REPUBLIC OF IRAQ

MINISTRY OF CONSTRUCTION, HOUSING, MUNICIPALITIES AND PUBLIC WORKS

ROADS AND BRIDGES DIRECTORATE

Emergency Operation Development Projects (EODP)
(P155732)

SITE SPECIFIC
Environmental and Social Impact Assessment
(Limited ESIA)

For the

Rehabilitation & Reconstruction
of
Al-Haronyah New & Old Bridges

21 September 2016

Revision History					
Version	**Revision Date**	**Description or Reason for Change**	**Discipline Review**	**Director Review**	**Approval**
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01	27/08/2016	First revision	Comments addressed partially		
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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AIM	Audit and Inspection Manager
ASD	Allowable Stress Design
BS	British Standard
EHS	Environmental Health and Safety
EODP	Emergency Operation for Development Project
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GIIP	Environmental and Social Management Plan
GOI	Government of Iraq
GRM	Grievance Redress Mechanism
IEODP	Iraqi Emergency Operation Development Project
MOCHPM	Ministry of Construction Housing and Public Municipalities
MOE	Ministry of Environment
MOST	Ministry of Science and Technology
MSDS	Material Safety Data Sheets
OP	Operational Policy
PAPs	Project Affected People
PMT	Project Management Team
PPE	Personal Protective Equipment
RBD	Road and Bridges Directorate
RE	Resident Engineer
TOR	Terms of Reference
WB	World Bank
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION

According to the Environmental and Social Management Framework (ESMF) which was prepared for the Emergency Operation for Development Project (EODP) and disclosed locally in Iraq and on the World Bank's InfoShop, a limited site specific Environmental and Social Impact Assessment (ESIA) should be prepared, cleared, publically consulted and disclosed prior to the commencement of any construction activities for the roads and bridges crossing permanent water courses. The Limited/Simplified ESIA study was carried out according to requirements of the current environmental regulations of the World Bank (WB) and Iraqi regulations.

This ESIA was developed to cover the activities associated with the rehabilitation and operation of **Al-Haronyah new and old bridges that are located on the Road that connects** Al-Moqdadya to Khanqeen city via Sadiyah City. It identifies key environmental and social impacts of the project activities during both the rehabilitation and the operational phases, and defines the necessary mitigation measures addressing potential negative impacts, as well as monitoring procedures during construction and operation. An Environmental and Social Management Plan (ESMP) is prepared and embedded in this Limited ESIA which should be followed and implemented by all relevant parties.

PROJECT DESCRIPTION

Introduction

The road that connects Moqdadya with Khanqeen, crosses Haronyah canal in different locations where bridges were constructed. The present limited ESIA tackle the rehabilitation of 2 adjacent bridges that cross Haronyah canal at 34° 1'4.69"N, 44°59'36.33"E hereafter called Al Haronyah Bridges.

Current Condition of the Bridges

Al Haronyah old and new Bridges were bombed by terrorist attacks. Currently, they are partially accessible to traffic through their non-damaged lanes on both bridges. After the bombing of the two bridges, the Roads and Bridges Directorate (RBD), with assistance from one of the State-owned companies specialized in the construction of bridges, closed the damaged lanes and removed the obstructing debris while allowing traffic (in both directions) to proceed on the remaining lanes of the bridges which were found safe for usage. While this was an urgent and immediately needed measure to reinstate the connectivity across Al Haronyah canal, the current situation is not sustainable not only due to the safety aspects but due to the heavy traffic crossing the canal on daily basis in both directions.

Purpose of the project

The purpose of the Project is the rehabilitation and reconstruction of **Al-Haronyah Bridges** to facilitate travel and commerce and access to essential service including health care and education and movement of agriculture products.

The Bridges are of a strategic significance used for transportation of goods and people from different areas around the bridges.

Following are the anticipated construction activities that are expected to take about 5 months:

Al Haronyah Old Bridge

- Removal and demolishment of damaged span.
- Replacement of 14 damaged post tension girders by steel girders and 28 rubber pads etc.)
- Casting the deck slab (0.20 m thick) and side walk.
- Repair of expansion joints for the whole bridge with all accessories.
- Treatment of partially damaged girders (crack injection).
- Installation of hand, guard rail and lighting poles, and operational lighting for bridge.
- Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders).

Al Haronyah New Bridge

- Removal and demolishment of damaged span.
- Replacement of 13 damaged post tension girders by steel girders and 22 rubber pads etc.)
- Casting the deck slab (0.20 m thick) and side walk.
- Repair of expansion joints for the whole bridge with all accessories.
- Treatment of partially damaged girders (crack injection).
- Installation of hand, guard rail and lighting poles, and operational lighting for bridge.
- Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders).

The construction equipment that will be used are mainly: 30 ton- crane, compressor, jack hammer, shovel, typical lorry with tipping, skipping, body to load of transport the demolished material, truck mixer, asphalt grinder, bitumen tanker, asphalt finisher, compactor, welding machine, diesel generator, grader, pickups and sedan cars, air shot, bell and bugger.

The construction site will include offices and accommodation for the workers that will be equipped with air conditioning and toilet. Potable water tanks will be provided and septic tanks will be constructed for disposal of human sewage. All these facilities will be installed

in state-owned land available around the bridge; therefore, there will be no need land acquisition. It is foreseen that most of the workers will be from the region, consequently the need for accommodation may not exist or will be very limited as most of the workers will reside at their homes.

BASELINE CONDITIONS

The Project Area

Al Haronyah Bridges are located in a semi-urban area. Within 300 m radius there are houses and farther, there are some farms of citrus and palm trees.

Environmental and Social Baseline conditions

The environmental baseline section is presented to give clear overview of the environmental and social conditions in the vicinity of the project location prior to commencement of works.

Climate

Diyala governorate climate is desert. The major rain falls from November thru February and totalizes yearly 203 mm on average. Highest temperatures occur in July and August and reach over 41 degrees centigrade. Monthly wind velocity record in recent years shown an average of 1.8 m/s.

Air Quality

There is no monitoring station close to the site. As Al-Haronyah Bridges are located in an open area, the expected concentration of pollutants is expected to be low, due to the good ventilation and dispersion of air pollutants.

Site Topography

The project is located in an open area that has some mountains, cliffs, and valleys.

Land use

There are houses in the vicinity of the Project and within 300 m radius. Farther, there are farms.

Seismic Activities

During the past years, some seismic activities were recorded in neighboring country Iran. However, there was no significant impact on human and infrastructures in the project area.

Floods

Al Haronyah canal is controlled upstream and therefore no floods are expected.

Traffic

Currently, the traffic is heavy but the congestion is moderate as both adjacent bridges can be used partially on the non-damaged lanes.

Noise

Except for the existing normal traffic, no other source of significant noise generation was identified in the area. The nearest sensitive receptors are the workers and contractor staff and the inhabitants. The nearest residential unit is at 50 m from the bridge

Heritage Environment

Further to site survey and consultation with the relevant authorities, there are no sites of historical or cultural importance in the area of the bridges and their surroundings. Therefore, the rehabilitation and operation of the bridges will not have any impact on archaeology or cultural heritage. No cemeteries, historical-cultural monuments, churches, mosques that exist in the area need to be removed in order to rehabilitate the bridges.

Flora & Fauna

Significant wild life and flora species were not observed in the Project area.

Land Acquisition

The bridges were built on a state-owned land. As the works consist of repair and rehabilitation of two existing bridges, there will be no need for expropriation. Furthermore, there are no livelihoods in the project vicinity that are likely to be adversely affected by the project, hence neither involuntary nor voluntarily relocation of people is necessary or expected.

Social Aspects

Although there are some houses and scattered shops in the proximity of the bridges, these were not constructed within the bridges area that is state owned land. Therefore, no land or property expropriation is necessary.

There aren't any licensed or unlicensed roadside vendors that will be displaced. The approaches areas on either side of the bridges are not settled on or utilized by any of the local population and yet no interference were registered from the local community which is eager for the works to be completed. It is worth mentioning that there isn't any agriculture activity initiated within the bridges area.

There is no interference registered from the local community which is eager for the works to be completed. It is also important to mention that most of the workers are from the local area and therefore, there is no need to have a big camp close to the project area and no influx of workers to the project area is expected which could result in adverse impact.

Since the repair and rehabilitation activities of the two bridges will not entail permanent nor temporary land acquisition and no impact is expected on the livelihood of the local people, therefore, OP 4.12 does not apply.

LEGAL REQUIREMENTS

In addition to the Iraqi laws and regulations, the limited ESIA follows the procedures of the WB, in particular OP/BP 4.01 covering the environmental assessment procedure, OP/BP 4.12 describing the involuntary resettlement, the Grievance Redress Mechanisms (GRM), and the WB Group Environmental Health and Safety (EHS).

ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS

Rehabilitation Phase

The environmental and social impacts that are likely to result from the construction and rehabilitation of Al-Haronyah Bridges, are summarized in the following table.

Table E1: Summary of Impact Assessment Matrix – During Construction / Rehabilitation

No.	Environmental Receptor	Impact Significance
1	Air Quality	Medium
2	Noise	Medium
3	Water Resources	Low
4	Soil	Low
5	Solid and hazardous wastes	Low
6	Flora & Fauna	Insignificant
7	Topography and landforms	Insignificant
8	Impacts on local traffic	Medium
9	Health and Safety	Medium
10	Socio-Economic impacts	Low
11	Land	Insignificant

Operational Phase

No significant negative environmental or social impacts are anticipated during the operation phase.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Mitigation measures, responsibilities and estimated associated costs

The Resident Engineer (RE) will be assisted by a team of environmental and social officers who will be responsible for supervising the daily activities of the contractor and will report non-compliances to the RE in order to take necessary actions towards the contractor. Regular supervision site visits will also be conducted by the Road and Bridges Directorate Project Management Team (RBD PMT), in particular the environmental/social officer in association with a qualified environmental and social consultant who will provide

technical advice in case there is a need to modify or add new mitigation measures as work necessitates.

The following tables summarize the mitigation measures which are required to be undertaken to avoid any negative impacts on the environment. Responsibilities and estimated costs are also presented.

Table E2: Mitigation Measures for Al Haronyah Bridges during Construction / Rehabilitation Phase

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
1	**Air quality**	- Open materials storage piles should be watered to increase of the moisture level thus reducing dust levels. - Inactive piles should be placed in enclosure or covered to reduce wind erosion. - Loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of vehicles moving inside and outside of the construction-site. - Signs and speed reduction bumps should be installed for vehicles approaching the site and near residential buildings and farmlands to reduce their speed below 40 km/hr. On site, speed should not exceed 20 km/hr.	Contractor	Resident engineer	3,000
		- Engines of vehicles and other machinery shall be kept turned on only if necessary, avoiding any unnecessary emission. - Machines and equipment should be periodically checked and maintained to ensure their good working condition. - All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications. - Activities should be carried out using the minimum required number of means at the same time. - Electric small-scale machines and technical tools shall be used when available and feasible.	Contractor	Resident engineer	Included in contractor cost
2	**Noise**	- Construction activities are to take place within reasonable hours during the day. - Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. - Equipment must be run only when necessary. - The noise sources should be placed in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site.	Contractor	Resident engineer	Included in contractor cost
		- Personal protection equipment for workers should be used of especially those who use jack hammers or work near noisy engines or compressors.	Contractor	Resident engineer	2,000

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
3	**Water resources**	- Damaged sections of the bridges should be carefully removed without polluting the water in the river. - In case of using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval. - No solid wastes are to be thrown into the river. - Paints or chemicals should be used away from the river. However, If non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water. - Material storage areas should be well isolated from storm water to prevent the contamination of the runoff - Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies	Contractor	Resident engineer	Included in contractor cost
		- Wastewater from the workers rest areas or construction offices should be contained in septic tank and should be removed regularly from site by means of authorized contractors and disposed in Wastewater Treatment Plant (WWTP) .	Contractor	Resident engineer	7,500
		- In case of the need to change engine oils or refuel some construction equipment, a proper maintenance workshop or shelter should be installed to ensure containment of any fuel or oil spills.	Contractor	Resident engineer	3,000
4	**Soil**	- Contractor to present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities. - Soil contamination by oil/grease spills, leakages or releases, all manipulations of oil derivatives in the process of construction are to be prevented. - Provision of the fuel to the machines should be performed with maximum care. - Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal. - Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills. - Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction. - Operation of equipment and vehicles outside the designated work areas and roads must be prohibited.	Contractor	Resident engineer	Included in contractor cost

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
		- No hazardous waste storage shall take place directly on soils. Appropriate and enclosed containers should be utilized and disposed of in designated locations in cooperation with MOST who in charge for hazard waste disposal.	Contractor	Resident engineer	1,000
5	**Solid and hazardous wastes**	- On site waste generation shall be minimized. - Simple waste management plan for specific waste streams must be developed. - General waste must be collected and transported to local council approved disposal sites. - Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors. - Waste containers must be located at each worksite. - Chemical wastes must be collected in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service. - Storage, transport and handling of all chemicals must be conducted in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority. - All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as "hazardous". - Transportation and disposal of hazardous wastes should be done through licensed contractors and in close coordination with the relevant local authority and in compliance with the legal requirements and instructions of the coordination with the as ministry of science and technology. - Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards. - A hazardous materials inventory for the construction period must be prepared. - Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers. - Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at approved locations.	Contractor	RE in coordination with the local authority and MOST regarding hazardous wastes	5,000
6	**Flora & Fauna**	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
7	**Topography & landforms**	Not Applicable	Not Applicable	Not Applicable	Not Applicable
8	**Traffic**	- Provide information, to the bridges users to use the bridges alternatively through appropriate signage. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic movement. - Where practicable, truck deliveries must be restricted to daytime working hours. - Dangerous goods must be transported along routes preferred for dangerous goods. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic.	Contractor in coordination with the Local Traffic Department	Resident Engineer	500
9	**Health & Safety**	- The speed of the construction vehicles should be limited. - Road signage for drivers and local community should be provided.	Contractor	Local traffic department & RE	1,000
		- Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues. - Personal protection equipment such as eyeglasses, gloves, hard heads, safety belts and slip-resistant safety footwear must be supplied and continuously used by all workers, technicians, engineers and site visitors.	Contractor	Resident engineer	2,500

