

National Road N.5 Improvement Project (Battambang- Sri Sophorn Section) Environmental Monitoring for Construction Stage (March 2020)

Item	Location	Parameter/Mean of Monitoring	Result (Average/ Max /Total)	Standards (Local/Inter Standard)	Frequency	Remarks
	Construction site	Visual inspection of mechanical condition and exhaust gas	No major adverse impacts	No standards	Every day before working	At construction camp site
	Construction site	Visual observation of dust	No major adverse impacts		Every day	Camp sites and site works
	Storage facilities for dust generation					Every day, especially in dry season
Air Quality	CP1: Air quality monitoring is conducted in Tapoun Commune, Thmal Koul District, BTB, PK35+120, widening road.	TSP/SPM	0.130	< 0.33 mg/m ³ (MoE, average 24h)	2 time in dray season	Air quality monitoring conduct by MoE Laboratory, on 20 March 2020,
		SO ₂	0.017	< 0.30 mg/m ³ (WHO average 24h)	2 times in wet season	
		NO ₂	0.029	< 0.10 mg/m ³ (WHO average 24h)		
	CP2: Air quality monitoring is conducted on widening road in Phnom Toch Commune, Mongkoul Borei District, BMC	TSP/SPM	0.35	< 0.33 mg/m ³ (MoE, average 24h)	2 times in dray season	Air quality monitoring conduct by MoE Laboratory, on 21 March 2020,
		SO ₂	0.029	< 0.30 mg/m ³ (WHO average 24h)	2 times in wet season	
		NO ₂	0.042	< 0.10 mg/m ³ (WHO average 24h)		
Water Quality	CP1: Surface Water Quality monitoring conducted in Sangke River on Bridge 78.	Visual observation/inspection	No major adverse impacts	No standards	Every day	Contractor and inspector
		Upstream	Results	Standards		
		pH	8.20	6.5-8.5 (MoE)		
		TSS	38.00	25-100 mg/l (MoE)	1 time in dry season	Took water sample in 23 March 2020
		BOD	1.20	1-10 mg/l (MoE)		
		COD	2.75	1-8 mg/l (MoE)	1 time in wet season	
		Oil-Grease	0.67	< 5.00		
		Downstream	Results			
		pH	8.22	--		
		TSS	76.00	--	1 time in dry season	Took water sample in 23 March 2020
		BOD	1.40	--		
		COD	3.83	--	1 time in wet season	
Oil-Grease	2.27	--				
CP2: No activities in this Month	Visual observation/inspection	No major adverse impacts	No standards	Standards	Every day	Contractor and inspector
	Upstream	Results	Standards			
	pH		6.5-8.5 (MoE)			
	TSS		25-100 mg/l (MoE)	1 time in dry season	There is not water quality monitoring in this Month	

Water Quality		BOD	1-10 mg/l (MoE)				1 time in wet season	
		COD	1-8 mg/l (MoE)					
		Oil-Grease	< 5.00					
		Downstream	Results					
		pH	--				1 time in dry season	
		TSS	--				1 time in wet season	
		BOD	--					
		COD	--					
		Oil-Grease	--					
Noise	Boundary of land plot nearest to the construction site	Noise Level: Visual inspection. the contractor plan to conduct site measures next time	No major adverse impacts (assessed by visual)	No major adverse impacts to communities at construction sites			- When noise/vibration level exceeding the Cambodian standards in suspected. - When local residents complain.	Visual check or monitoring. Plan to measure next time. The noise is regularly generate from heavy trucks are moving on NR5. the vibration is the same as trucks movement on NR5 (widening road)
Vibration		Vibration Level (Visual inspection)						
Waste Generation	CPI: Waste storage at construction sites (contractor campsites and temporary worker campsites)	Slurry and other construction waste (Oil waste)	Oil waste: is about 500 l/month	No No No treat Sell to local subcontractor	No standards. The oil waste (old oil) discharge from machines		Every day: collect, and temporary store in safety oil waste tanks. The local sub-contractor to collect out 1 time/week (reuse or any purposes)	The oil-plastic waste sell to local private collector
		General waste (Solid-household waste)	Discharged amount: 500l/month Recycled amount The way of recycle Treated amount	Solid waste/household waste is 70 kg/week			Every day: clean, collect, and temporary store in solid waste tanks. The local sub-contractor collects out 1 time/week to dispose in public waste dumping site	waste water flow into the Septic tanks
			Discharged amount: 70 kg/week	No				
			Recycled amount	No				
			The way of recycle	No				
			Treated amount	No treat				
				Sell to local subcontractor				

