Environmental Management Plan

Project Number: 3562
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Pakistan: Punjab Intermediate Cities Improvement Project

1. Improvement of Signals & Junctions

Prepared by Project Management Unit of Punjab Intermediate Cities Improvement Program (PICIIP), Local Government and Community Development department, government of Punjab for the Asian Development Bank.

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1.0 INSTITUTIONAL ARRANGEMENTS AND CAPACITY BUILDING

1. The main purpose of the EMP is to provide a strategy for environmental protection. According to EMP, all the activities associated with the project will be controlled and monitored during the design, construction and operation phase. EMP will propose a plan of actions that will indicate responsibilities and required measures to prevent or minimize the potential environmental impacts associated with the proposed project.

1.1 Organizational Set-up for Implementation of EMP

2. The following functionaries will be involved in the implementation of EMP:

- Project Management Unit (PMU);
- Environmental Expert of Supervision Consultant's;
- Contractor's Site Environmental Engineer; and
- Punjab EPA (Regulatory Authority)

3. The PMU will be overall responsible for implementation of this EMP and for the environmental management and supervisory affairs during the construction phase of the proposed project. For effective environmental management, the PMU will assign the necessary responsibilities through Project Director, to an Environmental Expert and a Social Expert in implementing the mitigation measures proposed in EMP.

4. The Contractor will be responsible for the implementation of EMP under the Supervision Consultant. The Contractor shall be bound to follow the provisions of the Contract documents, especially about environmental protection and apply good construction techniques and methodology without damaging the environment. Obligation of the Contractor is to safeguard, mitigate adverse impacts and rehabilitate the environment shall be addressed through environmental provisions in the Contract document and through adequate implementation at site. Regulatory Authority will be responsible for compliance of implementation of EMP.

Figure 1-1 : Organizational Setup for Implementation of EMP

1.2 Role and Responsibilities of PMU

1.2.1 Project Management Unit (PMU)

5. Design and Construction of the project is the core responsibility of PMU, PICIP. The major role and responsibilities related to environment and social tasks are as follows:

- To ensure that the Project design and specifications adequately reflected in the EMP.
- To ensure the Project compliance with the environmental regulations and donor requirements;
- To ensure that the TOR for the Supervisory Consultants adequately cover the environmental and social issues; and

1.2.2 Project Director (PD)

6. The specific responsibilities of Project Director are as follows:

- Setting up systems for environmental management;

- Ensuring that the Contractor(s) develop and carry out environmental implementation Plans that are consistent with the EMP;

1.2.3 Responsibilities of Environmental Engineer of Supervision Consultant

7. The Environmental Expert (EE) of the Supervision Consultant (SC) will oversee the performance of Contractor through periodic monitoring to make sure that the Contractor is carrying out the work in accordance with EMP.

8. The EE of SC will provide guidance to the Contractor's Environmental Engineer for implementing each of the activities as given in the EMP. The EE of SC will be responsible for record keeping providing instruction through the Resident Engineer (RE) for corrective actions and will ensure the compliance of various statutory and legislative requirements. The EE will maintain close coordination with the Contractor and PMU for successful implementation with environmental safeguard measures. However, overall responsibilities of EE of SC are as follows:

- Directly reporting to the RE;
- Discussing various environmental issues and environmental mitigation, enhancement and monitoring actions with all concerned directly or indirectly;
- Inspect, supervise and monitor all the construction and allied activities related to the EMP for the project;
- Assist the RE to ensure the environmental sound engineering practices;
- Assisting contractor and PMU in all matters related to public contacts including public consultation pertaining to environmental and community health & safety issues;
- Assisting PMU Safeguards staff to carry out environmental monitoring;
- Organizing training to the EE of Contractor and field staff; and
- Preparing and submitting monthly and quarterly environmental progress/ compliance reports to the PMU.