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
		- The contractor should comply with international standards for good construction practices; - The contractor should adhere to local and international guidance and codes of practice on EHS management during construction; especially as concerns management, supervision, monitoring and record-keeping; - EHS procedures should be part of the conditions of contract with contractors and their sub-contractors; - There should be a clear definition of the EHS roles and responsibilities of the companies involved in construction and of individual staff (including the EHS supervisors during construction and an EHS coordinator during operation); - There should be a pre-construction assessment of the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices; - There should be a regular inspection, review and recording of EHS performance; - Present detailed H&S Manual to be implemented - Implement H&S measures as detailed in Chapter 5 in the ESIA. - Staff working at the sides of the bridges shall put on a safety harness and connect it, via an energy-absorbing lanyard, to a suitable anchor point. - A high standard of housekeeping shall be maintained at all times.	Contractor	Resident engineer	Included in contractor cost
		- Any accident shall be reported and treated within site as a first aid procedure. - Appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues should be provided - Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment - First aid items should be available all times onsite and trained staff on emergency aids should be identified.	Contractor	Resident engineer in coordination with health and safety officials.	2,500
10	**Handling Complaints**	- A complaints' register will be kept on site and this will feed into the GRM. Details of complaints received will be incorporated into the audits as part of the monitoring process.	Resident Engineer	RBD/PMT	Included in contractor cost
Total Cost (Rehabilitation phase)					**28,000**

Table E3: Mitigation Measures for Al Haronyah Bridges during Operation Phase

Receptor		Mitigation Measures during Operation Phase	Responsibility	Supervision	Total estimated Cost in US$
1	**Air quality**	- During the license issuance or renewal process of vehicles, traffic authorities to ensure that all vehicle engines are in good conditions.	Traffic Department	Traffic Department	No direct cost
2	**Noise**	- During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions. - Speed limits should be reduced especially near residential buildings. - Limit trucks movement especially at night in coordination with the local traffic authorities.	Traffic Department	Traffic Department	No direct cost
3	**Water Resources**	- Ensure that any clogged drains are regularly cleaned especially before and during the rainy season	Not applicable	Not applicable	Not applicable
4	**Soil**	- Not applicable	Not applicable	Not applicable	Not applicable
5	**Solid and hazardous wastes**	- During the operational period, some littering and waste generation resulting from the repair activities will occur. Littering may occur due to wind action.	Local Authority (Municipality)	Local Authority (Municipality)	Within municipal budget
6	**Traffic**	- Speed limits and road signs should be in place to prevent or minimize the road accidents.	Traffic Department	Traffic Department	No direct cost
		- The bridges must be provided with suitable post lighting at night to reduce the probability of road accidents.	RBD	RBD	Within RBD budget
7	**Flora & Fauna**	- Not Applicable	Not Applicable	Not Applicable	Not Applicable
8	**Topography and landforms**	- Not Applicable	Not Applicable	Not Applicable	Not Applicable
9	**Traffic**	- Improved traffic conditions	Local Traffic Department	Resident Engineer	No Cost

Receptor		Mitigation Measures during Operation Phase	Responsibility	Supervision	Total estimated Cost in US$
10	**Handling Complaints**	- The continued operation of a GRM for one year following opening of the bridge for use will ensure that local community members have an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.	RBD/PMT	Local authorities	No cost
Total Cost (Operation phase)					**No Cost**

ENVIRONMENTAL AND SOCIAL MONITORING PLAN

In order to ensure full compliance of the performed activities to the environmental and social requirements, regular monitoring should be performed. For this purpose, an environmental and social monitoring program has been established for the construction phase as shown in the following Table.

ESMP Institutional Arrangements

In order to ensure full compliance with the environmental and social requirements which are described above, RBD PMT nominated a qualified engineer to act as the focal point for environmental and social affairs at the central level. On the field level, RBD PMT nominated engineers to act as environmental and social officers. Those engineers will be trained on monitoring and reporting of environmental and social impacts and how to fill the checklist to be used during field visits before implementation starts.

RBD Resident Engineer will be the official responsible staff member for ensuring environmental and social compliance. S/He will be assisted by the designated environmental and social field officers.

In addition, a qualified consultant is recruited by the PMT to provide technical assistance and capacity building to the environmental and social team both at the central level and at the field level.

Table E4: Monitoring Activities for Al- Haronyah Bridges Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
1	**Air quality**	- Open material storage piles are to be inspected - Inspection of vehicles and equipment operating or entering the site - Investigate dust complaints from workers and residents - Signs and speed reduction bumps installed near the site and near residential buildings and farmlands - Engines of vehicles and other machinery periodically checked and maintained - Measurements of exhaust emissions (CO, SOx, NOx, PM10, PM2.5)	- Visual inspection - Visual inspection - Recorded and documented complaints - Visual inspection - Recoded status of equipment and vehicles on site (excessive black or white smoke) - Recoded status of equipment and vehicles on site	- Daily - Daily - Daily - Weekly - Monthly measurements - Monthly measurements -	Engineer	PMT	10,000

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
2	**Noise**	- Investigate noise complaints from workers and neighboring communities in the affected locations - Silencers checked and placement of noise sourced in concealed area - Use of personal protection equipment effective - Measure ambient noise near sensitive receptors (dBA)	- Recorded and documented complaints - Visual inspection - - Visual inspection - - Noise Measurements results included in site investigation report	- Weekly inspection of complaints - Weekly - Daily - In case of complaint	Engineer	PMT	5,000
3	**Water resources**	- Investigate implementation of mitigation measures and - Damaged immersed sections removed with care - Investigate wastewater disposal measures - Perform water quality test on water samples taken from the water course beneath the bridge (pH, TDS, TSS, BOD, COD) - Install litter bins and make sure no wastes are thrown in the river - Installation of a proper maintenance shelter for paints and chemicals and observe any oil or fuel spills.	Site Investigation report	- Daily Investigation - During execution of this task - -Weekly - -Monthly - -Weekly - Daily	Engineer	PMT	10,000
4	**Soil**	- Monitor the filling up machine with oil - Monitor the oil/grease containers and hazardous waste location and disposal - Monitor the disposal of waste and debris	Site Investigation report	- During execution of this task - Weekly - Daily	Engineer	PMT	No cost

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
		- Assure the origin of purchased soil is from an authorized quarry - Forbid the operation of machinery outside the designated area - Observe any soil contamination with oil or fuel - Observe any accumulation of wastes		- During execution of this task - Daily - Daily - Daily			
5	**Solid and hazardous wastes**	- Maintain records on waste types and quantities - Observe any waste accumulation in un approved locations - Check that MSDS for hazardous materials is available on-site and explained to workers.	- Waste management contracts with authorized contractors - Waste delivery receipts from local authorities. - Site Investigation report	- Weekly - Weekly - Weekly	Engineer	PMT	No cost
6	**Flora & Fauna**	- Record any observation about wild animals or plants on site or nearby and report to the Environmental Authority	Observation report	Upon occurrence	Engineer	PMT	No cost
7	**Topography and landforms**	- No monitoring required	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
8	**Traffic**	- Ensure speed limits and warning signs are installed and in place - Ensure dangerous goods are transported along selected routes	Road signs are installed.	- Weekly - Upon occurrence	Engineer	PMT	No cost
9	**Health and safety**	- Speed limit and directional signs installed	Accidents report	Weekly	Engineer	PMT	No cost

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
		- Personnel trained for health and safety issues - Ensure compliance of workers to Health and Safety requirements and responsibilities assigned - EHS performance; regularly inspected, reviewed and recorded - Monitor the good housekeeping - Maintain log on accidents - Firefighting and safety equipment regularly checked - First aid kit items regularly checked					
10	**Handling Complaints**	- Ensure that the GRM is effective and well communicated	Number of complaints received, analyzed and responded to.	Weekly	Engineer	PMT	No cost
Total cost (Operation phase)							**25,000**

An institutional framework and strategy for the involved official institutions were suggested in order to strengthen the capacity buildings in the field of the environmental monitoring and reporting procedures and methodologies. The suggested capacity development requirement is a consolidated training for all RBD/PMT environmental/social field supervisors to save on the training costs.

Table E5: Capacity development requirement for RBD

Capacity development topic		Provider(s)	Duration	Estimated Cost (US$)
1	Environmental and social Impact Assessment Environmental and social Management in Construction Sites	Consultant	3 Days	3,000
2	Iraqi Environmental Legal Requirements	Ministry of Environment	1 Day	2,000
3	World Bank Environmental and Social Safeguards	The World Bank	2 Days	10,000 (international travel and accommodation cost for RBD trainees)
Total Estimated Cost				**$15,000**

PUBLIC CONSULTATION RESULTS

Objectives of the Consultations

World Bank policies require that broad and open public consultations be held with the project affected peoples (PAPs) on the project. These consultations are to ensure that the PAPs are provided with the opportunity to engage in the rehabilitation planning process, to raise questions and receive input and responses to their concerns. However, due to the current security situation in the project area and taking into utmost consideration the safety of the people as public meetings may be targeted by terrorist, the public meeting approach was not achievable.

Consultation Process

In order to fulfil the WB requirements, a one on one interview was adopted to obtain sound information on the possible impacts on the local communities. Accordingly, a questionnaire was prepared in order to cover the key environmental and social aspects related to the project. The questionnaire was then addressed to vehicle-road users and to the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities.

In addition, the draft ESIA and its translated executive summary were published on the RBD's website to allow for feedback and wider dissemination of information related to the planned activities under this project. A translated summary of the ESIA will be disclosed at the project site for feedback and comments if any.

It was difficult to conduct the questionnaire with women due the fact that it is not easy to take the women's opinions freely due to the tribe's habits that exist in the area of the project.

Findings of the Consultations

It can be concluded from the interviews that the rehabilitation activities will have a strong positive impact from the social perspectives on the locals and a positive impact on their social daily life. None of the people recorded any reservation regarding the ownership of the land where the bridges are located. All the comments mentioned that the reconstruction of the bridges will enhance the social relationship among the locals, improving their transport. Finally, most people agreed that the bridges will need some additional safety signs and instructions in order to keep the movement on the bridges within safe conditions. Please refer to annex (3) for more details.

GRIEVANCE REDRESS MECHANISM (GRM)

Objectives of the GRM

Bank procedures require that Grievance Redress Mechanisms (GRMs) be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works for third party settlement of disputes arising from resettlement. This GRM should take into account the availability of judicial recourse as well as traditional and community dispute resolution mechanisms.

Accordingly, a GRM will be established at the project level to ensure any grievance can be addressed in an amicable manner. Resolving complaints at community level is always encouraged to address the problem that a person may during implementation and/or operational phase.

In any case, the PMT must maintain records of grievances and complaints, including minutes of discussions, recommendations and resolutions made.

Distribution of GRM Forms

During individual interviews, information about a grievance mechanism was introduced to interviewed individuals and a translated GRM form was also provided. All interviewed people were informed that they can submit their complaint to either site engineer, or to community leader or to PMT during construction. The community leaders' information (mobile phone number) and PMT contact information (office and mobile phone numbers) will be available before implementation starts. There will be signs posted at the entrance of the bridges (Refer to Annex 1 for more details).

CONCLUSION AND RECOMMENDATIONS

The EIA concludes that the proposed rehabilitation and reconstruction of Al-Haronyah Bridges will have an overall significant positive impact on the affected population. The implementation and the monitoring of the recommended mitigation measures especially during the construction phase will ensure that potential negative environmental impacts are addressed.

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1. INTRODUCTION

According to the Environmental and Social Management Framework (ESMF) which was prepared for the Emergency Operation for Development Project (EODP) and disclosed locally in Iraq and on the World Bank's InfoShop, a limited site specific and simplified Environmental and Social Impact Assessment (ESIA) should be prepared, cleared and publically consulted upon, prior to the commencement of any construction activities for the bridges crossing water ways such as rivers and lakes as part of the roads and bridges component.

The concept of the ESIA is to propose measures to protect the environmental, social and socio-economic situation of the communities that may be adversely affected by development of the project, and to assist the competent authorities in taking decisions regarding the approval conditions for the project. This ESIA was developed to cover the activities associated with the rehabilitation and operation of **Al- Haronyah New and Old Bridges** that are located on the road that connects Al-Moqdadya to Khanqeen city via Sadiyah City. It identifies key environmental and social impacts of the project activities during both the rehabilitation and the operational phases, and defines the necessary mitigation measures addressing potential negative impacts, as well as monitoring procedures during construction and operation. An Environmental and Social Management Plan (ESMP) is prepared and embedded in this Limited ESIA which should be followed and implemented by all relevant parties.

The objectives of this site specific ESIA are to provide:

- Practical and achievable actions to ensure that the project's adverse environmental and social impacts are properly mitigated.
- An integrated plan for monitoring, assessing and controlling potential impacts.
- Support to Local and State authorities to enable setting approval conditions for the project based on relevant standards and procedures.
- Focus on positive aspects and benefits, mitigate negative impacts and avoid serious and irreversible damage to the environment and people.
- An opportunity for holding consultation with the communities to get their input on the project activities.
- Information to the local community about the revised project activities and the environmental measures, socio-economic measures, information on residents' rights who might be negatively affected by some project activities and bridges operations.
- Information to the local community of the existence of a Grievance Redresses Mechanism (GRM) system through which they might lodge complaints and expect prompt and fair consideration.

