BWSP-1 Package 3

Table 1: Generic EMP: Site Establishment and Preliminary Activities - Design phase

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
1.	Legislation, permits and agreements	In all instances- covering Environment & Forest, BUIDCo, implementation agency, contractors and consultants must remain in compliance with relevant local and national legislation.	SO- PIU, E-DSC	ES- PMC, ESMC- PMU	Prior to moving onto site and Quarterly during construction
		Proof of compliance to Air Act & Noise Act must be forwarded by the contractor to PMU/PMC/PIU (in relation to hot mixing, batch mix plants, stone crushers, diesel generators, etc. if any)	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	Prior to moving onto site and Quarterly during construction
		Forest land clearance, NOC from BMC for tree cutting	SO-PIU, DSC	ES- PMC, ESMC- PMU	Prior to moving onto site and Quarterly during construction for compliance
		A copy of the EMP must be kept on site during the construction period	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	At all times
2.	Access to site[1]	Access to site at all water storage reservoir location will be via existing roads. The Contractor will need to ascertain the existing condition of the roads and repair damage due to construction. Site management plant and alignment of approach road to site needs to be followed	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Prior to moving onto site and monthly
		The Local Traffic Department must be informed at least a month in advance if the traffic in the area will be affected (if any)	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Prior to moving onto site and quarterly
		The location of all affected services must be identified and confirmed.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Prior to moving onto site and quarterly
		All roads for construction access must be planned and approved by the Engineer and its Environmental Specialist ahead of construction activities. They shall not be created on an ad-hoc basis.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Prior to moving onto site and during construction - quarterly

[1] Access to site and traffic management shall be done in accordance to the directions of Engineer

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		No trees, shrubs or groundcover may be removed or vegetation stripped without the prior permission of the Engineer/Environmental Specialist	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	Before and during construction- semi annually
3.	Setting up of construction camp[2]	Choice of site for the Contractor's camp requires the Engineer's/ ES permission and must take into account location of local residents, businesses and existing land uses, including flood zones and slip / unstable zones. A site plan must be submitted to the Engineer for approval.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During surveys and preliminary investigations and prior to moving onto the site
		The construction camp may not be situated on a floodplain or on slopes greater than 1:3 (Horizontal : Vertical ratio). Preferable slope 1:1 (plain land) or !:2 (marginal slope)	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During surveys and preliminary investigations and prior to moving onto the site- quarterly monitoring
		Private land needs to be avoided. If no option NOC from pvt. party will be required	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site establishment and ongoing – monthly inspections
		In most cases, on-site accommodation will not be required. The construction camp can thus be comprised of: • site office • designated first aid area • separate eating areas • storage areas • batching plant (if required) • refueling areas (if required) • maintenance areas (if required) • crushers (if required)	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During set-up and monthly
		The camp must be properly fenced and secured	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site establishment and ongoing – monthly inspections
		The Contractor shall make adequate provision for temporary toilets (gender specific) for the use of their employees during the Construction Phase. Such facilities, which shall comply with	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site establishment and ongoing – weekly inspections

[2] Careful planning of the construction camp can ensure that time and costs associated with environmental management and rehabilitation are reduced.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced.			
		Bins shall be provided at convenient intervals for disposal of waste within the construction camp.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and ongoing-weekly
4.	Establishing equipment lay-down and storage area[3]	Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU,	During site set-up
		Storage areas shall be secured so as to minimize the risk of crime. They shall also be safe from access by children / animals etc.	SO-PIU, E-DSC, Contractor	ES- PMC	During site set-up and monthly
		Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During site set-up and monthly
		Equipment lay-down and Storage areas must be designated, demarcated and fenced if necessary.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and monthly
		Fire prevention facilities must be present at all storage facilities.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and monthly
		Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and monthly
		These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and monthly

[3] Storage areas can be hazardous and unsightly and can cause environmental pollution if not designed and managed carefully.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.	SO-PIU, E-DSC, Contractor	ES- PMC ESMC PMU	During site set-up and monthly
		Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and monthly
5.	Materials management – sourcing[4]	Prioritize sites already permitted by the Mining Department	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	On receipt of natural materials
		Contractors shall prepare a source statement indicating the sources of all materials (including sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to the Engineer for approval prior to commencement of any work.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	On award of contract and continued quarterly
		If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of DSC	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	On receipt of natural materials and continued quarterly
6.	Education of site staff on general and environmental conduct[5]	Ensure that all site personnel have a basic level of environmental awareness training.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During staff induction and ongoing monthly monitoring
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During staff induction, followed by ongoing weekly
		All employees must undergo safety training and wear the necessary protective equipments (e.g helmets, gloves, gumboots, nose mask, ear plugs as per type of work) and clothing.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During staff induction, followed by monthly monitoring
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • no alcohol/drugs on site; • prevent excessive noise; • construction staff are to make use of the facilities provided	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During staff induction, followed by ongoing monthly monitoring

