

Environmental Management Plan

February 2021

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

Battambang Wastewater subproject (Lot2),
Battambang Province

Prepared by the Ministry of Public Works and Housing 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 March 2020)

Currency unit	–	riel (KR)
KR 1.00	=	\$ 0.00025
\$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
DDPP	–	Detailed Design and Project Preparation
EA	–	Executing Agency
EIA	–	Environmental Impact Assessment
EMP	–	Environmental Management Plan
FGD	–	Focus Group Discussion
GDR	–	General Department of Resettlement
GHG	–	Greenhouse Gas
GRM	–	Grievance Redress Mechanism
I/NES	–	International and National Environmental Specialists
IA	–	Implementing Agency
IEE	–	Initial Environmental Examination
IEIA	–	Initial Environmental Impact Assessment
EMI	–	Environmental Monitoring Institute
MoE	–	Ministry of Environment
MOWRAM	–	Ministry of Water Resources and Meteorology
MPWT	–	Ministry of Public Works and Transport
PDoE	–	Provincial Department of Environment
PDPWT	–	Provincial Department of Public Works and Transport
PGRC	–	Provincial Grievance Redress Committee
PIU	–	Project Implementation Unit
PIU-SFP	–	PIU Safeguards Focal Point
PMC	–	Project Management Consultants
PMC-I/NES	–	PIM-International and National Environment Specialists
PMU	–	Project Management Unit
PMU-ESO	–	PMU Environmental Safeguards Officer
PRSC	–	Provincial Resettlement Subcommittee
PSC	–	Project Steering Committee
RCP	–	Representative Concentration Pathway
RGC	–	Royal Government of Cambodia
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 Organization
WWTP	–	Wastewater Treatment Plant

WEIGHTS AND MEASURES

dBa	-	A-weighted Decibel
km	-	Kilometer
km ²	-	Square kilometer
L _{Aeq}	-	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
PM ₁₀	-	Particulate Matter 10 micrometers or less
PM _{2.5}	-	Particulate Matter 2.5 micrometers 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

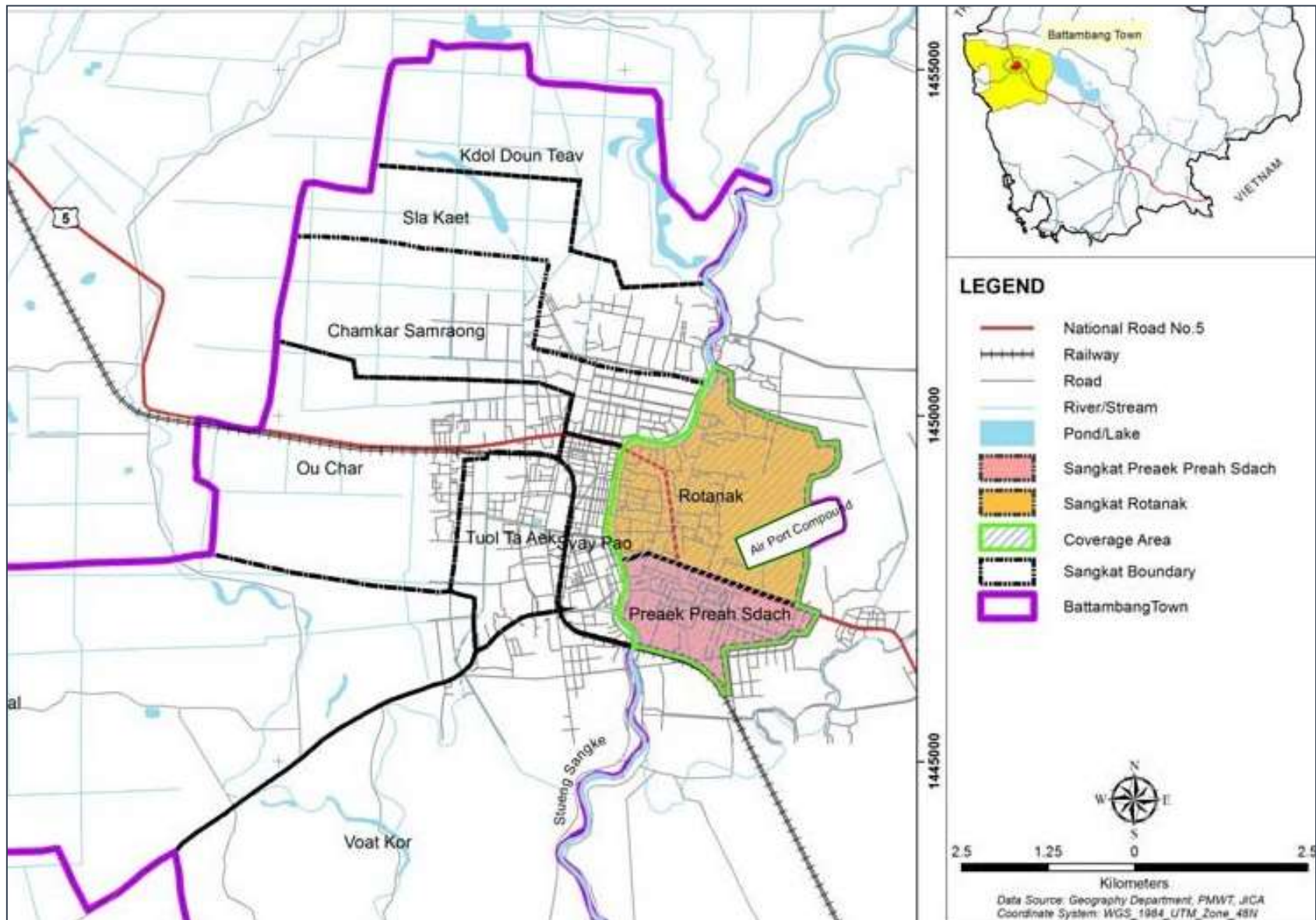
1.1. Purpose

1. This document is the environmental management plan (EMP) for Battambang Wastewater subproject (Lot2) in Battambang city, Battambang Province for the Second Integrated Urban Environmental Management in The Tonle Sap Basin Project (TS2 Project). The EMP for the subproject defines the mitigation and monitoring measures and describes the institutions, responsibilities and mechanisms to monitor and ensure compliance. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during preconstruction, construction, and operation of the subprojects in order to prevent, reduce, or mitigate adverse impacts.
2. The TS2 Project also includes infrastructure components in the subproject locations of Steung Saen, Kampong Thom Province, and Serei Saophoan, Banteay Meanchay Province. The Initial Environmental Examination (IEE) for Battambang Wastewater subproject (Lot2) have been updated under separate cover.

1.2. Planned Infrastructure Investments

3. The Battambang Wastewater subproject (Lot 2) is designed to cover the areas of Sangkat Rottanak and Sangkat Prek Preah Sdach located at the east side of Battambang (Figure 1) with the construction of separate sewer system network, pumping stations, and WWTP (on the East part of Sangke River).
4. The project design is in the context of an existing project sewage system prepared by the GMS: Southern Economic Corridor Towns Development Project. The drainage and sewage components will be implemented in two stages as follows. This subproject is for Stage 2:
 - ▶ Stage 1 – Construction of storm-water drainage system under GMS: Southern Economic Corridor Towns Development Project (Not part of this subproject).
 - ▶ Stage 2 – Construction of separate sewer system, including tertiary sewers, service connections, pump stations and WWTP under this project.
5. With a design period of 20 years, the project components/facilities are planned up to Year 2040. The project will include the following investments:
 - ▶ Construction of a primary, secondary and tertiary sewer collection network, including sewer household connections (SHCs);
 - 43 km gravity sewer pipeline
 - 9.7 km pressurized sewer pipeline
 - 56 km of Ø160mm tertiary sewers for SHCs within project timescale
 - ▶ Construction of two primary sewer pump stations and associated pumping mains;
 - ▶ Construction of four secondary sewer pump stations and pumping mains;
 - ▶ Construction of an 8,500 m³/day WWTP
 - ▶ Construction of administration, workshop, generator and security buildings at WWTP;
 - ▶ Upgrade and raise 4 km of access road to the WWTP site;
 - ▶ Provision of operations & maintenance equipment.
6. The DED for this subproject has been completed, and the construction contract was signed on 14 August 2020 (REF: CW01 Lot 2, M.T.A Construction Co. Ltd JV with No. 203 Research Institute of Nuclear Industry).

