ENVIRONMENTAL MANAGEMENT PLAN

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8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 GENERAL

Environmental Management Plan (EMP) is a tool for the implementation of all the suggested measures to make the project environmentally sustainable. It provides an overall approach for managing and monitoring the environmental, ecological and socio-economic issues of the proposed Project as well as health and safety aspects, and describes the institutional framework and reporting mechanism to implement EMP for the Project.

8.2 EMP COMPONENTS

The EMP comprises following main components:

- EMP Objectives;
- Scope of the EMP;
- Policy, Legal and Administrative Framework;
- Inclusion of EMP in Bidding/Contract Documents;
- Institutional Arrangements;
- Environmental Mitigation and Management Matrix;
- Environmental Monitoring Plan;
- Planning for EMP Implementation;
- Occupational Health and Safety Provisions for Contractors;
- Capacity Building/Strengthening;
- Communication & Documentation;
- Environmental, Social, Health and Safety Management Plans;
- Change Management Plan
- Tree Plantation Plan;
- Chance Find Procedure;
- Codes of Practices;
- Audits and Annual Review of EMP;
- Non-Compliance of EMP; and
- Budget for Implementation of EMP.

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8.3 EMP OBJECTIVES

The main objectives of the EMP are:

- Provide project impacts along with the proposed mitigation measures, and a corresponding implementation phase for the proposed mitigation measures;
- To ensure that all necessary corrective actions are carried out in time to counter any adverse environmental and social impacts;
- To ensure the regular monitoring of those factors which may affect the safety of the environment, workers and community under a systematic monitoring approach;

- Define the roles and responsibilities of the Project Proponent (RUDA), Supervision Consultant (SC) and Construction Contractor (CC) in the existing setup of proponent in order to effectively communicate environmental and social issues among them;
- Provide a procedure for timely action in the face of unanticipated situation;
- Identify training requirements at various levels including RUDA, SC and CC;
- Provide a monitoring mechanism in the form of an environmental and social monitoring plan, which includes monitoring parameters, monitoring frequency to ensure that all the mitigation measures are completely and effectively implemented;
- Identify the resources required to implement the EMP and outline the corresponding financing arrangements;
- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies; and
- Provide other plans considering the project specific requirements.

8.4 SCOPE OF THE EMP

The scope of the EMP includes the construction phase of the proposed Project Package 1A: upper promenade of right side embankment starting from RD 0+000 to RD 10+500. All the activities performed during the implementation phases will be controlled and monitored according to this EMP.

8.5 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The applicable polices, legislation, acts and guidelines are discussed in detail in Chapter 2 of Environmental Impact Assessment (EIA) Report. However, following is the list of the applicable policies, laws, regulations and guidelines related to the proposed Package:

8.5.1 National and Provincial Requirements:

- National Conservation Strategy (NCS), 1992
- National Environmental Policy (NEP), 2005
- National Climate Change Policy, 2012
- National Drinking Water Policy, 2009
- National Water Policy 2018
- National Forest Policy, 2001
- Pakistan Labour Policy, 2010
- National Resettlement Policy, 2002
- National Disaster Risk Reduction Policy, 2013
- National Action Plan for Covid-19 Pakistan
- Punjab Environmental Protection Act, 1997 (as Amended up to 2017)
- Punjab Environmental Protection Agency, (Review of IEE and EIA) Regulations, 2022
- Punjab Environmental Quality Standards (PEQS), 2016
- Guidelines for the Preparation and Review of Environmental Reports, 1997

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- Guidelines for Environmental Assessment
- Ravi Urban Development Authority Act 2020
- Pakistan Climate Change Act, 2017
- National Clean Air Act, 2000
- Land Acquisition Act (LAA), 1894 Including Later Amendments
- Punjab Wildlife Act, 1974
- Punjab Plantation and Maintenance of Trees Act, 1974
- Pakistan Antiquities Act 1975 & Punjab Antiquities Amendment Act 2012
- The Punjab Special Premises (Preservation), Ordinance, 1985
- Pakistan Penal Code, 1860
- Labour Laws as part of Constitution of Pakistan 1973
- Punjab Municipal Water Act, 2014
- The Punjab Water Act, 2019
- Punjab Hazardous Substances Rules 2019
- Punjab Environmental Protection (Motor Vehicles) Rules, 2013
- The Punjab Occupational Safety And Health Act, 2019
- Punjab Restriction on Employment of Children Act, 2016
- Punjab Protection of Women against Violence Act, 2016
- Electricity Act, 1910
- Cutting of Trees (Prohibition) Act, 1975
- Punjab Forest Act (Amended), 2016
- The Punjab Protected Areas Act, 2020
- The Punjab Heritage Foundation Act, 2005
- The Punjab Emergency Services Act, 2006
- National Disaster Management Act, 2010
- Seismic Building Code of Pakistan 2007 & 2021

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8.5.2 International Convention, Protocols and Obligations:

- UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972
- The Rio Declaration, 1992
- Kyoto Protocol, 1992
- Convention on Biological Diversity, 1994
- UN Convention to Combat Desertification (UNCCD), 1994
- Stockholm Convention on Persistent Organic Pollutants (POPs), 2004
- Paris Agreement, 2015
- Millennium Development Goals (MDGs)

8.6 INCLUSION OF EMP IN BIDDING/ CONTRACT DOCUMENTS

The EIA including EMP will be included in the bidding/contract documents and its implementation will be a contractual binding for the contractors.

8.7 INSTITUTIONAL ARRANGEMENTS

The institutional requirements for the implementation of the proposed Project are provided in below sections.

8.7.1 Institutional Arrangements for Implementation of EMP

The key players involved during implementation phase of the proposed Project RUDA as employer/proponent (including its environmental and social specialists), Environmental Protection Department (EPD) Punjab, SC, Monitoring and Evaluation Consultant (MEC) and the Contractor. The roles and responsibilities of these organizations are outlined below.

The following staff will be involved in the implementation of EMP:

- RUDA - Proponent/Employer (including Environmental and Social Staff);
- MEC;
- SC Environmental and Social Staff; and
- Contractor's Environmental, Social, Health and Safety Staff.

The employer RUDA will make Contractor bond through contract documents to implement the EIA including EMP and other terms and conditions of the Environmental Approval/NOC issued by the EPD Punjab. The whole EMP will be included as a clause of the contract documents. Construction camps will be established after necessary approvals and submission of Site-Specific EMPs to be developed in the light of the relevant agency requirements, before commencement of new works.

