Environmental Management Plan

September 2014

Cambodia: Flood Damage Emergency Reconstruction Project - Additional Financing

Subproject of Ministry of Rural Development Civil Work 10 in Siem Reap Province

Prepared by Ministry of Rural Development for the Asian Development Bank.

APPENDIX 2

FLOOD DAMAGE EMERGENCY RECONSTRUCTION PROJECT-ADDITIONAL FINANCING

ADB Loan No.3125-CAM (SF) and Government of Australia (Department of Foreign Affairs and Trade) Grant No.0285-CAM (EF)

ENVIRONMENTAL MANAGEMENT PLAN

for

CW10: Emergency Restoration functionality of 33.3km of 1 rural road including road structures in Seim Reap province

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ABBREVIATION

ADB	Asian Development Bank
APL	Angkor Protected Landscape
APSARA	Authority for Protection and Management of Angkor and the Region of Siem Reap
BOD	Biological Oxygen Demand
DBST	Double Bituminous Surface Treatment
DOE	Department of Environment
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FDERP-AF	Flood Damage Emergency Reconstruction Project-Additional Financing
FS	Feasibility Study
GoC	Government of Cambodia
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
ha	Hectare
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IA	Implementing Agency
IEE	Initial Environmental Examination
MAG	Mines Advisory Group
MCFA	Ministry of Culture and Fine Arts
MEF	Ministry of Economy and Finance
MOE	Ministry of Environment
MOWRAM	Ministry of Water Resources and Meteorology
MPWT	Ministry of Public Works and Transport
MRD	Ministry of Rural Development
MT	Motorized Transport

NR	National Road
NTFP	Non-Timber Forest Products
O&M	Operation and Maintenance
PCMU	Project Coordination and Monitoring Unit
PDPWT	Provincial Department of Public Works and Transport
PDRD	Provincial Department of Rural Development
PIU	Project Implementation Unit
PPTA	Project Preparation TA
RCVIS	Road Crash and Victim Information System
REA	Rapid Environmental Assessment
RI	Riel
ROW	Right of Way
RP	Resettlement Plan
SBST	Single Bituminous Surface Treatment
SEIA	Summary Environmental Impact Assessment
SEU	Social and Environmental Unit (in MRD)
SPS	ADB's Safeguard Policy Statement (2009)
TA	Technical Assistance
TSBR	Tonle Sap Biosphere Reserve
TSP	Total Suspended Particulates
UNESCO	United Nations Educational Scientific and Cultural Organization
US$	United States Dollar
UXO	Unexploded Ordnance

ENVIRONMENTAL MANAGEMENT PLAN

A. BACKGROUND

1 The Asia Development Bank (ADB) and the Royal Government of Cambodia (RGC) has agreed to implement the Flood Damage Emergency Reconstruction Project-Additional Financing (FDERP-AF), which will be financed by a project loan from the ADB and grant from the Government of Australia (Department of Foreign Affairs and Trade). The FDERP-AF is being implemented through the Ministry of Economy and Finance (MEF) as the executing agency (EA). There are three implementing agencies (IAs), namely: (i) Ministry of Public Works and Transport (MPWT) for Output 1; (ii) Ministry of Rural Development (MRD) for Output 2, and (iii) Ministry of Water Resource and Meteorology (MOWRAM) for Output 3. The MEF has engaged Korea Consultants International to provide services on the detailed design and implementation supervision (DDIS) for Output 2.

2 In compliance with the Safeguard Policy Statement 2009 of ADB, this Environmental Management Plan (EMP) was prepared for inclusion in the tender documents for Subproject CW10 under Stage2 of FDERP-AF. The DDIS will perform periodic monitoring to check if the mitigation measures provided in the EMP are appropriately implemented.

3 The EMP summarizes the project scope, the environmental condition, the impacts, the mitigation measures and monitoring plan to be implemented particularly during the construction stage of the project. The national environmental standards related to discharges, emissions release and disturbances by noise and vibration are also presented in the Attachments as reference.

B. PROJECT SCOPE

4 The subproject consists of restoration of the existing road embankment and top up with laterite, there will be no widening and road alignment will remain the same as the existing one, the road will be restoration as laterite pavement standard of 15cm on heightened embankment in 30cm thickness with selected subgrade material including one box culvert and five pipe culverts, and 33.3km lengths in Siem Reap province.

