



REPUBLIC OF YEMEN
MINISTRY OF PUBLIC WORKS & HIGHWAYS (MPWH)
IMPLEMENTATION UNIT (IU)
ROAD ASSET MANAGEMENT PROJECT (RAMP)

EXECUTIVE SUMMARY Of
ENVIRONMENTAL AND SOCIAL
MANAGEMENT PLAN for IBB
GOVERNORATE SUB-PROJECT (612.7 km)



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EXECUTIVE SUMMARY

1. Introduction

The Environmental and Social Management Plan (ESMP) for Ibb Governorate is financed under Road Asset Management Project (RAMP), and managed by the RMF Implementation Unit (IU). This ESMP contains the results of the environmental and social impact assessment undertaken for the Backlog Works and Repairs Phase as well as Routine Maintenance of the project for Ibb governorate roads. It complies with the World Bank's Environmental and Social Safeguards Policies and the Relevant Yemen Regulations. Due to the scope of work limited to backlog repairs and maintenance activities, the project is classified as category B.

The ESMP document identifies and assesses the environmental and social impacts of the sub-project. Moreover, the report identifies the necessary mitigation measures and elaborates the necessary management and monitoring plans to ensure that impacts are dealt with and mitigation measures are followed during the maintenance activities. The Environmental and Social Management Plan (ESMP) follows at the end of the executive summary and in chapter 7.

The ESIA report was carried out according to the guidelines set out in the Environmental and Social Impact Assessment Framework (ESIAF) document prepared for the implementation unit within the RMF. The environmental and social review guidelines stipulated in the OP 4.01, impact screening and scoping checklists, and consultations with both male and female groups for Ibb governorate roads were the main tools used during the preparation of this ESMP report.

2. Project Objectives

The overall project objective is to alleviate poverty in the area by improving access to basic services such as schools, health centers and markets, and by creating local employment through road maintenance works. This will be achieved by upgrading the existing paved roads to prevent their deterioration, improving traffic safety at critical locations, by improving slope stability at mountainous roads, cleaning cross drainage and side ditches and removing illegal speed bumps and replacing them with new safety speed bumps.

The backlog maintenance works of the proposed project will meet the future demand for better transportation and communication between many districts and villages of Ibb Governorate. In addition, keeping in view an anticipated overall development in the center and inland region of the country, it will reduce travel time and the cost of freight traffic between districts, cities and villages.

Furthermore, the importance of maintaining 612.7 km of roads is to serve the population of the governorate of about 2,700,000 inhabitants.

3. Project Description

The Road Asset Management Project (RAMP) sub-project of Ibb governorate is composed of twenty-five roads with the total length of 612.7 km. These roads connect many villages with the district centers and with the Ibb city. They also connect Ibb governorate with Taiz, Al- Dale'a,

Hodaidah governorates. The target roads consist of six main roads, twelve secondary roads, and seven tertiary roads.

These roads run in different regions such as, mountainous, hills, valleys, agricultural and flat lands, flat-rolling-mountainous and pure mountainous. The mountainous terrain of the roads alignments includes very high slopes and sharp curves.

The scope of works include structural excavation, gabions construction, construction of stone masonry for culverts and walls, installation of safety barriers and handrails, cleaning blocked drainage, repairs of riprap, road resurfacing, crack sealing, repairs and cleaning of shoulders, installation of pipe culverts, pavement marking, installation of subsoil filter drains, installation of road signs. All rehabilitation and backlog works of this sub-project will be conducted within the Right Of Way (ROW). No additional land acquisition is required. The duration of the backlog works and repairs phase of the project is 48 months.

4. Legal and Institutional Framework

The ESMP of this sub-project is carried out to meet the requirements of the Environment Protection Law (EPL) No. 26 of 1995 in Yemen that sets the framework for protection of the environment, natural resources, society and health. The provisions of this framework law are implemented through the Executive Regulations (By-Law 148-2000), issued by a decree of the Council of Ministers. According to the Law 26 described above, the EMP is required for road maintenance works.