Figure 1: Battambang Wastewater Subproject (Lot2) Coverage Area



1.2.1. Wastewater Treatment Plan Outline

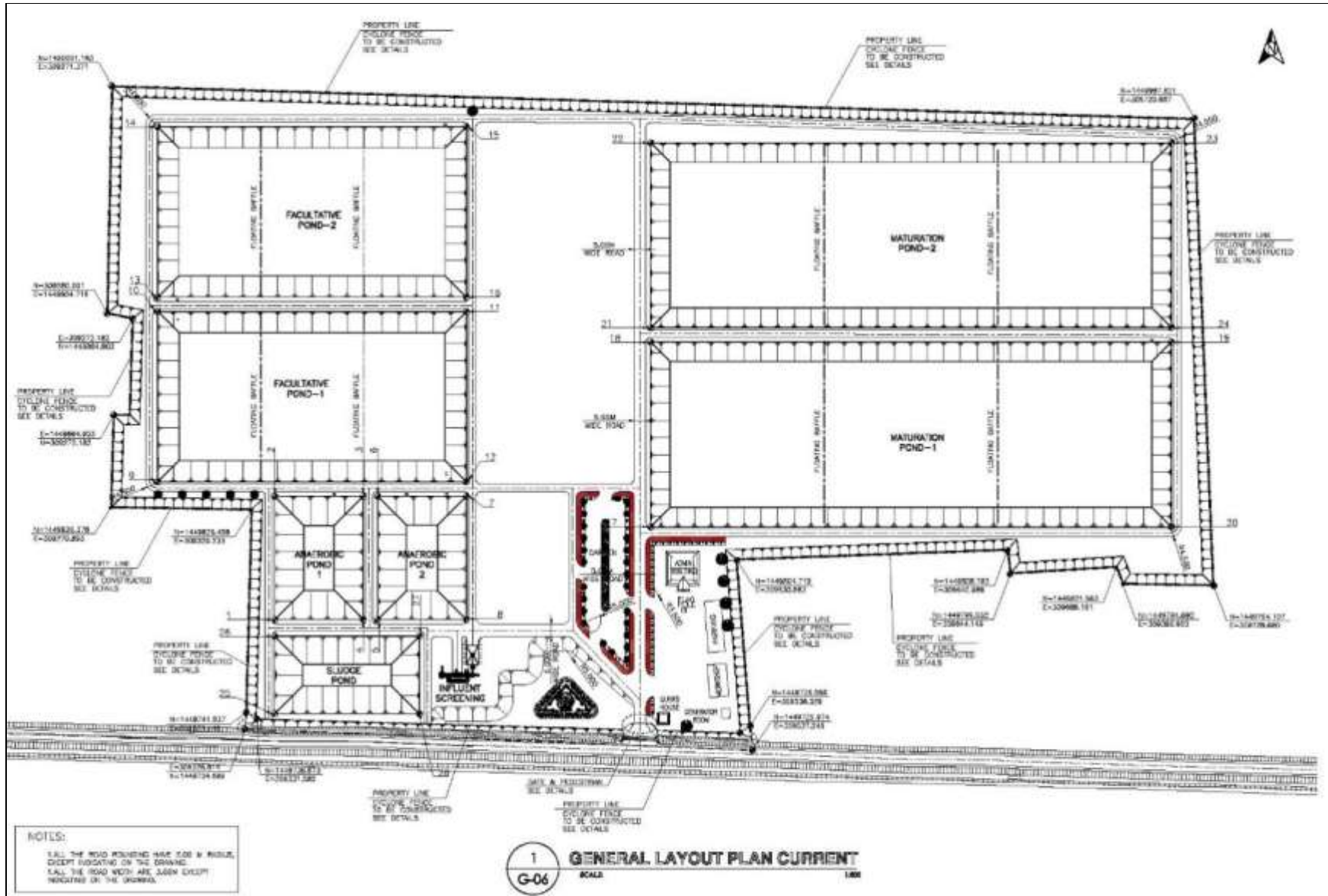
7. The technology is based on a pond system. Each step of treatment represents a progressively more advanced technology which leads to an enhanced pollutant removal efficiency and includes (Figure 2):

- ▶ Inlet screening – An automatic fine screen.
- ▶ Anaerobic ponds, 5 m deep - A first stage for treatment of high strength wastewaters, including mixtures of industrial/domestic wastewaters and septage with high organic loading
- ▶ Facultative ponds 2.5 m - 3 m deep - Designed to be naturally aerated to maintain the biological activity of the bacteria
- ▶ Maturation ponds 1.5 m deep - aerobic lagoons used as UV disinfection for bacteriological pollutant removal and tertiary or “effluent polishing” treatment
- ▶ Sludge stabilization/drying ponds - sludge will need to be removed after 3-5 years

1.3. Objective of EMP

8. 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 (agency) will implement them, and when and where they will be implemented. The following elements should be described in the EMP: (i) implementation of mitigation measures during project design; (ii) implementation of mitigation measures by contractors, and how impacts prevention will be incorporated in the materials procurement; (iii) social development program (e.g., resettlement plan, community training); (iv) contingency response plan for natural or other disasters, and project contingencies; and (v) environmental management and monitoring costs including mitigation costs.

Figure 2: Battambang WWTP layout.



2. SUMMARY OF POTENTIAL RECEPTORS & IMPACTS

9. The impacts of the project are influenced by the presence of receptors in the subproject area. Without receptors, there will not be any impacts. The receptors are summarized in Table 1 and shown in Figure 3.
10. In addition to these facility specific receptors, there are housing, businesses and access requirements that are also considered impact receptors at all locations where any excavations for pipe networks associated with the subproject.

Table 1: Summary of Receptors in Subproject Area

City/Town	Subproject	Surface Water Receptors	Socio-Economic & Cultural Receptors	Land Cover/ Ecological Receptors	Protected Area Status
BTB Town	Wastewater Treatment Plant	- About 4km from Sangke River - About 1km from O Kambot tream and 1.5km from O Monui Stream	- About 2 km from Norea School and about 1.5 km Christian School - About 3-4km from cultural site and pagoda - About 4km from provincial road and 5km from NR nN.5 - About 6km from BTB town center.	Lowland wet rice fields	None
BTB Town	Sewer System	Within Battambang town. Discharge at WWTP	The subproject is in town, there are: houses, school, hospital, offices, markets, shops, and pagodas and local utility services along the road.	Town area	None
BTB Town	Pump Station (6 nos.)	Discharges to the WWTP	Housings close to the pump stations. Error! Reference source not found.	Town area	None
BTB Town	Treated Effluent	Nearby irrigation	Water from canal is for rice	Lowland wet rice fields	None

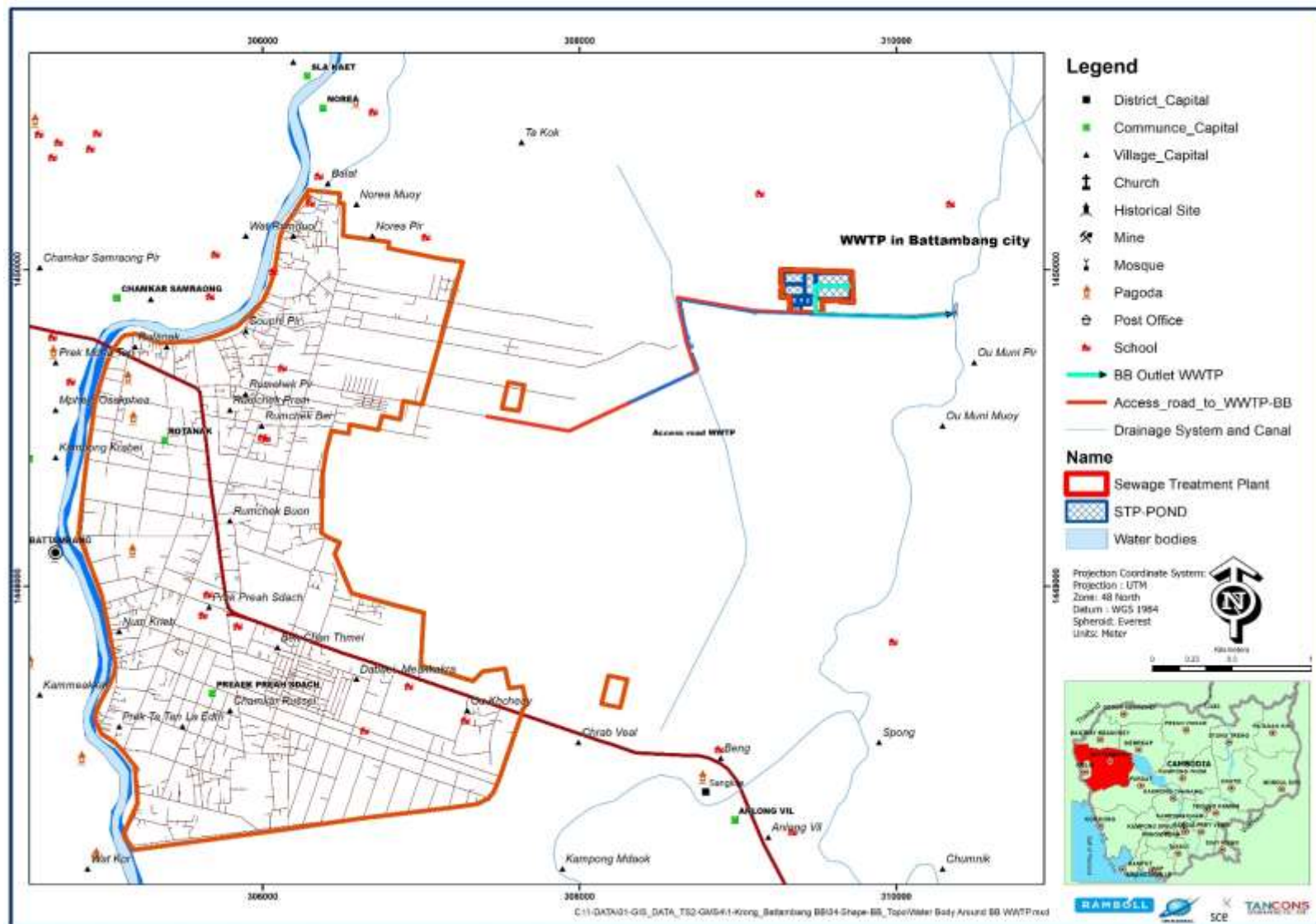
	Discharge Location	canal	cultivation		
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11. A summary of adverse impacts on the receptors is presented below:

- ▶ **Air Quality.** Moderate temporary air quality impacts during the construction stage of the project are anticipated because of fugitive dust generation associated with all construction works, earth works and waste movements.
- ▶ During the operation of the WWTP generation of nuisance odour may occur. The most likely sources of odour are the inlet chamber, the anaerobic ponds and the septage receiving facility. The WWTP will be in an open paddy field area with a buffer of about 500 m to the nearest houses ensuring that any release of nuisance odour from the WWTP will not impact the local residents. Monitoring of generation of offensive odour at the WWTP is included in the EMP.
- ▶ At the pumping stations (during operation), with proper operation and maintenance nuisance odours are not likely; however, this will be closely monitored, and the stations will be made ready for installation of odour control measures should this be warranted.
- ▶ **Noise.** Noise impacts will be temporary and localized at all construction sites as construction machinery and vehicles generate noise as they operate. Other noise sources include loading and unloading of equipment and materials. No noise impacts are expected during operation of the pump station, since pump stations are below ground and the WWTP is remote from the community.
- ▶ No noise impacts are expected during normal operation of the pumping stations, since the stations will be equipped with submersible pumps installed in wet wells approximately 6 m below ground surface, and the emergency generators will be installed in separate buildings with adequate noise attenuating provisions to meet all exterior noise level requirements.
- ▶ The operation of the WWTP does not involve any activities that would generate significant noise emissions, and due to its location approximately 500 m from the nearest residences, any occasional noisy activities are unlikely to cause any significant impacts.
- ▶ **Surface Water.** Construction will take place in areas which have a network of irrigation canals, used for both household water requirements such as laundry and bathing as well as for fishing. Short term construction impacts may be seen in terms of increased turbidity, when access roads improvement or other construction is taking place adjacent to the canals. Also, some construction activity will be required at the riverbank where outfalls for drainage are required. Effluent discharges will also negatively impact on water quality and water users, if the design discharge standards are not met.
- ▶ No significant impacts on surface water are expected during the operation of the sewer and drainage networks, pumping stations and the WWTP. The WWTP is designed to comply with the applicable effluent standards and when properly operated and maintained, the treated effluent is not expected to generate any significant water quality problems for the ambient water quality in the final recipient, the Sangke River. Simple mass balance calculations based on the mean minimum stream flow recorded in the Sangke River from 1997 to 2010 of 2.44 m³/s and the design treatment capacity of 8,500 m³/d or approx. 0.1 m³/s indicate that the resulting concentrations of key water quality parameters in Sangke River after mixing with the effluent are well within the Cambodian ambient water quality standards.
- ▶