The proposed organizational structure for the implementation of the EMP is presented in **Figure 8.1.**

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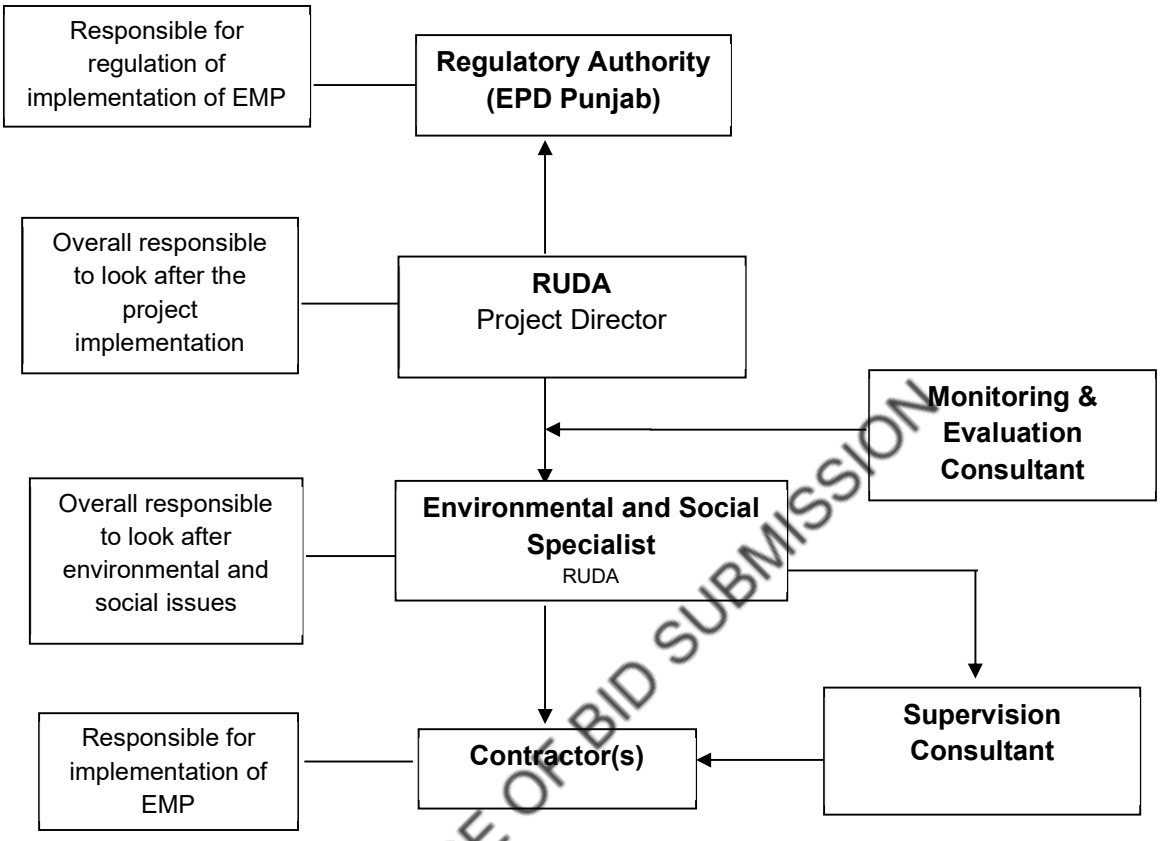

Figure 8.1: Institutional Arrangement for Implementation of EMP

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RUDA will monitor and coordinate all project implementation activities. The Project Director, will be responsible for all aspects of project implementation including financial management, procurement, recruitment of staff, consultants and contractors, and overseeing the implementation of EMP.

8.7.2 Roles and Responsibilities

Environmental and Social Specialists- RUDA

Following staff will be hired or engaged under RUDA, for the implementation of EMP:

- Environment Specialist
- Social Development Specialist

Overall responsibilities include:

- To ensure implementation of mitigation measures proposed in EMP during the construction and operational phase of the Package;

- To organize monitoring of ambient air quality, water and noise. In case, the noise and emission levels exceed the acceptable levels; a penalty or ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from nearby community and assisting the local authority including liaison with EPD Punjab;
- Ensuring availability of committed human resources and sufficient budget for successful implementation of EMP;
- To ensure that the proposed project is implemented in an environment friendly manner,
- Maintaining interface with the other lined departments/stakeholders; and
- Reporting to the EPD Punjab on status of EMP implementation.

Supervision Consultant

Overall responsibilities of Supervision Consultant include:

- Supervising, facilitating and coordinating implementation of environmental and social plans including EMP;
- Ensuring that contractors follow EPD Punjab regulations, and other requirements mentioned in the EMP;
- Identifying any issues of non-compliance and maintain a record;
- Suggesting mechanisms to link contractor performance in relation to the EMP to the timing of financial payments, incentives or penalties;
- Interacting with stakeholders for their concerns about the construction activities.
- Assisting Project Director in addressing and resolving environment-related complaints and grievances;
- Identifying and preparing environmental training materials and conducting environmental trainings; and
- Reviewing EMP and revising it if required.

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Contractor(s)

Contractor(s) are also required to appoint the following staff for the implementation of EMP in the field, particularly the mitigation measures.

- Environment Specialist
- Social Development Specialist
- Health and Safety Specialist

The contractor(s) will develop site specific management Plans addressing towards health, safety and environment and social issues including gender and get them approved by the RUDA. The contractor will also be responsible training its staff in the environmental/social and gender issues before the commencement of the construction works in consultation with RUDA. The construction contract will have appropriate clauses to bind the contractor for the above obligations

Monitoring and Evaluation Consultant (MEC)

MEC will be recruited by RUDA to carry out independent monitoring of implementation of EMP. The MEC will have environmental, and social experts and shall carryout third party monitoring of the project. MEC will also carry out regular observation of implementation of EMP carried out by the contractor.

8.8 ENVIRONMENTAL MITIGATION AND MANAGEMENT MATRIX

The impacts, mitigation measures, monitoring indicators, frequency and responsibility has been documented in EMP and given in **Table 8.1.**