B.1 Road Construction and Protection work

5 The embankment for the widening of existing road is not applied in this project, but the sections of the road are seriously damaged during flooding last year will be excavated and filled with embankment material up to get the same elevation of existing road . The other parts of the road just have pot holes will be reshaped with scarifying, grading, and compaction for the placement of subgrade material in 30cm thickness. Laterite will be placed on heightened road by selected subgrade material along with existing alignment in 15 cm thickness. Road slope from adjacent floodwater will be protected with stone gabion boxes or grouted riprap to control or minimize soil erosion.

Figure 1: project Location Map for Siem Reap Province

C. ENVIRONMENTAL CONDITION

6 The existing road was paved with laterite, but a road in this subproject was severely damaged, washed laterite out and weakened by 2013 heavy floods. The project corridor contains no designated forest, wildlife, or rare and endangered species or habitats. CW10 has been classified under Category B, with minor short-term and long-term environmental impacts provided that the mitigation measures identified in this report are implemented and monitored.

D. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

D.1 Design Stage

D.1.1 Loss of trees

7 The subproject will only involve repair along with the existing road alignment and construction of the road in Siem Reap province, there are not impacts on trees. There are no natural forest on the location of borrow pits to be used as source of subbase and selected subgrade materials since contractor of this subproject are using the borrow pits were developed already by others.

8 Ensure that there are acceptable alternative borrow pit areas that would have an overall beneficial advantage in terms of improved livelihood and reduced environmental impact.

D.1.2 Damage to existing structures

9 Some shops, private and public assets are located along the road side.

There is nothing impacts to road side assets and shops benefit by the construction according to road design. Resettlement framework for the Project and Cambodian laws, policies, and regulations should be complied with.

D.1.3 Risk of Land Mine and UXO

10 Subprojects will repair existing road without widening and changing of existing road alignment. Nevertheless, risks remain since there may be deep seated mines that could be exploded by heavy construction equipment.

11 Consultative meetings with local communities are necessary to know clearly where there are risks of mines or UXO. Unsafe areas should be cleared before project implementation.

D.2 Construction Stage

D.2.1 Dust Impacts

12 Generation of dust is expected during earthworks and from hauling of construction materials to site. Dust pollution is nuisance to communities who live adjacent to the site, especially during dry season. The dust will also affect aesthetics.

13 The Contractor will be required to formulate and implement a dust abatement program that includes spraying of water on roads and work areas within villages close to the road. Vehicles transporting materials should be covered with tarpaulin or similar material.

D.2.2 Noise Impacts

14 Similar to dust, operation of construction equipment and transporting materials will cause temporary noise and vibration. Communities close to work areas will be affected. The Contractor should ensure that construction activities within 100m of a village or town should be limited between 12 PM to 2 PM and at night time.

D.2.3 Generation of domestic wastes

15 Domestic wastes will be generated from camps or living quarters. If not properly managed, it will affect public health.

16 Food containers made of plastic, Styrofoam and glass bottles may pile up and serve as breeding grounds for disease-carrying organism like mosquitoes, houseflies and mouse. These may even clog the drainage system and may cause localized flooding.

17 Contractor should ensure that (i) sufficient garbage containers are provided in construction camps and at work site, and be emptied daily, the waste being disposed of in an approved landfill or site and (ii) every camp and work site should be cleaned up before moving to new sites.

D.2.4 Water contamination

18 The most severe water quality impact would be from bitumen, diesel fuel or used oil. These substances are toxic to living organisms.

19 Contractor has to ensure that: (i) Diesel and waste oil must be handled and stored properly to prevent leakage or spill. (ii) Waste oil is to be collected, stored and disposed at an approved site (according to national standard). (iii) Storage is to be in drums, raised off the ground, covered to keep rain out and surrounded by a bund to contain any spills and simplify clean up. (iv) The contractor shall prepare a Spill Management Plan (including measures to be taken and equipment to be used) to ensure adequate cleanup of any spills.