The ESIA includes project description, mitigation measures, monitoring plan, management plans schedule, institutional arrangements, and public consultation. The ESIA will aim at achieving good environmental and social performance during

construction and maintenance. To meet this goal, the following activities, measures and programs must be followed:

- Environmental regulations
- Application of all environmental and social mitigation and management measures
- Environmental and social monitoring plan
- Emergency and contingency plan
- Institutional plan
- Environmental and safety measures
- Effective and open consultations with local communities

Environmental and social monitoring is an important component of the ESIA. It provides the information for periodic review and refinement modification of the ESIA as necessary, ensuring that environmental and social protection is optimized in all project phases through monitoring and early detection and effective remediation of unwanted environmental and social impacts. Lastly, it will also demonstrate compliance with national and international regulatory requirements.

2. PROJECT DESCRIPTION

2.1 Location of the bridges

Hamreen Dam is located on Diyala River and is the major reason behind the storage of water in Hamreen Lake. Part of this water is allowed to flow in the natural watercourse of Diyala River and reaches Haronyah. In Haronyah, another dam diverts water into 2 canals, one to the North and one to the South hereafter called Haronyah canal. The road that connects Moqdadya to Sadiyah crosses Haronyah canal is different locations where bridges were constructed.

Al-Haronyah old and new bridges are located at 34° 1'4.69"N, 44°59'36.33"E (see figure below). The present ESIA tackles the rehabilitation of these 2 adjacent bridges.

Figure 1: General location of Al-Haronyah Bridges (Google Earth)

2.2. Current Condition of the Bridges

Al Haronyah two Bridges were attacked by terrorists' bombers. They are currently both accessible to traffic but only partially on the non-damaged lanes.

2.3 Technical Description of the Bridges:

Following are the descriptions and the technical specifications of the old and new bridges in sequence:

Al Haronyah Old Bridge

- It was built in 1976 with a total length of 30 m.

- The spacing between girders (pre-cast pre-stressed) is 0.85 m c/c.
- The actual length of girder is 14.90 m.
- The old bridge consists of 2 spans, 15m long each.
- It consists of two lanes and has a width of 12.00 m (9 m carriage way and 1.50 m sidewalks on each side).
- The superstructure consists of concrete girders 15 m long and 0.85 m deep and reinforced concrete deck.

Al Haronyah New Bridge

- It was built in 2013, adjacent to the old bridge with a total length of 40m.
- The spacing between girders (pre-cast pre-stressed) is 0.85m c/c.
- The actual length of girder is 19.90 m.
- The bridge consists of 2 spans, 20 m long each.
- It consists of two lanes and has a width of 11.00 m (8m carriage way and 1.00 and 2.00 m sidewalks on the sides).
- The superstructure consists of concrete girders 20 m long and 0.85 m deep and reinforced concrete deck.

2.4 Construction Activities

The anticipated duration of the rehabilitation and construction works for Al-Haronyah Bridges is 5 months. The works include the following activities:

Al Haronyah Old Bridge

- Removal of demolished of damaged span.
- Replacement of 14 damaged post tension girders by steel girders and 28 rubber pads. etc.)
- Casting the deck slab (0.20 m thick) and side walk.
- Repair of expansion joints for the whole bridge with all accessories.
- Treatment of partially damaged girders (crack injection).
- Installation of hand, guard rail and lighting poles, and operational lighting for bridge.
- Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders).

Al Haronyah New Bridge

- Removal of demolished of damaged span.
- Replacement of 13 damaged post tension girders by steel girders and 22 rubber pads. etc.)
- Casting the deck slab (0.20 m thick) and side walk.
- Repair of expansion joints for the whole bridge with all accessories.
- Treatment of partially damaged girders (crack injection).
- Installation of hand, guard rail and lighting poles, and operational lighting for bridge.

- Rehabilitation for surroundings (casting the curbstone, median and fixing the shoulders).

The Communication lines are the only service lines that cross the bridge and needs to be repaired in coordination with the relevant authority.

2.5 Construction equipment

The following table presents the types and numbers of construction equipment that are expected to be used during the rehabilitation their relevant operation periods.

Table 1: Equipment expected to be used during the rehabilitation/Construction

Item	Type of Equipment	Quantity	Operation
	30 – ton crane	2	60 days
	Compressor (diesel) 370 Airman	2	60 days
	Jack – hammer (low noise)	2	20 days
	Shovel (Kawasaki 70) or equivalent	2	5 months
	Typical lorry with tipping, skipping	4	7 days
	Truck mixer	4	7 days
	Asphalt grinder	1	7 days
	Bitumen tanker	1	7 days
	Asphalt finisher	1	10 days
	Compactor (steel & rubber tube)	2	10 days
	Welding machine (set)	2	5 months
	Diesel generator 30 K.V.A	2	5 months
	Grader (Komatsu)	1	2 months
	Pickups & sedan cars	3	5 months
	Air shot, bell, bugger	3	5 months

2.7 Construction site facilities

The construction site will include offices and accommodation for the workers that will be equipped with air conditioning and toilet facilities. Potable water tanks will be provided and septic tanks will be constructed for disposal of human sewage. All these facilities will be installed in state-owned land available around the bridges; therefore, there will be no need for land acquisition. It is foreseen that most of the workers will be from the region, consequently the need for accommodation may not exist or will be very limited as most of the workers will reside at their homes.

3. BASELINE CONDITIONS

3.1 The Project Area

The present ESIA tackles the rehabilitation/reconstruction of 2 adjacent bridges on Haronyah canal. The following figure shows their locations.

Figure 2: View on the old and new Haronyah Bridges (Wikimapia)

3.2 Environmental and Social Baseline conditions

The section below gives a clear overview of the environmental and social conditions in the vicinity of the project location prior to commencement of works. The elements of the environment include: climate and meteorology, air quality, surface and groundwater quality, soil, topography, noise, traffic, rivers and waterways, biodiversity including flora, fauna, rare or endangered species, and sensitive habitats. It also includes consideration of socio-economic characteristics such as population and land-use.

3.2.1 Climate

Diyala governorate has a desert climate.

The driest months are from June thru September when no rainfall (precipitation) occurs. The wettest months are February & March with about 203 mm of precipitation annually.

The average annual temperature in the project area is 22.7 °C. The highest temperatures occur in July and August and can reach over 41 degrees centigrade**.** The following Table

present the monthly mean temperatures in Diyala from 2008 to 2012. These were retrieved from Diyala meteorological station[1]

Table 2: Monthly Mean Temperature in Diyala

YEAR	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
2008	12	13.2	23.3	29.3	30.2	38.3	40.2	40.9	39.2	34.1	25.2	20.9
2009	13.3	12.8	22.2	28.9	30.4	39.3	40.3	41.0	39.5	33.2	25.2	18.1
2010	14.2	14.2	24.2	28.2	30.2	39.4	40.4	41.1	39.3	33.1	25.3	19.2
2011	13.2	14.5	23.4	29.3	30.2	39.8	40.6	41.2	39.2	34.4	25.6	19.3
2012	12.5	13.2	24.5	28.9	30.7	39.9	41.0	41.2	39.4	33.0	24.1	19.9

Monthly wind velocity record in recent years showed an average of 1.8 m/sec. The following table as shown in the Table below. Data were retrieved from Diyala meteorological station[2]

Table 3: Monthly Mean Wind Speed in Diyala

YEAR	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
2007	3.1	2.6	2.3	1.9	3.5	1.8	2.1	2.1	2.5	1.3	2.3	2.9
2008	2.7	1.2	1.8	1.7	1.8	1.2	1.4	1.4	2.4	2.5	1.4	2.4
2009	3.2	1.1	1.9	2.2	3.2	2.5	1.6	1.9	1.9	2.1	====	1.4
2010	2.0	2.1	2.1	1.8	2.1	1.4	3.2	1.9	2.3	1.00	1.3	1.1
2011	21.8	2.6	1.9	2.9	1.4	1.4	2.4	1.3	1.4	1.5	1.5	1.3

3.2.2 Air Quality

There are no air quality monitoring stations close to the site. Al-Haronyah Bridges are located in semi-rural area with some mountains, cliffs, and valleys. However, concentrations of pollutants are not expected because of the good ventilation and potential dispersion of air pollutants. The following Table presents the maximum permissible emissions according to WB and the Iraqi Guidelines.

Table 4: Maximum permissible concentrations for SO_2, NO_2 and CO

	Time	**SO_2 [ppm]**	**NO_2 [ppm]**	**CO [ppm]**
World Bank	24 h	125	-	2-
Iraq	8:00:00 AM	0.0023	0.011	0.548
	12:00:00 AM	0.0036	0.038	1.211

[1] Diyala meteorological station
[2] Diyala meteorological station

3.2.3 Site Topography

The project area is located within semi-rural area and has some mountains, cliffs, and valleys.

3.2.4 Land use

The area in the direct proximity of the bridges is populated with scattered houses while a bit farther, agricultural lands prevail as can be depicted from the following figure.

Figure 3: Land use around Al-Haronyah Bridges (Google Earth)

3.2.5 Seismic Activities

The territory of Iraq, especially the East of Iraq, although not directly located on a dense cluster of recent earthquake epicenters; is subject to seismic activities. These were recorded in the past as a result of movement of some tectonic plates in neighboring country, Iran. However, there was no significant impact on human nor on infrastructures.

3.2.6 Floods

Al Haronyah canal is controlled upstream and therefore no floods are expected.

3.2.7 Traffic Level

Currently, the bridges are partially accessible to traffic through their non-damaged lanes. After the bombing of the bridges, the Roads and Bridges Directorate (RBD), with assistance from one of the State Owned Companies specialized in bridge construction, closed the damaged lanes and removed the obstructing debris while allowing traffic (in

both directions) to proceed on the remaining segments of the bridges which was found safe for usage. The traffic crossing the canal on daily basis in both directions is heavy but not very congested.

3.2.8 Noise

Except for the existing normal traffic, no other source of significant noise generation was identified in the area. The nearest sensitive receptors are the workers and contractor staff and the inhabitants. The Table below presents the World Bank limits for ambient noise levels.

Table 5: World Bank limits for ambient noise levels

WB Requirements		
Receptor	One hour L_{Aeq} (dBA)	
	Day 07:00– 22:00	Night 22:00 - 07:00
Residential; Institutional; educational	55	45
Industrial; commercial	70	70

3.2.9 Heritage Environment

Further to site survey and consultation with the relevant authorities, there are no sites of historical or cultural importance in the area of the bridges and its surroundings. There are no cemeteries, historical-cultural monuments, churches, mosques that need to be removed in order to rehabilitate the bridges.

3.2.10 Flora & Fauna

Significant wild life and flora species were not observed in the Project area.

3.2.10 Land Acquisition

As the works consist of the repair and rehabilitation of two existing bridges, there will be no need to purchase additional land. Furthermore, there are no livelihoods in the project vicinity that are likely to be adversely affected by the project, hence neither involuntary nor voluntarily relocation of people is necessary or expected.

3.2.11 Social Aspects

The bridges were constructed on state-owned land. Although there are some houses and shops scattered in the proximity of the bridges, none of them was constructed or even partially-constructed in the bridges area.

No vendors, either licensed or non-licensed will be displaced. The approaches areas on both sides of the bridges are not settled on or utilized by any of the local population. Shops and residential units can be found near the bridges but no interference was registered from the local community which is eager to have the works completed. It is worth

mentioning that there isn't any agriculture activity that was initiated in the project area. It is also important to mention that most of the workers needed for the bridges rehabilitation can be found in the neighborhood.

The construction will need about 30-40 workers. As priority will be given to local workers from villages around the bridges, it is expected that the needs for workers' accommodation will be very limited because most of the workers will be staying with their families. Those labors are anticipated to be ongoing for the duration of the implementation (5 months). No influx of workers to the project area is expected which could result in adverse impact.

Since the repair and rehabilitation activities of Al Haronyah Bridges will not entail permanent nor temporary land acquisition and no impact is expected on the livelihood of the local people, therefore, OP 4.12 does not apply.

4. LEGAL REQUIREMENTS

4.1 Iraqi environmental legislations

During rehabilitation and operation, the work must follow the Iraqi laws and regulations for the environmental standards. These are:

- Laws of the environment protection No.3 issued in 1997 and the published regulations. The environmental regulations for gaseous emissions, noise and other air pollution standards are not in force and legally binding. However, limits for water disposal in any surface waters and main sewers are subject to regulation no. (25)/1967 and its modifications published by the Ministry of Health (MOH) and the Ministry of Environment (MOE).
- Law of heritage and antiques no. (55) issued in 2002. This law defines all movable and immovable antiquities, archaeological properties and artifacts in Iraq. It regulates communication channels between the public and the authorities for each type of contact between the public and the revealed and non-revealed archaeological sites.
- New environmental framework Law No. 27 of 2009 for the Iraqi national government. This Law was introduced but its executive decrees remain to be prepared. The requirements for environmental assessment are not legally binding.
- Regulations governing contact with archaeological sites extend also to encompass developmental activities like road construction and rehabilitation wherever these developmental activities lie within archaeological vicinity.
- Regulations of the MOE on sanitary waste must be followed, and for the rubbles (construction & demolition waste) the regulations, legislations and instruction of MOE and (Ministry of Construction, Housing and Public Municipalities) MOCHPM.

The following Table summarizes the Iraqi's laws applicable to the project's activity.

Table 6: Applicable Environmental Laws and Regulations in Iraq

Applicable Iraqi Law	Subject
Law no. 37 of 2008	Describes institutional arrangements of the MOE and outlines
Instructions issued by the Ministry of Health pursuant of	Contamination limits and protection of rivers.
Law no. 27 of 2009	Protection and Improvement of Environment
Laws No.3 issued in 1997	Environment protection
Regulations no. 2 of 2001	Preserving water resources.