Table 8-1: ENVIRONMENTAL MITIGATION AND MANAGEMENT MATRIX

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
Construction Phase					
1.	**Soil Erosion** Due to the proposed construction activities such as construction of river channelization, soil erosion and contamination may occur. Soil erosion may occur on River Ravi and at contractors' camps as a result of uncontrolled run-off from equipment washing yards and excavation of earth/cutting operations.	Use of stone pitching or riprap will be provided in the design at appropriate places especially	Visual observation and photographic record Waste Management plan implementation	CC CC stands for Construction Contractor	Proponent
2.	**Soil Contamination** The soil contamination occurs at all construction	The Contractors will be required to instruct and train their workforce in the storage handling and management of	Visual observation and photographic record Waste Management	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	stages. Land may be contaminated due to the spillage of chemicals, fuels, solvents, oils, paints, concrete, solid waste generated at campsites etc. This normally happens when these materials are transported in open or loosely capped containers. Various types of machinery will be used at the construction sites.	materials and chemicals that can potentially cause soil contamination	plan implementation		
3.	**Borrow / Open Pits** Borrow/ open pits and associated excavation activities may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation and landscape degradation. Borrow/ Open pits may also become potential sources of mosquito breeding and may prove hazardous to humans, livestock and wildlife. This will also degrade hygienic condition of the Project	Necessary permits will be obtained for any borrow pits from the competent authorities; In borrow pits, the depth of the pits will be regulated so that the sides of the excavation will have a slope not steeper than 1: 4. Borrow Area management plan shall be prepared by the contractor and approval shall of this plan shall be granted by the supervision consultant's	Visual observation and photographic record Waste Management plan implementation	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	Area				
4.	**Air Quality and Dust** Construction of the project building will affect air quality. Air sensitive receptors (ASR) will be adversely affected by the construction activities. The air quality of the project area will be affected by the exhaust emissions (NO_2, SO_2, CO and PM_{10}) produced from the construction machinery and equipment and fugitive dust. All these including PM_{10} are considered as pollution indicators	All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions.	Visual observation and photographic record Waste	CC	Proponent
5.	**Noise/ Vibration** The noise and vibration will be produced due to the operation of construction machinery and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers,	Selection of up-to-date and well maintained construction equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices.	Noise monitoring and visual checks.	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment's. The above machinery is expected to generate noise levels that would be severe in the project area.				
6.	**Surface and groundwater contamination** The surface water including River Ravi may get contaminated due to the surface runoff during construction phase. Construction activities may result in debris entering water body resulting in sedimentation. Storage and transport of construction material may also result in spills of chemical and contamination of water bodies	Construction camps will be established in areas with adequate natural drainage channels in order to facilitate the flow of the treated effluents after ensuring that PEQS are met.	Water Sampling and Testing from EPD Approved Laboratory. Visual Checks.	CC	Proponent
7.	**Traffic Management** The proposed Project area is approached through various	Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime	Vehicle maintenance record Training record Implementation of TMP Regular visual	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	major roads (Ravi road, Grand Trunk road (N-5), Bund road, Ring road and Sialkot-Lahore Motorway. These roads serve as main approach roads to the proposed Project Area and due to the proposed construction activities and movement of heavy Project vehicles for construction material supply; traffic problems may arise for the commuters and transporters travelling to the project area. The problems will include traffic jams and inconvenience to the public passing through the Project Area	Traffic Management Plan will be implemented to avoid traffic accidents, jams/public inconvenience.	observations		
8.	**Resource Conservation** Resources involved in the construction of proposed Project would include water, fuel and construction materials. Excessive consumption of	A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels.	Work site management plan Resource conservation plan and its implementation . Regular visual observations	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	these resources by the construction staff may stress the resources in the project area and in certain cases may disturb the existing supplies.				
9.	**Visual Impact and Aesthetics** Possible visual impacts during construction phase activities are likely to arise from fugitive dust generated from site preparation, on-site storage of construction material and storage of construction debris, physical presence and operation of labor camp, etc.	The area demarcated for proposed project should be fenced and all the construction activities should be restricted within the demarcated site;	Regular visual observations	CC	Proponent
10.	**Construction Camps/Camp Sites** Due to the construction camps, loss of vegetation and dis-satisfaction of rehabilitation measures during and after completion of construction phase may occur. These impacts	Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary.	Visual observation and photographic record sanitation plan for the construction camp implementation	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	may include waste, soil pollution, groundwater pollution, dust, etc				
11.	**Wastewater Generation at Construction Camps** Wastewater will be generated at the construction camps by the workers. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as river Ravi, water channels, etc. apart from soil contamination. The wastewater generation is estimated to be 6,400 liters/day for 200 construction workers during construction phase of the proposed Project.	Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e., septic tanks.	Visual observation Regular environmental monitoring, sampling and testing reports Waste Management plan implementation	CC	Proponent
12.	**Solid Waste Generation at Construction Camps** Considering the laborers (about 200 in numbers) residing in the construction camp and the locally	All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper solid waste management system. Contractor shall	Visual observation and photographic record. Waste Management plan implementation	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	available labour, an average solid waste generation rate of 0.612 kg/capita/day[1] is adopted for the estimation of solid waste generation. Based on this assumption, a total of about 122.4 kg/day of solid waste will be generated from construction camps on daily basis.	prepared solid waste management plan and approval shall be granted from the SC.			
13.	**Waste water generation at construction site** The construction waste will include wastewater, oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials etc.). The handling and storage of oil and other hazardous waste will be a source of environmental	The site will be restored back to its original conditions after construction completion as per agreement with land owner of camp site. Site Restoration Plan shall be prepared by the contractor and approval shall be granted by the SC.	Visual Observation and Environmental Monitoring, Sampling and Testing through an EPD approved laboratory	CC	Proponent

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[1] Climate and Clean Air Coalition Municipal Solid Waste Initiative Report, 2021

https://www.waste.ccacoalition.org/sites/default/files/files/lahore_city_profile.pdf

(Lahore: 0.612 kg/capita/day)

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	pollution during the excavation, foundation, leveling, carpeting and pavement activities. The quantification of construction material waste is not available but it is anticipated that less amount of such waste will be generated along the route length.				
14.	**Emergency Response to Natural and Man-made Disasters** Construction of the proposed project may encounter emergency situations. Natural Disasters such as earthquakes & flooding and other disasters triggered by humans/human error such as act of terror, fire etc. may occur, and must be considered to avoid or minimize their impacts.	Emergency Response Plan will be implemented in close consultation with the District Rescue Service, fire-fighting department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans should be regularly conducted.	Emergency Response Plan implementation	CC	Proponent
15.	**Climate Change and Green House Gas Abatement** The main sources of Greenhouse Gases (CO_2, CH_4,	Integration of careful planning on construction equipment activities with appropriate equipment selection could contribute to the reduction of	Regular maintenance of construction equipment and machinery. Visual observations and	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	NO_x etc.) during the construction activities of the proposed Project will include both mobile and stationary sources. The mobile sources will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants. Emission of greenhouse gases cause global warming and other climatic changes on regional and global scale.	carbon gas emissions as well as savings of construction cost	Environmental Monitoring, Sampling and Testing through an EPD approved laboratory.		
16.	**Flora** The project may involve destruction of vegetation cover on construction areas. It is initially examined that is approximately **2,524 number** of trees/saplings will be disturbed (14Km). The provided number of trees is approximate and tentative. Moreover, small plants will be removed due the	Incorporate technical design measures to minimize removal of trees, if possible; Cutting of trees and disturbance shall be avoided, as far as possible so, that negative effects on the process of natural regeneration of species are minimized and possible alternate route must be considered for proposed road, in which minimum ecological and environmental	Tree compensation record Visual observations Regular monitoring, audit and checks	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	layout of the project.	losses are expected.			
17.	**Fauna** During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc. The existing animals will leave the directly affected areas due to construction activities and human intervention. Some animals particularly reptiles may get killed during the earthworks operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase.	Care shall be taken during construction activities for avoiding purposely or chance killing of animals; If any wild species and habitat is found during construction, it must be dealt carefully and local wildlife department officials should be informed;	Departmental consultation record Visual observations Regular monitoring, audit and checks	CC	Proponent
18.	**Aquatic Ecology**	Proper facilities for	Departmental	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	Availability of the suitable approach is must for any project before its start. Presently there are no proper roads in the bed of river for the transport of heavy machinery to the site. So the construction of the approach roads will cause noise and dust pollution in the area. These activities will disturb the water quality and also aquatic life therein.	regular monitoring of fish stock and water quality will be provided in shape of a trained team equipped with necessary equipment.	consultation record Visual observations Regular monitoring, audit and checks		
19.	**Occupational Health and Safety** Occurrence of accidents / incidents and other natural emergencies during the construction stage is a common phenomenon and workers as well as locals will be more prone to serious accidents. Other physical hazards are exposure to weather elements, noise, work in confined spaces,	Safety precautions for the construction workers, Training of workers in construction safety procedures and use of Personnel Protective Equipment (PPE) will mitigate this impact. First Aid Facility shall be available within the construction camp.	Implementation of OHS Plan Use of PPEs Training Records Work permits Implementation of Emergency response plan and disaster management plan in case of natural disaster occurrence	CC	Proponent

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Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	trenching, contact with overhead power lines, falls from machinery or structures, and risk of falling objects).				
20.	**Community Health and Safety** Community health and safety issues may include dust, noise, and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labor.	The World Bank/IFC EHS Guidelines, 2007, defines community health and safety in terms that guarantee as-built infrastructure conforms to acceptable standards (structural safety, flood and fire risk), water supply sources are of suitable potable quality, emergency response planning is in place for built environments, traffic safety provisions are enforced alongside transport hazard assessment and mitigation, and disease prevention measures are taken.	Implementation of HSE Plan Use of PPEs Community concerns record Medical reports of worker	CC	Proponent

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8.9 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring provides timely and useful information to the project management and implementation agencies. Conceptually, “monitoring” means to check and balance, on a regular basis, the status of the project activities and realization of various developmental targets during implementation phase. It helps in timely identification/analysis and removal of the bottlenecks and expedites actions. Certain parameters (physical, ecological and social) are selected and quantitative analysis is 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. The objectives of environmental and social monitoring plan during the construction phase will be as follows:

- Monitor the actual project impacts on physical, ecological and socio-economic receptors;
- Recommend mitigation measures for any unforeseen impact or where the impact level exceeds the anticipated level in the EIA;
- Ensure compliance with legal and community obligations including safety during construction phase;
- Ensure the safe disposal of excess construction materials, solid waste, water, wastewater and gaseous emissions;
- Appraise the adequacy of the EIA with respect to the project's predicted long-term impacts on the area's physical, ecological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements in EMP, if required; and
- Compile periodic incidents/accidents data to support analyses that will help to minimize future risks.