- ▶ In terms of water quality limits for use of the water discharged from the WWTP for irrigation, as a general rule, a waste stabilization pond system comprising anaerobic, facultative and maturation ponds produces an effluent suitable for unrestricted irrigation. The microbiological quality guidelines for wastewater use in agriculture recommended by FAO also indicate that the treated effluents can be used for irrigation of cereal crops, industrial crops, fodder crops, pasture and trees. Specific microbiological analyses will be undertaken upon start of operations based on the actual strength of the raw wastewater and the performance of the treatment system to determine if the effluent can be used for unrestricted irrigation and aquaculture.
- ▶ **Soil and Land.** Soil erosion is not anticipated given the nature of the subproject and their flat locations, however borrow sites will cause local impacts to the land. The subproject is in fertile agricultural locations and fertile topsoil is a valuable resource which requires protection measures, particularly for the all construction areas which are located in and around rice fields where encroachment from inappropriate spoil disposal could have detrimental impacts.
- ▶ **Solid waste management.** Impacts on resource use and impacts associated with disposal will arise from waste generated during construction. This includes generation of inert wastes e.g. spoil, biodegradable wastes (cleared vegetation), and hazardous wastes (oily wastes).
- ▶ **Community and Occupational Health and Safety.** Construction sites and access roads will present health and safety risks not only to construction workers, but also to people living and working around the sites. Community risks come from unauthorized access to construction sites and construction traffic i.e. heavy vehicles which the community may not be used to on their neighbourhood roads. Occupational risks come from a range of activities including the use of heavy machinery, earth moving, and use of chemicals. The sewer and drainage construction activities will affect local business and decrease their income. Due to COVID-19 pandemic, workers and staff at constructing site can be infected by the virus, then some prevention and mitigation measures need to be applied. Contractor will prepare standard operation plans and comply with applicable government regulations and guidelines on COVID-19.
- ▶ **Socio-Economic Impacts (accessibility).** The installation of sewage pipes will require the excavation of parts of the road network. This is in urban areas where businesses and other activities take place. The community in and around these areas will be disrupted by the noise and dust, as described above, and by potentially impaired access (for themselves and their customers) to their properties and businesses. The community will have temporary impact on pavements/walkways, kerbs, minor secondary structures (signposts, eaves) and need for relocating small businesses for interim period during construction. Temporary impacts will be responsibility of the construction contractor.

Figure 3: Battambang wastewater subproject, indicative receptors



3. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

12. The framework for implementation of the EMP for the project is described in this section. The key institutions, organizations and stakeholders relevant to environmental safeguards are set out below.
13. The overall responsibility for EMP implementation and compliance with loan assurances lies with the Executing Agency (EA), the Ministry of Public Works and Transport (MPWT). The EA will establish a Project Management Unit (PMU) based in Phnom Penh, responsible for general project implementation. The Implementing Agency is the Provincial Department of Public Works and Transport (PDPWT) in each subproject 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.
14. A summary of the key functions for project implementation and environmental safeguards is presented in Table 2 for ease of reference:

Table 2: 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 within MPWT	Responsible for general project implementation and reporting
PMU Environment Safeguards Officer (funded through CTDP4 Loan)	PMU-ESO	Phnom Penh within PMU	EMP compliance across the subprojects for environmental safeguards - Full Time
Project Implementation Unit	PIU	Provinces within PDPWT	Responsible for subproject implementation
PIU Safeguards Focal Point	PIU-SFP	Provinces within PIU	Responsible for subproject environmental and social safeguard monitoring - Full Time
Contractor Environmental Compliance 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 within 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 the mandate.

15. 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 ministry of provincial departments representatives including the Ministry of Environment, General Department of Resettlement (GDR) and Ministry of Labor as a minimum.

16. External support to the IA/PIU for EMP implementation during the project detailed design and implementation phase will be provided by the International and National Environment Specialists (I/NES) of the Project Management Consultants (PMC). 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).
17. 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.
18. 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:
- (i) Overall responsibility for subproject implementation and management of the Project Management Unit (PMU);
 - (ii) Recruit and manage qualified ESO for PMU;
 - (iii) Recruit and manage Project Management Consultants;
 - (iv) Ensure compliance with Loan Covenants;
 - (v) Approve procurement plans, bidding documents, bid evaluation and contract awards including EMP;
 - (vi) Submit regular quarterly and annual subproject reports to ADB including summary on EMP and GRM implementation;
 - (vii) Ensure compliance of subproject/component implementation with ADB and Government social and environmental policies, guidelines and plans;
 - (viii) Approve proposed corrective actions in the event of identified impacts or non-compliance issues identified in monitoring and evaluation reports.
19. 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;
 - (iii) Obtain necessary approvals from respective departments and other institutions prior to awarding of civil works contracts;
 - (iv) Support PMU-ESO in the implementation of EMP;
 - (v) Coordinate regular reporting of PMU to EA on EMP implementation;
 - (vi) Undertake regular quality control inspection of subproject facilities;
 - (vii) Manage the handover of subproject facilities to agencies responsible for operation and maintenance;
 - (viii) Ensure PIU engage with and follow the Grievance Redress Mechanism GRM.
20. Specific environmental safeguard of EMP responsibilities are set out for each project phase as shown in Table 3.

Table 3: EMP Responsibilities

Responsible Entity	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
Executing Agency	Ministry of Construction and Urban Development 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		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	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
PMC		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 CEMPs	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 CEMPs 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 PCR are completed.

Responsible Entity	Project Preparation	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	
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 (WWTP)	Ensure proper operation of project facilities according to design standards & monitoring Allocation of budget for O&M

3.1. Institutional Capacity Review and Needs

21. 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 centers (air quality) or major rivers (water quality).
22. During the preparation of this IEE 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 project by project basis, and there is an established Safeguards team within the ministry of six people. This team have experience of working on highways 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 and will be issued copies of relevant monitoring reports, EMPs and other relevant safeguards documents.
23. In addition, through understanding 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.
24. A training program is set out in Table 4 which addresses the safeguard reporting and implementation requirements during construction, and the environmental and social risks from operations.
25. The engagement of a National Environmental Specialist for 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.
26. Training for EMP implementation. The proposed training required for project implementation is set out in Table 4. 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;
27. 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. This is also relevant to WWTP operations. Therefore, the Feasibility Studies for the landfills and WWTP 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 wastewater plant and collection system, and a training program on the operations manual provisions;
 - ▶ Train operators on plant equipment at the wastewater treatment plant sites;
 - ▶ Train operators on achievement of, and compliance with, regulatory standards and monitoring of the performance of the facilities;
 - ▶ Train WWTP operators and maintenance on management of the wastewater system, odor control, operational control of treatment efficacy, compliance with effluent

standards, sludge disposal and other environmental controls related to the operation of the WWTP.

Table 4: Capacity Building and Training Requirements

Subject / Content	Participants	Trainer/ Organization	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 Project Mgmt Consultant	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)-roles and responsibilities	PMU, PIU, contractors, Commune Councils	I/NES of Project Mgmt Consultant	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 Project Management Consultant	Once (during project implementation)	2	10	
Environmental monitoring - Monitoring methods, data collection and processing, reporting systems	PMU, PIU, contractors, Operators of WWTP,	I/NES of Project Management Consultant & MoE (environmental analyst)	Once (at beginning of project construction)	2	10	
WWTP Management	Included as part of the WWTP investment management training budget					

4. MITIGATION MEASURES PLAN

28. Comprehensive mitigation measures are set out for the subproject in Table 5. In addition, subproject specific mitigation measures are set out in environmental monitoring plan.
29. Construction Environmental Management Plans (CEMP). The Contractor has developed specific 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.
30. Specific Management Plan. The contractor has developed the following specific subplans withing the CEMP prior to the start of the work:
 - Construction Materials Acquisition, Transport, and Storage Subplan
 - Spoil Management Subplan
 - Solid and Liquid Construction Waste Subplan
 - Noise and Dust Subplan
 - Utility and Power disruption Subplan
 - Tree and Vegetation removal, and site restoration Subplan
 - Erosion control Subplan
 - Worker and Public Safety Subplan
 - Construction and Urban Traffic Subplan
 - Construction Drainage Subplan
 - Covid-19 Health and Safety Plan

Table 5: EMP Mitigation Measures for WWTP Subproject

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
Pre-Construction Phase					
National IEIA Approval	All	1. the Initial Environmental and Social Impact Assessment (IESIA) was approved by the Ministry of Environment (MoE) in May 2020 2. Baseline environmental surveys completed required by MoE	PMU-PMC Local Firm	MoE	Included in project cost
Design	Effluent Discharge	3. Final design ensures that the effluent will meet the criteria in Sub-decree, No. 27 ANRK.BK on Water Pollution Control, MoE, 1999 (public water area and sewer).	PMC-NIES	PMU	Part of Contract Cost
Disclosure and engagement of community through consultation	No community impacts	4. Initiate Information Disclosure and Grievance Redress Mechanism of IEE 5. Consultation of community based on final detailed designs	PMU-ESO/ PIU-SFP	EA	Included in PMC cost package
Unexploded Ordnance (UXO) survey, & removal	Injured worker or public	6. Ensure national military is consulted to confirm all relevant areas are clear from UXO. This include: 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. 7. Cambodian Mine Action Centre (CMAC) to clear areas where necessary and provide evidence of clearance to PMU in advance of construction. 8. 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
Flora survey for protection or cutting	Impacts to flora and fauna habitat	9. Survey for trees higher than 3 m within the construction area for protection or removal. Ensure DWPT and local authority have been informed and obtain the permit for tree cutting. Addition replantation shall be sought upon completion of the work	Contractor	PMC, PMU	Include in bid price
Final Design	Flooding/ Climate Change	10. Final design incorporates adequate cross drains on all facility access roads to ensure any roads raised above natural flood level do not cause ponding or further flooding elsewhere.	PMC	EA	Included in consultancy contract price
Final Design	Emergency	11. Ensure the operational and maintenance plan for each facility includes an emergency response plan considering	PMC	EA	Included in consultancy