D.2.5 Water-borne disease

20 Borrow pits may hold water and can serve as breeding grounds for mosquitoes causing dengue fever.

21 Contractor must ensure that (i) solid wastes are regularly disposed into safe landfill. (ii) Siting camps distant to community's and removal of stagnant water areas, and (iii) borrow pits may be utilized for aquaculture or be developed as water storage for community use.

D.2.6 Soil erosion

22 Soil erosion usually occurs during site clearing, embankment works and other earth moving works. When heavy rain comes, sediments are carried into ditches, culverts, nearby water bodies and adjacent lands.

23 The contractor will be required to implement soil erosion control to minimize soil erosion and sedimentation of waterways. The alternative approaches should be: (1) provide adequate cross drainage to avoid over flow or flooding and (2) re-vegetation of erosion-prone areas.

D.2.7 Loss of trees

24 The project will not impact during repair of the existing 4 roads.

25 The borrow pits will need to be re-vegetated before being handed back to the owner, or may be used for aquaculture as well.

26 Tree clearing should be avoided as much as possible and tree planting carried out where appropriate in order to enhance the environment around the road.

D.2.8 Loss of agricultural land for borrow pits

27 Quarrying filling materials from the rice fields will reduce areas used for rice production. It is expected that the volume of rice that can be planted and be harvested will decrease.

28 The contractor will use only licensed borrow pits operators. There will be no side borrow pits permitted, unless agreed to with roadside residents.

29 The contractor will be responsible for rehabilitating any borrow pit sites opened and operated by them.

D.2.9 Traffic congestion

30 Traffic congestion normally occurs due to illegal parking of equipment and piling of construction materials on roadways.

31 Contractor should perform the following: i) orient their drivers or equipment operators to comply with the required speed limit. (ii) Drive at low speeds, especially in market, school, hospital, urban areas. (iii) Keep the roadway or bypass accessible to commuters to avoid traffic jams. (iv) Park at designated area.

D.2.10 Traffic Accidents

32 Traffic accidents can happen when motorists drive at night without lights. Also accidents can be caused by illegal parking, deep excavations, soil piled along roads with no warning signs. Accidents are also caused by careless, high speed or unprofessional driving.

33 Contractor should: (i) Install traffic/warning signs like “safety first” at the construction area including fences or enclosures (ii) orient drivers to drive at low speeds, especially in market, school, hospital, urban areas. (iii) keep the roadway or bypass accessible to commuters to avoid traffic jam (iv) park at designated area.

D.2.11 Safety and Health

34 Accidents inevitably happen during construction, therefore, the Contractor should formulate and implement a Health and Safety Plan to protect both the public and the workers. A trained first aid personnel and health facility should be provided on site. Potable water and sanitary facilities should be provided to workers.

D.2.12 Transmission of sexually transmitted diseases

35 HIV/AIDS is still prevalent in Cambodia thus it may happen due to influx of workers from various provinces.

36 The Contractor should incorporate in the Health and Safety Plan the education of workers on sexually transmitted disease.

E. ATTACHMENTS

E.1 Attachment 1: Environmental Management Plan

The Environmental Management Plan will be part of the General Conditions of Contract (Appendix 2) and will take precedence in any conflict with General Specifications.

This item will not be measured and instead will be assessed by the Engineer if the Contractor has successfully met all the Specifications requirements.

No separate payment shall be made with respect to compliance with the provisions of the Environmental Management Plan. The Contractor shall be deemed to have made allowances for such compliance with these provisions in the preparation of his prices for items of work included in the Bill of Quantities period.

The contractor has to incorporate the environmental management plan into account for high consideration to compliance with Cambodian Policy and ADB safeguard policy.

The EMP below is a general guide for the contractor to follow. After appointment and mobilization of the contractor, own version of the EMP known as the Contractors EMP (CEMP) should be prepared. This must give specific details of locations of borrow pit areas; road areas, workers camps and other facilities. This must be submitted to the Supervising Consultant for their approval before works commence.

Compliance monitoring reports will be submitted by the contractor to PIU of MRD and DDIS Consultant on a monthly basis.