1.2.4 Responsibilities of Site Environmental Engineer of Construction Contractor

9. The Site Environmental Engineer of Construction Contractor will carry out the implementation of mitigation measures at construction site. Construction Contractor will be bound through Contract documents to appoint the Site Environmental Engineer with relevant educational background and experience. Responsibilities of EE of Contractor are as follows:

- Preparing sub plans including monitoring plan, traffic control/diversion plan, site rehabilitation plans etc. and will submit all the plans to the EE of SC. Implementation of EMP and to take effective measures against corrective actions plan;

- Preparing the compliance reports as per schedule and will submit it to the SC;
- Providing proper Personal Protective Equipment (PPEs) to the workers and train them for their proper use; and
- Providing environmental and health & safety trainings to the workers / labor.

1.3 Non-Compliance of the EMP

10. The implementation of the proposed EMP involves inputs from various functionaries as discussed earlier. The Contractor will be primarily responsible for ensuring implementation of the mitigation measures proposed in the EMP, which will be part of the Contract documents. The provision of the environmental mitigation cost will be made in the total cost of project, for which Contractor will be paid on the basis of monthly compliance reports. The Contractor will not be allowed to proceed further until the mitigation measures as proposed in the EMP are taken and approved by Supervision Consultant.

1.4 Environmental Technical Assistance and Training Plan

11. In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. The SC will play a key role in this respect and supervise the arrangements of trainings.

12. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP as without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A suitable training program is proposed to train the Contractor(s) staff who will be involved in the Construction Phase and the professional staff from the client involved at the operational stage of the project.

13. The PMU, PICIP will engage consultants to manage the environmental training program. The objective of engaging these consultants will be to help in establishment of appropriate systems, and to train senior project staff and Environmental Expert responsible for managing environment, operations, and planning. The details of this training program are presented in Table-1.1.

Table 1-1: Personnel Training Program

Provided by	Contents	Trainees/Events	Duration
Consultants/ organizations specializing in environmental management and monitoring	Short seminar and a course on: Environmental laws and regulations, Daily monitoring and supervision	One seminar for PMU and contractor project staff	1 day
Consultants/ organizations specializing in social management and monitoring	Short seminar and course on: Social and environmental awareness	One seminar for project staff dealing in Social/land matters and environmental issues	1 day
Consultants/ organizations specializing in Occupational, health and safety issues	Short lecture relating to Occupational Safety and Health	One seminar for contractor's staff	2 days

2.0 ENVIRONMENTAL MANAGEMENT PLAN

14. The Environmental Management Plan (EMP) provides the framework for the implementation of the mitigating measures and environmental management and monitoring during the construction and operation phases of the proposed project. The proper implementation of the EMP will ensure that any adverse environmental impacts are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully taken by the concerned institutions or regulatory agencies. The implementation of EMP will be carefully coordinated with the design, construction and operation programs of the project to ensure that relevant mitigation measures are implemented at the appropriate stage and adequate resources are properly allocated to achieve the desired results.

15. The **Table 2.1** depicts impacts, targets, mitigations and the responsible authorities for the implementation of the mitigation measures during design, construction and operational phases.