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
	Response Plan	flooding.			contract price
IEE and EMP Updated	All	12. The IEE and EMP have been updated reflecting the final detailed design and assess impacts of associated facilities not identified during preliminary design (quarries, borrow and spoil disposal areas, access roads and material sources) and integrate further environmental protection measures, as necessary.	I/NES	PMU	Included in project cost
Construction EMP (CEMP) Approvals	All	13. Prepare and develop CEMP by contractor and Approval of CEMP by consultant and PMU, including site maps as required by CEMP.	Contractor	PMC, PMU / EA	Included in project cost
GRM	Dissemination	14. Erect sign boards with project details and GRM procedures/contact details at the entrance to each construction site/camp. 15. 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. 16. 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/ PIU/ PMC	Included in bid price
Construction Phase					
Civil works	Air quality	1. Asphalt and concrete batching facilities will be located at least 500m 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. 2. Water will be sprayed for construction sites, material handling areas, and borrow pits where fugitive dust is generated. 3. Trucks carrying dry and loose construction materials such as earth will be covered with tarpaulins or other suitable cover. 4. Construction vehicles and machinery will be maintained to a high standard to minimize emissions. 5. Areas in which road excavations are required for sewage and drainage pipe works will be notified adequately 1 month in advance of works starting.	Contractor	PMU/PMC	Included in bid price
Civil Works	Noise	6. Maintain all exhaust systems in good working order;	Contractor	PIU/PMU/	Included in bid

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		undertake regular equipment maintenance; 7. Restrict construction activities using heavy machinery work between 8am-6pm, (especially for drainage and pumping works in urban area); 8. Provide advance warning to the community on timing of noisy activities. Seek suggestions from community members to reduce noise annoyance, particularly related to noise sensitive activities at receptors such as periods of worship for pagodas 9. Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated. 10. Ensure noise monitoring is undertaken near sensitive receptors, particularly dwellings when construction machinery is operational; 11. All construction workers will use appropriate Personal Protective Equipment (PPE) including ear defenders when operating machinery; 12. Ensure that mobile noise barriers are available for use in populated areas where excavations are taking place, if necessary provide fencing at construction zones		PMC	price
Civil Works	Flora or vegetation	13. All trees over 3m in construction sites to be protected from construction activities if they are not required to be removed. The cutting trees shall inform and get permit from DPWT and local authority. 14. An inventory shall be held of trees to be cut and addition replantation shall be sought upon completion of the work. 15. Where possible, material 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	Contractor	PIU/PMU/PMC	Included in bid price
Civil Works	Water Quality and Access	16. Provision of adequate short-term drainage away from construction sites to prevent contaminated run off entering water bodies including canals. 17. Installation of temporary storm drains or ditches for construction sites to manage and control the flow and direction of surface water run off	Contractor	PIU/PMU/PMC	Included in bid price

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		18. Stockpiles and materials will be stored at least 50 m from surface waters with drainage directed away from the irrigation canals or drainage channels and stream or water sources. 19. All construction fluids such as oils, and fuels should be stored and handled on a bund and impermeable surface; a bund will be provided around any above ground fuel storage tanks with a capacity of 110% of the largest single tank. 20. No washing or repair of machinery within 50 m of surface waters including irrigation canals. 21. Pit latrines (for worker camps if required) to be located at least 200 m from surface waters, and in areas of suitable soil profiles and above the groundwater levels. 22. Refuelling only in designated areas which are to be 50m from a water course and drip trays to be used when refuelling or topping up / changing machinery fluids. 23. Maintenance of irrigation water supplies for agriculture during dry season works within or around irrigation canals. Seek suggestions from water users if supply may be affected.			
Civil Works	Power, Water Supply and any town utilities Interruption	Based on the pre-construction assessment of power and water supply locations, if the contractor identifies a risk to supplies from construction activities, the contractor will: 24. Liaise with power or water supplier to identify an approach to minimise inconvenience to residents 25. Provide advance warning to residents (minimum 2 weeks in advance) that power/water supplies will be interrupted 26. Provide alternatives for residents if the supply interruption exceeds 2 days for water	Contractor	PMU/PMC	Included in bid price
Implementation of Materials Spoil and Borrow Management	Soil and land resources	Site specific materials, spoil and borrow site management plan will be developed and approved by the relevant Municipal authority; 27. A map of all borrow sites will be developed and maintained with copies held by the Contractor and PIU; 28. Safety measures, if required, will be implemented to prevent access by members of the public and livestock. 29. Measures to rehabilitate the borrow sites include contouring of the slopes within each site and replanting sites with native species. 30. Topsoil present on construction sites will be removed and	Contractor	PMU/ PMC	Included in bid price

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		stockpiled in a labelled area for use on rehabilitation of the site post-construction or rehabilitation of borrow sites 31. No disposal of spoil or dredged material on agriculturally productive land or within 50 m of a water course. 32. Construction working areas will be clearly demarcated and encroachment onto adjacent areas avoided.			
Implementation of Solid and Liquid Waste Management	Resource use and natural resource contamination	33. 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; 34. Effective management of materials on site through good housekeeping and work planning. 35. Clear arrangements for storage and transportation of all hazardous and non-hazardous waste to an authorised and approved disposal point as set out in the Waste Management Plan. 36. The wastes, especially hazardous waste shall be collected and stored in safety tanks and provide to license sub-contractor to dispose in local license dumping site. 37. Prohibit burning of waste (anytime and anywhere). 38. 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/PMC	Included in bid price
Implementation of Community and Occupational Health and Safety and Emergency Response	Human health and safety	39. Appropriate fencing, protective barriers, and buffer zones will be provided around all construction sites including barriers where needed on access roads and populated. 40. The construction campsites should be located outside and distance from residential area and fencing campsites with safety barriers and safety zones. 41. Sufficient signage giving health and safety warnings and information disclosure at all sites. 42. Worker education and awareness seminars for construction hazards will be given. A construction site safety program will be developed and distributed to workers. 43. Conduct daily toolbox meetings (safety briefings) 44. An accident record book will be maintained where all major or minor accidents and incidents are recorded with actions taken. 45. Ensure that all workers are equipped with and use Personal Protective Equipment (PEE). 46. Develop Traffic Management Plan together with provision	Contractor	PIU/PMU/PMC	Included in bid price

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		of safety signs, traffic safety control and regular monitoring the public safety or traffic safety management on construction sites on the streets in urban area. 47. Limited the driving speed in village/urban areas and other sensitive areas. Provide watering to reduce dust pollution in village and urban areas, when and where is dusty. 48. Each Contractor shall appoint an Environment, Health and Safety Officer who is qualified engineer. Adequate first aid equipment will be made available on site 49. 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. 50. Provide the training or awareness on safety management and HIV-AIDs to construction staffs, workers and local people. 51. 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. 52. COVID-19 prevention measures: 53. 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; 54. Daily checking temperature of staff and workers prior starting the works; 55. Staff and workers have to wear masks all the time and properly; 56. Do not share personal items or supplies such as phones, pens, notebooks, tools, etc.; 57. Avoid common physical greetings, such as handshakes; 58. Maintain a minimum physical distance of one metre from others if possible; 59. 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; 60. 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			

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		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; 61. Commonly touched surfaces on vehicles and equipment are thoroughly cleaned and disinfected at the end of shifts and between users; 62. 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; 63. Complying with any instructions announced by Ministry of Health accordingly; 64. Responding measures if there is a COVID-19 case: 65. 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. 66. 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; 67. Individual 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; 68. All areas on site potentially infected by a confirmed or probable case are barricaded to keep individuals two meters away until the area is properly cleaned and disinfected 69. The Emergency Response Plan will set out detailed Preventative Measures for all types of incidents covered in the Emergency Plan. This will include: 70. Prevention of Injury and Accidents – to include Personal Protective Equipment requirements for construction workers, training requirements 71. Prevention of Spillage - All construction fluids such as oils, and fuels will be stored on hard standing with sealed drainage with a capacity of 110% of the largest fuel container, will include procedures on refueling and maintaining vehicles.			

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		72. Prevention of Fire – to include measures for Ignition Sources including prevention of smoking on construction site, management of flammable materials and liquid. 73. Other Incidents – prevention measures relevant to other issues considered relevant by the contractor 74. The Contractor will develop Emergency Response Procedures prior to construction. The procedures will cover actions to be taken in case of: 75. Worker injury (e.g. construction or traffic accident) 76. Spillage (e.g. fuel spillage) 77. Fire (e.g. fuel or chemicals storage area); and 78. Any other incidents anticipated by the contractor.			
Implementation of Construction Workers Camp Management	Contamination of water, soil, waste production and social issues	79. If a camp for construction workers is required the contractor will set out a management plan which includes a map showing camp lay out, adequate accommodation and sanitation for male and female workers, relevant training and a plan of how camp areas will be restored to original condition after construction completed. 80. 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 81. Priority will be given to employ local labor and retain evidence of how local labour recruitment efforts were undertaken.	Contractor	PIU/PMU/PMC	Included in bid price
Pipe Network Installation	Socio-Economic (Accessibility)	82. Warning given to residents 4 weeks in advance of any excavations 83. Implement traffic management procedures to ensure smooth traffic. Provide traffic signs, control vehicle speeds and be able to warn drivers in advance for any changes to road surface or traffic direction 84. Provide adequate and safe pedestrian and vehicular (motorbike) access to enter and exit buildings across any open trenches. 85. Complete work on a segment according to a progressive sequence of activity. Provide access by bridging trenches. 86. Avoid trenching in locations where damage might occur. If needed, provide shoring to assure no subsidence occurs. 87. Excavations should be barricaded and marked. Workers should not be allowed to enter deep trenches unless they are properly shored. 88. Temporary restoring/rebuilding the impacted assets or	Contractor	PIU/PMU, PMC	Included in bid price