In addition, this ESMP report has been prepared in conformity with World Bank Operational Policy OP/BP/GP 4.01. The policy OP / BP/ 4.12 is not triggered for this sub-project because no widening or re-alignment would occur during construction and repair works and there will be no economic or physical displacement.

5. Baseline Conditions

A detailed field study was carried out by environmental, social and gender specialists for the purpose of assessing the existing environmental and social condition. Baseline of environmental and social conditions were studied and presented in the ESMP. The information was collected from the existing reports, papers and publications, as well as the field surveys.

Physical Region and Land Use

The terrain types of these roads vary between mountainous to rolling and some of them are mixed of flat-rolling-mountainous. The road alignments pass through the agricultural land. Most of the terrains have vegetative cover. Agricultural and pastures activities are the major land use characteristic at the project area. The land use of the province also includes mining such as clay mineral (for making cement and refractory bricks), zeolite (for detergents), and basalt stones (used in construction and as decorative stones).

Geology and Soils

The underlying geological strata in the Ibb governorate are largely volcanic rocks created in the Tertiary and Quaternary Volcanism. Sedimentary processes are particularly active along valleys.

Climate

Ibb Governorate is characterized by moderate climate during the year. It has a cool continental climate, and is one of the wettest areas of Yemen; typically receiving 800–1200 mm of rain. There is little rain from November to February, but for the rest of the year there is at least 100mm of rain per month. Temperatures are warm, averaging about 30 °C during the day but nights are quite cool.

Water Resources

Ibb Governorate is considered rich in water. The rain falls during most parts of the year. Yemenis for centuries have been constructing terraces to utilize highlands for cultivation, which are also useful in controlling soil erosion. Field visits to project alignments region, several systems were found for water harvesting; direct discharge to terraces from mountain tops, irrigation system, and water wells.

Air Quality and Noise

No air quality monitoring data for the project area was found. The air quality in Ibb governorate is considered unique due to its dense vegetation and the highest mountains especially in rural areas. Based on field visit, it was noticed that the air quality along the road is good.

Noise: The field survey indicated that the current noise levels along the roads alignments are low and do not exceed 50dB due to relatively low traffic volume and speed as well as lack of noisy activities along the road alignment.

Flora

The most significant feature in Ibb governorate is the rich vegetation. There are different kinds of flora in the governorate in most part of the sub- project area. The vegetation is used by the residents for their daily uses, for firewood and as rangeland for livestock. The plants species includes acacia, *Aloe Sabaea Schweinf*, *Cadia purpurea*, *Ficus cordata*, etc._None of these species are under protection or threat.

Fauna

The rich vegetation of the valleys, mountains, and plains of As Saddah, Al Shi'r, Al Odain, An Nadera, Athareb is home to predators such as lions and tigers. Other wild animals include monkeys, rabbits, foxes, reptiles and birds. The most common livestock in the area are goats and sheep, cows, camels and donkeys.

Proposed Protected Areas:

Annah, Al-Door, and Banna Valleys are three wadis in Ibb governorate, which are proposed to be declared natural protected areas. These areas are characterized by rich biodiversity. Annah and Al-Door valleys are located within Al-Oudain area. Annah valley is away by about 3 km south of Al Oudian center. It is considered one of the largest valleys in Yemen. Likewise, Al-Door Valley is located within Al-Oudain area neighboring Wadi Annah. The two wadis form a series. This valley

is considered one of the famous wadis in Yemen. On the other hand, Banna valley is located within As-Saddah district starting from the areas such as, Areab, Qa'a Al-Haql, Amam, Obaha, Bii Alhareth. The water flows from these areas and passes in a winding strait for about 3 km and then goes down into Wadi Banna. The shortest distance from the road alignment to the proposed nature protected areas is 150m.

Cultural and Historical Resources

Many historical and cultural sites were found near the project area. The most interesting and ancient historical site is Thafar historical City. It is about 500 meters from Thafar crossing. There are many other historical and cultural sites in the governorate such as, Arwa Queen Mosque and some historical spots in Jebbla district, Ba'adan Castle, Al-Taqar Castle.

