTDS+GC)and TSSC
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	Site Verification	Contractor	PMU (AIWTDS+GC)and TSSC

		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. • 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 • Working hours of labourers would not exceed the standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated. Septic tanks/soak pits would be provided for its disposal.			

Table 1.2 Social Management Plan

Component	Social Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Health & Safety	Accident and Incident risk from construction activities and safety of workers Impact on Social life of nearby community	-Local labour would preferably be employed for construction. -Site would be barricaded and would have security guards. -Register 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 -Rest area for workers would be provided. -Contractors would adopt and maintain safe working practices.	-Regular health check-up of the workers -Training on communicable diseases.	Contractor	PMU (AIWTDS+ GC)and TSSC

		SOPs would be prepared and followed for all activities under supervision of site engineer -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 -Maintenance and repair of any local village road used for the project activities should be carried out both before and end of construction by contractor.			
Labour Influx	- STD, HIV/AIDS to local community Increased demand and competition for local social and health services -Social conflicts between the local community and the construction migrant workers. -Increased 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	-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 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 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	- Awareness training for applicable regulatory regulations. -The Indian Factories Act, 1948 and State Rules,	Contractor	PMU (AIWTDS+ GC)and TSSC

		with nearest higher order hospital to refer patients of major illnesses and critical cases. - 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 shifts.			
Gender Based Violence	There might be a possibility of gender-based violence arising from the inflow of migrant workers/ labours.	- Code of Conduct shall be signed by the workers. - Integration of GBV into existing strategy, Grievance Redressal Mechanism, safety talks, tool box meeting and regular trainings for the workers. - Identification of GBV focal points through community consultations. - Trainings shall be arranged for the workers on Occupational Health and Safety. - Identification of Hot Spots for GBV within the project including construction sites and labour camps alongside local communities, schools, vocational training centers, liquor shops, migrant laborers' residing in rented accommodations within the villages. - Both men and women labours shall be made aware about the applicable rules and regulations. - Formation of a committee comprising of representatives from local NGOs/ CBOs, police, academia, advocate, etc. with at least 70% women members. The committee shall meet every quarter in order to address the problems faced by the labours/ locals. Consultation with women's groups should also be held during construction and operation phases to listen to their issues	-Regular Training shall be conducted. -IEC material should be displayed at site -Awareness Campaign	Contractor	PMU (AIWTDS+ GC)and TSSC

		and concerns regarding labour, health and safety etc. as well as to solicit their ideas on various community initiatives.			
	With the inflow of migrant workers and their interaction with the local population, health issues among the local community might emerge. Health problems like STIs, HIV/AIDS, Hepatitis B&C, Tobacco chewing, Tuberculosis etc. might spread in the area because of this floating population	- Regular medical camps can be conducted amongst the labours and the local population to make them aware about HIV/AIDS and associated factors. - Awareness on health issues like HIV/AIDS, Tuberculosis, Hepatitis B & C, Sexually Transmitted Infections, Dengue, Chikungunya, Malaria, Tobacco control, etc., shall be conducted periodically. - District AIDS and Prevention Control Unit (DAPCU), District level Agency for the implementation of National Health Mission and Employee's State Insurance Corporation (ESIs) Hospital shall be liasoned for the same. - Community based meetings, consultations in camp, distribution of leaf lets, IEC tools (outreach programmes, campaigns, awareness through newspapers, TV's, etc.), posters, banners. Use of mobile phones shall be banned during driving and construction activities.	- Regular health check-up of the workers -Training on communicable diseases	Contractor	PMU (AIWTDS+ GC)and TSSC

2. ENVIRONMENT MONITORING PLAN

Environmental Monitoring Programme is to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The same will be included in tender / bid document. The broad objectives of the environment monitoring program are:

- To monitor impacts on the surrounding environment and the effectiveness of mitigation measures during the construction and operation phase.
- To ensure that the environmental control systems, installed are effective.
- Comply to the provisions of relevant environmental regulations

The parameters to be monitor, frequency of monitoring, number of samples, locations and responsibility of monitoring is given in **Table- 2.1**

Table 2.1 Summary of Environmental Monitoring Programme: Construction Phase

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
1.	**River Water**					
	Physico-chemical parameters	pH, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides.	For three seasons in construction phase; Turbidity, DO and salinity will be monitored once every week at 3 locations: near the Berth, channel and records of monitoring will be maintained during construction phase If DO level goes 4.0 mg/l, then its causes will be investigated, and corrective actions will be taken	Surface Water Upstream- 2 • Downstream- 2 • Near Project site- 1 Ground water-2 near the project site	As per AIWTDS directions	Contractor
	Biological parameters	Light penetration, Chlorophyll, Primary Productivity, Phytoplankton's, Zooplanktons	For three seasons in construction phase For two seasons in operation phase except monsoon	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
2.	**Sediments**					
	Physico-chemical parameters	Texture, pH, Sodium, Potassium, Phosphate,	For three seasons in construction phase	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor

		Chlorides, Sulphates, Hg, Pb, Fe, Cu, Zn, Cd	For two seasons in operation phase except monsoon			
	Biological parameters	Benthic Micro-fauna, Benthic Macro-fauna	For three seasons in construction phase. For two	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
			seasons in operation phase except monsoon			
3.	**Ambient Air Quality**	$PM_{2.5}$, PM_{10}, SO_2 and NO_2	- For three seasons in construction phase and one season for operation phase. - Twice a week for four consecutive weeks per season.	Upwind- 2 Downwind- 2 Near Project site- 1	As per AIWTDS directions	Contractor
4.	**Noise Quality**	Equivalent Noise Level	During peak construction activities	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
5.	**Soil Quality**	N, P, K and Heavy metals	2 samples pre-monsoon season and 2 samples post-monsoon in construction phase and one season during operation phase	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
6.	**Dolphin study**	Assessment and presence of Dolphins, survival etc.	Once per year	--	As per AIWTDS directions	AIWTDS

*Note: All the Samples to be collected as per standard norms. Parameters and components may vary as per requirement.

3. BUDGET FOR EMP

Tentative Environment budget has been prepared for design, construction and operation

phase of the project which 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. Environmental budget for Aphalamukh terminal is detailed break-up of costs is given in **Table- 3.1**

Table 3.1 Summary of Environmental Budget- Construction Stage

S.No.	Particulars	Stages	Costs Covered By
A.			
1	Water Quality Monitoring	Pre -Construction	Contractor
		Construction	Contractor
2	Biological Monitoring	Pre -Construction	Contractor
		Construction	Contractor
3	Sediments: Physico Chemical	Pre -Construction	Contractor
		Construction	Contractor
4	Sediments: Biological	Pre -Construction	Contractor
		Construction	Contractor
5	Ambient Air Quality	Pre -Construction	Contractor
		Construction	Contractor
6	Noise Quality	Pre -Construction	Contractor
		Construction	Contractor
7	Soil Quality	Pre -Construction	Contractor
		Demobilisation	Contractor
8	Groundwater	Pre -Construction	Contractor
		Construction	Contractor
		Camp/Kitchen During Construction	Contractor
		Decomissioning	Contractor
	Subtotal (A)		
B.			
1	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Plans and Protocols Social and cultural values of the area. (1 day)	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators (at the beginning of Contract)	TSSC
2	Training for Ghat management'	Section officers/ Vessel operators/ Masters/ Khalasi , Ghat officers, Ghat Maintenance workers etc.(At Beginning of Construction)	Contractor
3	Community issues; Awareness of transmissible diseases; social and cultural values.	Construction Crew (once every six months)	Contractor
4	EMP; Waste disposal, Cultural values and social sensitivity.	Once every year or as directed by the PIU	Contractor
5	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers; boat/launch crew, (once every year)	Contractor

6	Camp operation; Waste disposal; Natural resource conservation; Housekeeping.	Camp staff (once every quarter)	Contractor
7	Construction Implementation requirements; handling situations for important flora / fauna especially Dolphin; Physical Cultural resources;	PIU; supervisor Selected crew members and contractors (once every six months)	Contractor
8	Health and safety equipment on board and in terminals	Selected crew members and Vessel operators/ Masters/ Khalasi etc.	Contractor
9	Environment Management tracking System	AIWTDS	Contractor
	Subtotal (B)		
C.	**Construction Contractor EMP Implemenation**		
5.	Water Sprinkling Measures for Dust Supression	Construction	The cost is integrated as part of the civil work cost
6	Development and Implementation of the Dolphim Management Plan of Contractor	Construction	The cost is integrated as part of the civil work cost
7	Providing, fixing, maintaining, shifting & refixing, barricading of minimum 2.0 mtr height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initialy, painting, lettering & border with reflective paint at the time of every shifing, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project	Construction	The cost is integrated as part of the civil work cost
8	Supplying and fixing of cautionary and or informationary signssign boards including the cost of posts, fixtures, fixing, foundation, fitting and fixing. Sheeting will be made of encapsulated lens type of retro-reflective type and message / borders will be screen printed complete as per screen specification in IRC SP 55: 2001. To be made available at all time at the work sites as required and directed by the engineer	Construction	The cost is integrated as part of the civil work cost
9	Supplying and fixing of flashing beacon warning lights including the cost of posts, fixtures, fixing, foundation, fitting and fixing, cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc. and as per specification in IRC SP 55: 2001	Construction	The cost is integrated as part of the civil work cost

10	Provision and maintenance of Bio toilets with 1 male and 1 female units including cost of material , labour, loading, unloading, lead, lift, transportation, shifting etc. And shall be made available at worksite at the direction of the PIU. The facility shall complete with water arrangement, privacy, lighting arrangement. The WC and /urinals should be made of stainless Steel and the partitions should be made of aluminium framework with FRP panels. The bio-digester tank should be approved by Defence Research & Development Organisation (DRDO)or any other competent agency. The whole toilet shall be mounted on MS framework with skids; Overhead water tank shall be made of HDPE with proper arrangement of ball cock and mosquito proof cover. These should also be provided with two dustbin for wet and dry waste. The bio-digester toilets shall be mounted on skids and shall not require any creation of permanent structure so that they can be shifted from one worksite to another	Construction	The cost is integrated as part of the civil work cost
11	Provision of Helmets (IS CODE 2925 : 1984) , Safety Shoes (IS CODE 5852 : 1996), Googles (•IS CODE 5983 : 1980), Reflective Jackets, mitten/ gloves (IS 2573) , safety nose masks to all personnel (including temporary labour) involved in the worksites	Construction	The cost is integrated as part of the civil work cost
12	Provision of First Aid Kits for worksites	Construction	Civil works contract
13	Provision and maintenance of waste collection bins in sets of 2 (blue and green) for collection of municipal solid waste generated at the worksite including cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc.	Construction	The cost are integrated as part of the civil work cost
14	Environment, Health & Safety Engineer/Supervisor having Bachelors in Env Science / Management/ B.Tech (Env Engg.)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
15	Diploma in Central Labour Institute / Regional Labour Institute (Mandatory)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
	River bank protection through plantation (Erosion management)		Contractor

4. BUDGET FOR SMP

The various activities for social management under the subproject to be undertaken by the contractor are given in **Table 4.1.**

Table 4.1: Summary of Social Budget (construction phase)

Item of SMP	Duration
Training for contractor staff on labour laws such as Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Bonded Labour System (Abolition) Act, 1976; The Workmen's Compensation Act, 1923; The Contract Labour (Regulation & Abolition)	Actual, before and during the project implementation time

Item of SMP	Duration
Act, 1970 and Rules; The Child Labour (Prohibition and Regulation) Act, 1986; The Indian Factories Act, 1948 and State Rules; Public Liability and Insurance Act, 1991; The new labour Act like The Code on Social Security, 2020 and The Code on Wages, 2019,	
Social safeguards training including training of staff on GRM. GBV training (SEA and SH)	Actual, before and during the project implementation time
Environmental Health and Safety Officer and Social Development Specialist hired by contractor, for on-site supervision	Actual, during the project implementation

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING PROGRAMME- NORTH GUWAHATI

1. GENERAL

The Environment and Social Management Plan (ESMP) is required to ensure sustainable development of the proposed terminal on river Brahmaputra both during the construction as well as operational phases. The ESMP is site and time specific. In order to effectively implement ESMP, an institutional framework has been developed and roles and responsibilities of various relevant agencies have been worked out. Capacity development program are also identified and part of the ESMP.

