EMERGENCY ROAD REHABILITATION PROJECT

Environmental and Social Management Plan of Samawa – Nasiriya Road Rehabilitation Project

Ministry of Housing and Construction
State Commission for Roads and Bridges
January 2014
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### Abbreviations

1. AIM: Audit and Inspection Manager  
2. BP: Bank Policy  
3. BOD: Biological Oxygen Demand  
4. ECA: Environmental compliance Assessment.  
5. ECR: Environmental compliance Report.  
7. ERRP: Emergency Roads Rehabilitation Project  
8. MoCH: Ministry of Construction and Housing  
10. MoWSA: Ministry of Works and Social Affairs  
11. OP: Operational Policy  
12. PPE: Personal Protective Equipment  
13. SCRB: State Commission of Roads and Bridges.  
14. WB: World Bank
Executive summary

The Samawa – Nasiriya road rehabilitation project is part of the Component A.1 Highway Rehabilitation Works of the Emergency Road Rehabilitation Project (ERRP) financed by the World Bank’s loan. The implementing agencies for the ERRP are the Iraqi Ministry of Construction and Housing (MOCH) and the State Commission for Roads and Bridges (SCRB).

The objective of the ERRP is to improve the condition of roads assets by rehabilitating highly damaged segments of the country’s highway and rural road networks, re-establishing critical river crossings, and restoring the capacity to manage and maintain road assets. The ERRP aimed to benefit road users throughout Iraq, as well as promote the country’s economic integration, facilitate trade, and support reconstruction efforts across all sectors.

This Environmental and Social Management Plan was prepared to identify environmental and social impacts of upgrading the road section Samawa–Nasiriyah (both the construction and maintenance phases), and propose mitigation measures to address the negative impacts identified. The findings of the ESMP are presented in the management plan matrix.

Project description

The Samawa – Nasiriya road passes through the Al Muthanna governorate in Iraq. It is considered one of the vital transportation roads that link these two governorates. The road traffic is heavy. Heavy weight trucks, trailers, buses and personal cars use the road for the transportation of goods, people, and agricultural products. The total length of the road (covered by this study) is about 20km, separated in two segments 10km long each. The road width is 7.3 m. The road on both sides has a safe clearance of 3m each side.

The general objective of the project is to improve the transportation infrastructure in the area, which will stimulate transport and trade given the heavy usage of this road. In addition, it is to improve social and economic conditions for the local communities and for the road users.

The road rehabilitation will follow the existing alignment. The work will comprise repairs to damaged road surfacing, drainage cleaning and repairs, restoration of eroded shoulders and road furniture, re-installing stolen road signs and renewing pavement marking. The pavement layers for the remaining length will be aggregate base course and asphalt concrete wearing course.

The project works started in November 2011. The remaining works include: paving 16 km of the road section with asphalt concrete leveling course, 18 km with asphalt concrete binder course, 20 km with asphalt concrete wearing course, repairing culverts and stabilizing shoulders, making road marking and installing traffic signs.

The project area is flat land. The western side of the road contains scattered agricultural fields that are 400-700m away, while on the eastern side there are scattered faraway houses, and temporary buildings (400-600m away) used as resting and food service area. No domestic or agricultural structures or small commercial entities existed which encroached on the right of way (ROW); hence to relocation of any entity has been, or will be, required. The road section is located 1 to 10km south of the Euphrates River, and 85km away from the IBA of the Al-Hammar marshland (which is located to the south east of the project area).
Legal Framework
The project is subject to the Iraqi Environmental Law and its guidelines. Regarding the national legislation, the framework environmental law regulating amongst other requirements for EIA for infrastructure project is the Law for the Protection and Improvement of Environment No. 27, 2009. Other relevant national laws are: the law on Preservation of Water Resources from 2001, the 2008 law on the Ministry of Environment, and the law of Antiquities and Heritage of 2002. Iraqi laws do not currently include provisions for mitigation and/or compensation for entities and structures which have encroached on state-owned land. A gap thus exists between GOI laws and regulations and World Bank policies. Given this, World Bank policies apply in this case, as are outlined in the Environmental and Social Safeguards Assessment Framework (ESSAF) prepared for the ERRP. This activity falls under the ESSAF prepared for the ERRP, and the activity is compliant with the terms of the ESSAF.

Two Bank’s operational policies were triggered by the project. These are Environmental Assessment (OP/BP 4.01) and Involuntary Resettlement (OP/BP 4.12). According to the OP/BP 4.01 the project is classified as category B.

Environmental Baseline conditions
The baseline conditions allow assessment of the project impacts and their significance by comparing the existing situation with the predicted situation (affected by the project impacts). The baseline data include: climate, surface and groundwater quality, soil, topography, noise and vibration levels, air quality, traffic, biodiversity, socio-economic characteristics, cultural properties.

The project area has arid climate with the average annual precipitation of 50-80mm. The land adjacent to the road is flat with wide open areas. It is used for agriculture. The land is state owned and hence there are no issues related to land acquisition. The air quality in the project area is good. There are no significant sources of air pollution other than traffic emissions. The hourly noise levels do not exceed 55 dB. The Euphrates River is located 1 to 10km to the North of the road alignment. The groundwater level is 50-75m deep and it is brackish. Protected or endangered species were not reported in the vicinity of the road alignment. The nearest protected area the Hammar Marshes is located 85km SE of the road section. Al Sulaybiyat depression saline marshes are located 15-20km south of the road alignment but the area is of low ecological value.

Environmental & Social Impact Analysis
The study found that the Samawa - Nasiriya road rehabilitation project will have no significant negative impacts on the environment and local community during both the construction and the maintenance phases. There will be very minor effects on the flora and fauna, as the area has very scarce vegetation and wildlife. No impacts are predicted on the groundwater or surface water due to the distance to the Euphrates River (1-10km) and deep groundwater aquifer that is not suitable for human consumption or irrigation to its brackish conditions. The road has no impact on any archeological, heritage, and cultural sites, as the road area and its surrounding are free from such objects. From the social perspectives, there was no need for any land acquisition, as the road alignment area is state owned. Community displacement or resettlement will not take place due to the limited scope of works. No claims of any financial compensation were recorded either by individuals, tribes or establishment. Furthermore, there are no encroachers and squatters identified or recorded along the road alignment.
Any environmental and social impacts of the construction activities of the project are expected to be minor and short-term. The project activities with the highest number of identified negative impacts are: restoration of road surface; generation and disposal of construction waste. The physical aspects mostly affected by the road repairs/construction phase are: noise level and air quality (including dust). The significant positive and short-term impact of the project is generation of local employment during the road works.

**Mitigation Measures**

The key mitigation measures during the repairs/construction phase of the project include (see Table No 1):

- Avoid noisy operations at the night.
- Apply road watering during construction works and after heavy movements.
- Maintain vehicles and machinery in good condition to minimize gas emissions and noise.
- Avoid bitumen melting activities in open spaces.
- Ensure that construction preparations are located away from populated areas.
- Clear and clean underpasses for animal crossings.
- Minimize waste generation.
- General and construction waste must be stored in areas agreed with local communities and disposed of in the approved disposal sites.
- Refuse containers must be located at each worksite, and
- Establishment and operation of a citizens’ Grievance Redress Mechanism (GRM)

The total estimated costs of implementing meeting measures is expected to reach 12,000 USD.

**Environmental and Social Monitoring**

The Environmental and Social Monitoring Plan presents the monitoring arrangements during both the construction and the maintenance phases (see Table 2). It covers project activities from site preparation, through construction, commissioning, operation of the road. The plan relates to the handling of hazardous materials and wastes, emission and discharge monitoring. The plan will help to verify the effectiveness of the prescribed mitigation measures designed to guarantee and achieve the implementation of the ESMP recommendations. The cost of monitoring activities will include primarily cost of full time monitoring specialist, vehicle, fuel, camera and other equipment. It is estimated to reach 30,000 USD.