Table 2-1: Environmental Management Plan

Sr. No.	Parameters	Target	Mitigation	Responsibility
Design/Pre-construction Phase				
1	Design & Layout Planning	Intended to enhance the aesthetic and focused on certain project structures	▪ All structural, layout and engineering designing of project shall be strict in accordance with the applicable by laws and engineering parameters.	PMU, PICIP
2	Drainage	To prevent flooding andpooling	▪ Provision of appropriate drainage structures and storm water pumpingstation; and ▪ Proper slopes shall be incorporated in design feature to avoid the formation of the water layer on road surfaces in rainyseasons.	PMU, PICIP
3	Public Utilities	To avoid disturbance tothe public.	▪ The design engineer shall consider the adjustments of the proposed plans, where feasible and within acceptable design standards, to avoid relocation or adjustment of major or costly utilities without changing the scope of the project. ▪ The design engineer shall consider the feasibility and possible choices of electrical works and installation of lights keeping in view health and safety of workers and general public hazard analysis, updated structural	PMU, PICIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
			and seismic evaluations will be consulted.	
4	Traffic Management	To minimize traffic problems in the projectarea	▪ Proper traffic management plan shall beformulated and announced before construction to avoid traffic jams/public inconvenience; ▪ Plan the timing for movement of construction materials carrying vehicles toreduce traffic load and avoid inconvenience to the local residents. ▪ Means of communication of recommended alternative routes shall be planned to avoid inconvenience and traffic blockades during construction	PMU, PICIP
5	Health and Safety	To minimize health risks	▪ Preparation of health and safety plan tominimize health risks; and ▪ An emergency response plan shall be formulated which emphasizes line of action for rescue, medical emergencies,natural disasters and firefighting operations.	PMU, PICIP
6	Solid Waste Management	To manage (i.e. collect and dispose) the solid waste safely at appropriatesites.	▪ Incorporate technical design features forrefuse collection at sites that would minimize burning impacts; and ▪ Devise plan(s) for safe handling, storageand disposal of harmful	PMU, PICIP