In general, Assam Inland Water Transport Development Society (AIWTDS), (with assistance from Contractor, Third Party Monitoring Consultant /Technical Support & Supervision Consultant) is the responsible entity for ensuring that the mitigation measures as suggested in the ESMP are carried out. A detailed ESMP has been prepared for North Guwahati terminal. The list provides reference implementing organisation and responsible entity.

COMPONENTS OF EMP

Key components of the EMP are summarized below and explained in detail in the following subsections:

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

Site-specific environment and social riverine infrastructure along with the roles and responsibilities of the key persons involved at different phases of the proposed development are described below:

The Environmental Management Plan for North Guwahati Terminal for construction and Social Management Plan is detailed in **Table -1.1 and Table- 1.2,**

Table 1.1: Environment Management Plan (Construction Phase)

Component	Environmental Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Design					
Development of the Final Design	The design of the infrastructure must be resilient to the Floods	The design must take into consideration the projected rainfall levels as in the Assam State Action Plan on Climate Change (2015- 2020). The Annual rainfall is likely to increase by 10-25 %, and the extreme rainfall days will increase by 5-38%, with the extreme rainfall increase projected to increase between 25 and 150 mm.	Assessment of Design for Resilience	Contractor	TSSC & PMU (AIWTDS +GC)
	Collection and Treatment of Solid and Liquid Waste	The design of bio-digesters at the Terminal must be an adequate size to meet the regular passenger demand. Additional space needs to be made available for setting up additional bio-toilets for the pilgrim / festival. Adequate space must be made available to store municipal solid waste.	Assessment of Capacity of Bio-Digestor Assessment of space for the setting up bio-toilets, Adequate space for storage of Municipal Solid waste	Contractor	TSSC & PMU (AIWTDS +GC)
	Energy Efficiency	Energy-efficient measures in the terminal buildings will be implemented; Solar power will be used in potential area	Use of Energy efficient Fitting and fixtures	Contractor	TSSC & PMU (AIWTDS +GC)
Pre-Construction Activities					
Field Verification Surveys	Requirement for felling of trees	**Permission of tree(s) removal from non-forest area** -The GC/ PMU and the Contractor will carry out joint field verification to ascertain whether any tree would be affected and needs to be felled either for the construction activities or for safety purpose. In case any tree must be felled. -Permissions must be obtained from the Forest Department, Government of Assam. No tree would be felled without permission. At present there is no requirement for felling of trees for the proposed construction at North Guwahati	Copy of the Permit of the Forest Department, Government of Assam	Contractor	PMU (AIWTDS +GC)and TSSC
Assessment of Impacts due to Changes/Additions in the Project	Additional Impacts	**Site-specific EMP before the commencement of construction** -In case of any change in the event of changes/revisions (including addition or deletion) in the project's scope of work or change in the site condition. the impacts of the changes need to be assessed. **-**The Contractor will also prepare site-specific EMP to address these additional impacts. The Site Specific EMP has to be submitted to the PMC for approval. The Construction activities must not start before the approval of site-specific EMP by the PMC.	Approved copy of the C-EMP	Contractor	PMU (AIWTDS +GC)and TSSC
Setting up of Plant and Machinery	Potential source of pollution (air	**Location of Batching Plants**	Consent to Establish and Operate	Contractor	PMU (AIWTDS

(Batching Plants or concrete mixer location)	quality, water quality, soil)	-Batching plants will be sited sufficiently away from settlements, agricultural operations, or commercial establishments. Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -Concrete mixers and batching plants will comply with the requirements of the relevant emission control legislations and -Consent/NOC for all such plants obtained from the State Pollution Control Board will be submitted to the PIU. -The Contractor will not initiate plant/s operation till the required legal clearances are obtained and submitted. In case the concrete is procured from a third party, a valid consent of the plant, along with the latest copy of the Annual report, will be submitted to the PIU before the procurement of any material			+GC)and TSSC
Procurement of Other Construction Vehicles, Equipment and Machinery	Potential for air pollution and noise	**Statutory Compliance:** All Construction equipment[1] and machinery to be used in the project will conform **to** BS IV standards to be adopted by the Ministry of Road Transport and Highways. The discharge standards promulgated under the Environment Protection Act, 1986, will be strictly adhered to. -Noise limits for construction equipment to be procured, such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws, will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986. The Contractor will maintain a record of PUC for all vehicles and machinery used during the contract period.	Certification by Manufacturer of emission and noise levels/ Pollution under Control Certificates, Insurance and Driving License of the driver to be submitted for all vehicles	Contractor	PMU (AIWTDS +GC)and TSSC
Sourcing of construction material	Unsustainable mining practices	-Contractor will finalise the stone quarry /sand mine / borrow area for procurement of construction materials after assessment of the availability of sufficient materials and other logistic arrangements. The -- Contractor will provide a copy of the Environmental Clearance Certificate of the quarry/sand mine and the Consent to Establish and Operate along with the recent compliance report to the PMU before any such quarry is engaged. -In case the contractor decides to use new quarries then the contractor will obtain the environmental clearance and all other permits and licenses and submit the same to the PMU before extracting any material. The contractor will submit a copy of the approval and the rehabilitation plan to the PIU and the Environmental Expert of the PMU Consultant.	Permission for mining/ quarrying of materials from the Mining Department, District Administration and District Level Environment Appraisal Committee	Contractor	PMU (AIWTDS +GC)and TSSC

[1] *Every agricultural tractor, construction equipment vehicle and combine harvester shall be so manufactured that it complies with the following standards of gaseous pollutants as per rule 115A,after sub-rule (8), of the Central Motor Vehicle Rules, 1989.*

		-Contractor will also work out haul road network and report to the Environmental Expert of the PMC. They will inspect and in turn report to PMU before approval.			
Identification of water sources for construction	Adverse impact on water resources	If the contractor will source water requirements for construction form groundwater, prior permission from the Ground Water Board is required. A copy of the permission will be submitted to PIU prior to the initiation of construction. A flow meter must be installed, and the records of water used for construction must l be maintained. The usage of groundwater must be recorded. The contractor can use fresh groundwater sources after the required treatment for drinking. Even if water is sourced from third parties, the above provisions must be followed. -If the river water is used, the permission of the Irrigation department must be obtained	Permission from the Ground Water Board for Groundwater usage Permission of the Irrigation /Water Resources Department in case of River water is used.	Contractor	PMU (AIWTDS +GC)and TSSC
Environmental monitoring of baseline conditions of air, noise, water, and soil	To establish baseline environmental conditions and ascertain the impacts during the construction phase	Environmental monitoring to be carried out through recognised[2] Laboratory as per the locations specified in the environmental monitoring plan in **Table 2.1 Error reference source not found.**	Submission of test results to PMU	Contractor	PMU (AIWTDS +GC)and TSSC
EMP Implementation Training	Lack of awareness of EMP can lead to irresponsible behaviour resulting in an Irreversible impact to the environment, workers, and community.	-Project manager and all key workers will be required to undergo EMP implementation, including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labour laws, applicable environmental laws, etc. Additional modules for Dolphin Protection and Cultural Heritage Management - All new personnel joining the work need to undergo induction training. All personnel joining work after a break of more than 15 days need to undergo refresher.	-Certificate of Completion (Safeguards Compliance Orientation) -Posting of EMP at worksites. -Maintaining Records of training both induction and refresher -Submission of the Training records to the PIU every month	Contractor	PMU (AIWTDS +GC)and TSSC
	Deployment of EHS Officer and OHS Officer	Deploy qualified personnel and management committee. - Contractor must depute qualified EHS personnel in the start of the project to conduct training to all the personnel and effective monitoring of mitigation measures during construction. The name and functions of the responsible EHS persons and their relevant expertise must be notified in the Quarterly Report -If an EHS person resigns/ replaced/replaced or the team has been	Submission of records of the availability of the EHS personnel onsite in the Monthly Report and Quarterly Report	Contractor	PMU (AIWTDS +GC)and TSSC

[2] (National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited /Ministry of Environment Forest and Climate Change (MoEF&CC) / respective State Pollution Control Board (SPCB's)).

		enlarged, the same must be reported to the Bank within 15 days of the incident			
Legal compliance	Environmental legal noncompliance may	-Obtain all consents, clearances (CTE/CTO from ASPCB), permits NOCs etc., before start of construction works. -Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (Refer Table 3.1 in this report) -Following consents are required- -Tree cutting-local authority -Storage, handling, and transport of hazardous materials-ASPCB. -Sand mining, quarries, borrow areas-Department of mines and Geology. .-Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. -Include in detailed design drawings and documents all conditions and provisions; if necessary	Copy of the Permit/ Consent to be submitted with QPR to PMU	Contractor	PMU (AIWTDS +GC)and TSSC
Chance finds	Damage / disturbance to artifacts	Construction Contractors to follow these measures in conducting any excavation work. -Create awareness among the workers, supervisors and engineers about the chance finds during excavation work. -Stop work immediately to allow further investigation if any finds are suspected. -Inform State Archaeological Department if a find is suspected and taking any action, they require to ensure its removal or protection in situ.	-Chance Find Protocol -Awareness training for workers	Contractor	PMU (AIWTDS +GC)and TSSC
Preparation of Method Statement	Occupational Health Safety and Community Health Safety Impacts	Carry out a Hazard Identification and Risk Assessment for all tasks presented in the Method Statement Prepare occupational health and safety plan, including COVID-19 H&S Plan Prepare Community Health Safety Plan to ensure that the community/ pilgrims are segregated from the construction area Prepare a Debris/spoils management plan, Waste Management Plan.	- Occupational Health and Safety Plan (including HIRA) to be integrated with Method Statement - Community Health Safety Plan - Debris/spoils management plan, Waste Management Plan	Contractor	PMU (AIWTDS +GC)and TSSC
	Impact of Aquatic Species and Dolphins	Construction Planning must be carried out so that No-construction /piling (stop the construction activities) in the water part between Mid- March to Mid-June) Construction activities must not be planned on the waterside during the monsoon period. Construction schedule should ensure that no work is planned during the monsoon in the water part.	Construction Scheduling	Contractor	PMU (AIWTDS +GC)and TSSC
Construction Stage					
Clearing and Grubbing for site Preparation (Terminal Site, Base	Landscape and Aesthetics	Permission of tree(s) removal from non-forest area -Vegetation will be removed from the construction zone before the commencement of civil works. All works will be carried out such that the damage or	Verification of number of trees felled; Copy of NOC from forest dept.	Contractor	PMU (AIWTDS +GC)and TSSC

camp, Construction Camp & Labour camp)		disruption to flora other than those identified for cutting is avoided or minimized. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert of the Consultant. The contractor, under any circumstances, will not cut or damage trees. Trees identified under the project and have received permission of felling from the Forest Dept will only be felled. - Compensatory afforestation must be carried out per the Tree Felling permission provisions.			
	Loss of topsoil. Loss of natural resources (Earth/soil) in area where the Constrctioncamp is setup	•Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • At least 10% of the acquired area for construction purposes must be kept for stockpiling of fertile topsoil •Precautions must be taken while stockpiling. The slope of the stockpile shall not exceed 1:2 (V:H) to retain soil & allow percolation of H_2O and the edges of the pile shall be protected by silt fencing. The piles shall be covered with gunny bags/ tarpaulin. The maximum height of the stockpiles shall be kept less than 2 m •Excavated materials would be preferably used for site filling for land reclamation to construct the terminal	Site verification	Contractor	PMU (AIWTDS +GC)and TSSC
Transporting Construction Materials and Haul Road Management	Impacts on air quality and safety	-Contractor will maintain all hauls roads (existing or built for the project), which are used for transporting construction materials, equipment, and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials or being blown away during the transportation. -Only major roads will be used by the contractor's vehicles or any of his sub-contractor or materials suppliers. --Roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. -Contractor will arrange for regular water sprinkling for dust suppression of all roads and surfaces. -The unloading of materials at construction sites in/close to settlements will be restricted to daytime only. -All stockpiles will be covered/protected to prevent dust generation	Complaints from local community Visual observation in Site reports Monitoring of the air quality in the worksite and material storage area	Contractor	PMU (AIWTDS +GC)and TSSC
	Impacts on Water Quality	- Boats/ Vessels carrying construction material must not be overloaded. - Loading and unloading activities must ensure that spillage does not occur. - loose and friable material transported by boat must be covered	Site Reports	Contractor	PMU (AIWTDS +GC)and TSSC