Legally, the works under rehabilitation and operation must follow the Iraqi laws and the regulations for the Environmental Standards. These are laws of the environment protection No.3 issued in 1997 and the published regulations. The following should be noted:

- There are no environmental regulations for gaseous emissions, noise and other air pollution standards that are and legally binding.

- Water disposal into any surface waters and main sewers is regulated by regulation by regulation no. (25)/1967 and its modifications released by the MOH and MOE
- The Law of heritage and antiques no. (55) was Issued in 2002,
- The sanitary waste (municipal) disposal should follow the regulations of the MOE
- For rubbles (construction &demolition waste) the regulations, legislations and instruction of both MOE and MOCHPM must be followed.

It should be noted that legislation related to social safeguards issued in Iraq since 2003 has focused primarily on the ratification of international conventions and protocols on issues such as cultural heritage. Currently, there aren't Law related to social and environmental assessment.

4.2 The World Bank Safeguards Policies

In addition to the Iraqi laws and regulations the ESIA follows the policies and procedures of the WB. The following section presents the WB operational policies that are relevant to the rehabilitation of the bridges that ensure that projects proposed for Bank financing are environmentally and socially sound and sustainable.

4.2.1 OP/BP 4.01 - Environmental assessment procedure

The Bank requires environmental assessment (EA) of projects proposed for Bank financing. The objectives of the EA are to:

- Inform decision makers of the nature of environmental and social risks.
- Increase transparency and participation of stakeholders in the decision-making process.

4.2.2 OP/BP4.12 - Involuntary resettlement

OP/BP 4.12 focuses on the following principles:

- Involuntary resettlement is avoided wherever feasible, or minimized, exploring all viable alternative project designs;
- Where it is not feasible to avoid involuntary resettlement, activities are conceived and executed as sustainable development programs. Displaced persons are to be meaningfully consulted and have opportunities to participate in the planning and implementing of resettlement programs affecting them; and
- Displaced persons are assisted in their efforts to improve their livelihoods and standards of living, or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. The mechanism of assisting displaced persons is based on full and prior mitigation and compensation for loss of assets or livelihoods.
- OP 4.12 applies whenever, in a Bank-financed project, land is acquired involuntarily or access is restricted in legally designated parks or protected areas.
- However, in this specific project, OP 4.12 will not be applied for the repair and rehabilitation of this bridge as all repair and rehabilitation activities will be

within the existing footprint and no additional land acquisition is needed either permanently or temporarily.

4.3 World Bank Group Environmental, Health and Safety

The Iraqi requirements on Environmental, Health and Safety (EHS) are quite stringent and match, to a large extent, the international best practices on EHS. The WB Group (EHS) Guidelines (General EHS Guidelines: Construction and Decommissioning) provide specific guidance on EHS requirements for construction related activities (Chapter 4). This includes EHS aspects related to:

a. Environment
- Noise and Vibration
- Soil Erosion
- Air Quality
- Solid Waste
- Hazardous Materials
- Wastewater Discharges
- Contaminated Land

b. Occupational Health and Safety

c. Community Health and Safety
- General Site Hazards
- Disease Prevention
- Traffic Safety

4.4 Grievance Redress Mechanism

Bank procedures require that GRMs be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works. A checklist of issues to be considered in the design of the GRMs includes the following:

- An inventory of any reliable conflict mediation organizations or procedures in the project area is undertaken and an assessment made to determine if any of these entities or procedures might be used, ensuring that complaints were received and addressed in an effective, timely and transparent manner.
- Good practice is to ensure that Project Affected People (PAP) can apply orally and in the local language and to impose explicit time limits for responding to grievances received. Appeal procedures need to be specified, and this information is made publicly available therefore, allow for both verbal and written grievances to be lodged with the local project authorities, who will transmit these to the local level committee for review, consideration and response.

5. IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 Construction/Rehabilitation Phase

This section of the report describes the environmental and social impacts that are likely to result from the construction and rehabilitation of Al Haronyah, and the mitigation measures addressing them.

The Environmental actions, procedures and responsibilities as required during the construction phase must comply with the available specifications, legislation, laws issued by MOE.

The construction contractor(s) will be responsible for compliance with the ESIA provisions during the rehabilitation phase of the project. The contractor will be also in charge of undertaking work in a manner which complies with all relevant environmental procedures, adheres to all legislative requirements, and ensures that all environmental objectives associated with the contract are achieved. The key environmental and social impacts are described below.

5.1.1 Impacts on Air Quality

Impacts

The main impacts on air quality will result from the emissions of the construction equipment and trucks used to transport construction materials. In addition, dust will be generated from the movement of vehicles and equipment on unpaved roads as well as the demolition and removal of concrete blocks.

The dust and particulate matters may occur also from accumulated piles of stored inert waste material (stockpiles of ground asphalt, rubble, gravel, and also sand) at/ or near the site prior to their removal for disposal,

As the duration of the Project is for 5 months, the impacts on air quality will be temporary and will be reversed once the rehabilitation works are completed.

Therefore, the impacts on air quality are assessed to be of **medium significance.**

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Engines of vehicles and other machinery are kept turned on only if necessary, avoiding any unnecessary emission;
- Machines and equipment are periodically checked and maintained to ensure their good working condition;
- All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications;
- Activities are carried out using the minimum required number of means at the same time; and
- Electric small-scale mechanization and technical tools are used when available and feasible.

Concerning dust control methods and measures, the following actions are to be taken into account to reduce the generation of dust:

- Watering or increasing the moisture level of the open materials storage piles to reduce dust levels;
- Enclose or cover inactive piles to reduce wind erosion;
- Spray with water all trucks loads transporting dust-generating materials to suppress dust, as well as wheels of means moving inside and outside of the construction-site; and
- Reduce speed for vehicles approaching the site to less than 40 km/hr. On site, speed should not exceed 20 km/hr.

5.1.2 Noise impacts

Impacts

Currently the main source of noise is the road traffic. Once the rehabilitation works start the nearest sensitive receptors are the workers and contractor staff. The other sensitive receptors are the inhabitants of the houses around the bridges and people taking the roads in the surroundings. The nearest residential unit is at around 50 m from the bridge. The impact of the noise on the inhabitants will be significant even after attenuation. The noisiest equipment that will be used during the rehabilitation being the scraper and the leveler. They generate a noise of 111 dB. By applying the simple inverse square law, and considering that there is no barrier between the bridge and the nearest residential unit, the noise level that will reach the residential unit is estimated at 57 dB. For comparison purposes, the World Health Organization (WHO) Noise level guidelines for residential areas is 55 dB and the national noise level is 80 dB.

However, the noise will not be continuous and no noisy activities will not be allowed to take place at night to prevent any inconvenience for the nearest community. As for on-site workers, the personal protective equipment should be used in order to reduce the impact of the noise and for the all period of work. Therefore, the noise level will have minimal impacts on the workers and contractor staff from the emission sources identified and it will be expected to be less than 70 db. The following will be expected to be the main sources for noise impacts on the surrounding receptors:

- Noise emissions from the equipment engines used during the construction activities (earth works, breaking of damaged blocks, use of jack hammers, cutting of steel, etc.);
- Movement of trucks and other equipment from and to the construction site.

Noise impact was evaluated considering the equipment that could operate simultaneously in the construction site.

In the following Table equipment typologies and sound power levels are reported.

Table 7: Expected Noise levels of machinery to be used in Al-Haronyah Project

Machinery	Lw (dBA)
Excavators	105.9

Machinery	Lw (dBA)
Truck	105.9
Scrapers and levellers	111.0
Rollers	99.2
Asphalting machines	100.0
Truck cranes	108.3
Generating sets	97.3
Motor-driven compressors	99.2
Fork lifts	101.0

The Lw values were determined based on a comparison of the equipment model with equipment of similar features and comparable power.

Noise impacts will mainly affect the construction workers and may also affect the nearby houses. They are expected to be of **medium significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Perform construction activities within reasonable hours during the day and early evening. Activities should not be allowed during night in sensitive areas, such as close to residential buildings.
- Keep equipment in good working order and where appropriate fitted with silencers that should also be kept in good working order.
- Run equipment only when necessary;
- Position the noise sources in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site.
- Implement an effective Grievance Redress Mechanism (GRM) to allow nearby communities to complain about any noise impacts.

5.1.3 Impacts on water resources

Impacts

The potential impacts on the water environment derived from the Al-Haronyah construction activities are presented in this section with particular reference to:

- *Impacts related to Water Consumption*

During construction phase, water will be needed for domestic and potable use of the staff (estimated at 60 l/d per worker), for soil watering and spraying to suppress dust and to clean the equipment and the work site offices. The water supply requirements will be provided by trucks through licensed service provider from sustainable water source. The source of this water is via the local water network in locations identified by the municipality. Normally, the same source of water is used for spraying and equipment cleaning. Drinking water is provided as purified bottled water.

Signage for water conservation will be placed on site to encourage workers to conserve water consumption.

- *Impacts related to ground water*

The construction sites will be equipped with worker's/engineer's caravans which will have lavatory facilities (toilets and sinks). Improper wastewater disposal on soils may percolate to ground water and thus causing contamination of subsurface/ground water table. As it is expected that most workers will be from the neighborhood, the need for accommodation will be limited and consequently, the need for water in the worker's caravans too.

Contaminated wastewater by engine oils or lubricant after washing of equipment or by accidental spills may percolate to the soil thus polluting the ground waters and affecting its ecosystem.

- *Impacts related to Surface Water*

Contaminated wastewater by engine oils or lubricant after washing of equipment or by accidental spills may also find its way to the river stream thus polluting its waters and affecting its ecosystem.

- If the damaged concrete blocks, are broken into small pieces to allow their movement, the generated dust will fall into the water stream and will increase the suspended solids which will in turn affect the surface water quality.
- In addition, improper disposal of any liquid or solid wastes into the river may pollute its waters or block the water flow.
- If wastewater is collected and discharged into the water stream, it will cause pollution to the river surface water.
- Erosion and runoff due to precipitation is considered of low impact due to the low rate of precipitation and rainfall.
- Material storage areas should be well isolated from storm water to prevent the contamination of the runoff
- Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies.

The overall impact related to water consumption is temporary and reversible and is considered negligible because the quantities of water involved are relatively small, and they will be required over a short period of time. Consequently, as the rehabilitation activities are temporary, the potential pollution of the river water and underground water is assessed to be of **low significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Remove damaged sections of the bridges which are immersed in the river carefully without polluting the river water.
- In case of big volumes, the damaged sections will need to be broken into smaller size blocks. Use geotextile meshes or other suitable means to prevent the dispersion of cement dust into the water stream.
- Monitor the water quality in specific locations upstream and downstream of the site to ensure that water quality is not adversely affected.
- Make sure wastewater from the worker rest areas or construction offices is contained in solid bottom containers and removed regularly from site by means of authorized contractors. The wastewater should be disposed in wastewater treatment plants as determined by the municipality.

- Using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval.
- Install and maintain a proper workshop to maintain the engines (change lubricant or refuel) and a shelter ensure containment of any fuel or oil spills.
- Strictly forbid disposal of solid wastes in the river.
- Use of paints or chemicals should be done away from the river. However, if non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water.
- The contractor shall present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities.
- The contractor to submit to the Resident Engineer for approval a comprehensive emergency plan including all the needed steps and procedures in order to have a good confinement of any emergency situation related to accidents and spillages.
- Isolate material storage areas to prevent the contamination of the runoff
- Wash construction vehicles and machinery only in designated areas where runoff will not pollute natural water bodies.

5.1.4 Impacts on soil

Impacts

The removal of vegetation and large-scale excavation activities for the construction may increase the soil erosion. However, there aren't any vegetation in the Project's site hence impact related to soil erosion is insignificant. Furthermore, the construction activities will not cause changes in geomorphologic landforms and site setting.

Improper disposal of solid or liquid wastes and accidental oil and fuel spills may also pollute the surrounding soils may also result in contaminating soils.

Due to the temporary and limited rehabilitation activities, soil contamination impacts are assessed to be of **low significance**.

Mitigation measures

Mitigation measures should include, but not limited to, the following practices and actions:

- Use appropriate and enclosed containers for hazardous waste storage. Do not place hazardous waste directly on soils.
- Prevent soil contamination by oil/grease spills, leakages or releases. All manipulations of oil derivatives in the process of construction and provision of the fuel to the machines should be performed with maximum care; leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal;
- Collect construction waste and debris on a regular basis and dispose them of at designated landfills;
- Use authorized quarries only when purchasing soil to be used for embankment, padding, bedding, backfilling during construction;
- Do not operate equipment and vehicles outside the designated work areas and roads.

- The contractor shall present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities.

5.1.5 Solid and hazardous wastes

Impacts

The present section discusses the potential environmental and social impacts of solid and hazardous waste associated with the Project construction phase through the temporary storage on the site area; and the management and disposal of wastes.

The construction phase will be carried out through different activities as civil, mechanical, piping electrical, etc. which in turn will generate volumes of waste with typology characteristic of the nature of each activity.

In general, waste generated during construction phase shall be divided into:

- Construction waste;
- Municipal solid waste;
- Other waste related to the maintenance activities of machines.

Solid construction waste typically includes concrete, asphalt, wood, plastic, glass, metals and other composite materials.

Hazardous waste potentially generated during construction activities includes empty paints/chemical containers, equipment batteries, and trash such as oil contaminated material, and similar. Removed asphalt will also be considered as hazardous wastes.

The quantities of solid and hazardous wastes are expected to be moderate but due to the weaknesses in the capacity of the local authorities in managing solid and hazardous wastes and lack of waste management facilities, the impacts of solid and hazardous wastes are assessed to be of **low significance**.