8.9.1 Monitoring Mechanism

Safeguard monitoring is an essential tool for assessing whether the adopted environmental and social management measures are meeting their stated objectives. Two, complementary methodology shall be applied to monitor the proposed actions under the EMP:

- Compliance monitoring: To check the compliance of actions proposed by the EMP by visual observation, photographic documentation and the use of checklists etc.; and
- Effects monitoring: To monitor the consequences of program/activities on the biophysical and social environment; as applicable, the effects are repeatedly measured by applying selected indicators.

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Monitoring will be carried out to ensure that the mitigation plans are regularly and effectively implemented. It will be performed at three levels. RUDA will ensure EMP monitoring regularly to ensure that the mitigation plans are being effectively implemented. Monitoring and Evaluation Consultant will monitor regularly the mitigation plans are being effectively implemented. At contractor's level, the environmental monitoring checklist will be filled on daily basis by their environmental manager.

8.9.2 Monitoring Strategy

Under the proposed monitoring strategy, it is recommended that Contractor should be responsible for all the instrumental Environmental Monitoring activities. All the findings and results in the form of monitoring report will be finally shared with the Employer and the employer will share it with EPD Punjab. The monitoring program has been designed carefully considering the identified impacts and some additions or deletions probably in

frequency may be taken up. **Table 8.2** provides environmental monitoring schedule for construction stage of the proposed package.

Table 88-2: Environmental Monitoring Plan

Sr. #	Parameter	Location	Monitoring Mechanism/Parameters	Frequency
A.	**DESIGN/PRE-CONSTRUCTION PHASE**			
1.	Land acquisition	Project Area	Confirm that all acquisition has been completed and compensation paid to affectees as per RAP	Monthly
2.	Tree cutting	Project Area	Comply with the Project Area tree plantation plan as and when required	Monthly
3.	Drinking Water	Water being used for drinking purposes by workers and nearby communities	Discrete grab sampling and laboratory testing of groundwater according to PEQS	Once (Two samples of drinking water from the workers' camp and other from nearby villages)
4.	Wastewater	Workers' camp	Effluent discharges from workers' camp to be tested for all 32 parameters mentioned in PEQS	Once
5.	Noise Levels	Active construction sites and workers' camp(s)	Noise level monitoring (Day and Night) according to PEQS	Once (Once prior to the start of construction)
6.	Ambient Air	Near project site, access roads and settlements	Visual checks and monitoring of SO2, NO, NO2, CO, Suspended Particulate Matter, PM10, PM2.5 according to PEQS	Once
B.	**CONSTRUCTION PHASE**			
1.	Drinking Water	Water being used for drinking purposes by workers and nearby communities	Discrete grab sampling and laboratory testing of groundwater according to PEQS	Quarterly (Two samples of drinking water from the workers' camp and other from nearby villages)
2.	Wastewater	Workers' camp	Effluent discharges from workers' camp to be tested for all 32 parameters mentioned in PEQS	Quarterly

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Sr. #	Parameter	Location	Monitoring Mechanism/Parameters	Frequency
3.	Noise Levels	Active construction sites and workers' camp(s)	Noise level monitoring (Day and Night) according to PEQS	Weekly (Once prior to the start of construction and then weekly throughout the construction period)
4.	Ambient Air	Near project site, access roads and settlements	Visual checks and monitoring of SO_2, NO, NO_2, CO, Suspended Particulate Matter, PM_{10}, $PM_{2.5}$ according to PEQS	Quarterly
5.	Solid Waste	Workers' camps and active construction sites	Visual Checks for assessment of condition of waste generation, segregation, storage, collection and disposal.	Fortnightly
6.	Health and Safety	Workers' camps, batching plant, and active construction sites	All HSE related activities to be monitored including Tool Box Talks, safety signage, PPEs, first aid boxes, dispensary, medical check-ups, etc.	Daily
7.	Communicable Diseases	Labor camp / project colony	Medical check-ups and routine safety check-ups of the communicable diseases and accidents	Quarterly
8.	Ecological aspects	At and around project site or in the whole Study Area	Illegal hunting of fauna / avifauna	Weekly
9.	Environmental Audit	Whole Project Area	Auditor's checklists & performs	Annually

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8.10 PLANNING FOR EMP IMPLEMENTATION

8.10.1 NOC and Other Approvals

The EIA report duly reconciled with RUDA is to be submitted to EPD Punjab for obtaining NOC. A demand draft of required EIA review fee has to be deposited along with the report by the Proponent to EPD Punjab for initiating the review and EIA approval process. The approval from EPD Punjab is the mandatory requirement before commencement of the proposed Project activities.

8.10.2 Stakeholder Coordination

Notwithstanding the efforts so far put in for public participation, this activity will have to be pursued through the forthcoming implementation phases of the Project. In particular, the focus will be on the improvement and modification of the proposed intervention designs.

Participation mechanisms facilitate the consultative process and include information sharing and dissemination, disclosure, and participation of affected people and other stakeholders in the proposed Project related activities. In the peculiar social set-up of the Project Area, it is also important to involve the religious leaders as representatives of the public as well as part of effective communication process. They can provide a very effective medium to bring information to the affected male population through Friday prayers. Local business community, especially the affected one, should also be brought into the process of awareness and participation.

The related institutional arrangements should also be in place for continuous consultation throughout the process of planning and implementation. During construction, RUDA will have to implement the EMP.

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8.11 OCCUPATIONAL HEALTH AND SAFETY PROVISIONS FOR CONTRACTORS

8.11.1 Contractor OHS Policy

Contractor OHS policy shall be intended to: help prevent accidents, illnesses and injuries; increase safety awareness; meet requirements of environmental, occupational health, and safety local and international laws and regulations; reduce institutional liability; and establish safety responsibilities for staff/workers at the project site and local community. Contractor OHS policy outlines safety responsibilities and training requirements to ensure individual and institutional compliance with relevant environmental health and safety laws, regulations, policies, and guidelines.

It shall be the Contractor(s) policy to perform work in the safest practicable manner, consistent with good local and international best practice. The Occupational health and safety of the staff, workers and all those likely to be affected by the pre-construction, construction and operations activities is the responsibility of the Contractor(s); in addition to, adequate resources shall be made available to ensure the success of this policy. It shall be the duty of the Contractor(s) to provide safe systems of work and do everything practicable to prevent injuries, property damage, loss of life and ill health by controlling the risks arising out of construction activities. Equally it shall be the duty of each worker/staff to exercise personal responsibility for his or her own safety and that of others and co-operate with his or her worker/staff in matters of health, safety.

It shall be the Contractor(s) policy to adhere completely to the local/applicable legal requirements.

8.11.2 Contractor OHS Criteria

The Contractor OHS Criteria shall comply with the following sections:

Environment

- Contractor shall have implemented EMP described in main EIA report of proposed Project through an effective Environmental Management System. If a system is not in place, a commitment to comply with the standard in the future is required; and
- Contractor shall monitor amount and type of discharges according to requirements, such as accidental discharges and planned and permitted discharges (PEQS).