	Community Safety due to movement of Constractio Vehicles	- Constraction material shall be stored within the construction area to prevent accessibility issue with the community - Schedule transportation of the constraction material so that heavy vehicles do not cause inconvenience to the local population and people on site ; - Drive vehicles in a considerate manner; - Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids - Notify affected area by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.	Site Reports Complaints form Local people on disturbance	Contractor	PMU (AIWTDS +GC)and TSSC
Storage of Construction Material	Potential for waterlogging	-The contractor will ensure that no construction materials like earth, stone, sand, or appendage are disposed of so as not to block the flow of water of any water course and cross drainage channels. -The contactor must not dump any excavated material into the river. -The contractor will take all necessary measures to prevent the blockage of water flow. -The stockpiled material must be prevented from erosion and deposition in the drainage channel from sites where these are stocked for construction.	Complaints of water logging	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Storage of Construction Material	Run-off from a material stockpile can also contaminate water. To prevent the contamination of the construction material, the following measures must be adopted; -The runoff from the construction material storage yard must be channelled through peripheral drains -The peripheral drains must be connected to sedimentation tanks (holding tanks excavated in the ground) of adequate capacity All sedimentation tanks and peripheral drains must be cleaned before the monsoon.	-Site visit Report -Number of sedimentation tanks installed. - Records of surface water quality Monitoring. -No visible Sedimentation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC
	Water Pollution from Fuel and Lubricants	- The contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery, and equipment maintenance are in accordance with the provisions stated in (**Annexure 19: Environmental Codes of Practice & Other Plans**) -Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refuelling areas as per the design provided.	-Number of Oil interceptors installed. -Records of surface water quality Monitoring. - No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU (AIWTDS +GC)and TSSC
	Pollution of water bodies	**-Wastewater from domestic activities such as bathing and washing at the**	-Adequate number of toilets	Contractor	PMU (AIWTDS

	from domestic activities	**camp site must be treated.** -The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering streams, water bodies or the irrigation system. -- The liquid waste from the construction camp must be treated and disposed of. -In the absence of construction camp if the contractor takes a rental accommodation must be channelized to the nearest municipality drain. In the absence of a municipality drain, a septic tank and a soak pit system of adequate capacity must be constructed. -Stagnation of water should not be allowed at any place near the campsite as a precaution against vector-borne disease. **Wastewater from the North Guwahati Worksite** -An adequate number of toilets must be provided Bio-toilets of adequate capacity must be provided for the workers based on no of users. The supernatant from the Bio-digestor must be discharged into the soak pits. The Supernatant from the. bio-toilets must be tested at periodic intervals to meet discharge standards **Collection of Food waste and kitchen waste from Construction Camp** -All waste arising from the project is to be stored and disposed of as per the provisions of **Annexure 19- Environment Codes of Practices & other Plans** or as directed by EHS Specialist of the PMU In the case of rented accommodation, arrangements must be made with the Municipal corporation for the disposal of the waste. **Collection and Disposal of Food Waste from the North Guwahati Construction Site** Adequate space must be provided in the Construction Site for the storage of Solid Waste No Solid waste should be discharged into the river Mechanisms of transporting and disposing of the Solid waste to Guwahati must be carried out.	as per no of labours - Records of surface water quality Monitoring; -No visible degradation to nearby drainages, nallahs or waterbodies due to civil works		+GC)and TSSC
Construction activities in Waterside	Degradation of Water Quality due to piling activities	-The piling work in the river must be undertaken during low-flow periods. -Turbidity traps/curtains/ Geo-Textile synthetic sheet curtains would be placed around piling and construction areas to prevent sediments and construction waste movement.	-Construction methodology for waterside construction -Schedule of construction works to ensure completion of the works before monsoon/ develop a Monsoon Management Plan	Contractor	PMU (AIWTDS +GC)and TSSC

			- Records of Works inspection		
	Impact on aquatic life and dolphins	-Construction Planning must be carried out so that No-construction Period (stop the construction activities in the water part between Mid- March to Mid-June) -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 piling starts, Dolphin Watch must be carried out in the river for one hour. Piling must commence if dolphins are not spotted. - Before starting piling, allow some time for aquatic fauna to displace from the piling area. -Piling must be stopped for some time if any dolphin/turtle/RET species are sighted in the activity area .-Noise-reducing devices like mufflers ,enclosures baffles must be fitted with the equipment as much as feasible. -Fish exclusion devices must be installed in the water column around the pile driving area to prevent fish access -Geo Textile synthetic sheet curtains &turbidity traps must be placed around piling and construction areas to prevent the movement of sediments and construction waste -Aquatic ecology monitoring must be carried out before the start of construction and after completion of construction to assess the impact of construction activities on aquatic life. . Effect of piling during the construction period will be managed by the adoption of vibratory piling and the usage of bubble curtains to disperse the fauna and reduce the noise level -If, despite the introduction of preventive measures, fish kills or impact on aquatic life is observed, then the work will stop immediately, and the methods will be reviewed and corrected. -If drilling is carried out Polymer-based mud instead of bentonite to be used as drilling fluid with proper storage of polymer at designated storage areas. Drill cutting and spent drilling mud must not be disposed in the river - All equipment will be adequately maintained to prevent potentially hazardous or toxic products from leaking or spilling. This includes hydraulic fluid, diesel, gasoline and other petroleum products. -The piling activities must be carried out in the shortest possible timeframe.	Preparation of the Dolphin / Aquatic Manal Management Plan 2. Logs for recording watch and ward for dolphins / turtles during the piling 3. Log for aquatic fauna monitoring	Contractor	PMU (AIWTDS +GC)and TSSC
	Degradation of water quality due to	Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition.	(i) Construction methodology for	Contractor	PMU (AIWTDS

	construction activity	Schedule construction works to complete the construction work before the onset of the monsoon. Schedule the construction works during the low water level period –ensure that works are completed during the same period before the onset of monsoon. - Inspection and maintenance of disturbed areas where mobilisation and barrier installation occur for sediment control measures. -Washing of vehicles and equipment must not be carried out in rivers or nearby places.	waterside construction -Schedule of construction works to ensure completion of the works before monsoon/ develop a Monsoon Management Plan -Records of inspection of the sedimentation chamber -Effectiveness of water management measures. -No visible degradation of water quality		+GC)and TSSC
	Water Pollution from Fuel and Lubricants and hazardous waste	- Avoid/minimise storage of fuels, chemicals, and lubricants near the river/water; ensure no spillage - A temporary secured hazardous material handling and waste storage area must be provided at the construction site. As part of a design feature, a permanently secured ('bunded') impermeable surface and dykes capable of carrying 110% volume of materials for accidental spills or leakage must be constructed and maintained. Fuel transfer through decanting is prohibited. The use of a transfer pump with the proper fitting is suggested. -The storage area should be covered. - Dispose of any wastes generated by construction activities as per the guidance presented in **Annexure 19- Environment Codes of Practices & other Plans** and - Conduct surface quality inspection and monitoring according to the EMP. - Contractors will have emergency spill equipment available whenever working near or on the water.	- No of spills reported -Field observation -Water quality monitoring reports	Contractor	PMU (AIWTDS +GC)and TSSC
Construction on the landside	Deterioration of air quality from fugitive sources	**Prevent Dust Generation** -The soil/earth must be transported by covering the haulage vehicles with tarpaulin or any other good quality material. -Dust suppression measures by water sprinkling on worksites and temporary service and access roads. -All construction workers must be provided with pollution masks to mitigate the effect of dust generation on the health of workers. -Construction Material must be transported in covered dump trucks to the project site. This must not be stockpiled at the project site - Clean wheels and undercarriage of haul trucks before leaving the construction site.	- Complaints from sensitive receptors. - Quarterly environmental monitoring report for ambient air, noise, water, and soil	Contractor	PMU (AIWTDS +GC)and TSSC

		- Loading and unloading of construction materials must be made at designated locations with provisions of water sprinkling. -Construction vehicles, machinery & equipment must be regularly serviced and maintained and would have a valid PUC certificate -Don't allow non-project vehicle access in the work area, limit soil disturbance and prevent access by barricading and security personnel. -Traffic detours and diversions must be designed to minimise bottlenecks and ensure smooth traffic. -Air pollution monitoring must be carried out at specified locations as described in the monitoring plan to verify that the contractor follows air pollution norms and that the air quality at the construction site does not exceed the prescribed limits.			
Use of Plant, Equipment Machinery and Vehicle	Emissions from Construction Vehicles, Equipment and Machineries (Generation of Exhaust Gases) lead to the deterioration of air quality	-The contractor will take every precaution to reduce the level of dust from batching Plant/Cement Storage/, construction sites involving earthwork by a sprinkling of water, encapsulation of dust source and by the erection of screens/barriers. -All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. -The contractor will provide necessary certificates to confirm that all Plants, equipment, machinery, and vehicle used in construction conform to relevant dust emission control legislation. -No open burning of bitumen or preparation of hot mix is allowed. -No burning of firewood is allowed in the construction camp. The Contractor must make provisions for LPG cylinders. -Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -All vehicles, plants and machinery used during construction must conform to the emission standards promulgated under the Environment (Protection) Act, 1986. The contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB. -The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Valid PUC must be maintained throughout the construction period Monitoring results will also be submitted to PMU Consultant and PIU as per the monitoring plan. -Contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB emission standards	- Heavy equipment and machinery with air pollution control devices. - Latest Six-Monthly Compliance Report to ASPCB - Valid Consent to Establish and Consent to Operate. - Certification that vehicles are compliant with Air Act - Quarterly environmental monitoring report for ambient air, noise, water and soil	Contractor	PMU (AIWTDS +GC)and TSSC

	Noise pollution leads to inconvenience for the people	The Contractor will confirm the following: - All plants and equipment used in construction (including third-party plants and equipment) must conform to the MoEF&CC/CPCB noise standards. - All vehicles and equipment used in construction will be fitted with exhaust silencers. - Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked, and if found defective will be replaced. -The activities must be carried out during the daytime. Night-time activities may be carried out in an emergency, but all measures mentioned in the mitigation measures for night work must be strictly adhered to. - Limits for construction equipment used in the project, such as concrete mixers, cranes (moveable), vibrators and saws, must not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. -Maintenance of vehicles, equipment and machinery must be regular and up to the satisfaction of the Environmental Expert of the PMU Consultant to keep noise levels at a minimum. - No noisy construction activities will be permitted around educational institutes/health centres (silence zones) up to 100 m from the sensitive receptors, i.e., schools, health centres and hospitals between 9.00 am to 6.0 pm. -Restriction on Honking at the project site -Traffic management plans prepared during the construction mobilization period must also be implemented during the construction stage. Effective traffic management must be taken care of in sensitive locations, major built-up areas, and along important highway junctions. - Barricading (Temporary noise barrier) around the construction site to minimize the noise level -Monitoring must be carried out at the construction sites as per the monitoring schedule, and results will be submitted to PMC and PIU. -The Environmental expert of PMC will be required to inspect regularly to ensure the compliance of EMP.	- Complaints from sensitive receptors. - Use of silencers in noise-producing equipment and sound barriers.	Contractor	PMU (AIWTDS +GC)and TSSC
	Vibration from the works.	No explosives should be used in construction activities. -Only mechanical equipment must be used to prevent Chances of damage from vibration. -If a mechanical vibrator/ pneumatic hammer is used within 100 m of the archaeological property, advice must be obtained from the State archaeological department for precautions.	-Complaints from sensitive receptors, Archaeology dept. -Site verification -Availability of trained man-power	Contractor	PMU (AIWTDS +GC)and TSSC

