

Environmental Management Plan

March 2021

Cambodia: Second Urban Environmental Management in the Tonle Sap Basin Project

Solid Waste Management Subproject in Battambang Town, Battambang Province (CW03c)

Prepared by the Ministry of Public Works and Transport for the Asian Development Bank. This is an updated version of the draft originally posted in April 2018 available on <https://www.adb.org/projects/documents/cam-50102-002-emp-1>.

CURRENCY EQUIVALENTS

(as of February 2020)

Currency unit	–	riel (KR)
KR 1.00	=	\$ 0.000250
\$1.00	=	KR 4,000

ABBREVIATIONS

ADB	–	Asian Development Bank
BOD	–	Biochemical Oxygen Demand
CDIA	–	Cities Development Initiative for Asia
CEMP	–	Construction Environmental Management Plan
C-EHS	–	Contractor Environmental Health and Safety Officer
CMAC	–	Cambodia Mine Action Center
COD	–	Chemical Oxygen Demand
CRVA	–	Climate Risk Vulnerability Assessment
DED	–	Detailed Engineering Design
DDPP	–	Detailed Design and Project Preparation
EA	–	Executing Agency
EIA	–	Environmental Impact Assessment
EMI	–	Environmental Monitoring Institute
EMP	–	Environmental Management Plan
FGD	–	Focus Group Discussion
GDR	–	General Department of Resettlement
GHG	–	Greenhouse Gas
GRM	–	Grievance Redress Mechanism
IA	–	Implementing Agency
IEE	–	Initial Environmental Examination
IEIA	–	Initial Environmental Impact Assessment
MoE	–	Ministry of Environment
MoLVT		Ministry of Labour and Vocational Training
MOWRAM	–	Ministry of Water Resources and Meteorology
MPWT	–	Ministry of Public Works and Transport
MRF	–	Material Recovery Facility
PDoe	–	Provincial Department of Environment
PDPWT	–	Provincial Department of Public Works and Transport
PMC-I/NES	–	PMC-International and National Environment Specialists
PIU	–	Project Implementation Unit
PIU-SFP	–	PIU Safeguards Focal Point
PMC	–	Project Management Consultant
PMU	–	Project Management Unit
PMU-ESO	–	PMU Environmental Safeguards Officer
PSC	–	Project Steering Committee
RCP	–	Representative Concentration Pathway
SHC	–	Sewer Household Connection
SPS	–	Safeguards Policy Statement
TS-1	–	Tonle Sap Urban Environmental Improvement Project
TSBR	–	Tonle Sap Biosphere Reserve
TSS	–	Total Suspended Solid
UXO	–	Unexploded Ordnance
WHO	–	World Health Organisation

WEIGHTS AND MEASURES

dBA	–	A-weighted Decibel
km	–	Kilometre
km ²	–	Square kilometre
LAeq	–	Equivalent Continuous Level 'A weighting' - 'A'-weighting = correction by factors that weight sound to correlate with the sensitivity of the human ear to sounds at different frequencies
m	–	Meter
oC	–	Degree Celsius
PM10	–	Particulate Matter 10 micrometres or less
PM2.5	–	Particulate Matter 2.5 micrometres or less
µg/m ³	–	Microgram per cubic meter

NOTE

- (i) In this report, "\$" refers to United States dollars.

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1. INTRODUCTION

1.1. Purpose

1. This document is the Environmental Management Plan (EMP) for the solid waste management subproject in Battambang Town, Battambang Province of the Second Integrated Urban Environmental Management in The Tonle Sap Basin Project (also referred to as the TS-2 Project). This EMP was prepared based on the Initial Environmental Examination (IEE) and consistent with the final Detailed Engineering Design (DED).
2. The EMP for the landfill subproject in Battambang outlines the anticipated environmental and social impacts of the project and presents the mitigation and monitoring measures to be undertaken to offset/mitigate the negative impacts at specific locations and the time at which the measures will be implemented.
3. The EMP describes the roles and responsibilities for the implementation of the measures and monitoring, to be shared between the Project Owner, the Contractor, and the future Site Operator during pre-construction, construction, and operation of the landfill. Costs are associated with the implementation of the EMP and therefore the project owner or contractor then the operator must plan for capable/experienced staffs and budget to manage and implement the EMP during project activities.
4. The EMP is compliant with ADB Safeguards Policy 2009 and the sub-decree on Environmental Impact Assessment Process, MoE, 1999. The IEE prepared for this subproject is found under separate cover dated March 2021.
5. This EMP was prepared for the construction of a controlled landfill. It is one of several EMPs prepared for the TS-2 project. The TS-2 Project also includes other infrastructure components in Serei Saophoan city, Banteay Meanchay Province, and Stueng Saen city Kampong Thom province.

1.2. Outline of Sub-Project

Landfill technology outline

6. A preliminary Feasibility Study (FS) was conducted in 2018 during a Preparatory Technical Assistance (PPTA) and the IEE and EMP have been completed in conjunction with the completion of the Detailed Engineering Design (DED) thereby ensuring consistency between the environmental measures and the engineering designs.
7. As described in the DED and in the IEE, the proposed landfill subproject is designed as a controlled engineered landfill located in an upland area currently used as a quarry/borrow pit. The site is located within Poar Svay Village, Ta Keam Commune, Banan District, Battambang Province. The location of the landfill was approved by MoE in February 2020.
8. The standard controlled landfill facility was considered during project preparation to be the most appropriate standard of technology as it provides the best balance between capital cost and operating difficulty and enables environmental controls and sustainability equivalent to those of an engineered landfill.
9. Investment works to be implemented for Battambang under TS-2 project comprises the following:
 - Total landfill area is 25 hectares
 - Project requires upgrading and elevating 420 m of the external access road to the landfill site, with levels to be above flood levels. (out of a total of 3.5 km of access road, which may be upgraded in the 2040 horizon).
 - Construction of 1 (one) controlled landfill cell out of a total of 4 (four) cells with grading, drainage in site preparation, improved leachate and surface water management.
 - Construction of 1 (one) hazardous waste landfill cell.

- Construction of leachate collection, storage, treatment system and recirculation system.
- Construction of concrete internal road and rainwater drainage system along with peripheral embankments.
- Construction of fencing and entrance gate.
- Construction of weighbridge and office building; staff dining and rest room; supply room; workshop, electrical and mechanical room.
- Construction of a non-mechanical materials recovery facility (MRF)
- Construction of hazardous waste storage facility.
- Construction of vehicle washing facility.
- Provision of operations & maintenance equipment.

10. Details on design hypotheses, construction principles and operations are provided in the IEE.

Existing Dumpsite.

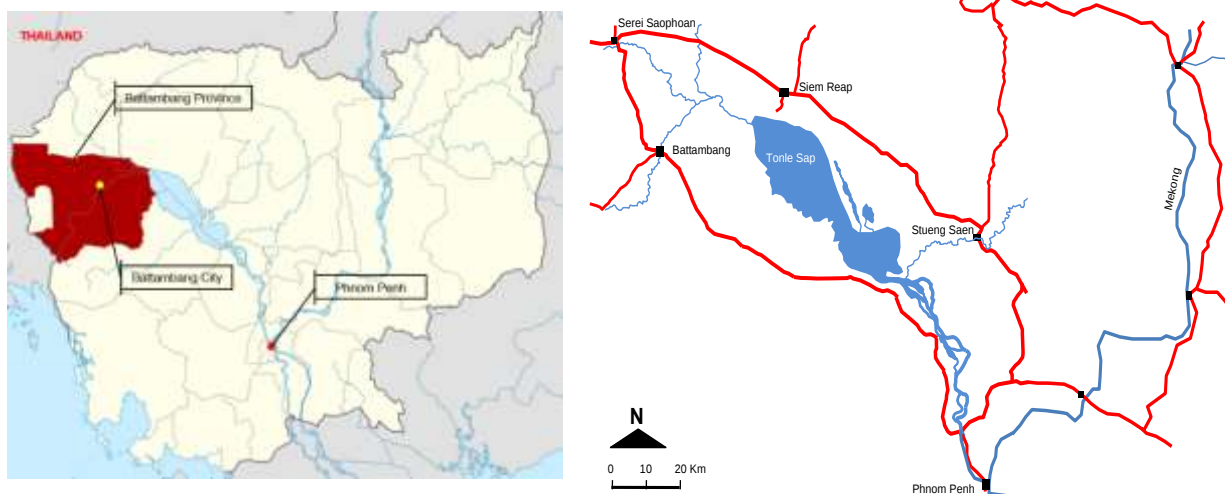
11. The existing dumpsite of Battambang town is located north of Battambang town, within Sankat Commune.

12. The closure of the existing dumpsite is not included in this project, considering the presence of the MRF and of a composting plant on this site. The rehabilitation and closure of this site may be considered at a later stage and will be subject to a specific Environmental and Social Due Diligence.

1.3. Project location

13. The Landfill project targets Battambang town, in Battambang province. Battambang is the capital city of Battambang province in north-western Cambodia, a leading rice growing area. Battambang is one of the country's most populated cities and is located approximately 300 km from the capital, Phnom Penh.

Figure 1: Location of Project Urban Centres of TS-2



14. The proposed landfill site location is:

- About 3 kilometres from Poar Svay Village, Ta Keam Commune, where there are: houses, school, pagoda, health center, water well and pond.
- About 3.5 kilometres from Road 1570.
- About 22 kilometres from Battambang town.