Health

- Contractor shall ensure access to an Occupational Health Service for follow up of sick leave, occupational illness/injury and other focus areas within occupational health and working environment; and
- Contractor shall present periodic checks of basic medical such as hearing, eyesight etc. on all staff working under controlled environmental conditions.

Emergency Preparedness

Contractor shall ensure duty numbers to contact Persons are available at any time by means of a phone answering service in case of an emergency.

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8.11.3 Personal Protective Equipment

PPEs are equipment worn to minimize exposure to a variety of hazards which cannot be avoided due to engineering measure (residual impact). It includes gloves, foot and eye protection, protective hearing devices (earplugs, muffs) hard hats, respirators, full body suits etc. Contractor shall be responsible to provide PPEs to working staff and ensure its use. Contractor shall adhere to Client's OHS requirements related to "Personal Protective Equipment (PPEs)" in respect of personal protective equipment. Contractor shall, at its own expense, provide Personnel for duty staff with all necessary protective clothing and equipment suitable for working conditions. List of PPEs has been provided in the **Table 8-3**.

Table 88-3: Personal Protective Equipment

Sr. No	Type of Protection	Workplace Hazard	Suggested PPEs
1	Over All, Exterior garments	Entanglement, chemical spill safeguard etc.	Long pants, shirt with sleeves (no tank tops or shorts)
2	High Visibility Vests	Accidental hazard etc.	A reflective vest will be worn outside of any other garments
3	Foot protection	Falling or rolling objects, pointed objects. Corrosive or hot liquids	Safety toed footwear / boots/ shoes

Sr. No	Type of Protection	Workplace Hazard	Suggested PPEs
4	Eye and Face Protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation	Safety Glasses, Spectacles and Goggles. Spectacles with side shield. Prescription Lenses. Sun Glasses. Special Helmets or shields/ Face shields.
5	Head Protection	Falling objects, inadequate height clearance, and overhead power cords.	Hard hats with top and side impact protection. Hard hats shall be worn with the brim pointed forward.
6	Hearing protection	Noise, ultra-sound	Earplugs, muffs
7	Hand Protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperature	Gloves (Plastic, leather, fireproof and rubber)
8	Breathing Protection	Dusts, fogs, fumes, mists, gases, smokes, vapors	Facemasks
9	Toxic Gases Protection	Health and ailment etc,	SCBA (if applicable)
10	Falling Hazard Protection	Injury and death etc,	Safety Belt/Chains, Locks

Source: General IFC- Environmental, Health, and Safety (EHS) Guidelines

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8.11.4 Work Permit Provisions

Importance of work permit system in any construction projects cannot be neglected. A work permit is a written form used to authorize jobs that expose workers to serious hazards. Permits only allow authorized personnel to perform those serious hazard activities at specified times and in a way set out in the permit and referenced documents. It identifies the work to be done, the hazards involved, and the necessary preparation and precautions for the job. A permit to work might be required for activities such as:

- Electrical works;
- Hot works;
- Excavation;
- Lone working;
- Lifting operations;
- Work in confined spaces;
- Work to high risk spaces such as laboratories, or industrial plant;
- Work at height;

- Work to roofs;
- Temporary works;
- Work with asbestos;
- Demolition; and
- Work to high pressure systems.

8.12 CAPACITY BUILDING/STRENGHTENING

The environmental and social trainings will help to ensure that the requirements of the EMP are clearly understood and followed by all project personnel. The primary responsibility of providing these trainings to all project personnel will be that of the contractor and RUDA. The trainings will be provided to different professional groups separately such as managers, skilled personnel, unskilled labors, and camp staff. Capacity building will be aimed at strengthening the operational staff in the field of environmental management and social development. The contractor will be required to provide environmental and social trainings to its staff, to ensure effective implementation of the EMP. The training plan shall include a program for periodic training, to cover the subjects included in **Table 8.4**. Training should be carried out initially at induction of staff and repeated throughout the project.

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Table 8-4 : Training Subjects for Inclusion in Contractors Training Plan

Training Activity	Participants	Type of Training	Content	Scheduling
Awareness workshop regarding Covid-19 and other vector borne diseases	Contractor Staff	Presentation	Risk, Prevention and available treatment	Biannually
Pollution prevention practices	Contractor Staff	Lecture	Awareness and importance of Practices to be adopted for pollution preventions	Biannually
Sensitivity to local culture	Contractor Staff	Lecture	Awareness of local culture and practices	Biannually
Awareness on vector borne diseases	Contractor Staff	Presentation	Risk, Prevention and available treatment	Biannually
Driver safety	Contractor Staff	Lecture	Risks, safe practices and responding to accidents	Biannually
Waste Management	Contractor Staff	Lecture	Awareness associated with waste Storage, collection and safe disposal	Biannually
Emergency Response	Contractor Staff	Workshop	Potential natural and other hazard / emergencies and dealing	Biannually

Training Activity	Participants	Type of Training	Content	Scheduling
			with emergency to minimize damage	
Ecological Conservation	Contractor Staff	Lecture	Awareness on regulations wild life and forest and penalties against violation of laws. Importance of protection of endangered species	Biannually
EPD Regulation	Managerial Staff of Contractor	Lecture	Awareness on EPD rules, guidelines, regulation and standards for satisfactory compliance	Biannually

8.13 COMMUNICATION AND DOCUMENTATION

8.13.1 Data Recording and Maintenance

All forms to be used for recording information during the environmental monitoring will follow a standard format which will correspond to the data base in to which all the gathered information will be placed. Check boxes will be used as much as possible to facilitate data entry. Tracking system will be developed for each form. Moreover, a database will also be prepared. The database may include the following information:

- Training programs;
- Staff deployment;
- Non-compliances;
- Corrective actions
- List of environmental and social data to be maintained:
  - Soil and land pollution;
  - Disposal of waste;
  - Water resources ;
  - Fuel oil and chemical spills;
  - Vegetation record;
  - Noise pollution;
  - Air and dust pollution;
  - Socio-economic data; and
  - Ecological sensitivities.

8.13.2 Meetings and Reporting

Monthly meetings will be held at site during the construction phase. The purpose of these meetings will be to discuss the routine activities, non-compliances and their remedial measures.

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The Contractor will prepare monthly reports covering various aspects of the EMP implementation including compliance and effects monitoring, capacity building, and grievance redressal during project implementation. MEC will prepare quarterly, biannual and annual reports during construction period. List of reports to be prepared during implementation stages are presented in **Table 8.5.**

Table 8-5: Reporting during Implementation Stages

Report	Contents	Prepared by	Distribution
Monthly Progress Report for EMP Compliance	Non-Compliances observed on sites and actions required	Contractor	RUDA, SC, MEC,
Quarterly Progress Report for EMP Compliance	Quarterly review on implementation of EMP including compliance and monitoring, capacity building, and grievance redressal	CC, SC	RUDA, MEC, EPD Punjab
Annual Report for EMP Compliance	Results of effects monitoring Independent review of environmental and social performance on site Recommended actions required by all parties	SC	RUDA, MEC, EPD Punjab

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8.13.3 Complaint Management

The Contractor will maintain a register of complaints record from local communities and measures taken to mitigate these concerns.