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		relocation of shops and stalls through cooperation, between construction contractor, HHs and PIU 89. Define and adjust suitable working hours in urban areas or at sensitive sites. Open access road for entry and exit for business sites. Remove the unsuitable soil and materials(spoils) from construction sites which are in front of houses and shops 90. Restoration or compensation of any damage to properties at an expense of the contractor 91. Consideration and management of potential localized flood impacts.			
PMC-I/NES	Project Completion	92. 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	Part of Contract Cost
Operation Phase					
Operation of WWTP	Surface Water	1. Final design ensures that the absorptive capacity of the receiving waterway is not exceeded and health risks to users of the waterways are minimized. 2. Final design considers climate change and the ground level of the WWTP site will be raised to protect against flooding. 3. Always comply with required operating standards (i.e. Surface Water Quality Standard Referring to Sub-Decree No. 27 ANRK.BK) to ensure effluents are treated effectively prior to discharge. 4. Provision of adequate budget for O&M of WWTP. 5. Regular inspect the sewage system structures and provide maintenance or corrective actions. 6. Conduct monitoring and reporting on water quality of receiving water after discharge from WWTP. The discharge of wastewater quality from WWTP shall always comply with discharged standards specified in Sub-decree, No. 27 ANRK.BK on Water Pollution Control, MoE, 1999 and Sub-decree on Management of Sewage System and Wastewater Treatment Plant 2017. Inform downstream users of the risks to their health of using water for consumption.	Operator Team	MPWT MoE	Included in operational costs
Operation of WWTP	Odour and Dust (wastewater treatment).	7. Regular inspect and maintenance the operation of WWTP, culvert system, and pumping stations. 8. Removing screenings and grit from the inlet and outlet works;	Operator Team	MPWT MoE	Included in operational costs – O&M Budget

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
		9. Cutting grasses on the embankment, and removing it so that it does not fall in the ponds; 10. Removing floating scum and floating macrophytes from the surface of the maturation and facultative ponds. This will be done to maximise the light energy reaching the pond algae, increase surface re-aeration, and prevent fly and mosquito breeding; 11. Spraying scum on the surface of the anaerobic ponds and not removing it, since this will help the treatment processes; 12. Removing any accumulated solids in the inlet and outlet works; 13. Repairing any damaged embankment as soon as possible; and 14. Repairing any damage of the fences or gates. 15. Use quick-disconnect fittings between septage pumper truck and receiving station to minimize exposure of septage to the atmosphere 16. Wash-down septage facilities to clean up any spills, with drainage into the septage chamber 17. Avoid free fall of septage by extending receiving pipes below the water surface 18. Introduce septage at slow controlled rates to avoid turbulence or agitation 19. Ventilate the air from the septage chamber to an odour biofilter 20. Clean tanks, trucks and equipment daily 21. Transport of any sludge materials off site on days of low wind speed; 22. Washing/cleaning wheels of vehicles before leaving the site to remove mud or dirt to control dust dispersion to nearby houses 23. Provide Tree plantings (tree screen) and green place inside and around the WWTP sites to reduce dust and odors; 24. Fully cover sludge loading trucks during transport for disposal 25. Provision of adequate budget for O&M 26. Conduct air quality monitoring inside and near the WWTP. The air quality shall be complied with national standards of Sub-decree on Air Pollution and Noise Disturbance 2000. 27. Quarterly meetings between WWTP operator, DPWT and nearby residents and / or their representatives to identify odor or nuisance issues and corrective actions.			

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
Operation of Sewerage Network	Community and Occupational Health and safety	28. Community outreach initiatives, such as consultations, meetings and information campaigns regarding contact with wastewater. 29. Preparation of an operations manual for combined sewers and WWTP, which shall include an occupational health and safety plan (OHSP) 30. Monitor the pumping stations for possible release of offensive odour, and if necessary, install ventilation stacks with odour filter treatment (carbon filters, biofilter). 31. Conduct routine hosing and debris removal at the pumping station wet wells to remove accumulated solids. 32. 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. 33. 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. 34. Conduct Risk communication, training, and education. Training of workers in infection prevention and control practices 35. Adopt engineering, organizational and administrative measures, plan work so employees can keep distance from each other and minimize contact. 36. Provide clear and visible guidelines on how to prevent infection at the construction site and initiatives taken. 37. Regularly clean and disinfect toilet and bathrooms. 38. Promote personal hygiene (including hand and respiratory hygiene), make wash basins and sanitizers available. 39. Screen on entry the temperature of each person entering the work site and record their contact details to facilitate tracking of infected persons should there be a need 40. Provide personal protective equipment (PPE) and inform workers of its correct use. 41. Health surveillance and insurance 42. Consider other hazards, including psychosocial 43. Review emergency preparedness plans 44. Review and update preventive and control measures as the situation evolves. Involve workers/OHS groups in the review.	Operator Team	MPWT/MoE	Included in operational costs – O&M Budget
Effluent Discharge	Agricultural Yield	45. Provision of effluent analysis to the Provincial Department of Agriculture on a regular basis	Operator	PDAFF/	Included in operational

Subproject Activity	Environmental Impact / Issue	Mitigation measures	Implement by	Supervise by	Cost (\$)
	Impact	46. Regular monitoring the operation system of discharging of treated wastewater effluent in to canal. 47. Collaborate with MOE/PDoE to conduct monitoring of wastewater discharging quality from WWTP and surface water quality in stream or irrigated canal. The discharging wastewater quality shall always comply with national standards of sub-decree on Water Pollution Control 2009 and Sub-decree, No. 27 ANRK.BK on Water Pollution Control, MoE, 1999. 48. In collaboration with the Provincial Department of Agriculture carry out microbiological analyses of effluents to determine if the effluent can be used for unrestricted irrigation and aquaculture.	Team	MoE	costs – O&M Budget

5. MONITORING PLAN

31. The project monitoring is 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 Project Management Consultants) 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 subproject and will be undertaken by the relevant government department or a nominated private sector operator.

32. 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 for Subproject

33. Before construction, the PMC will monitor the project's readiness on environmental management based on a set of indicators in Table 6 below 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 6: 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 (see Annex 4)	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 Quality Monitoring

34. During construction, the impact on the sensitive environmental receptors will be monitored and compared against the relevant national environmental standards.
35. During operation, the PIU and relevant operators will be expected to maintain an adequate budget to ensure environmental monitoring can be undertaken as specified in Table 7.

5.3. EMP Compliance Monitoring

36. In order for the EMP to be effective, all its mitigation measures must be monitored to ensure they are implemented. Note this applies to construction only; during operation, it is the responsibility of the appropriate ministries or its line departments to ensure monitoring of operational facilities is incorporated in the operations and maintenance manual and carried out routinely. Compliance monitoring requirements are summarized in Table 8.

5.4. Environmental Policy and Standards

37. The construction and operation phases of the projects shall follow relevant environmental quality standards. These are presented in Annex 5 for reference. These quality standards relate to i) air quality, ii) ambient surface water quality, iii) groundwater quality, vi) soil quality, v) effluent quality.

Table 7: Environmental Quality Monitoring for Battambang Wastewater subproject

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementation	Per Sample	Total per site/yr
Pre-Construction Phase						
Air Quality -including PM10, CO2, NO2, SOx	Nearest residential receptor (2 locations) WWTP site: (X:309292 Y:1449786)	1 day (24-hr) before construction.	CSC/PIU	Contractor	\$1000	\$1000
Noise	Nearest residential receptor (2 locations) WWTP site: (X:309292 Y:1449786)	1 day (day time only) before construction	CSC/PIU	Contractor	\$300	\$300
Water Quality pH, Color, Odor, SS, BOD5, COD, total P, N total, E.coli, Coliform	Two locations: O Kambot Stream (X: 309966, Y: 1450644) O Mony Sream (X: 310094, Y:1449118)	1 day (day time only) before construction	CSC/PIU	Contractor	\$100	\$200
Construction Phase						
Air Quality -including PM10, CO2, NO2, SOx	Nearest residential receptor (2 locations) WWTP site: (X:309292 Y:1449786) (Monitor only when construction activities occur within 250 m)	1 day (24-hr) per 3 months Means in accordance with national standard	CSC/PIU	Contractor	\$1000	\$8000
Noise	Nearest residential receptor (2 locations) WWTP site: (X:309292 Y:1449786) (Monitor only when construction activities occur within 250 m)	1 day (day time only) per 3 months Means in accordance with national standard	CSC/PIU	Contractor	\$300	\$3600

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementation	Per Sample	Total per site/yr
Water Quality Flow, pH, Colour, Odour, SS, BOD5, COD, total P, N total, E.coli, Coliform.	Two locations: O Kambot Stream (X: 309966, Y: 1450644) O Mony Sream (X: 310094, Y:1449118)	Every 3 months during construction periods Means in accordance with national standard	CSC/PIU	Contractor	\$100	\$800
Operations Phase						
Treatment monitoring: Inlet and outlet flow rates, pH, DO, BOD5, COD, total N, total P, TSS, TDS, faecal coliform bacteria	Each step in the treatment process	Weekly during the first 6 months of operations, thereafter monthly or more often in case of performance problems	PIU	Operator	Included in operational costs – O&M Budget	
Effluent Quality: Parameters: Outlet flow rates, pH, Colour, Odour, DO, TSS, TDS, BOD ₅ , COD, total P, total N, NH ₃ -N, Fe, Cu, Pb, Cd, Zn, Oil and Grease, E.coli, Coliform	Effluent outfall	Twice per year or in case of complaints	MoE MPWT	Operator	Included in operational costs – O&M Budget	
Effluent Quality: Parameters: Outlet flow rates, pH, Colour, Odour, DO, TSS, BOD5, COD, NH ₃ -N, total P, total N, TDS, faecal coliform bacteria	Effluent outfall	Monthly	MoE MPWT	Operator	Included in operational costs – O&M Budget	
Receiving Water Body, Flow, pH, Colour, Odour, TSS, TDS, DO, BOD5, COD, total P, total N, NH ₃ -N, faecal coliform bacteria	SWQ1, O Monui Stream Upstream (13°06'08.6"N 103°14'53.9"E) SWQ2, O Monui Stream Downstream (13° 6'34.14"N 103°15'3.74"E) SWQ3, Sangke River, Upstream (13°10'54.03"N 103°15'7.22"E) SWQ4, Sangke River,	Quarterly during the first 2 years of operation. Thereafter, the frequency shall be revaluated. In case of significant non-compliance with effluent standards	MoE MPWT	Operator	Included in operational costs – O&M Budget	