Figure 3: Location of proposed Landfill Site service area in Battambang

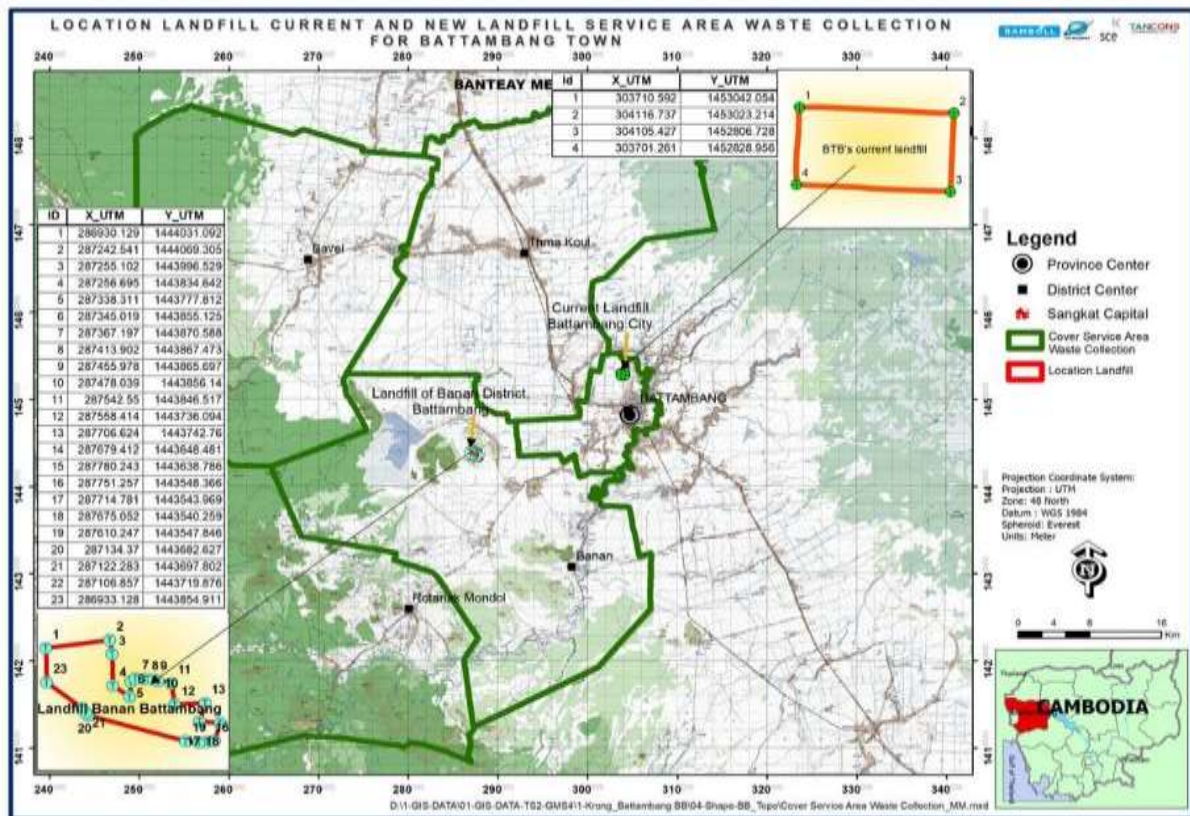
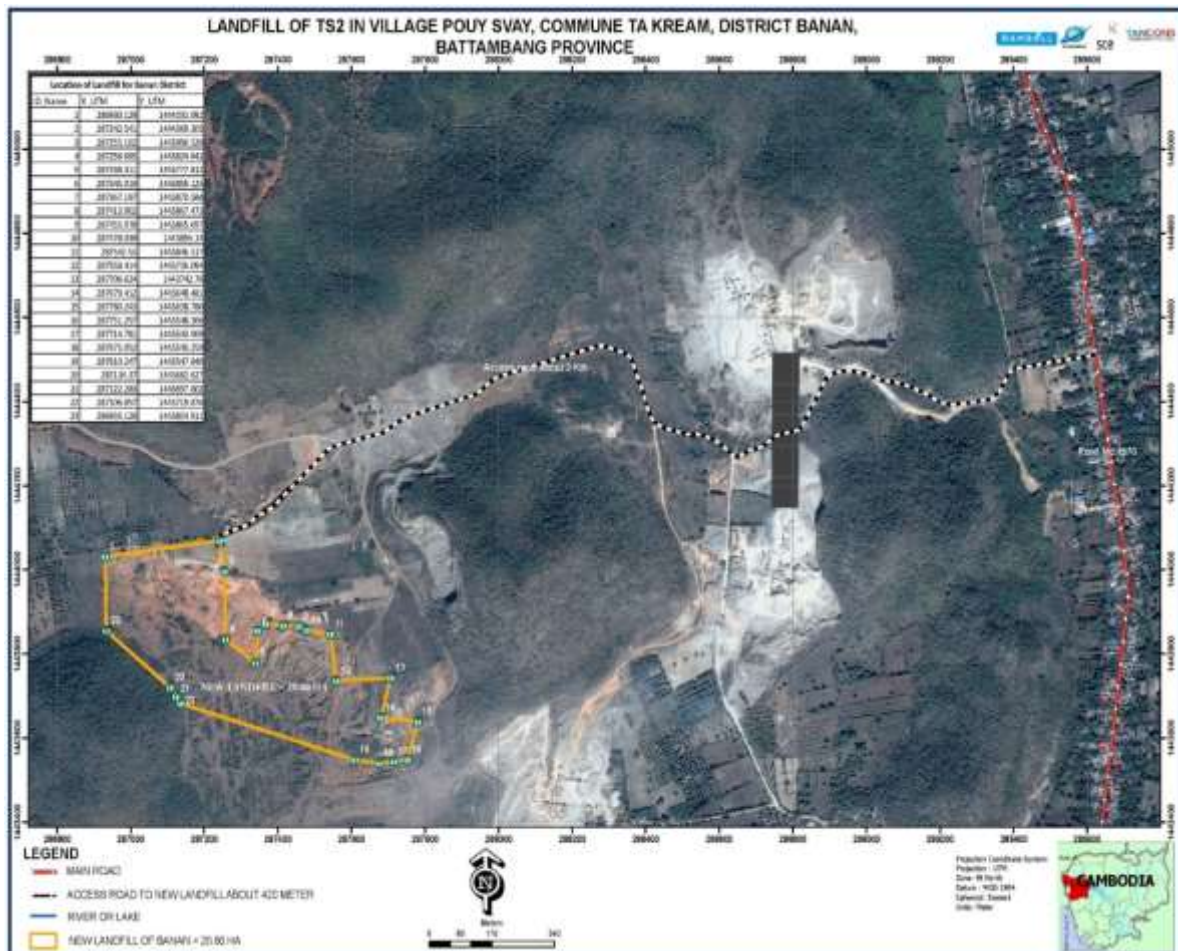


Figure 2: Proposed landfill boundaries and access road, 3.5 km to closest village



15. Figure below shows the Existing Dumpsite, located on the outskirts of Battambang town, in a rural area in Sankat Commune.

Figure 4: Location of Existing Dumpsite - Sankat Commune, Battambang town



1.4. Objective of EMP

16. The EMP describes how the mitigation and other measures to enhance the benefits of environmental protection will be implemented. It explains how the measures will be managed, who will implement them, and when and where they will be implemented.

17. The following elements are presented in the EMP:

- (i) Implementation of mitigation measures during project preparation (pre-construction phase).
- (ii) Implementation of mitigation measures by contractors during the construction phase.
- (iii) Implementation of measures during the operation phase.
- (iv) Monitoring plan to control efficiency of measures proposed and assess the effective impacts of the project on the natural and human environment.
- (v) Contingency response plan for natural or other disasters, and project contingencies;
- (vi) and environmental management and monitoring costs including mitigation costs.

2. SUMMARY OF POTENTIAL RECEPTORS AND IMPACTS

18. The impacts of the project are dependant of the presence of receptors (natural and social resources) in the sub-project area. Without receptors, there will not be a noticeable impact. The main receptors around the project's sites are summarised in Table 1.

Table 1: Receptors in Sub-Project Area

Project sites	GPS	Surface Water /Groundwater Receptors	Socio-Economic & Cultural Receptors	Land Cover/ Ecological Receptors	Protected Area Status
Existing Dumpsite (for reference only)	103°11'30.80"E 13° 8'14.92"N	- No water body near the site - Closest river 1.2 km east of the site, surrounded by residential areas	- Site located in Agricultural area - No community directly surrounding the site. - Closest houses ca 500 m from site - 40 waste pickers work at site, out of which 16 live on site	- Site is enclosed by farmlands - No apparent natural habitat in the area	Closest area is Tonle Sap protected, 20 km east
New Landfill Site and access road	103° 2'12.19"E 13° 3'7.49"N	- Site located in upland or mountainous area of Ta Kream Mountain - No water body directly near the site - Wells and ponds in the Pouy Svay Village Ta Kream Commune about 3 km from site - Kaming Pouy River is about 7 km northwest of the landfill site - Sangke River is about 15 km east of the landfill site	- Site located about 3.5 km from Pouy Svay Village, where there are: houses, school, and health centre, pagoda. - Quarry work camps are located 2 km from the site - About 3.5 km from road N.1570 - 3 houses are located very close to the proposed new landfill (within 200 m radius) and 9 houses further away.	- The site itself is a Quarry and borrow-pit area, with little vegetation remaining - Sparse trees and bushes within footprint - Farms (fruit trees) are located north of landfill site. - On the South-West border, a hilly area uphill of project site is covered by a forest	Closest area is Tonle Sap protected, 40 km east

Figure 5: Land use around the proposed Landfill site



19. The EMP sets for the measures necessary to adequately mitigate the impacts on the receptors and the project site itself in accordance with the assessments in the IEE. A summary of potential adverse impacts on the receptors is presented in Table 2:

Table 2: Summary of impacts for Battambang landfill

Impact	Source	Receptors
Construction		
Degradation of Air Quality	■ Exhaust fumes from construction machinery and equipment, movement of haulage trucks ■ Asphalt pouring ■ Fugitive dust from borrow pits and all excavation works ■ Fugitive dust from loading, unloading and haulage of construction materials ■ Fugitive dust from concrete batching plants.	■ Ambient Air ■ Populations near project sites ■ Workers
Noise nuisance	■ Noise from construction machinery and haulage trucks ■ Noise from Generators ■ Movement of material / dumping of material (including waste from dumpsite)	■ Populations near project sites ■ Workers ■ Waste pickers at the dumpsite
Impacts on water quality	■ Discharge of contaminated stormwater (suspended material, spills) ■ Accidental Spills ■ Waste / litter ■ Improperly drilled boreholes	■ No surface water body identified nearby ■ Ground water ■ Nearby agricultural fields
Erosion or degradation of soil and land / Flooding	■ Earthworks ■ Accidental spills/ poor management of waste	■ Surface water bodies ■ Communiies
Destruction of fauna and flora	■ Clearing of construction sites (landfill, borrow pit)	■ Trees, bushes and shrubs
Impacts on health and safety	■ Traffic increase in residential areas from trucks movement ■ Air emissions and effluents ■ Co-activity ■ Use of construction equipment/tools ■ COVID-19	■ Communities ■ Workers
Operation		
Degradation of Air quality	■ Biogas Generation ■ Smoke from waste fires ■ Emissions from waste trucks and cover material trucks	■ Ambient air ■ Nearby communities
Impacts on water quality	■ Non-compliant discharged leachates ■ Contaminated stormwater ■ Spills and windblown litter	■ No surface water body identified near the site ■ Groundwater ■ Nearby agricultural fields ■ Fauna and Flora
Odours and Dust	■ Landfill operations / open cells ■ Dust from movement of vehicles	■ Workers ■ Communities
Impacts on Health and Safety	■ Movement of waste trucks and trucks for cover material ■ Accidental events such as fires and explosions ■ Use of equipment/maintenance of landfill ■ Presence of litter and pests around landfill	■ Workers ■ Communities

Impact	Source	Receptors
	■ Non-compliant effluents ■ COVID-19	

3. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

20. The framework for implementation of the EMP for the project is described here. The key institutions, organizations and stakeholders relevant to environmental safeguards are set out below.

21. The overall responsibility for EMP implementation and compliance with loan assurances lies with the Executing Agency (EA) which is the Ministry of Public Works and Transport (MPWT). The EA has established a Project Management Unit (PMU) based in Phnom Penh, responsible for general project implementation.

22. The Implementing Agency (IA) is the Provincial Department of Public Works and Transport (PDPWT) in each sub-project city. The PDPWT will establish a Project Implementation Unit (PIU) in each province, comprising relevant provincial government representatives including the Provincial Department of the Environment.

23. A Project Steering Committee (PSC) will be created to provide policy and technical guidance for subproject implementation. The PSC is chaired by the EA and comprises relevant ministries of provincial departments representatives including the Ministry of Environment, General Department of Resettlement (GDR) and Ministry of Labour as a minimum.

24. A summary of the key functions for project implementation and environmental safeguards is presented in Table 3 below for ease of reference:

Table 3: Key Roles for Project Implementation

Role	Abbreviation	Location	Summary of Overall Function
Project Steering Committee	PSC	Phnom Penh	Policy and technical guidance for subproject implementation
Project Management Unit	PMU	Phnom Penh MPWT	Responsible for general project implementation and reporting
PMU Environment Safeguards Officer (funded through CTDPA Loan)	PMU-ESO	Phnom Penh PMU	EMP compliance across the sub-projects for environmental safeguards – Full Time
Project Implementation Unit	PIU	Provinces PDPWT	Responsible for sub-project implementation
PIU Safeguards Focal Point	PIU-SFP	Province, PIU	Responsible for sub-project environmental and social safeguard monitoring – Full Time
Contractor Environmental, Health and Safety Officer	C-EHS	Construction Site	Mitigation measure implementation and reporting
Project Management Consultants	PMC	Phnom Penh	Project final design and implementation, support and capacity development. Engineering supervision for all construction and reporting.
International and National Environment Specialists	PMC-I/NES	Phnom Penh PMC team	Environmental safeguards and reporting support during design and implementation - Intermittent
Asian Development Bank	ADB		Review project progress, compliance with covenants and advise on corrective actions
Ministry of Environment (MOE)/ Provincial Department of Environment (PDoE)	MoE/PDoE	Phnom Penh province	Collaborate with project to provide policies or environmental standards and advise. Observer and conduct environmental monitoring of the project activities based on their mandate during construction and operation.

25. External support to the IA/PIU for EMP implementation during the Project Detailed Design and Implementation Phase is provided by the International and National Environment Specialists (I/NES) of the PMC.

26. An external Environmental Monitoring Institute (EMI) will be engaged to conduct the field sampling and laboratory analyses of environmental quality (e.g., water quality, air quality) that cannot be performed by other functions within the project. In Cambodia, this can be performed by qualified staff from the Ministry of Environment (MoE).

27. ADB is responsible for reviewing project progress reports and semi-annual environmental safeguards monitoring reports and undertaking review missions to ensure the project is implemented in line with project environmental safeguard requirements, SPS (2009) and Royal Government of Cambodia regulations and guidelines.

28. The EA will be accountable for project implementation and operation on behalf of the Royal Government of Cambodia. The responsibilities of the EA in relation to environmental safeguards requirements are summarized below:

- (vii) Overall responsibility for subproject implementation and management of the Project Management Unit (PMU).
- (viii) Recruit and manage qualified Environmental Site Office (ESO) for PMU.
- (ix) Recruit and manage Project Management Consultants.
- (x) Ensure compliance with Loan Covenants.