[4] Materials must be sourced in a legal and sustainable way to prevent offsite environmental degradation.
[5] These points need to be made clear to all staff on site before the subproject begins.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); • no fires permitted on site; • trespassing on private/commercial properties adjoining the site is forbidden; • other than pre-approved security staff, no workers shall be permitted to live on the construction site; and • no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do.			
7.	Social impacts[6]	Open liaison channels shall be established between the contractors and interested and affected parties such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	Prior to moving onto site and ongoing monthly
		Road closure (if any) together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	Prior to moving onto site and ongoing monthly
		Advance road signage indicating the road detour and alternative routes (if required). Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/ complaints.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	Prior to moving onto site and ongoing monthly
		Storage facilities and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During surveys and preliminary investigations and site set-up. Monthly monitoring
8.	Conservation of the natural	No vegetation may be cleared as per Bihar Govt. Rule	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During site setup and quarterly
		Trees that are not to be cleared shall be marked beforehand with danger tape. The PIU/ES-PMC /Engineer (DSC) must be given a chance to mark vegetation that is	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During site set-up and as per requirement

[6]It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
	environment [7]	to be conserved before the Contractor begins clearing the site.			
9	Set-up of waste management procedure	The excavation and use of rubbish pits on site is forbidden.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Monthly monitoring
		Burning of waste is forbidden.	E- DSC, Contractor	ES- PMC, ESMC PMU	Monthly monitoring
10	Social and Cultural Resources	(i) Consult Archaeological Survey of India (ASI) or concerned dept. of Tripura Govt. to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; (iii) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During site set-up and ongoing quarterly
11	Core Labour Standard (CLS)- safety and compliance	Monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. DSC will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC- PMU	During site set-up and ongoing quarterly
12	Occupational health &safety	Comply with IFC EHS Guidelines on Occupational Health and Safety- ref.	Contractor	SO-PIU, ES-PMC, ESMC-PMU	During site set-up and ongoing monthly.

[7] Alien plant encroachment is particularly damaging to natural habitats and is often associated with disturbance to the soil during construction activities. Care must be taken to conserve existing plant and animal life on and surrounding the site.

Sr. No.	Activity	Management/Mitigation	Responsible for Mitigation /	Responsible for Monitoring and supervision	Frequency
		(www.ifc.org/ifcext/enviro.nsf/Content/ Environmental Guidelines) Mitigation measures as mentioned during construction phase to be followed			
13.	Security and safety	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	During site set-up and continued monthly
		Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Monthly
		Flammable materials shall be stored as far as possible from adjacent residents / businesses.	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Monthly
		All interested and affected parties shall be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples are: • stringing of power lines • earthworks / earthmoving machinery on steep slopes above houses / infrastructure • risk to residences along haulage roads / access routes	SO-PIU, E-DSC, Contractor	ES- PMC, ESMC PMU	Week prior to activity and monthly to be continued

DSC: Design and Supervision Consultant, E: Engineer, EE: Environmental Engineer, ES: Environment Specialist**,** ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant**,** PMU: Project Management Consultant, SO: Safeguard Officer

Table 2: Generic EMP: Management of Construction and Workforce Activities-Construction phase

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
1	Climatic impact	✓ Seasonal climatic variations will be considered during scheduling of construction activities in the area. ✓ Consideration of suitable season (non monsoon /lien period) for major construction activity ✓ Excavations and other clearing activities will only be done during agreed working times and permitted weather conditions.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU , E-DSC	Quarterly monitoring

