

APPENDIX-P

Environmental and Social Management and Monitoring Plan

SAMAWA COMBINED CYCLE GAS TURBINE POWER PLANT PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)



SEPTEMBER 2018
ANKARA



SAMAWA COMBINED CYCLE GAS TURBINE POWER PLANT PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

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1 INTRODUCTION

An “Environmental and Social Management and Monitoring Plan (ESMMP)” has been prepared for construction and operational phases of the Project in order to present the organizational requirements, actions and monitoring programme that should be implemented by the EPC Contractor and the Project Owner in order to;

- Avoid negative impacts;
- Minimize residual impacts to levels which are acceptable in terms of environment, health, safety (EHS) and society, in case negative impacts are unavoidable, and;
- Operate in compliance with the national legislation as well as IFC/WB Group Performance Standards.
- ESMP presents the measures for environmental and social impacts of the Project, which are developed based upon the information gathered regarding the baseline conditions of the Project site and the impact assessments that were described in the main text of the ESIA report. The Commitments Register, which includes the measures for environmental and social impacts of the Project, is given in Appendix-O. Additionally, discussions with stakeholders, EPC Contractor and the Project Owner were taken into consideration while defining these measures.

The scope of the ESMMP covers the construction and operation phases of the Project which have positive or negative potential impacts on the environment and the communities.

The ESMMP includes the development and implementation of a number of management plans for different phases of the Project. It is the responsibility of the Project Owner, EPC Contractor and the nominated Sub-Contractor to implement these plans. The Project Owner, EPC Contractor and the nominated Sub-Contractor will provide the required organizational capacity for the implementation of the plans.

It is essential to ensure the outcomes of the impact assessment of the Project are put in place throughout the entire life of the Project and their effectiveness is monitored.

2 SUPPORTING MANAGEMENT PLANS

2.1 Environmental Supporting Management Plans

2.1.1 Environmental Management Plan

Environmental Management Plan (EMP) assigns specific responsibilities for environmental impact control, compliance and emergency response during engineering and construction of the Samawa Combined Cycle Power Plant Project. The purpose of this Environmental management plan is:

- Clearly define the division of responsibility for environmental compliance for all involved parties and assign tasks to personnel.

- Provide the necessary procedures for impact assessment, communication, monitoring, documentation, and review of environmental compliance activities during construction activities.
- Definition of environmental risks in scope of the project.
- Procedures of environmental risk assessments.
- Definition of risky area, hazardous work activities, hazardous items and facilities.
- Developing methods to prevent or minimize all defined environmental risks in scope of the project.

This plan applies to all Construction activities in Samawa Combine Cycle Power Plant Project. All Office, Construction and pre-commissioning personnel engaged in project activities shall adhere to this plan and associated procedures until all construction is concluded and the plant is formally handed over to the Project Owner.

The HSE Plan describes the following activities that are to be implemented and adhered to by all parties involved with the Project:

- Strategies to be used for implementation of health and safety systems;
- Complying requirements with ISO 14001, OHSAS 18001, OWNER HSE requirements;
- Complying requirements with Iraqi Legislations;
- Management systems required to measure and audit safety performance and objectives;
- Accountabilities and responsibilities for each employment category to ensure effective safety management;
- Guidelines for the development of project safe working procedures and systems.

2.1.2 Health and Safety Management Plan

A Health, Safety and Environmental (HSE) plan has been developed for the Samawa Combined Cycle Power Plant Project.

The plan is supported and linked with specifications, guidelines, standard reference material and various other project developed project specific lower tier plans, procedures, guidelines, Job Hazard Analysis, safe work instructions, risk assessments and forms that are referenced throughout this document shall collectively provide the benchmark and correct working practices for the management of the Health, Safety, Environmental risks associated with Engineering, Procurement, Construction, Pre-Commissioning and Commissioning phases undertaken during execution of the Project.

Project Execution Team will strive to meet and exceed the Project's expectations by providing a proactive, dedicated management structure and leadership in all aspects of HSE Management.

This HSE Plan has been written to:

- The purpose of the Project HSE Plan is to provide a system and strategy that enables Health, Safety and Environmental Policies and business objectives to be achieved by

successfully performing the Project work in compliance with the Project's requirements and the legal requirements of the country where the Project is located.