**Environmental and Social Management Plan**

Implementation of this ESMP will ensure that the project during construction and regular maintenance will meet regulatory and operational environmental performance requirements. Hence, the ESMP is essential to ensure that identified impacts are maintained within the allowable level, anticipated impacts are mitigated at an early stage, and the expected projects benefits are achieved. The overall implementation of the ESMP is the responsibility of the SCRB which includes qualified environmental and social specialists. Table 3 presents the ESMP matrix for the backlog repairs and maintenance phases. The total estimated costs of implementing the ESMP (mitigation measures and monitoring activities) is estimated to be 42,000 USD.
Table 1. Summary of general mitigation measures during the backlog works and repairs phase of the Samawa – Nasiriya road.

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Measure</th>
<th>Responsibility</th>
<th>Cost [USD]</th>
</tr>
</thead>
</table>
| 1   | Waste generation, storage and disposal | Proper solid waste disposal or liquid waste recycling at designated permitted sites  
Plan for solid and liquid waste management  
Periodic inspection of equipment maintenance | Contractor | 1,500 |
| 2   | Deterioration of air quality | Usage of well-maintained equipment  
Water spraying during dry periods and strong winds for dust control  
Cleaning of vehicle tires.  
Covering trucks carrying loose construction materials and fill to avoid dust generation | Contractor in coordination with the Supervising Consultant and the MoE | 2,500 |
| 3   | Increase of noise levels | Usage of quiet/well-maintained equipment  
Limiting noisy activities to normal daylight hours  
Inform the public about the location and timing of noisy activities  
Use of safety instructions and personal protective equipment by workers | Contractor | 1,000 |
| 4   | Damage to drainage system and groundwater | Keeping the drainage ditches and culverts unblocked by periodic cleaning  
Proper side sloping the road to prevent the accumulation of water on the road surface  
Storage of liquid materials (especially hydrocarbons) in sealed containers far away from the water sources in authorized dumpsites | Contractor in coordination with the Supervising Consultant and the MoE | 1,000 |
| 5   | Damage to fauna and flora | Planting trees at critical locations and known animal crossing pathways  
Periodic cleaning and maintenance of culverts to facilitate small animals crossing | Contractor | 500 |
| 6   | Traffic disruption | Informing the public about schedule of repairs/maintenance works  
Provision of temporary alternative access roads/ by-passes  
Traffic management  
Ensure traffic safety | Contractor in coordination with the traffic police | 2,500 |
| 7   | Health & Safety | Provision and use of personal protective equipment to workers  
First aid facilities must be available on site at all times.  
Helmets and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc.  
Installing construction and warning signs | Contractor in coordination with the Supervising Consultant and the MoE | 2,000 |
| 8   | Socio-economics | Shortening the road works period  
Informing the public and coordinating with them on the schedule of maintenance activities  
Provision of alternative access roads/ by-passes  
Establishment and operation of a citizens’ GRM  
Traffic management | Contractor in coordination with the MoWSA | 1,000 |

Total estimated costs of mitigation measures [USD]: 12,000
Table 2. Summary of General Monitoring activities during backlog repairs and maintenance phase and standard maintenance phase

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Parameters to be monitored</th>
<th>Location</th>
<th>Measurements (incl. methods &amp; equipment)</th>
<th>Frequency</th>
<th>Responsibilities (incl. review and reporting)</th>
<th>Cost [USD] (incl. specialists and equipment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste management</td>
<td>Waste type, quantity, and disposal Location of waste generation</td>
<td>Along the road</td>
<td>– Maintaining a record of type, quantity, and disposal location of solid and liquid waste generation</td>
<td>Daily</td>
<td>Supervising consultant in coordination with the MoE</td>
<td></td>
</tr>
<tr>
<td>Air quality</td>
<td>Dust, NOx, TSP, CO</td>
<td>Along road and at intersections</td>
<td>– Visual observation and photographic documentation of equipment induced emissions and dust clouds</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Hearing noise level</td>
<td>Along the road and at intersections</td>
<td>– Site supervision/inspection and documentation to ensure the implementation of mitigation measures</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td></td>
</tr>
<tr>
<td>Runoff water and drainage</td>
<td>Vegetation, culverts</td>
<td>Along the road</td>
<td>– Site inspection and photographic documentation of re-vegetation activities - Checking on culverts particularly following rainfall events</td>
<td>Once a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td>Cost of full time environmental monitoring specialist: 15,000 Cost of vehicle, fuel and camera: 15,000</td>
</tr>
<tr>
<td>Fauna and flora</td>
<td>Vegetation, animals</td>
<td>Along the road</td>
<td>– Site inspection and photographic documentation of excavation and re-planting activities</td>
<td>Once a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Congestion</td>
<td>Along road and at intersections</td>
<td>– Site supervision-inspection and photographic documentation</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with the SCRB</td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>Accidents and injuries</td>
<td>Along the road</td>
<td>– Inspection/supervision and photographic documentation - Maintaining a record of injuries and accidents specifying cause and location</td>
<td>Continuous</td>
<td>Supervising consultant in coordination with the SCRB</td>
<td></td>
</tr>
<tr>
<td>Socio-economics</td>
<td>Commercial activities</td>
<td>Along the road</td>
<td>– Site inspection and documentation of community activities along the road - Operation of the GRM</td>
<td>Continuous</td>
<td>Supervising consultant in coordination with the MoWSA</td>
<td></td>
</tr>
</tbody>
</table>

Total estimated monitoring costs [USD]: 30,000
### Table 3. Summary of ESMP during Backlog Repair and Maintenance Phase

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Mitigation Measures</th>
<th>Responsibility</th>
<th>Cost [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Waste generation, storage and disposal</td>
<td>Proper solid waste disposal or liquid waste recycling at designated permitted sites</td>
<td>Contractor</td>
<td>1,500 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plan for solid and liquid waste management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periodic inspection of equipment maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitoring Implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Deterioration of air quality</td>
<td>Usage of well-maintained equipment</td>
<td>Visual observation and photographic documentation of equipment induced emissions and dust clouds during excavation activities</td>
<td>2,500 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water spraying during dry periods and strong winds for dust control</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning of vehicle tyres. Covering trucks carrying loose construction materials and fill to avoid dust generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Increase of noise levels</td>
<td>Usage of quiet/well-maintained equipment</td>
<td>Site supervision/inspection and documentation to ensure the implementation of mitigation measures</td>
<td>1,000 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limiting noisy activities to normal daylight hours</td>
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<td></td>
<td></td>
<td>Inform the public about the location and timing of noisy activities</td>
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<td></td>
<td></td>
<td>Use of safety instructions and personal protective equipment by workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site supervision/inspection and photographic documentation</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Damage to runoff and drainage system</td>
<td>Keeping the drainage ditches and culverts unblocked by periodic cleaning</td>
<td>Site inspection and photographic documentation of drainage system and runoff during rains Checking on culverts particularly following rainfall events</td>
<td>1,000 plus monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proper side sloping the road to prevent the accumulation of water on the road surface</td>
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<tr>
<td></td>
<td></td>
<td>Storage of liquid materials (especially hydrocarbons) in sealed containers far away from the water sources in authorized dumpsites</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Impact on fauna and flora</td>
<td>Planting trees at critical locations and known animal crossing pathways</td>
<td>Site inspection and photographic documentation of culverts and re-planting activities</td>
<td>500 plus monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periodic cleaning and maintenance of culverts to facilitate small animals crossing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Traffic disruption</td>
<td>Informing the public about schedule of repairs/maintenance works</td>
<td>Site supervision-inspection and photographic documentation</td>
<td>2,500 plus monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of temporary alternative access roads/ by-passes</td>
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<td></td>
<td></td>
<td>Traffic management</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ensure traffic safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health &amp; Safety</td>
<td>Provision and use of personal protective equipment to workers. First aid facilities must be available on site at all times. Personal Protective Equipment (PPE) will be made available to all construction staff. Helmets and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. Installing construction and warning signs.</td>
<td>Inspection/supervision and photographic documentation. Maintaining a record of injuries and accidents specifying cause and location.</td>
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<tr>
<td>7</td>
<td>Socio-economics</td>
<td>Shortening the road works period. Informing the public and coordinating with them on the schedule of maintenance activities. Provision of alternative access roads/ by-passes. Traffic management.</td>
<td>Site inspection and documentation of community activities along road and documented. Maintenance of the citizens’ GRM.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Contractor in coordination with the Supervising Consultant and SCRB.</td>
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<tr>
<td></td>
<td></td>
<td>Total estimated cost of mitigation measures and monitoring activities [USD]:</td>
<td>42,000</td>
<td></td>
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</table>
1. Introduction