Socio-Economic

Majority of the local population depends on agricultural revenue and commerce, and external transfer. Agricultural practices are centered around the traditional means of tillage and transportation using animal-drawn (camels, donkeys, and oxen) ploughs. The most important agricultural crops are fruits, vegetables and grains. Other socio—economic activities include intensive livestock and poultry, in most areas of the province where there is arable land, which is used for crops in rainfall seasons and for pastures in non-agricultural seasons.

6.Environmental and Social Impacts Assessment

The impact analysis for both the backlog repairs and maintenance works indicates that overall, beneficial impacts of the project on physical resources, safety, job creation and local economic development are expected to outweigh negative impacts. All potentially adverse impacts arising during rehabilitation works could be mitigated satisfactorily.

The following potential negative environmental and social impacts were identified:

- Generation, storage, disposal of construction and domestic waste
- Landslides, soil erosion
- Increased level of noise
- Deterioration of Agricultural Lands,
- Deterioration of air quality
- Temporary disruption of traffic circulation and
- Temporary disruption of social and economic activities.

The project activities that are likely to cause more deterioration of environmental quality and social integrity include generation, storage and disposal of debris and construction waste, trucking of construction materials, earth works, and resurfacing of roads.

These activities are predicted to have minor negative impacts on the siltation, soil erosion, slope stability, surface runoff, noise, agricultural land, air quality, habitats changes, vegetation, wild life movement and landscape.

Trucking and construction materials are predicted to cause increase of noise levels and vibration, and deterioration of air quality. Road resurfacing is predicted to lead to increase noise levels, deterioration of air quality and reduced safety during the repairs works.

Storage of diesel and oil, and refueling of vehicles is expected to cause contamination risk to agricultural land, surface and groundwater, and safety of project workers. The setting up and operation of labor camps may create minor increase of noise levels and deterioration of vegetation and landscape.

Since this project does not involve the construction of new roads, the negative impacts associated with resettlement and land acquisition are not expected.

Therefore, the maintenance activities will create positive environmental and social impacts. The positive environmental impacts include: reduced soil erosion and siltation of surface water, and improved slope stability and surface runoff. Likewise, the social positive impacts include employing locals in the maintenances activities, easy access to markets to get goods, providing traffic safety.

7.Environmental and Social Mitigation Measures (ESMM)

Mitigation measures will eliminate or reduce the negative impacts of the project. The objective of the ESMM is to address the identified negative impacts shown in the screening and scoping impact analyses. All these mitigation measures should be ensured and approved under the terms of reference and contract for construction and supervision, and as necessary by the agreement with communities that will be stated in the SFA. Therefore, the mitigation plans include measures in order to reduce and mitigate the potentially adverse impacts and strengthening the positives ones.

The key mitigation measures proposed include: proper management prepared by contractor, temporary storage and safe disposal of construction waste, construction of retaining walls and gabions, water spraying during operations causing dust emissions, control measures for waste fuel, oil and lubricants, reduction of noise and dust levels through restricting working hours and proper maintenance of equipment, rehabilitation of areas used for construction detours and sites used for temporarily storage of construction materials, provision of alternative access to residents and roadside businesses. All costs associated with the mitigation measures for environmental and social impacts should be incorporated into the overall project budget. It is estimated to reach 90,000 USD in addition to items included in the BoQ.

8.Environmental and Social Monitoring

The monitoring activities will aim at verifying compliance of project activities with the mitigation measures. It will be the responsibility of the Supervision consultant supported by the environmental and social specialist. Tables A and B present monitoring activities, and specifies monitoring indicators, frequency, responsibilities and costs during the backlog works and repairs phase, and monitoring phase respectively. 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 sub-project officer at Road Asset Management Project Implementation Unit (RAMP-IU) shall conduct site inspections every 2-6 weeks to monitor the compliance of the project activities, the contractor and the supervising consultant with the applications of all mitigation measures for environmental and social impacts. The expected cost of the monitoring activities is 96,000 USD.