- Provide instruction and guidance to the Project team, including subcontractors, on the development and implementation of project specific HSE requirements.
- Identify and incorporate safety considerations as related to design, construction, pre-commissioning and commissioning.
- Identify coordination and collaboration arrangements of the design and execution phases of the Project.
- Inform MoE in advance of the Health and Safety requirements that will be strictly enforced on the Project.
- Inform the Project Parties, of the content of the Project's Health and Safety program.
- Establish a framework for the implementation and sequencing of safety and health initiatives across the various phases of Installation, construction and pre-commissioning activities.
- Establish roles and responsibilities associated with Health, Safety and Environment oversight and management oversight and management.

The HSE Committee will monitor and track the HSE performance for each site activities to evaluate implementation and effectiveness of the HSE Management System. The performance indicators are to be routinely reported, visibly reviewed and acted upon by HSE Team. Some of the proactive Key Performance Indicators (KPI) to be considered is presented in Section 4-5.

2.1.3 Hazard Management Process

The Hazard Management Process describes the requirements for the development, review, approval, and revision of project procedures. The process document has been prepared to describe the general methodologies to be used by the ENKA and its subcontractors while analysing hazards, and assessing and managing associated risks arising from the activities performed by ENKA.

2.1.4 Waste Management Procedure

The Waste Management Plan has been developed to provide guidance for the ENKA Project management and staffs during engineering and construction of the Project. The purpose of this program is assure that all waste generated at the Project is properly managed and disposed of.

This includes;

- Identification of the source of all waste streams and assignment of a responsible person to manage this waste stream.
- An ongoing evaluation of all waste streams to determine their proper characterization as; hazardous waste, non-hazardous waste, universal waste, medical waste, recyclable waste or special waste.

- Co-ordinate the requirements of the various “sections” of the program so that requirements common to one or more, such as training, storage & waste disposal effectively.
- Define all roles and responsibilities.
- Identify methods of waste collection, waste transfer and waste disposal.
- Define the plans for recording, monitoring and reporting of waste stream.

2.1.5 Spill and Prevention and Response Plan

The Plan outlines specific preventive measures and practices to reduce the likelihood of an accidental release of a hazardous or regulated liquid and to expedite response and cleanup of any release that may occur during construction activities of the Project.

The Plan provides restrictions and procedures for fuel storage location, fueling activities, and construction equipment maintenance along the construction area. Training and lines of communication to facilitate the prevention, response, containment, and cleanup of spills during construction activities are also outlined. The goals of this plan are to minimize the potential for a spill, to contain any spillage to the smallest area possible, and to protect areas that are considered environmentally sensitive (e.g., streams, groundwater wells, wetlands, etc.).

2.1.6 Noise Control Procedure

The purpose of this procedure is to outline the hazards associated with noise and the preventative measures to be taken to reduce risk to health.

The scope of this procedure covers all areas where the work is being carried out and includes consideration for adjacent populated areas in the Project.

The following table 2-1 shows the acceptable noise levels for employee exposure.

Table 2-1 Acceptable Noise Levels

Hours duration per day	Sound level (dBA)*
8	90
4	95
2	100
1	105
½	110
¼ or less	115

*No exposure to continuous or intermittent noise in excess of 115 dBA is permitted.

2.1.7 Heavy Haul Operations Procedure

The purpose of this Procedure is to define the responsibilities, requirements & precautionary studies for heavy haul operations of Gas Turbine, Generator and Auxiliary Units.

2.2 Social Supporting Management Plans

2.2.1 Disciplinary Action Procedure

This standard is provided to uniformly apply disciplinary action for safety violations throughout the Samawa Combined Cycle Power Project.

The requirements in this process document apply to all ENKA personnel, ENKA's subcontractors and activities performed during execution of the Project. activities covered do not only include engineering, procurement, and construction operations, but also temporary facilities, workshops and other support services/facilities, which will be monitored for compliance throughout the Project.

Locations covered by the scope of this procedure include all sites and accommodation utilized by ENKA and ENKA's subcontractors in Samawa Combined Cycle Power Project.