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Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
1.Pre-Construction	Detailed Engineering Design	1) Loss of trees (during site clearing and quarrying of construction materials)	• On the design stage, ensure that there are acceptable alternative borrow pit areas that would have an overall beneficial advantage in terms of improved livelihood and reduced environmental impact.	DDIS Consultant, IA/EA	DDIS Consultant, IA/EA
		2) Damage to existing structures	• The design should maximize benefits or avoid impacts on assets. Resettlement framework for the Project and Cambodian laws, policies, and regulations should be complied with.	DDIS Consultant, IA/EA	DDIS Consultant, IA/EA
		3) Risk of land mine or UXO	• Consultative meetings with local communities are necessary to know clearly where there are risks of mines or UXO. Unsafe areas should be cleared before project implementation.	DDIS Consultant, IA/EA	DDIS Consultant, IA/EA
2. Construction	Earthworks, site clearing, hauling of construction materials,	4). Dust generation	• The Contractor will be required to formulate and implement a Dust Abatement Program that includes spraying of water on roads and work areas within	Contractor	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
	piling works, Operation of construction/ workers' camps, borrow pit operation, hauling of construction wastes to spoil sites		villages close to the road. • Vehicles transporting materials should be covered with tarpaulin or similar material		
		5).Noise and vibration	• The Contractor should ensure that construction activities within 100m of a village or town should be limited between 12 PM to 2 PM and at night time. • Provide enclosures/barriers on major works being undertaken on sensitive areas.	Contractor	DDIS Consultant, IA/EA
		6).Water contamination	• Waste/used oil should be collected, properly stored and disposed to an approved site (according to national standard). Storage should be in drums raised off the ground and properly covered to keep rain water out. Lining or pan should	Contractor	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
			be provided to contain any spills and simplify clean up. • The Contractor shall prepare a Spill Management Plan (including measures to be taken and equipment to be used) to ensure adequate cleanup of any spills		
		7) Water-borne disease	• Fill-up depressed areas to prevent water ponding which may be used as breeding ground for disease- carrying organisms mosquitoes • Borrow pits may be utilized for aquaculture or be developed as water reservoir for community use.	Contractor	DDIS Consultant, IA/EA
		8).Loss of agricultural land for borrow pits	• The contractor will use only licensed pit operators. There will be no side borrow pits permitted, unless agreed to with roadside residents. • The contractor will be responsible for rehabilitating any borrow pit sites opened and	Contractor	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
			operated by them		
		9) Loss of trees	• Tree clearing should be avoided as much as possible; • The borrow pits will need to be re-vegetated before being handed back to the owner, or could be used for aquaculture. • Tree planting should be carried out in the appropriate location of the road. Coordinate with MoE regarding the species of trees to be used.	Contractor	DDIS Consultant, IA/EA
		10) Soil erosion	• The contractor will be required to implement soil erosion control to minimize soil erosion and sedimentation of waterways. The alternative approaches should be: (1) provide adequate cross drainage to avoid over flow or flooding and (2) re-vegetation of erosion-prone areas	Contractor	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
		11) Generation of domestic wastes	• Sufficient garbage containers should be provided in construction camps and work sites • Employ regular disposal of waste in an approved landfill or site • Maintain cleanliness/orderliness at camps and work sites	Contractor	DDIS Consultant, IA/EA
		13) Safety and Health	• The Contractor should formulate and implement a Health and Safety Plan to protect both the public and the workers. A trained first aid personnel and health facility should be provided on site. • Provide potable water and sanitary facilities to workers • Install warning signs like “safety first” at the construction area including fences or enclosures • Provide Protective Personal Equipment (PPE) to workers e.g. safety shoes, hardhats,	Contractor	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
			earplugs, etc.		
		12)Traffic congestion	• Contractor should perform the following: i) orient their drivers or equipment operators to comply with the required speed limit. (ii) drive at low speeds, especially in market, school, hospital, urban areas. (iii) keep the roadway or bypass accessible to commuters to avoid traffic jams. (iv) park at designated area. • Prepare and implement a Traffic Management Plan • Provide appropriate storage area for the construction materials. • Detour road should be provided and accessible to commuters • Temporary access of equipment and trucks must be established and approved by the sub-district officials	Contractor/in coordination with the sub-district officials	DDIS Consultant, IA/EA