The Environmental and Social Specialists within the RAMP are responsible for overall monitoring of the environmental and social issues resulting from the project activities, and review of monthly reports on contractor compliance. The results of the monitoring will be archived in a project dossier for the WB Audit.

9. Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan (ESMP) summarizes the findings of the field assessment. It presents the key impacts identified, mitigation measures and monitoring arrangements. It is presented in a tabular format in chapter 7 of this report (see also tables A and B). The objective of this ESMP is to establish a procedural framework and mechanism for implementing and monitoring the environmental and social mitigation measures for the expected negative impacts and to monitor the efficiency of these mitigation measures. The estimated cost of implementing mitigation measures is 94,000 USD.

10. Social Consultations

Social consultations were carried out with both male and female members of the local communities present in the project area.

Consultation with male beneficiaries from selected local communities along road alignments were carried out from January 2014 to February 2014. One hundred and six sites were selected within the twenty-five roads. A total of 143 beneficiaries from these sites were randomly selected and interviewed. Due to the fact most of the respondents are illiterate; data was collected by face-to-face interviews. The interview started with general talk and a brief explanation about the nature and objectives of the study to gain the trust and confidence of the respondents and to ensure the most reliable responses.

During the Social Consultations that were carried out with the local people, most of the locals expressed their willingness to cooperate with the contractor as well as interest to work with the contractor as workers.

The locals reiterated the need for road maintenance to improve road safety and reduce damage to agricultural lands resulting from floods and limited number of box culverts. Other comments were related to the need to include local workers in the maintenance works, provision of safety measures at dangerous curves, implementation of works without delays, and removal of random speed bumps. It is worth noting that this round of consultations included representatives from the civil society organizations and women participants.

Likewise, consultations with women were carried out in June 2013 by the female consultant through field visits and interviews in different villages along the road alignments. 72 women were interviewed along the project areas. About 75% of the respondents were married and illiterate women. During the consultation process, questionnaires were also used to solicit respondents' views, concerns, and feedback on the road maintenance activities. The main environmental and social concerns of roads from the point of view of the women are the following:

- Lack of beneficiaries' involvement in the road maintenance activities.
- Lack of local authorities' cooperation in road maintenance activities.
- Lack of community awareness of the positive impacts for road maintenance works.
- Lack of community awareness of the negative impacts for bad road uses, which represented by: overloading, throwing waste in both sides of the roads especially in the markets, and making illegal bumps.
- Lack of supervision by authorities overseeing road safety.

The main recommendations received was to put traffic signs at places at school crossings for school children and students as well as at points where women and animals cross to fields and around health centers. They emphasized that it is important to involve beneficiaries in the maintenance activities in order to contribute in poverty reduction as well as ensuring the cooperation of locals. The respondents also recommended setting up a group of residents responsible for traffic control around schools during school time, and to build speed bumps near entrances to villages.

11. Conclusion

Backlog Maintenance Works and Repairs Phase, and the Standard Maintenance Phase are associated with some potential negative impacts. Most of them are of a temporary nature and can be mitigated with appropriate measures. The Contractor is responsible for adhering to these mitigation measures and implementing them throughout the duration of his contract in coordination with the supervising consultant and the RAMP. The latter will ensure adequate monitoring. The total expected costs of the mitigation measures and monitoring costs is estimated at 190,000 USD. The monitoring costs include full time social and environmental monitoring specialist, travel and equipment costs. When properly and consistently applied, these measures are expected to minimize the potential impacts to negligible levels.

Table A. Environmental and Social Management Plan: Mitigation Measures during backlog works and repairs stage.