Sr. No.	Parameters	Target	Mitigation	Responsibility
			materials	
Construction Phase				
1	Topography	To make ensure minimumchanges in topography of the project area.	▪ Excavations shall be kept confined to the specified location as per the approved engineering drawings and unnecessary excavations shall be avoided.	CC, SC
2	Soil	To minimize soil erosionand contamination.	▪ All spoils shall be disposed off as desired and the site will be restored back to its original conditions; ▪ Unnecessary excavations shall beavoided; ▪ Septic tanks of adequate capacities will be constructed for receiving and treating wastewater from all temporary worksite toilets and at the temporary container offices, if any. The toilet wastewater shall not be discharged untreated onto the adjacent lands/sewers/disposal station; and ▪ Washout from washing of equipment and gadgets will be drained into either a septic tank or a sand-gravel bed for removal of the grit and contaminants.	CC, SC
3	Camp Site	To minimize loss of assets and vegetation due to labor movement and to prevent	▪ Preparation of Waste Management Plan addressing the classification, storage and disposal of all solid wastes and the training of employees	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
		degradation of environment due to construction camps.	for handling the hazardous materials. ▪ Training will be provided to all staff members on camp management rules and overall discipline and cultural awareness.	
4	Health and safety of workers and associated communities	To minimize health risks	▪ Obligatory insurance against accidents forlaborers/workers shall be ensured; ▪ Basic medical training shall be imparted to specified work staff and basic medical service and supplies to workers; ▪ Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents; ▪ Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risksfor laborers; ▪ Protection devices (ear muffs) shall be provided to the workers doing job in the vicinity of high noise generating machines; ▪ Provision of protective clothing for laborers handling hazardous	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			materials, e.g. helmet, adequate footwear for bituminous pavement works, protectivegoggles and gloves etc; ▪ Ensure strict use of wearing these protective clothing during work activities; ▪ Emergency number shall be placed atworksites; ▪ Elaboration of contingency planning in case of major accidents; ▪ Instruct construction supervisor to strictlyenforce the keeping out of non-working persons, visitors, particularly children, offwork sites; and ▪ Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads. ▪ There shall be proper control on construction activities and oil spillageleakage of vehicles; ▪ The labor staff with any transmittable diseases shall be restricted within the construction site; ▪ Efforts will be made to create awareness about road safety among	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			the drivers operating construction vehicles; ▪ Timely public notification on plannedconstruction works; ▪ Provision of proper safety and diversion signage, particularly at sensitive/accident-prone spots; ▪ Setting up speed limits in close consultation with the local stakeholders; ▪ The communicable disease of most concern during construction phase, like sexually-transmitted disease (STDs) such as HIV/AIDS, shall be prevented by successful initiative typically involving health awareness; education initiatives; training of workers in disease treatment; immunization program and providing health service; and ▪ Reducing the impacts of vector borne diseases on long-term health effect of workers shall be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which includes Prevention of larval and adult propagation of vectors through	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water.	
5	Air Pollution	To minimize air pollution	▪ All excavation work will be sprinkled withwater to control dust; ▪ The excavated material shall be covered and shall not be stored for long intervals; ▪ All vehicles, machinery, equipment and generators used during construction activities shall be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; ▪ All vehicles, machinery and equipment used for the construction shall be pluggedoff or switched off immediately after completion of their work to avoid idlingcondition; ▪ Filter shall be installed at the point sources (machinery or equipment) of air emissions and shall be replaced regularly; ▪ Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions;	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ Open burning of solid waste from the Contractor's camps shall be strictly banned; ▪ Preventive measures against dust shall be adopted for on-site mixing and unloading operations. Regular water sprinkling of thesite shall be carried out to suppress excessive dust emission(s); ▪ Construction workers shall be provided with masks for protection against the inhalation of dust; and ▪ PEQS applicable to gaseous emissionsgenerated by construction vehicles, equipment and machinery shall be enforced during construction works.	
6	Noise and Vibration	To minimize noisepollution	▪ Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriatemuffling devices; ▪ Confining excessively noisy work to normal working hours in the day, as far as possible; ▪ Providing the construction workers with suitable hearing protection like ear cap, orearmuffs and training them in their use; ▪ Preferably, restricting construction vehicles movement during night time;	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ Avoid use of heavy drill machines to avoid the vibration effect on the historical buildings. ▪ Vehicles and equipment used shall be fitted, as applicable, with silencers andproperly maintained; ▪ Use of low noise machinery, or machinery with noise shielding and absorption; ▪ Contractors shall comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and employ strict implementation of operation procedures.	
7	Construction Waste and Hazardous Waste	To minimize the construction and hazardous waste	▪ Wastewater effluent from contractor's workshop and equipment washing yards would be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams; ▪ Training of working force in the storage and handling of materials and chemicals that can potentially cause soil contamination; ▪ Solid waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan; ▪ Burning of waste will be prohibited;	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ Proper labelling of containers, including the identification and quantity of the contents, hazard contact information etc.; ▪ Training employees involved in the transportation of hazardous material regarding emergency procedures; ▪ Providing the necessary means foremergency response on call 24 hours/day; ▪ The sewage system for camps will be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters; and ▪ Lined wash areas will be constructed atsite, for the receipt of wash waters from construction machinery. ▪ Covering material during heavy rainfall; ▪ Locating stockpiles to minimize potentialvisual impact, and ▪ Minimizing land intake of stockpiles areasas for as possible.	
8	Resource Conservation	Sustainable use of energyresources	▪ Wastage of water shall be controlled through providing proper valves and through controlling pressure of the water; ▪ Water jets and sprays shall be used for watering surfaces rather than usingoverflow system; ▪ Source of water shall be carefully	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			selected. Water use shall not disturb the existing community water supplies; ▪ Reuse of construction waste materials; ▪ Unnecessary equipment washings shallbe avoided; ▪ A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand tothe lowest levels	
9	Energy Efficiency	To minimize energy efficiency	▪ Ensure adequate insulation to reduce heatloss through batching plants; ▪ Regularly monitor CO and CO_2 content ofthe flue gases to verify that combustion systems are using practical excess air volumes; ▪ Maintain clean heat transfer surfaces inasphalt batching plant;	CC, SC
10	Surface and Groundwater	To protect the ground and surface water resources from any kind of pollution due to project	▪ Protection of surface and groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potablequality; ▪ Wastewater effluent from contractor's workshop and equipment washing yards shall be passed through gravel/ sand beds to remove oil/ grease contaminants before discharging it into natural streams ▪ The solid waste will be disposed off in designated sites to sustain the water quality for domestic requirements;	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ water required for construction is obtained in such a way that the water availability and supply to nearby communities remainunaffected; ▪ For construction purposes, water shall be drawn from surface water bodies on priority and as available; ▪ Regular water quality monitoring according to determined samplingschedule; ▪ The contractor shall ensure that construction debris do not find their way into the drainage network, which may getclogged; ▪ To maintain the surface water flow/drainage, proper mitigation measures will be taken, like drainage structures ▪ Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond; ▪ Construction work close to the streams or other water bodies will be avoided, especially during monsoon period; ▪ Take precautions construct temporary or permanent devices to prevent water pollution due to increased siltation; and ▪ Waste must not be disposed off into anysurface water body.	