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		✓ Storm water control (through drainage, diversion) during construction phase as per the method approved by the Engineer.			
2.	Maintenance of construction camp and work site	The Contractor must monitor and manage drainage of the camp site to avoid standing water and soil erosion.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU , E-DSC,	Weekly inspection
		Run-off from the camp site must not discharge into neighbors' properties.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU , E-DSC	Weekly inspection
		Toilets are to be maintained in a clean state and shall be moved to ensure that they adequately service the work areas.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		Drinking water facility needs to be maintained at camp and work site	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		The Contractor is to ensure that open areas or the surrounding bushes are not being used as toilet facility.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		The Contractor shall ensure that all litter is collected from the work and camp areas daily.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		Bins and shall be emptied regularly and waste shall be disposed of at the pre-approved site.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		Eating areas shall be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Weekly inspection
		The Contractor shall ensure that his camp and working areas are kept clean at all times.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU, E- DSC	Weekly monitoring
3.	Staff conduct	The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.
		The rules that are explained in the worker conduct section, must be followed at all times	Contractor	SO-PIU/ ES-PMC, ESMC-PMU,	Monthly monitoring.
4.	Dust and air pollution[8]	Consult with DSC/PIU on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.

[8] Main causes of air pollution during construction are dust from vehicle movements and stockpiles, vehicle emissions and fires.

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;	Contractor	SO-PIU/ ES-PMC, ESMC-PMU,	Monthly monitoring.
		Avoiding the need to stockpile on site	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.
		Use tarpaulins to cover sand and other loose material when transported by trucks	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.
		Fit all heavy equipment and machinery with air pollution control devices which are operating correctly and rregular servicing of the vehicles& equipments off site in order to limit gaseous emissions	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.
		Excess earth and other windblown loads in transit will be kept covered	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring.
		No fires are allowed on site	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Ongoing monthly monitoring.
5	Noise Level	➢ Plan activities in consultation with DSC/PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; ➢ Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach; ➢ Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; ➢ Ensure that machinery is in a good state of maintenance. ➢ Monitor noise levels in potential problem areas, and ➢ Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. ➢ Noise: Around the substation will be surrounded with the protective wall with fence	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
6	Storm water	Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site i.e. these materials must not be placed in storm water channels, drainage lines	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring
		During construction, un-channeled flow must be controlled to avoid soil erosion.	Contractor	SO-PIU/ ES-PMC, ESMC-PMU , E-DSC,	Monthly monitoring
7	Water quality[9]	Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets	Contractor	SO-PIU/ ES-PMC	Regular monitoring - monthly
		Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with BMC/PIU on designated disposal areas	Contractor	SO-PIU/ES-PMC	Regular monitoring - monthly
		Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies	Contractor	SO-PIU/ES-PMC	Regular monitoring - monthly
		Place storage areas for fuels and lubricants away from any drainage leading to water bodies	Contractor	SO-PIU/ES-PMC	Regular monitoring - monthly
		Dispose any wastes generated by construction activities in designated sites	Contractor	SO-PIU/ES-PMC	Regular monitoring - monthly
		Conduct surface quality inspection according to the Environmental Management Plan (EMP)	Contractor	SO-PIU/ES-PMC	Quarterly monitoring
8.	Conservation of natural environment – terrestrial flora	As the work front progresses the Contractor is to check that no vegetation cleared as per Bihar Govt Rule.	Contractor	SO-PIU/ES-PMC, ESMC-PMU , E-DSC	Monthly monitoring
		Removal of vegetation and disallow cutting of trees. As far as possible through design modification	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Monthly monitoring
		Prohibit employees from poaching wildlife, bird hunting, and cutting of trees for firewood	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Ongoing monitoring. Monthly monitoring
		Non removal of trees of religious importance	Contractor	SO-PIU/ ES-PMC, ESMC-PMU	Quarterly monitoring.
9.	Materials management	Stockpiles shall not be situated such that they obstruct natural water pathways.	Contractor	PIU/ES-PMC, ESMC- PMU E- DSC	Monthly monitoring. Location as

[9]Water quality is affected by the incorrect handling of substances and materials. Soil erosion and sediment is also detrimental to water quality. Mismanagement of polluted run-off from vehicle and plant washing and wind dispersal of dry materials into rivers and watercourses are detrimental to water quality.