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time environmental and social monitoring specialists, camera and vehicle (96,000 USD for all monitoring activities)	Will be part of the contract. Bidders will be able to cost this item in their bids. Expected additional 15,000 costs USD	Contractor, Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Maintaining a record of type, quantity, and disposal location of solid and liquid waste generation • Site inspections • <i>Frequency: Twice a month for each road under repairs</i> 	<ul style="list-style-type: none"> • Waste minimization • Storage of construction waste in locations pre-agreed with the local communities • Waste disposal in designated locations • Avoid disposal in environmentally sensitive areas e.g. the streams of Annah, Al-Door, and Banna Valleys • Waste from cleaning of blocked drainage should be disposed at vacant land agreed with the local populations • Coarse and fine waste materials should be used as filling, construction and stabilization material • Handling of liquid waste in sealed containers • Solid and liquid waste management plan 	Generation, storage, disposal of construction and domestic waste	1

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids.	Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Site inspection and photographic documentation of excavation and maintenance activities • Photographic documentation of planting and re-vegetation activities • <i>Frequency: Once a week for each road under repairs</i> 	<ul style="list-style-type: none"> • Construction and repairs of retaining walls • Restoration of riprap and stone pitching • Provision of open area ~1m wide, behind cut side channels, to store temporarily fallen debris • Increase the mass thickness of rock fill for additional stability • Restoration of drainage systems • Planting trees in sensitive zones • Restoration of vegetative cover 	Landslides, soil erosion, and Visual intrusion	2
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the works contract. Expected additional costs: 10,000 USD	Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Visual observation and photographic documentation of equipment induced emissions and dust clouds from works and trucks • <i>Frequency: Once a week for each road under repairs</i> 	<ul style="list-style-type: none"> • Usage of well-maintained equipment • Using good quality fuel to reduce exhaust emissions. • Water spraying for dust control • Cleaning of vehicle tires • Covering of trucks carrying fine grade construction materials • Avoiding earthworks near schools during the school hours. 	Deterioration of air quality	3

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids. Expected additional cost: 5,000 USD	Supervision Consultant in coordination with the Contractor	Contractor	<ul style="list-style-type: none"> • Site supervision, inspection and documentation to ensure the implementation of mitigation measures • <i>Frequency: Once a week for each road under repairs</i> 	<ul style="list-style-type: none"> • Usage of quiet/well-maintained equipment • Limiting noisy activities to normal daylight hours • Provision of speed limit signs at critical locations • Informing local population about noisy road works • Obtain permits for siting and operation of any new quarrying or borrow pit areas • Planting trees in sensitive zones 	Increased level of noise	4
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Expected cost 20,000 USD.	Supervision Consultant in coordination with the Contractor	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Close supervision and documentation of pipe re-location activities • Monitoring any interruptions of water supplies to local communities caused by project works • <i>Frequency: Once a week for each road under repairs</i> 	<ul style="list-style-type: none"> • Protecting water supply systems during works • Fixing the damaged riprap after compacting the top soil along the eroded side ditches • Coordination with land owners on scheduling maintenance activities • Ensuring no interruption of water supply during works. 	Disruption of water supply	5

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids. Additional cost (revegetation): 7,000 USD	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and photo documentation of water harvesting activities and re-vegetation activities • Checking on culverts particularly following rainfall events • <i>Frequency: Twice a month during the rainy season for each road</i> 	<ul style="list-style-type: none"> • Proper side sloping of the road to prevent the accumulation of water on the road surface • Re-vegetation of disturbed soils • Keeping the drainage ditches and culverts unblocked 	Disruption of the runoff water and drainage systems	6
Cost of full time environmental monitoring specialist, camera and vehicle.	Will be part of the works contract. Bidders will be able to cost this item in their bids. Expected additional costs: 20,000 USD (incl. water sampling and analysis)	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Monitoring water quality of the groundwater wells • Monitoring of fuel and oil handling and storage. • <i>Frequency: Once every month for each road under repairs</i> 	<ul style="list-style-type: none"> • Storage of liquid materials (especially hydrocarbons) in sealed containers. • Application of liquid fuels and oils in sealed and paved areas with sump. • Refueling in sealed locations • Development and implementation of Waste management plan. 	Deterioration of groundwater quality	7