		-The Contractor must employee an archaeologist to monitor the sites during the rock-cutting and piling activities.	(archaeologist) at site		
	Contaminatio n of Soil	Ensure all equipment, vehicles and other sources of fuels and lubricants will be collected and contained to avoid soil/ groundwater contamination. -Fuel must be stored in proper bounded and covered areas. -All spills and collected petroleum products must be disposed of in accordance with the provisions mentioned in **Annexure 17 Emergency Spill Control Procedure.** -Maintenance and refuelling of vehicles, machinery and other construction equipment must be carried out on an impervious surface so that spillage of fuels and lubricants does not contaminate the ground. -The runoff from the maintenance yard must lead to a peripheral drain and pass through an oil-water separator		Contractor	PMU (AIWTDS +GC)and TSSC
Safety aspects during the execution of works	Community Health Safety risks in Work Zones	The Contractor must ensure that : -The construction zone is hard Barricaded with MS Barricades of a height of 3.0 m. -The construction site must be access controlled, and the workers must be provided valid identification cards to allow entry. -Construction material must be stored in the barricaded area. If temporary storage is required (for 1-2 days) outside the demarcated construction area, the same must be discussed with the community. Hard Barricading with proper signages must be put to prevent the entry of commuters/pilgrims in the areas. The permission of the Environmental Officer is essential. -To prevent the dust from the construction area affecting the sensitive receptor/ commuters' green screens may be used over and above the Hard Barricading at the advice of the Environment Officer of the PMC	-Barricading of the worksites -Traffic management Plan construction works, including number of permanent signages, barricades and flagmen on the worksite -Number of signages placed at the project location. -Regular reporting of the measures in the Quarterly Report	Contractor	PMU (AIWTDS +GC)and TSSC
	Occupational Health Safety: Personal Safety Measures for Labour	The contractor will provide: -Comply with all national, state and local labour laws (refer **Table 8.2: Social Management Plan).** -Develop and implement site-specific occupational health and safety (OHS) plan, which will include measures such as (a) excluding the public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents -Barricading of all excavation carried out for construction. For deep excavation -shoring and bracing must be provided	-Site-specific OHS Plan. -Equipped first-aid stations. -Medical insurance coverage for workers. -Number of accidents. -Supplies of potable drinking water. - Clean eating areas where workers are not exposed to hazardous or	Contractor	PMU (AIWTDS +GC)and TSSC

		Movement of equipment and machinery near the deep excavation of soft soil must be prohibited. - Flagmen must accompany all movement of equipment and vehicle inside. -All vehicles and equipment must be fitted with reverse horns, alarms etc. -Protective clothing as may be appropriate to the risk involved in the activities being undertaken by the labour. -Protective clothing must be as per the BIS standards -Earplugs for workers exposed to loud noise, and workers working in concrete mixing operations, piling and other high-noise-generating operations -Adequate safety measures for workers during the handling of materials at the site are taken up. -All tools, tackle, lifting instruments, and cranes must have valid load certification. The tools and tackle must be regularly inspected by the Environment Officer / OHS officer of the PMU. -The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangways, stairwells, excavations, trenches and safe means of entry and egress. -All precautions must be taken for working at heights. -The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. -Ensure that qualified first aid is always provided. Equipped first-aid stations must be easily accessible throughout the site. - Provide medical insurance coverage for workers. -The Contractor will not employ ad-hoc work procedures, follow best & acceptable work practices -The contractor will document work-related accidents. Provide qualified & easily accessible first-aid facilities all times at all sites. -Secure all installations from unauthorised intrusion and accident risks. -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 with drinking water and protected from the elements of nature - Barrier structures are of sufficient height to prevent waves or overflows from flooding in the enclosed area. -During working in River, workers must be made aware of risks of water depth, currents, and dangerous areas of water must be properly marked by fixed or floating barricades and signage of danger. Workers must also be made aware of the protection of the biodiversity of the water, and fishing	noxious substances. - record of H&S orientation trainings - personal protective equipment. - % of moving equipment outfitted with audible back-up alarms; -permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. -Compliance to core labour laws		

		must be strictly prohibited. A boat must be made available at the site to transport labour and materials and be well-maintained for emergencies. Workers must not be allowed to dip or bathe in rivers. A suitable working platform must be provided during construction works in water. -Life-saving equipment and lifeguards must be made available during the period of working in water. -The Contractor will mark 'hard hat' and 'no smoking' and other 'high-risk areas and enforce non-compliance of the use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilisation and will be approved by the Safety Officer of PIU. Please refer **Annexure 23** for Safety Measures during Construction Phase.			
	Injuries/fatalities to the employees	Accident/Incident Reporting for SHE -The PMU must carry out an awareness campaign for the Do's and Do nots in construction sites. -Near misses must be recorded and reported on a regular basis • -Fortnightly meetings must be held with employees to make them aware of unsafe acts and practices.	-Record of near misses - Record of fatalities - No of workers' meetings -Labour Law Compliance Report generated through Labour Law Compliance system	Contractor	PMU (AIWTDS+GC)and TSSC
	Cultural & Heritage Resources	- Adequate signs must be displayed in the access route for the devotees towards this cultural heritage and temples. -Warning signs about the construction activities must be provided to warm commuters/ pilgrims. - Regular supervision by an archaeologist to identify the impact on these archaeological properties from vibration -Make workers aware of chance finds and archaeological heritage • -Make workers aware of controlled vibration when working within 100 m of the site	i. No of training for workers on precautions against vibration ii. Report by the Archaeologist in the Quarterly report.	Contractor	PMU (AIWTDS+GC)and TSSC
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	Site Verification	Contractor	PMU (AIWTDS+GC)and TSSC

		• Segregated solid waste would be disposed of at municipal solid waste disposal location. • 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 • Working hours of labourers would not exceed the standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated. Septic tanks/soak pits would be provided for its disposal.			

Table 1.2 - Social Management Plan

Component	Social Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Health & Safety	Accident and Incident risk from construction activities and safety of workers Impact on Social life of nearby community	-Local labour would preferably be employed for construction. -Site would be barricaded and would have security guards. -Register 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 -Rest area for workers would be provided. -Contractors would adopt and maintain safe working practices. SOPs would be prepared and followed for all activities under supervision of site engineer -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 -Maintenance and repair of any local village road used for the project activities should be carried out both before and end of construction by contractor.	-Regular health check-up of the workers -Training on communicable diseases.	Contractor	PMU (AIWTDS+ GC)and TSSC
Labour Influx	- STD, HIV/AIDS to local community Increased demand and competition for	-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	- Awareness training for applicable regulatory regulations. -The Indian Factories Act, 1948	Contractor	PMU (AIWTDS+ GC)and TSSC

	local social and health services -Social conflicts between the local community and the construction migrant workers. -Increased 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	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 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. - 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 shifts.	and State Rules,		

Gender Based Violence	There might be a possibility of gender-based violence arising from the inflow of migrant workers/ labours.	- Code of Conduct shall be signed by the workers. - Integration of GBV into existing strategy, Grievance Redressal Mechanism, safety talks, tool box meeting and regular trainings for the workers. - Identification of GBV focal points through community consultations. - Trainings shall be arranged for the workers on Occupational Health and Safety. - Identification of Hot Spots for GBV within the project including construction sites and labour camps alongside local communities, schools, vocational training centers, liquor shops, migrant laborers' residing in rented accommodations within the villages. - Both men and women labours shall be made aware about the applicable rules and regulations. - Formation of a committee comprising of representatives from local NGOs/ CBOs, police, academia, advocate, etc. with at least 70% women members. The committee shall meet every quarter in order to address the problems faced by the labours/ locals. Consultation with women's groups should also be held during construction and operation phases to listen to their issues and concerns regarding labour, health and safety etc. as well as to solicit their ideas on various community initiatives.	-Regular Training shall be conducted. -IEC material should be displayed at site -Awareness Campaign	Contractor	PMU (AIWTDS+ GC)and TSSC
Community Health and Safety	With the inflow of migrant workers and their interaction with the local population, health issues among the local community might emerge. Health problems like STIs, HIV/AIDS, Hepatitis B&C, Tobacco chewing, Tuberculosis etc. might spread in the area because of this floating population	- Regular medical camps can be conducted amongst the labours and the local population to make them aware about HIV/AIDS and associated factors. - Awareness on health issues like HIV/AIDS, Tuberculosis, Hepatitis B & C, Sexually Transmitted Infections, Dengue, Chikungunya, Malaria, Tobacco control, etc., shall be conducted periodically. - District AIDS and Prevention Control Unit (DAPCU), District level Agency for the implementation of National Health Mission and Employee's State Insurance Corporation (ESIs) Hospital shall be liasoned for the same. - Community based meetings, consultations in camp, distribution of leaf lets, IEC tools (outreach programmes, campaigns, awareness through newspapers, TV's, etc.), posters, banners. Use of mobile phones shall be banned during driving and	- Regular health check-up of the workers -Training on communicable diseases	Contractor	PMU (AIWTDS+ GC)and TSSC

		construction activities.			

2. ENVIRONMENT MONITORING PLAN

Environmental Monitoring Programme is to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The same will be included in tender / bid document. The broad objectives of the environment monitoring program are:

- To monitor impacts on the surrounding environment and the effectiveness of mitigation measures during the construction and operation phase.
- To ensure that the environmental control systems, installed are effective.
- Comply to the provisions of relevant environmental regulations.

The parameters to be monitored, frequency of monitoring, number of samples, locations and responsibility of monitoring is given in **Table 2.1**

Table 2.1 Summary of Environmental Monitoring Programme: Construction Phase

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
1.	**River Water**					
	Physico-chemical parameters	pH, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides.	For three seasons in construction phase; Turbidity, DO and salinity will be monitored once every week at 3 locations: near the Berth, channel and records of monitoring will be maintained during construction phase If DO level goes 4.0 mg/l, then its causes will be investigated, and corrective actions will be taken For two seasons in operation phase except monsoon	Surface Water Upstream- 2 • Downstream- 2 • Near Project site- 1 Ground water- 2 near the project site	As per AIWTDS directions	Contractor
	Biological parameters	Light penetration, Chlorophyll, Primary Productivity, Phytoplanktons, Zooplanktons	For three seasons in construction phase For two seasons in operation phase except monsoon	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
2.	**Sediments**					
	Physico-chemical parameters	Texture, pH, Sodium, Potassium, Phosphate, Chlorides, Sulphates, Hg, Pb, Fe, Cu, Zn, Cd	For three seasons in construction phase For two seasons in operation phase except monsoon	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
	Biological parameters	Benthic Meio-fauna, Benthic Macro-fauna	For three seasons in construction phase.	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
			For two seasons in operation phase except monsoon			
3.	**Ambient Air Quality**	$PM_{2.5}$, PM_{10}, SO_2 and NO_2	- For three seasons in construction phase and one season for operation phase. - Twice a week for four consecutive weeks per season.	Upwind- 2 Downwind- 2 Near Project site- 1	As per AIWTDS directions	Contractor
4.	**Noise Quality**	Equivalent Noise Level	During peak construction activities	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
5.	**Soil Quality**	N, P, K and Heavy metals	2 samples pre-monsoon season and 2 samples post-monsoon in construction phase and one season during operation phase	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
6.	**Dolphin study**	Assessment and presence of Dolphins, survival etc.	Once per year	--	As per AIWTDS directions	Contractor

*Note: All the Samples to be collected as per standard norms. Parameters and components may vary as per requirement.

