

Environmental Management Plan

February 2022

Cambodia: Second Greater Mekong Subregion Corridor Towns Development Project

CW01: Kampot Wastewater Collection and Treatment, and Drainage and Sewerage

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected people
CEMP	-	Contractor Environmental Management Plan
C-EHS	-	Contractor Environmental, Health and Safety Officer
EA	-	Executing Agency
EMP	-	Environment Management Plan
ESO	-	Environment Safeguards Officer
ESC	-	Environment Safeguards Counterpart
EMR	-	Environmental Monitoring Report
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redress Mechanism
GPS	-	Global Positioning System
HH	-	Household
IEE	-	Initial Environment Examination
I/NES	-	International and National Environmental Specialists
PISCB	-	Project Implementation Support and Capacity Building Consultants
PDoE	-	Provincial Department of Environment
PIU	-	Project Implementation Unit
PMU	-	Project Management Unit
PSC	-	Project Steering Committee
PCR	-	Project Completion Report
MPS	-	Main Pump Station
MOE	-	Ministry of Environment
MPWT	-	Ministry of Public Works and Transport
NR	-	National Road
PSC	-	Project Steering Committee
PDPWT	-	Provincial Department of Public Work and Transportation
SPS	-	ADB's safeguard policy statement (2009)
WWTP	-	Wastewater Treatment Plant

WEIGHTS AND MEASURES

km	-	kilometer
kg	-	kilogram
mm	-	millimeter
mg	-	milligram
m ³	-	Cubic meter
ha	-	hectare
L	-	liter

NOTE

In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1.1 Purpose

1. This environmental management plan (EMP) is prepared for construction of a wastewater collection network, a wastewater treatment plant (WWTP) and drainage, subproject in Kampot city, Kampot province of the Second Greater Mekong Sub-region Corridor Towns Development Project (the project) in Cambodia. The EMP defines 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. This EMP version (February 2022) supersedes the latest disclosed version (disclosed November 2020) already provided to the contractor. This version includes updates for a major scope change and Variation Orders. The major scope change is implemented through Variation Orders CW01/V03/VO4; this EMP update is based on the Detailed Design for CW01/V03/VO4.
3. Changes reflected in previous versions of this EMP include:
 - New WWTP location
 - Variation Order (VO1) for the CW01 works contract Kampot wastewater collection, treatment, drainage and sewerage, and project scope change for reallocation of unspent funds from the cancelled Sihanoukville subproject to the Kampot subproject.
 - Variation Order (VO3) for the CW01 works contract which is primarily for renovation of open canal 4b including installation of concrete lining and canal roads on the banks.
4. Changes reflected in this updated EMP (February 2022) include:
 - Variation Order (VO4) primarily for improvement of drainage for flood mitigation, open canal 4b and sewage interception improvements, a balancing pond at the main pumping station and primary treatment improvements.
5. Updated versions of the IEE and EMP will be provided to the contractor. If required the construction EMP (CEMP) will be updated to reflect the changes.
6. An IEE for this subproject is a separate document. The other subprojects under the Project have a separate EMP and a separate IEE.

1.2 Budget

7. The costs for EMP implementation comprise:
 - Training and Capacity Building : \$10,000 (See Table 4)
 - Environmental Quality Monitoring:
 - Pre-Construction \$7,250 (Costs are included in domestic Initial Environmental Impact Assessment (IEIA))
 - During Construction per year \$21,700 (see Table 8)
8. CW01/VO4 increased the contract length for the subproject by 20 months (until 31 May 2023). The project will require the contractor to continue the schedule of environmental quality monitoring until the construction is complete. The costs will reduce as towards the end of the contract, more construction areas are complete meaning monitoring locations are no longer required; therefore CW01/VO4 will **require an additional environmental quality monitoring cost of \$21,700** as per table 8.
9. Other aspects of the EMP including mitigation measures, reporting, affected people consultation and EMP monitoring are included in other budgets depending on the organization

responsible for the aspect e.g. Project Management Unit (PMU) operational budget or included in contractor's bid price.