This report presents the Environmental and Social Management Plan of the Samawa – Nasiriya road rehabilitation project in Iraq. The Samawa – Nasiriya project is part of the Emergency Road Rehabilitation Project in Iraq – component A.1: Highway rehabilitation works. The road is located in the Al Muthanna governorate which is situation in south Iraq (see Figure 1.1).

The objectives of this ESMP are to provide:

- Prediction of negative environmental and social impacts of the road construction.
- Mitigation measures that will reduce predicted impacts.
- Practical and achievable plans to ensure that the project’s environmental requirements are covered.
- An integrated plan for monitoring, assessing and controlling potential environmental and social impacts.
- Local, State and authorities with a common focus for approval of conditions and compliance with policies and conditions.

![Figure 1.1. Location of the Al Muthanna governorate](image-url)
1.1 Objectives of the ESMP

The specific objectives of this ESMP are:

- Ensure that significant positive and adverse environmental and social impacts are identified.
- Mitigate negative impacts and avoid irreversible damage to the environment and people.
- Prepare environmental and social management and monitoring plan for the proposed project.
- Ensure that environmental and social factors are considered in the decision-making process of the proposed road upgrade including through effective consultation with potentially affected persons and stakeholders.
- Where necessary, provide guidelines for project design to ensure its fulfillment with the compliance and mitigation measures.

1.2 Project description

The Samawa – Nasiriya road rehabilitation project is part of the Component A.1 Highway Rehabilitation Works of the Emergency Road Rehabilitation Project (ERRP) financed by the Bank’s loan. The implementing agencies for the ERRP are the Iraqi Ministry of Construction and Housing (MOCH) and the State Commission for Roads and Bridges (SCRB).

The objective of the ERRP is to improve the condition of roads assets by rehabilitating highly damaged segments of the country’s highway and rural road networks, reestablishing critical river crossings, and restoring the capacity to manage and maintain road assets. The ERRP aimed to benefit road users throughout Iraq, as well as promote the country’s economic integration, facilitate trade, and support reconstruction efforts across all sectors.

The road is located in the Samawa governorate. The road section Samawa – Nasiriya is 20km long and the road width is 7.3m. The road has a safe clearance of 3m on each side. The road rehabilitation will follow the existing alignment. The photographic evidence of the road condition is presented in Annex 1.

The work will comprise repairs to damaged road surfacing, drainage cleaning and repairs, restoration of eroded shoulders and road furniture, re-installing stolen road signs and renewing pavement marking. The pavement layers for the remaining length will be aggregate base course and asphalt concrete wearing course.

The construction materials will be brought to the site from the neighboring governorates of Wasit (crushed sand and gravel: from Badra and Jassan quarries) and Najaf (granular materials and natural sand: from the Najaf quarry).

1.3 Project road status

The contract for road works was signed on 27 October 2011. The works have started in November 2011. As of July 2013 the contractor has milled all the road, treated all cracks, paved an asphalt concrete leveling course for milled area from Sta. (0+00) to Sta. (4+00) and paved an asphalt concrete binder course from Sta. (2+00) to Sta. (4+00). Some bleeding of the exposed asphalt is noted due to extensive traffic on the pavement without the new asphalt layers being put in place as planned. This may require additional milling to be undertaken.

The remaining works include: paving 16 km of the road section with asphalt concrete leveling course, 18 km with asphalt concrete binder course, 20 km with asphalt concrete wearing course, repairing culverts and stabilizing shoulders, making road marking and installing traffic signs.
1.4 Site description

The Samawa – Nasiriya road which passes through the Al Muthanna governorate in south Iraq. The project area is flat and very sparsely populated. There are scattered agricultural fields on the western side of the road (400-700m away). On the eastern side there are scattered faraway houses, and around (400-600m) from the side road there are some temporary building, used as resting and food service area during religious occasions. The nearest settlement is the small town of Al Khidir located 1km north of the road alignment. Figures 1.2 and 1.3 show the aerial view of the road area. Annex 1 presents photographic evidence of the project area.

Figure 1.2. The wider aerial view of the road area.

Figure 1.3. The aerial view of the road area.
2. Legislative and Regulatory Considerations

2.1 National Environmental Legislation

The project is subject to the Iraqi Environmental Law and its guidelines. The existing national environmental laws, regulations and instructions in Iraq relevant to the scope of this project are presented in table 2.1.

Table 2.1. National Environmental Legislation in Iraq

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Relevant Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Law for the Protection and Improvement of Environment No. 27, 2009</td>
<td>This law addresses the following major points:</td>
</tr>
<tr>
<td></td>
<td>o The establishment of the Environmental Protection Council/Office which will oversee the implementation of environmental protection across the country;</td>
</tr>
<tr>
<td></td>
<td>o The environmental protection provisions such as importance of conducting Environmental Impact Assessment for projects that may impact the environment;</td>
</tr>
<tr>
<td></td>
<td>o The water protection from contamination, air quality protection and control of noise emissions, land protection, ecological protection and hazardous waste management.</td>
</tr>
<tr>
<td>The Forestry Law, No. 30, 2009</td>
<td>This law addresses the following major points:</td>
</tr>
<tr>
<td></td>
<td>o Enhancing the environmental situation and combat desertification;</td>
</tr>
<tr>
<td></td>
<td>o Protection and control of forests, trees.</td>
</tr>
<tr>
<td>The Law for the Ministry of Environment No. 37, 2008</td>
<td>This law addresses the following major components:</td>
</tr>
<tr>
<td></td>
<td>o The structure of the Iraqi Ministry of Environment, their goals and methods of implementation;</td>
</tr>
<tr>
<td></td>
<td>o The law requires an agency that carrying out activities with potential environmental effects to prepare an environmental impact assessment.</td>
</tr>
<tr>
<td>Law on the protection of Wild Animals and Birds No. 17, 2010</td>
<td>This law aims to protect wild animals and birds as a national resource and organize hunting areas and procedures for granting hunting permits and to identify illegal hunting practices.</td>
</tr>
<tr>
<td>Public Health Law No. 89 , 1981</td>
<td>This law discusses the country’s role in the provision of health, and the importance of health awareness among all citizens, in addition to the provision of a healthy environment within the work place.</td>
</tr>
<tr>
<td>The Regulation for the Protection of Rivers No. 25, 1967 (and Instruction Corrections issued in pursuance to provision of article 16 of the regulation)</td>
<td>This law defines the following major components:</td>
</tr>
<tr>
<td></td>
<td>o The water resources;</td>
</tr>
<tr>
<td></td>
<td>o The water contamination;</td>
</tr>
<tr>
<td></td>
<td>o The required physical, chemical and biological measurements of water components and acceptable limit values;</td>
</tr>
<tr>
<td>The Law of Antiquities and Heritage No. 55, 2002</td>
<td>This law regulates the following major items:</td>
</tr>
<tr>
<td></td>
<td>o The communication channels between the public and authorities for each type of contact between the public and the revealed and non-revealed archaeological sites;</td>
</tr>
<tr>
<td></td>
<td>o Discussion of the development activities such as road construction and rehabilitation wherever these developmental activities lay within archaeological areas vicinity.</td>
</tr>
<tr>
<td>Regulation for the Preservation of Water Resources, No.2, 2001</td>
<td>This regulation states the prohibited practices in terms of discharging any kind or amount of waste to any water body, unless permission was granted by the office of protecting and improving the environment.</td>
</tr>
</tbody>
</table>