Project Phase	Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibilities	
				Implement	Supervise
		13)Transmission of sexually transmitted disease (HIV)	• Prepare and implement a Health and Safety Plan including education of workers on sexually transmitted disease should be done.	Contractor	DDIS Consultant, IA/EA
		14) Generation of employment	• The contractor should comply with the Labor and Gender Action Plan ; employ people from villages including women and unskilled workers	Contractor	IA/EA, local authorities
3.Operation Phase	Use of bypass and the traffic signs	15)Traffic accident	• Provide traffic signs on accident-prone points especially near schools, hospitals and market areas.	IA/EA	IA/EA, local authorities

E.2 Attachment 2: Environmental Monitoring Plan (EMoP)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
Pre-Construction Phase						
Loss of trees	• Ensure that there are acceptable alternative borrow pit areas that would have an overall beneficial advantage in terms of improved livelihood and reduced environmental impact.	Confirmed by MRD-IA via note to file	Once during Contract preparation	Before start of Construction stage / Before end of design stage	Note to file regarding action(s) by MRD-IA	DDIS Consultant, EA, IA
Damage to existing structures	• The design should maximize benefits or avoid impacts on assets. Resettlement framework for the Project and Cambodian laws, policies, and regulations should be complied with.	Confirmed by MRD-IA via note to file	Once during Contract preparation	Before start of Construction stage / Before end of design stage	Note to File regarding action(s) by MRD-IA	DDIS Consultant, EA, IA
Possible accident due to risk of Land mine or UXO	• Consultative meetings with local communities are necessary to know clearly where there are risks of mines or	Verify Information from local communities	Before the mobilization of contractor	Before the mobilization of contractor	Information from local communities	DDIS Consultant, EA, IA

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
	UXO. Unsafe areas should be cleared before project implementation.					
Construction Phase						
Dust generation	• .The Contractor will be required to formulate and implement a Dust Abatement Program that includes spraying of water on roads and work areas within villages close to the road. • Vehicles transporting materials should be covered with tarpaulin or similar material	Check copy of the Dust Abatement Plan Check level of dust pollution by: -Aesthetics thru visual observation -Feedback from village people	Monthly	Start of Construction stage/Construction stage	Proof that copies of the IEE/EMP are received by the contractor; Compliance monitoring reports	DDIS Consultant, EA,IA, Contractor's Safeguard Specialist (self monitoring)
Noise and vibration	• The Contractor should ensure that construction activities within 100m of a village or town should be limited between 12 PM to 2 PM and at night time.	Feedback from village people about noise concern	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
Generation of domestic wastes	• Sufficient garbage containers should be provided in construction camps and work sites • Employ regular disposal of waste in an approved landfill or site • Maintain cleanliness/orderliness at camps and work sites	Check aesthetics through visual observation	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)
Water contamination	• Waste/used oil should be collected, properly stored and disposed to an approved site (according to national standard). Storage should be in drums raised off the ground and properly covered to keep rain water out. Lining or pan should be provided to contain any spills and simplify clean up. • The Contractor shall	Check copy of Spill Management Plan; records of waste/used oil generated/ collected by licensed transporter-treated Visual inspection of waste/used oil in the storage area Check of color of	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
	prepare a Spill Management Plan (including measures to be taken and equipment to be used) to ensure adequate cleanup of any spills	surface water traversed by the project through visual inspection				
Water-borne disease	• Contractor must ensure that (i) solid wastes are regularly disposed into safe landfill • Locate camps distant to communities • Fill-up depressed areas to prevent water ponding which may be used as breeding ground for disease-carrying organisms mosquitoes • Borrow pits may be utilized for aquaculture or be developed as water reservoir for community use.	Visual observation – stagnant water/water ponding due to construction	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)
Loss of	• The contractor will use	Check records on				