Sr. No.	Parameters	Target	Mitigation	Responsibility
11	Flora and fauna	To minimize the impact onflora and fauna	▪ The Contractor's staff and labor will be strictly directed not to damage any vegetation such as trees or bushes; and ▪ Contractor will provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel will not be allowed. ▪ Hunting, poaching and harassing of animals will be strictly prohibited and Contractor will warn their labor accordingly; ▪ The camps will be properly fenced and gated to check the entry of animals in search of eatable goods. Similarly, waste of the camps will be properly disposed off to prevent the chances of eating by animals, which may become hazardous tothem; ▪ Special measures will be adopted to minimize impacts on the birds, such as avoiding noise generating activities duringcritical periods of breeding; ▪ Staff working on the project shall be given clear orders, not to shoot, snare or trap any bird.	CC, SC
12	Public Utilities/ Infrastructure	To minimize the disturbance to public utilities and infrastructure	▪ All public utilities likely to be affected by the proposed project need to be relocated well ahead of the commencement of construction work; ▪ Unnecessary excavation shall be avoided;and	CC, SC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ Excavations shall be carried out carefully to avoid damaging infrastructure in the surroundings of the project area.	
13	Traffic Management	To minimize traffic problems in the projectarea	▪ Proper traffic management plan will be needed to avoid traffic jams/public inconvenience; ▪ Movement of vehicles carrying construction materials shall be restricted during the daytime to reduce traffic load and inconvenience to the local residents; ▪ Availability of continuous services of the Traffic Wardens in the diversion and control of traffic; and; ▪ The executing agency is required to maintain liaison between the Traffic Police, local residents/visitors, travelers and the contractor to facilitate traffic movement during construction stage.	CC, SC and TrafficPolice
14	Communicable diseases	To minimize the spread ofcorona virus	**COVID-19 specific measures** ▪ All workers must perform completesanitization at the site as per SOPs/guidelines issued by WHO. ▪ All workers must wear a mask as soonas they arrive at site and must keep wearing it at all times while present at the work site/hospital premises. ▪ As soon as workers arrive at work	CC