- (xi) Approve procurement plans, bidding documents, bid evaluation and contract awards including EMP.
- (xii) Submit regular quarterly and annual subproject reports to ADB including summary on EMP and Grievance Redress Mechanism (GRM) implementation
- (xiii) Ensure compliance of subproject/component implementation with ADB and Government social and environmental policies, guidelines and plans.
- (xiv) Approve proposed corrective actions in the event of identified impacts or non-compliance issues identified in monitoring and evaluation reports.

29. The responsibilities of the IA in relation to environmental safeguards requirements are summarized below:

- (i) Coordinate and monitor subproject implementation activities including all environmental safeguards activities.
- (ii) Coordinate capacity development program for PIU.
Obtain necessary approvals from respective departments and other institutions prior to awarding of civil works contracts.
- (iii) Support PMU-ESO in the implementation of EMP.
- (iv) Coordinate regular reporting of PMU to EA on EMP implementation.
- (v) Undertake regular quality control inspection of subproject facilities.
- (vi) Manage the handover of subproject facilities to agencies responsible for operation and maintenance.
- (vii) Ensure PIU engage with and follow the Grievance Redress Mechanism GRM.

30. Specific environmental safeguard responsibilities are set out for each project phase in Table 4.

Table 4: EMP Implementation Responsibilities

Responsible Entity	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
Executing Agency	MPWT and MoE is responsible for ensuring the implementation of the mitigation in the EMP and for ensuring compliance with loan covenants			
PMU / PMU-ESO	Update IEE/EMP if needed	Engage PMC & PMU-ESO	Ensure EMP is implemented, and that the contractor(s) abide by the EMP	
	Review updated EMP	Coordinating the tendering process including overseeing incorporation of EMP clauses into the bidding documents	supervising project construction (with support of PMC engineers)	
	Confirm that mitigation measures have been included in engineering detail design	Ensuring the procurement of environmentally responsible contractors and approve CEMP	Prepare and submit quarterly and annual reports including environmental safeguard reporting to ADB	
		Ensuring that domestic EIA approvals by MoE have been secured prior to the awarding of civil works contracts		
		Dissemination and coordination of Grievance Redress Mechanism	Ensure EMP implementation and submit regular monitoring reports to IA and EA	
			ensure PIU-SFPs undertake regular site inspections as part of progress reporting	
PIU-SFP		Attend all pre-construction training courses regarding EMP implementation	working closely with the contractors to ensure EMP implementation	
			Support GRM	
			Support Progress Monitoring and Reporting requirements working with PMU-ESO	
			Conduct consultation interviews with affected people	
Project Management Consultants PMC	Engage appropriate engineer and safeguards staff	See PMC-I/NES	See PMC-I/NES	Operator training and support as per ToR in PAM

Responsible Entity	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
	Finalise Detailed Engineering Design in accordance with Environmental Safeguard principles			
Project Management Consultants PMC (PMC-I/NES)]	Update IEE/EMP if needed	Providing training on EMP supervision and GRM to PMU, PIU and contractors	coordinate public consultation with PMUESO / PIU-SFP	Organize, prior to project completion report (PCR) mission, a survey to assess community satisfaction with project implementation and EMP implementation performance. Draft environment sections of the PCR.
		Setting up environmental management and internal monitoring systems at PUSO and civil works contracts level	preparing annual EMP progress reports	
		Review tender and contractor documents	identifying environment-related implementation issues and necessary corrective actions	
		Review Contractor Construction EMP	Training of PMU, PIU and other stakeholders GRM and EMP implementation	
		Ensure grievance redress mechanism established		
		Regular EMP and implementation monitoring		
		Coordinate public consultation		
			Organize, prior to project completion report (PCR) mission, a survey to assess community satisfaction with project implementation and EMP implementation performance. Draft environment sections of the PCR.	
Contractor		Provision of Construction EMP and environmental track record in bid response	Ensure sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP throughout the construction phase	Ensure handover of sites is in accordance with EMP and any corrective actions identified in Project

Responsible Entity	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
			Appoint an environment, health and safety (EHS) officer to oversee EMP implementation related to environment, occupational health and safety on construction site Ensure health and safety Implement mitigation measures Act as a local entry point for the project GRM and collaborate with PMU on all GRM issues	Completion Report are completed.
External Monitoring Institute		Undertake specialised environmental monitoring as contracted by PMU	Undertake specialised environmental monitoring as contracted by PMU	Undertake specialised environmental monitoring as contracted by Operator
Operator			Testing prior to commissioning to ensure discharge standards can be met.	Prepare specific Operational Environmental Management Plan and associated sub-plans for the operation Allocate staff and budget for implementation of Operational EMP Ensure proper operation of project facilities according to design standards & monitoring Allocation of budget for O&M

3.1. Institutional Capacity Review and Needs

31. Currently there is little experience of monitoring and implementing environmental mitigation measures particularly at a provincial level. There is little enforcement of environmental or health and safety legislation and routine environmental monitoring is not undertaken apart from in major urban centres (air quality) or major rivers (water quality).

32. During the preparation of this EMP, the team checked the capacity and experience at MPWT and found that there are a number of people who have fulfilled the role of 'focal point' for safeguards on a project-by-project basis, and there is an established Safeguards Team within the ministry of six people. This team has experience of working on highway projects but have not to date been involved with urban development projects and are willing to be involved in any training and site visits required during project implementation. The team will be provided with copies of relevant monitoring reports, the EMP and other relevant safeguard documents.

33. In addition, through reviewing existing operations for the landfill in Phnom Penh, provincial disposal sites and existing wastewater treatment operations, it is clear that there is limited ability for operation and maintenance. The limiting factors affecting the operators' ability to maintain adequate standards are likely to be a function of (i) a lack of technical capacity and experience; and (ii) insufficient budget. A training program is set out in Table 5 below which addresses the safeguard reporting and implementation requirements during construction, and the environmental and social risks from operations.

34. The engagement of a National Environmental Specialist for about 10 months spread throughout implementation will be critical to ensuring the capacity of the PIU staff and to ensuring monitoring and reporting are managed effectively during implementation. This person will also work closely with the PMU Environment Safeguards Officer (PMU-ESO) in order to ensure safeguards are implemented and monitored Training for EMP implementation. The proposed training required for project implementation is set out in Table 5. For budgeting purposes, refer to Feasibility Report Volume 5, Institutional Strengthening and Capacity Building. Specifically, the training requirements for the project set out in the relevant Terms of Reference include:

- Train PIUs, contractors, municipalities, and other relevant stakeholders on the implementation of EMPs. The Training for investment sustainability. The importance of training in landfill operations and management should be emphasized if the investment in landfills is to be sustainable and adequate operations are maintained as per the landfill design. Therefore, the Feasibility Studies for the landfill include details on operator training. For budgeting purposes, refer to Feasibility Report Volume 5, Institutional Strengthening and Capacity Building. Specifically, the training requirements for the project set out in the relevant Terms of Reference include:
- Develop an operation and maintenance manual for each landfill and collection system, and a training program on the operations manual provisions.
- Train operators on plant equipment at the landfill sites.
- Train operators on achievement of, and compliance with, regulatory standards and monitoring of the performance of the facilities.
- Train landfill operators on controlled landfill recycling and disposal operations.

Table 5: Capacity Building and Training Requirements

Subject / Content	Participants	Trainer/ Organisation	When/ Frequency	Duration (days / event)	# of participants	Cost (\$) USD
EMP adjustment and implementation - Development and adjustment of the EMP, roles and responsibilities, monitoring, supervision and reporting	PMU, PIU, contractors	I/NES of PMC	Twice - Once prior to, and once after 6 months of construction	2	10	For costs and details see: Feasibility Report Volume 5, Institutional Strengthening and Capacity Building
Grievance Redress Mechanism (GRM) and roles and responsibilities	PMU, PIU, contractors, Commune Councils	I/NES of PMC	Twice - Once prior to, and once after 6 months of construction	1	10	
Environmental protection Pollution control on construction sites (air, noise, wastewater, solid waste)	PMU, PIU, contractors	I/NES of PMC	Once (during project implementation)	2	10	
Environmental monitoring - Monitoring methods, data collection and processing, reporting systems	PMU, PIU, contractors, Operators of Landfill	I/NES of PMC & MoE (environmental analyst)	Once (at beginning of project construction)	2	10	
Landfill Management	Included as part of the solid waste management investment training budget					

4. MITIGATION MEASURES PLAN

35. Comprehensive mitigation measures are set out below for landfill sub-project in Battambang Town.

36. **Construction Environmental Management Plans.** The Contractor is required to develop a specific Construction Environmental Management Plan (CEMP) which is a detailed plan which set out the contractor's approach to mitigating the highest risks, as identified by the Environmental Impacts section of the IEE or those impacts which are best addresses through provision of a detailed map.

37. **Specific Management Plans.** As part of the CEMP, the contractor is required to develop the following specific subplans prior to start of work:

- Community and Occupational Health and Safety and Emergency Response Sub-Plan
- Materials, Spoil and Borrow Site Management Sub-Plan
- Solid and Liquid Waste Management Sub-Plan
- Community and Occupational Health and Safety and Emergency Response Sub-Plan
- Traffic Management Sub- Plan
- Construction Workers Camp Management Sub-Plan

38. Similarly, the future operator will have to develop its own set of **Environmental Management Plans and Subplans.**

4.1. Pre-construction phase

Table 6: EMP Mitigation Measures for Landfill Project – Pre-Construction

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Pre-Construction Phase					
National IEIA Approval	All impacts	1. Approval by MoE of the IEIA has been obtained on 10 February 2021. Conditions in the approval including baseline environmental surveys shall be met. The PMU should also ensure all other relevant permits are obtained prior to start of any works (including vegetation clearing).	PMU	MoE	Included in project cost
Disclosure and engagement of community through consultation	Community impacts	2. Initiate Information Disclosure and Grievance Redress Mechanism 3. Include discussions on (including with waste pickers): - The project implementation schedule, - Key construction activities (in particular those that result in disturbance or nuisance) - GRM and status of compensation (if relevant). - And discussions related to: - Impacts/ Nuisance on the Environment and the communities reported by community members. - Concerns and expectations from the project	PMU-ESO/ PIU-SFP	EA	Included in PMC cost package
Contractor EMP (CEMP)	All impacts	4. The contractor(s) will develop a Construction EMP of landfill subproject to be submitted to PMC-I/NES Consultant for review and approval. 5. The CEMP will include a map of each construction site, showing as a minimum: Access routes, storage areas for waste, storage area for chemicals such as fuels, refuelling locations for vehicles, concrete mixing, stockpile storage areas (on & off site), first aid kit and equipment used in emergency response, location of worker camps (if required) and borrow sites. 6. All related subplans should also be developed by the Contractor (as listed above.)	Contractor (C-EHS)	PMU and DDISC	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		7. The CEMP should also provide a Method Statement for well drilling (groundwater observation wells, and water supply well for the landfill site).			
Backfill / Extraction of material at Borrow sites	Destruction of Flora Erosion Traffic Air Quality impact	8. Where possible, materials from existing licensed borrow and quarry sites will be used. If new sites are needed, they will be subject to due diligence and approval by ADB and the relevant PDoE to ensure that sensitive habitats are avoided and that an appropriate restoration plan using native species is agreed following re-contouring. 9. Select Borrow sites located as close as possible to the proposed landfill site to reduce distances. 10. The Borrow sites to be exploited for the construction activities need to be identified within the CEMP, and site-specific spoil and borrow site management plans need to be prepared for each borrow site identified for construction.			
UXO survey, & removal	Injured worker or public people	11. Ensure national military is consulted to confirm all relevant areas are clear from UXO. This includes: a) All land to which is used for resettlement purposes (for people/businesses/farmland) b) All construction sites including 50 m either side of any access roads c) All associated areas including borrow sites. 12. Cambodian Mine Action Centre (CMAC) to clear areas where necessary and provide evidence of clearance to PMU in advance of excavation and construction. 13. As evidence, submit a certificate of UXO clearance and attach it as annex to the subsequent monitoring report to ADB once the certificate of clearance has been awarded.	CMAC	PMU	To be confirmed as required
Preservation of trees and other vegetation	Impacts to trees and other vegetation	14. Preservation of existing vegetation:	Contractor	PMC/PMU	Include in the bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		- Existing vegetation shall be preserved where no construction activity is planned - All trees over 3 m high will be registered prior to construction works and any unavoidable removal will be reported to DWPT and the local authority to obtain permission. - Make provision for plantation of more than 5 new trees for each one removed (agree number with communities in affected area).			
GRM	Dissemination	15. Erect sign boards with project details and GRM procedures/contact details at the entrance to each construction site/camp. 16. PMU to provide contractor with GRM contact details which the contractor will use to print 'GRM Contact Cards' for its staff to hand to complainants and will keep cards with all vehicles, machinery and site managers/foremen. 17. Contractor to raise awareness of all workers on how to respond when an affected person or member of the public has a complaint i.e. direct the person to the most senior site manager present at the time and provide a 'GRM Contact Card'.	Contractor	PMU and Consultant	Included in bid price
Construction	Groundwater Surface water	18. A site-specific Hydrogeological study is required prior to start of works in order to identify groundwater characteristics (depth, flow, direction, productivity, usage, variations), and identify the most appropriate location for monitoring wells. 19. Identification of all groundwater wells and boreholes used by nearby villagers (farmers and industries) within a 3 km radius. 20. Provide Method statement for the construction of groundwater monitoring wells and water supply wells are required during pre-construction period. The statement will be prepared by Contractor and approved by PMC-NES. Monitoring boreholes should	Contractor	PMC-NES	Part of Contract Cost