8.14 ENVIRONMENTAL, SOCIAL, HEALTH AND SAFETY MANAGEMENT PLANS

8.14.1 Site Specific Environmental and Social Management Plans

Contractor shall prepare Site-Specific Environmental Management Plan (SSEMP). As a part of this plan, mitigation and management subplans shall also be prepared on the basis of the detailed impact assessment and recommended measures. These subplans shall be project-specific and shall be prepared by contractor prior to the commencement of construction activities. These plans will be reviewed and approved by RUDA. A brief description of each of these subplans is provided below:

Erosion and Drainage Control Plan will be prepared by the contractor on the basis of the mitigation measures given in EMP. The Plan will be submitted to RUDA for review and approval before contractor mobilization.

Pollution Prevention Plan will be prepared and implemented by the Contractor on the basis of WBG EHS Guidelines (2007), as well as the mitigation plans given in EMP. The Plan will be submitted to the RUDA for review and approval before contractor mobilization.

Waste Disposal and Effluent Management Plan will be prepared and implemented by the Contractor on the basis of WBG EHS Guidelines (2007), as well as the mitigation plans given in EMP. The Plan will be submitted to the RUDA for review and approval before contractor mobilization.

Traffic Management Plan will be prepared by the Contractor on the basis of the mitigation plans given in EMP, after discussion with RUDA and authorities responsible for roads and traffic. The Plan will be submitted to the RUDA for their review and approval before contractor mobilization.

Borrow Area Management and Restoration Plan for management and restoration of borrow areas will be prepared by the Contractor on the basis of requirements described in the mitigation plans. This Plan will aim at minimizing the environmental and social impacts during borrowing activities and restoring as much as possible the original natural situation of these sites by various measures (refill, leveling or smoothening). Restoration methodologies will be included in the Plan. The Plan will be approved by the RUDA.

Drinking Water Supply and Sanitation Plan: Separate water supply and sanitation provisions will be needed for the temporary facilities, labor camps and workshops, in order not to cause shortages and/or contamination. The Plan will be submitted to the RUDA for review and approval before contractor mobilization.

Construction Camp Management Plan will be prepared by the Contractor on the basis of the mitigation plans given in EMP. The Plan will include the camp layout, details of various facilities including supplies, storage, and disposal. The Plan will be submitted to the RUDA for review and approval before camp establishment.

Fuel and Hazardous Substances Management Plan will be prepared by the Contractor on the basis of mitigation plans given in EMP and in accordance with the standard operating procedures, relevant guidelines, and where applicable, material safety data sheets. The Plan will include the procedures for handling oils and chemical spills. The Plan will be submitted to the RUDA for review and approval before contractor mobilization.

Emergency Preparedness Plan will be prepared by the Contractor after assessing potential risks and hazards that could be encountered during construction of road. The Plan will be submitted to the RUDA for review and approval before contractor mobilization.

Communication Plan will be prepared by the contractor to demonstrate how they will communicate with local community leaders, provide details regarding employment opportunities, and traffic management throughout the construction period. The contractor's communication plan should define a process for receiving, recording and responding to

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complaints and also monitoring of the success of any responsive action taken to prevent the escalation of any conflicts.

Camp Site Restoration and Rehabilitation Plan will be prepared by the contractor. The main areas to be considered for site restoration & rehabilitation include the construction area, campsite area, temporary tracks; land used for vehicles, material stores etc. These areas should be restored to their original condition with the maximum possible effort. The restoration work comprises the removal of temporary construction works and removal of any fences installed and levelling of the area (wherever required) etc. The following procedures will be adopted for the restoration of the project site and nearby sites:

- All temporary construction built for the site development will be removed;
- Site for construction camps will be restored to its original (pre-construction) condition as much as possible;
- All the toxic and hazardous chemicals/materials will be completely removed from the site. Efforts will be made to completely remove the oils and chemical spills which occurred during the construction stage;
- Any debris from the construction site will be removed properly from the site and disposed of in an environmentally friendly manner; and
- All fencing and gates will be removed and pits will be backfilled; and
- Whole of the site will be covered with the original soil and plantation will be done, wherever required.

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To achieve the above objectives, the Contractor will prepare a Camp Site Restoration & Rehabilitation Plan well before the completion of the construction activities and submit to RUDA through the SC for approval. Finally, after the completion of the restoration process, RUDA through the representatives of the community members will inspect the site and give restoration clearance to the Contractor.

Spoil Disposal Areas Management and Restoration Plan will be prepared by the Contractor. The Plan will describe the procedures for spoil management, transportation and disposal at the selected site(s). The Plan will also describe the procedures for systematically disposing the spoil at the disposal site. This Plan would aim at minimizing the environmental and social impacts during disposal activities and restoring as much as possible the original natural situation of these sites by various measures (landscaping, leveling or smoothening). The Plan will include measures to avoid land/soil erosion and landslides. Restoration methodologies will be included in the Plan. The Plan would be approved by the SC and a landscape architect assigned by RUDA.

8.15 CHANGE MANAGEMENT PLAN

The present EMP has been carried out on the basis of the Project information available at this stage. It is however possible that the changes are made in some components of the project during the design and construction phases. In order to address the environmental and social implications of these changes, a simple framework has been devised, which is

described in this section. The change management framework recognizes the three broad categories (A, B & C) of the changes in the Project as detailed below:

8.15.1 Category 'A' Change

The 'Category A' change is one that will lead to a significant departure from the project described in the EMP and consequently requires a reassessment of the environmental and socioeconomic impacts associated with the change. In such an instance, Client will be required to conduct a fresh EMP of the changed aspect of the Project design and send the updated report to the relevant agencies for approval.

8.15.2 Category 'B' Change

The category 'B' change is one that will entail project activities not significantly different from those described in the EIA, which may result in the project effects with overall magnitude to be similar to the assessment made in this report. In case of such changes, the EIA will be required to reassess the environmental and socio-economic impacts of the activity, specify additional mitigation measures, if necessary and report the changes to the relevant agencies.

8.15.3 Category 'C' Change

A Category-C change is one that is of little consequence to the EMP findings such as change in alignment. This type of change does not result in effects beyond those already assessed in the EMP; rather it may be made onsite to minimize the impact of an activity, such as re-aligning a particular section to avoid cutting a tree or relocating construction campsites to minimize clearing vegetation. The only actions required for such changes are informing all the key personnel and document the change.

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8.16 TREE PLANTATION PLAN

The basic purpose of afforestation/plantation of suitable species in the project area is to reduce the risk been made due to cutting of trees for the proposed project and to enhance green cover and improve the overall environment of the area. Afforestation will not only reduce the risk been made but will also increase the carrying capacity of the area regarding many positive aspects.

Plantation will be done after the removal of trees during the construction work immediately. Plantation of indigenous trees species is highly important to maintain the biodiversity and ecological balance. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. The afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability. It is estimated that around 2,524 trees will be cut due to the implementation of the proposed Package. Total Number of 25,240 trees shall be provided as an environmental enhancement measure.

Note: *The rates and calculations shall be made according to the standard rates of concerned Forest Departments/Implementing Agency, during implantation stage.*

8.17 CHANCE FIND PROCEDURE

The purpose of these guidelines is to address the possibility of archaeological deposits, finds and features becoming exposed during earth removing and ground altering activities to provide procedures to follow in the event of a chance archaeological find. The guidelines for chance find procedure of archaeological deposits is provided in the EIA Report.

8.18 CODES OF PRACTICES

Contractor will follow the following Environmental Codes of Practices during the implementation of the proposed package.