3. BUDGET FOR EMP

Tentative Environment budget has been prepared for design, construction and operation phase of the project which 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. Environmental budget for North Guwahati Terminal during construction phase along with detailed break-up of costs for construction phase is given at **Table- 3.1.**

Table-3.1Summary of Environmental Budget- Construction Stage

S. No.	Particulars	Stages	Costs Covered By
A.	**Monitoring Measures**		
1	Water Quality Monitoring	Pre -Construction	Contractor
		Construction	Contractor
2	Biological Monitoring	Pre -Construction	Contractor
		Construction	Contractor
3	Sediments: Physico Chemical	Pre -Construction	Contractor
		Construction	Contractor
4	Sediments: Biological	Pre -Construction	Contractor
		Construction	Contractor
5	Ambient Air Quality	Pre -Construction	Contractor
		Construction	Contractor
6	Noise Quality	Pre -Construction	Contractor
		Construction	Contractor
7	Soil Quality	Pre -Construction	Contractor
		Demobilisation	Contractor
8	Groundwater	Pre -Construction	Contractor
		Construction	Contractor
		Camp/Kitchen During Construction	Civil works contract
		Decommissioning	
	Subtotal (A)		
B.	**Capacity Building**		
1	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Plans and Protocols Social and cultural values of the area. (1 day)	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators (at the beginning of Contract)	TSSC
2	Training for Ghat management'	Section officers/ Vessel operators/ Masters/ Khalasi , Ghat officers, Ghat Maintenance workers etc.(At Beginning of Construction)	Contractor
3	Community issues; Awareness of transmissible diseases; social and cultural values.	Construction Crew (once every six months)	Contractor
4	EMP; Waste disposal, Cultural values and social sensitivity.	Once every year or as directed by the PIU	Contractor
5	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers; boat/launch crew, (once every year)	Contractor
6	Camp operation; Waste disposal; Natural resource conservation; Housekeeping.	Camp staff (once every quarter)	Contractor

S. No.	Particulars	Stages	Costs Covered By
7	Construction Implementation requirements; handling situations for important flora / fauna especially Dolphin; Physical Cultural resources;	PIU; supervisor Selected crew members and contractors (once every six months)	Contractor
8	Health and safety equipment on board and in terminals	Selected crew members and Vessel operators/ Masters/ Khalasi etc.	Contractor
9	Environment Management tracking System	AIWTDS	Contractor
	Subtotal (B)		
C.	**Construction Contractor EMP Implementation**		
5.	Water Sprinkling Measures for Dust Suppression	Construction	The cost is integrated as part of the civil work cost
6	Development and Implementation of the Dolphin Management Plan of Contractor	Construction	The cost is integrated as part of the civil work cost
7	Providing, fixing, maintaining, shifting & refixing, barricading of minimum 2.0m height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initially, painting, lettering & border with reflective paint at the time of every shifting, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project	Construction	The cost is integrated as part of the civil work cost
8	Supplying and fixing of cautionary and or informative signs boards including the cost of posts, fixtures, fixing, foundation, fitting and fixing. Sheeting will be made of encapsulated lens type of retro-reflective type and message / borders will be screen printed complete as per screen specification in IRC SP 55: 2001. To be made available at all time at the	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
	work sites as required and directed by the engineer		
9	Supplying and fixing of flashing beacon warning lights including the cost of posts, fixtures, fixing, foundation, fitting and fixing, cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc. and as per specification in IRC SP 55: 2001	Construction	The cost is integrated as part of the civil work cost
10	Provision and maintenance of Bio toilets with 1 male and 1 female units including cost of material , labour, loading, unloading, lead, lift, transportation, shifting etc. And shall be made available at worksite at the direction of the PIU. The facility shall complete with water arrangement, privacy, lighting arrangement. The WC and /urinals should be made of stainless Steel and the partitions should be made of aluminium framework with FRP panels. The bio-digester tank should be approved by Defence Research & Development Organisation (DRDO)or any other competent agency. The whole toilet shall be mounted on MS framework with skids; Overhead water tank shall be made of HDPE with proper arrangement of ball cock and mosquito proof cover. These should also be provided with two dustbin for wet and dry waste. The bio-digester toilets shall be mounted on skids and shall not require any creation of permanent structure so that they can be shifted from one worksite to another	Construction	The cost is integrated as part of the civil work cost
11	Provision of Helmets (IS CODE 2925 : 1984) , Safety Shoes (IS CODE 5852 : 1996), Googles (•IS CODE 5983 : 1980), Reflective Jackets, mitten/ gloves (IS 2573) , safety nose masks to all personnel (including	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
	temporary labour) involved in the worksites		
12	Provision of First Aid Kits for worksites	Construction	Civil works contract
13	Provision and maintenance of waste collection bins in sets of 2 (blue and green) for collection of municipal solid waste generated at the worksite including cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc.	Construction	The cost is integrated as part of the civil work cost
14	Environment, Health & Safety Engineer/Supervisor having Bachelors in Env Science / Management/ B. Tech (Env Eng.)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
15	Diploma in Central Labour Institute / Regional Labour Institute (Mandatory)	Construction	The Manpower Cost is integrated into the cost of the Civil Works

4. BUDGET FOR SMP

The various activities for social management under the sub project to be undertaken by the contractor are given in **Table 4.1.**

Table 4.1: Summary of Social budget (construction phase)

Item of SMP	Duration
Training for contractor staff on labour laws such as Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Bonded Labour System (Abolition) Act, 1976; The Workmen's Compensation Act, 1923; The Contract Labour (Regulation & Abolition) Act, 1970 and Rules; The Child Labour (Prohibition and Regulation) Act, 1986; The Indian Factories Act, 1948 and State Rules; Public Liability and Insurance Act, 1991; The new labour Act like The Code on Social Security, 2020 and The Code on Wages, 2019,	Actual, before and during the project implementation time
Social safeguards training including training of staff on GRM. GBV training (SEA and SH)	Actual, before and during the project implementation time

Item of SMP	Duration
Environmental Health and Safety Officer and Social Development Specialist hired by contractor, for on-site supervision	Actual, during the project implementation

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING PROGRAMME- UMANANDA

1. GENERAL

The Environment and Social Management Plan (ESMP) is required to ensure sustainable development of the proposed terminal on river Brahmaputra both during the construction as well as operational phases. The ESMP is site and time specific. In order to effectively implement ESMP, an institutional framework has been developed and roles and responsibilities of various relevant agencies have been worked out. Capacity development program are also identified and part of the ESMP.

In general, Assam Inland Water Transport Development Society (AIWTDS), (with assistance from Contractor,Third Party Monitoring Consultant /Technical Support & Supervision Consultant) is the responsible entity for ensuring that the mitigation measures as suggested in the ESMP are carried out. A detailed ESMP has been prepared for Umananda terminal. The list provides reference implementing organisation and responsible entity.

COMPONENTS OF EMP

Key components of the EMP are summarized below and explained in detail in the following subsections:

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

Site-specific environment and social riverine infrastructure along with the roles and responsibilities of the key persons involved at different phases of the proposed development are described below:

The Environmental Management Plan for Umananda Terminal for construction phase is given in **Table -1.1,** Social Management Plan in **Table 1.2** and environment budget in Table-2.

Table-1.1 Environment and Social Management Plan

Component	Environmental Attribute and potential impacts	Remedial Measure	Monitoring Indicators	Institutional Responsibility	
				Implementation	Supervision
Design					
Development of the Final Design	The design of the infrastructure must be resilient to the Floods	The design must take into consideration the projected rainfall levels as in the Assam State Action Plan on Climate Change (2015- 2020). The Annual rainfall is likely to increase by 10-25 %, and the extreme rainfall days will increase by 5-38%, with the extreme rainfall increase projected to increase between 25 and 150 mm.	Assessment of Design for Resilience	Contractor	TSSC & PMU
	Design of the Riverbank Protection	The design of any reclamation and riverbank protection must be carefully assessed so that the hazards due to Bank failure do not affect the stability of the structure.	Assessment of Design for Resilience	Contractor	TSSC & PMU
	Collection and Treatment of Solid and Liquid Waste	The design of bio-digesters at the Terminal must be an adequate size to meet the regular passenger demand. Additional space needs to be made available for setting up additional bio-toilets for the pilgrim / festival. Adequate space must be made available to store municipal solid waste.	Assessment of Capacity of Bio-Digestor Assessment of space for the setting up bio-toilets, Adequate space for storage of Municipal Solid waste	Contractor	TSSC & PMU
	Energy Efficiency	Energy-efficient measures in the terminal buildings will be implemented; Solar power will be used in potential area	Use of Energy efficient Fitting and fixtures	Contractor	TSSC & PMU
Pre-Construction Activities					
Field Verification Surveys	Requirement for felling of trees	**Permission of tree(s) removal from non-forest area** -The GC/ PMU and the Contractor will carry out joint field verification to ascertain whether any tree would be affected and needs to be felled either for the construction activities or for safety purpose. - In case any tree must be felled. -Permissions must be obtained from the Forest	Copy of the Permit of the Forest Department, Government of Assam	Contractor	PMU , GC and TSSC

		Department, Government of Assam. No tree would be felled without permission. At present there is no requirement for felling of trees			
Assessment of Impacts due to Changes/Additions in the Project	Additional Impacts	**Site-specific EMP before the commencement of construction** -In case of any change in the event of changes/revisions (including addition or deletion) in the project's scope of work or change in the site condition. the impacts of the changes need to be assessed. **-**The Contractor will also prepare site-specific EMP to address these additional impacts. The Site Specific EMP has to be submitted to the PMC for approval. The Construction activities must not start before the approval of site-specific EMP by the PMC.	Approved copy of the C-EMP	Contractor	PMU , GC and TSSC
Setting up of Plant and Machinery (Batching Plants or concrete mixer location)	Potential source of pollution (air quality, water quality, soil)	**Location of Batching Plants** -Batching plants will be sited sufficiently away from settlements, agricultural operations, or commercial establishments. Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -Concrete mixers and batching plants will comply with the requirements of the relevant emission control legislations and - Consent/NOC for all such plants obtained from the State Pollution Control Board will be submitted to the PIU. -The Contractor will not initiate plant/s operation till the required legal clearances are obtained and submitted. In case the concrete is procured from a third party, a valid consent of the plant, along with the latest copy of the Annual report, will be submitted to the PIU before the procurement of any material	Consent to Establish and Operate	Contractor	PMU, GC & TSSC
Procurement of Other Construction	Potential for air pollution and noise	**Statutory Compliance:-**All Construction equipment[1] and	Certification by Manufacturer of	Contractor	PMU, GC & TSSC

[1] *Every agricultural tractor, construction equipment vehicle and combine harvester shall be so manufactured that it complies with the following standards of gaseous pollutants as per rule 115A,after sub-rule (8), of the Central Motor Vehicle Rules, 1989.*