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
agricultural land for borrow pits	only licensed borrow operators. There will be no side borrow permitted, unless agreed to with roadside residents. • The contractor will be responsible for rehabilitating any borrow sites opened and operated by them	borrow sites ;license of borrow pit operators; rehabilitation done ; status of borrow sites used				
Loss of trees	• Tree clearing should be avoided as much as possible; • The borrow pits will need to be re-vegetated before being handed back to the owner, or may be used for aquaculture. • Tree planting should be carried out in the appropriate location of the road. Coordinate with MoE regarding the species of trees to be used.	Visual observation , records of trees affected; Check tree planting plan	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA,IA, Contractor's Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
Soil erosion	• The contractor will be required to implement soil erosion control to minimize soil erosion and sedimentation of waterways. The alternative approaches should be: (1) provide adequate cross drainage to avoid over flow or flooding and (2) re-vegetation of erosion-prone areas	Visual observation of possible eroded segments. Visual observation on the possible change of color of surface water traversed by the project.	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)
Safety and Health	• The Contractor should formulate and implement a Health and Safety Plan to prevent accident both on the side of the public and the workers as well. A trained first aid personnel and health facility should be provided on site. The Contractor should incorporate in the Health and Safety Plan the education of	Check copy of Health and Safety Plan; health/accident records Visual observation – Safety signs installed, workers in PPE and without PPE	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
	workers on sexually transmitted disease. • Provide potable water and sanitary facilities to workers • Install warning signs like “safety first” at the construction area including fences or enclosures • Provide Protective Personal Equipment (PPE) to workers e.g. safety shoes, hardhats, earplugs, etc.					
Traffic congestion	• Contractor should perform the following: i) orient their drivers or equipment operators to comply with the required speed limit. (ii) drive at low speeds, especially in market, school, hospital, urban areas. (iii) keep the roadway or bypass accessible	Feedback from village people about traffic; visual observation Check copy of Traffic Management Plan	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor’s Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
	to commuters to avoid traffic jams. (iv) park at designated area. • Prepare and implement a Traffic Management Plan • Provide appropriate storage area for the construction materials. • Detour road should be provided and accessible to commuters • Temporary access of equipment and trucks must be established and approved by the sub-district officials					
Generation of employment particularly among women and unskilled people	• The contractor should comply with the Labor and Gender Action Plan ; employ people from villages including women and unskilled workers •	Check reports/records on women/unskilled workers employed	Monthly	Construction stage	Compliance monitoring reports	DDIS Consultant, EA, IA, Contractor's Safeguard Specialist (self monitoring)

Issue	Mitigation Measures (Items to Monitor)	Monitoring Required/Methods/ Parameters	Schedule / Frequency	Start/Completion Date	Reporting	Responsibility
Operation Phase						
Traffic accident	• Provide traffic signs on accident-prone points especially near schools, hospitals and market areas. • Regular maintenance of road/bridges	Check traffic signs installed; accident record	Annually	Operation stage	Compliance monitoring reports	EA, IA,

E.3 Attachment 3: Environmental Monitoring Checklist

General information	DD/MM/YY	
	Report prepared by	
	Name of road and location of construction site	
	Name of contractor/ subcontractor	
Permits, agreements	Request for obtaining a permit for quarry/borrow pit opening during construction	☐ Yes ☐ No ☐ N/A
	Request for obtaining an agreement for disposal of construction waste	☐ Yes ☐ No ☐ N/A
Management of construction sites	Proper location of construction site/camp	☐ Yes ☐ No ☐ N/A
	Aggregate/asphalt batching plants properly licensed and approved by Ministry of the Environment (MOE).	☐ Yes ☐ No ☐ N/A
	Availability of proper storage for fuel, oil and construction materials	☐ Yes ☐ No ☐ N/A
	Proper maintenance of construction machinery and equipment (prevent leakage of fuel, oil, lubricants, etc.)	☐ Yes ☐ No ☐ N/A
	Availability of temporary storage areas for excavated and demolished materials and construction wastes within the existing right-of-way	☐ Yes ☐ No ☐ N/A
	Timely removal of excavated and demolished materials and construction waste from the temporary storage areas to planned and agreed places	☐ Yes ☐ No ☐ N/A