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		also be put in place prior to start of excavation of landfill cells. 21. Monitoring boreholes should also be put in place prior to start of excavation of landfill cells (minimum 1 borehole upstream and 2 boreholes downstream), 22. A baseline assessment of groundwater quality should be conducted prior to start of work. Samples must be taken from each borehole, and from nearby boreholes at the nearest receptors, to conduct laboratory analyses against drinking water guidelines.			
Construction works and Operations	Nuisance for neighbouring residents	23. Installation of opening glass windows into all windows within the house. 24. Provision of enough viable tree or shrub saplings (native species, to be determined through consultation) to provide a vegetation screen around the front or back, and sides of the property; the residents are responsible for aftercare	Contractor	PMU/PIU	To be included in bid price

4.2. Construction Phase

Table 7: EMP Mitigation Measures for Landfill – Construction

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Construction Phase					
Civil works	Air quality	25. Concrete batching facilities will be located at least 500 m downwind from the nearest dwellings in order to reduce the impact of fumes on humans and to be fitted with necessary equipment such as bag house filters to reduce fugitive dust emissions. 26. Water will be regularly sprayed on construction sites, materials handling areas, access roads and borrow pits where fugitive dust is generated.	Contractor	PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		27. Trucks carrying dry construction materials such as earth or waste will be covered with tarpaulins or other suitable cover. 28. Construction vehicles and machinery will be maintained to a high standard to minimize emissions for comply to National emission standards. All mobile equipment should be fitted with catalytic converters. 29. Vehicle speed will be reduced to 30 km/hour in each inhabited area. 30. Waste pickers and all residential areas within 500 m of existing dumpsite will be informed in advance of when waste movements will take place. 31. Unauthorized burning of construction and demolition waste material and refuse is prohibited. 32. Air quality will be monitored at landfill site and at receptor level and actions should be taken in case of complaints or non-compliance.			
Civil Works	Noise	33. Maintain all exhaust systems: systems should remain at all time in good working order - undertake regular equipment maintenance; 34. Restrict construction activities between 8 am-6 pm; 35. Provide advance warning to the community on timing of noisy activities. Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated. 36. Ensure noise monitoring is undertaken near sensitive receptors, particularly dwellings, when construction machinery is in operation; and ensure compliance with noise standards of sub-decree N.42 on air pollution control and noise disturbance MoE, 2000. 37. All construction workers will use appropriate Personal Protective Equipment (PPE) including ear defenders when operating machinery;	Contractor	PIU/PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		38. Use of mobile noise barriers as appropriate where noisy construction activities are taking place. 39. As part of traffic management plan, speed limits should be set for trucks and other work machinery when passing through residential areas. Vehicle speed will be reduced to 30 km/hour in each inhabited area. Engines should be turned off when not in use. 40. Regularly monitor noise levels at construction site boundaries and in villages crossed by construction vehicles (like Poar Svay). If noise standards are exceeded by more than 3 dB, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation.			
Civil Works	Flora and fauna	41. Existing vegetation shall be preserved where no construction activity is planned 42. Trees/vegetations over 3 m height encountered on the construction site or access areas shall be protected from construction activities if they are not required to be removed. 43. Cutting of trees over 3 m height shall be informed to DPWT and the local authorities to obtain permission. In addition, where trees have been removed or grassland disturbed, trees shall be replanted and grassland shall be revegetated after construction. 44. Where possible, materials from existing licensed borrow and quarry sites will be used. If new sites are needed, they will be subject to due diligence and approval by ADB and the relevant PDoE to ensure that sensitive habitats are avoided and that an appropriate restoration plan using native species is agreed following re-contouring (pre-construction). 45. Construction workers shall be prohibited from capturing any wildlife in the project areas. 46. Relatively to impacts on Agricultural fields, crops and trees, refer to Resettlement Action Plan.	Contractor	PIU/PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Civil Works	Water Quality and Access	47. Portable toilets and small wastewater treatment units will be provided on construction sites and construction camps for the workers and canteens. If there are nearby public sewers, interim storage tanks and pipelines will be installed to convey wastewater to those sewers. All sanitary facilities should be located at least 200m from surface water bodies. 48. Temporary ditches should be installed around the construction site to manage and control the runoff and prevent direct discharge to surrounding farmland or streams. 49. Sedimentation ponds will be installed on construction sites to treat process water (e.g. concrete batching) and runoff with high concentrations of suspended solids. If necessary, flocculants such as polyacryl amide will be used to facilitate sedimentation. 50. Runoff accumulating at the bottom of the cells during construction will be pumped out and discharged appropriately. 51. The discharge point for stormwater runoff, pumped out water, and other effluents must be identified prior to construction works. Capacity of receiving water body or irrigated land needs to be assessed, as well as risk of contamination from pumped out water or stormwater runoff. 52. Construction machinery will be repaired and washed at dedicated repair shops. Onsite machine repair and washing is not allowed. 53. The hazardous waste (oil waste) shall be properly collected and stored in closed containers under shelter for reuse, recycling or disposal, to ensure they will not contaminate soil, groundwater or surface water. 54. Material stockpiles will be protected against wind by being covered and runoff waters which might	Contractor	PIU/PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		transport them to surface waters. They shall be located further than 50 m from water bodies. 55. Storage of bulk fuel should be on covered concrete pads away from the public and worker camp, and 300 m from surface waters. Fuel storage areas and tanks must be clearly marked, protected, and lighted. Contractors will be required to have an emergency plan to handle fuel and oil spillage. 56. All construction fluids such as oils, and fuels shall be stored and handled on a bunded impermeable surface; a bund will be provided around any above ground fuel storage tanks with a capacity of 110% of the largest single tank. 57. No washing or repair of machinery should take place within 50 m of surface water bodies. 58. Implement all soil erosion protection measures needed to prevent erosion. 59. A vegetation buffer shall be maintained between the construction sites and the nearest water bodies. 60. Final design to incorporate adequate drainage management system like cross drains on all facilities and access roads to ensure project does not cause ponding or further flooding elsewhere. 61. Conduct monitoring of surface water quality around the project site for key parameters including turbidity, Hydrocarbon content and physical parameters.			
Protection of Groundwater	Groundwater	39. Landfill design complies with best practices to prevent contamination of groundwater, including: Compacted clay layer at the bottom and on the side of the cells, HDPE liner bottom and side, drainage of leachates and pumping out of the cells, etc. Contractors to make sure they implement the prescription of the Detailed Engineering Design. 62. Construction vehicles and machinery will be maintained to a high standard to prevent leak of oil, lubricant into the ground.	Contractor	PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		63. Pits must be backfilled to keep bottom of cells more than 3 m above highest ground water table level 64. Backfilling material must be tested and controlled to ensure it does not impact ground water quality. 65. Implement mitigation measures for waste management as indicated in Solid Waste Management section. 66. Ground water monitoring wells must be put in place prior to start of works and monitoring must be conducted on water upstream and downstream of future cells. Baseline water quality and depth needs to be controlled before the start of works. Method statement for the construction of groundwater monitoring wells and water supply wells are required during pre-construction period. The statement will be prepared by Contractor. 67. An inventory of all water wells used by populations around the site should be conducted, and monitoring should also be conducted on these wells against drinking water guidelines			
Implementation of Materials, Spoil and Borrow Site Management Sub-Plan	Soil and land resources erosion	68. Contractor to prepare a subplan for Soil and Borrow pits management 69. A map of all borrow sites will be developed and maintained with copies held by the Contractor and PIU. 70. Site specific spoil and borrow site management plan will be developed and approved by the relevant Municipal authorities or departments. 71. Safety measures will be implemented including the prevention of access by members of the public and livestock. 72. Measures to rehabilitate the borrow sites shall be implemented including contouring of the slopes within each site and replanting sites with native species; 73. Topsoil present on construction sites will be removed and stockpiled in a labelled area for use on	Contractor	PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		rehabilitation of the site post-construction or rehabilitation of borrow sites; 74. There shall be no disposal of spoil or dredged material on agriculturally productive land or within 50 m of a water course. 75. Construction working areas will be clearly demarcated and encroachment onto adjacent areas prevented.			
Implementation of Solid and Liquid Waste Management Sub-Plan	Resource use and natural resource contamination	76. Preparation of a Waste Management Plan before construction which applies the waste hierarchy to ensure efficient use and management of resources with a priority to prevent waste at source as much as possible. 77. Clear arrangements for storage and transportation of all hazardous and non-hazardous waste to an authorised and approved disposal point (approved by PDoE or Local authority). 78. Recyclables to be separated at source and given/sold to recycler (plastic, metal, card, paper as a minimum) 79. No waste will be stored within 20m of a water course and all solid waste to be stored in containers with lids. 80. Prohibit burning of waste at all times; 81. Provide all vehicles/drivers with plastic bags for waste collection and prevent any unauthorized waste disposal with particular attention paid to prevention of waste entering water ways including irrigation canals.	Contractor	PIU/PMU	Included in bid price
Implementation of Community and Occupational Health and Safety and Emergency Response Sub-Plan	Human health and safety	82. Community H&S measures to be included in the Community and Occupational Health and Safety and Emergency Response Sub-Plan will include: - The contractor shall appoint an Environment, Health and Safety (HSE) Officer who is qualified engineer. - Access to construction sites will be prevented through appropriate fencing, protective barriers, and buffer zones.	Contractor	PIU/PMU	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		- Excavation sites will also be specifically fenced and no person shall be allowed to enter an excavation area without supervision/control. - Sufficient signage giving health and safety warnings and information will be displayed at all sites. - Worker education and awareness seminars for construction hazards will be given on a regular basis. A construction site safety program will be developed and distributed to all workers. - The Contractor HSE supervisor shall conduct daily toolbox meetings (safety briefings) - An accident record book will be maintained where all major or minor accidents and incidents are recorded with actions taken. - The contractor shall ensure that all workers are equipped with and use Personal Protective Equipment. - Adequate first aid equipment will be made available on site. - Provision will be made for safety precautions when using 220 to 240V Electric Power tools if the workers are likely to be working within wet or flooded environments. - Warning signs will be set up if mud is likely on public roads. Mud will be removed at the end of each day. Other spillages on public roads will be removed immediately. - Contractor will set out an Emergency Response Plan. - The contractor will also develop a traffic management plan covering movement of vehicles within the construction sites, and outside the construction sites. Traffic management must include regular monitoring of traffic safety both within construction site and on public road. Traffic			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		monitoring should entail, description of access roads, speed limits, controls and monitoring on drivers, training of drivers on Health and Safety, emergency numbers for road accidents, grievance mechanism. 83. COVID -19 Risk Management¹ measures will include (see also Annex 5 with detailed measures): - Plan and execute work in compliance with country-specific COVID-19 risk management regulations and directives including directions of the Ministry of Labour, and Vocational Training (MoLVT) - Conduct workplace risk assessment to identify low, medium or high exposure risk to COVID-19. Prepare an action plan for prevention and mitigation of the spreading of COVID-19. - Conduct Risk communication, training, and education. Training of workers in infection prevention and control practices. - Adopt engineering, organizational and administrative measures, plan work so employees can keep distance from each other and minimise contact. - Provide clear and visible guidelines on how to prevent infection at the construction site and initiatives taken. - Regularly clean and disinfect toilet and bathroom - Promote personal hygiene (including hand and respiratory hygiene), make wash basins and sanitizers available - Screen on entry the temperature of each person entering the work site and record their contact			