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time environmental monitoring specialist, camera and vehicle.	Will be part of the works contract. Expected additional costs: 10,000 USD	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and photographic documentation of the condition of culverts • Monitoring of re-planting activities • Checking records of spillages and animal killings • <i>Frequency: Once every two weeks for each road under repairs</i> 	<ul style="list-style-type: none"> • Placing speed limit signs and planting trees at critical locations and known animal crossing pathways • Road works to be conducted outside of the birds spawning and nesting season • Waste and spoil cannot be dumped near sensitive areas (Al-Door and Bana valleys) • Keeping culverts unblocked to facilitate amphibians crossing • Spraying of water to reduce dust emissions during road works • Restoring affected land along the road alignment to the preconstruction status • Preventing leakages of fuel 	Damage to fauna, flora and the proposed protected areas	8
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids. Additional costs: 2,000	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and photographic documentation • <i>Frequency: Weekly</i> 	<ul style="list-style-type: none"> • Informing the public about schedule of repair and maintenance works • Provision of temporary 	Disruption of traffic	9

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
	USD			<i>(including photo evidence) for each road under repairs</i>	alternative access roads/ by-passes • On the spot traffic management		
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids.	Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Inspection and photo evidence • Maintaining records of injuries and accidents with cause and location • <i>Frequency: Weekly for each road under repairs</i> 	<ul style="list-style-type: none"> • Provision and use of personal protective equipment to workers • Installing construction and warning signs • Retaining walls and gabions to prevent landslides • Speed limit bumps in settlements • Installing barriers in sharp curves 	Deterioration of health & safety conditions	10
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Part of the contract. Bidders will be able to cost this item in their bids.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection/ supervision and photographic documentation of cultural and historical sites. • <i>Frequency: Monthly for each road under repairs</i> 	<ul style="list-style-type: none"> • Do not block access to cultural and religious sites, wherever possible • Use of manual equipment when working next to cultural, religious or historical sites • Mark graves by sign posts and notify workers about them 	Damage to cultural and historical sites	11

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of full time social monitoring specialist, camera and vehicle.	Will be part of the contract. Bidders will be able to cost this item in their bids. Expected additional cost: 5,000 USD	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and documentation of community activities along roads. • Inspections of worker camps • <i>Frequency: Bi-weekly for each road under repairs</i> 	<ul style="list-style-type: none"> • Coordinating with the public schedule of maintenance activities in residential areas • Employ local workers • Provide alternative access roads/by-passes • Traffic management • Workers' camps have to be located away from settlements • Camps must be equipped with sealed septic tanks and waste containers. 	Social Impacts	12
USD 94,000		Expected additional mitigation costs:					
USD 96,000		Expected monitoring costs:					
USD 190,000		Total expected costs of ESMP:					

Table B: Summary of ESMP during the Maintenance Phase

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of part time environmental and social monitoring specialists, camera and vehicle	Will be part of the contract.	Constructor, Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Maintaining a record of type, quantity, and disposal location of solid and liquid waste generation • Site inspections • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Waste minimization • Storage of construction waste in locations pre-agreed with the local communities • Avoid disposal in environmentally sensitive areas e.g. the streams of Annah, Al-Door, and Banna Valleys 	Generation, storage, disposal of construction and domestic waste	1

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
					<ul style="list-style-type: none"> Waste from cleaning of blocked drainage should be disposed at vacant land agreed with the local populations Waste disposal in designated locations Handling of liquid waste in sealed containers 		
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract.	Supervision Consultant	Contractor	<ul style="list-style-type: none"> Site inspection and photographic documentation of maintenance activities Photographic documentation of planting and re-vegetation activities <i>Frequency: Once a month for roads under maintenance</i> 	<ul style="list-style-type: none"> Repairs of retaining walls Restoration of riprap and stone pitching Cleaning and repairs of drainage systems Restoration of vegetative cover 	Landslides, soil erosion, and Visual intrusion	2
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the works contract.	Supervision Consultant	Contractor	<ul style="list-style-type: none"> Visual observation and photographic documentation of equipment induced emissions and dust clouds from works and trucks <i>Frequency: Once a month for roads under maintenance</i> 	<ul style="list-style-type: none"> Usage of well-maintained equipment Water spraying for dust control Using good quality fuel to reduce exhaust emissions. Clearing vehicle tires Covering of trucks carrying fine grade construction materials 	Deterioration of air quality	3