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2.2 Environmental and Social Impact Assessment Requirements

Articles 10 of the Law for the Protection and Improvement of Environment No. 27, 2009 describes the procedures related to EIA studies as follows:

A project owner must be committed with providing an EIA Study prior to project commencement. The EIA study must include the following:

- Assessment of positive and negative impacts as a result of project activities;
- Propose mitigation measures to prevent or treat contamination and pollution sources in accordance with the acceptable environmental standards and guidelines.
- Adopt and discuss measures for the prevention of potential contamination and emergency pollution.
- Assessment of alternatives in terms of utilizing proper means/technology that cause the least impact to the environment; in addition to rationalizing and managing the consumption of resources.
- Reduce and manage wastes and adopt measures for reuse of recycling wherever possible.
- Estimating the environmental feasibility of the project and estimate the cost of pollution to production ratio.

The technical and economic feasibility study for any project must include the EIA study as described in the first item.

Article 11 of the Law stipulates that any entity’s activities that may impact the environment are prohibited from performing its activities without the approval from the Ministry of Environment. The relevant law that applies in terms of social safeguards issues is The Republic of Iraq’s Acquisition Law, No. 12 of 1981, which says the State has the right to remove encroachers and settlers on State-owned land without compensation. Hence, a gap exists between GOI laws and regulations and the World Bank’s OP4.12 policy in those national laws provide for removal of encroachers without mitigation/compensation. However, the ERRP operates under the ESSAF guidelines prepared and negotiated for the project, which specifies that no project activities may be undertaken where there is a need for relocation of project affected people. In the case of the Samawa-Nasiriya road works it has been confirmed that no relocation of encroachers is required. Consequently, the project activity is in compliance with the ESSAF provisions.

2.3 World Bank Safeguard Operational Policies

The World Bank has ten operational safeguard policies which apply to various development projects which the Bank is either implementing or funding. The purpose of these policies is to ensure that social and environmental risks are prevented or at least minimized while increasing socio-economic benefits of approved projects in addition to preserving the environment.

These policies have been a means to increase the effectiveness and positive impacts of development projects and programs supported by the Bank.

The Bank’s 10 safeguard policies include:
With respect to this project, two key policies were triggered. These are Environmental Assessment (OP/BP 4.01) and Involuntary Resettlement (OP/BP 4.12). Additionally, it should be noted that this activity operates under the ESSAF prepared for the ERRP and complies with the ESSAF in that no encroachment on state-owned land in the project activity area and, hence, no need for relocation of project affected people.

- **OP/BP 4.01** - the key Operational Policy describing the environmental assessment procedure. The Bank requires environmental assessment of projects proposed for Bank financing. The objectives of the EA are to:
  - Ensure that projects proposed for Bank financing are environmentally and socially sound and sustainable.
  - Inform decision makers of the nature of environmental and social risks.
  - Increase transparency and participation of stakeholders in the decision-making process.

- **Involuntary resettlement OP/BP4.12**, which focus 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.

The potential environmental and social impacts of the construction and/or rehabilitation works of the proposed road alignment are typical of category B projects.
3. Environmental baseline conditions

The baseline conditions allow assessment of the project impacts and their significance by comparing the existing situation with the predicted situation (affected by the project impacts). The baseline components include: climate, surface and groundwater quality, soil, topography, noise and vibration levels, air quality, traffic, biodiversity including flora, fauna, rare or endangered species, socio-economic characteristics.

3.1 Climate

Samawa governorate is located in the southern part of Iraq and has an arid climate with the highest temperatures in July and August reaching over 45\(^{0}\)C. The lowest temperatures are recorded in January. They can reach 5\(^{0}\)C.

3.2 Rainfall

The annual rainfall in the project area ranged from 76.2 - 47mm between 2001 and 2010. The rain falls during the winter months. Occasionally, heavy rain falls in a single day during the winter.

3.3 Wind velocity

The average wind velocity is approximately 2.3m/sec. There are not many variations in the wind velocity between months. Stronger winds are usually recorded in the spring.

3.4 Site Topography

The area surrounding the road section Samawa – Nasiriya represents an extension of the flat plateau areas that stretches from the middle of Iraq till the mid-southern parts of the country. No specific terrains or natural land are present in the project area. All surrounded areas adjacent to the road are flat with wide open areas.

3.5 Land use

The land of the area surrounding the road alignment is used primarily for agriculture. The local community living along the road section relies on farming based on irrigation as the main source of revenue. The main cultivated crop is wheat.

The land is state owned and hence there are no issues related to land acquisition. No additional land is required for the project. Involuntary nor voluntarily relocation of people and any individuals are not needed.

3.6 Geology

Samawa city and its suburban area are situated in the basin of the lower reaches of the Euphrates River. The alluvial soil is dominant in this region. The underlying rocks are silt-clay strata. No Seismic activities have been recorded for more than 25 years.
3.7 Air quality

The Ministry of Environment has established an air quality monitoring network which was implemented under the Emergency Environment Management Project that was financed by the Multi-donor Iraq Trust Fund. Ten fixed stations: 6 in Baghdad, 2 in Mosul and 2 in Al-Basra and all 15 Governorates were provided with portable air quality monitoring equipment.

Efforts were made to collect data on air quality within the project area but no results were achieved. The data from the Samawa city is used as proxy. In general the project area is comprised of agricultural lands that do not include any major sources of air pollution. Traffic on the existing road is considered a source of pollution considering the high volume of trucks using the road. Table 3.1 shows the average daily concentration of four air pollutants in the Samawa city (according to the State of Environment Report, 2008 issued by the MoE). The data shows that the average daily SO$_2$, NO$_2$ and CO concentrations in the air are well below the WHO and US EPA maximum allowable concentration standards.

Table 3.1. The average (daytime) concentration (mg/m$^3$) of SO$_2$, NOx and CO in Samawa

<table>
<thead>
<tr>
<th></th>
<th>SO$_2$</th>
<th>NO$_2$</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO:</td>
<td>0.002-0.0041</td>
<td>0.008-0.03</td>
<td>0.21-0.78</td>
</tr>
<tr>
<td>US EPA</td>
<td>0.02mg/m$^3$</td>
<td>0.2mg/m$^3$</td>
<td>9mg/m$^3$</td>
</tr>
</tbody>
</table>

3.8 Noise

The site visit reveals no significant noise emissions caused by traffic and affecting the nearby population. The WHO limits value of 55 dB and the MoE standard limit of the noise level of maximum 70dB are not exceeded outside of the road alignment (State of Environment reports, 2009, 2010).

3.9 Surface and groundwater

The road alignment passes parallel to the Euphrates River which is situated north of the road section in a distance of 1 to 10km. Flooding of the road has not been reported in the past 40 years. The Euphrates is polluted with chemicals from agriculture, industry, and sewage making it an unreliable source for domestic use and restricting it for other usage (particularly below Baghdad). There are many sources of the Euphrates water pollution including petroleum fuels and by-products, sewage, solid waste, heavy metals, herbicides, pesticides, radioactive waste, toxic wastes, nutrient and sediments. The water quality in the project area is affected by high suspended solids (above 50 mg/l), BOD (5-10 mg/l) and increased salinity.