1.3 Outline of Technical Approach

1.3.1 Drainage

10. The drainage subproject will comprise:

- Reinforced concrete U-drain with concrete cover
- Rehabilitation of earth channel
- Laterite pavement on the crest of embankments
- Grass sodding on the side slopes
- Construction of terminal structure
- Drain Inlet pipe culvert
- Drainage manholes
- Outfall Structures
- Catch basin pits
- Renovation of open canal line 4b including DBST road construction on each embankment and installation of pre-formed concrete lining sections.

11. The drainage construction will include the alignments as follows:.

- U-Drain Line 2 (From NR#3 to Prek Kampot) to Collection
- U-Drain Line 3 (From NR#3 to Prek Kampot)
- U-Drain Line 4a1 (From NR#3 to Prek Kampot)
- U-Drain Line 7a and Line 5 (From Traffic Roundabout D, Education Garden to Prek Kampot)
- U-Drain Line 6 (Connect to Line 2, Line 3, Line 4a1 & Line 5)
- Renovation of Open Canal Line 4b (From Boeung Chak to Kampot River)¹

1.3.2 Sewage Collection and Wastewater Treatment Plant

12. The WWTP subproject will comprise:

WWTP Works:

- Anaerobic: A pond (normally at least 3-5m deep) where sewage is digested anaerobically
- Facultative: A pond (normally 1.5-2.5m deep) where both anaerobic and aerobic digestion of sewage takes place
- Maturation: A pond (normally 0.9-1.5m deep) primarily responsible for pathogen removal by various ways mechanisms, including UV disinfection and daily high pH levels.
- Sludge Drying Beds: Sludge generation rate: 0.04 m³/person/year, sludge application thickness: 200 to 400 mm and sludge drying time: 4 to 6 weeks, depending on prevailing weather conditions.

Ancillary works including:

- Water tanks for freshwater supply (to be tankered in)
- Fencing around the entire site
- Septage receiving chamber
- Internal roads
- Operations house

¹ DRP for Line 4b was approved by ADB in September 2019.

- Storm drainage channels
- Lighting monitoring (CCTV camera) works

13. The sewage collection system subproject will comprise the following investments, where C1, C2 and C3 refer to collections areas within the town as allocated by the project:

Pumping stations

- C1 lift Pump Station
- Main Pump Station (MPS)
- Power supply to be supplied by EDC, transformer to be supplied by the Project
- Generator for backup power

Force main

- Force main 250 from C1
- Force main 200 from C3
- Force main 400 from MPS

Main sewer

- C1 area
- C2 area
- C3 area

14. Additions to the ongoing works under VO1:

- Cleaning of the existing 32 km of drainage lines in the town center on the east bank of the river, including repair of approximately 500 manhole covers and replacement of approximately 90 manhole covers and pits
- Soil improvement at the WWTP site
- Pavement reinstatement and improvement of the roads under which the force main line from the MPS to the WWTP is installed
- Removal of Garbage from the open canal line 4b and cleaning of box culvert in the canal crossing with National Road 33 Demolition of foundations of houses relocated from the canal bank, under the resettlement plan.

15. Additional works under the scope change:

- Modification of the new drainage line parallel to the river to intercept the flows from both the new and existing drainage lines that drain towards the river and extend the line with 1.4 km to connect with the outfall of the open drainage canal 4b
- New 1.3 km main drainage collector line and 780 m of secondary collector lines
- Construction of C3 pumping station
- Open canal bank stabilization and vegetation control
- Pump gate structure construction at the outfall of the open drainage canal
- Connection of new and existing drainage system to the pumping station at the outfall of the open canal
- Soil filling at MPS and access road
- Sedimentation and pre-treatment facility construction at the MPS
- Balancing reservoir construction at MPS
- Installation of the main sewer lines in the sectors C2 and C3 in addition to the installation of main sewer lines in the sector C1 under the original project scope
- Survey relating to household connections for implementation under the forthcoming Liveable Cities Investment Project²

² ADB project 53199-001 currently under preparation. The project will focus on enhancing urban planning, building community resilience, and providing infrastructure that will facilitate long-term sustainable and economic growth.