Mitigation measures

- Minimize waste generation on site.
- Develop simple waste management plan for specific waste streams.
- Collect and transport general waste to disposal sites approved by the local municipality
- Where realistic, collect food wastes, considering health and hygiene issues, for disposal off-site through licensed contractors.
- Locate waste containers at each worksite.
- Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service.
- Conduct storage, transport and handling of all chemicals in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority.
- Store all hazardous wastes appropriately in bounded areas and clearly identify them as “hazardous”.
- Transport and dispose of hazardous wastes through licensed contractors and in close coordination with the relevant local authority and in compliance with the

legal requirements and instructions of the coordination with the as Ministry of Science and Technology (MOST).

- Manage hazardous liquids, such as solvents, rust proofing agents and primer in accordance with the requirements of relevant legislation and industry standards.
- Prepare a hazardous materials inventory for the construction period.
- Explain to workers and make the Material Safety Data Sheets (MSDS) for hazardous materials available on-site during construction
- Collect hydrocarbon wastes, including lube oils, for safe transport off-site and potential reuse, recycling, transport or disposal at approved locations.
- The contractor shall present accidents and spill response and cleanup plan of hazardous water to the resident Engineer for approval prior to construction works activities.
- Report accidents due to the hazardous waste dispersion response to resident Engineer

5.1.6 Flora & Fauna

No rare or endangered species were identified within or nearby the project site.

5.1.7 Topography and landforms

The local topography will not be altered by the project activities.

5.1.8 Local Traffic

Impacts

During construction and rehabilitation works, the vehicles can use the adjacent old and new bridges alternatively as one lane on each bridge is still trafficable. Consequently, traffic is expected to be slow but not completely blocked and there will be no need to divert the traffic to an alternative route.

The overall impacts of the rehabilitation activities on the local traffic is expected to be of **medium significance.**

Mitigation measures

- Provide information, through appropriate signage, to the bridges users to use either of the bridges and to slow down.

In order to minimize the impacts on the traffic d with traffic generated by the project's machinery and equipment, the following measures must be implemented:

- Where practicable, truck deliveries must be restricted to daytime working hours.
- Dangerous goods must be transported along preferred routes preferred routes for dangerous goods.
- Clear traffic signs and signs signals must be installed on-site to provide for safe traffic.

5.1.9 Health and Safety

Impacts

During the rehabilitation phase of the project, there are risks posed to human health.

Potential hazards for workers in construction include:

- Falls (from heights);
- Trench collapse;
- Scaffold collapse;
- Electric shock and arc flash/arc blast;
- Failure to use proper personal protective equipment; and
- Repetitive motion injuries.

The above risks are considered of high importance and need appropriate mitigation measures. As for the emission of pollutants in the air, the potential impact of rehabilitation activities was found to be medium as the project in an urbanized area. If compared to the regulation limits, the expected concentrations of the various pollutants that could be generated from the site, are not expected to overcome the limits.

Similarly, the levels of noise that are expected from the site works are expected to be within acceptable limits and the impact is expected to be low.

There are no risks or impacts related to workers' accommodation, public health/communicable disease, or working at heights that are expected as all the needed logistics for the proper and healthy working environment will be provided by the contractor on-site.

Therefore, the impacts on health and safety are assessed to be of **medium significance.**

Mitigation measures

In order to minimize these risks, the following mitigation measures are proposed:

- Limit speed of construction vehicles and provide road signage for drivers and local community.
- Employ qualified personnel for the use of construction equipment, and train them for health and safety related issues.
- Supply personal protection equipment such as eyeglasses, gloves, hard heads and safety belts and continuously monitor their use by all workers, technicians, engineers and site visitors.
- Comply with international standards for good construction practices;
- Adhere to local and international guidance and codes of practice on EHS management during construction including management, supervision, monitoring and record-keeping;
- Implement EHS procedures as a condition of contract with contractors and their sub-contractors;
- Clearly define the EHS roles and responsibilities of the companies involved in construction and to individual staff (including the nomination of EHS supervisors during construction and an EHS coordinator during operation);

- In the Pre-construction phase, assess the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices;
- Provide appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues;
- Provide health and safety information;
- Regularly inspect, review and record EHS performance;
- Putting on a safety harness and connecting it, via an energy-absorbing lanyard, to a suitable anchor point for staff working at the sides of the bridges
- Provide a comprehensive Health and Safety Manual for approval by the Engineer and implementation by all workers and engineers.
- Maintain standard of housekeeping at all times.
- Prepare an emergency plan that covers all the potential risks that may result from different civil work activities. Such plan must deal with the following items:
    - Reporting on accidents
    - Treat minor injuries on site using a first aid procedure
    - Train the workers on safety
    - Equip fuel and oil changing shelters with necessary firefighting and safety equipment.

Specific health and safety mitigation measures include:

1. Scaffolding
    - Scaffold must be sound, rigid and sufficient to carry its own weight plus four times the maximum intended load without settling or displacement. It must be erected on solid footing.
    - Unstable objects, such as barrels, boxes, loose bricks or concrete blocks must not be used to support scaffolds or planks.
    - Scaffold must not be erected, moved, dismantled or altered except under the supervision of a competent person.
    - Scaffold must be equipped with guardrails, midrails and toeboards.
    - Scaffold accessories such as braces, brackets, trusses, screw legs or ladders that are damaged or weakened from any cause must be immediately repaired or replaced.
    - Scaffold platforms must be tightly planked with scaffold plank grade material or equivalent.
    - A "competent person" must inspect the scaffolding and, at designated intervals, reinspect it.
    - Rigging on suspension scaffolds must be inspected by a competent person before each shift and after any occurrence that could affect structural integrity to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.
    - Synthetic and natural rope used in suspension scaffolding must be protected from heat-producing sources.

- Employees must be instructed about the hazards of using diagonal braces as fall protection.
- Scaffold can be accessed by using ladders and stairwells.
- Scaffolds must be at least 10 feet from electric power lines at all times.

2. Fall protection
    - Consider using aerial lifts or elevated platforms to provide safer elevated working surfaces;
    - Erect guardrail systems with toeboards and warning lines or install control line systems to protect workers near the edges of floors and roofs;
    - Cover floor holes; and/or
    - Use safety net systems or personal fall arrest systems (body harnesses
3. Elevated Surfaces
    - Signs are posted, when appropriate, showing the elevated surface load capacity.
    - Surfaces elevated more than 48 inches above the floor or ground have standard guardrails.
    - All elevated surfaces (beneath which people or machinery could be exposed to falling objects) have standard 4-inch toeboards.
    - A permanent means of entry and exit with handrails is provided to elevated storage and work surfaces.
    - Material is piled, stacked or racked in a way that prevents it from tipping, falling, collapsing, rolling or spreading.

4. Ladders
    - Use the correct ladder for the task.
    - Have a competent person visually inspect a ladder before use for any defects such as:
    - Structural damage, split/bent side rails, broken or missing rungs/steps/cleats and missing or damaged safety devices;
    - Grease, dirt or other contaminants that could cause slips or falls;
    - Paint or stickers (except warning labels) that could hide possible defects
    - .
    - Make sure that ladders are long enough to safely reach the work area.
    - Mark or tag ("Do Not Use") damaged or defective ladders for repair or replacement, or destroy them immediately.
    - Never load ladders beyond the maximum intended load or beyond the manufacturer's rated capacity.
    - Be sure the load rating can support the weight of the user, including materials and tools.
    - Avoid using ladders with metallic components near electrical work and overhead power lines.

5. Head protection

- Be sure that workers wear hard hats where there is a potential for objects falling from above, bumps to their heads from fixed objects, or accidental head contact with electrical hazards.

6. Hazard communication
    - A list of hazardous substances used in the workplace is maintained and readily available at the worksite.
    - There is a written hazard communication program addressing Material Safety Data Sheets (MSDS), labeling and employee training.
    - Each container of a hazardous substance (vats, bottles, storage tanks) is labeled with product identity and a hazard warning(s) (communicating the specific health hazards and physical hazards).
    - Material Safety Data Sheets are readily available at all times for each hazardous substance used.
    - There is an effective employee training program for hazardous substances.
7. Crane Safety
    - Cranes and derricks are restricted from operating within 10 feet of any electrical power line.
    - The upper rotating structure supporting the boom and materials being handled is provided with an electrical ground while working near energized transmitter towers.
    - Rated load capacities, operating speed and instructions are posted and visible to the operator.
    - Cranes are equipped with a load chart.
    - The operator understands and uses the load chart.
    - The operator can determine the angle and length of the crane boom at all times.
    - Crane machinery and other rigging equipment is inspected daily prior to use to make sure that it is in good condition.
    - Accessible areas within the crane's swing radius are barricaded.
    - Tag lines are used to prevent dangerous swing or spin of materials when raised or lowered by a crane or derrick.
    - Illustrations of hand signals to crane and derrick operators are posted on the job site.
    - The signal person uses correct signals for the crane operator to follow.
    - Crane outriggers are extended when required.
    - Crane platforms and walkways have antiskid surfaces.
    - Broken, worn or damaged wire rope is removed from service.
    - Guardrails, hand holds and steps are provided for safe and easy access to and from all areas of the crane.
    - Load testing reports/certifications are available.
    - Tower crane mast bolts are properly torqued to the manufacturer's specifications.
    - Overload limits are tested and correctly set.
    - The maximum acceptable load and the last test results are posted on the crane.

- Initial and annual inspections of all hoisting and rigging equipment are performed and reports are maintained.
- Only properly trained and qualified operators are allowed to work with hoisting and rigging equipment.

8. Forklifts
    - Forklift truck operators are competent to operate these vehicles safely as demonstrated by their successful completion of training and evaluation.
    - No employee under 18 years old is allowed to operate a forklift.
    - Forklifts are inspected daily for proper condition of brakes, horns, steering, forks and tires.
    - Powered industrial trucks (forklifts) meet the design and construction requirements established in American National Standards Institute (ANSI) for Powered Industrial Trucks, Part II ANSI B56.1-1969.
    - Written approval from the truck manufacturer is obtained for any modification or additions which affect capacity and safe operation of the vehicle.
    - Capacity, operation and maintenance instruction plates, tags or decals are changed to indicate any modifications or additions to the vehicle.
    - Battery charging is conducted in areas specifically designated for that purpose.
    - Material handling equipment is provided for handling batteries, including conveyors, overhead hoists or equivalent devices.
    - Reinstalled batteries are properly positioned and secured in the truck.
    - Smoking is prohibited in battery charging areas.
    - Precautions are taken to prevent open flames, sparks or electric arcs in battery charging areas.
    - Refresher training is provided and an evaluation is conducted whenever a forklift operator has been observed operating the vehicle in an unsafe manner and when an operator is assigned to drive a different type of truck.
    - Load and forks are fully lowered, controls neutralized, power shut off and brakes set when a powered industrial truck is left unattended.
    - There is sufficient headroom for the forklift and operator under overhead installations, lights, pipes, sprinkler systems, etc.
    - Overhead guards are in place to protect the operator against falling objects.
    - Trucks are operated at a safe speed.
    - All loads are kept stable, safely arranged and fit within the rated capacity of the truck.
    - Unsafe and defective trucks are removed from service.
9. Electrical Safety
    - Work on new and existing energized (hot) electrical circuits is prohibited until all power is shut off and grounds are attached.
    - An effective Lockout/Tagout system is in place.
    - Frayed, damaged or worn electrical cords or cables are promptly replaced.
    - All extension cords have grounding prongs.
    - Protect flexible cords and cables from damage. Sharp corners and projections should be avoided.

- Use extension cord sets used with portable electric tools and appliances that are the three-wire type and designed for hard or extra-hard service. (Look for some of the following letters imprinted on the casing: S, ST, SO, STO.)
- All electrical tools and equipment are maintained in safe condition and checked regularly for defects and taken out of service if a defect is found.
- Do not bypass any protective system or device designed to protect employees from contact with electrical energy.
- Overhead electrical power lines are located and identified.
- Ensure that ladders, scaffolds, equipment or materials never come within 10 feet of electrical power lines.
- All electrical tools must be properly grounded unless they are of the double insulated type.
- Multiple plug adapters are prohibited.

Details on the above measures should be included in the H&S manual to be presented by the Contractor and approved by the Engineer.

5.1.10 Socio – Economic Impacts

It is expected that the Local community members overwhelmingly support the bridges rehabilitation because of its potentially very significant contribution to local transportation, marketing of local produce, and stimulation of local business opportunities.

On the short term, during the rehabilitation phase, the Project will generate new employment opportunities for local community residents. These will be for both skilled and unskilled workers. It is agreed that, for both work categories, first preference will be given to local residents.

Anyway, in case any impact was not identified by the present assessment, the local community will be able to communicate its complaints through a GRM which will be developed by the project and will be easily accessible (see Annex 1).

Therefore, the socio-economic impacts are assessed to be of l**ow significance.**

5.1.11 Land Acquisition

There will be no need to expropriate or rent any land. The existing state-owned land area can be used by the contractor to accommodate his facilities.

5.1.12 Summary of Impacts

Based on the above section, the following table presents a summary of the impacts of the works on the environment during operational and their relevant impacts

Table 8: Summary of Impacts during Construction / Rehabilitation

No.	Environmental Receptor	Impact Significance
1	Air Quality	Medium
2	Noise	Medium
3	Water Resources	Low
4	Soil	Low
5	Solid and hazardous wastes	Low
6	Flora & Fauna	Insignificant
7	Topography and landforms	Insignificant
8	Impacts on local traffic	Medium
9	Health and Safety	Medium
10	Socio-Economic impacts	Low
11	Land	Insignificant

5.2 Operational Phase

5.2.1 Air Quality

Impacts

When the rehabilitation works are completed, the bridges will enter in operation and the traffic is expected to increase, the air emissions from vehicles too. However, the traffic congestion will be released and the velocity of the vehicles too which will however reduce the air emissions.