The depth of ground water in the area ranges from 50-75m, and is brackish. The flow of the groundwater is from the south-west to north-east of the project according to the hydraulic gradient. The groundwater in the project area is not used for human consumption or irrigation.
3.10 Biodiversity and endangered species

The project area is located in the Arabian Desert and Saharo-Arabian xeric shrub lands ecoregion. This desert and semi-desert ecosystem is one of the largest ecoregions in Iraq. The biodiversity of this region is the least known in the country. Several uniquely adapted plants are likely to exist in this region e.g. several members of the chenopodiaceae family (Salsola sp. Atriples sp, Sueda sp. etc.) and others Artemisia sp. Achilea sp. Tamarix sp.

This region was known to contain mammal species such as wolves, hyenas, gazelles, wild boars, fox, bats and others. Several species have probably been eradicated from the area such as Arabian Oryx (Oryx leucoryx) and Asiatic Cheetah (Acinonyx jubatus). Spiny-tailed lizards (Uromastyx sp).

Some of the common desert birds found in this ecoregion include: Steppe Eagle (Aquila nipalensis), Bar-tailed Lark (Ammomanes cincture), Temminck's Lark (Eremophila bilopha), Eurasian Eagle Owl (Bubo bubo), Macqueen’s Bustard (Chlamydotis macqueenii), Spotted Sandgrouse (Pterocles seneggallus), Cream-coloured Courser (Cursorius cursor), Desert Wheatear (Oenanthe desertii), and Desert Finch (Rhodospiza obsoletus). Breeding birds in this biom include SaroArabian breeding communities as follows: Ammomanes deserti, Pycnonotus leucoti, Turdoides altirostris, Oenanthe lugens and Rhodospiza obsoletus. Reports indicates that in the area an active hunting of the Macqueen’s Bustard (Chlamydotis macqueenii) is taking place.

The road section passes near the Euphrates hosting (especially in the wetlands located 80km, to the south east) species of water birds including: Sterna hirundo and S.albifrons that breed on islands within flooded areas around Euphrates and Cursorius cursor, Merops superciliosus and Pycnonotus leucotis that breed in the surrounding area. Wintering species include several waterfowls of Anser anser, Tadorna ferruginea, Mergellus albellus, and Grus grus.

This Arabian Desert ecoregion is endangered due changes to traditional land management resulting in overgrazing by camels and goats, off-road vehicles, agricultural and irrigation projects, as well as un-assessed impacts from past and current conflicts. Many species have declined or became extinct in this area due to hunting and human encroachment.

The wildlife of the project area is scarce. Protected or endangered species are not recorded along the road alignment. The Al Sulaybiyat salty marshes are located in a depression 15 to 20km to the south of the road alignment. They are reported of low ecological value.

3.11 Heritage Environment

The road alignment does not pass through any historical or cultural sites. There are no sites of historical or cultural importance in the area. The nearest settlement is the small town of Al Khidir located 1km north of the road alignment.
4. Environmental and Social Impacts of the Project

This section of the report describes the potential environmental impacts that are likely to result from repairs, construction and maintenance of the road. The maintenance phase of the project will have a very limited scope of works in comparison to the backlog repair works. Hence, the predicted impacts of the maintenance phase of the project will be substantially more limited than the impact predicted for the construction phase.

4.1 Impact scoping

During the field work, scoping was used to identify the key potential impacts that should be given more attention. Scoping was primarily conducted as expert exercise. However, input from the local communities during this process were also considered and incorporated.

Table No. 4.1 below provides a matrix of potential impacts associated with the implementation of the sub-project and likely to occur. The key activities during backlog repairs and maintenance activities are listed against physical resources, natural resources and social issues. The estimated magnitudes of impacts are also presented.

The scoping exercise indicated that minor environmental and social impact are expected such as waste generation and debris, soil erosion, noise, air quality (including dust), temporary disruption of traffic circulation, and higher safety risks. Since this project does not involve the construction of new roads, the negative impacts associated with resettlement and land acquisition are not expected.

The impact scoping exercise shows also beneficial impacts of the project primarily related to local jobs creation and local economic development.
Table 4.1. Impact Scoping Matrix for the Backlog Repairs and Maintenance Phase.

<table>
<thead>
<tr>
<th>Impact Category</th>
<th>Physical Resources</th>
<th>Natural Resources</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Generation and handling of debris and construction waste</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>Restoration of eroded shoulders</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Trucking materials</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drainage system restoration and repairs</td>
<td>-1</td>
<td>0</td>
<td>B</td>
</tr>
<tr>
<td>Road resurfacing</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Renewing pavement marking</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Storage of diesel/oils</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Operation of labour camp</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend: 0 = no adverse impact; -1 = Low adverse impact; -2 = Medium adverse impact; -3 = High adverse impact; B = Beneficial impact (bold – high)
4.2 Specific Impacts

4.2.1 Impacts of Waste Generation and Handling

The project activities will generate construction waste (tar, sub-base, used gravel) during the repairs and maintenance works. Improper disposal of waste can destroy agricultural land adjacent to the road sections. Construction waste generation is also expected where segments of the road require reconstruction (scraped tarmac and shoulders fixing). During maintenance works, excess fill material asphalt scrapping will be generated.

Another important waste generation is expected from cleaning of the blocked drainage system. The generated waste should be stored temporarily in locations agreed with the local communities, reused in road construction and ultimately disposed of in designated areas.

The temporary storage of debris and fill materials may lead soil erosion, and damage to soil and agricultural land.

Waste generation may arise at the contactor’s base camp and work site as a result of inadequate provision and use of sanitary and waste facilities and spillage or leakage of polluting substances. Organic waste from labour camps may lead to local contamination of groundwater.

Overall, the expected volume of construction and general waste is low. The impact during the backlog repairs phase is predicted to be minor, local and short-term. The impacts during the standard maintenance phase are negligible due to the smaller scope of works and volume of waste involved.

4.2.2 Soil Erosion, Mineral Extraction and Visual Intrusion

During the backlog repairs activities, any excavation and earth removal activities render slopes and topsoil more vulnerable to erosion – especially during the rainy season. In addition to soil erosion, excavations can result in visual impact on the landscape. No such impacts are expected during the standard maintenance activities as these usually do not required earth removal and excavation works.

The indirect impact of the backlog repairs is quarrying of construction granulates and their haulage. The construction materials will be brought to the site from different quarries located in the adjacent governorates. The quarries are located more than 10km away from the road alignment and not adjacent to residential areas. Their operation will have no impact on the road alignment. The quarrying operations will lead to minor increase of the overall volume of extraction, and hence will result in minor increase of impacts within the quarries.

Soil erosion caused by backlog repair works can cause negative impacts agricultural land, soil and vegetation, especially during rainy season. The soil erosion impact is minor, localized and reversible. Soil erosion is not expected during the standard maintenance phase due to the limited scope of works. The additional indirect impacts of quarrying will have no adverse impacts on the road alignment as the quarries that will be used for extraction of sand and gravel are located in a distance of more than 10 km from the Samawa – Nasiriya road.
4.2.3 Impacts of dust and vehicles emissions on Air Quality

During the backlog repairs phase, air quality can be affected negatively by dust generated by excavation works, transport and storage of fill materials and granular materials from the quarries, and construction waste, removing of the older layers of the pavement, resurfacing, cleaning of culverts as well as gaseous emissions from operation of equipment such as dozers, excavators, trucks. The dust arisings and emissions to air will be limited to less than a 100m wide corridor along the road.

The nature of impacts during the backlog repairs phase on air quality impact is temporary, localized, limited, minor and reversible. Impacts during the maintenance phase are predicted to be negligible due to limited and localized interventions.

4.2.4 Traffic disturbance

During the backlog repairs works and standard maintenance phase, traffic flow along the road undergoing the construction and repairs activities will be disturbed. This effect is very temporary. The traffic flow will be affected because one lane of the road might need to close temporarily which will affect traffic movement. This may lead to short-term traffic delays and impact on local economic life.