16. Additions to the ongoing works under VO3:

- Removal of unsuitable material from the canal bed between station 0+785 and station 2+225 and installing a foundation layer for reinforced concrete canal lining that will consist of a layer of composite geotextile overlaid with a sand layer with a thickness of minimum 50 cm;
- Manufacture, transport and installation of rectangular reinforced concrete canal segments;
- Construction of canal roads on both canal banks, DBST pavement, 3m wide either side between station 0+785 and station 2+225;
- Installation of a capping beam on the rectangular canal segments with a protective railing on both canal banks.

17. Additions to the ongoing works under VO4:

- Construction of a primary treatment facility and interception of sewage flow from the drainage area 2 at the MPS;
- Construction of a balancing reservoir at the MPS and renovation of the section of the open canal;
- Interception of the sewage flow from the existing and new drainage lines in drainage area 1;
- Drainage area 1 and 2 U-drain line and box culvert improvements and amendments;
- Collection of drainage/sewage flow improvements including:
 - A new trunk line
 - Pavement upgrade from DBST to concrete on the riverside road
 - A gate pump pumping station
- Construction of flow dividers/sewage flow interceptors at the C1 and C2 pumping stations for the drainage area 1 and at the MPS for the drainage area.

II. SUMMARY OF POTENTIAL RECEPTORS & IMPACTS

18. 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

19. In addition to these site-specific receptors, housing, businesses and access requirements are also considered impact receptors.

Table 1 Key Functions for Project Implementation

Receptors	Description	GPS Co-Ordinate or Alignment (Line = L)
Surface Water Receptors	Prek Kampong Bay – drainage outfall receptors	Outfall 1 Street 174 10°36'45.72"N, 104°10'33.94"E Outfall 2 Street 720- 10°36'35.73"N, 104°10'39.63"E Outfall 3, Street 724 (Kampot Fish Market) 10°36'27.05"N, 104°10'43.62"E Outfall Street 739 - 10°36'19.84"N, 104°10'46.65"E Outfall Open Channel 10°35'44.64"N 104°11'14.09"E
	Prek Kbal Romeas-Adjacent to WWTP	10°38'24.36"N, 104°13'6.19"E
	Open canal sedimentation	Open canal line 4b
	Ephemerally wet low land area	MPS Balancing Pond
Socio-Economic	Densely populated residential & commercial areas	All
	Kampot Market (L2.2)	10°36'55.93"N, 104°10'50.23"E
	Kampot Night Market (L3.1, 3.2)	10°36'40.91"N, 104°10'52.78"E
	Kampot Fish Market (force main and drainage L6-3)	10°36'27.05"N, 104°10'43.62"E
	Power supplies - cables and electricity poles in residential areas and commercial areas	All
	Resort	10°38'32.72"N, 104°12'50.12"E
Cultural Receptors	Mosque	10°35'49.41"N, 104°11'18.48"E
	Wat Kampong Bay (Pagoda)	10°36'46.78"N, 104°11'4.65"E
	Wat Prey Tom (Pagoda)	10°38'9.50"N, 104°11'43.60"E
	Pres Mae Pagoda	10°36'49.11"N, 104°10'34.55"E
School/Hospital Receptors	Primary School Keat Minh	10°36'21.78"N, 104°11'4.36"E
	Chinese school	10°36'48.09"N, 104°10'34.93"E
	Krang Apil Health Center	10°36'41.95"N, 104°10'38.47"E
	Kampot Referral Hospital	10°36'37.43"N, 104°10'40.68"E
	Bokor clinic and Maternity	10°36'51.13"N, 104°10'42.16"E

20. A summary of 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, and earth works. Odor will be an impact during WWTP operation.
- **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 and breaking and reconstruction road surfaces during excavation.
- **Surface Water.** There are two rivers in the project site. Short term construction impacts may be seen in terms of increasing turbidity from construction activities. The Prek Kbal

Romeas river (10°38'24.36"N, 104°13'6.19"E) at the WWTP site and Prek Kampong Bay (10°36'35.04"N, 104°10'37.53"E) in Kampot town. Dewatering and clearing open canal line 4b will increase turbidity temporarily. Effluent discharge into Prek Kbal Romeas River may impact on water quality if effluent standards are not met. During operation, drainage outfalls will discharge water which will typically contain small quantities of micro-plastics from car tyre wear and hydrocarbons.