Mitigation measures

During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.

5.2.2 Noise

Impacts

The operation of the bridges after rehabilitation will release the congestion of the traffic which in turn will reduce the noise levels from vehicles. As the bridges are currently trafficable, the increase in noise level is not expected to be insignificant.

Mitigation measures

- During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions.
- Reduce speed limits especially near residential buildings.
- Limit trucks movement especially at night in coordination with the local traffic authorities

5.2.3 Water resources

During rainy seasons, runoff water contaminated with oil and grease may cause pollution of the river. Since maintenance of broken vehicles on the bridge is unlikely, the generation of pollution unless in the case of extreme emergency such as oil spills from tankers would be minimal

However, the installed drains (conduits and pipes) for run-off water should be regularly cleaned especially prior to and during the rainy season.

5.2.4 Soil

No impacts are expected on soil during operation.

5.2.5 Solid and hazardous wastes

Impacts

During the operational period, some littering and waste generation resulting from the repair activities will occur. Littering may occur due to wind action.

Mitigation measures

Collect solid waste and dispose it using municipal trucks and vehicles.

5.2.6 Flora & Fauna

There are no impacts expected on flora or fauna during operation.

5.2.7 Topography and landforms

The local topography will not be altered by the project activities.

5.2.8 Impacts on local traffic

It is expected that the local traffic conditions will significantly improve due to the operation of the bridges.

5.2.9 Health and Safety

Impacts

- Road accidents may result due to the operation of the bridges and increased traffic volume.

Mitigation measures

- Limit the speed and place road signs to prevent or minimize the road accidents.
- Provide lighting of the bridges to reduce the probability of road accidents.

5.2.10 Socio-Economic impacts

During the operational period, the project is expected to result in positive socio-economic outcomes for the local communities. However, the GRM will be kept in continued operation of a GRM for one year after completion of works and will help address the complaints of the local community through an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

6.1 Responsibilities for implementation of mitigation measures

In this section, the identified mitigation measures will be summarized. The responsibility for implementation of the mitigation measures will be mostly upon the contractor. However, the supervision and assurance that the mitigation measures are implemented will be the responsibility of the Resident Engineer (RE) who represents the Roads and Bridges Directorate (RBD) as the Project owner.

The RE will be assisted by a team of environmental and social officers who will be responsible for supervising the daily activities of the contractor and will report non-compliances to the RE in order to take necessary actions towards the contractor. Regular supervision site visits will also be conducted by the RBD Project Management Team (PMT) environmental/social officer in association with a qualified environmental and social consultant who will provide technical advice in case there is a need to modify or add new mitigation measures as work necessitates.

6.2 Cost of mitigation measures

The costs of mitigation measures are estimated based on the average market rates for similar activities in Iraq and can be used as indicative costs. It is the sole responsibility of the contractor to estimate the costs associated with the recommended mitigation measures based on his work experience. The estimated cost of the mitigation measures is 28,000 US$ as shown in the following Table.

6.3 ESMP

The following tables summarize the mitigation measures which are required to be undertaken to avoid any negative impacts on the environment. Responsibilities and estimated costs are also presented.

Table 9: Mitigation Measures during Rehabilitation Phase.

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
1	**Air quality**	- Open materials storage piles should be watered to increase of the moisture level thus reducing dust levels. - Inactive piles should be placed in enclosure or covered to reduce wind erosion. - Loads in all trucks transporting dust-generating materials have to be sprayed with water to suppress dust, as well as wheels of vehicles moving inside and outside of the construction-site. - Signs and speed reduction bumps should be installed for vehicles approaching the site and near residential buildings and farmlands to reduce their speed below 40 km/hr. On site, speed should not exceed 20 km/hr.	Contractor	Resident engineer	3,000
		- Engines of vehicles and other machinery shall be kept turned on only if necessary, avoiding any unnecessary emission. - Machines and equipment should be periodically checked and maintained to ensure their good working condition. - All equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications. - Activities should be carried out using the minimum required number of means at the same time. - Electric small-scale machines and technical tools shall be used when available and feasible.	Contractor	Resident engineer	Included in contractor cost
2	**Noise**	- Construction activities are to take place within reasonable hours during the day. - Equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. - Equipment must be run only when necessary. - The noise sources should be placed in a concealed area with respect to acoustic receptors, consistent with the needs of the construction site.	Contractor	Resident engineer	Included in contractor cost
		- Personal protection equipment for workers should be used of especially those who use jack hammers or work near noisy engines or compressors.	Contractor	Resident engineer	2,000
3	**Water resources**	- Damaged sections of the bridges should be carefully removed without polluting the water in the river.	Contractor	Resident engineer	Included in contractor cost

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
		- In case of using septic tanks on site, the engineering drawings of these tanks should be presented to the Resident Engineer for approval. - No solid wastes are to be thrown into the river. - Paints or chemicals should be used away from the river. However, if non-avoidable, excessive precautions should be undertaken to avoid spillages into the river water and the ground water. - Material storage areas should be well isolated from storm water to prevent the contamination of the runoff - Construction vehicles and machinery shall be washed only in designated areas where runoff will not pollute natural water bodies			
		- Wastewater from the workers rest areas or construction offices should be contained in septic tank and should be removed regularly from site by means of authorized contractors and disposed in Wastewater Treatment Plant (WWTP) .	Contractor	Resident engineer	7,500
		- In case of the need to change engine oils or refuel some construction equipment, a proper maintenance workshop or shelter should be installed to ensure containment of any fuel or oil spills.	Contractor	Resident engineer	3,000
4	**Soil**	- Contractor to present accidents and spill response and cleanup plan to the resident Engineer for approval prior to construction works activities. - Soil contamination by oil/grease spills, leakages or releases, all manipulations of oil derivatives in the process of construction are to be prevented. - Provision of the fuel to the machines should be performed with maximum care. - Leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated appropriately before disposal. - Construction waste and debris shall be collected on a regular basis and disposed of at designated landfills. - Only authorized quarries shall be used for purchasing soil to be used for embankment, padding, bedding, backfilling during construction. - Operation of equipment and vehicles outside the designated work areas and roads must be prohibited.	Contractor	Resident engineer	Included in contractor cost

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
		- No hazardous waste storage shall take place directly on soils. Appropriate and enclosed containers should be utilized and disposed of in designated locations in cooperation with MOST who in charge for hazard waste disposal.	Contractor	Resident engineer	1,000
5	**Solid and hazardous wastes**	- On site waste generation shall be minimized. - Simple waste management plan for specific waste streams must be developed. - General waste must be collected and transported to local council approved disposal sites. - Food wastes must be collected, where practicable, considering health and hygiene issues, for disposal off-site through licensed contractors. - Waste containers must be located at each worksite. - Chemical wastes must be collected in 200 liter drums (or similar sealed container), appropriately labeled, for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service. - Storage, transport and handling of all chemicals must be conducted in accordance with all legislative requirements, through licensed contractors and in coordination with the local authority. - All hazardous wastes must be appropriately stored in bounded areas and should be clearly identified as "hazardous". - Transportation and disposal of hazardous wastes should be done through licensed contractors and in close coordination with the relevant local authority and in compliance with the legal requirements and instructions of the coordination with the as ministry of science and technology. - Hazardous liquids, such as solvents, rust proofing agents and primer must be managed in accordance with the requirements of relevant legislation and industry standards. - A hazardous materials inventory for the construction period must be prepared. - Material Safety Data Sheets (MSDS) for hazardous materials must be available on-site during construction and made available and explained to workers. - Hydrocarbon wastes, including lube oils, must be collected for safe transport off-site for reuse, recycling, transport or disposal at approved locations.	Contractor	RE in coordination with the local authority and MOST regarding hazardous wastes	5,000
6	**Flora & Fauna**	Not Applicable	(N/A)	(N/A)	(N/A)

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
7	**Topography & landforms**	Not Applicable	(N/A)	(N/A)	(N/A)
8	**Traffic**	- Provide information, to the bridges users to use the bridges alternatively through appropriate signage. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic movement. - Where practicable, truck deliveries must be restricted to daytime working hours. - Dangerous goods must be transported along routes preferred for dangerous goods. - Clear traffic signs and signs signals must be installed on-site to provide for safe traffic.	Contractor in coordination with the Local Traffic Department	Resident Engineer	500
9	**Health & Safety**	- The speed of the construction vehicles should be limited. - Road signage for drivers and local community should be provided.	Contractor	Local traffic department & RE	1,000
		- Qualified personnel must be employed for the construction equipment, and personnel must be trained for health and safety issues. - Personal protection equipment such as eyeglasses, gloves, hard heads, safety belts and and slip- resistant safety footwear must be supplied and continuously used by all workers, technicians, engineers and site visitors.	Contractor	Resident engineer	2,500

Receptor		Mitigation Measures during Rehabilitation Phase	Responsibility	Supervision	Total Estimated Cost in US$
		- The contractor should comply with international standards for good construction practices; - The contractor should adhere to local and international guidance and codes of practice on EHS management during construction; especially as concerns management, supervision, monitoring and record-keeping; - EHS procedures should be part of the conditions of contract with contractors and their sub-contractors; - There should be a clear definition of the EHS roles and responsibilities of the companies involved in construction and of individual staff (including the EHS supervisors during construction and an EHS coordinator during operation); - There should be a pre-construction assessment of the EHS risks and hazards associated with construction and operation, including consideration of local cultural attitudes, education level of workforce and local work practices; - There should be a regular inspection, review and recording of EHS performance; - Putting on a safety harness and connecting it, via an energy-absorbing lanyard, to a suitable anchor point for staff working at the sides of the bridges - Present detailed H&S Manual to be implemented - Implement H&S measures as detailed in Chapter 5 in the ESIA - A high standard of housekeeping shall be maintained at all times.	Contractor	Resident engineer	Included in contractor cost
		- Any accidents shall be reported and treated within site as a first aid procedure. - Appropriate training on EHS issues for all construction and operation workers, including initial induction and regular refresher training, taking into account local cultural issues should be provided - Fuel and oil changing shelters should be equipped with necessary firefighting and safety equipment - First aid items should be available all times onsite and trained staff on emergency aids should be identified.	Contractor	Resident engineer in coordination with health and safety officials.	2,500
10	**Handling Complaints**	- A complaints' register will be kept on site and this will feed into the GRM. Details of complaints received will be incorporated into the audits as part of the monitoring process.	Resident Engineer	RBD/PMT	Included in contractor cost
Total Cost (Rehabilitation phase)					**28,000**

Table 10: Mitigation Measures during Operation Phase.

Receptor		Mitigation Measures during Operation Phase	Responsibility	Supervision	Total estimated Cost in US$
1	**Air quality**	- During the license issuance or renewal process of vehicles, traffic authorities to ensure that all vehicle engines are in good conditions.	Traffic Department	Traffic Department	No direct cost
2	**Noise**	- During the license issuance or renewal process of vehicles, traffic authorities should ensure that all vehicle engines are in good conditions. - Speed limits should be reduced especially near residential buildings. - Limit trucks movement especially at night in coordination with the local traffic authorities.	Traffic Department	Traffic Department	No direct cost
3	**Water Resources**	- Ensure that any clogged drains are regularly cleaned especially before and during the rainy season.	(N/A)	(N/A)	(N/A)
4	**Soil**	- Not applicable (N/A)	(N/A)	(N/A)	(N/A)
5	**Solid & hazardous wastes**	- Install waste collection bins on the bridges. - Install environmental awareness signs along the bridges	RDB	Local Authority (Municipality)	To be covered by private sector as a contribution to
6	**Traffic**	- Speed limits and road signs should be in place to prevent or minimize the road accidents.	Traffic Department	Traffic Department	No direct cost
		- The bridges must be provided with suitable post lighting at night to reduce the probability of road accidents.	RBD	RBD	Within RBD budget
7	**Flora & Fauna**	- Not Applicable	(N/A)	(N/A)	(N/A)
8	**Topography & landforms**	- Not Applicable	(N/A)	(N/A)	(N/A)
9	**Traffic**	- Improved traffic conditions	Local Traffic Department	Resident Engineer	No Cost
10	**Handling Complains**	The continued operation of a GRM for one year following opening of the bridge for use will ensure that local community members have an accessible, fair and transparent means of reporting any emerging adverse impacts, and a means of obtaining mitigation.	RBD/PMT	Local authorities	No cost
Total cost US$ (Operation phase)					**No Cost**

7. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

7.1 Environmental and Social Monitoring

In order to ensure full compliance of the performed activities to the environmental and social requirements, regular monitoring should be performed.

In this section, the environmental and social monitoring activities will be presented, the institutional responsibilities will be determined in addition to the necessary resources which need to be in place to perform the monitoring activities. The objectives of the monitoring are as follows:

- To measure the compliance with the ESMP mitigation measures
- To verify the results of the project's environmental and social impact assessment
- To study the trend of construction values of the parameters, which have been identified as critical.
- To ensure that all safety concepts were implemented properly during the bridges operation.
- To ensure no harm is incurred by local communities from bridges operation, including to land, productive plants, infrastructures, and livelihoods.

To ensure the proper implementation of the environmental and social mitigation measures, an environmental and social monitoring program has been established for the construction phase as shown in the Table below.

Table 11: Monitoring Activities during Rehabilitation Phase.