Vehicles, Equipment and Machinery		machinery to be used in the project will conform **to** BS IV standards to be adopted by the Ministry of Road Transport and Highways. The discharge standards promulgated under the Environment Protection Act, 1986, will be strictly adhered to. -Noise limits for construction equipment to be procured, such as compactors, rollers, front loaders, concrete mixers, cranes (moveable), vibrators and saws, will not exceed 75 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986. The Contractor will maintain a record of PUC for all vehicles and machinery used during the contract period.	emission and noise levels/ Pollution under Control Certificates, Insurance and Driving License of the driver to be submitted for all vehicles		
Sourcing of construction material	Unsustainable mining practices	-Contractor will finalise the stone quarry /sand mine / borrow area for procurement of construction materials after assessment of the availability of sufficient materials and other logistic arrangements. The --Contractor will provide a copy of the Environmental Clearance Certificate of the quarry/sand mine and the Consent to Establish and Operate along with the recent compliance report to the PMU before any such quarry is engaged. -In case the contractor decides to use new quarries then the contractor will obtain the environmental clearance and all other permits and licenses and submit the same to the PMU before extracting any material. The contractor will submit a copy of the approval and the rehabilitation plan to the PIU and the Environmental Expert of the PMU Consultant. -Contractor will also work out haul road network and report to the Environmental Expert of the PMC. They will inspect and in turn report to PMU before approval.	Permission for mining/ quarrying of materials from the Mining Department, District Administration and District Level Environment Appraisal Committee	Contractor	PMU, GC & TSSC
Identification of water sources for construction	Adverse impact on water resources	-If the contractor will source water requirements for construction form groundwater, prior permission	Permission from the Ground Water Board for	Contractor	PMU, GC & TSSC

		from the Ground Water Board is required. A copy of the permission will be submitted to PIU prior to the initiation of construction. -A flow meter must be installed, and the records of water used for construction must l be maintained. The usage of groundwater must be recorded. -The contractor can use fresh groundwater sources after the required treatment for drinking. Even if water is sourced from third parties, the above provisions must be followed. -In case, the river water is used, the permission of the Irrigation department must be obtained	Groundwater usage Permission of the Irrigation /Water Resources Department in case of River water is used.		
Environmental monitoring of baseline conditions of air, noise, water, and soil	To establish baseline environmental conditions and ascertain the impacts during the construction phase	Environmental monitoring to be carried out through recognised[2] Laboratory as per the locations specified in the environmental monitoring plan in **Table 8.4**	Submission of test results to PMU	Contractor	PMU, GC & TSSC
EMP Implementation Training	Lack of awareness of EMP can lead to irresponsible behaviour resulting in an Irreversible impact to the environment, workers, and community.	-Project manager and all key workers will be required to undergo EMP implementation, including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labour laws, applicable environmental laws, etc. Additional modules for Dolphin Protection and Cultural Heritage Management - All new personnel joining the work need to undergo induction training. All personnel joining work after a break of more than 15 days need to undergo refresher.	-Certificate of Completion (Safeguards Compliance Orientation) -Posting of EMP at worksites. -Maintaining Records of training both induction and refresher -Submission of the Training records to the PIU every month	Contractor	PMU, GC & TSSC
	Deployment of EHS Officer and OHS Officer	Deploy qualified personnel and management committee. - Contractor must depute qualified EHS personnel in the start of the project to conduct training to all the personnel and effective monitoring of mitigation measures during	Submission of records of the availability of the EHS personnel onsite in the Monthly Report and Quarterly Report	Contractor	PMU, GC & TSSC

[2] (National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited /Ministry of Environment Forest and Climate Change (MoEF&CC) / respective State Pollution Control Board (SPCB's)).

		construction. The name and functions of the responsible EHS persons and their relevant expertise must be notified in the Quarterly Report -If an EHS person resigns/ replaced/replaced or the team has been enlarged, the same must be reported to the Bank within 15 days of the incident			
Legal compliance	Environmental legal noncompliance may	-Obtain all consents, clearances (CTE/CTO from ASPCB), permits NOCs etc., before start of construction works. -Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (Refer Table 3.1 in this report) -Following consents are required- -Tree cutting-local authority -Storage, handling, and transport of hazardous materials-ASPCB. -Sand mining, quarries, borrow areas- Department of mines and Geology. .-Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs etc. -Include in detailed design drawings and documents all conditions and provisions; if necessary	Copy of the Permit/ Consent to be submitted with QPR to PMU	Contractor	PMU, GC & TSSC
Chance finds	Damage / disturbance to artifacts	Construction Contractors to follow these measures in conducting any excavation work. -Create awareness among the workers, supervisors and engineers about the chance finds during excavation work. -Stop work immediately to allow further investigation if any finds are suspected. -Inform State Archaeological Department if a find is suspected and taking any action, they require to ensure its removal or protection in situ.	-Chance Find Protocol -Awareness training for workers	Contractor	PMU, GC & TSSC
Preparation of Method Statement	Occupational Health Safety and Community Health Safety Impacts	Carry out a Hazard Identification and Risk Assessment for all tasks presented in the Method Statement Prepare occupational health and safety plan, including COVID-19 H&S Plan	- Occupational Health and Safety Plan (including HIRA) to be integrated with Method Statement - Community Health Safety Plan	Contractor	PMU, GC & TSSC

		Prepare Community Health Safety Plan to ensure that the community/ pilgrims are segregated from the construction area Prepare a Debris/spoils management plan, Waste Management Plan.	- Debris/spoils management plan, Waste Management Plan		
	Impact of Aquatic Species and Dolphins	Construction Planning must be carried out so that No-construction /piling (stop the construction activities) in the water part between Mid-March to Mid-June) Construction activities must not be planned on the waterside during the monsoon period.	Construction Scheduling	Contractor	PMU, GC & TSSC
Construction Stage					
Clearing and grubbing for site Preparation (Terminal Site, Base camp, Construction Camp & Labour camp)	Landscape and Aesthetics	Permission of tree(s) removal from non-forest area -Vegetation will be removed from the construction zone before the commencement of civil works. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is avoided or minimized. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert of the Consultant. The contractor, under any circumstances, will not cut or damage trees. Trees identified under the project and have received permission of felling from the Forest Dept will only be felled. - Compensatory afforestation must be carried out per the Tree Felling permission provisions.	Verification of number of trees felled; Copy of NOC from forest dept.	Contractor	PMU, GC & TSSC
	Loss of topsoil. Loss of natural resources (Earth/soil)	•Top soil (15 cm) would be stripped and kept separately in stockpiles for use in landscaping. • At least 10% of the acquired area for construction purposes must be kept for stockpiling of fertile topsoil •Precautions must be taken while stockpiling. The slope of the stockpile shall not exceed 1:2 (V:H) to retain soil & allow percolation of H_2O and the edges of the pile shall be protected by silt fencing. The piles shall be covered with gunny bags/	Site verification	Contractor	PMU, GC & TSSC

		tarpaulin. The maximum height of the stockpiles shall be kept less than 2 m •Excavated materials would be preferably used for site filling for land reclamation to construct the terminal			
Transporting Construction Materials and Haul Road Management	Impacts on air quality and safety	-Contractor will maintain all hauls roads (existing or built for the project), which are used for transporting construction materials, equipment, and machineries as précised. All vehicles delivering fine materials to the site will be covered to avoid spillage of materials or being blown away during the transportation. -Only major roads will be used by the contractor's vehicles or any of his sub-contractor or materials suppliers. --Roads, which are part of the works, will be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. -Contractor will arrange for regular water sprinkling for dust suppression of all roads and surfaces. -The unloading of materials at construction sites in/close to settlements will be restricted to daytime only. -All stockpiles will be covered/protected to prevent dust generation	Complaints from local community Visual observation in Site reports Monitoring of the air quality in the worksite and material storage area	Contractor	PMU, GC & TSSC
	Impacts on Water Quality	- Boats/ Vessels carrying construction material must not be overloaded. - Loading and unloading activities must ensure that spillage does not occur. - loose and friable material transported by boat must be covered - Construction material must not be stored at the Umananda Site	Site Reports	Contractor	PMU, GC & TSSC
Storage of Construction Material	Potential for waterlogging	-The contractor will ensure that no construction materials like earth, stone, sand, or appendage are disposed of so as not to block the flow of water of any water course and cross drainage channels. -The contactor must not dump any excavated material into the river. -The contractor will take all necessary measures to prevent the blockage of water flow.	Complaints of water logging	Contractor	PMU, GC & TSSC

		-The stockpiled material must be prevented from erosion and deposition in the drainage channel from sites where these are stocked for construction.			
	Water Pollution from Storage of Construction Material	Run-off from a material stockpile can also contaminate water. To prevent the contamination of the construction material, the following measures must be adopted; - The quantum of construction material at the Umananda site must be minimal as possible -The runoff from the construction material storage yard must be channelled through peripheral drains -The peripheral drains must be connected to sedimentation tanks (holding tanks excavated in the ground) of adequate capacity All sedimentation tanks and peripheral drains must be cleaned before the monsoon.	-Site visit Report -Number of sedimentation tanks installed. - Records of surface water quality Monitoring. -No visible Sedimentation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU, GC & TSSC
	Water Pollution from Fuel and Lubricants	- The contractor will ensure that all construction vehicle parking locations, fuel/lubricants storage sites, vehicle, machinery, and equipment maintenance are in accordance with the provisions stated in (Annexure 19 : Environmental Codes of Practice & Other Plans) -Contractor will ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Oil interceptors will be provided for vehicle parking, wash down and refuelling areas as per the design provided.	-Number of Oil interceptors installed. -Records of surface water quality Monitoring. - No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU, GC & TSSC
	Pollution of water bodies from domestic activities	**-Wastewater from domestic activities such as bathing and washing at the camp site must be treated.** -The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering streams, water bodies or the irrigation system. -- The liquid waste from the construction camp must be treated and disposed of. -In the absence of	-Adequate number of toilets as per no of labours - Records of surface water quality Monitoring; -No visible degradation to nearby drainages, nallahs or waterbodies due to civil works	Contractor	PMU, GC & TSSC

		construction camp if the contractor takes a rental accommodation must be channelized to the nearest municipality drain. In the absence of a municipality drain, a septic tank and a soak pit system of adequate capacity must be constructed. -Stagnation of water should not be allowed at any place near the campsite as a precaution against vector-borne disease. Wastewater from the Umananda Worksite An adequate number of toilets must be provided Bio-toilets of adequate capacity must be provided for the workers based on no of users. The supernatant from the Bio-digestor must be discharged into the soak pits. The Supernatant from the. bio-toilets must be tested at periodic intervals to meet discharge standards **Collection of Food waste and kitchen waste from Construction Camp** -All waste arising from the project is to be stored and disposed of as per the provisions of Annexure 19-Environment Codes of Practices & other Plans or as directed by EHS Specialist of the PMU In the case of rented accommodation, arrangements must be made with the Municipal corporation for the disposal of the waste. **Collection and Disposal of Food Waste from the Umananda Construction Site** Adequate space must be provided in the Construction Site for the storage of Solid Waste No Solid waste should be discharged into the river Mechanisms of transporting and disposing of the Solid waste to Guwahati must be carried out.			
Construction activities in Waterside	Degradation of Water Quality due to piling activities	-The piling work in the river must be undertaken during low-flow periods. -Turbidity traps/curtains/ Geo-Textile synthetic sheet curtains would be placed around piling and	-Construction methodology for waterside construction -Schedule of construction works to ensure	Contractor	PMU, GC & TSSC

		construction areas to prevent sediments and construction waste movement.	completion of the works before monsoon/ develop a Monsoon Management Plan - Records of Works inspection		
	Impact on aquatic life and dolphins	-Construction Planning must be carried out so that No-construction Period (stop the construction activities in the water part between Mid-March to Mid-June) -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 piling starts, Dolphin Watch must be carried out in the river for one hour. Piling must commence if dolphins are not spotted. - Before starting piling, allow some time for aquatic fauna to displace from the piling area. -Piling must be stopped for some time if any dolphin/turtle/RET species are sighted in the activity area .-Noise-reducing devices like mufflers ,enclosures baffles must be fitted with the equipment as much as feasible. -Fish exclusion devices must be installed in the water column around the pile driving area to prevent fish access -Geo Textile synthetic sheet curtains &turbidity traps must be placed around piling and construction areas to prevent the movement of sediments and construction waste -Aquatic ecology monitoring must be carried out before the start of construction and after completion of construction to assess the impact of construction activities on aquatic life. . Effect of piling during the construction period will be managed by the adoption of vibratory piling and the usage of bubble curtains to disperse the fauna and reduce the noise level	Preparation of the Dolphin / Aquatic Manal Management Plan 2. Logs for recording watch and ward for dolphins / turtles during the piling 3. Log for aquatic fauna monitoring	Contractor	PMU, GC & TSSC