¹ For more details, refer to: WHO Guidelines for getting the workplace ready for COVID19: <https://www.who.int/docs/default-source/coronaviruse/getting-workplace-ready-for-covid-19.pdf?ua=1>

And ILO's Guide: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---act_emp/documents/publication/wcms_740212.pdf

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		details to facilitate tracking of infected persons should there be a need - Provide personal protective equipment (PPE) and inform workers of its correct use. - Provide health surveillance and insurance. - Consider other hazards, including psychosocial - Review emergency preparedness plans - Review and update preventive and control measures as the situation evolves. Involve workers/OHS groups in the review 84. COVID19 contaminations shall be reported as part of the HSE monitoring report submitted to PMU/ADB.			
Implementation of Construction Workers Camp Management Sub-Plan	Contamination of water, soil, waste production and social issues	85. Construction camp outside the village requires the contractor to develop campsite management plan which includes map showing camp lay out. Provide adequate accommodation and sanitation for male and female workers. Campsite restoration plan after completion of work shall be developed. 86. The construction campsite should be located far from water sources with fencing and safety zone campsite. 87. If a construction camp is not required, the contractor will set out a management plan which includes: Provision of adequate waste disposal facilities, welfare facilities, and sanitation for both male and female workers. 88. Priority should be given to use of local labour and contractor should retain evidence of how local labour recruitment efforts were undertaken.	Contractor	PIU/PMU	Included in bid price
Construction works	Socio-Economic Impacts	89. Warning given to residents 4 weeks in advance of any excavations 90. Develop traffic management plan and implement around the construction site. Avoid blockage the road and traffic sign shall be installed to indicate reduced driving speeds, changes to detour or traffic direction. 91. Restoration of any road surface damage.			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		92. Consideration and management of potential localised flood impacts due to construction work. 93. Set up and follow up of grievance mechanism as prepared prior to works.			
Construction works	Cultural impacts	94. The contractor will ensure awareness of all cultural resources in the area including individual family graves along access roads, cemeteries or other relevant sites. 95. The contractor will fence off any such resources to ensure that they are clearly marked and will not be affected by the construction 96. The contractor will take and store a Pre-Condition photograph of any such resources and make this available to MWPT should any dispute occur.			
Project Completion	-	97. Site visit in order to develop Project Completion Report to assess community views on project and EMP implementation overall and state of project at contractor' handover.	PMC-NIES	PMU MPWT	Part of Contract Cost

4.3. Operation Phase

Table 8: EMP Mitigation Measures for Battambang Landfill Operations

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Operation Phase					
Waste Management	General	1. Obtain required approvals and permits to operate the site. 2. Agree with MPWT and MOE on the solid waste strategy considering existing facilities (current dump site, MRF and composting plant)	Operator-PIU	MPWT	Included in bid price
Waste Management	General	3. An operation plan shall be prepared by the operator of the landfill, and the Environmental Management Plan will need to be updated for the operational phase. Minimum measure should include:	Operator-PIU	MPWT	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		a. compaction and cover of waste. b. controlling and minimising windblown waste c. clear arrangements for collections, transportation and storage of all hazardous and non-hazardous waste d. controlling and recording waste disposed of at the landfill, including origin, quantity, type of waste, collector. e. Separating and managing hazardous waste according to their type and in line with local regulations and international guidelines. f. Guidelines for leachate management. 4. Some people in Ta Kream commune, next to the proposed landfill site dump and or burn solid waste in their field or in the village area. The project should provide waste collection in their commune for disposal at the Battambang landfill.			
Landfill Operation	Air Quality	5. Controlled biogas generation and reduction of windblown litter through regular cover of waste and injection of leachate into waste heap to stimulate biogas generation. 6. Monitoring of air quality at source and at distant receptors level downwind to ensure the discharged gases do not affect nearby air quality. 7. Retrofitting of treatment systems and potentially flaring or gas recovery system, when economically viable 8. Nets to collect windblown litter downwind of operated cells. 9. Optimisation of waste collection routes, and study of construction of transfer stations to reduce transport distances 10. Monitoring of air quality, at the landfill to assess control of biogas, and at receptor level.	Operator-PIU	MPWT	Included in bid price
Transport of waste	Air Quality	11. Regular maintenance should be conducted on machinery and vehicles.	Operator-PIU	MPWT	Included in bid price

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		12. Monitoring of emissions from trucks to control that they respect Cambodian guidelines for vehicles 13. Waste shall be covered during transport.			
Leachate and other effluent generation	Surface water protection	14. Ensure proper containment of hazardous waste facility. 15. The landfill site will have a cut-off drain on the outer side of a 1 m high embankment along the perimeter of the site. This drain will capture runoff from the surrounding hills and prevent it from entering the site. 16. A drainage system will be provided within the site to collect surface water runoff from landfill mounds. These open cut-off drains will divert the internal uncontaminated stormwater to the natural drainage line outside the landfill site. 17. Potentially contaminated water, including leachates, will be treated prior to discharge to the environment. A series of leachate treatment ponds will ensure that in case of a rare release of leachate to the environment, effluent standards are likely to be met and that the absorptive capacity of the receiving waterways is not exceeded and not causing health risks to users of the water. 18. Minimise leachate production by (i) intercepting surface water run-on to the site and internal runoff, (ii) intermediate cover and waste compaction to reduce infiltration into the waste, (iii) building waste in pyramidal phases as opposed to being spread across the whole cell; and (iv) completing the main phases prior to the onset of the wet season. 19. Ensure that only waste leachate is sent to the leachate treatment facility by separating rainwater from the inactive parts of a cell and discharging it as clean stormwater. Each section of a cell will be equipped with an interchangeable pipe system, initially set to stormwater, and subsequently turned	Operator-PIU	MPWT	Included in operational costs – O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		via a valve to the leachate transport system when waste is deposited in that particular area. 20. Operation of a low tech, easy to maintain, biological leachate treatment facility. Leachate is moved via gravity through a series of ponds: an anaerobic lagoon, aerobic lagoon, and a maturation lagoon in the form of a constructed wetland. There will also be a final treated water lagoon, which will provide a storage for the water and connected to a leachate recirculation system returning the liquid to the waste in order to manage flow rates and accelerate uniform settlement of wastes. 21. Always comply with required operating standards to ensure effective treatment of leachates. 22. Allocate adequate budget for O&M of the landfill and surface water management. 23. Recirculation of leachate to the landfill as necessary and practicable. 24. In case of discharged effluents, monitor and report the quality of receiving water bodies around the landfill site.			
Landfill liner/ Membrane	Groundwater protection	25. Limit ingress of rainwater through construction and use of drainage canals around the operating cells. 26. Ensure separation of hazardous waste to be treated at the Hazardous waste facility. Ensure proper containment of hazardous waste facility. 27. Always comply with required operating standards to limit water infiltration and therefore the generation of leachate including compaction of waste, management of run off and use of (frequent) cover materials; 28. Provision of adequate budget for O&M including three monitoring groundwater quality of wells in nearest village (locations to be confirmed) and addressing liner integrity failure (if identified through groundwater monitoring).	Operator-PIU	MPWT	Included in operational costs – O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		29. Monitoring will be required during operation and after closure of landfill. Monitoring wells should be installed prior to start of construction. One upstream and 2 downstream of landfill cells. Baseline conditions to be determined prior to start of works. Additional monitoring to be conducted on nearby wells if there are any identified within 3 km radius.			
Landfill Operation	Odour, Dust, Pest (Landfill) and Fire Protection	30. Compaction of waste within the day: deposited at the site and cover the waste daily. 31. Nets downwind of operated cell when operations near the top of the pit, to capture potential windblown litter. 32. Weekly litter collections and removal of any wastes which are not deposited in cells, including waste at the boundary and access roads to the site. 33. Washing wheels of vehicles before they leave site if they are muddy from accessing the landfill cells to prevent dust increasing on public roads. 34. Quarterly meetings with residents and / or their representatives to identify odour or nuisance issues. 35. Providing and maintaining a vegetation buffer with tree plantings and green places around and in the landfill site as a screen around the site to reduce noise, dust and odours. 36. All waste transport to be done with covered trucks 37. Provision of adequate budget for O&M. 38. There is no plan to flare recovered landfill gas. Gas generated at the landfill will be ventilated to atmosphere. The design shall consider appropriate landfill gas ventilation system. 39. A Strict control of fire risk will be implemented at the landfill site including prevention of burning, smoking. 40. A fire response team shall be designated and trained to intervene in case of fire at the landfill. 41. A fire water tank should be available at the dumpsite, in particular during the dry season.			

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Landfill operation	Flora and Fauna	42. Prepare a Pest Management Plan complying with ADB Control presence of pest and take measures as necessary 43. Provide worker immunization and health monitoring (e.g. for Hepatitis B and tetanus); 44. Maintain good housekeeping in waste processing and storage areas 45. Promptly compact and cover wastes in operated cells, especially for waste with the potential to attract vermin and flies, such as food wastes 46. Grade the area properly to prevent ponding (to minimize insect breeding areas); 47. Use integrated pest-control approaches to control vermin levels, treating infested areas 48. Fully enclose the waste management site with fencing so that no livestock or wildlife is able to come in contact with the waste and thus prevent spread of livestock and zoonotic disease.			
Landfill Operation	Community Nuisance impact	For houses within a 500 m radius of landfill site boundaries: 49. Installation of opening glass windows into all windows within the house. 50. Provision of enough viable tree or shrub saplings (native species, to be determined through consultation) to provide a vegetation screen around the front or back, and sides of the property; the resident is responsible for aftercare. 51. The operator will install a sign board with relevant contact details and operating hours at the entrance to the landfill site. It will state contact details for raising complaints. 52. The operator will record all public complaints and deal with them within a timeframe agreed with MPWT and in accordance with the GRM 53. The operator will cover all waste loads and all drivers will follow legal speed limits at all times.	Operator-PIU	MPWT	Included in operational costs – O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
Landfill Operation	Community and Occupational Health and Safety	54. The Operator will appoint an Environment, Health and Safety Officer who is a qualified engineer. 55. Access to the site will be prevented through appropriate fencing, protective barriers, and buffer zones for all non-authorized persons. All entrances will be controlled, and access will be recorded. Video cameras will also be put in place around the perimeter of the site. 56. Sufficient signage giving health and safety warnings and information disclosure at the entrance of all sites. 57. Worker education and awareness seminars for landfill-related hazards will be given. A site safety program will be developed by the operator and workers shall be trained regularly. 58. The site operator HSE supervisor should conduct daily toolbox meetings (safety briefings) 59. An accident record book will be maintained where all major or minor accidents and incidents are recorded with actions taken. 60. Ensure that all workers and waste pickers are equipped with and use Personal Protective Equipment. 61. Adequate first aid equipment will be made available on site for landfill operators and waste pickers. 62. Fire-fighting equipment and a trained fire-fighting team shall be present on site. 63. The operator will set out an Emergency Response Plan. 64. The operator will develop a Traffic Management Plan for movement of vehicles within the landfill site, and to and from the landfill site. Traffic management must include regular monitoring of traffic safety both within construction site and on public road. Traffic monitoring should entail, description of access roads, speed limits, controls and monitoring on drivers,	Operator-PIU	MPWT	Included in operational costs – O&M Budget

Sub-Project Activity	Environmental Impact / Issue	Mitigation measures	Implemented by	Supervised by	Cost (\$)
		training of drivers on Health and Safety, emergency numbers for road accidents, grievance mechanism. 65. Monitoring should be conducted on discharged effluents (see surface and groundwater) to control sanitary innocuity. 66. Potential impacts to workers in operation due to COVID-19 will be mitigated through specific measures set out in Appendix 6.²			
Landfill closure	Landscape Alteration and erosion	67. Preventing infiltration by adding a cover at the top of the cell, including a soil cover and a geosynthetic liner. 68. The elevated design of the landfill and the diversion channels should be maintained. Appropriate ripraps / retaining walls should be established and regularly checked. 69. Re-vegetation of the cover shall be facilitated by a cover of topsoil and seeding with local appropriate species. 70. Monitoring after closure of the cells shall include monitoring of: - movement of heap and settlement - groundwater - revegetation - erosion			

² For more details, refer to: WHO Guidelines for getting the workplace ready for COVID19: <https://www.who.int/docs/default-source/coronaviruse/getting-workplace-ready-for-covid-19.pdf?ua=1>

And ILO's Guide: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---act_emp/documents/publication/wcms_740212.pdf

5. MONITORING PLAN

40. The project monitoring conducted under the EMP includes:

- (i) **Project readiness monitoring.** Monitoring to check progress on project readiness and close gaps through corrective actions.
- (ii) **Environmental quality monitoring.** To be conducted by a competent authority or person appointed by the Contractor, involving the collection and analyses of air quality, noise and water quality data at designated monitoring locations for assessing compliance with applicable environmental quality and emission standards during construction.
- (iii) **EMP compliance monitoring.** To be conducted by the PMC-NES (contracted via the PMC) to verify EMP compliance during project implementation.
- (iv) **Affected People monitoring (consultation).** This is to be conducted by the PIU-SFP via consulting affected people on the impacts during construction.
- (v) **Operational monitoring.** This is required as part of the operations of the sub-project and will be undertaken by the relevant government department or a nominated private sector operator.