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
1	**Air quality**	- Open material storage piles are to be inspected - Visual inspection of vehicles and equipment operating or entering the site - Investigate dust complaints from workers and residents - Signs and speed reduction bumps installed near the site and near residential buildings and farmlands - Engines of vehicles and other machinery periodically checked and maintained - Measurements of exhaust emissions (CO, SOx, NOx, PM10, PM2.5)	- Visual inspection - Visual inspection - Recorded and documented complaints - Visual inspection - Recoded status of equipment and vehicles on site (excessive black or white smoke) - Results of exhaust emissions measurements	- Daily - Daily - Daily - Weekly - Monthly measurements - Measurements monthly during implementation period.	Engineer	RBD/PMT	10,000

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
2	**Noise**	- Investigate noise complaints from workers and neighboring communities in the affected locations - Silencers checked and placement of noise sourced in concealed area - Use of personal protection equipment effective - Measure ambient noise near sensitive receptors (dBA)	- Recorded and documented complaints - Visual inspection - - Visual inspection - - Noise Measurements results included in site investigation report	- Weekly inspection of complaints - Weekly - Daily - In case of complaint	Engineer	PMT	5,000
3	**Water resources**	- Investigate implementation of mitigation measures and - Damaged immersed sections removed with care - Investigate wastewater disposal measures - Perform water quality test on water samples taken from the water course beneath the bridges (pH, TDS, TSS, BOD, COD) - Install litter bins and make sure no wastes are thrown in the river - Installation of a proper maintenance shelter for paints and chemicals and observe any oil or fuel spills.	Site Investigation report	- Daily Investigation - During execution of this task - -Weekly - -Monthly - -Weekly - Daily	Engineer	PMT	10,000
4	**Soil**	- Monitor the filling up machine with oil - Monitor the oil/grease containers and hazardous waste location and disposal	Site Investigation report	- During execution of this task - Weekly	Engineer	PMT	No cost

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
		- Monitor the disposal of waste and debris - Assure the origin of purchased soil is from an authorized quarry - Forbid the operation of machinery outside the designated area - Observe any soil contamination with oil or fuel - Observe any accumulation of wastes		- Daily - During execution of this task - Daily - Daily - Daily			
5	**Solid and hazardous wastes**	- Maintain records on waste types and quantities - Observe any waste accumulation in un approved locations - Check that MSDS for hazardous materials is available on-site and explained to workers.	- Waste management contracts with authorized contractors - Waste delivery receipts from local authorities. - Site Investigation report	- Weekly - Weekly - Weekly	Engineer	PMT	No cost
6	**Flora & Fauna**	- Record any observation about wild animals or plants on site or nearby and report to the Environmental Authority	Observation report	Upon occurrence	Engineer	PMT	No cost
7	**Topography and landforms**	- No monitoring required	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
8	**Traffic**	- Ensure speed limits and warning signs are installed and in place - Ensure dangerous goods are transported along selected routes	Road signs are installed.	- Weekly - Upon occurrence	Engineer	PMT	No cost

Receptor		Monitoring Activities	Monitoring Indicators	Frequency	Responsibility	Supervision	Total estimated Cost in US$
9	**Health and safety**	- Speed limit and directional signs installed - Personnel trained for health and safety issues - Ensure compliance of workers to Health and Safety requirements and responsibilities assigned - EHS performance; regularly inspected, reviewed and recorded - Monitor the good housekeeping - Maintain log on accidents - Firefighting and safety equipment regularly checked - First aid kit items regularly checked	Accidents report	Weekly	Engineer	PMT	No cost
10	**Handling Complaints**	- Ensure that the GRM is effective and well communicated	Number of complaints received, analyzed and responded to.	Weekly	Engineer	PMT	No cost
Total cost (Operation phase)							**25,000**

7.2 ESMP Institutional Arrangements

In order to ensure full compliance with the environmental and social requirements which are described above, RBD PMT nominated a consultant to act as the focal point for environmental and social affairs at the central level. On the field level, RBD PMT nominated two engineers to act as environmental and social officers. Those engineers will be trained on monitoring and reporting of environmental and social impacts and how to fill the checklist to be used during field visits before implementation starts. RBD Resident Engineer will be the officially responsible staff member for ensuring environmental and social compliance. S/He will be assisted by the designated environmental and social field officers.

In addition, a qualified consultant is recruited by the PMT to provide technical assistance and capacity building to the environmental and social team both at the central level and at the field level.

7.3 Reporting requirements

To ensure that the mitigation and monitoring measures are being carried out effectively with the required frequency, a clearly defined and regular (monthly) reporting and response system must be established.

All inspection and audit reports of environmental performance should be stored in the Audit and Inspection Manager (AIM) system. The AIM is an electronic database that is used to enable corrective actions identified during the inspection \ auditing process to be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities as required. In addition to the monitoring and reporting requirements documented in the relevant sections of the ESMP, the following reporting regime will be implemented:

- All incidents or accidents during the bridges rehabilitation should be reported immediately to relevant authorities.
- All corrective measures must be discussed to ensure compliance with laws and regulations.
- Reports for personnel training on environmental issues or emergency practices must be produced.
- Progress reports, environmental monitoring report and other inspections reports must be produced periodically.

The RBD PMT engineers will provide the Resident Engineer with a weekly report briefing their observations and recommendations for action. Whereas the Resident Engineer shall prepare an environmental and social management progress report on monthly basis to RBD PMT in Baghdad. The environmental and social consultant will prepare a monthly environmental and social supervision report after conducting monthly site supervision visits. RBD PMT shall prepare a quarter environmental and social progress report which will be submitted to the WB for review and disclosure.

7.4 Capacity Development and Resources Requirements

7.4.1 Capacity Development

RBD PMT dedicated sufficient human resources to undertake the environmental and social management requirements as explained above. The assigned RBD staff at the central and field levels are competent in the field of engineering and have variable practical experience. For RBD staff who will be responsible for undertaking the environmental and social tasks, they will require some capacity development.

All construction personnel and contractors are required to undertake appropriate environmental training and induction programs including, importantly, on GRM procedures. All managers and supervisors will be responsible for ensuring that personnel under their control have the requisite competencies, skill and training to carry out their assigned tasks in accordance with the requirements of the ESMP. They will also be responsible for identifying additional training and competency requirements.

All project supervisors and managers will receive additional detailed training on the use and implementation of the ESMP. The following Table presents the proposed institutional strengthening program and capacity development requirements.

Table 12: Capacity Development Requirements for RBD[3]

Capacity development topic		Provider(s)	Duration	Estimated Cost (US$)
1	Environmental Impact Assessment Environmental and social Management in Construction Sites	Private sector consultant	3 Days	$3000
2	Iraqi Environmental Legal Requirements	Ministry of Environment	1 Day	$2000
3	World Bank Environmental and Social Safeguards	The World Bank	2 Days	$10,000 (international travel and accommodation cost for RBD trainees)
Total Estimated Cost				**$15,000**

7.4.2 Required Resources

In order to ensure full compliance of the environmental and social requirements, regular site visits should be conducted. Dedicated office spaces, office equipment and supplies in addition to adequate means of transportation should be made available for the environmental and social management team at the central level and most importantly on the field level. RBD PMT should ensure the allocation of sufficient budget resources to ensure availing the required resources to achieve the required tasks.

[3] Consolidated training for all RBD/PMT environmental/social field supervisors will be conducted to save on the training costs.

8. PUBLIC CONSULTATION RESULTS

8.1 Objectives of the Consultations

WB policies require that broad and open public consultations be held with PAPs on the project. These consultations are to ensure that the project affected peoples (PAPs) are provided with the opportunity to engage in the rehabilitation planning process, to raise questions and receive input and responses to their concerns. However, due to the current security situation in the project area and taking into utmost consideration the safety of the people as public meetings may be targeted by terrorist, the public meeting approach was not achievable.

8.2 Consultation Process

In order to fulfil the WB requirements, a one on one interview was adopted to obtain sound information on the possible impacts on the local communities. Accordingly, a questionnaire was prepared in order to cover the key environmental and social aspects related to the project. The questionnaire was then addressed to vehicle-road users and to the local individuals in the surrounding community randomly to have their opinions and thoughts regarding the rehabilitation activities. It was difficult to conduct the questionnaire with women due the fact that it is not easy to take the women's opinions freely due to the tribe's habits that exist in the area of the project.

In addition, the draft Limited/Simplified ESIA and its translated summary were published on the RBD's website to allow for feedback and wider dissemination of information related to the planned activities under this project. A translated summary of the draft ESMP will be disclosed at the project site for feedback and comments if any.

8.3 Findings of the Consultations

According to the results revealed from these questioners (Annex 3), the local community individuals agreed that, the rehabilitation activities will have a positive impact on their social daily life. None of the locals expressed any reservations against the project and did not specify any negative impact that might affect him or his family. All locals agreed that the bridges will need some additional safety signs and instructions in order to keep the movement on the bridges within safe conditions. The following are the main findings of the consultation process which took place in April 2016.

1. All questioned locals agreed that the reconstruction activities will have a strong positive impact from the social perspectives on the locals.
2. No claims from any locals were recorded or alleged regarding the ownership of the land where the bridges were constructed; all agreed that is governmental land property.
3. No vegetation covers, crops, plants, trees…etc. will be removed in order to execute the rehabilitation activities of the bridges.
4. No infrastructure within the bridges area will be affected negatively due the reconstruction activities.
5. No deportation, dislocation of any of the local community will be needed due to these activities.

6. The reconstruction of the bridges will enhance the social relationship among the locals, improving their transport.
7. All locals agreed that the bridges will need instructional signs for the bridges users' safety.

8.4 Distribution of the GRM Forms

During individual interviews, information about a grievance mechanism was introduced to interviewed individuals and a translated GRM form was also provided. All interviewed people were informed that they can submit their complaint to either site engineer, or to community leader or to PMT during construction. The community leaders' information (mobile phone number) and PMT contact information (office and mobile phone numbers) will be available before implementation starts. There will be signs posted at the entrance of the bridges (Refer to Annex 1 for more details).

9. GRIEVANCE REDRESS MECHANISM

Bank procedures require that Grievance Redress Mechanisms (GRMs) be established and operational prior to commencement of the project, and that they continue to operate for one year following completion of the works for third party settlement of disputes. This GRM should take into account the availability of judicial recourse as well as traditional and community dispute resolution mechanisms.

Accordingly, a GRM will be established at the project level to ensure any grievance can be addressed in an amicable manner. Resolving complaints at community level is always encouraged to address the problem that a person may have during implementation and/or operational phase.

The project grievance redressed system should be developed in consultation with communities, which might include the following for written complaints:

1. First, the affected person sends his/her grievance in writing to the communities'/community leaders. The grievance note should be signed and dated by the aggrieved person. Where the affected person is unable to write, s/he should obtain assistance from the community to write the note and mark the letter with his/her thumbprint. The community should respond within 14 days.
2. Second, if the aggrieved person does not receive a response or is not satisfied with the solution provided by the community, s/he lodges her or his grievance to PMT which should respond within 14 days.
3. Third, if the aggrieved person is not satisfied with the solution of PMT, s/he can go to the court.

In any case, the PMT must maintain records of grievances and complaints, including minutes of discussions, recommendations and resolutions made. The contact information of the designated GRM personnel will be also be posted at the project site for any complaint and redress.

10. CONCLUSION AND RECOMMENDATIONS

The limited ESIA concludes that the proposed rehabilitation and reconstruction of Al Haronyah Bridges will have an overall significant positive impact on the affected population. The implementation of the recommended mitigation measures especially during the construction phase will ensure that potential negative environmental impacts are addressed.

ANNEXES

Annex (1): Grievance Form

Reference No:	
Full Name **Note:** ***you can remain anonymous if you prefer or request not to disclose your identity to the third parties without your consent***	My first name_____ My last name_____ I wish to raise my grievance anonymously I request not to disclose my identity without my consent
Contact information Please mark how you wish to be contacted (mail, telephone, e-mail).	By Post: Please provide mailing address: By Telephone: _____ By E-mail _____
Description of Incident or Grievance: **What happened? Where did it happen? Who did it happen to? What is the result of the problem?**	
Date of Incident/Grievance	
	One-time incident/grievance (date_____) Happened more than once (how many times? __) On-going (currently experiencing problem)
What would you like to see happen to resolve the problem?	