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
					directed by the engineer
		Stockpiles shall not exceed 2m in height unless otherwise permitted by the concerned Engineer.	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC,	Monthly monitoring Location as directed by the engineer and ES-PMC
		All concrete mixing must take place on a designated, impermeable surface.	Contractor	PIU/ES-PMC, ESMC- PMU,	Monthly monitoring.
		Verify suitability of all material sources and obtain approval of PIU & DSC	Contractor	PIU/ES-PMC, ESMC- PMU,	Monthly monitoring
10.	Landscape and Aesthetics including Waste management	Refuse must be placed in the designated skips / bins which must be regularly emptied.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring.
		Prepare and implement Waste Management Plan	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring.
		In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas for improvement of aesthetic environment. Recycling is to be encouraged by providing separate receptacles for different types of wastes (including demolition waste) and making sure that staff is aware of their uses.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		All waste must be removed from the site and transported to a disposal site or as directed by the Engineer.	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Monthly monitoring.
		Waste from toilets shall be disposed of regularly and in a responsible manner.	Contractor	PIU/ES-PMC, ESMC- PMU	Weekly monitoring.
		Hazardous waste disposal must be carried out by the Contractor in a responsible manner	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.
		Storage areas will be properly fenced off	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		Top soil needs to be utilised by farmers for nutrient value	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.
		Coordinate with DSC-PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.
		Recover used oil and lubricants and reuse or remove from the sites	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.
		Request DSC/PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work	Contractor	PIU/ES-PMC, ESMC- PMU, E- DSC	Monthly monitoring.
11	Occupational Health and Safety	World bank Environmental, Health, and Safety (EHS) Guidelines - EHS Guidelines for water & sanitation will be followed. Specifically, (i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment like helmet, gumboot, safety belt, gloves, nose musk and ear plugs; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents; (ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iii) Provide medical insurance coverage for workers; (iv) Secure all installations from unauthorized intrusion and accident risks; (v) Provide supplies of potable drinking water; (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		preventing injuring to fellow workers; (viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (x) Ensure moving equipment is outfitted with audible back-up alarms; (xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.			
12	Community Health & Safety	Plan routes to avoid times of peak-pedestrian activities.	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
		Liaise with DSC- PIU in identifying risk areas on route cards/maps	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
		Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
		Provide road signs and flag persons to warn of dangerous conditions, in case of location near the road.	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
		Provide protective fencing around open trenches, and cover any open trench with metal planks during non-construction hours	Contractor	PIU/ES-PMC, ESMC- PMU , E-DSC	Ongoing Weekly

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		Maintaining accident register and arrangement of emergency response plan for community	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
13	Construction and air, soil, and water pollution due to inadequate management and control	Construction wastes to be managed in accordance with GOI standards and industry best practices. Waste lubricating oils to be disposed or recycled off-site by licensed service companies.	Contractor	PIU/ES-PMC, ESMC- PMU , E-DSC	Ongoing Weekly
14	Storage of chemicals and any hazardous materials	Possible spills resulting in contamination land, water, and air Fuel and any other hazardous materials will be securely stored to prevent spills. Contractors to provide spill response kit in accordance with Material Safety Data Sheets for chemicals and hazardous materials	Contractor	PIU/ES-PMC, ESMC- PMU , E-DSC	Ongoing Weekly
15	Electrical Safety	Rubber mats shall be provided in front of all L T switchgear throughout the length of the switchgear. Danger Plate & Chart will be provided by the contractor. A set of 33 kV grade hand gloves and earthling rods to be provided	Contractor	PIU/ES-PMC, ESMC- PMU, E-DSC	Ongoing Weekly
16	Traffic & accessibility impact	Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; Schedule transport and hauling activities during non-peak hours; Locate entry and exit points in areas where there is low potential for traffic congestion; Keep the site free from all unnecessary obstructions; Drive vehicles in a considerate manner; Coordinate with Govt. Traffic Department for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and Notify affected sensitive receptors by providing sign boards informing nature and duration of construction	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		works and contact numbers for concerns/complaints			
17	Social impacts[10]	Contractor's activities and movement of staff to be restricted to designated construction areas.	Contractor	PIU/ ES-PMC, ESMC-PMU	Monthly monitoring
		The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times.	Contractor	PIU/ ES-PMC, ESMC-PMU	Monthly monitoring
		Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized and must have the Engineer's permissions.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		The work plan for the construction and laying of pipelines will be devised in such a way to ensure that the construction period is minimized. Affected persons will be assisted in moving to the other side of the road and returning after construction work is completed. Where they are not required to shift, their access road will be ensured by the contractor. The construction period will be minimized and is estimated to be less than 30 days per section of work. Compensation will be provided to impacted person (all deals under Resettlement Plant)	Contractor	PIU/ ES-PMC, ESMC-PMU	Monthly monitoring
		Provide walkways and metal sheets where required to maintain access for people and vehicles.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		Increase workforce in front of critical areas such as educational institutions, places of worship, business establishment and health care establishments to shorten the duration of impacts.	Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		Consult businesses and institutions regarding operating hours and factoring this in work schedules.	Contractor	PIU/ES-PMC,	At least 1 week prior to the activity taking place. Monthly monitoring
		The Contractor is to inform neighbors in writing of disruptive activities at least a week beforehand.	Contractor	PIU/ES-PMC	At least a week prior to the activity taking place.