This impact is very short term, localized and minor (during both backlog repairs and standard maintenance phase).

4.2.5 Increased level of Noise and Vibration

Noise impacts are expected to increase during the backlog repairs works on the road, due to the use of construction machinery. As estimated considering the major construction equipment to be used, the daytime noise levels must be within the applicable standards of 85 dB when the noise receptor is at a distance of 50m or more from the noise source. No such levels are expected to be exceeded.

Noise emissions will be much lower during the maintenance phase due to much smaller scope of works that will involve less heavy machinery.

In both phases, the area that may be potentially impacted would typically be limited to less than a 100 m wide corridor along the road and the associated increase in noise level is expected to be less than 10 dBA.

The nature of this impact during the backlog repair works is temporary, localized, minor and reversible. The noise and vibration impacts during the standard maintenance phase are predicted to be negligible.

4.2.6 Impacts on Surface Water and Ground Water

According to the field visits findings, there would be no impacts on the water supply system caused by the road works. This is due to limited scope of works of the project (road repairs and rehabilitation). The field surveys did not reveal any water pipes underneath or crossing the road.
There are no wells in the project area. The groundwater level is 50-75m deep. The groundwater is brackish and not suitable for consumption and irrigation. The effects on groundwater quality are associated with drainage and soak away sinks. Contamination of ground water may be caused also by hazardous wastes and spill. The risk is considered negligible as no significant spillages were reported in the past 20 years.

The road alignment is located in a distance of 1-10km from the Euphrates River and so it will not impact on the water quality.

*The project impact on surface and groundwater, and water supply is minor during both the backlog repairs and the maintenance phase.*

4.2.7 Impacts on Runoff Water and Drainage

According to the survey data, there are several locations where drainage culverts are filled with accumulated sand and other debris. Cleaning of drainage culverts will require unskilled workers, and thus it will create job opportunity for the local population. During standard maintenance phase, the issue of runoff water is not expected to be cause of concern. The periodic cleaning of culverts should be conducted.

*This type of impact is localized and negligible.*

4.2.8 Impact on Fauna and Flora

The road repair/maintenance works will not cause adverse impacts on the wildlife as there will be no significant noise disruption or no effluent discharges. The works will not cause fragmentation of ecosystem as side fencing will not be installed. The project does not traverse any known biodiversity hotspot, nor is it close to any area identified as neither having particular biodiversity value nor hosting endangered species. Therefore, the activities from the backlog repairs as well as maintenance are not expected to have any negative impact on fauna.

*The nature of this impact is negligible during both the backlog repairs and standard maintenance phases.*

4.2.9 Health and Safety Conditions

The road works will increase the risk of car accidents due to traffic disruption, temporary deterioration of road surface. The road works will create the risk of work accidents resulting from the use of heavy construction equipment.

Road works activities pose potential risk to the safety of workers as well as the general public through traffic disturbance or negligent-careless use of heavy equipment.

*The nature of this impact is temporary, localized, minor and reversible.*
4.2.10 Heritage environment

As the project is not near any cultural, archeological and historical sites, the backlog repairs and standard maintenance works will have no impact on archaeology or cultural heritage. No cemeteries, historical-cultural monuments, churches, mosques near the project need to be removed in order to construct the road.

4.2.11 Socio – Economic

During backlog works the project will generate local employment opportunities in the area for both skilled and unskilled labor. Negative socio-economic impacts include disruption of traffic and social impacts of the workers camps. The project activities are being undertaken in what is a very sparsely populated area and no entities have been found which encroach on the ROW or other state-owned land in the immediate Corridor of Impact (COI). Hence, there are no people associated with the road works who will be adversely affected through the need to relocate, or whose livelihoods will be adversely affected by the road works activities.

The main economic benefits generated by the project will vehicle operating cost savings, reduced travel time, cost savings from reduced accidents. The benefits from a reduction in the number and severity of accidents an important element of the economic benefits. No land acquisition is necessary under the project and no voluntary land donations are required.

The socio-economic impacts of the maintenance phase on inhabitants can be minimized by adopting traffic management plans to ensure a safe and efficient movement of traffic during maintenance as well as by informing the public about the schedule of road works activities.
5. Mitigation Measures

5.1. The purpose
To further assure environmental sustainability of the project, mitigation measures are presented. The mitigation measures are proposed for the potential impacts associated with both the backlog repairs and maintenance phases of the project. The mitigation measures will prevent or reduce potential negative impacts and enhance positive effects of the project (see Table 5.1).

Contractors are responsible for adhering to these mitigation measures and implementing them throughout the duration of their contracts in coordination with the Supervising Consultant and the SCRF. The total costs of implementing mitigation measures is expected to reach 12,000 USD. The cost of mitigation measures will be a part of the contractor’s fees and shall be disbursed at the completion of a project upon satisfactory compliance with the mitigation plan.

5.2. Mitigation Measures for Impacts of Waste Generation
The mitigation measure for the construction and resurfacing waste (including shoulders) is to remove the excess material and dispose it in designated areas. In addition, the mitigation for waste generation during cleaning of the blocked drainage is to dispose the waste at vacant land agreed with the local population.

The contractor should provide waste containers and sanitation facilities for the construction camp. All contractors must define and commit to a clear plan for solid and liquid waste management for the SCRB approval prior to initiating repair and maintenance activities. Information signs should be installed for road users about proper disposal of empty diesel, fuel oil containers along the road alignment. The conditions of equipment used by the contractor should be periodically monitored.

5.3. Mitigation Measures for Impacts on Air Quality
The short-term impacts of road works on air quality can be effectively mitigated. The mitigation measures include:

- Maintained equipment and project vehicles in good conditions.
- Using good quality fuel to reduce exhaust emissions.
- Cleaning of vehicle tyres.
- Spraying of water during dry periods and strong winds to reduce dust generation.
- Covering trucks carrying fine construction materials and fill to avoid dust generation.

The gaseous impact will be limited to less than a 100m wide corridor along the road and no impact is expected on the neighboring habitat. During the standard maintenance phase, gaseous emissions can be reduced by using good quality fuel and keeping equipment in good conditions to control mufflers emissions.
5.4. Mitigation Measures for Impacts of Noise and Vibration

The impact of road works on noise levels can be mitigated and reduced by using well maintained equipment, and limiting noisy activities to normal daylight working hours. The contractor should also inform the public about the location and timing of noisy activities.

The increase of noise levels during the maintenance phase will be very minor due to limited scope of works. The mitigation measure that should be applied is limiting road works to daytime hours. Road workers need to receive safety instructions and personal protective equipment.

5.5. Mitigation measures for impacts on drainage system and groundwater

The mitigation measures against the blockage of cross culverts during road works are to control sediment runoff into culverts, cleaning of clogged culverts and side sloping. This type of work is labor intensive which will create job opportunity for the local population.

Mitigation measure for protecting groundwater from hydrocarbon pollution is to store fuel, lubricants and solvents in sealed containers, and conducting refueling and small repairs on paved surfaces.

During the maintenance phase, the impact on drainage system and groundwater is negligible due to the limited scope of works. Any blockages of culverts will require periodic cleaning.

5.6. Mitigation Measures for Impacts on Fauna and Flora

The project does not traverse any known biodiversity hotspot, nor is it close to any area identified as having particular biological values such as (birds and sensitive animals). Periodic cleaning and maintenance of culverts will need to be applied to facilitate small animals crossing. Trees planting can be applied at critical locations known as animal crossing pathways.

5.7. Mitigation Measures for Impacts on Traffic

The impact of the road works activities on traffic can be mitigated by measures including: (i) informing the public about the location and length of time expected for temporary traffic disruption; (ii) the provision of alternative access roads during road works (such as to the Al Khidir town); (iii) on the spot traffic management.