8.18.1 Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor shall • Develop waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to SC for approval. • Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Prohibit burning of solid waste • Collect and transport non-hazardous wastes to all the approved disposal sites. Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary • Storage of all wastes before transportation and final disposal.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Collect chemical wastes drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from water courses. • Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills

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8.18.2 Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these	The Contractor shall • Prepare spill control procedures and submit the plan for SC approval. • Train the relevant construction personnel in handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses; and also under a rainwater

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	goods may harm the environment or health of construction workers.	shed (to prevent contact with rainwater). • Refueling shall occur only within bunded areas. • Make available MSDS for chemicals and dangerous goods on- site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPD Punjab or sold to EPD Punjab registered vendors. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored and personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill. • Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials. • Return the gas cylinders to the supplier. However, if they are not empty prior to their return, they must be labeled with the name of the material they contained or contain, information on the supplier, cylinder serial

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		number, pressure, their last • Hydrostatic test date, and any additional identification marking that may be considered necessary.

8.18.3 Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous Material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor shall • Follow the management guidelines proposed in ECPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables
Discharge from construction sites	Waste waters from construction sites and work camps. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area including infiltration and storage of storm water.	The Contractor shall • Minimize the amount of exposed soil at any one time (only clear vegetation immediately before construction is about to begin) • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site • Divert runoff from undisturbed areas around the construction site • Stockpile materials away from drainage lines • Prevent all solid entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting and transport to an approved waste disposal site or recycling depot • Collect, transport and discharge the septic tank waste from the construction camps in the nearby municipal waste water treatment plants

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This shall be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Ensure that sealed roads used by construction vehicles are swept regularly to remove sediment. • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds)

8.18.4 Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall • Prepare a program for prevent/avoid standing waters, which SC will verify in advance and confirm during implementation • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line • Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there • Rehabilitate road drainage structures immediately if damaged by contractors' road transports. • Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to the relevant standards provided by PEQS, before it being discharged into the recipient water bodies.

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Ensure the internal roads/hard surfaces in the construction yards/construction camps that generate has storm water drainage to accommodate high runoff during downpour and that there is no stagnant water in the area at the end of the downpour. • Construct wide drains instead of deep drains to avoid sand deposition in the drains that require frequent cleaning. • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion • Protect natural slopes of drainage channels to ensure adequate storm water drains. • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem. • Reduce infiltration of contaminated drainage through storm water management design
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially near the waste storage areas and construction camps • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position

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8.18.5 Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of Hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall • Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2 • Construct appropriate spill contaminant facilities for all fuel storage areas • Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals • Train personnel and implement safe work

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		practices for minimizing the risk of spillage • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site • Remediate the contaminated land using the most appropriate • available method to achieve required commercial/industrial guideline validation results
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds

8.18.6 Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities and material stockpiles	The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying.	The Contractor shall • Locate stockpiles away from drainage lines • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds • Remove debris from drainage paths and sediment control structures • Cover the loose sediments and water them if required • Divert natural runoff around construction areas prior to any site disturbance • Install protective measures on site prior to construction, for example, sediment traps • Observe the performance of drainage structures and erosion controls during rain and modify as required.

8.18.7 Top Soil Management

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Earthworks will impact the fertile top soils that are enriched with nutrients required for plant growth or agricultural development.	The Contractor shall • Strip the top soil to a depth of 15 cm and store in stock piles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and similar others. • The stockpiles will be done in slopes of 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil. • Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. • Construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil. • Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites • Prior to the re-spreading of topsoil, the ground surface will be ripped to assist the bunding of the soil layers, water penetration and revegetation
Transport	Vehicular movement outside right of way of existing roads or temporary access roads will affect the soil fertility of the agricultural lands	• Limit equipment and vehicular movements to within the approved construction zone • Construct temporary access tracks to cross concentrated water flow lines at right angles • Plan construction access to make use, if possible, of the final road alignment • Use vehicle-cleaning devices, for example, ramps or wash down areas

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8.18.8 Topography and Landscaping

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Construction activities especially earthworks will change topography and disturb the natural rainwater/flood water drainage as well as will change the local landscape.	The Contractor shall • Ensure the topography of the final surface of all raised lands (construction yards, approach roads, access roads, etc.) are conducive to enhance natural draining of rainwater/flood water; • Keep the final or finished surface of all the

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		raised lands free from any kind of depression that insists water logging • Undertake mitigation measures for erosion control/prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that will change the shape of topography. • Cover immediately the uncovered open surface that has no use of construction activities with grass-cover and tree plantation to prevent soil erosion and bring improved landscaping

8.18.9 Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor shall • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel efficient manner • Cover haul vehicles carrying dusty materials moving outside the construction site • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions • Control the movement of construction traffic • Water construction materials prior to loading and transport • Service all vehicles regularly to minimize emissions • Limit the idling time of vehicles not more than 2 minutes
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Focus special attention on containing the emissions from generators • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites • Service all equipment regularly to minimize emissions • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	• Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted • Minimize the extent and period of exposure of the bare surfaces • Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations • Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems

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8.18.10 Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling • operations for the purpose of minimizing construction noise on the work site
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents • Use the quietest available plant and equipment • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment • Avoid the unnecessary use of alarms, horns and sirens
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours (6 pm to 7 am) if the construction works are being carried out near residential areas • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions • Employ best available work practices on-site to minimize occupational noise levels • Install temporary noise control barriers where appropriate

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Notify affected people if major noisy activities will be undertaken, • e.g. pile driving • Plan activities on site and deliveries to and from site to minimize impact • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night (6pm to 7 am) near the residential areas

8.18.11 Protection of Flora

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora are important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human-living. As such damage to flora has wide range of adverse environmental impacts.	The Contractor shall • Reduce disturbance to surrounding vegetation • Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation. • Get approval from supervision consultant for clearance of vegetation. • Make selective and careful pruning of trees where possible to reduce need of tree removal. • Control noxious weeds by disposing of at designated dump site or burn on site. • Clear only the vegetation that needs to be cleared in accordance with the plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill and construction of diversion roads, etc. • Before excavation, mark the trees that must remain on the site and cannot be removed. • Do not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		encourages re-growth and protection from weeds. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. • Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. • Ensure excavation works occur progressively and re-vegetation done at the earliest • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction • Supply appropriate fuel in the work caps to prevent fuel wood collection

8.18.12 Protection of Fauna

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding of animals	The Contractor shall • Restrict the tree removal to the minimum required. • Retain tree hollows on site, or relocate hollows, where appropriate • Leave dead trees where possible as habitat for fauna • Identify the trees that require specific attention (e.g the hollow bearing trees) and fell them in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Construction	Illegal poaching	• Provide adequate knowledge to the workers

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
camps		regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.

8.18.13 Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor shall • Prepare and submit a traffic management plan to the SC for their approval before commencement of construction. • Include in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs/ lights, and road signs. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistan Traffic Regulations. • Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in local language: o Location: chainage and village name o Duration of construction period o Period of proposed detour / alternative route o Suggested detour route map o Name and contact address/telephone number of the concerned personnel o Name and contact address / telephone number of the Contractor o Inconvenience is sincerely regretted.
Construction vehicular traffic	Accidents and spillage of fuels and chemicals	• Restrict truck deliveries, where practicable, to day time working hours (7 am to 6 pm). • Restrict the transport of oversize loads. • Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		traffic disruptions. • Enforce on-site speed limit

8.18.14 Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall • Locate the construction camps within the proposed site • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Submit to the SC for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor shall provide the following facilities in the campsites • Housing facilities for all the non-local workers hired by the contractor • Safe and reliable water supply. • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by wall or by location. The minimum number of