Waste Generation	CP2: Waste storage at construction sites (contractor campsites and temporary worker campsites)	Slurry and other construction waste (Oil waste)	Discharged amount: 400kg/month	Oil waste: is about 400kg /month	No standards. The oil waste (old oil) discharge from machines	Every day, collection The local sub-contractor to collect out 1 time/week (reuse or any purposes)	Collect an store in safety tanks and sell to local private subcontractor for re-use
			Recycled amount The way of recycle Treated amount	No No No treat Sell to local buyer for reusing (oil waste and plastic waste).			Sell to local buyer for re-use and recycle
		General waste (Solid-household waste)	Discharged amount: 65 kg/week	Collect and temporary store in waste tanks and provide to waste company to transport out		Every day: clean, collect, and temporary store in solid waste tanks.	Contract with local license waste company to transport to public dumping site
			Recycled amount The way of recycle Treated amount	No No No treat Sell to local buyer for reuse.			
Subsidence	Subsidence prone locations along the project road	Visual inspection, site assessment and interview to the local people	Visual inspection, site assessment and interview to the local people	No major adverse impacts	No standards	1 time/week to 1 time/2 weeks (depending on situation)	Minor affects to prone locations along the project road.
Hydrology	River, stream, and reservoir where construction works are executed	Visual inspection on volume of water flow (in up and down stream), and flood occurs	Visual inspection on volume of water flow (in up and down stream), and flood occurs	No major adverse impacts		Every day	In The main rivers are crossing NR-5. Most action in raining season.
Ecosystem	CP1, Along NR-5	Visual observation of animals, reptiles, and amphibious	Visual observation of animals, reptiles, and amphibious	No major adverse impacts or complains. base of discussion with commune leaders and communities, during RAP meetings and HIV awareness meetings	No standards Species funded: Acacia, Eucalyptus, Rain tree, coconut, banana and a few paddy fields.	4 time/month	Most village garden crops. The road project is located in village areas, so there are not any sensitive ecological and animal resources located there.
	CP2, Along NR-5	Visual observation of animals, reptiles, and amphibious	Visual observation of animals, reptiles, and amphibious	No major adverse impacts, or complains. base of discussion with commune leaders and communities, during RAP meetings and HIV awareness meetings	No standards Species funded: Acacia, Eucalyptus, Rain tree, coconut, banana and a few paddy fields.	4 time/month	Most village garden crops. The road project is located in village areas, so there are not any sensitive ecological and animal

Ecosystem	CP1, BTB bypass	Visual observation and site consultation of animals, reptiles, and amphibious	No major adverse impacts on local ecosystem resources. Most are rice crops and fruit trees	No standards. Species funded: Orange tree, Pomelo, Lagen tree, Neen tree, banana, coconut, Cashew nut, Sugar palm, Rain tree, and more paddy fields.	4 times/month	resources located there. Bypass is considered than along NR5, especially in wet season, but most are rice crops and fruit trees.
	CP2, SS bypass	Visual observation and site consultation of animals, reptiles, and amphibious	No major adverse impacts on local ecosystem resources. Most are rice crops.	No standards. Species funded: Acacia, Eucalyptus, Neen tree, grass filed, and most areas are paddy fields.	4 times/month	The road project is located in and near village areas, so there are not any sensitive ecological and animal resources. Most of bypass is passing the paddy fields
Endangered Reptiles (Turtle-Fish)	Widening and bypasses	Visual observation/inspection in rivers and ponds	during site investigation. No fund any endangered turtles and wildlife species are in the project areas.	No standards	1-2 time/week	There are not endangered reptiles or species in the project areas. The road project is located in village areas, farm, and rice filed.

Updated: March 2020

Sources:
- Contractors (CP1-CP2)
- MoE Laboratory

Remarks:
Past trend and current statute including remedial measures, if necessary.
- The Water Quality results are analyzed by MoE laboratory, in Phnom Penh,
- The air quality monitoring is conducted and analyzed by MoE laboratory.

Note:

The water quality in Sangke River (bridge 78 construction):

- The Oil-Grease in Upstream of the bridge: 0.67 and in Downstream of the bridge: 2.27
- The results of Oil –Grease in upstream and downstream is changed but are under the MoE standards. (MoE Standard: < 5.00).

WHO: World Health Organization,
MoE: Ministry of Environment
N/A: No Applicable
NO₂: Nitrogen Dioxide
SO₂: Sulfur Dioxide
SPM: Suspended Particulate Matters
BOD: Biochemical Oxygen Demand
COD: Chemical Oxygen Demand
TSS: Total Suspended Solid

Attachment 15-2

Noise	BTB-KP 300, ROW boundary	Noise Level	60dB (06:00-18:00) 50dB (18:00-22:00) 45dB (22:00-06:00) (MoE, residential area)	Visual regularly check and maintain all equipment Not action in this time
	BTB Bypass Intersection with NR-57, ROW boundary		N/A	
	BMCH-KP 356, ROW boundary			
	BTB-KP 300, ROW boundary			
Vibration	BTB Bypass Intersection with NR-57, ROW boundary	Vibration Level	65Hz (05:00-17:00) 60Hz (17:00-05:00) (Lab. MoE)	Visual regularly check and maintain all equipment
	BMCH-KP 356, ROW boundary			
	Along the road and public gathering	Discharged amount Recycled amount The way of recycle Treated amount Location of final disposal site	N/A N/A N/A N/A	Sell to local private collector Septic tank (waste water) some give to local waste collector and some put in the underground (solid waste)
Subsidence	Building and other structures in BTB Province	Rising up of building is visually inspected		Visual inspection
	Building and other structures in BMCH province			Visual inspection
Ecosystem	Along NR-5	Visual observation of animals, reptiles, and amphibious		1-2 time in dry and in rainy season. There are not sensitive animals species in the project sites. (rice filed and residents)
	BTB bypass			
	SS bypass		Not action	No action

Remarks: Past trend and current statute including remedial measures, if necessary.