5.8. Mitigation Measures for Impacts on Human Safety

Road workers need to receive safety instructions and personal protective equipment. First aid facilities must be available on site. Construction signs should be used to avoid accidents. Implementation of traffic management plan and bypasses in the working areas should be organized to establish a safe working environment.

5.9. Mitigation Measures for Social and Economic Impacts

The socio-economic impacts of the project on the nearby local communities (especially those of the Al Khadir town) can be minimized by shortening the works period, adopting traffic management plans to ensure a safe and efficient movement of traffic during road works, as well as by informing the public about the schedule of road works activities.
Table 5.1. Summary of general mitigation measures during the backlog works and repairs phase of the Samawa – Nasiriya road.

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Measure</th>
<th>Responsibility</th>
<th>Cost [USD]</th>
</tr>
</thead>
</table>
| 1   | Waste generation, storage and disposal | Proper solid waste disposal or liquid waste recycling at designated permitted sites  
|     |                               | Plan for solid and liquid waste management  
|     |                               | Periodic inspection of equipment maintenance | Contractor | 1,500      |
| 2   | Deterioration of air quality  | Usage of well-maintained equipment  
|     |                               | Water spraying during dry periods and strong winds for dust control  
|     |                               | Cleaning of vehicle tyres  
|     |                               | Covering trucks carrying loose construction materials and fill to avoid dust generation | Contractor | 2,500     |
| 3   | Increase of noise levels      | Usage of quiet/well-maintained equipment  
|     |                               | Limiting noisy activities to normal daylight hours  
|     |                               | Inform the public about the location and timing of noisy activities  
|     |                               | Use of safety instructions and personal protective equipment by workers | Contractor in coordination with the Supervising Consultant and the MoE | 1,000      |
| 4   | Damage to drainage system and groundwater | Keeping the drainage ditches and culverts unblocked by periodic cleaning  
|     |                               | Proper side sloping the road to prevent the accumulation of water on the road surface  
|     |                               | Storage of liquid materials (especially hydrocarbons) in sealed containers far away from the water sources in authorized dumpsites | Contractor in coordination with the Supervising Consultant and the MoE | 1,000     |
| 5   | Damage to fauna and flora     | Planting trees at critical locations and known animal crossing pathways  
|     |                               | Periodic cleaning and maintenance of culverts to facilitate small animals crossing | | 500       |
| 6   | Traffic disruption            | Informing the public about schedule of repairs/maintenance works  
|     |                               | Provision of temporary alternative access roads/ by-passes  
|     |                               | Traffic management  
|     |                               | Ensure traffic safety | Contractor in coordination with the traffic police | 2,500     |
| 7   | Health & Safety               | Provision and use of personal protective equipment to workers  
|     |                               | First aid facilities must be available on site at all times.  
|     |                               | Helmets and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc.  
|     |                               | Installing construction and warning signs | Contractor in coordination with the Supervising Consultant and the MoE | 2,000     |
| 8   | Socio-economics               | Shortening the road works period  
|     |                               | Informing the public and coordinating with them on the schedule of maintenance activities  
|     |                               | Provision of alternative access roads/ by-passes  
|     |                               | Establishment and operation of a citizens’ GRM  
|     |                               | Traffic management | Contractor in coordination with the MoWSA | 1,000     |

Total estimated costs of mitigation measures [USD]: 12,000
6. Monitoring

Environmental monitoring of the road will be conducted to ensure that mitigation measures are complied with. Environmental monitoring will allow unwanted environmental and social impacts to be detected early and remedied effectively. It will also validate the impacts predicted in the ESMP and the effectiveness of the proposed mitigation measures. Lastly, it will also demonstrate compliance with national and International regulatory requirements. Table 6.1 presents the monitoring arrangements during the backlog repairs phase of the project.

The monitoring activities for both environmental and social measures of this project will be the responsibility of the environmental and social specialists’ of supervision consultant. Monitoring activities will rely primarily on field observations, feedback from stakeholders and other affected people, and documentation of their reactions to the project works and their perception of the adequacy of the mitigation measures. Photographic documentation will be required in the continuous and regular monitoring. The cost of the monitoring activities will include one full time environmental specialist, vehicle, fuel, camera, and other equipment/meters if needed. The total monitoring costs is expected to reach 30,000 USD.

The World Bank will monitor the implementation of the ESMP. In particular the Bank must ensure that proper monitoring takes place and that the reports are filed regularly. Should these reports indicate incomplete monitoring of specifically identified social issues; these will be reported to the responsible staff in the SCRB.

Table 6.1. Summary of Monitoring activities during backlog repairs and maintenance phase.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Parameters to be monitored</th>
<th>Location</th>
<th>Measurements (incl. methods &amp; equipment)</th>
<th>Frequency</th>
<th>Responsibilities (incl. review and reporting)</th>
<th>Cost [USD] (incl. specialists and equipment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste management</td>
<td>Waste type, quantity, and disposal Location of waste generation</td>
<td>Along the road</td>
<td>Maintaining a record of type, quantity, and disposal location of solid and liquid waste generation</td>
<td>Daily</td>
<td>Supervising consultant in coordination with the MoE</td>
<td>Cost of full time environmental monitoring specialist: 15,000</td>
</tr>
<tr>
<td>Air quality</td>
<td>Dust, NOx TSP CO</td>
<td>Along road and at intersections</td>
<td>Visual observation and photographic documentation of equipment induced emissions and dust clouds</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td>Cost of vehicle, fuel and camera: 15,000</td>
</tr>
<tr>
<td>Noise</td>
<td>Hearing noise level</td>
<td>Along the road and at intersections</td>
<td>Site supervision/inspection and documentation to ensure the implementation of mitigation measures</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with the MoE</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Frequency</td>
<td>Responsible Authority</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fauna and flora</td>
<td>Vegetation, animals. Along the road.</td>
<td>Once a week</td>
<td>Supervising consultant in coordination with MoE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>Congestion. Along road and at intersections.</td>
<td>Twice a week</td>
<td>Supervising consultant in coordination with SCRAB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>Accidents and injuries. Along the road.</td>
<td>Continuous</td>
<td>Supervising consultant in coordination with SCRAB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socio-economics</td>
<td>Commercial activities. Along the road.</td>
<td>Continuous</td>
<td>Supervising consultant in coordination with MoWSA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural and historical sites</td>
<td>Chance find of Cultural and/or historical significance items/structures.</td>
<td>Continuous</td>
<td>Supervising consultant in coordination with MoTA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total estimated monitoring costs [USD]: 30,000
7. Reporting and Auditing

After each inspection, a report shall be compiled that is location and activity specific. This shall identify areas of contractor’s non-compliance with the ESMP and provide guiding remarks on actions to be taken. The significance of the non-compliance shall also be noted. The E&S specialists shall prepare these reports and follow-up with the contractor to comply with all ESMP items or otherwise corrective actions would be taken. In addition, an annual report of all the environmental and social monitoring activities will be compiled by the SCRB and submitted to the Bank as part of the overall project.

All inspection and audit reports of environmental performance will be stored in the Audit and Inspection Manager (AIM). 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 auditing regime will be implemented:

a) All incidents or accidents during the operation be reported immediately by legal authorities and measures will be taken to comply with the environmental rules and regulations. Detailed reporting must be provided within days.

b) All corrective measures must be discussed to ensure compliance with laws and regulations.

c) Reports for personnel training on environmental issues or emergency practices must be produced.

d) Progress reports, environmental monitoring report and other inspections reports must be produced periodically and will include all necessary details.

Table 7.1 presents the proposed scheduling and reporting.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation Measures</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Monitoring</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Institutional Strengthening</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Training</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>
8. Environmental and Social Management Plan

The Purpose of the Environmental and Social Management Plan is to summarize findings of the study and establish a mechanism for implementation of mitigation measures addressing the expected negative impacts and monitor their efficiency.