2.2.2 Preliminary Security Plan

MoE will be responsible for guarding the site fence and gates MoE will provide;

- An armed uniformed and guard force commanded by a Guard Commander or Supervisor who is to provide external security to the Project site, first access control and protection of the Project assets for the duration of the project work.
- External hardware protection to all accesses of the site in such way to avoid any car truck to approach the entrance at speed other than external low,
- To assist the Contractors Security Managers in sites security surveys
- Supply authorization letter to Contractors Security company in order to allow personnel to be armed in the execution of their duties while operation in and for the project sites
- Sponsor and application of visas for such company
- Assistance in all project relates security incidents and evacuation processes
- Continues occupation and security of the project sites when not occupies by contractor project schedule is halted.

The Contractor shall be utilize the fence of the plant and apply all necessary precautions to safeguard the health and safety of all employees and material and equipment from all construction and construction relates activities inside the fence.

The purpose of the security plan is threefold to;

- present the security management strategy for the Project,
- describe in detail security arrangements in place for all phases of the Project;
- establish this plan as the primary framework and control mechanism for the management of the security risk on the Project.

2.2.3 Camp Management Procedure

The procedure outlines the standard requirements of ENKA's camp management process for the projects abroad. The main purpose of this procedure is to delineate the general requirements applicable to administration and maintenance of temporary camp facilities.

The scope of this procedure is mainly covering the vital and social needs of the residents and visitors they should be provided by the camp management throughout their accommodation in the camp. Satisfying these needs are crucial to achieve employee expectations as outlined in the Quality statements.

2.2.4 Recruitment Procedure

This procedure presents uniform practice on Recruitment of expatriates personal carried out at the Project. The general principles specified in this procedure in relation to good personnel practice should be followed at all times.

2.2.5 Subcontract Administration – Monitoring and Reporting Procedure

The purpose of the procedure is to achieve efficient administration and management of subcontracts while setting out the monitoring and reporting requirements. The Subcontract Administration which is covering the monitoring & reporting processes regarding subcontracted works are under the scope of this procedure. The procedure is applicable to all Projects under the administrative control of ENKA.

2.2.6 Occupational Health Plan

The purpose of the Plan is to provide a procedure to ensure an effective Occupational Health Plan is implemented on the Project. The content and frequency of the fitness to work assessment is based on the health risks associated with the work and living environment, and risk factors in the population and individuals. ENKA Project Manager will ensure that an effective Occupational Health Plan is implemented for its personnel & subcontractor's personnel to assure they are fit to work. The procedure also includes all respective local, regional and international requirements necessary for an adequate fitness to work coverage.

2.2.7 Hygiene and Food Safety Procedure

The purpose of the Procedure is to be met for ensuring hygiene and food safety on the Project. The methods given in this directive are to be followed in food production/management activities on all ENKA projects.

The applications specified in this Procedure may show some differences depending on the rules and regulations, legal environments of countries involved, as well as the procedures, instructions and demands of the Clients of ENKA.

2.2.8 Health Management Plan

The purpose of this Plan is to provide a procedure to ensure an effective Occupational Health Plan is implemented on the Project. The content and frequency of the fitness to work assessment is based on the health risks associated with the work and living

environment, and risk factors in the population and individuals. Project Manager will ensure that an effective Occupational Health Plan is implemented for its personnel & subcontractor's personnel to assure they are fit to work. This procedure also includes all respective local, regional and international requirements necessary for an adequate fitness to work coverage.

The requirements in this document apply to all ENKA personnel, ENKA's subcontractors and activities performed during execution of the Project. Activities covered do not only include construction operations, but also temporary facilities and other support services, which will be monitored for compliance throughout the Project.

Locations covered by the scope of this plan include all sites and accommodation utilized by ENKA and its subcontractors.

2.2.9 Fitness to Work Procedure

The purpose of this procedure is to ensure an effective fitness to work process is implemented on the Project.

The content and frequency of the fitness to work assessment is based on the health risks associated with the work and living environment, and risk factors in the population and individuals.

ENKA Project Manager will ensure that an effective fitness to work process is implemented for its personnel & subcontractor's personnel to assure they are fit to work.