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. Both sides of roads are to be provided with shallow v drains to drain off storm water to a silt retention pond which shall be sized to provide a minimum of 20 minutes retention of storm water flow from the whole site. Channel all discharge from the silt retention pond to natural drainage via a grassed swale at least 20 meters in length with suitable longitudinal gradient. • Paved internal roads. Ensure with grass/vegetation coverage to be made of the use of top soil that there is no dust generation from the loose/exposed sandy surface. Pave the internal roads of at least haring-bond bricks to suppress dusts and to work against possible muddy surface during monsoon. • Provide child crèches for women working construction site. The crèche shall have facilities for dormitory, kitchen, indoor and outdoor play area. Schools shall be attached to these crèches so that children are not deprived of education whose mothers are construction workers • Provide in-house community/common entertainment facilities. dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor shall • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Dispose organic wastes in a designated safe

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. One may dig a large hole to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition of wastes. Cover the bed of the pit with impervious layer of materials (clayey or thin concrete) to protect groundwater from contamination. • Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor shall • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including COVID 19, heat stroke, malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.	The Contractor shall • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		from outside areas • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work • Provide COVID 19, heat stroke and HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis • Complement educational interventions with easy access to condoms at campsites as well as voluntary counseling and testing • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during monsoon. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices
Safety	In adequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor shall • Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry in to the camp area. • Maintain register to keep a track on a head count of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps. • Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.
Site	Restoration of the construction	The Contractor shall

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Restoration	camps to original condition requires demolition of construction camps.	• Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed • Give prior notice to the laborers before demolishing their camps/units • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner. • Not make false promises to the laborers for future employment in O&M of the project.

8.18.15 Socio-Cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near residential areas	Disturbance from construction activities (dust, noise, traffic, conflicts with contractor's work force etc.)	The Contractor shall • Establish a system for receiving complaints from the community and address them (the community can also make complaints to the GRM established under the project) • Shall ensure all the construction workers follows the following code of conduct: • All workers are strictly forbidden to establish any kind of relationship with local women bring any un-related women to the project site. • All workers should avoid sexual harassment and child abuse. • All workers must not leave the camps or

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		work sites unless a written authorization is issued by the respective supervisor • The contractors will advise and prohibit the local population and its authorities or representatives not to enter the project operation areas (camp sites, colonies, etc.) in order to minimize the potential risk of incidents related to the operations.
Construction activities near Religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor shall • Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. • Do not block access to cultural and religious sites, wherever possible • Restrict all construction activities within the foot prints of the construction sites. • Stop construction works that produce noise (particularly during prayer time) shall there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the SC/RUDA. • Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people • Allow the workers to participate in praying during construction time • Resolve cultural issues in consultation with local leaders and supervision consultants • Establish a mechanism that allows local people to raise grievances arising from the construction process.

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

8.18.16 Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc), (ii) risk factors resulting from human behavior (e.g. COVID 19, heat stroke, STD, HIV etc) and (iii) road accidents from construction traffic.	The Contractor shall • Implement suitable safety standards for all workers and site visitors which shall not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the Government of Pakistan (• Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, • Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job • Appoint an environment, health and safety manager to look after the health and safety of the workers • Inform the local authorities responsible for health, religious and security duly informed

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters
Best practices	Child and pregnant labor	The Contractor shall • not hire children of less than 16 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the national Labor Laws
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures. • Provide awareness to the construction drivers to strictly follow the driving rules • Provide adequate lighting in the construction area and along the roads
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECP 14 Construction Camp Management • Adequate ventilation facilities • Safe and reliable water supply • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECP 2

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Solid waste collection and disposal system in accordance with ECP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 - 3 m height. • Sick bay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	The contractor shall provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities shall be at least 6 m away from storm drain system and surface waters. These portable toilets shall be cleaned once a day and all the sewerage shall be pumped from the collection tank once a day and shall be brought to the common septic tank for further treatment. Contractor shall provide bottled drinking water facilities to the construction workers at all the construction sites.
Other ECPs	Potential risks on health and hygiene of construction workers and general public	The Contractor shall follow the following ECPs to reduce health risks to the construction workers and nearby community ECP 2: Fuels and Hazardous Goods Management ECP 4: Drainage Management ECP 9: Air Quality Management ECP 10: Noise and Vibration Management ECP 13: Road Transport and Road Traffic Management
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor shall • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria, Dengue, heat stroke, COVID-19 and transmission of sexually transmitted infections (STI) HIV/AIDS. • Train all construction workers in general health and safety matters, and on the specific hazards of their work. Training shall consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Commence the malaria, Dengue heat stroke, COVID-19, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to

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Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		condoms in the area as well as to voluntary counseling and testing. • Implement malaria, COVID-19, heat stroke, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This shall be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

8.19 AUDITS AND ANNUAL REVIEW OF EMP

Internal environmental and social audits will be held with an objective to review the effectiveness of environmental management of the project. RUDA will carry out annual review of the appropriateness and adequacy of EMP in the light of its own monitoring and supervision as well as on the basis of the third party monitoring and audits. RUDA will revise the EMP in case substantial gaps and shortcomings are identified in these plans.

External third party environmental audits will be held with an objective to review the effectiveness of environmental and social management of the project independently. It is proposed that third party carry out these audits on yearly basis. These audits would be used to re-examine the continued appropriateness of the EMP and to provide advice on any updates required.

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8.20 NON-COMPLIANCE OF EMP

The implementation of the proposed EMP involves inputs from various functionaries. The Contractor will be primarily responsible for ensuring implementation of the mitigation measures proposed in the EIA including EMP and Environmental Permit from EPD Punjab, 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 the Contractor will be paid on the basis of monthly compliance reports. However, if the Contractor fails to comply with the implementation of EIA including EMP and Environmental Permit from EPD Punjab and submission of the monthly compliance reports, deductions will be made from the payments to the Contractor claimed under the heads of environmental components.

8.21 BUDGET FOR IMPLEMENTATION OF EMP

8.21.1 Cost for Testing of Ambient Air, Noise, Water

Testing and analysis for soil, ambient air, noise, water and wastewater shall be undertaken during pre-construction and construction to ensure the effectiveness of the proposed mitigation measures. Certain environmental parameters shall be selected and quantitative analysis shall be carried out. The results of analysis must be compared with the guidelines; standards and pre-project conditions to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not. Parameters to be analyzed during pre-construction and construction of the project and responsibilities for monitoring and reporting have been discussed in the **Table 8.6.**

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Table 8-6: Environmental Monitoring and Testing Cost Estimate

Sr. No.	Parameter	Mechanism	Frequency	Quantity	Remarks
A	**Pre- Construction Phase**				
1	Water / Wastewater	Discrete grab sampling and laboratory testing of water/wastewater samples by EPD approved Laboratory for monitoring.	Once from each source	08 (04 drinking water and 04 wastewater)	One-time monitoring shall be carried out before the construction commencement.
2	Noise Levels	dBA Leq. as per PEQS by EPD approved Laboratory	Once	04	
3	Ambient Air Monitoring	Monitoring of CO, SOx, NO_x, and $PM_{2.5}$ PM_{10} by EPD approved Laboratory	Once	04	
B	**Construction Phase**				
1	Water / Wastewater	Discrete grab sampling and laboratory testing of water/wastewater samples by EPD approved Laboratory for monitoring.	Quarterly from each source	03 (01 drinking water and 01 wastewater and 1 surface water)	The Contractor shall quote quarterly monitoring cost for the one-year construction period and will be updated each year based on latest rates during construction timeline of the proposed Project.
2	Noise Levels	dBA Leq. as per PEQS by EPD approved Laboratory	Quarterly	02	
3	Ambient Air Monitoring	Monitoring of CO, SOx, NO_x, and $PM_{2.5}$ PM_{10} by EPD approved Laboratory	Quarterly	02	

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