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)	
			Supervision	Implementation	Per Sample	Total per site/yr
	Downstream (13°12'10.18"N 103°16'44.97"E)					
Microbiological irrigation water quality parameters	Effluent outfall	Prior to determining if effluents are allowed for unrestricted use in irrigation and aquaculture. Thereafter as required by the competent authority	Ministry of Agriculture and Forestry	Operator	Included in operational costs – O&M Budget	
Odour	Site boundary (downwind)	Odor boundary monitoring method to be established within Operational Plan	MoE MPWT	Operator	Included in operational costs – O&M Budget	
Worker & public injury associated with WWTP operations	On property of WWTP	Regular record keeping	MPWT Ministry of Labor and Vocational Training (MLVT)	Operator	Included in operational costs – O&M Budget	

Table 8: EMP Compliance Monitoring

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)
			Verification	Implementation	
Construction Phase – WWTP Subproject					
Air Quality	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Noise	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Flora	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Water Quality	Civil works sites	Monthly 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	Monthly 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 Sub-Plan B	Monthly 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 Sub-Plan C	Monthly 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 Sub-Plan D	Monthly checking against mitigation measures specified in this EMP	PMC-NES	CSC	Included in CSC contract
Community Issues • Environmental impacts of	At all construction locations	Consultation interview with Affected People Using the	PMU-ESO	PIU-SFP	Included in PIU staff/travel budget

Environmental Indicators	Location	Method & Frequency	Responsibility		Estimated Costs (USD)
			Verification	Implementation	
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 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		form in Annex 2 4-6 weeks after construction starts Every 2 months until end of construction			
Socio-Economic (accessibility)	All sites of pipe excavations in urban areas	4-6 weeks after construction starts Every 2 months until end of construction	PMU-ESO	PIU-SFP	Included in PIU staff/travel budget

6. PUBLIC CONSULTATION

38. As part of IEE and EMP preparation, site visits were conducted that included several meetings with key stakeholders in proposed subproject areas, including provincial and district officials and village office holders (Annex 7).
39. Consultations, public meetings and village discussions with the affected households (Ahs) and the local authorities were conducted (i) during project PPTA stage of draft resettlement plan (RP) preparation, and during (ii) DED and Detailed Measurement Survey (DMS) and (iii) preparation of the Detailed Resettlement Plan (DRP). The first public consultation and focus group discussions at PPTA stage was conducted in February 2018. Both public consultation meeting and focus group discussions provided good opportunity to the AHs to express their concerns mainly about actual impacts on land and the viability of farming on marginal lands after acquisition, DMS, compensation payments and GRM. All issues were fully discussed and addressed, consistent with the Project's participatory approach.
40. During the Subproject design, the second public consultations with AHs was conducted on one-to-one due to restrictions and safety requirements caused by COVID-19 pandemic from April to July 2020. During the consultations, the AHs were explained on the subproject scope, entitlements, and compensation for lost assets, GRM, including contact persons, and processes of conducting DMS/SES. Third consultation took place 2 and 25 April 2020 (two separate consultations) with PDOWRAM to agree on access road along the irrigation canal and WWTP effluent discharge. Fourth consultation was done in 28-30 May 2020 covering market vendors (77 participants, including 4 males and 73 females), WWTP access road to AHs (9 participants, including 3 males and 6 females) and mobile vendors (10 participants, including 3 males and 7 females). The consultation explained to the attendees about the Project and Subproject and its benefits, the scope of works, resettlement impacts, the ADB and RGC policies on compensation, eligibility, entitlements, contractor responsibility for temporary impact and GRM processes. Fifth consultation took place on 29 May 2020 with the single vulnerable AH on eligibility and entitled to participate in the income restoration plan (IRP). This included a final consultation conducted with farmers impacted by a loss of land use along the access road to WWTP site and at WWTP site (11 participants, including 10 male and 1 female).
41. Consultation during implementation. The Consolidated IEE for this subproject contains details of the consultation undertaken during preparation of this subproject. In addition, consultation will take place during pre-construction and construction. The PIU Safeguard Focal Point (PIU-SFP) 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 Environmental Monitoring Plan
42. The PDPWT is a key stakeholder that holds the interests of the community to be its primary mission. The subproject concept and design are driven by the need for rehabilitation of system elements within the constraints of the available budget. Furthermore, the draft IEE has been reviewed by MPWT and concurrence was reached on the contents of the draft EMP. Similar process will be followed for the final IEE and EMP.
43. The IEE and EMP were disclosed on the ADB website and the updated IEE and EMP will be disclosed after detailed engineering design. Copies of the IEE and EMP will be provided to concerned ministries and implementing agencies and the public.

44. 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 Annex 2. This will contribute to project monitoring.
45. Public consultation will be undertaken in compliance with national regulation and legislation in force, including those put in place to prevent the spread of COVID-19 (details included in Annex 6).
46. The PMC has prepared public information booklets which have been distributed prior to start of construction in a work section, undertake 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 compliance monitoring plan.

7. GRIEVANCE REDRESS MECHANISM

7.1. GRM Objective

47. 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

48. In Cambodia, there is currently no existing legally established system to resolve environmental concerns and complaints. The MPWT, as the EA of the Tonle Sap II 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) 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 subproject level.

49. 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

50. 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)

51. 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 Contractors
- ▶ District and Commune Councils

- ▶ The PIU office
- ▶ The Provincial Department of Public Works and Transport (PDWT).

7.2.2. GRM Steps and Timeframe

52. 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

53. 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.

54. 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'.

55. 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. 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

57. 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 9:

Table 9: 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,
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 a proposed GRM Complaint Form is in Annex 3.
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 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.

58. **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.

59. 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:

60. **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.

61. **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 subproject 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

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

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.

63. The GRM follows the process as described in the Royal Government of Cambodia (RGC) Standard Operating Procedures for Land Acquisition and Involuntary Resettlement for Externally Financed Projects in Cambodia promulgated under Sub-Decree No. 22.ANK.BK on 22 February 2018. Aggrieved AHs/APs can lodge a complaint at the District, GDR, and Provincial levels to seek timely resolution. The authority is vested with the Provincial Grievance Redress Committee (PGRC) to make the final administrative decision if the AH/AP is not satisfied with the resolution at the District or GDR level. If the AH/AP is not satisfied with the decision of the PGRC, s/he is free to file a lawsuit in the competent court (Municipal or Provincial court, as applicable).

64. GRM was initiated by establishing PGRC with reference letter 037/19 SSR and Provincial Resettlement Subcommittee (PRSC) with reference letter 036/19 SSR on 13 March 2019 (Annex L). The AHs have been made fully aware of their rights through verbal and written means during resettlement planning and updating. The updated Public Information Brochure included detailed information on the GRM for the Subproject and was distributed to each participant. In addition, the GDR on 29 August 2019 conducted a comprehensive training workshop for the members of PGRC and the other local authorities on the GRM to strengthen the capacity of the members of the PGRC for effective functioning of the GRM. The GRM has been operationalized and is functional.

65. The contact details of each level of GRM are:

(a) Commune Chief

Name: Mr. Yuos Yern

Position: Chief of Ratanak Commune

Tel: 092 330181

Name: Mr. Tao Horn

Position: Chief of Preak Prah Sdac Commune

Tel: 012 365279

(b) District Grievance Redress Committee

Name: Peng Sithy

Position: Governor of Battambang city

Name: Lum Sorm

Position: Governor of Sangkae District

Name: Mel Sophal

Position: Governor of Ek Phnom District

Name: Tep Horn

Position: Governor of Kim Vannak City

(c) General Department of Resettlement, Ministry of Economy and Finance (Phnom Penh)

Tel/Fax: 023 42 66 82

(d) Provincial Grievance Redress Committee

8. REPORTING

66. 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 10 gives reporting requirements.

Table 10: Reporting Requirements

Report	Frequency	Purpose	From	To
Contractors' Progress Report	Monthly	EMP Implementation Progress and Monitoring Results	Contractor	PMU
EMP Progress and Compliance Report	Monthly	Confirm Mitigation Measures	International National Env Specialists 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
WWTP Operation	Quarterly	Surface and groundwater Quality. Effluent quality, sludge disposal, health and safety	Operator	EA

8.1. Mechanisms for Feedback and Adjustment

67. 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

68. The total cost for EMP implementation for the WWTP comprises the following:

- ▶ Mitigation measures (in table 5, 7, and 8) Costs to be included in construction contract and operations budget
- ▶ Environmental quality monitoring (Table 7) \$12,400 per year
- ▶ EMP Compliance Monitoring (including public consultation) (Table 8) No additional cost

69. 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= 500USD
- 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 WWTP operator training which is covered under the feasibility study for each specific subproject.

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

71. 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

- 72. The EMP, if implemented as directed, will mitigate impacts on the natural environment and affected people to an acceptable level. The key parties for mitigation measure implementation are the construction contractors and the operators. The implementation of this EMP will be closely monitored and reported by the relevant stakeholders in the project.
- 73. The most significant impacts from the project will arise from facility operation, for the WWTP subproject is more concerning during operation stage and the sewerage system more consider during construction for installation the sewage pipes in the town. 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
- 74. 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.
- 75. Overall, the project is anticipated to bring environmental benefits to the populations of the project cities. It will serve to improve the current sewage and waste management situation and will provide long term environmental improvements.

Annex 1: Environmental Safeguards Terms of Reference

Project Management Consultants

Key responsibilities for the environment safeguards specialists under the Project Management Consultant (PMC) are listed below. These responsibilities will be executed as part of the TOR of the PMC.

- ▶ Review and update the IEE reports and environment management plans (EMP) prepared during the TA and recommend necessary refinements and improvements based on government and ADB policies and requirement.
- ▶ Ensure that EMPs and related environmental considerations are factored in detailed designs and technical engineering of the urban infrastructure subprojects under the Project.
- ▶ Ensure that environment safeguards measures are adequately considered in the bidding documents and in the evaluation criteria for selection and awarding of contracts for civil works, goods and services
- ▶ Conduct environmental safeguards due diligence assessments. Assist in consultations with project-affected people for drafting safeguard documents.
- ▶ Assess the capacity development needs of EAs, IAs and PMUs in environment measures and recommend appropriate capacity building interventions and training programs.
- ▶ Coordinate with participating Ministries, and local authorities on regulatory and compliance issues related to environment safeguards.
- ▶ Advise EAs, IAs and PMU on environment related concerns that may arise during Project implementation and recommend appropriate action plans.
- ▶ Assist in monitoring implementation of environmental safeguards, including the impact environmental measure on urban sector development.