This procedure also includes all respective local, regional and international requirements necessary for an adequate fitness to work coverage.

The requirements in this process document apply to all ENKA personnel, ENKA's subcontractors and activities performed during execution of the Project. Activities covered do not only include construction operations, but also temporary facilities and other support services. Locations covered by the scope of this plan include all sites and accommodation utilized by ENKA and ENKA's subcontractors.

2.2.10 First Aid Procedure

The requirements in this process apply to all ENKA personnel, ENKA's subcontractors and activities performed during execution of the Project. Locations covered by the scope of this plan include all sites and accommodation utilized by ENKA and ENKA's subcontractors.

All nominated first aiders/personnel are to follow the requirements set out in this procedure.

- First aid provides the initial and immediate attention to a person suffering from an injury or illness to reduce stress and anxiety of injured person and possibly reducing the severity of the injury or illness.
- It is essential all personnel have ready access to first aid and plans are in place for responses to injuries.

- Qualified first aiders are identified through the site entry induction process. If insufficient qualified first aid.
- First Aiders should be identified (where appropriate) on telephone lists, in the Emergency Plan, by signage and on their person via their nametag.
- First Aid must be contactable at all times.
- An approved, appropriately sized, stocked first aid kit must be available for use at all times by mobile teams, at site sites and in emergency operation centers.

3 ENVIRONMENTAL and SOCIAL MANAGEMENT and MONITORING

Monitoring will be conducted for the Project activities to confirm effectiveness of management and mitigation measures within the ESMMP to ensure compliance with Project standards (national legislation and IFC/WB performance standards).

Periodical monitoring will be conducted during the life of the Project to confirm the effectiveness of the management plans. A reporting mechanism for the monitoring results is essential and will ensure the review of the Project seniors and lenders. The ESMP Audit Reports shall cover the status of EHS-related aspects such as permits, status of compliance with obligations arising from licenses or permits, non-compliance with regulatory environmental standards with root cause analysis, corrective measures, as well as conformance with the ESMMP. The Audits must address the performance of both the Project Owner and the EPC Contractor or Subcontractors.

A management and monitoring plan has been prepared for the construction and operation phases of the Project in Table 3-1 and Table 3-1. This plan includes the parameters, measurement/sampling locations, monitoring frequency, cost and responsibilities for implementation.

Table 3-1 Environmental and Social Management Plan

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
Construction Phase							
Air Quality	Operation of heavy machinery and transport vehicles	Exhaust emissions	Environmental Management Plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Air Quality	Overall construction activities	Dust emissions	Environmental Management Plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Noise	Overall construction activities	Increase in ambient noise levels	Noise Control Procedure is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Surface Water Quality	Wastewater Discharges	Impact on surface water quality due to discharge of untreated wastewater	Water Management Plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Soil and Groundwater Quality	Fuelling of heavy machinery and transport vehicles	Soil and groundwater contamination through spills and leakage	Hazard Management Process is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
Soil and Groundwater Quality	Storage, handling and disposal of solid waste	Soil and groundwater contamination due to improper handling of wastes	Waste Management Plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Soil and Groundwater Quality	Storage, handling and disposal of hazardous waste	Soil and groundwater contamination from spills or leaks of hazardous wastes	Hazard Management Process is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Biological Environment	Land clearance	Habitat loss	Security management plan is in place Traffic safety rules have been implementing in the scope of HSE plan	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Biological Environment	Construction activities	Noise disturbance	Security management plan is in place Traffic safety rules have been implementing in the scope of HSE plan	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Biological Environment	Construction activities	Increased exposure to atmospheric pollutants	Security management plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Biological Environment	Construction activities	Introduction of alien or invasive species	Traffic safety rules have been implementing in the scope of HSE plan	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Biological Environment	Protected fish species	Wastewater discharge	Waste water management Plan is in place	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Traffic	Transportation of construction equipment to Project site	Disturbance to existing road users through increased traffic	Traffic safety rules have been implementing in the scope of HSE plan	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Land Use	Lands used by locals close to Project activities	Damage on crops or lands near the Project site or along the	Stakeholder engagement Plan is in place	EPC Contractor Project Owner	Site Management team and Project Management Team	Monthly Reporting to MoE on land use based	EPC Contractor Cost