Sr. No.	Parameters	Target	Mitigation	Responsibility
			site,their body temperature must be checked and in case any worker is assessed to be running a fever or suffering from a flu or cough, he must be informed to leave immediately and self-isolate for a two-week period and not report for work until this two-week mandatory period has been completed. ▪ At the work site(s), social distancing measures must be strictly implemented and gathering of workers at any location at the work site(s) must be strictly forbidden. In case of workers not taking this measure seriously, strict penalties must be imposed to ensure implementation. ▪ The work tasks must be divided into shifts, as far as possible, to reduce theworkforce present at the work site(s) at any one moment and improve the working speed/efficiency. ▪ All workers will be strictly advised to wash their hands as frequently as practicable and not to touch their faceduring work. ▪ A supply of safe drinking water will bemade available and maintained at theproject site(s). ▪ COVID awareness sign boards must be installed at the clinic premises	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			andat the work site(s). ▪ Contact details of all workers will be kept in a register on site in order to efficiently trace and manage any possible workers that might experience symptoms of COVID-19. ▪ Prohibition of entry for local community/any unauthorized personsat work sites. ▪ Proper hygiene practices in the toilets and washrooms will be implemented with proper and adequate use of soaps and disinfectant spray. ▪ Social distancing must be maintained during the pick-up and dropping off of workers from their residences to and from the work site(s). **COVID-19 Specific measures GOP Advice for Site Managers:** ▪ Every construction project shall make proper arrangements for uninterrupted building services including but not restricted to, electricity, fuel, water supply, water disposal and sanitation, communication links, washrooms with hand hygiene and shower facility and with proper and adequate supply of soaps and disinfectants.	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ Workers shall not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site. ▪ Ensure the availability of the thermal gun at the entry and exit of the construction site and no worker shall be allowed without getting his/her temperature checked. ▪ Site manager must maintain a register of all contact details with NID number and addresses of all present at the site in case a follow up or tracing and tracking of contacts is required at a later stage. ▪ Develop the employee roster to decrease the number of people on the site very day. Split the shifts of the workers in morning and evening with limit of each shift to 8 working hours. ▪ Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after taking shower when their duty hours' end. ▪ In addition to all other internationally recognized safety precaution for construction workers	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			and other staff, every individual must be provided witha face mask. It must be ensured that everyone during his or her presence at the site continues to wear the mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands. ▪ Non-essential work trainings must be postponed avoiding gathering of people. ▪ Ensure the physical distance by creating more than one route of entryand exit to the site. ▪ Instruct the workers to inform the construction manager (or authorities) if ▪ They develop any symptoms of cough,flu or fever. ▪ They have been exposed to someone suspected or confirmed with COVID 19. ▪ They have met someone who has a travel history of COVID 19 endemic country. They have travelled in last couple of days or plan to travel soon. ▪ All incidences of appearance of the symptoms of COVID-19 shall be immediately documented and maintained at the site and information regarding which shall	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			be immediately communicated through e-mail or else, to the designated health facility, and the sick worker shall be transported to the health facility for further advice and action. The site manager mustestablish a link with a nearby healthcare facility with arrangementsfor quick transportation of workers in case of an emergency. ▪ Persuade the workers to inform the authorities for their safety and of other if they observe any signs and symptoms in a colleague. ▪ Do not allow any worker at the construction site who has the symptoms ▪ Display the awareness banners about hand hygiene and physical distancing, where you can, around the work site. ▪ Everyone on the construction site must observe sneezing and coughing etiquettes. Workers shall be requested and required to wash their hands as frequently as practicable and shall also be advised not to touch their face with their hands during work. ▪ Workers must maintain no less than two arm lengths between them before, during after work at all	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labeled and stored without intermixing. ▪ Only sanitizable dinning surfaces shall be used, which must be cleaned before each service. ▪ The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers. Workers must not sit at less than 2 meters' distance while having meals and while any other activity requiring interpersonal communications. ▪ Adequate ventilation shall be provided in dining areas, resting places and sleeping areas. ▪ In the wake of current restrictions on transportations site mangers will ensure safe transport arrangements for worker which shall not be crowded and shall have social distancing in place during the entire process from pickups till drops at destination. ▪ In case of workers sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms in a well ventilated area.	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			▪ A supply of safe drinking water must be made available at the project siteand maintained. **Advice for Construction Workers:** ▪ All possible and prescribed measuresshall be taken to ensure your and others health. Enter your contact details in the register maintained at the site, in case a follow up or tracing and tracking of contacts is required at a later stage. ▪ Follow hygiene practices at washrooms and shower facility withproper and adequate use of soaps and disinfectants. ▪ Every worker must change into standard working attire at the time of commencement of duty and change back to their regular dress after takingshower when their duty hours' end. ▪ In addition to all other internationally recognized safety precaution for construction workers and other staff, every individual must use face mask. Face mask shall be replaced as and when soiled or otherwise removed. Outer surface of face mask must not be touched with hands. ▪ Workers shall wash their hands as	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			frequently as practicable and shall not to touch their face with their hands during work. ▪ Everyone on the construction site must observe sneezing and coughingetiquettes. ▪ Workers must maintain no less than two arm lengths between them before,during after work at all the times. They shall not make physical contact and shall be required to maintain separate personal gears and assets which must be clearly labeled and stored without intermix. ▪ Sick worker shall immediately informthe site manager and must get medical advice from nearby health Centre. ▪ Only sanitizable dining surfaces shallbe used. ▪ Do not sit at less than 2 meters' distance while having meals and while any other activity requiring interpersonal communications. ▪ Do not use biometric attendance machines or crowd during attendance, entry or exit to the premises of the construction site. ▪ Use safe transport arrangements which shall not be crowded and shall have social distancing in place during the entire process	