PMU Safeguards Officer

- ▶ Review Contractor response to EMP requirements and assess suitability based on previous experience and response to site EMP request
- ▶ Ensure Site EMP is prepared by the Contractor and cleared by the Construction Supervision Contractor
- ▶ Ensure that environment safeguards measures are adequately considered in the bidding documents and in the evaluation criteria for selection and awarding of contracts for civil works, goods and services.
- ▶ Support PIU Safeguard Focal Points (PMU-SFP) to ensure regular site inspections are undertaken to check on implementation of mitigation measures in the EMP. Record results of site inspections and submit to the relevant authorities and project stakeholders as part of progress reporting (Monthly EMP Progress and Compliance Report).
- ▶ Contribution to Quarterly Monitoring Report to the Executing Agency and Semi-Annual Environmental Monitoring Report to ADB.
- ▶ Co-ordinate with PMU-SFP to ensure consultation is undertaken regularly with affected people in all project locations in accordance with IEE (Public Consultations during Implementation)
- ▶ Ensure Grievance Redress Mechanism (GRM) is implemented and functioning throughout project implementation.

Qualifications

- ▶ Bachelor's degree in environmental science, environment management and engineering or equivalent academic qualification
- ▶ At least 5 years' experience of environmental safeguards on similar projects.
- ▶ Knowledge and experience in the application of the ADB Safeguards policy would be an advantage.
- ▶ Fluency in English writing and communication skills is an advantage.

Annex 2: 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, school teacher, 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. Where did the noise come from? E.g. traffic, machinery, people, music When did it disturb the person? E.g. all day, at night, intermittently	
During the construction, is the person disturbed by noise from the project? If yes, explain how and when. What type of noise and where did the noise come from? All day, at night, intermittently?	
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. Where did the pollution or dust come from? E.g. traffic, machinery, construction, burning garbage, cooking stoves When was the dust or pollution a problem? E.g. all day, at night, intermittently	
During the project, is the person disturbed by dust or pollution? If yes, explain how and when. What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc When did it disturb the person? E.g. all day, at night, intermittently	
3. VEGETATION AND LAND USE	Record of Discussion
Before the project started, what was the vegetation like in the project area?	

E.g. pasture land, trees, shrubs, rice fields.	
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? E.g. no problems, some accidents, difficulty crossing the roads	
During the project, has the person found the community safety situation has changed? If yes, explain how and when. Slower traffic so easier to cross the roads, construction vehicles are making a crossing harder / easier, more accidents / less accidents, construction site dangers	
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. Ground water ? Surface Water ? which Water source ? How was it polluted ?	
During the project, is the person affected by water pollution? If yes, explain how and when. Ground water ? Surface Water ? which Water source ? How is quality being affected ?	
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? E.g. wastewater concerns, waste disposal, Other concerns, labour force,	

Annex 3: 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 4: Particular Conditions (For Bidding Documents)

1. The following clauses shall be added to the Bidding Document, Section 8 Particular Conditions in relation to the Environmental Safeguards for the Project:
2. 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).
3. 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.
4. 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.
5. 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 5: Environmental Quality Standards

(1) Ambient Air Quality Standards

Source: Sub-decree No. 42 ANRK.BK on Air Pollution Control and Noise Disturbance, MoE 2000.

Parameter	Averaging Period	Standard	
		Unit	Value
Nitrogen Dioxide (NO ₂)	24 hours	mg /m ³	0.1
Sulfur Dioxide (SO ₂)	24 hours	mg /m ³	0.3
Carbon Monoxide (CO)	24 hours	mg /m ³	20
PM 2.5	24 hours		-
PM 10	24 hours		-

(2) Ambient Noise Standards

Source: Sub-decree No. 42 ANRK.BK on Air Pollution Control and Noise Disturbance, MoE , 2000.

Areas	Time Period (24 hours)	Standard	
		Unit	Standard Value
Area is not identified	Day time (from 6:00am to 6:00pm)	Noise Level dB(A)	70.0
	Evening Time (from 6:00pm to 11:00pm)	Noise Level dB(A)	65.0
	Night time (from 11:00pm to 6:00am)	Noise Level dB(A)	50.0

(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 standards applicable to the Subproject are those for discharging to 'public water area and 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	BOD ₅ (5 days at 200 °C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 60	< 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 (NO ₃)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO ₄)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO ₄)	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
28	Mercury (H)	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. 27 ANRK.BK on Water Pollution Control, MOE, 1999.

a) River

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
BOD ₅	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
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
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

(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 6 COVID-19 Protection and Mitigation Measures

1 Construction Site Working Conditions Mitigation Measures for COVID-19	
1. Form a joint team to plan and organize return to work	• Develop or convene a joint occupational safety and health committee with members representing the employer and workers. • Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures. • Develop and communicate a work plan on safe working for COVID-19. Such plan should be fully aligned with any government regulations and guidelines on COVID-19 prevention and control, or in the absence thereof, with international good practice guidelines as may be updated from time to time.
2. Risk assessment to decide when to work, who works and how	• Undertake a risk assessment to determine the preventive and control measures. • Ensure preventative measures are in place before resuming or beginning construction work.
3. Adopt engineering, organizational and administrative measures	• Avoid physical interaction and maintain physical distancing requirements as prescribed by national policy, or in the absence thereof, international good practice. • Ventilate enclosed workplaces including work camps and communal spaces. • Avoid concentration of workers - limit the capacity of common areas such as work camp dining rooms and changing rooms to allow the minimum separation of 2 m and organize one-way systems. This includes sleeping areas which must be a minimum of 2 m between beds. • Put in place training and information on COVID-19 and measures required for its management. • The construction site is to be segregated to the extent possible in zones or other methods to keep different crews physically separated at all time. • Stagger break and lunch schedules to minimize the number of people in
4. Regularly clean and disinfect	• Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps. • All door handles, railings, ladders, switches, controls, eating surfaces, shared tools and equipment, taps, toilets, and personal areas are wiped down at least twice a day with a disinfectant. • Discourage the sharing of items such as cups, glasses, plates, tools.
5. Promote personal hygiene	• Provide workers with the conditions and means necessary for frequent hand washing (soap, water or alcohol gel) with a posted hand washing protocol at site entries, exits, bathrooms, communal areas, offices, and any other areas with commonly touched surfaces. • Inform workers of the need to avoid physical contact when greeting, and avoid touching eyes, nose and mouth. • Inform workers of the need to cover the mouth and nose with a disposable handkerchief when coughing or sneezing or the crook of their arm. • Dispose of tissues in a lined and covered waste bin and wash hands

6. Provide PPE and inform workers of its correct use	• Identify appropriate PPE related to the tasks and health and safety risks faced by workers according to the results of risk assessment and the level of risk, and provide it to workers free of charge and in sufficient number, along with instructions, procedures, training and supervision. • Non-medical face-coverings (such as homemade cloth masks) should be worn as mitigation for catching and transmitting the virus, but are not to be treated as substitutes for proper handwashing.
7. Health surveillance and insurance	• Before entering the site, staff and visitors must confirm that they are not currently exhibiting flu-like symptoms. • Monitor the health status of workers, develop protocols for cases of suspected and confirmed COVID-19. The protocol will state that: • Workers with symptoms or confirmed cases must be isolated within the construction camp or stay at home for 7 days after symptoms started. • If symptoms persist after 7 days the person must isolate until the symptoms stop. • People who have been in close contact with the person with confirmed COVID-19 be quarantined for 14 days. • All workers in quarantine or isolation must be provided with adequate food, water, medical assistance and sanitation. • Identify workers who have had close contact with people infected with COVID-19 and follow national medical guidance. • Communicate confirmed cases of COVID-19 infection to the appropriate authorities. • All workers should be provided with health insurance that includes COVID-19 treatment
8. Consider other hazards, including psychosocial	• Promote a safe and healthy working environment free from violence and harassment. • Encourage health promotion and wellbeing in the workplace through enough rest, balance of physical and mental activity and adequate work-life balance. • Implement prevention and control measures for the use and storage of
9. Review emergency preparedness plans	• Develop an emergency plan adapted to COVID-19 and regularly review it.
10. Review and update preventive and control measures as the situation evolves	• Periodically monitor prevention and control measures to determine whether they have been adequate to avoid or minimize risk, and identify and implement corrective actions for continuous improvement. • Establish and maintain records related to work-related injuries, illnesses and incidents, worker exposures, monitoring of the work environment and workers' health.
Source: Adapted from: ILO, WHO, Canada Construction Association, and UK Government.	

2 Worker Camp Siting and Management Mitigation Measures for H&S and COVID-19	
1. Siting	• Not in area liable to flooding, landslide or other natural disaster • Not in area affected by construction dust, noise, sewage or other pollution • Not in a residential area.
2. Minimum housing standards	• A separate bed for each worker • Beds should not be arranged in tiers of more than two; • Separate accommodation of the sexes or to accommodate couples • Adequate natural light during the daytime and adequate artificial light • Adequate ventilation to ensure sufficient movement of air • Adequate supply of safe potable water • Adequate sanitary facilities (see below); • Adequate drainage • Adequate furniture for each worker to secure his or her belongings, such as a locker. • Common dining rooms, canteens or mess rooms, located away from the sleeping areas • Appropriately situated and furnished laundry facilities • Reasonable access to plug sockets for charging telephones and other devices • Rest and recreation rooms and health facilities, where not available in the community.
3. Minimum accommodation sizes	• Sleeping space • Inside dimensions over 198 cm by 80 cm; sleeping room: • headroom of over 203 cm allowing full free movement • Beds minimum 2 m apart for COVID-19 risk management
4. Sanitation Facilities	• One toilet, one tap / basin, one toilet for every 6 people • Convenient location to accommodation • Provision of soap • Separate facilities for men and women • Ventilation to open air • Fresh cold running water • Clean and hygienic • Septic tank / sewage treatment facility, or pit latrines located at least • 200 m from surface waters, and in areas of suitable soil profiles and above the groundwater levels
5. H&S within worker accommodation	• Separate area for sick workers to prevent transmission of disease • Smoke detector in sleeping area • Fire safety throughout accommodation such as fire extinguishers, fire alarms, fire blankets • Worker training in fire prevention and procedures • Fire exit sign, adequate means of escape and clearly maintained exit • Security lighting within camp and for sanitation block and lighting for route from sleeping area to sanitation block. • Electrical cables to be in safe condition, elevated and not in areas liable to flood
6. Inspection	• 2 weekly inspect to inspect for cleanliness, state of repair of building, accommodation and fire equipment. • Record inspection results and retain for review
Source: Adapted from ILO Workers' Housing Factsheet No. 6.	