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
	and access roads.	transportation road.			of MoE	grievances	
Local Employment	Employment of Iraqi nationals during construction phase	Providing employment opportunities to the locals will cause decline in the high unemployment rate of the Aol.	Recruitment policy is in place	EPC Contractor Project Owner	Human Resources of the Project Sub-contractor Project Management Team of MoE	Monthly Site Report to the MoE	EPC Contractor Cost
Labour and Working Conditions	Employment of multinational groups	Conflict between multinational groups of workers	Recruitment policy is in place	EPC subcontractor MoE	Site Management team and Project Management Team of MoE	Monthly Report to the MoE	EPC Contractor Cost
Labour Influx	Employment of international workers for the Project	Disturbance of social cohesion	Alcohol and Drug Policy is in place Disciplinary Action Procedure is in place	EPC subcontractor MoE	Site Management team and Project Management Team of MoE	Monthly Report to the MoE	EPC Contractor Cost
Labour Influx	Use of infrastructure for Project activities	Weight on the current electricity deficit	Recruitment policy is in place	EPC subcontractor MoE	Site Management team and Project Management Team of MoE	Monthly Report to the MoE	EPC Contractor Cost
Local Procurement	Goods and services received from the locals	Indirect job opportunities Contribution to the locals businesses	Local procurement plan will be developed.	EPC subcontractor	Site Management Team and the Project Owner	Monthly outcomes of the procurement plan will be presented to MoE	
Occupational Health and Safety	Construction activities	Health and safety of workforce	Occupational Health Plan and HSE Plans are in place	EPC Contractor	Site Management team and Project Management Team of MoE	Weekly reporting to the MoE	EPC Contractor Cost
Occupational Health and Safety	Labour and working conditions	<ul style="list-style-type: none"> • Working conditions • Terms of employment • Child/ forced labour 	Occupational Health Plan and HSE Plans are in place.	EPC Contractor	Site Management team and Project Management Team of MoE	Weekly reporting to the MoE	EPC Contractor Cost
Occupational Health and Safety	Monitoring and review of accidents/	Accident/incident risks due to construction activities,	Occupational Health Plan and HSE Plans are in place	EPC Contractor	Site Management team and Project Management Team	Weekly reporting to the MoE	EPC Contractor Cost

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
	incidents due to construction activities	Workers' health and safety			of MoE		
Community Health and Safety	Construction activities, transportation of construction material	Disturbance to local communities and potential safety hazard due to increased traffic.	Security Plan is In place	EPC Contractor	Site Management team and Project Management Team of MoE	Weekly reporting to the MoE	EPC Contractor Cost
Cultural Heritage	Construction activities	Damage to cultural resources	Chance Find Procedure will be prepared	EPC Contractor	Site Management team and Project Management Team of MoE	Monthly reporting to the MoE	EPC Contractor Cost
Operation Phase							
Air quality	Stack emissions	Impact on ambient air quality	-Necessary measures and procedures will be developed prior to operation phase of the Project.	EPC Contractor/MoE	Site Management team and Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/landers as required.	EPC Contractor Cost /Operation and Maintenance cost
Greenhouse Gases	GHG emissions from plant operation	Contribution to global warming	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/landers as required.	Operation and Maintenance cost
Noise	Operation of the Power Plant	Increase in ambient noise levels	-Necessary measures and procedures will be developed prior to operation phase of the Project.	EPC Contractor/MoE	Site Management team and Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/landers as required.	EPC Contractor Cost /Operation and Maintenance cost
Surface Water Quality	Wastewater Discharges	Impacts on surface water due to wastewater discharges during operation	-Necessary measures and procedures will be developed prior to operation phase of the Project.	EPC Contractor/MoE	Site Management team and Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory	EPC Contractor Cost /Operation and