Sr. No.	Parameters	Target	Mitigation	Responsibility
			from pickups till drops at destination. ▪ In case sleeping in at the site of construction, a safe distance of 2 meters must be ensured in the sleeping rooms in a well ventilatedarea **Deliveries or Other Contractors Visitingthe Site:** ▪ Non-essential visits to the constructionsites shall be cancelled or postponed. ▪ Delivery workers or other contractors who need to visit the construction site must go through temperature check before entering and shall be given clear instructions for precautions to be taken while on site. ▪ Designate the workers, with protective gears or at least gloved and mask, to attend to the deliveries and contractors. ▪ Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries. ▪ Instruct the visiting truck drivers to remain in their vehicles and whenever possible make use of contactless methods, such as mobile phones, to communicate with your workers	

DC	Design Consultant
CC	Construction Contractor
SC	Supervision Consultant

3.0 ENVIRONMENTAL MONITORING

16. Environmental Monitoring is undertaken during the construction phase to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters are selected and quantitative & qualitative analyses are carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not.

17. Parameters to be analyzed during construction of the project and responsibilities for monitoring & reporting have been discussed in this section.

3.1 Environmental Monitoring during Pre-Construction and Construction Phase

18. The respective monitoring to be conducted during the project development phases is provided in **Tables 3.1** and **3.2** below.

3.2 Responsibilities for Monitoring and Reporting

19. The PMU will be responsible for environmental monitoring and reporting throughout the construction phase. A monitoring report will be prepared on quarterly basis and one comprehensive report will be prepared on bi-annual basis for submission to ADB.

Table 3-1: Pre-Construction' Monitoring Plan for Baseline Development

Parameter to be measured	Objective ofMonitoring	Parameters to be Monitored	Measurements	Location*	Frequency	Responsibility
Ambient Air Quality	To establish baseline air quality levels	CO,NO_2, SO_2, O_3 & PM_{10} (particulate matter smaller than 10 microns) concentration at receptor level	1-hr and 24-hr concentration levels	At three random receptor locations inthe project area	Once (before start of project)	SC
Ambient Noise	To establish noise levels inventory as well pointing the high noise areas.	Ambient noise level near receptors in project area	A-weighted noise levels – 24 hours, readings taken at 15s intervals over 15 min. every hour, and then averaged	At three random receptor locations in the project area	Once (before start of project)	SC
Ground water Quality	To establish baseline groundwater quality in project area	Groundwater quality in project area	Water samples for comparison against PEQS parameters	At two locations around the site in the project area	Once (before start of project)	SC
Surface water Quality	To establish baseline surface quality in project area	Surface water quality in project area	Water samples for comparison against PEQS parameters	At two locations around the site in the project area	Once (before start of project)	SC

*Monitoring Locations to be finalized jointly between PMU Safeguards staff and Supervision Consultant (SC)