The report includes specific management plan based on the findings of consultations with local stakeholders (see Table 8.1 below). The ESMP for this project will be reviewed in accordance with the World Bank guidelines and disclosed prior to the launching of the works contract.

The overall implementation of the ESMP is the responsibility of the SCRB, which includes qualified environmental and social specialists. The procedures of the SCRB are designed to incorporate, or “mainstream” environmental and social considerations into the overall process for road planning and implementation.

The total cost of implementing the ESMP (mitigation measures and monitoring activities) is estimated to reach 42,000 USD. The quantities, specifications and specific costs of design measures to avoid or mitigate negative impacts will be assessed by the technical engineers at the SCRB who will incorporate them into the works bidding documents. Other costs will be disbursed at the completion of the project upon satisfactory compliance with the mitigation plan.

Table 8.1. Summary of ESMP during Backlog Repair and Maintenance Phase

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Mitigation Measures</th>
<th>Responsibility</th>
<th>Cost [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Waste generation, storage and disposal</td>
<td>Proper solid waste disposal or liquid waste recycling at designated permitted sites</td>
<td>Contractor maintaining a record of type, quantity, and disposal location of solid and liquid waste generation</td>
<td>1,500 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plan for solid and liquid waste management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Periodic inspection of equipment maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Deterioration of air quality</td>
<td>Usage of well-maintained equipment</td>
<td>Visual observation and photographic documentation of equipment induced emissions and dust clouds during excavation activities</td>
<td>2,500 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water spraying during dry periods and strong winds for dust control</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning of vehicle tyres. Covering trucks carrying loose construction materials and fill to avoid dust generation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Increase of noise levels</td>
<td>Usage of quiet/well-maintained equipment</td>
<td>Site supervision/inspection and documentation to ensure the implementation of mitigation measures</td>
<td>1,000 + monitoring specialist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limiting noisy activities to normal daylight hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inform the public about the location and timing of noisy activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of safety instructions and personal protective equipment by workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Category</td>
<td>Description</td>
<td>Activities</td>
<td>Monitoring Specialist</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>4</td>
<td>Damage to runoff and drainage system</td>
<td>Keeping the drainage ditches and culverts unblocked by periodic cleaning Proper side sloping the road to prevent the accumulation of water on the road surface Storage of liquid materials (especially hydrocarbons) in sealed containers far away from the water sources in authorized dumpsites</td>
<td>Site inspection and photographic documentation of drainage system and runoff during rains Checking on culverts particularly following rainfall events</td>
<td>1,000 plus monitoring specialist</td>
</tr>
<tr>
<td>5</td>
<td>Impact on fauna and flora</td>
<td>Planting trees at critical locations and known animal crossing pathways Periodic cleaning and maintenance of culverts to facilitate small animals crossing</td>
<td>Site inspection and photographic documentation of culverts and re-planting activities</td>
<td>500 plus monitoring specialist</td>
</tr>
<tr>
<td>6</td>
<td>Traffic disruption</td>
<td>Informing the public about schedule of repairs/maintenance works Provision of temporary alternative access roads/ by-passes Traffic management Ensure traffic safety</td>
<td>Site supervision-inspection and photographic documentation</td>
<td>2,500 plus monitoring specialist</td>
</tr>
<tr>
<td>7</td>
<td>Health &amp; Safety</td>
<td>Provision and use of personal protective equipment to workers First aid facilities must be available on site at all times. Personal Protective Equipment (PPE) will be made available to all construction staff. Helmets and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. Installing construction and warning signs</td>
<td>Inspection/supervision and photographic documentation Maintaining a record of injuries and accidents specifying cause and location</td>
<td>2,000 plus monitoring specialist</td>
</tr>
<tr>
<td>8</td>
<td>Socio-economics</td>
<td>Shortening the road works period Informing the public and coordinating with them on the schedule of maintenance activities Provision of alternative access roads/ by-passes Traffic management</td>
<td>Site inspection and documentation of community activities along road and documented. Maintenance of the citizens’ GRM</td>
<td>Contractor in coordination with the Supervising Consultant and SCRB 1,000 plus monitoring specialist</td>
</tr>
</tbody>
</table>

Total estimated cost of mitigation measures and monitoring activities [USD]: 42,000
9. Public feedback and consultation

Public consultations were undertaken along the road with a road users including, public sector, owners and workers in shops, vehicle workshops, two taxi drivers (one of temporarily residences of the area and another building worker), residents in the area and other persons working within the vicinity of the road. The consultations focused on the participants opinion regarding the road project. These feedback consultations were held along the road.

The consultations revealed that there was widespread support for the improvement and upgrading of the road. All acknowledged the danger presented to both travelers and roadside entities by the poor road quality and fast moving traffic. Stakeholders were also very supportive of road work opportunities that will provided to local residents given the prevailing high unemployment rate. The consulted persons expressed commonly views that the project will not generate any significant negative environmental and social impacts, and that any impacts that may arise can be successfully mitigated.
10. Institutional Capacity Building and Training Activities

The MoCH and the SCR are the responsible agency for maintaining the road network and maintenance services contracts. The institutional capacity of the MoCH and the SCR will be strengthened by training programs. In addition, all contractor personnel will be required to undertake appropriate environmental training and induction programs. 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 have additional detailed training on the use and implementation of the ESMP. The total cost of institutional strengthening and training is estimated to reach 58,000 USD.

The safeguards training will focus on (see Table 10.1):

- Introduction to basic environmental laws, regulations, and standards.
- Methods of environmental impact assessment (screening, baseline conditions, scoping, impact prediction, impact significance, mitigation measures).
- Pollution impact on health.
- Traffic and human safety measures.
- Identifying stakeholders in the projects: their social status and impact on the local communities.
- Promoting society participation.

### Table 10.1. Institutional Strengthening and Training during the Backlog Works Phase

<table>
<thead>
<tr>
<th>Institutional Strengthening Activity</th>
<th>Participants (Institutions, contractors, consultants)</th>
<th>Scheduling</th>
<th>Responsibilities</th>
<th>Scheduling</th>
<th>Cost Estimates [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods of environmental impacts assessment</td>
<td>MoE, resident engineers, contractors, municipalities</td>
<td>Throughout project implementation</td>
<td>MoCH, Consultants</td>
<td>Once per year</td>
<td>5,000</td>
</tr>
<tr>
<td>Mitigation</td>
<td>MoE, resident engineers, contractors, municipalities</td>
<td>Throughout project implementation</td>
<td>MoCH, Consultants, Contractors</td>
<td>Once per year</td>
<td>5,000</td>
</tr>
<tr>
<td>Monitoring</td>
<td>MoE, resident engineers, contractors, municipalities</td>
<td>Throughout project implementation</td>
<td>MoCH, MoE, MoWSA, Consultants</td>
<td>Once per year</td>
<td>18,000</td>
</tr>
<tr>
<td>ESMP Implementation</td>
<td>MoE, Resident engineers, contractors, municipalities</td>
<td>Learning-by-doing Workshops</td>
<td>Pollution health impacts Pollution prevention measures Protection of cultural heritage in developmental projects Traffic and pedestrians safety measures Design and operation of citizens’ GRMs Public consultation and participation.</td>
<td>Twice a year during construction and operation phases</td>
<td>30,000</td>
</tr>
</tbody>
</table>

Total estimated cost of institutional strengthening and training [USD]: 58,000
Annex 1

Photographic evidence

Photo 1. General view of the road section
Photo 2. Western side of the road

Photo 3. Eastern side of the road
Photo 4. Scattered houses near the road sides

Photo 5. End of the first 10km segment
Photo 6. General view for the urban areas near the road

Photo 7. Agricultural areas near the road
Photo 8. Condition of the road surface