[10] Regular communication between the Contractor and the interested and affected parties is important for the duration of the contract.

Sr. No.	Issues	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
					Monthly monitoring
		Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses.	Contractor	PIU/ES-PMC	Monthly
		The site must be kept clean to minimize the visual impact of the site.	Contractor	PIU/ES-PMC	Weekly monitoring.
		Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors.	Contractor	PIU/ES-PMC	Monthly monitoring.
		Notice of particularly noisy activities must be given to residents / businesses adjacent to the construction site. Examples of these include: • noise generated by jackhammers, diesel generator sets, excavators, etc. • drilling • dewatering pumps	Contractor	PIU/ES-PMC	Monthly monitoring
		A complaints register (refer to the Grievance Redressal Mechanism) shall be housed at the site office.	E- DSC, Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring.
18	Cultural environment	All the staff and laborers of the Contractor be informed about the possible items of historical or archaeological value	E- DSC, ES-PMC, contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
		If something of this nature be uncovered, ASI or State Department of Archaeology shall be contacted and work shall be stopped immediately.	E- DSC, ES-PMC, Contractor	PIU/ES-PMC, ESMC- PMU	Monthly monitoring
19	Environment Safeguard/safety Officer	Contractor shall appoint one Environment Safeguard/ Safety Officer who shall be responsible for assisting contractor in implementation of EMP, community liaison, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis.	Contractor	PIU/ES-PMC, ESMC- PMU	Person to be appointed before start of construction activities and remain available throughout the project duration.

Monitoring method- Through field check, document check, visual observation, generation of air, water & noise level data

ASI = Archeological Survey of India, BSPCB= Bihar State Pollution Control Board,
DSC: Design and Supervision Consultant, E: Engineer, ES: Environment Specialist**,** ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant**,** PMU: Project Management Consultant, SO: Safeguard Officer

Table 3: Generic EMP- Post Construction Activities and Operation

	Activities	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
1.	Construction camp	All structures comprising the construction camp are to be removed from site or handed over to the property owner/ community as per mutual agreement (if established on private/community land).	Contractor	SO - PIU, ES-PMC	Subproject completion
		The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up.	Contractor	SO - PIU, ES-PMC	Subproject completion
		The Contractor must arrange the cancellation of all temporary services.	Contractor	SO - PIU, ES-PMC	Subproject completion
		The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.	Contractor	SO - PIU, ES-PMC	Subproject completion
3.	Land rehabilitation	All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.	Contractor	SO - PIU, ES-PMC, ESMC- PMU	Subproject completion
		All rubble is to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited.	Contractor	SO - PIU, ES-PMC, ESMC- PMU	Subproject completion
		The site is to be cleared of all litter.	Contractor	SO - PIU, ES-PMC, ESMC- PMU	Subproject completion
		Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer.	Contractor	SO - PIU, ES-PMC, ESMC- PMU	Subproject completion
		The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.	Contractor	SO - PIU, ES-PMC, ESMC- PMU	Subproject completion
4.	Materials and infrastructure	Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	Contractor	SO - PIU, ES-PMC , Engineer-DSC,	Subproject completion
		All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.	Contractor	SO – PIU, ES-PMC, Engineer-DSC,	Subproject completion

	Activities	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		The Contractor must repair any damage that the construction work has caused to neighboring properties.	Contractor	SO-PIU, ES-PMC	As directed by the Engineer.
5.	General	A meeting is to be held on site between the Engineer, ES-PMC and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.	Engineer-DSC, SO-PIU, ES- PMC, Contractor	PIU, ES-PMC, ESMC-PMU	On completion of the construction and maintenance phases-monthly monitoring
		Temporary roads must be closed and access across these blocked.	Engineer-DSC, SO-PIU, ES- PMC, Contractor	SO – PIU, ES-PMC	On completion of construction
		Refill and re-compact trenches soil and backfilled sand will be removed to expose the leaking junction or pipe	Contractor	PIU, ES-PMC, ESMC-PMU, Engineer-DSC	On completion
		Cover or wet excavated material to prevent dusts	Contractor	SO – PIU, ES-PMC, Engineer-DSC	Monthly monitoring
		All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer	Contractor	SO – PIU, ES-PMC Engineer-DSC	On completion of construction
6	Hazardous chemical & waste management	Use equipment constructed of corrosion-resistant materials	Contractor	SO – PIU, ES-PMC, ESMC PMU Engineer-DSC	Monthly during Operation
		Minimize the amount of disinfection materials for using in chlorinator	Contractor	SO – PIU, ES-PMC, ESMC PMU, Engineer-DSC	Monthly during Operation
		Material safety data sheet to be maintained at chlorine/ common salt storage area	Contractor	SO – PIU, ES-PMC, ESMC PMU, Engineer-DSC	Monthly during Operation
		Regular laboratory testing for dosing and residual chlorine	Contractor	SO – PIU, ES-PMC, ESMC PMU, Engineer-DSC	Monthly during Operation
		Develop and implement a prevention program that includes identification of potential hazards, written operating procedures,	Contractor	SO – PIU, ES-PMC, ESMC PMU, Engineer-DSC	During Operation – quarterly