41. The engagement of a National Environmental Specialist for 10 months will be critical to ensuring the capacity of the PIU staff and to ensuring monitoring is effective and that corrective actions are promptly identified and implemented.

5.1. Project Readiness Monitoring

42. Before construction, the PMC will monitor the project's readiness on environmental management based on a set of indicators (Table 9) and report it to ADB and PMU. This assessment will formally demonstrate that environmental commitments are being carried out and environmental management systems are in place before construction starts or suggest corrective actions to ensure that all requirements are met.

Table 9: Project Readiness Assessment Indicators

Indicator	Criteria	Are the Criteria met?	If No, What Corrective action is needed?	Date for Corrective Action Completion
		Yes/No		
1. EMP update	EMP updated after detailed design & approved by ADB	Y/N		
2. Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management	Y/N		
3. Public involvement effectiveness	Meaningful consultation completed	Y/N		
	GRM established with entry points	Y/N		
4. Environmental supervision and monitoring in place	Recruitment of external staff as set out in the Institutional Arrangements for this EMP	Y/N		
	Nomination of government staff for PMU and PIU roles as set out in the Institutional Arrangements for this EMP	Y/N		

Indicator	Criteria	Are the Criteria met?	If No, What Corrective action is needed?	Date for Corrective Action Completion
		Yes/No		
5. Bidding documents and contracts with environmental safeguards	Bidding documents and contracts incorporate the environmental activities and mitigation measures required by this EMP.	Y/N		
	Bidding documents and contracts incorporate the Particular Conditions for bidding.	Y/N		
6. EMP financial support	The required funds have been set aside for EMP implementation including training and capacity building.	Y/N		

5.2. Environmental Policy and Standards

43. The construction and operation phases of the projects shall follow relevant environmental quality standards. These are presented in Annex 4. These quality standards relate to i) air quality and noise, ii) ambient surface water quality, iii) groundwater quality, vi) soil quality, v) effluent quality.

5.3. Environmental Quality Monitoring

44. During operation, the Operator will be expected to maintain an adequate budget to ensure environmental monitoring can be undertaken as specified below.

Table 10: Environmental Quality Monitoring: Landfill sub-project

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementing	Per Sample	Total per site/yr
Pre-Construction Phase						
High trees	Landfill site and access road Borrow sites Construction workers camp	Record trees above 3 m high to request permit for removal	CSC/PIU Consultant	Contractor		\$5000
Groundwater	All monitoring wells (one up gradient, two down gradient) And nearest receptors (5 samples)	Establish baseline – full range parameters as per Cambodian standards	CSC/PIU Consultant	Contractor	\$500	\$2500
Construction Phase – Landfill Sites						
Air Quality -including PM ₁₀ , NO ₂ , SO _x	Nearest residential receptors (landfill and nearest residential house2 locations)	1 day (24-hr) every 3 months More often in case exceedances are observed, or grievances are filed. Means in accordance with national standards	CSC/PIU Consultant	Contractor	\$1000	\$24000
Noise	Landfill and nearest residential receptor (2 locations)	1 day (daytime only) every 3 months More often in case exceedances are observed, or grievances are filed Means in accordance with national standards	CSC/PIU Consultant	Contractor	\$300	\$7200
Water Quality pH, BOD, COD, TSS, NH4-N, Total Nitrogen, Total Phosphorus, Oil and grease, Coliform	The effluent Recipient, upstream and downstream the point of discharge (Monitor when construction active)	Every month during the rainy season Every 3 months in the dry season Throughout construction period Means in accordance with national standards	CSC/PIU Consultant	Contractor	\$100	\$800
Groundwater	All monitoring wells (minimum one up gradient, two down gradient).	Conduct monitoring every 6 months (dry season and rainy season) during construction phase – full range of	CSC/PIU Consultant	Contractor	\$500	\$3000

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementing	Per Sample	Total per site/yr
		parameters as per Cambodian standards				
Operations Phase – Landfill Sites						
Groundwater pH, COD, Hardness, TDS, NH4-N, Nitrate, Sulphate, Fe, Pb, Cr, Coliform	All monitoring wells (one up gradient, two down gradient) + selected wells within 3 km in nearby villages (5 samples)	Every 6 months (dry season and rainy season) Means in accordance with national standard	MoE	Operator / PIU	Included in operational costs – O&M Budget	
If exceedances are observed in the wells, the wells would be resampled more frequently and for an extended range of parameters as listed below. As above, plus aluminium, PAH, BTEX, cadmium, mercury, selenium, phosphorus scan, chlorinated hydrocarbons, cyanide, phenolic substances.						
Surface Water pH, DO, BOD, COD, TSS, NH3-N, Total Nitrogen, Total Phosphorus, Oil and grease, Coliform	In the recipient, upstream and downstream the point of discharge	Every month during rainy season 3 months otherwise Means in accordance with national standard	MoE	Operator	Included in operational costs – O&M Budget	
Air & Noise PM10, NO2, SOx, Leq 24	Nearest residential receptor (02 samples) Site Boundary (02 samples – upwind and downwind).	Every 6 months or as required by local authority or an incident. Noise: 1 day (daytime only. Means in accordance with national standard	MoE	Operator	Included in operational costs – O&M Budget	
Odour	Downwind Boundary	Monthly	MoE	Operator	Included in operational costs – O&M Budget	
Leachate pH, DO, BOD, COD, TSS, NH3-N, Total Nitrogen, Total Phosphorus, Oil and grease, Coliform	Outlet point from leachate treatment	Quarterly Means in accordance with national standard	MoE	Operator	Included in operational costs – O&M Budget	

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementing	Per Sample	Total per site/yr
Leachate Full range of regulatory parameters	Outlet point for leachate treatment	Once a year Means in accordance with national standard				
Occupational Health and Safety	-	Annual Health monitoring all staff (landfill site)	Min. of Labour	Operator & Health Professionals	Included in operational costs – O&M Budget	
Worker & public injury associated with Landfill operations	On property of landfill	Regular record keeping	Min. of Labour	Operator	Included in operational costs – O&M Budget	

5.4. EMP Compliance Monitoring

45. In order for the EMP implementation to be effective, all its mitigation measures must be monitored to ensure they are implemented. Note that this monitoring applies to construction period only (Table 11). During operation, it is the responsibility of the appropriate ministry or its line department to ensure monitoring of operational facilities is incorporated in the operations and maintenance manual and carried out routinely.

Table 11: EMP Compliance Monitoring – Construction phase

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)
			Verification	Implementation	
Construction Phase					
Air Quality	Civil works sites	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Noise	Civil works sites	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)
			Verification	Implementation	
Flora	Civil works sites	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Water Quality	Civil works sites	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Soil and land resources	Quarries, Borrow and Spoil Disposal Sites	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Resource use and natural resource contamination	Implementation site of Solid and Liquid Waste Management	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Human health and safety	Implementation of Community and Occupational Health and Safety and Emergency Response	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC/Contractor H&S engineer	Included in CSC contract
Contamination of water, soil, waste production and social issues	Implementation of Construction Workers Management	Weekly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Community Issues - Environmental impacts of civil works (e.g., solid & liquid waste, erosion, local flooding, pollution). - Any unforeseen impacts caused by accidentally e.g. through spillages - Civil nuisance (e.g., noise, disrupted	At all construction locations	Consultation interview with Affected People Using the form in Appendix 2 4-6 weeks after construction starts Every 2 months until end of construction	PMU-ESO	PIU-SFP	Included in PIU staff/travel budget

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)
			Verification	Implementation	
business & farming activity, social issues, community health and safety). • Impaired use of access roads (e.g. traffic issues and access). • GRM and its procedures & key contacts					

6. PUBLIC CONSULTATION

46. The IEE for this subproject contains details of the consultations undertaken during preparation of the subproject. In addition, consultations will take place during implementation. The PIU Safeguard Focal Point (PIU-SFP) will undertake consultations after the detailed design has been completed and will conduct consultation interviews within 4-6 weeks of construction starting and then again every 3 months until the end of construction. This is set out in the EMP.

47. Informal monitoring interviews with affected people will focus on complaints about community disturbance from construction activities, such as construction noise, dust, solid waste and wastewater, as well as public concerns about ecological protection, soil / land concerns and access issues. A sample Environmental Monitoring Interview Form is given in Appendix 2. This will contribute to project monitoring.

48. The IEE for this subproject also includes information on consultations undertaken during preparation of the EMP and can be consulted for reference.

7. GRIEVANCE REDRESS MECHANISM

7.1. GRM Objective

49. A grievance redress mechanism (GRM), consistent with the requirements of the ADB Safeguard Policy Statement (2009) will be established to prevent and address community concerns, reduce risks, and assist the project to maximize environmental and social benefits. In addition to serving as a platform to resolve grievances, the GRM has been designed to help achieve the following objectives: (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the project; (ii) demonstrate concerns about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations. The GRM is accessible to all members of the community.

7.2. Proposed GRM System

50. In Cambodia, there is currently no existing legally established system to resolve environmental concerns and complaints. The MPWT, as the EA of the TS-2 will establish the GRM. The setup shall be made before commencement of site works and have members from the PMU, district authority and commune councils. Grievances can be filed in writing or verbally with any entry point of the GRM. The committee will have 15 days to respond with a resolution. The PMU's Environment Safeguards Officer (PMU-ESO)³ will oversee the implementation/observance of the mechanism and will be responsible for keeping the PMU informed. The PIU Safeguards Focal Point (PIU-SFP) will be responsible for ensuring GRM implementation at the sub-project level.

³ The Environment Safeguards Office will be the focal point for all social and environmental grievances to be brought to the attention of the EA by affected persons. There will be a full-fledged Grievance Redress Mechanism set up from commune level to the town and province, up to the EA. This will be detailed in the Resettlement Framework.

51. The GRM will accommodate both informally and formally lodged eligible, grievances. Informally lodged grievances are those received by the contractor during construction. Formally lodged grievances are those received at District and Commune Council offices or direct to the PIU. Commune Councils evaluate complaints for eligibility and then report to PDPWT. The PDPWT and PMU maintain record of all grievances, informally and formally lodged, eligible and ineligible. The PMU will inform the MPWT, as necessary, and report on the observance/implementation of the GRM in the monthly progress reports and in the periodic Environmental Monitoring Report that will be submitted to the MPWT.

7.2.1. Access to the Mechanism

52. Any person who has environmental issues pertaining to the subproject during detailed design, construction and operation phases will have access to the mechanism free of charge. The PMU, through its Environment Safeguards Officer (PMU-ESO) and staff in the MPWT, will ensure that:

- (i) The public and all stakeholders are aware of their rights to access, and will have access to the GRM free of administrative and legal charges; and
- (ii) The GRM is fully disclosed prior to construction: (a) in public consultations, (b) through posters displayed in the commune office (posters to include names and contact details of the PIU-SFP)

53. The Access Points to the GRM are critical for ensuring it is useable for affected people (APs). The GRM Access points for this project, as set out in this GRM Mechanism will be:

- The Contractor(s)
- District and Commune Councils
- The PIU office
- The Provincial Department of Public Works and Transport (PDWT)
- And potential additional informal approach

7.2.2. GRM Steps and Timeframe

54. Grievances raised on environmental impacts are critical to the health and safety of APs. Hence, the proposed mechanism intends to be easily accessible and promptly responsive to APs' complaints.

7.2.3. Informal Approach

55. Informally, APs can lodge complaints directly to the contractor during construction. PMU to provide contractor with GRM contact details which the contractor will use to print 'GRM Contact Cards' for its staff to hand to complainants and will keep cards with all vehicles, machinery and site managers/foremen. The contractor shall document and assess the complaint immediately. If assessment validates the complaint as within the scope of the GRM/eligible, the contractor shall act on the complaint within three days from receipt of complaint. MPWT shall obtain a written confirmation of satisfaction from the AP after 7 days from completion of resolution by the contractor.