		-If, despite the introduction of preventive measures, fish kills or impact on aquatic life is observed, then the work will stop immediately, and the methods will be reviewed and corrected. -If drilling is carried out Polymer-based mud instead of bentonite to be used as drilling fluid with proper storage of polymer at designated storage areas. Drill cutting and spent drilling mud must not be disposed in the river - All equipment will be adequately maintained to prevent potentially hazardous or toxic products from leaking or spilling. This includes hydraulic fluid, diesel, gasoline and other petroleum products. -The piling activities must be carried out in the shortest possible timeframe.			
	Degradation of Water Quality due to land reclamation	-Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition. - The reclamation work in the river must be undertaken during the low flow period - Schedule construction works to complete the construction work before the onset of the monsoon. -Turbidity traps/curtains/ Geo-Textile synthetic sheet curtains would be placed around the piling and construction area to prevent the movement of sediments and construction waste.	-Regular monitoring of site - Water quality tests	Contractor	PMU, TSSC and GC
	Degradation of water quality due to construction activity	Select a construction methodology that is least disturbing and appropriate for the in-situ soil condition. Schedule construction works to complete the construction work before the onset of the monsoon. Schedule the construction works during the low water level period –ensure that works are completed during the same period before the onset of monsoon. - Inspection and maintenance of disturbed areas where mobilisation and barrier installation occur for sediment control measures.	(i) Construction methodology for waterside construction -Schedule of construction works to ensure completion of the works before monsoon/ develop a Monsoon Management Plan -Records of inspection of the sedimentation chamber -Effectiveness of water management measures.	Contractor	PMU, GC and TSSC

		-Washing of vehicles and equipment must not be carried out in rivers or nearby places.	-No visible degradation of water quality		
	Degradation of water quality due to the coffer dam	Erect the coffer dam to form an enclosed construction area with the least disturbance. . Prohibit the discharge of turbid water directly into the river. - All silt-laden water from the coffer dam must be pumped to a settling tank. Develop a settling tank of adequate capacity, and allow sufficient time to settle the distributed solids before pumping out water from the coffer dam; only clear/clarified water shall be pumped back into the river. .- Clear the work site after completion/ before monsoon at least to pre-project conditions; ensure that there are no materials, debris, spills etc., and before removal of temporary barriers/coffer dam/ before monsoon; and -Impervious material or clayey soil in gunny bags to be used. -Outer area of the coffer dam must be covered with thick plastic sheets to minimise turbidity.	-Water quality monitoring reports -No visible degradation of water quality	Contractor	PMU, GC and TSSC
	Water Pollution from Fuel and Lubricants and hazardous waste	- Avoid/minimise storage of fuels, chemicals, and lubricants near the river/water; ensure no spillage - A temporary secured hazardous material handling and waste storage area must be provided at the construction site. As part of a design feature, a permanently secured (‘bunded’) impermeable surface and dykes capable of carrying 110% volume of materials for accidental spills or leakage must be constructed and maintained. Fuel transfer through decanting is prohibited. The use of a transfer pump with the proper fitting is suggested. -The storage area should be covered. - Dispose of any wastes generated by construction activities as per the guidance presented in Annexure 19	- No of spills reported -Field observation -Water quality monitoring reports	Contractor	PMU, GC and TSSC

		Environment Codes of Practices & other Plans and - Conduct surface quality inspection and monitoring according to the EMP. - Contractors will have emergency spill equipment available whenever working near or on the water.			
Construction on the landside	Deterioration of air quality from fugitive sources	**Prevent Dust Generation** -The soil/earth must be transported by covering the haulage vehicles with tarpaulin or any other good quality material. -Dust suppression measures by water sprinkling on worksites and temporary service and access roads. -All construction workers must be provided with pollution masks to mitigate the effect of dust generation on the health of workers. -Construction Material must be transported in covered dump trucks to the project site. This must not be stockpiled at the project site - Clean wheels and undercarriage of haul trucks before leaving the construction site. - Loading and unloading of construction materials must be made at designated locations with provisions of water sprinkling. -Construction vehicles, machinery & equipment must be regularly serviced and maintained and would have a valid PUC certificate -Don't allow non-project vehicle access in the work area, limit soil disturbance and prevent access by barricading and security personnel. -Traffic detours and diversions must be designed to minimise bottlenecks and ensure smooth traffic. -Air pollution monitoring must be carried out at specified locations as described in the monitoring plan to verify that the contractor follows air pollution norms and that the air quality at the construction site does not exceed the prescribed limits.	- Complaints from sensitive receptors. - Quarterly environmental monitoring report for ambient air, noise, water, and soil	Contractor	PMU, GC and TSSC
Use of Plant, Equipment Machinery and Vehicle	Emissions from Construction Vehicles,	-The contractor will take every precaution to reduce the level of dust from batching Plant/Cement	- Heavy equipment and machinery with air	Contractor	PMU, GC and TSSC

	Equipment and Machineries (Generation of Exhaust Gases) lead to the deterioration of air quality	Storage/, construction sites involving earthwork by a sprinkling of water, encapsulation of dust source and by the erection of screens/barriers. -All the plants will be sited at least 1 km in the downwind direction from the nearest human settlement. -The contractor will provide necessary certificates to confirm that all Plants, equipment, machinery, and vehicle used in construction conform to relevant dust emission control legislation. -No open burning of bitumen or preparation of hot mix is allowed. -No burning of firewood is allowed in the construction camp. The Contractor must make provisions for LPG cylinders. -Compliance with laws, ordinances, codes, rules, regulations, orders, or declarations -All vehicles, plants and machinery used during construction must conform to the emission standards promulgated under the Environment (Protection) Act, 1986. The contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of PCB. -The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project. Valid PUC must be maintained throughout the construction period Monitoring results will also be submitted to PMU Consultant and PIU as per the monitoring plan. -Contractor will ensure that all vehicles, equipment, and machinery used for construction are regularly maintained and confirm that pollution emission levels comply with the relevant requirements of CPCB emission standards	pollution control devices. - Latest Six-Monthly Compliance Report to ASPCB - Valid Consent to Establish and Consent to Operate. - Certification that vehicles are compliant with Air Act - Quarterly environmental monitoring report for ambient air, noise, water and soil		

	Noise pollution leads to inconvenience for the people	The Contractor will confirm the following: - All plants and equipment used in construction (including third-party plants and equipment) must conform to the MoEF&CC/ CPCB noise standards. - All vehicles and equipment used in construction will be fitted with exhaust silencers. - Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked, and if found defective will be replaced. -The activities must be carried out during the daytime. Night-time activities may be carried out in an emergency, but all measures mentioned in the mitigation measures for night work must be strictly adhered to. - Limits for construction equipment used in the project, such as concrete mixers, cranes (moveable), vibrators and saws, must not exceed 75 dB (A) (measured at one meter from the edge of equipment in the free field), as specified in the Environment (Protection) rules, 1986. -Maintenance of vehicles, equipment and machinery must be regular and up to the satisfaction of the Environmental Expert of the PMU Consultant to keep noise levels at a minimum. - No noisy construction activities will be permitted around educational institutes/health centres (silence zones) up to 100 m from the sensitive receptors, i.e., schools, health centres and hospitals between 9.00 am to 6.0 pm. -Restriction on Honking at the project site -Traffic management plans prepared during the construction mobilization period must also be implemented during the construction stage. Effective traffic management must be taken care of in sensitive locations, major built-up areas, and along important highway junctions.	- Complaints from sensitive receptors. - Use of silencers in noise-producing equipment and sound barriers.	Contractor	PMU, GC and TSSC

		- Barricading (Temporary noise barrier) around the construction site to minimize the noise level -Monitoring must be carried out at the construction sites as per the monitoring schedule, and results will be submitted to PMC and PIU. -The Environmental expert of PMC will be required to inspect regularly to ensure the compliance of EMP.			
	Vibration from the works.	No explosives should be used in construction activities. -Only mechanical equipment must be used to prevent Chances of damage from vibration. -If a mechanical vibrator/ pneumatic hammer is used within 100 m of the archaeological property, advice must be obtained from the State archaeological department for precautions. -The Contractor must employee an archaeologist to monitor the sites during the rock-cutting and piling activities.	-Complaints from sensitive receptors, Archaeology dept. -Site verification -Availability of trained man-power (archaeologist) at site	Contractor	PMU, GC and TSSC
	Contamination of Soil	Ensure all equipment, vehicles and other sources of fuels and lubricants will be collected and contained to avoid soil/ groundwater contamination. -Fuel must be stored in proper bounded and covered areas. -All spills and collected petroleum products must be disposed of in accordance with the provisions mentioned in **Annexure -Oil & Waste Storage** -Maintenance and refuelling of vehicles, machinery and other construction equipment must be carried out on an impervious surface so that spillage of fuels and lubricants does not contaminate the ground. -The runoff from the maintenance yard must lead to a peripheral drain and pass through an oil-water separator		Contractor	PMU, GC and TSSC
Safety aspects during the execution of works	Community Health Safety risks in Work Zones	The Contractor must ensure that : -The construction zone is hard Barricaded with MS Barricades of a height of 3.0 m.	-Barricading of the worksites -Traffic management Plan construction works, including number of	Contractor	PMU, GC and TSSC

		-The construction site must be access controlled, and the workers must be provided valid identification cards to allow entry. -Construction material must be stored in the barricaded area. If temporary storage is required (for 1-2 days) outside the demarcated construction area, the same must be discussed with the community. Hard Barricading with proper signages must be put to prevent the entry of commuters/pilgrims in the areas. The permission of the Environmental Officer is essential. -To prevent the dust from the construction area affecting the sensitive receptor/ commuters' green screens may be used over and above the Hard Barricading at the advice of the Environment Officer of the PMC	permanent signages, barricades and flagmen on the worksite -Number of signages placed at the project location. -Regular reporting of the measures in the Quarterly Report		
	Occupational Health Safety: Personal Safety Measures for Labour	The contractor will provide: -Comply with all national, state and local labour laws (refer **Table 1A:** Social Management Plan -Develop and implement site-specific occupational health and safety (OHS) plan, which will include measures such as (a) excluding the public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents -Barricading of all excavation carried out for construction. For deep excavation -shoring and bracing must be provided Movement of equipment and machinery near the deep excavation of soft soil must be prohibited. - Flagmen must accompany all movement of equipment and vehicle inside. -All vehicles and equipment must be fitted with reverse horns, alarms etc. -Protective clothing as may be appropriate to the risk involved in the activities being undertaken by the labour. -Protective clothing must be as per the BIS standards	-Site-specific OHS Plan. -Equipped first-aid stations. -Medical insurance coverage for workers. -Number of accidents. -Supplies of potable drinking water. - Clean eating areas where workers are not exposed to hazardous or noxious substances. - record of H&S orientation trainings - personal protective equipment. - % of moving equipment outfitted with audible back-up alarms; -permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and	Contractor	PMU, GC and TSSC

		-Earplugs for workers exposed to loud noise, and workers working in concrete mixing operations, piling and other high-noise-generating operations -Adequate safety measures for workers during the handling of materials at the site are taken up. -All tools, tackle, lifting instruments, and cranes must have valid load certification. The tools and tackle must be regularly inspected by the Environment Officer / OHS officer of the PMU. -The contractor will comply with all regulations regarding safe scaffolding, ladders, working platforms, gangways, stairwells, excavations, trenches and safe means of entry and egress. -All precautions must be taken for working at heights. -The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. -Ensure that qualified first aid is always provided. Equipped first-aid stations must be easily accessible throughout the site. - Provide medical insurance coverage for workers. -The Contractor will not employ ad-hoc work procedures, follow best & acceptable work practices -The contractor will document work-related accidents. Provide qualified & easily accessible first-aid facilities all times at all sites. -Secure all installations from unauthorised intrusion and accident risks. -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 with drinking water and protected from the elements of nature - Barrier structures are of sufficient height to prevent waves or overflows from flooding in the enclosed area. Regular inspection must be	areas for storage and disposal. -Compliance to core labour laws		

		carried out for the coffer dam to ensure no water leakage in the construction area. -During working in River, workers must be made aware of risks of water depth, currents, and dangerous areas of water must be properly marked by fixed or floating barricades and signage of danger. Workers must also be made aware of the protection of the biodiversity of the water, and fishing must be strictly prohibited. A boat must be made available at the site to transport labour and materials and be well-maintained for emergencies. Workers must not be allowed to dip or bathe in rivers. A suitable working platform must be provided during construction works in water. -Life-saving equipment and lifeguards must be made available during the period of working in water. -The Contractor will mark 'hard hat' and 'no smoking' and other 'high-risk areas and enforce non-compliance of the use of PPE with zero tolerance. These will be reflected in the Construction Safety Plan to be prepared by the Contractor during mobilisation and will be approved by the Safety Officer of PIU.			
	Injuries/fatalities to the employees	Accident/Incident Reporting for SHE -The PIU must carry out an awareness campaign for the Do's and Do nots in construction sites. -Near misses must be recorded and reported on a regular basis • -Fortnightly meetings must be held with employees to make them aware of unsafe acts and practices.	-Record of near misses - Record of fatalities - No of workers' meetings -Labour Law Compliance Report generated through Labour Law Compliance system	Contractor	PMU, GC and TSSC
	Cultural & Heritage Resources	- Adequate signs must be displayed in the access route for the devotees towards this cultural heritage and temples. -Warning signs about the construction activities must be provided to warm commuters/ pilgrims. - Regular supervision by an archaeologist to identify theimpact on these archaeological properties from vibration	i. No. of training for workers on precautions against vibration ii. Report by the Archaeologist in the Quarterly report.	Contractor	PMU, GC and TSSC