	Activities	Management/Mitigation	Responsible for Mitigation	Responsible for Monitoring/ Supervision	Frequency
		training, maintenance, and accident investigation procedures			
7	Water quality assessment and maintained – Health & safety	• Undertake regular monitoring and maintenance of water supply infrastructure. • Quality of drinking water will be checked regularly at Tube well at OHSR site and end point of supply water locations as given in agreement.	Contractor,	ES-PMC, ESMC PMU	Monthly monitoring - During Operation
8	Social and Cultural Resources	• Consult the city authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; • Complete work in these areas quickly; • Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals	Contractor, SO- PIU	ES-PMC, ESMC PMU	Monthly monitoring during operation

ASI = Archeological Survey of India, BSPCB= Bihar State Pollution Control Board,
DSC: Design and Supervision Consultant, E: Engineer, ES: Environment Specialist**,** ESMC: Environment & Social Management Coordinator, PIU: Project Implementation unit, PMC: Project Management Consultant**,** PMU: Project Management Consultant, SO: Safeguard Officer

C. Environmental Monitoring Program

1. **Table 4** outlines the environmental monitoring program to ensure implementation of the management and mitigation measures specified in the EMP. The table shall be read within the context of the body of the entire EMP.

Table 4: Environmental Monitoring Program

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring &Supervision
1. Site establishment and preliminary activities						

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring &Supervision
Legislation, permits and agreements	Consent for Establishment and Consent to Operate (in relation to hot mixing, wet mixing, batching plant, stone crushers, and diesel generators, etc. if any)	Air Act Water Act Noise Act	-	Prior to moving onto site and during construction	Contractor,	Engineer of DSC / ESMC-PMU/ ES-PMC
	Copy of EMP	EARF and ADB SPS	Subproject site, offices, website, library, etc.	At all times	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/ ES- PMC
Access to site	Existing conditions	EMP	All access and haul roads	Prior to moving onto site	Contractor, Engineer of DSC &SO- PIU and ES- PMC	ES- PMC /ESMC PMU
	Road closures and traffic rerouting if required	EMP	All affected roads	One week in advance of the activity	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/ ES- PMC
	Notifications and road signages	EMP	All affected roads	One week in advance of the activity	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/ ES- PMC
Construction camp	Approval of location and facilities	EMP	As identified	Prior to moving onto site	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/ ES- PMC
Equipment lay-down and storage area	Approval of location and facilities	EMP	As identified	Prior to moving onto site and during site set-up	Contractor, Engineer of DSC &SO- PIU	ESMC- PMU/ ES- PMC
Materials management – sourcing	Approval of sources and suppliers	EMP	As identified	Prior to procurement of materials	Contractor, Engineer of DSC &SO- PIU	ESMC PMU/ ES- PMC
Education of site staff	Awareness level training - Environment - Health and safety	EMP and records	-	During staff induction, followed by schedule as determined	Contractor, ES-PMC	ESMC- PMU/ ES- PMC
Social impacts	Public consultations, information disclosure, communication strategy	EARF, ADB SPS and EMP	Subproject site	Prior to moving onto site and ongoing	Contractor Social Expert DSC ,SO- PIU	ESMC- PMU/ ES/Social Expert - PMC
	GRM register	EMP	Subproject site	Prior to moving onto site and ongoing	Contractor, SO-PIU	ESMC- PMU/ ES- PMC
Noise quality	Baseline data for noise level in dB(A) L_{eq}	National noise standards	Once before start of construction works at all the project locations as	Once prior to site set-up	Contractor with the help of National Accreditation Board for Testing and	SO- PIU, ES-PMC, ESMC PMU