Signature: _____

Date: _____

Please return this form to: **[name],** _____**[company name]** _____

Address_____**: Tel.:**_____ **or E-mail:** _____

Annex (2): Site photos

Figure 4: Photo showing Al Haronyah old and new bridges

Figure 5: Damaged span in the old Bridge

Figure 5: Damaged and un-trafficable span of the old bridge

Figure 6: Side view of damaged Haronyah new bridge

Figure 7: Side view of the damaged span of the old Bridge

Figure 8: Damages in the old bridge

Annex (3): Individual Interviews

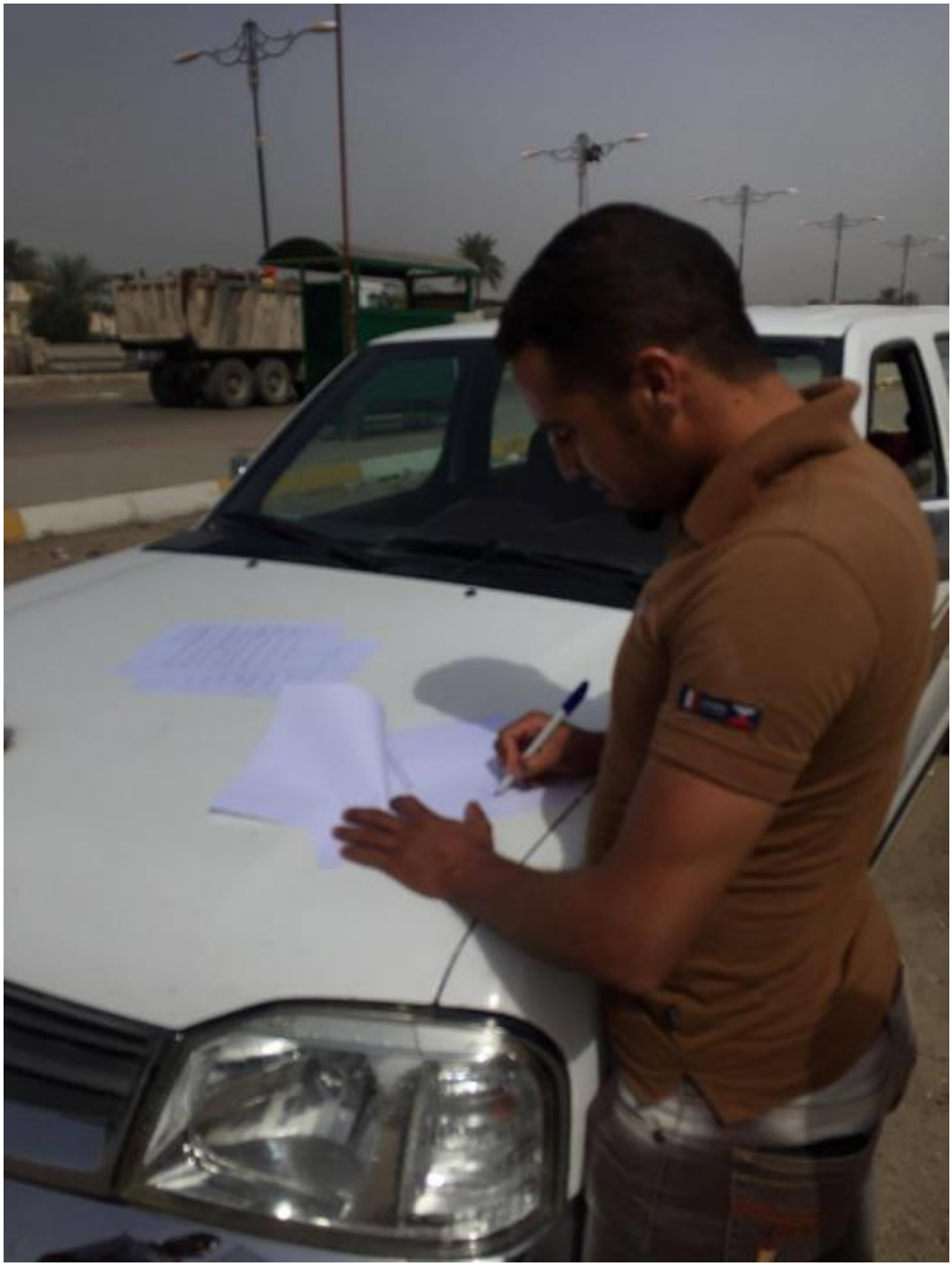

Figure 9: Mr. Hazem Hilal signing his individual consultation sheet

الاسم: حازم عبود هلال

المهنة: كاسب

تاريخ الزيارة: ٢٠١٦/٩/٢١

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم ✓ كلا

س٢:هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعائدية الارض المقام عليها الجسر / الطريق؟

نعم كلا ✓

س٣:بسبب اعمال اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائديته لمواطنين او السكان المحليين؟

نعم كلا ✓

س٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟

نعم كلا ✓

س٥:هل هنالك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان ستتأثر بعملية تاهيل الجسر / الطريق؟

نعم كلا ✓

س٦:هل ان اعمال اعادة اعمار الجسر / الطريق ستتسبب باجراءات اعادة لتوطين لشخص(و\او) لاشخاص الى مناطق جديدة؟

نعم كلا ✓

س٧:هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ، علما ان الارض تابعة للدولة؟

نعم كلا ✓

س٨:هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟ماهي؟

نعم كلا ✓

س٩:هل هناك تغييرات ديموغرافية او ضرر في النسيجالاجتماعي من جراء اعمال اعادة التأهيل؟

نعم كلا

س١٠:ماهي المجاميع الاكثر ضعفا و هشاشة التي من المحتمل ان تتأثر باعمال اعادة الاعمار؟

نعم كلا

س١١:هل سيعزز المشروع من عمليات النقل و يقلل من انعزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟

نعم كلا

س١٢:هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلامات تحذيرية او استدلالية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق

نعم كلا

هاشم محمود هلال

Figure 10: Mr. Amir Saleh signing his individual consultation sheet

الاسم: أمير عباس رضا

المهنة: مصادق طبي

تاريخ الزيارة: ٢١ / ٩ / ٢٠١٦

س١: هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم ✓   كلا

س٢: هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعائدية الارض المقام عليها الجسر / الطريق؟

نعم   كلا ✓

س٣: بسبب اعمال اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائديته لمواطنين او السكان المحليين؟

نعم   كلا ✓

س٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟

نعم   كلا ✓

س٥: هل هنالك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان ستتأثر بعملية تاهيل الجسر / الطريق؟

نعم   كلا ✓

س٦: هل ان اعمال اعادة اعمار الجسر / الطريق ستتسبب باجراءات اعادة لتوطين لشخص(و/او) لاشخاص الى مناطق جديدة؟

نعم   كلا ✓

س٧: هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،علما ان الارض تابعة للدولة؟

نعم   كلا ✓

س٨: هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل/اماهي؟

نعم   كلا ✓

س٩:هل هنالك تغييرات ديموغرافية او ضرر في النسيجالاجتماعي من جراء اعمال اعادة التأهيل؟

نعم ✓ كلا

س١٠:ماهي المجاميع الاكثر ضعفا و هشاشة التي من المحتمل ان تتأثر باعمال اعادة الاعمار؟

نعم ✓ كلا

س١١:هل سيعزز المشروع من عمليات النقل و يقلل من انعزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟

نعم ✓ كلا

س١٢:هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلامات تحذيرية او استدلالية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق

نعم ✓ كلا

احمد محمد

امير قياسم صباح

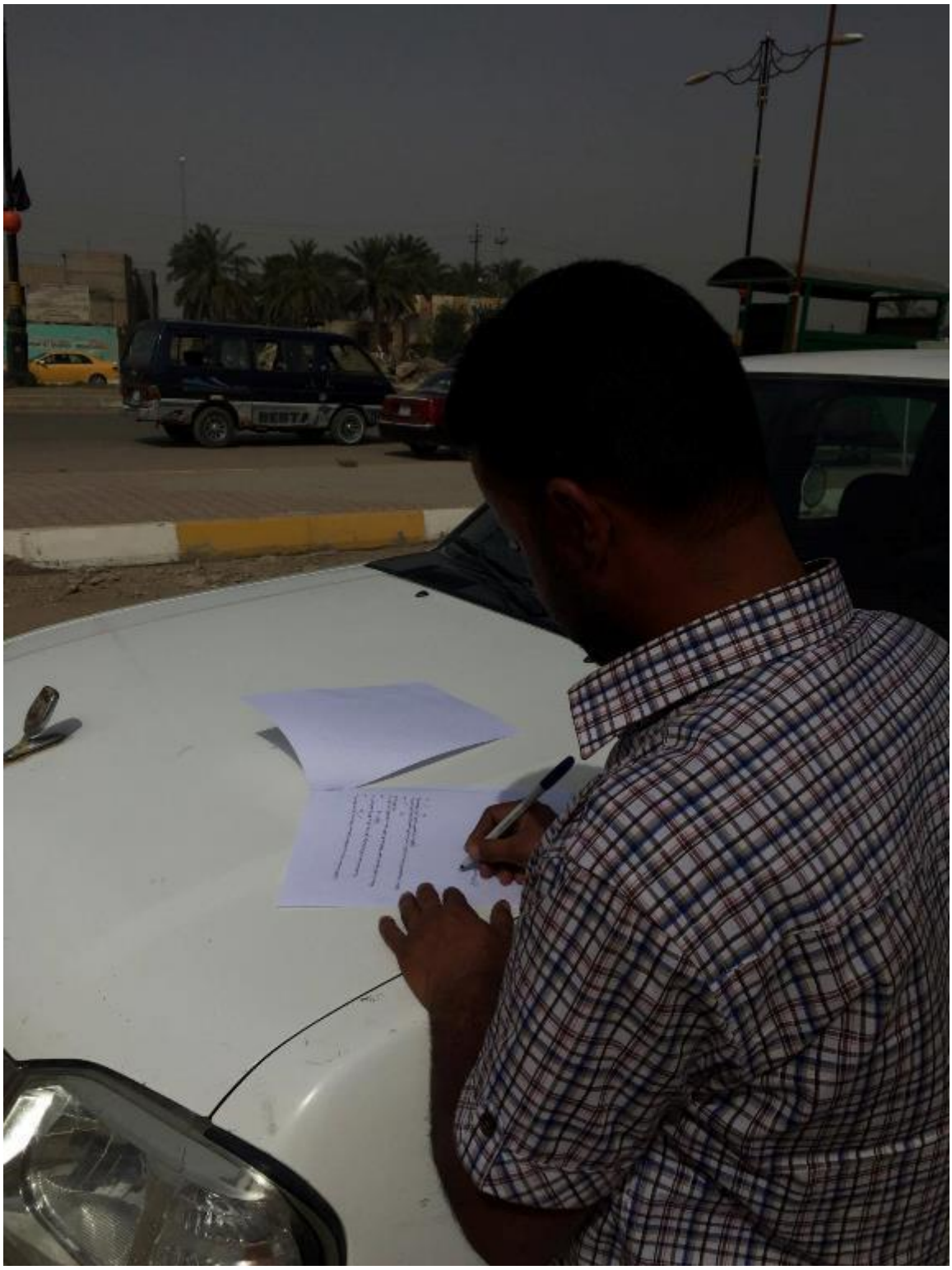

Figure 11: Mr. Maan Hmed signing his individual consultation sheet

الاسم: معن محسن حميد

المهنة: معلمة

تاريخ الزيارة: ٢٠١٦/٤/٢١

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم ✓ كلا

س٢:هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعائدية الارض المقام عليها الجسر / الطريق؟

نعم كلا ✓

س٣:بسبب اعمال اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائديته لمواطنين او السكان المحليين؟

نعم كلا ✓

س٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟

نعم كلا ✓

س٥:هل هنالك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان ستتأثر بعملية تاهيل الجسر / الطريق؟

نعم كلا ✓

س٦:هل ان اعمال اعادة اعمار الجسر / الطريق ستتسبب باجراءات اعادة لتوطين لشخص(و\او) لاشخاص الى مناطق جديدة؟

نعم كلا ✓

س٧:هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ، علما ان الارض تابعة للدولة؟

نعم كلا ✓

س٨:هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟ماهي؟

نعم كلا ✓

س٩:هل هنالك تغييرات ديموغرافية او ضرر في النسيجالاجتماعي من جراء اعمال اعادة التأهيل؟

نعم كلا ✓

س١٠:ماهي المجاميع الاكثر ضعفا و هشاشة التي من المحتمل ان تتأثر باعمال اعادة الاعمار؟

نعم كلا ✓

س١١:هل سيعزز المشروع من عمليات النقل و يقلل من انعزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟

نعم ✓ كلا

س١٢:هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلامات تحذيرية او استدلالية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق

نعم ✓ كلا

الاسم: علي هاوكي مهدي

المهنة: مدرسة

تاريخ الزيارة: ٢٠١٦/٩/٢١

س١:هل تعتقد ان عملية اعادة بناء الجسر / الطريق له اثار ايجابية من الناحية الاجتماعية على السكان القاطنين في المناطق المحيطة بالجسر / الطريق؟

نعم ✓ كلا

س٢:هل هنالك ادعاءات او مطالبات من قبل السكان المحليين بعائدية الارض المقام عليها الجسر / الطريق؟

نعم كلا ✓

س٣:بسبب اعمال اعادة البناء للجسر / الطريق هل تمت عملية ازالة لمحاصيل زراعية او اشجار او اي غطاء نباتي تعود عائديته لمواطنين او السكان المحليين؟

نعم كلا ✓

س٤: هل تضررت مصالح المواطنين القاطنين بالقرب من الجسر / الطريق بسبب اعمال اعادة البناء؟

نعم كلا ✓

س٥:هل هنالك اي بنى تحتية مؤقتة او دائمية تلعب دورا اساسيا في النشاطات الحياتية اليومية للسكان ستتأثر بعملية تاهيل الجسر / الطريق؟

نعم كلا ✓

س٦:هل ان اعمال اعادة اعمار الجسر / الطريق ستتسبب باجراءات اعادة لتوطين لشخص(والو) لاشخاص الى مناطق جديدة؟

نعم كلا ✓

س٧:هل تمت عملية استخدام منطقة بناء الجسر / الطريق بطريقة ما من قبل السكان المحليين ،علما ان الارض تابعة للدولة؟

نعم كلا ✓

س٨:هل تتوقع وجود تأثيرات اجتماعية سلبية بالمنطقة نتيجة اعمال اعادة التأهيل؟ماهي؟

نعم كلا ✓

س٩:هل هناك تغييرات ديموغرافية او ضرر في النسيجالاجتماعي من جراء اعمال اعادة التأهيل؟

نعم كلا

س١٠:ماهي المجاميع الاكثر ضعفا و هشاشة التي من المحتمل ان تتأثر باعمال اعادة الاعمار؟

نعم كلا

س١١:هل سيعزز المشروع من عمليات النقل و يقلل من العزالية المجتمعات الموجودة بالقرب من منطقة الجسر / الطريق؟

نعم كلا

س١٢:هل يحتاج المواطنون المقيمون بالقرب من الجسر / الطريق الى وضع اعلامات تحذيرية او استدلالية لزيادة معدلات الامن و الامان لمستخدمي الجسر / الطريق

نعم كلا

هلا جارين محمد