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
						authorities/lenders as required.	Maintenance cost
Surface Water Quality	Water intake	Impact on water quality of Euphrates River due to water intake	-Necessary measures and procedures will be developed prior to operation phase of the Project.	EPC Contractor/MoE	Site Management team and Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	EPC Contractor Cost /Operation and Maintenance cost
Soil and Groundwater Quality	Accidental Spills and Leaks	Impacts to soil and groundwater due to contamination from accidental releases of hazardous substances such as fuels, oils or lubricants, as well as improper chemical/fuel storage.	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management	Operation and Maintenance cost
Soil and Groundwater Quality	Storage, handling and disposal of solid waste	Wastes will be collected and stored separately according to their types.	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Soil and Groundwater Quality	Storage, handling and disposal of hazardous waste	Soil and groundwater contamination from spills or leaks of hazardous wastes	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Biological Environment	Operation activities	Noise disturbance	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
Biological Environment	Operation activities	Electrocution and collision risks	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Biological Environment	Protected fish species	Wastewater discharge	-Necessary measures and procedures will be developed prior to operation phase of the Project.	EPC Contractor/MoE	Site Management team and Designated Team for Operation of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	EPC Contractor Cost /Operation and Maintenance cost
Local Employment	Employment of locals	Decline in the high unemployment rate of the Aol.	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Human Resources of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Labour and Working Conditions	Labour and working conditions of Project employees	Working conditions Terms of employment	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Human Resources of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Occupational Health and Safety	Operation activities	Health and safety of workforce Labour and working conditions	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Project Management Team of MoE	Monthly internal reports to senior management and reporting to regulatory authorities/lenders as required.	Operation and Maintenance cost
Community Health and Safety	Plant operations	Disturbance to local communities	-Necessary measures and procedures will be developed prior to operation phase of the Project.	MoE	Project Management Team of MoE	Monthly internal reports to senior management and reporting to regulatory	Operation and Maintenance cost

Environmental Issue/Impact	Impact Source	Potential Impacts	Reference Document Status	Responsibility for Mitigation Implementation	Responsibility for Supervision of Mitigation Implementation	Reporting Requirements	Mitigation Cost Source
						authorities/lenders as required.	

Table 3-2 Monitoring Programme

Project Phase	Potential Impact	Parameters to be Monitored	Location	Monitoring	Frequency	Responsibility	Cost		
Construction Phase									
General	Inspection of mitigation compliance	General compliance with mitigation measures presented in the ESMP	Project activity areas	Visual inspection to ensure the effectiveness of the mitigation measures	Daily	EHS Team of EPC Contractor	EPC Cost	Contractor	
Air Quality	Increase in ambient dust emission levels	PM ₁₀ concentration	At the nearest receptor (Al Sadah Village)	PM ₁₀ measurements	Upon complaint	3 rd party measurement company	EPC Cost	Contractor	
Noise	Increase in ambient noise levels	Noise levels in Leq day and Leq night	At the noise sensitive receptors (at Al Sadah and Auejah Villages)	Noise measurements for 24 hours	Upon complaint	3 rd party measurement company	EPC Cost	Contractor	
Soil	Contamination of soil	Heavy metals, TPH, TOX	At the spill area	Soil analysis	In the event of leakage or spill of hazardous substances or fuel/oil	3 rd party measurement company	EPC Cost	Contractor	
Surface water	Contamination of surface water	Temperature, color, pH, TSS, DO, BOD, COD, Total dissolved solids, CN ⁻ , F ⁻ , Cl ₂ , Cl ⁻ , phenol, SO ₂ ⁻⁴ , NO ₃ ⁻ , PO ₄ ⁻³ , NH ₄ ⁺ , DDT, heavy metals, oil & grease, total hydrocarbons, S ⁻² , Ammonia, Sulphur Dioxide, Petroleum Alcohol, Calcium Carbonate, TNT (mg/l), Br ₂	At downstream and upstream of Euphrates River	Surface water analysis	Quarterly	3 rd party measurement company	EPC Cost	Contractor	