56. Contractor to raise awareness of all workers on how to respond when an AP or member of the public has a complaint i.e. direct the person to the most senior site manager present at the time and/or Contractor GRM focal point and prepare a 'GRM Contact Card.'

57. If assessment invalidates the complaint (i.e., reveals the complaint as ineligible or not associated with the project's environmental performance), the contractor shall direct the AP

to the Commune Council and shall report the complaint to MPWT within 2 days from receipt of complaint, stating reasons for ineligibility

7.2.4. Formal Approach

58. If complaint is eligible but is not acted on within three days from receipt of complaint, or if AP is not satisfied with the resolution undertaken by the contractor, he/she can access the formal mechanism, as shown in table below:

Table 12: GRM Steps

Step	Action
Step 1: Lodging a Complaint (Day 1)	AP lodges complaint, by him/herself or with assistance from the village chief or district council, at the access point with the Commune Council. The complaint may also be lodged with the PIU or PDPWT, through contractors staff or through informal channels.
Step 2: Documentation & Registration of Complaint (Day 1)	Commune Council, PIU/PMU or PDPWT documents/registers lodged complaint, makes sure these are referenced and provides AP with a copy of referenced complaint. The commune forwards complaint document to the MPWT. A copy of the GRM Complaint Form is in Annex 2 GRM- Complaint Recording Form.
Step 3: Assessment and Discussion (Day 1 to 3)	AP shall be informed if the grievance is eligible or ineligible. If it is ineligible, AP shall be directed to the district. If complaint is eligible, AP shall be informed of the expected action timelines as set out in the established mechanism. If both of the AP and contractor/operator are available, the complaint shall be immediately reviewed, investigated and discussed. If not, both parties should agree to undertake the review, investigation and discussion within 3 days. The discussion will centre on the cause and action/measure to implement and will engage the PIU/PMU. After review and investigation, agreement on actions and measures and time involved shall be made with the AP. Agreement shall be properly documented and filed; MPWT, PIU/PMU, Commune Council and AP shall have copies.
Step 4: Implementing the Agreed Resolution	(Day 3 to Day 4) If complaint is minor, i.e., not requiring further investigation and would be easy to resolve, the contractor/operator shall immediately implement agreed on action/resolution. (To be implemented by Day 8). If further investigation and/or procurement of supplies/parts would be necessary, the contractor/operator shall: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact; and (ii) start work on the final measure within 15 days from the day the complaint is lodged.
Step 5: Acceptance of Resolution (1 week after completion of action/measure taken)	If, according to the AP, the impact has been resolved satisfactorily, MPWT shall obtain a written confirmation of satisfaction from the AP. This confirmation will signify closure of grievance and will form part of the grievance documentation. The PIU, Commune Council and AP shall retain their copies of the confirmation.

Step	Action
Step 6: Monitoring and Evaluation (for 1 week after closure of grievance)	The MPWT shall monitor the effectiveness of the resolution for at least a week after closure of grievance (that is, when action implemented has been satisfactorily confirmed in writing by the complainant). Monitoring and evaluation shall be properly documented and included in the Environmental Monitoring Report.
Step 7: Appeal for Dissatisfied AP	When dissatisfied (or, in the event the issue/impact persists despite actions undertaken), AP can appeal for assistance from the district in the elevation of his/her complaint to the provincial authority. The provincial authority shall call all parties concerned to review the history of the grievance and resolution process taken and assess the validity of the appeal.

Source: PPTA IEE Report, TS-2, 2018.

59. Appeals. If appeal is found not valid, the provincial authority shall write the AP and declare the grievance closed. In the event of an appeal, the MPWT shall immediately report to the PMU. The PMU shall ensure that the ADB is immediately informed.

60. If appeal is assessed to be valid, provincial authority and the parties discuss and agree on the quick resolution of the issue. The PMU requires the contractor and operator to implement the agreed resolution. Should the issue continue to persist despite the second action, or the AP remain dissatisfied, the following steps will be taken:

61. Special Mission or Judicial System. If the complainant is still unsatisfied, the PMU/EA will inform ADB to convene a special mission to attempt a resolution prior to use of the Cambodian judicial system.

62. Accountability Mechanism of the ADB. In addition, affected people may always contact the Complaints Receiving Officer of the ADB via the following addresses which will be included in the sub-project signboard:

Complaints Receiving Officer, Accountability Mechanism

Asian Development Bank

ADB Headquarters, 6 ADB Avenue, Mandaluyong City 1550, Metro Manila, Philippines

(+632) 632-4444 loc. 70309

(+632) 636 2086

amcro@adb.org

63. Instructions available here: <http://www.adb.org/site/accountability-mechanism/how-file-complaint>

64. Sufficient communication on the GRM including signs containing contact details of the GRM access points will be displayed at strategic locations to sustain the effective implementation of the mechanism.

8. REPORTING

49. Environmental monitoring reports (using ADB's integrated safeguards monitoring report format) will be prepared semi-annually for the EA by the PMC in collaboration with PMU-ESO and sent to the MoE and ADB. The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators and will include relevant national environmental quality standards. Table 13 summarises reporting requirements.

Table 13: Reporting Requirements

Report	Frequency	Purpose	From	To
Contractors' Progress Report	Monthly	EMP Implementation Progress and Monitoring Results Report Environmental Incidents Report Complaints	Contractor	PMU
EMP Progress and Compliance Report	Monthly	Confirm Mitigation Measures Report Environmental Incidents	National Env Specialist with PIU-SFP	PMU
Environmental Monitoring	Quarterly	Relevant environmental parameters	PMU-ESO	EA
Environmental Monitoring Report (Integrated safeguards monitoring report format)	Semi-Annual	Full EMP Implementation and Adherence to Environmental Covenants/Conditions	PMU	ADB
Landfill Operations	Quarterly	Tonnages collected, Groundwater Quality, operator health and safety	Operator	EA

8.1. Mechanisms for Feedback and Adjustment

50. Based on environmental monitoring and reporting systems in place, the PMU shall assess whether further mitigation measures are required as corrective action, or improvement in environmental management practices are required. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. The PMU will play a critical role in the feedback and adjustment mechanism. If the PMU identifies a substantial deviation from the EMP, or if any changes are made to the project scope that may cause significant adverse environmental impacts or increase the number of affected people, then the PMU shall immediately consult MoE, MPWT and ADB to get approval and identify EMP adjustment requirements.

9. ESTIMATED COST OF EMP

51. The total cost for EMP implementation for the landfill comprises the following:

- Environmental monitoring prior to construction \$ 7,500
- Environmental quality monitoring during construction \$38,000 per year
- EMP Compliance Monitoring (including public consultation) – No additional cost

52. Excluded from the EMP budget as separate items are:

- Measures required as part of good construction practice. This includes provision of PPE for workers working at site. Cost estimate for such provision for 100 workers are as follow:

- Hard hat (@ 3 USD) 300 USD
- Glove (@ 0.25USD) 25USD for 10 units/person/year =250 USD/year
- Mask (50 pcs) @7 USD for 20 units/person/year=280 USD/year
- Ear plug @1 USD for 5 units/person/year= 500 USD
- Safety Glass @ 1.5 USD for 5 units/person/year =750 USD/year
- Boot @ 13 USD for 2 pairs/person/year =2600 USD/year

Total= 4680 USD/year with 15% contingency then= 5382 USD/year

The annual machinery maintenance cost is, in general, 10 % of machinery cost while mobile noise barriers can be custom designed and built on site for temporary use.

- Remuneration and associated costs for Project management consultants and staff within PMU and PIU as this is covered elsewhere in the project budget.
- Cost for Project Management Consultant which includes a National and International Environmental Safeguards specialist.
- Training covered elsewhere including landfill and wastewater treatment plant operator training which is covered under the feasibility study for each specific sub-project.

53. Contractors will bear the costs for all mitigation measures pre and during construction, including those specified in the tender and contract documents as well as those to mitigate unforeseen impacts due to their construction activities.

54. The selected operators, private sector or government, will bear all environmental monitoring and reporting costs during the operational stage. EMP operational environmental mitigation and monitoring measures will be incorporated in the operations and maintenance manual.

10. CONCLUSION

55. The most significant impacts from the project are expected during operations, for the landfills this includes collection and transportation of waste from generation point to the landfill.

56. The EMP, if implemented as directed, will mitigate impacts on the natural environment and nearby communities to an acceptable level. The key parties for mitigation measure implementation are the construction contractors and then the operators. The implementation of this EMP will be closely monitored and reported on by contractor and project consultant team and collaborate or consultation with the relevant stakeholders in the project.

57. The next step of Environmental Safeguards implementation is the preparation of the Contractors Environmental Management Plan (CEMP), which is to be based on the EMP, but is expected to develop in more details the measures to be implemented by the Contractor. The CEMP will be the backbone of the Environmental Management System of the operator and will be supported by associated sub-plans which will deal with specific topics, such as Health and Safety, Waste management, Soil and Borrow sites management, Traffic Management, etc.

58. When operations will start, the operator shall also develop its own Environmental Management System, specific to the operations.

59. As a result, there is a comprehensive training and capacity building component to the project which is essential for ensuring the investment is both financially and environmentally sustainable and beneficial.

60. A robust Grievance Redress Mechanism will be established, as outlined in this EMP. It will ensure that all unplanned impacts which cause grievances for affected people are managed swiftly and a satisfactory outcome brought about.

61. Overall, the project is anticipated to bring environmental benefits to the populations of the project cities. It will serve to improve the current waste management situation in the urban areas and will provide long term environmental improvements.

Annex 1. Affected Person Monitoring Form

Consultation / Interview Form

Date of Interview		Interviewer Name	
Interview Site: <i>Where is the interview held? In school, on the road, in shop</i>		Stakeholder Name & Status: <i>Full name, status is business owner, schoolteacher, religious leader, resident</i>	
Construction Site & Date Construction Started <i>Which road, GPS location if available</i>		Has this stakeholder been interviewed before? <i>Yes (when were they interviewed) No</i>	

Interview Discussion Points:

1. NOISE	Record of Discussion
Before the project started, was the person disturbed by noise? If yes, explain how and when. <i>Where did the noise come from? E.g. traffic, machinery, people, music</i> <i>When did it disturb the person? E.g. all day, at night, intermittently</i>	
During the construction, is the person disturbed by noise from the project? If yes, explain how and when. <i>What type of noise and where did the noise come from?</i> <i>All day, at night, intermittently?</i>	
If noise from construction is a problem, what changes does the person suggest are made?	
2. AIR QUALITY	Record of Discussion
Before the project started, was the person affected by air pollution or dust? If yes, explain how and when. <i>Where did the pollution or dust come from? E.g. traffic, machinery, construction, burning garbage, cooking stoves</i> <i>When was the dust or pollution a problem? E.g. all day, at night, intermittently</i>	
During the project, is the person disturbed by dust or pollution? If yes, explain how and when. <i>What type of noise and where did the noise come from?</i> <i>E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc</i> <i>When did it disturb the person? E.g. all day, at night, intermittently</i>	

If dust or air pollution from the construction is a problem, what changes does the person suggest are made?	
3. VEGETATION AND LAND USE	Record of Discussion
Before the project started, what was the vegetation like in the project area? <i>E.g. pasture land, trees, shrubs, rice fields.</i>	
During the project, has the person found the vegetation situation has changed? If yes, explain how and when.	
If impact on vegetation is unacceptable, what changes does the person suggest are made?	
4 COMMUNITY SAFETY	Record of Discussion
Before the project started, can you describe the community safety situation in the project area? <i>E.g. no problems, some accidents, difficulty crossing the roads</i>	
During the project, has the person found the community safety situation has changed? If yes, explain how and when. <i>Slower traffic so easier to cross the roads, construction vehicles are making a crossing harder / easier, more accidents / less accidents, construction site dangers</i>	
If change in road safety is unacceptable, what changes does the person suggest are made?	
5. WATER QUALITY	Record of Discussion
Before the project started, was the person affected by poor water quality? If yes, explain how and when. <i>Ground water? Surface Water? which Water source? How was it polluted?</i>	
During the project, is the person affected by water pollution? If yes, explain how and when. <i>Ground water? Surface Water? which Water source? How is quality being affected?</i>	
If water quality from the construction is a problem, what changes does the person suggest are made?	
6. ACCESS	Record of Discussion
During the project, is the person affected by reduced access to their business, home or land? Access to what is limited, and how?	
If access limitations are not acceptable, please suggest changes which can be made?	
7. OTHER ISSUES	Record of Discussion
Any other issues about the construction sites that the person wants to discuss? <i>E.g. wastewater concerns, waste disposal, Other concerns, labour force,</i>	

Annex 2. GRM- Complaint Recording Form

PIU Staff Responsible: (name and role)	
Date: (of this record)	
Date of Complaint:	
Date Resolution Required by (15 days from initial complaint):	
Complaint Made by: (Name & Contact Details)	
Method of Complaint: (direct to PMU, via Contractor, Via Commune People's Council)	
Details of Complaint: (issues, actions taken so far, when did it start – all details needed)	
PMU Actions: (Next steps for PMU to resolve the issue or to move complaint to next level)	
Follow Up Actions Needed and Date: (PMU to follow up on resolution if needed, e.g. check contractor actions)	

Annex 3. Particular Conditions (For Bidding Documents)

62. The following clauses shall be added to the Bidding Document, Section 8 Particular Conditions in relation to the Environmental Safeguards for the Project:

63. The contractor will undertake to develop and submit to the PMU/CSC for approval, a site-specific Construction Environmental Management Plan with the following management sub-plans:

- A. Spoil and Borrow Site Management;
- B. Solid and Liquid Waste Management;
- C. Community and Occupational Health and Safety and Emergency Response;
- D. Construction Workers' Camp Management (if required).