		-Make workers aware of chance finds and archaeological heritage • -Make workers aware of controlled vibration when working within 100 m of the site			
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. • 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 • Working hours of labourers would not exceed the standard norms as per Factory Act • Wastewater from construction site would not be allowed to be accumulated. Septic tanks/soak pits would be provided for its disposal.	Site Verification	Contractor	PMU, GC and TSSC

Table 1 (A) Social Management Plan

Component	Social Attribute and potential impacts	Remedial Measure		Institutional Responsibility	
				Implementation	Supervision
1. Accident, Incident and Safety Risks					
1.1 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. -Register 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 -Rest area for workers would be provided. -Contractors would adopt and maintain safe working practices. SOPs would be prepared and followed for all activities under supervision of site engineer -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 -Maintenance and repair of any local village road used for the project activities should be carried out both before and end of construction by contractor.	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996,	Contractor	PMU, GC and TSSC
Labour Influx	-Risk of Gender based violence, STD, HIV/AIDS to local community Increased demand and competition for local	-Specifications on employment of local workforce including women should be reflected in the civil works bidding documents and	-Contract Labour Act, 1970; and -Inter-State Migrant Workers Act, 1979 Workers Accommodation:	Contractor	TSSC & PMU

	social and health services -Social conflicts between the local community and the construction migrant workers. -Increased 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	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 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. - Awareness camps on HIV/AIDS for both, construction workers	Processes and Standards (A guidance note by IFC and EBRD)		

		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 shifts.			

2. ENVIRONMENT MONITORING PLAN

Environmental Monitoring Programme is to ensure that the intended environmental protection goals are achieved and result in desired benefits of the project. The same will be included in tender / bid document. The broad objectives of the environment monitoring program are:

- To monitor impacts on the surrounding environment and the effectiveness of mitigation measures during the construction and operation phase.
- To ensure that the environmental control systems, installed are effective.
- Comply to the provisions of relevant environmental regulations.

The parameters to be monitor, frequency of monitoring, number of samples, locations and responsibility of monitoring is given in **Table- 2.1**

Table-2.1 Summary of Environmental Monitoring Programme: Construction Phase

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
1.	**River Water**					

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
	Physico-chemical parameters	pH, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides.	For three seasons in construction phase; Turbidity, DO and salinity will be monitored once every week at 3 locations: near the Berth, channel and records of monitoring will be maintained during construction phase If DO level goes 4.0 mg/l, then its causes will be investigated, and corrective actions will be taken	Surface Water Upstream- 2 • Downstream- 2 • Near Project site- 1 Ground water- 2 near the project site	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			
	Biological parameters	Light penetration, Chlorophyll, Primary Productivity, Phytoplankton's, Zooplanktons	For three seasons in construction phase	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			
2.	**Sediments**					
	Physico-chemical parameters	Texture, pH, Sodium, Potassium, Phosphate, Chlorides, Sulphates, Hg, Pb, Fe, Cu, Zn, Cd	For three seasons in construction phase	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor
			For two seasons in operation phase except monsoon			
	Biological parameters	Benthic Micro-fauna, Benthic Macro-fauna	For three seasons in construction phase. For two seasons in operation	Upstream- 2 Downstream- 2 Near Project site- 1	As per AIWTDS directions	Contractor

S. No.	Aspects	Parameters to be monitored	Frequency of monitoring	No. of Samples	Location	Responsibility
			phase except monsoon			
3.	**Ambient Air Quality**	$PM_{2.5}$, PM_{10}, SO_2 and NO_2	- For three seasons in construction phase and one season for operation phase. - Twice a week for four consecutive weeks per season.	Upwind- 2 Downwind- 2 Near Project site- 1	As per AIWTDS directions	Contractor
4.	**Noise Quality**	Equivalent Noise Level	During peak construction activities	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
5.	**Soil Quality**	N, P, K and Heavy metals	2 samples pre-monsoon season and 2 samples post-monsoon in construction phase and one season during operation phase	Construction site- 1 Labour Camp- 2	As per AIWTDS directions	Contractor
6.	**Dolphin study**	Assessment and presence of Dolphins, survival etc.	Once per year	--	As per AIWTDS directions	AIWTDS

*Note: All the Samples to be collected as per standard norms. Parameters and components may vary as per requirement.

3. BUDGET FOR EMP

Tentative Environment budget has been prepared for design, construction and operation phase of the project which 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. The summary of the environmental budget is given below.

Table 3.1 Summary of Environmental Budget- Construction Stage

S. No.	Particulars	Stages	Costs Covered By
A.	**Monitoring Measures**		
1	Water Quality Monitoring	Pre -Construction	Contractor

S. No.	Particulars	Stages	Costs Covered By
		Construction	Contractor
2	Biological Monitoring	Pre -Construction	Contractor
		Construction	Contractor
3	Sediments: Physico Chemical	Pre -Construction	Contractor
		Construction	Contractor
4	Sediments: Biological	Pre -Construction	Contractor
		Construction	Contractor
5	Ambient Air Quality	Pre -Construction	Contractor
		Construction	Contractor
6	Noise Quality	Pre -Construction	Contractor
		Construction	Contractor
7	Soil Quality	Pre -Construction	Contractor
		Demobilisation	Contractor
8	Groundwater	Pre -Construction	Contractor
		Construction	Contractor
		Camp/Kitchen During Construction	Civil works contract
		Decommissioning	
	Subtotal (A)		
B.	**Capacity Building**		
1	General environmental awareness; environmental and social sensitivity of the project influence area; Key findings of the EIA; Mitigation measures; EMP; Plans and Protocols Social and cultural values of the area. (1 day)	Training for Selected staff of AIWTDS, supervisor, and contractors, Vessel Operators (at the beginning of Contract)	TSSC
2	Training for Ghat management'	Section officers/ Vessel operators/ Masters/ Khalasi , Ghat officers, Ghat Maintenance workers etc.(At Beginning of Construction)	Contractor
3	Community issues; Awareness of transmissible diseases; social and cultural values.	Construction Crew (once every six months)	Contractor
4	EMP; Waste disposal, Cultural values and social sensitivity.	Once every year or as directed by the PIU	Contractor
5	Road/waterway safety; Defensive driving/sailing; Waste disposal;	Drivers; boat/launch crew, (once every year)	Contractor
6	Camp operation; Waste disposal; Natural resource conservation; Housekeeping.	Camp staff (once every quarter)	Contractor

S. No.	Particulars	Stages	Costs Covered By
7	Construction Implementation requirements; handling situations for important flora / fauna especially Dolphin; Physical Cultural resources;	PIU; supervisor Selected crew members and contractors (once every six months)	Contractor
8	Health and safety equipment on board and in terminals	Selected crew members and Vessel operators/ Masters/ Khalasi etc.	Contractor
9	Environment Management tracking System	AIWTDS	Contractor
	Subtotal (B)		
C.	**Construction Contractor EMP Implementation**		
5.	Water Sprinkling Measures for Dust Suppression	Construction	The cost is integrated as part of the civil work cost
6	Development and Implementation of the Dolphin Management Plan of Contractor	Construction	The cost is integrated as part of the civil work cost
7	Providing, fixing, maintaining, shifting & refixing, barricading of minimum 2.0m height at stipulated active site of the same project site, made with angle iron frame of 50x50x5mm and GI sheet of 0.63mm thick including primer painted initially, painting, lettering & border with reflective paint at the time of every shifting, traffic diversion arrangement, safety guard, suitable lightning arrangement during night, complete in all respect till completion of the project as per technical specification and direction of Engineer-In-charge and same shall be possessed by the contractor after completion of the Project	Construction	The cost is integrated as part of the civil work cost
8	Supplying and fixing of cautionary and or informative signs boards including the cost of posts, fixtures, fixing, foundation, fitting and fixing. Sheeting will be made of encapsulated lens type of retro-reflective type and message / borders will be screen printed complete as per screen specification in IRC SP 55: 2001. To be made available at all time at the	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
	work sites as required and directed by the engineer		
9	Supplying and fixing of flashing beacon warning lights including the cost of posts, fixtures, fixing, foundation, fitting and fixing, cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc. and as per specification in IRC SP 55: 2001	Construction	The cost is integrated as part of the civil work cost
10	Provision and maintenance of Bio toilets with 1 male and 1 female units including cost of material , labour, loading, unloading, lead, lift, transportation, shifting etc. And shall be made available at worksite at the direction of the PIU. The facility shall complete with water arrangement, privacy, lighting arrangement. The WC and /urinals should be made of stainless Steel and the partitions should be made of aluminium framework with FRP panels. The bio-digester tank should be approved by Defence Research & Development Organisation (DRDO)or any other competent agency. The whole toilet shall be mounted on MS framework with skids; Overhead water tank shall be made of HDPE with proper arrangement of ball cock and mosquito proof cover. These should also be provided with two dustbin for wet and dry waste. The bio-digester toilets shall be mounted on skids and shall not require any creation of permanent structure so that they can be shifted from one worksite to another	Construction	The cost is integrated as part of the civil work cost
11	Provision of Helmets (IS CODE 2925 : 1984) , Safety Shoes (IS CODE 5852 : 1996), Googles (•IS CODE 5983 : 1980), Reflective Jackets, mitten/ gloves (IS 2573) , safety nose masks to all personnel (including	Construction	The cost is integrated as part of the civil work cost

S. No.	Particulars	Stages	Costs Covered By
	temporary labour) involved in the worksites		
12	Provision of First Aid Kits for worksites	Construction	Civil works contract
13	Provision and maintenance of waste collection bins in sets of 2 (blue and green) for collection of municipal solid waste generated at the worksite including cost of material , labour, loading, unloading, lead, lift, shifting, transportation etc.	Construction	The cost is integrated as part of the civil work cost
14	Environment, Health & Safety Engineer/Supervisor having Bachelors in Env Science / Management/ B. Tech (Env Eng.)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
15	Diploma in Central Labour Institute / Regional Labour Institute (Mandatory)	Construction	The Manpower Cost is integrated into the cost of the Civil Works
	Subtotal (C)		
D	**PIU/AIWTDS EMP Implementation cost**		
1	EMP Supervision Cost	Construction	PIU Cost
2	Equipment	Construction	PIU Cost

4. BUDGET FOR SMP

The various activities for social management under the subproject to be undertaken by the contractor are given in **4.1**

Table 4.1: Summary for Social Budget (Construction phase)

Item of SMP	Duration
Training for contractor staff on labour laws such as Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Bonded Labour System (Abolition) Act, 1976; The Workmen's Compensation Act, 1923; The Contract Labour (Regulation & Abolition) Act, 1970 and Rules; The Child Labour (Prohibition and Regulation) Act, 1986; The Indian Factories Act, 1948 and State Rules; Public Liability and Insurance Act, 1991; The new labour Act like The Code on Social Security, 2020 and The Code on Wages, 2019,	Actual, before and during the project implementation time

Item of SMP	Duration
Social safeguards training including training of staff on GRM. GBV training (SEA and SH)	Actual, before and during the project implementation time
Environmental Health and Safety Officer and Social Development Specialist hired by contractor, for on-site supervision	Actual, during the project implementation