Table 3-2: Construction Phase Monitoring Requirements

Project Activity and Potential Impact	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
Noise Disturbance due to noise from construction activity	To determine the effectiveness of noise abatement measures on sound pressure levels	Ambient noise level at different locations in project area	A-weighted noise levels 24 hours, readings taken at 15 s intervals over 15 min. every hour at 15 m from receptors, and then averaged	At three random receptor locations in project area	Quarterly basis on a typical working day	Contractor's Environmental officer, SC
Air Quality Dust emissions from construction vehicles and equipment	To determine the effectiveness of dust control program on dust at receptor level	CO, NO_2, SO_2, O_3 & PM_{10} (particulate matter smaller than 10 microns) concentration at receptor level Visible dust	1-hr and 24-hr concentration levels	At three random receptor locations in project area	Quarterly basis on a typical working day	Contractor's Environmental officer, SC
			Visual observation of size of dust clouds, their dispersion and the direction of dispersion	Construction site	Once daily during peak construction period	Contractor's Environmental officer, SC
Groundwater Quality	To establish groundwater quality in project area	Groundwater quality in project area	Water samples for comparison against PEQS parameters	At two locations around the site in the project area	Quarterly	Contractor's Environmental officer, SC
Safety precautions by workers	To prevent accidents for workers and general public	Number of near miss events and accidents taking place	Visual inspections	Construction site	Once Daily	Contractor's Environmental officer, SC

Project Activity and Potential Impact	Objective of Monitoring	Parameters to be Monitored	Measurements	Location	Frequency	Responsibility
Soil Contamination	To prevent contamination of soil from oil and toxic chemical spills and leakages	Incidents of oil and toxic chemical spills	Visual inspections	At construction site and at vehicle and machinery refueling & maintenance areas	Once a month	Contractor's Environmental officer, SC
Solid Waste & Effluent disposal Insufficient procedures for waste collection, storage, transportation and disposal	To check the availability of waste management system and implementation	Inspection of solid and liquid effluent generation, collection, segregation, storage, recycling and disposal will be undertaken at all work sites in project area	Visual inspections	At work sites in project area	Once daily.	Contractor's Environmental officer, SC

* Monitoring Locations to be finalized jointly between PMU Safeguards staff and Supervision Consultant (SC).

PUBLIC IMPROVEMENT OF SHAHABPURA ROAD

Break up of Environmental Management Cost (PKR)

Total cost allocated = Rs. 1,034,500.00

Items	Units	Cost	Remarks
Contractor Environmental Specialist	1	290,000.0	One environmental Specialist with intermittent inputs
Environmental Monitoring (for air, noise, water and waste Water analysis)	3	230,000.0	A total of three time monitoring during the implementation of project
Personal Protective Equipment	80	304,000.0	For all project staff during the implementation of project
COVID prevention measures	-	210,500.0	For all project staff during the implementation of project

GRADE SEPARATOR AT RAILWAY CROSSING AT PARKING PLAZA

Break up of Environmental Management Cost (PKR)

Total cost allocated = Rs. 1,834,500.00

Items	Units	Cost	Remarks
Contractor Environmental Specialist	1	475,000.0	One environmental Specialist with intermittent inputs
Environmental Monitoring (for air, noise, water and waste Water analysis)	3	425,000.0	A total of three time monitoring during the implementation of project
Personal Protective Equipment	80	445,000.0	For all project staff during the implementation of project
COVID prevention measures	lumpsum	315,500.0	For all project staff during the implementation of project
Traffic Diversion (with special consideration of illumination of lights	lumpsum	174,000.0	During the implementation of project

during night time at diversion of construction areas)			

SIGNAL AND JUNCTION IMPROVEMENT

Break up of Environmental Management Cost (PKR)

Total cost allocated = Rs. 5,345,000.00

Items	Units	Cost	Remarks
Contractor Environmental Specialist	1	1,090,000.0	One environmental Specialist with intermittent inputs
Environmental Monitoring (for air, noise, water and waste Water analysis)	3	1,225,000.0	A total of three time monitoring during the implementation of project
Personal Protective Equipment	80	1,245,000.0	For all project staff during the implementation of project
COVID prevention measures	lumpsum	1,110,000.0	For all project staff during the implementation of project
Traffic Diversion (with special consideration of illumination of lights during night time at diversion of construction areas)	lumpsum	675,000.0	During the implementation of project