Project Phase	Potential Impact	Parameters to be Monitored	Location	Monitoring	Frequency	Responsibility	Cost
	Surface water quality	Flowrate, temperature, pH	At treated wastewater discharge point	Discharge water and analysis measurement	Continuous	EPC Contractor	EPC Contractor Cost
Groundwater	Contamination of groundwater	EC, ammonium, arsenic, mercury, cadmium, chloride, lead, nitrite, sulfate, tetrachloroethane, total phosphorous, trichloroethane	Existing two wells within the plant area	Groundwater analysis	Quarterly	EPC Contractor	EPC Contractor Cost
Biological Environment	Wastewater discharge	<i>Capoeta barroisi</i> and <i>Carasobarbus kosswigi</i>	Wastewater discharge point	Population of <i>Capoeta barroisi</i> and <i>Carasobarbus kosswigi</i>	Every spring during season construction	3 rd party company	EPC Contractor Cost
Occupational Health and Safety	Accidents or incidents due to construction activities	Near-misses, incidents, occupational diseases	Project activity areas	According to Health and Safety Plan developed for the construction phase of the Project	According to Health and Safety Plan	EHS Team of EPC Contractor	EPC Contractor Cost
Community Health and Safety	Community disturbance and potential safety hazard due to road traffic	Accidents, incidents and complaints	Access road to the Project site Location of the associated facilities	Accident, complaint records	On occurrence	EHS and/or Community Liaison Officer of EPC Contractor	EPC Contractor Cost
	Public concerns	Complaints from local communities	Close settlements around the Project activity areas	In line with grievance mechanism developed for the Project	Continuously	Project Company	EPC Contractor Cost

Project Phase	Potential Impact	Parameters to be Monitored	Location	Monitoring	Frequency	Responsibility	Cost
Cultural heritage	Damage to cultural heritage	Cultural heritage assets	Excavation areas	Visual checks	Continuously during excavation	EPC Contractor	EPC Contractor
Operation Phase							
General	Inspection of mitigation compliance	General compliance with mitigation measures presented in the ESMP	Project activity areas	Visual inspection to ensure the effectiveness of the mitigation measures	Daily	EHS Team	Operation and Maintenance Cost
Air emissions	Stack emissions	NO _x , SO ₂ , PM ₁₀ , O ₂ , CO and moisture content	Plant stacks	Through Continuous Emissions Monitoring Systems (CEMS)	Continuously	EHS Team	Operation and Maintenance Cost
Air emissions	Ambient air quality	NO _x , SO ₂ and, PM ₁₀	Baseline measurement locations	Ambient air measurements	Quarterly	3 rd party measurement company	Operation and Maintenance Cost
GHG emissions	Climate change	GHG emissions	-	GHG emissions inventory	Annual	EHS Team	Operation and Maintenance Cost
Noise	Increase in ambient noise levels	Noise levels in Leq day and Leq night	At the noise sensitive receptors (at Al Sadah and Auejah Villages)	Noise measurements	At the start of operation	3 rd party measurement company	Operation and Maintenance Cost
Surface Water	Contamination of surface water	Temperature, color, pH, TSS, DO, BOD, COD, Total dissolved solids, CN ⁻ , F ⁻ , Cl ₂ , Cl ⁻ , phenol, SO ₂ ⁻⁴ , NO ₃ ⁻ , PO ₄ ⁻³ , NH ₄ ⁺ , DDT, heavy metals, oil & grease, total hydrocarbons, S ⁻² , Ammonia, Sulphur Dioxide, Petroleum Alcohol, Calcium Carbonate, TNT (mg/l),	At downstream and upstream of Euphrates River	Surface water analysis	Quarterly	3 rd party measurement company	Operation and Maintenance Cost