Annex 7: Second Tonle Sap Urban Environmental Management Project (TS-2)

Activity Report

Component	Environmental consideration/information, (IEE Report)	
Type of Activity	Site Public Consultation Meeting	
Sub-project/s	WWTP Sub-project, Battambang Town, Bttambang Province, TS-2	
Start date	25-10-2019	
End date	28-10-019	
Planned Activities	Consultation meeting with: - Local communities in sub-project area - Village and commune leaders/councils - Relevant departments, town, and local authorities in BTB Province.	
Activities Carried Out	The consultation is a part of IEE report and prepared by SBK firm and collaborated with DDIS consultant.	
	Present the project location, activities, and receive the issues, feedbacks, and comments, that concerning to environment.	
Appendix 1: Persons met		
Appendix 2: Pictures		

Notes of Consultation Meetings

During project detailed design the SBK local consultant conducted IEIA report submitted to MoE for review, comment and approve. In this period the SBK collaborated with national environmental specialist of PMC and PIU conducted public consultation meetings with local authorities. There are 03 consultation meetings have been conducted for WWTP sub-project in Battambang Town, Battambang province. The key issues, questions, and comment from consultation meetings on WWTP are briefed below:

1. Consultation Meeting with Rottanak Commune (25-10-2019)

The consultation meeting with village and commune authorities. The meeting conducted at 2:00pm on 25 October 2019 in Rottanak Commune Office.

- In our commune area is located in urban area of Battambang town, during raining season in heavy rain some road and some village areas are flood by run off. I think this project of good for management the wastewater and storm water in Battambang town as well as for Rottanak commune.
- In our area some culverts are damages and some areas are not culvert connection and some don't have sewage connection system.
- The sewage or culvert should be connected to all areas or villages in the Rottanak commune. Because we have the same problem of wastewater.
- Now TS1 is under construction of culvert/sewage for combining system of rainy water and waste water. How for TS2 separate culvert or combine culvert?
- Where is location of culverts, if close to road side is less/small impacts on social properties/structures, if the culvert will install on the ROW is more impacts.
- If impacts to our structures or any properties, how the will compensation?
- There are many households are generating the business activities (selling shops, restaurants or any economic activities) on the ROW, in their houses. So construction will be impacted to local businesses.
- The project should be considered the impacts of project on properties and structures are along the roadway, during construction.
- In our commune area will be impacted only during project construction. Project should consider on: (i) Dust protection or mitigation, (ii) Safety control in construction site, provide safety signs, safety zone, and traffic signs (iii) Speed up excavation and fill up soil before move to another sites. (iv) Open access to business places for generation business activities.
- How and when the connection the waste water from house to project culvert? The project allows for this connection?
- During WWTP operation, is not more affected to our people in Rottanak commune because this commune area is in the town. The impact is in downstream area and if waste water flows into WWTP is not problem.
- We are happy and supporting to this project, because is important for Protection environment in our town.

2. Consultation Meeting with Prek Preah Sdach and Anlong Vel Commune authorities (26-10-2019)

The consultation meeting with villages and commune authorities of Prek Preah Sdach and Anlong Vel communes is conducted at 8:00pm on 26 October 2019 in Prek Preah Sdach Commune Office.

- We have problem of waste water in our commune. Can we connect waste water from houses to project culverts and how to connect?.
- The project will support for the connection of sewage pipes to households?
- In our commune areas, there are some existing culverts, if TS2 project location affected to existing culverts, how will do?

- There are some trees, shops, and structures are located in ROW and on the road shoulders, when excavate for culverts will be impacted to those properties. How the project will compensate?
- TS1, ADB project is just finished, we are affected from construction activities for installation the drainage culverts and now TS2 will construct soon, we be affect again. Please consider and provide the good mitigation measures for reduce the negative impacts during construction period.
- There are some business shops, restaurants, and other selling places are located on the ROW will be impacted (loss income) from project construction activities. The project will be compensate?.
- For mitigation the impacts on business or income, the project should: (i) Provide water on construction site for reduce dust. (ii) Speed up the construction works and speed up the soil filling in excavation site after install culverts before move to other sites. Open access road to shops or business places for generating businesses.
- We are happy with this project for management our waste water in BTB Town. The commune authorities will collaborate and negotiate with affected people for project, if there are any impacts.

3. Consultation Meeting with Provincial-Town Authorities and Relevant Provincial Departments in BTB (28-10-2019)

The consultation meeting with Provincial authority, BTB Town, and relevant department in Battambang Province. The meeting is conducted at 8:00pm on 28 October 2019 in meeting room of Provincial Department of Environment (PDoE). This meeting is leaded by HE. **Yim Seap** Vice Governor of BTB Province.

- We don't have WWTP is BTB town (the old is not operated). Is good project for our town environment.
 - Should discuss or consult with farmers are cultivate around the WWTP site.
 - The main canal or culvert from town to WWTP are open canal? Should closed or culvert is good.
 - Should be planted trees along the main canal and culvert from town to WWTP
 - There are more impact to properties and structures along the roadside during project construction. So compensation policy should be considered before construction
 - When to connect waste water from households?. Project will pay?. Should discuss with local authorities and households.
 - How many km the odor from WWTP will affect to community?
 - Consultant should study the Labour Law and use labour should be complied with the law (over time, safety works, and sanitation)
 - The project should try to use local workers or staffs, especially affected people.
 - If project will affect to water supply pipe. Project will compensate for removing pipes?
 - Should study the culvert locations, where are minor impacts to properties and structures. And location for connect from households to project culverts
 - During construction should be considered on Traffic safety, air quality (dust), and public safety.
 - The project owner shall be collaborated with concerning agencies, if impacts on utilities (water supply, Telecommunication cable, electric line ect.
- During project operation should be provide the proper management for water quality, air quality (odor) and local public safety.
- More mitigation should be put in EMP and monitoring. The project owner will conduct environmental social monitoring follow to EMP is approve by MoE.
 - The project schedule, location, and activities should be informed to local authorities and line departments for support and coordinate of any issues or affects before construction starts

Appendix 1: Participants of consultation meetings

1. Meeting with Rottanak, Prek Preah Sdach, and Anlong Vel commune authorities (25-26 October 2019)

 អង្គប្រឹក្សាព្រះបរមរាជវាំង ផ្ទះលេខ៣ ផ្លូវលេខ៣១៧ ភូមិបឹងកក់ សង្កាត់បឹងកក់ ខណ្ឌទួលគោក រាជធានីភ្នំពេញ ទូរស័ព្ទ: (៨៥៥-២៣) ៣៣ ៨៨៨៨ និង (៨៥៥-២៣) ៩៩៩ ០៦៩ អ៊ីម៉ែល: khnhelbora@gmail.com							
បញ្ជីចំណុចសម្រាប់ការពិគ្រោះយោបល់ និងផ្សព្វផ្សាយពីគំរោងទាក់ទងនឹងអនុគមន៍ គ្រប់គ្រងទឹកកខ្វក់ក្នុងតំបន់							
ស្ថិតនៅសង្កាត់គោរ: និងសង្កាត់ព្រៃក្រ:ស្តុប ក្រុងបាត់ដំបង ខេត្តបាត់ដំបង របស់ក្រសួងសាធារណការ និងដឹកជញ្ជូន							
ល.រ	ឈ្មោះ	ភេទ	ស្ថាប័ន	ឋានៈ/តួនាទី	កាលបរិច្ឆេទ	លេខទូរស័ព្ទ	ហត្ថលេខា
1	គ. គង្គា	ប	ក្រុមប្រឹក្សាសង្កាត់	ប្រធាន		092915799	S. Khan
2	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		092-738891	
3	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		017340509	
4	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		0977939440	
5	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		01291211	
6	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		08651513	
7	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		07259882	
8	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		012386377	
9	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		012945546	
10	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		092766727	
11	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក		092666053	
12	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	25.10.19	092330181	
13	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	25.10.19	012552969	
14	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	25.10.19	012630880	
15	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	25.10.19	012621707	
16	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	092393376	
17	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	011310120	
18	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	012459321	
19	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	092790447	
20	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.2019	092752096	
21	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	07771150	
22	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	012908269	
23	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	0922281963	
24	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	061969040	
25	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	092273783	
26	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.2019	077936063	
27	គ. ឈ	ប	សមាជិកសង្កាត់	សមាជិក	26.10.19	012482610	

2. Meeting with provincial and town authorities and relevant departments (28 October 2019)

បញ្ជីរាយនាមអង្គភាព						
ស្តីពីការចូលរួមប្រជុំ ពិភាក្សាស្តារបង្កើនការងារសាងសង់ប្រព័ន្ធបង្គោលស្រោចស្រូវ និងការសាងសង់ប្រព័ន្ធបង្គោលស្រោចស្រូវ... ក្នុងតំបន់ស្រះស្រោចស្រូវ... ក្នុងតំបន់ស្រះស្រោចស្រូវ...						
នៅមជ្ឈមណ្ឌលខេត្តបាត់ដំបង ចន្លោះថ្ងៃទី ២៨ ខែ តុលា ឆ្នាំ ២០១៩						
ល.រ	នាមក្រុមប្រឹក្សា-នាមខ្លួន	ភេទ	តួនាទី-នាមកិត្តិយស	អង្គភាព	លេខទូរស័ព្ទ	ហត្ថលេខា
1	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១១ ៨៨៨៣៧	
2	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៨១៨០១	
3	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១៥ ៩៩៩៩៩	
4	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ២២២២	
5	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១៧ ៦៦៦៦	
6	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
7	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៣៣៣៣	
8	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១៥ ៨៨៨៨	
9	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ២២២២	
10	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១៥ ៨៨៨៨	
11	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ២២២២	
12	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
13	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
14	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
15	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
16	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
17	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
18	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
19	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
20	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
21	លីម កុសុម	ប	អគ្គនាយក	ក្រសួងសេដ្ឋកិច្ច	០១២ ៧៧៧៧	
22						
23						

Appendix 2: Pictures of Consultation Meetings



Consultation with village and commune leaders in Rottanak Commune, Battambang Town on 25 October 2019



Consultation with village and commune leaders in Prek Preah Sdach and Anlong Vel Commune on 26 October 2019



Consultation with provincial authorities and relevant departments in Battambang Province