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring &Supervision
			identified by ES- PMC		Calibration Laboratories	
Air quality	Baseline ambient data for particulate matters 10 and 2.5 (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2)	National ambient air quality standards	Once before start of construction works at all the project locations as identified by ES- PMC	Once prior to site set-up	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	SO- PIU, ESMC PMU/ ES- PMC
Storm water	Storm water management measures	EMP	As identified by the engineer	During site set-up and throughout the duration of the subproject-monthly	SO-PIU ,ESMC-PMU/ ES- PMC	ESMC PMU/ ES- PMC
Conservation of natural environment	Existing conditions	EMP	Subproject sites	Prior to site set-up-then monthly	Contractor & ES-PMC	ESMC- PMU/ ES- PMC
Waste management procedure	Disposal sites	EMP	As determined	Prior to site set-up and ongoing throughout the subproject-monthly	Contractor, ES-PMC	EE- PMU/ ES-PMC
Cultural environment	Chance finds	ASI Act and EMP	As determined	Prior to site set-up and ongoing throughout the subproject-monthly	Contractor with Engineer- DSC &SO-PIU	ESMC- PMU/ ES- PMC
Security & safety arrangement	Arrangement at working sites	EMP	Subproject sites	Prior to site set-up and ongoing throughout the subproject	Contractor with Engineer- DSC &SO-PIU	ESMC- PMU/ ES- PMC
Occupational Health & safety	Compliance with IFC EHS Guidelines of World Bank	EMP, Guidelines	Subproject sites	Prior to site set-up and ongoing throughout the subproject	Contractor with Engineer- DSC &SO-PIU	ESMC- PMU/ ES- PMC
2. Construction phase						
Access to site	Qualitative characteristics	Pre-subproject condition and EMP	All access and haul roads	Refer to EMP (table on management of construction and workforce activities	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring &Supervision
Construction camp	Qualitative characteristics	Pre-subproject condition and EMP	Camp site	Prior to site set-up and ongoing throughout the subproject-weekly monitoring	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Staff conduct	Site records (accidents, complaints)	EMP	Subproject sites	Ongoing-monthly monitoring	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Air quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2	National ambient air quality standards	Covering at all the project locations as identified by Engineer.	Quarterly basis at water reservoir sites, pipe laying areas, during subproject execution	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	ESMC- PMU/ SO- PIU/ ES-PMC
Storm water	Soil erosion management measures	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Water quality	Protection from contamination	EMP, Water quality standard	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Conservation of natural resources	Vegetation conditions	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Materials management	Qualitative characteristics	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Landscape and Aesthetics including Waste management	Qualitative characteristics	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
	Disposal manifests	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Social impacts	Public consultations, information disclosure, communication strategy	EARF, ADB SPS and EMP	Subproject sites	Ongoing-monthly	Contractor with the Engineer, DSC, SO- PIU	ESMC- PMU/ ES- PMC
	GRM register	EMP	Subproject sites	Ongoing-monthly	Contractor with the Engineer, DSC, SO- PIU	ESMC- PMU/ ES- PMC
Occupational Health and Safety	World bank Environmental, Health, and Safety (EHS) Guidelines	EMP	Subproject sites	Ongoing-weekly	Contractor with the Engineer, DSC, SO- PIU	ESMC- PMU/ ES- PMC
Cultural environment	Chance finds	ASI Act and EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC

Aspect	Parameter	Standards	Location	Duration / frequency	Implementation	Monitoring &Supervision
Noise quality	Noise level in dB(A) L_{eq}	National noise standards	Covering at all the project locations as identified by Engineer.	Quarterly basis at water reservoir sites, pipe laying areas, during subproject execution	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	ESMC- PMU/ SO- PIU/ ES-PMC
Community Health & Safety	Safety arrangement during construction	EMP	Subproject sites	Ongoing-weekly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
Traffic & accessibility impact	Arrangement and follow up rules related to traffic safety	EMP	Subproject sites	Ongoing-monthly	Contractor	ESMC- PMU/ SO- PIU/ ES-PMC
3. Post-construction activities						
Construction camp	Pre-existing conditions	EMP	Construction camp	Subproject completion	Contractor	ESMC- PMU/ ES- PMC
Vegetation (if felled)	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	ESMC- PMU/ ES- PMC
Land rehabilitation	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	ESMC- PMU/ / ES- PMC
Materials and infrastructure	Pre-existing conditions	EMP	Subproject sites	Subproject completion	Contractor	/ ES-PMC,ESMC PMU
General	Records	EMP	Subproject sites	Subproject completion	Contractor with Engineer- DSC &SO- PIU and ES-PMC	ESMC- PMU/ / ES- PMC
Social and Cultural Resources	Pubic complaint	EMP	Subproject sites	During operation	Contractor	ESMC PMU/ ES- PMC
4. Operation and maintenance						
Water Quality	As per national standard	Central Pollution Control Board standards	Once at all constructed tube well near OHTs, and consumer end level.	Quarterly basis	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	ESMC- PMU/ ES- PMC
Noise quality	Noise level in dB(A) L_{eq}	As per national noise standards	Once at OHTs & Pump house	Quarterly basis	Contractor with the help of National Accreditation Board for Testing and Calibration Laboratories	ESMC- PMU/ ES- PMC
Hazardous chemical & waste management	Storage and use	Safety data sheet EMP	At OHTs	Monthly monitoring	Contractor	ESMC- PMU/ ES- PMC

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D. Environmental Management and Monitoring Cost

2. The Contractor's cost for site establishment, preliminary activities, construction, and defect liability activities will be incorporated into the contractual agreements, which will be binding on him for implementation. The air quality and noise level monitoring at construction phase and water quality at operation and maintenance phase will be conducted by the contractor.
3. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of implementing agency (BUIDCo) with the help of contractor and program Consultant. The water quality monitoring during the operation and maintenance phase will be conducted by the hired recognized environmental laboratory.
4. The activities identified in environmental monitoring program mainly includes site inspections and informal discussions with workers and local people and this will be the responsibility of PMU and PMC with the assistance of DSC's Engineer, costs of which are part of project management.
5. The remaining actions in the EMP are the various environmental monitoring activities to be conducted by the Environmental Monitoring Specialist. These have not been budgeted elsewhere, and their costs are shown in **Table 5.**The figures show that the total cost of environmental management and monitoring for the subproject BWSP 1 as a whole is INR 24.70 Lac, i.e., about USD 34,612

Table 5: EMP Implementation Cost

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
Legislation, Permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor.	As required	Not Applicable	Not Applicable	These consents are to be obtained by contractor on his own cost.
Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase.	As required	Lump sum	-	Project Cost-PMU
Providing access to commercial establishments and properties.	Providing access, in case of access disruptions, to affected properties.	As per requirement	Contractor's liability	Not applicable	Covered under engineering cost
Dust Suppression at subproject sites	Application of dust suppression measures during construction phase.	As required	Lump sum	50,000	Covered under engineering design and cost – by contractor
Traffic management	Safety Signboards, delineators, traffic regulation equipments, flagman,	Wherever required throughout subproject corridor	Contractor's liability	Not applicable	Covered in engineering cost

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
	temporary diversions, etc				
Baseline Monitoring Site preparation and preliminary activities					
Air	Once before start of construction work at all the water reservoir locations, and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 15 samples	10,000 per sample	1,05,000	Covered under engineering design and cost- by contractor
Noise	Once before start of construction work at all the water reservoir locations, and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 15 samples	1000 per sample	15,000	Covered under engineering design and cost- by contractor
Construction Monitoring					
Air	Quarterly (except rainy season) during construction works at all the water reservoir locations. and pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 100 samples	10,000 per sample	10,00,000	Covered under engineering design and cost- by contractor
Noise	Quarterly at all the water reservoir locations, pipe laying locations as identified by Engineer of DSC & Environmental Specialist of PMC	Approx. 100 samples	1000 per sample	1,00,000	Covered under engineering design and cost- by contractor
Tree plantation at OHT site	As per BSPCB norms			50000	Covered under engineering design and

Component	Description	Number	Cost per Unit (INR)	Cost (INR)	Source of Funds
					cost by contractor
Operation phase					
Water Quality	At all constructed OHTs, and consumer end as per drinking water standard parameters	Approx. 100 numbers	10,000 per sample	10,00,000	Covered under O & M cost – by contractor
Noise quality	quarterly during the operation phase – at all noise generating sites	Approx. 50 samples	1000 per sample	50,000	Covered under O & M cost – by contractor
Any unanticipated impact due to subproject implementation	Mitigation of any unanticipated impact arising during construction phase and O & M phase	Lump sum	-	1,00,000	Project cost
TOTAL (INR)				**24,70,000.00**	
TOTAL (USD)				**34,612**	