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract.	Supervision Consultant in	Contractor	<ul style="list-style-type: none"> • Site and documents inspections • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Usage of quiet/well-maintained equipment • Informing local population about noisy road works • Limiting noisy activities to normal daylight hours • Provision of speed limit signs at critical locations 	Increased level of noise	4
Cost of part time environmental and social monitoring specialists, camera and vehicle.	None	Supervision Consultant in coordination with the Contractor	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Monitoring any interruptions of water supplies to locals caused by project works • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Protecting water supply systems during works • Coordination with land owners on scheduling maintenance activities • Ensuring no interruption of water supply during works. 	Disruption of water supply	5
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Checking on culverts particularly following rainfall events • <i>Frequency: Once a month during the rainy season for each road under maintenance</i> 	<ul style="list-style-type: none"> • Keeping the drainage ditches and culverts unblocked 	Disruption of the runoff water and drainage systems	6
Cost of part time environmental monitoring specialist, camera and vehicle.	Will be part of the works contract.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Monitoring of fuel and oil handling and storage. • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Storage of liquid materials (especially hydrocarbons) in sealed containers. • Application of liquid fuels and oils in sealed areas with sump. 	Deterioration of groundwater quality	7

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
					<ul style="list-style-type: none"> • Refueling in sealed locations 		
Cost of part time environmental monitoring specialist, camera and vehicle.	Will be part of the works contract.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and photographic documentation of the condition of culverts • Checking records of spillages and animal killings • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Keeping culverts unblocked to facilitate amphibians crossing • Preventing leakages of fuel • Road works should be conducted outside of the birds spawning and nesting season • Waste and spoil cannot be dumped near sensitive areas (Al-Door and Bana valleys) 	Damage to fauna, flora and the proposed protected areas	8
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site supervision-inspection and photographic documentation • <i>Frequency: Monthly for each road under maintenance</i> 	<ul style="list-style-type: none"> • Informing the public about schedule of maintenance works • On the spot traffic management 	Disruption of traffic	9
Cost of part time environmental and social monitoring specialists, camera and vehicle.	Will be part of the contract.	Supervision Consultant	Contractor	<ul style="list-style-type: none"> • Inspection and photo evidence • <i>Frequency: Once every month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Provision and use of personal protective equipment to workers • Installing construction and warning signs near markets, schools, health centres, pastures, firewood sites • Removal of random speed bumps • Maintaining 	Deterioration of health & safety conditions	10

Additional Cost in USD		Responsibility		Monitoring	Mitigation Measures	Potential Impacts	No.
Monitoring	Mitigation measures	Monitoring	Implementation				
					barriers in sharp curves and along steep slopes		
Cost of full time environmental and social monitoring specialists, camera and vehicle.	Part of the contract.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and photographic documentation . • <i>Frequency: Monthly for each road under maintenance</i> 	<ul style="list-style-type: none"> • Do not block access to cultural and religious sites, wherever possible • Use of manual equipment when working next to a cultural or religious and historical sites. 	Damage to cultural and historical sites	11
Cost of part time social monitoring specialist, camera and vehicle.	Will be part of the contract.	Supervision Consultant	Contractor in coordination with Supervision Engineer	<ul style="list-style-type: none"> • Site inspection and documentation of community activities along roads. • <i>Frequency: Once a month for each road under maintenance</i> 	<ul style="list-style-type: none"> • Coordinating with the public the schedule of maintenance activities in residential areas • Awareness workshop on road maintenance • Traffic management • Camps must be equipped with sealed septic tanks and waste containers. 	Social Impacts	12