Project Phase	Potential Impact	Parameters to be Monitored	Location	Monitoring	Frequency	Responsibility	Cost
		Br ₂					
	Surface water quality	Flowrate, temperature, pH	At treated wastewater discharge point	Discharge water analysis and measurement	Continuous	3 rd party measurement company	Operation and Maintenance Cost
Biological Environment	Wastewater discharge	<i>Capoeta barroisi</i> and <i>Carasobarbus kosswigi</i>	Wastewater discharge point	Population of <i>Capoeta barroisi</i> and <i>Carasobarbus kosswigi</i>	Every spring season for three years	3 rd party company	Operation and Maintenance Cost
Soil	Contamination of soil	Heavy metals, TPH, TOX	At the spill area	Soil analysis	In the event of leakage or spill of hazardous substances or fuel/oil	3 rd party measurement company	Operation and Maintenance Cost
Groundwater	Contamination of groundwater	EC, ammonium, arsenic, mercury, cadmium, chloride, lead, nitrite, sulphate, tetrachloroethane, total phosphorous, trichloroethane	Existing two wells within the plant area	Groundwater analysis	Quarterly	3 rd party measurement company	Operation and Maintenance Cost
Occupational Health and Safety	Workers' health and safety, Accidents or incidents due to operation activities	Near-misses, incidents, occupational diseases	Project activity areas	According to Health and Safety Plan developed for the operation phase of the Project	According to Health and Safety Plan	EHS Team	Operation and Maintenance Cost
Community Health and Safety	Community disturbance and potential safety hazard due to road traffic	Accidents, incidents and complaints	Access Road	Accident, complaint records	On occurrence	EHS and/or Community Liaison Officer of the Project Company	Operation and Maintenance Cost
	Public concerns	Complaints from local communities	Close settlements around the Project activity areas	In line with grievance mechanism developed for the Project	Continuously	EHS and/or Community Liaison Officer of the Project Company	Operation and Maintenance Cost

4 KEY PERFORMANCE INDICATORS

Table 4-1 below summarizes the key performance indicators and associated targets that will be used to assess the progress and effectiveness of proposed mitigation strategies.

Table 4-1 Key Performance Indicators

KPI	Target
Air Quality	
Air Quality Incidents	Minimization and continued improvement in the number of the reported air quality related incidents.
Non-Compliance with Air Quality Standards	Target: 0 per year
Community Complaints	Minimization and continued improvement in the number of air quality related community complaints.
Noise	
Noise and Vibration Incidents	Minimize and continued improvement in number of reported noise and vibration related incidents.
Non-Compliance with Project Standards	Target: 0 per year
Number of Noise-related Community Grievances	Target: 0 per year
Water	
Spill incident	Minimization and continued improvement in the number of the reported water quality related incidents.
Non-Compliance with Project Standards	Target: 0 per year
Number of Noise-related Community Grievances	Target: 0 per year
Soil	
Spill incident	Minimization and continued improvement in the number of the reported soil quality related incidents.
Non-Compliance with Project Standards	Target: 0 per year
Number of Noise-related Community Grievances	Target: 0 per year

Traffic	
Number of non-compliances against the mitigation controls identified in this Traffic Management Plan	Decreasing number/ continuous improvement in number of reported non-compliances
Number of drivers found to be exceeding speed limits or driving unsafely	Zero speed exceedance per year
Number of road traffic accidents involving: Accidental injuries and deaths, Spillages (such as cargo or fuel), Wildlife-vehicle collisions.	Zero road traffic accidents per year
Number of traffic-related grievances	Zero traffic-related grievances per year Any grievances to be resolved with timeframes specified in grievance procedure
Occupational Health and Safety	
% of workforce attending STARRT	>90
% of scheduled HSE Inspection	>90
% of attendance at HSE meetings	>90
% of closing of NCRs	100
Reporting safe observations	100%
Reporting unsafe observations	100%
Reporting near misses	100%
Investigating NMs/PSEs	>90
% of Toolbox attending	>90
% of Risk Assessment Compliance	>90
% of Legal Requirements Compliance	>90
Results of Scheduled Audits(exp. Corporate Audits)	>85
HSE Training carried out to training matrix > 90% of all training to matrix	>90
% of attendance at scheduled trainings	>90
Live Emergency Drills	1 drill / quarter

% of reuse-recycling materials	TBD
Days-Man hours w/o LTIs	Total Project
Individual managers and foreman proactive performance	>90
Subcontractor's proactive performance	>90
Labor and Working Conditions	
Number of worker grievances not closed out within the target timeframe	Zero worker grievances not closed out within the target timeframe set out within the procedure
Community Health and Safety	
Number of communicable and non-communicable diseases and injuries.	No significant increase in communicable and non-communicable disease and injury rates per 1,000 residents per annum.
Number of community health safety & security complaints from local communities as recorded in the grievance management system.	Minimize and continued improvement in number of community health safety and security related complaints.
Number of reported community health & safety incidents	Minimize and target zero per annum
Number of reported noise incidents	Minimize and continued improvement in number of reported noise related incidents.