	Use covered trucks for transportation of construction materials and waste	☐ Yes ☐ No ☐ N/A
	Clean the surrounding area from dust by water sprinkling in construction zone (when necessary)	☐ Yes ☐ No ☐ N/A
	Clean/ wash tires of vehicles before they get to dwellings and/or drive on highways (when necessary)	☐ Yes ☐ No ☐ N/A
	Implementation of works at the established time (e.g. work during daytime 06.00 to 18.00)	☐ Yes ☐ No ☐ N/A
	Installation of road signs in construction sites, camps and along access roads	☐ Yes ☐ No ☐ N/A
	Ensure proper sanitary/ hygienic conditions for workers at the construction site	☐ Yes ☐ No ☐ N/A
Management of construction sites	Restoration of the area of construction sites and camps when the construction works are over	☐ Yes ☐ No ☐ N/A
	Replanting/planting of finished work areas (i.e. embankment slopes, borrow pits, etc.)	☐ Yes ☐ No ☐ N/A

E.4 Attachment 4: Annex to Sub-decree No. 42/ANK/BK of July 10, 2000 (Ambient Air Quality Standard)

No.	Parameter	1 Hour Average mg/m^3	8 Hours Average mg/m^3	24 Hours Average mg/m^3	1 Year Average mg/m^3
1	Carbon Monoxide (CO)	40	20		
2	Nitrogen dioxide (NO_2)	0,3		0,10	
3	Sulfur dioxide (SO_2)	0,5		0,30	0,10
4	O Zone (O_3)	0,2			
5	Lead (Pb)			0,005	
6	Total Suspended Particulate (TSP)			0,33	0,10

This standard applies to ambient of air quality and to monitoring of air pollution status.

Method for analysis of ambient air quality is specified in the guideline of the Ministry of Environment.

TSP = Total Suspended Particulate.

E.5 Attachment 5: Annex to Sub-decree No. 42/ANK/BK of July 10, 2000 (Maximum Allowable Standard of Pollution Substance for Immovable Sources in Ambient Air)

No.	Parameter		Maximum Level of Discharge
1	Particulate in smoke of:		
	- Incinerator		400 mg/m^3
	- Heating Metal		400 mg/m^3
	- Bad Stone, lime, cement manufacturing		400 mg/m^3
	- Asphalt concrete plant		500 mg/m^3
2	Dust		
	- Containing silica (SiO_2)		100 mg/m^3
	- Containing Asbetos		27μg/m^3
	Chemical in organic substance		
3	Aluminum	Al	(dust) 300mg/m^3; (Al) 50mg/m^3
4	Ammonia	NH3	100 mg/m^3
5	Antimony	Sb	25 mg/m^3
6	Arsenic	As	20 mg/m^3
7	Berylium	Be	10 μg/m^3
8	Chloride	Cl	20 mg/m^3
9	Hydrogen chloride	HCl	200 mg/m^3
10	Hydrogen Fluoride	HF	10 mg/m^3
11	Hydrogen Sulfide	H2S	2 mg/m^3
12	Cadmium	Cd	1 mg/m^3
13	Copper	Cu	(dust) 300 mg/^{3} (Cu) 20 mg/m^3

No.	Parameter	Maximum Level of Discharge
14	Lead Pb	(dust) 100 mg/m^3 , (Pb) 30 mg/m^3
15	Zinc Zn	30 mg/m^3
16	Mercury Hg	0,1 mg/m^3
17	Carbon Monoxide CO	1000 mg/m^3
18	Sulfur dioxide SO_2	500 mg/m^3
19	Nitrogen Oxide (all kinds) NOx	1000 mg/m^3
20	Nitrogen oxide NOx (emitted HNO_3 product)	2000 mg/m^3
21	Sulfuric Acid $H2SO_4$	35 mg/m^3
22	Nitric Acid HNO_3	70 mg/m^3
23	Sulfur Trioxide SO_3	35 mg/m^3
24	Phosphoric Acid $H3PO_4$	3 mg/m^3
	Chemical organic substance	
25	Acetylene tetra bromide $CHBr_2$	14 mg/m^3
26	Acrolein CH2=CHCHO	1,2 mg/m^3
27	Aniline C6H5NH2	19 mg/m^3
28	Benzidine NH2C6H4C6H4NH2	None
29	Benzene C6H6	80 mg/m^3
30	Chloro benzyl C6H5CH2Cl	5 mg/m^3
31	Butyl Amine CH3(CH2)2CH2NH2	15 mg/m^3
32	Cresol (O-,m-,p-) CH3C6H6H4OH	22 mg/m^3
33	Chloro benzene C6H5CL	350 mg/m^3