64. The management sub-plans will be sufficiently detailed as to allow a clear understanding of the approach the contractor will take to mitigate environmental impacts during construction. The contractor will adhere to the management sub-plans at all times unless prior agreement has been given by the PMU under extenuating circumstances.

65. The Contractor will commit to ensuring a full-time environmental health and safety officer on site who is competent, nominated to manage health and safety risks, and who can implement the EMP requirements for occupational health and safety and ensure relevant health and safety legislation is followed.

66. The Contractor will commit to enabling the project staff or consultants tasked with monitoring, full access to all information and data required in order that the Environmental Management Plan can be fully monitored.

Annex 4. Environmental Quality Standards

(1) Ambient Air Quality Standards

Source: Sub-decree **No. 42 ANRK.BK** on Air Pollution Control and Noise Disturbance, MoE 2000 and WHO Ambient Air Quality Guidelines (2005)

Parameter	Averaging Period	No. 42 ANRK.BK		WHO Ambient Air Quality Guidelines (2005)	
		Unit	Value	Averaging Period	Value / Unit
Nitrogen Dioxide (NO ₂)	24 hours	mg /m ³	0.1	1 hour	200 µg/m ³
Sulfur Dioxide (SO ₂)	24 hours	mg /m ³	0.3	1 hour	20 µg/m ³
Carbon Monoxide (CO)	24 hours	mg /m ³	20		
PM 2.5	24 hours	-	-	24 h	25 µg/m ³
PM 10	24 hours	-	-	24 h	50 µg/m ³

(2) Ambient Noise Standards

Source: Sub-decree **No. 42 ANRK.BK** on Air Pollution Control and Noise Disturbance, MoE , 2000 and WHO Community Noise Guidelines (1999)

Time Period (24 hours)	No. 42 ANRK.BK	Areas Specified for WHO Guidance	WHO Noise (1999)	Community Guidelines
	Value / Unit		Value / Unit	
Day time (from 6:00am to 6:00pm)	70.0 dB(A)	Outdoor Living Area - serious annoyance - moderate annoyance	55 dB(A) 50 dB(A)	
Evening Time (from 6:00pm to 11:00pm)	65.0 dB(A)	Inside dwellings - moderate annoyance	35 dB(A)	
Night time (from 11:00pm to 6:00am)	50.0 dB(A)	Inside dwellings - sleep disturbance	30 dB(A)	

(3) Surface Water Quality Standard

Referring to Sub-decree **No. 27 ANRK.BK** on Water Pollution Control, MoE, 1999, the standards of water quality are divided as follows:

Annex 2 of Sub-decree on Water Pollution Control

Effluent standard for pollution sources discharging wastewater to public water areas or sewer

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	0C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 60	< 120
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO3)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO4)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO4)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Byphenyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1
51	Trichloro benzene	mg/l	<2	<2
52	Hexachloro cyclohexene	mg/l	<2	<2

Remark: The Ministry of Environment and the Ministry of Agriculture, Forestry and Fishery shall collaborate to set up the standard of pesticides which discharged from pollution sources.

Annex 4 of Sub-decree on Water Pollution Control

Water Quality Standard in public water areas for bio-diversity conservation

Source: Sub-decree No. 42 ANRK.BK on Water Pollution Control, MOE, 1999.

a) River

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
BOD5	mg/l	1 – 10
Suspended Solid	mg/l	25 – 100
Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 5000

b) Lakes and Reservoirs

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
COD	mg/l	1 – 8
Suspended Solid	mg/l	1 – 15
Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 1000
Total Nitrogen	mg/l	1.0 – 0.6
Total Phosphorus	mg/l	0.005 – 0.05

Annex 5 of Sub-decree on Water Pollution Control:

Water Quality Standard in public water areas for public health protection

Source: - Ground water quality monitoring MoE, 2016.

- The CNDWQS Standard is National Standard of the Ministry Industry and Handicraft.

No	Parameter	Unit	Standard Value
1	Carbon tetrachloride	µg/l	< 12
2	Hexachloro-benzene	µg/l	< 0.03
3	DDT	µg/l	< 10
4	Endrin	µg/l	< 0.01
5	Dieldrin	µg/l	< 0.01
6	Aldrin	µg/l	< 0.005
7	Isodrin	µg/l	< 0.005

No	Parameter	Unit	Standard Value
8	Perchloroethylene	µg/l	< 10
9	Hexachlorobutadiene	µg/l	< 0.1
10	Chloroform	µg/l	< 12
11	1,2 Trichloroethylene	µg/l	< 10
12	Trichloroethylene	µg/l	< 10
13	Trichlorobenzene	µg/l	< 0.4
14	Hexachloroethylene	µg/l	< 0.05
15	Benzene	µg/l	< 10
16	Tetrachloroethylene	µg/l	< 10
17	Cadmium	µg/l	< 1
18	Total mercury	µg/l	< 0.5
19	Organic mercury	µg/l	0
20	Lead	µg/l	< 10
21	Chromium, valent 6	µg/l	< 50
22	Arsenic	µg/l	< 10
23	Selenium	µg/l	< 10
24	Polychlorobiohenyl	µg/l	0
25	Cyanide	µg/l	< 0.005

(4) Groundwater Quality Standard

No	Parameter	Standard	
		Unit	Value (CNDWQS Standard)
1	pH	-	6.5-8.5
2	Turbidity	NTU	5.0
3	Dissolved Oxygen (DO)	mg/l	NV
4	Total Suspended Solid (TSS)	mg/l	NV
5	Chloride (Cl ⁻)	mg/l	250
6	Nitrate (NO ₃)	mg/l	50
7	Phosphate (PO ₄)	mg/l	NV
8	Sulphate (SO ₄)	mg/l	250
9	(BOD) ₅	mg/l	NV
10	(COD) Mn	mg/l	NV
11	Aluminum (Al)	mg/l	0.2

No	Parameter	Standard	
		Unit	Value (CNDWQS Standard)
12	Arsenic (As)	mg/l	0.05
13	Copper (Cu)	mg/l	1.0
14	Iron (Fe)	mg/l	0.3
15	Lead (Pb)	mg/l	0.01
16	Manganese (Mn)	mg/l	0.1
17	Mercury (Hg)	mg/l	0.001
18	Zinc (Zn)	mg/l	3.0
19	Total Coli form	MPN/100mlml	0

(5) Effluent Quality Standard

(Effluent from WWP and from Leachate Treatment Facility at the controlled disposal facility)

Source: Sub-decree **No. 42 ANRK.BK** on Water Pollution Control, MOE, 1999.

No	Parameter	Standard (Allowable limits for pollutant substance discharging) to		
		Unit	Value (Protected public water area)	Value (Public water area and sewer)
1	Temperature	OC	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO3)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO4)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO4)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0

No	Parameter	Standard (Allowable limits for pollutant substance discharging) to		
		Unit	Value (Protected public water area)	Value (Public water area and sewer)
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Byphenyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1

No	Parameter	Standard (Allowable limits for pollutant substance discharging) to		
		Unit	Value (Protected public water area)	Value (Public water area and sewer)
51	Trichloro benzene	mg/l	<2	<2
52	Hexachloro cyclohexene	mg/l	<2	<2

(6) Soil Quality Standard

Source: Cambodia National Quality Standards for agriculture, Ministry of Agriculture, Forest, and Fishery (MAFF).

Parameter	Standard	
	Unit	Value
pH		
Salinity	ppt	6-8
Oil & Grease	mg/kg	-
Chloride	mg/kg	-
Petroleum Hydrocarbons		
Kerosene hydrocarbons (c10-c14)	mg/kg	-
Diesel hydrocarbons (c15-c28) (mg/L)	mg/kg	-
Heavy oil hydrocarbons (c29-c36) (mg/L)	mg/kg	-
BTEX		
Ethylbenzene	mg/kg	0.018
Benzene	mg/kg	0.0068
Toluene	mg/kg	0.08
Xylene	mg/kg	2.4
Metals		
Nickel	mg/kg	50
Copper	mg/kg	63
Zinc	mg/kg	200
Arsenic	mg/kg	12
Cadmium	mg/kg	1.4
Lead	mg/kg	70
Iron	mg/kg	-
Chromium	mg/kg	64
Mercury	mg/kg	6.6

Annex 5. COVID-19 related Health and Safety Measures

Potential impacts to workers in operation due to COVID-19 will be mitigated through the following measures ⁴ :

- (i) Plan and execute work in compliance with country-specific COVID-19 risk management regulations and directives including directions of the General Department of Labour, MoLVT.
- (ii) Conduct workplace risk assessment to identify low, medium or high exposure risk to COVID-19. Prepare an action plan for prevention and mitigation of the spreading of COVID-19.
- (iii) Conduct Risk communication, training, and education. Training of workers in infection prevention and control practices
- (iv) Adopt engineering, organizational and administrative measures, plan work so employees can keep distance from each other and minimise contact.
- (v) Provide clear and visible guidelines on how to prevent infection at the work site and initiatives taken.
- (vi) Dissemination about COVID-19 prevention and mitigation measures to staff and workers through orientation or distributing leaflet/poster at information/safety board at each construction and camp site;

More specifically, measures implemented shall entail:

- (i) Daily checking temperature of staff and workers prior starting the works;
- (ii) Staff and workers have to wear masks all the time and properly;
- (iii) Do not share personal items or supplies such as phones, pens, notebooks, tools, etc.;
- (iv) Avoid common physical greetings, such as handshakes;
- (v) Maintain a minimum physical distance of one metre from others if possible;
- (vi) Wash hands often with soap and water for at least 20 seconds after using the washroom, before handling food, after blowing nose, coughing, or sneezing, and before smoking. If hands are not visibly soiled, and soap and water are unavailable, alcohol-based hand sanitizer can be used;
- (vii) All offices and jobsites implement additional cleaning measures of common areas. All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal workstation areas are wiped down at least twice a day with a disinfectant, such as disinfectant wipes. Individuals are responsible for cleaning and disinfecting their workstations;

⁴ For more details, refer to: WHO Guidelines for getting the workplace ready for COVID19: <https://www.who.int/docs/default-source/coronaviruse/getting-workplace-ready-for-covid-19.pdf?ua=1>
And ILO's Guide: https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---act_emp/documents/publication/wcms_740212.pdf

- (viii) Commonly touched surfaces on vehicles and equipment are thoroughly cleaned and disinfected at the end of shifts and between users;
- (ix) Coughing or sneezing into a tissue or the bend of your arm, not your hand; And dispose of any tissues you have used as soon as possible in a lined waste basket and wash your hands afterwards;
- (x) Individuals who have been potentially exposed to the virus, or who are exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion are instructed to: Not come to work; Contact their supervisor and/or human resources department; Stay at home and self-isolate; and Contact local health authorities for further direction.
- (xi) Such individuals are required to follow the directions of the local health authority and may not return to work until given approval by the proper health authorities;
- (xii) Individuals who begin to display flu-like symptoms on site are instructed to avoid touching anything, take extra care to contain coughs and sneezes, and return home immediately to undergo self-isolation as directed by the local health authority.