No.	Parameter	Maximum Level of Discharge
34	Chloroform CHCl3	240 mg/m^3
35	Chloropicrin $CCl3NO_2$	0,7 mg/m^3
36	O-dichlorinbenzene C6H4Cl2	300 mg/m^3
37	1,1-dichloro ethane CHCl2CH3	400 mg/m^3
38	Di methyl sulfate (CH3)2SO4	0,5 mg/m^3
39	Di methyl hydrazine (NH3)2NNH2	1 mg/m^3
40	Di nitro benzene (o-,m-,p-)C6H4(NO2)2	1 mg/m^3
41	Ethylene di amine NH2CH2-CH2NH2	30 mg/m^3
42	Ethylene Chlorohydrine CH2ClCH2OH	16 mg/m^3
43	Ethylene oxide CH2OCH2	20 mg/m^3
44	Formaldehyde HCHO	6 mg/m^3
45	Methyl Acrylate CH2=CHCOOCH3	35 mg/m^3
46	Methanol CH3OH	260 mg/m^3
47	Methyl bromide CH3Br	80 mg/m^3
48	Monomethyl Aniline C6H5NHCH3	9 mg/m^3
49	Nitro Benzene C6H5NO2	5 mg/m^3
50	Nitroglycerine C3H5(NO2)3	5 mg/m^3
51	Nitrotoluene NO2C6H4CH3	30 mg/m^3
52	Phenol C6H5OH	19 mg/m^3
53	Phenylhydrazine C6H5NHNH2	22 mg/m^3
54	Pyridine C5H5N	30 mg/m^3
55	Pyrene C16H10	15 mg/m^3

No.	Parameter	Maximum Level of Discharge
56	Quinone C6H4O2	0,4 mg/m^3
57	Styrene C6H5CHCH2	420 mg/m^3
58	1,1;2,2-tetrachloroethane CL2HCCHCl2	35 mg/m^3
59	Tetrachloromethane CCl4	65 mg/m^3
60	Toluene C6H5CH3	750 mg/m^3
61	Tetranitromethane C(NO2)4	8 mg/m^3
62	Toluidine CH3C6H4NH2	22 mg/m^3
63	Toluene-2,4-D-isocyanate CH3C6H3(NCO)2	0,7 mg/m^3
64	Trichloro ethylene ClCH=CCl2	110 mg/m^3
65	Xylidine (CH3)2 C6H3NH2	50 mg/m^3
66	Vinylchloride CH2=CHCl	150 mg/m^3

This standard applies to control of pollution substances for immobile source to atmosphere

E.6 Attachment 6: Annex-5 to Sub-decree No. 42/ANK/BK of July 10, 2000 (Maximum Standard of Noise Emission Level Allowable for Vehicles on Public Roads)

No.	**Category of Vehicles**	**Maximum Noise Level permitted** (dB (A))
1	- Motorcycles, cylinder capacity (cc) of engine <125cm^3	85
2	- Motorcycles, cylinder capacity (cc) of engine ≥125cm^3	90
	- Motorize Tricycles	
3	- Cars, taxi, bus with capacity of < 12 passengers	90
4	- Bus with capacity of ≥ 12 passengers;	80
5	- Truck with loading capacity of <3,5 tons	85
6	- Truck with loading capacity of ≥ 3,5 tons	85
7	- Truck with engine capacity of ≥ 150 kw	88
8	- Other machinery (tractors/trucks) that are not listed above	89
9		91

This standard applies to control of noise emission standard for all kind of vehicle when operating on the public road.

E.7 Attachment 7: Annex-6 to Sub-decree No. 42/ANK/BK of July 10, 2000 (Maximum Standard of Noise Level Allowable in the Public and Residential Areas (dB(A))

No.	Areas	Period of Times		
		From 6AM through 18PM	From 18PM through 22PM	Form 22PM through 6AM
1	Quiet Areas - Hospitals - Libraries - School - Kindergarten	45	40	35
2	Residential Areas - Hotels - Administrative office - Villa, flat	60	50	45
3	Commercial and Service Areas and Area of multiple business	70	65	50
4	Small industrial factories mingling in residential area	75	70	50

This standard applies to control of noise level of any source or activity that emitted noise into the public and residential areas.