- **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 e.g. cleared vegetation, and hazardous wastes e.g. oily wastes. Significant quantities of waste will be generated during the network cleaning including removal of waste from the open drainage canal and during the removal of house foundations from the canal side. During operation, waste from the WWTP will include dried sludge and chemicals packaging.
- **Community and Occupational Health and Safety.** Construction sites and access roads will necessarily mean health and safety risks not only to construction workers, but also to people living and working around the WWTP and alignments. 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 neighborhood roads and changes in road priorities for traffic movements. Occupational risks come from a range of activities including the use of heavy machinery, earth moving, and use of chemicals during construction and operation of the WWTP.

21. The layout of drainage is shown in Figure 1. The layout of the wastewater collection and wastewater treatment plan is shown in Figure 2, the works under the scope change are in Figure 3

Figure 1. Layout of the drainage

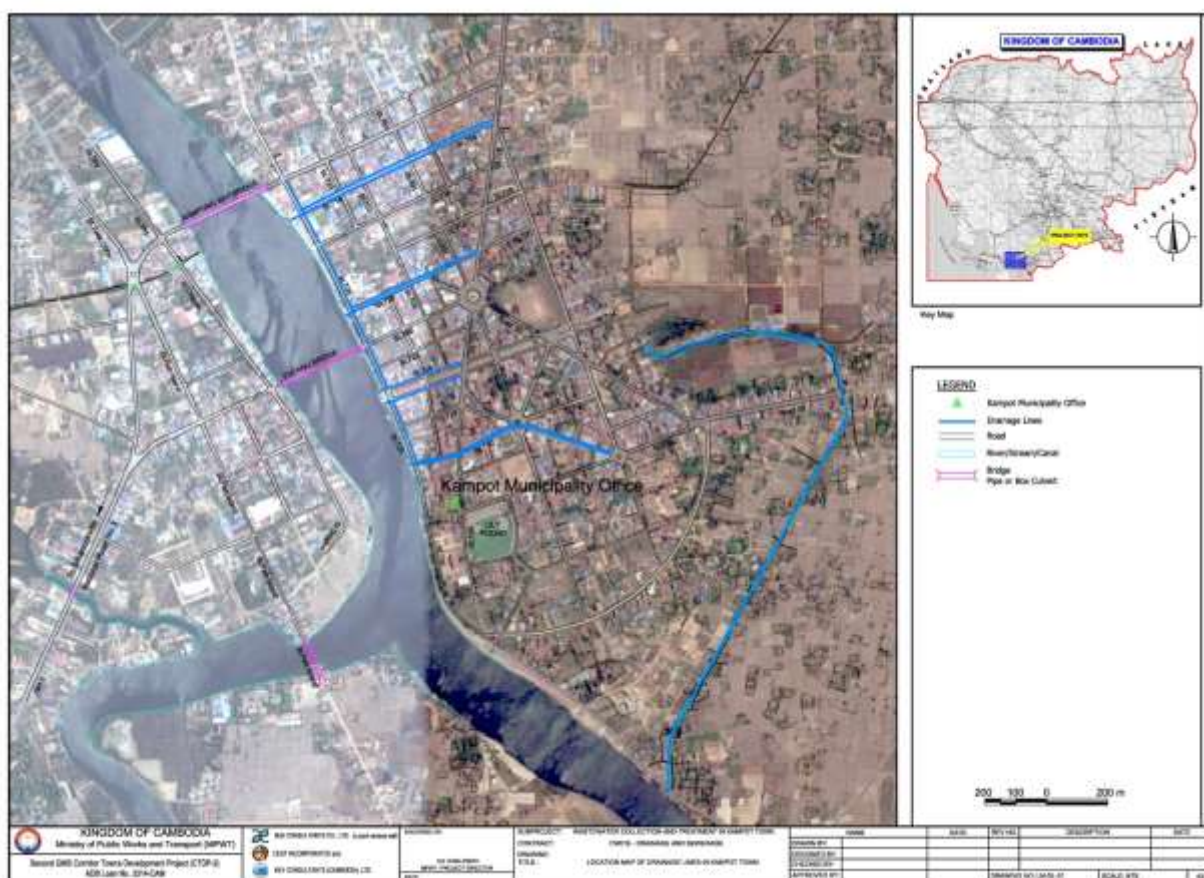


Figure 2: Layout of wastewater collection and wastewater treatment plant

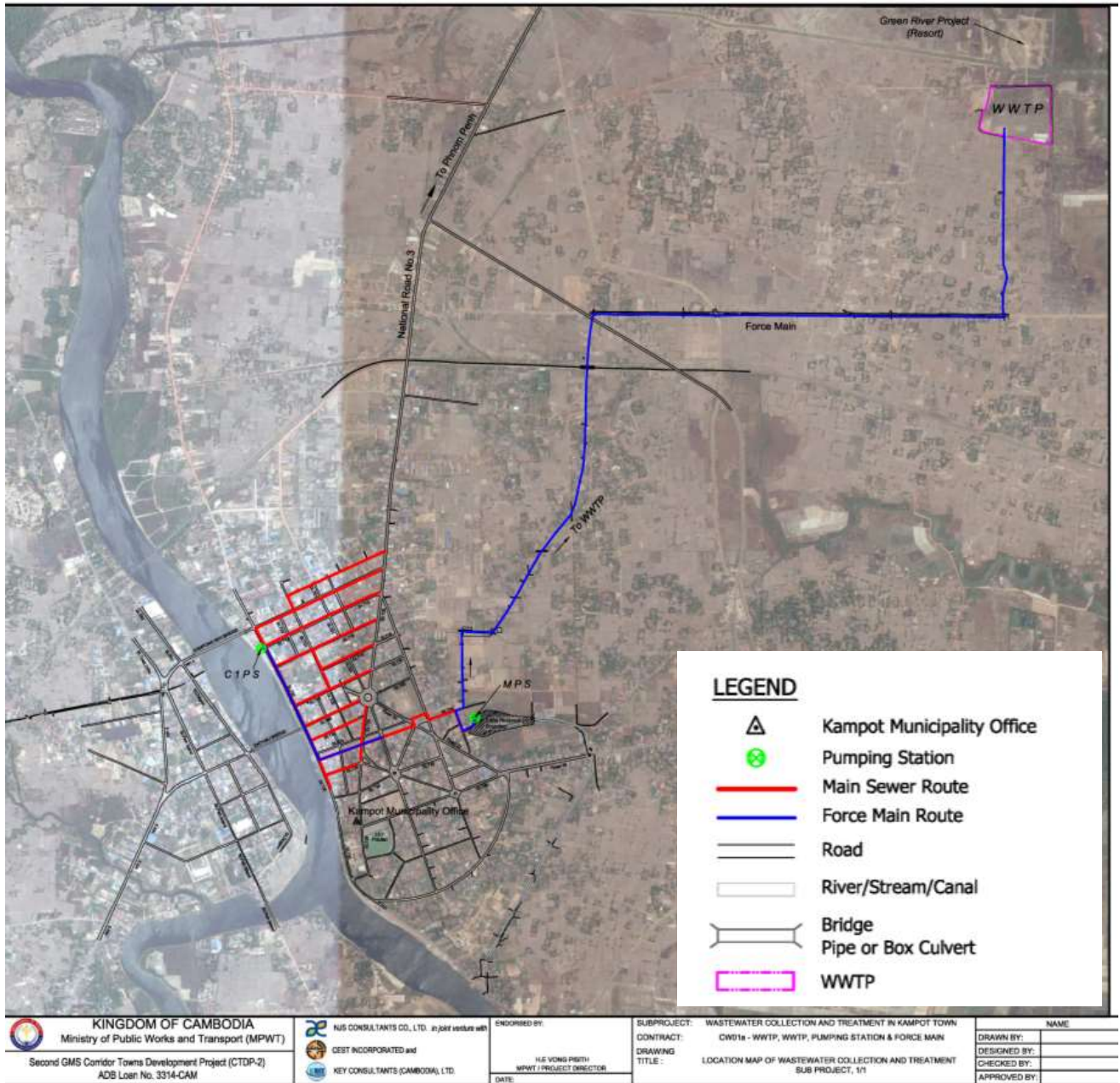
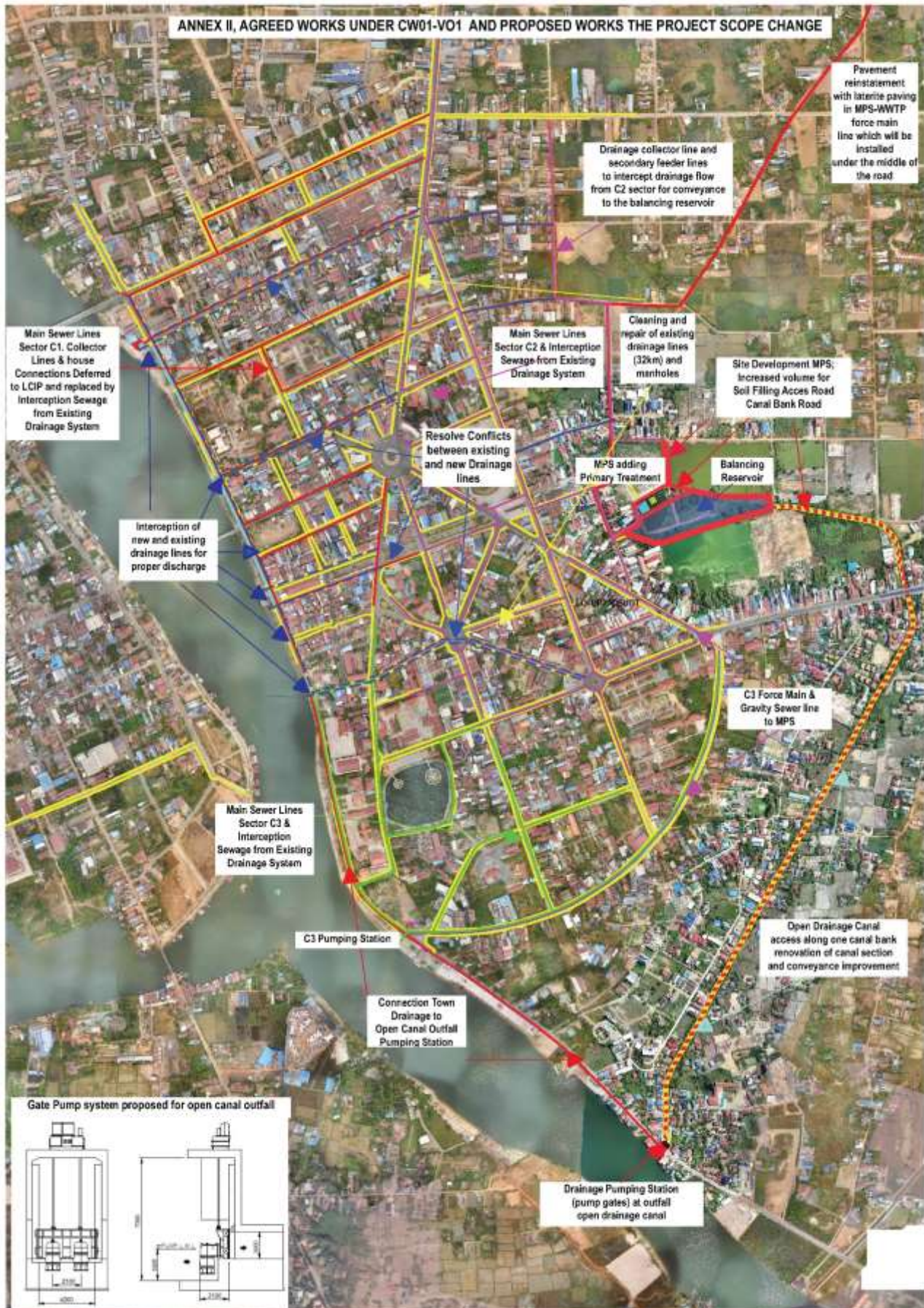
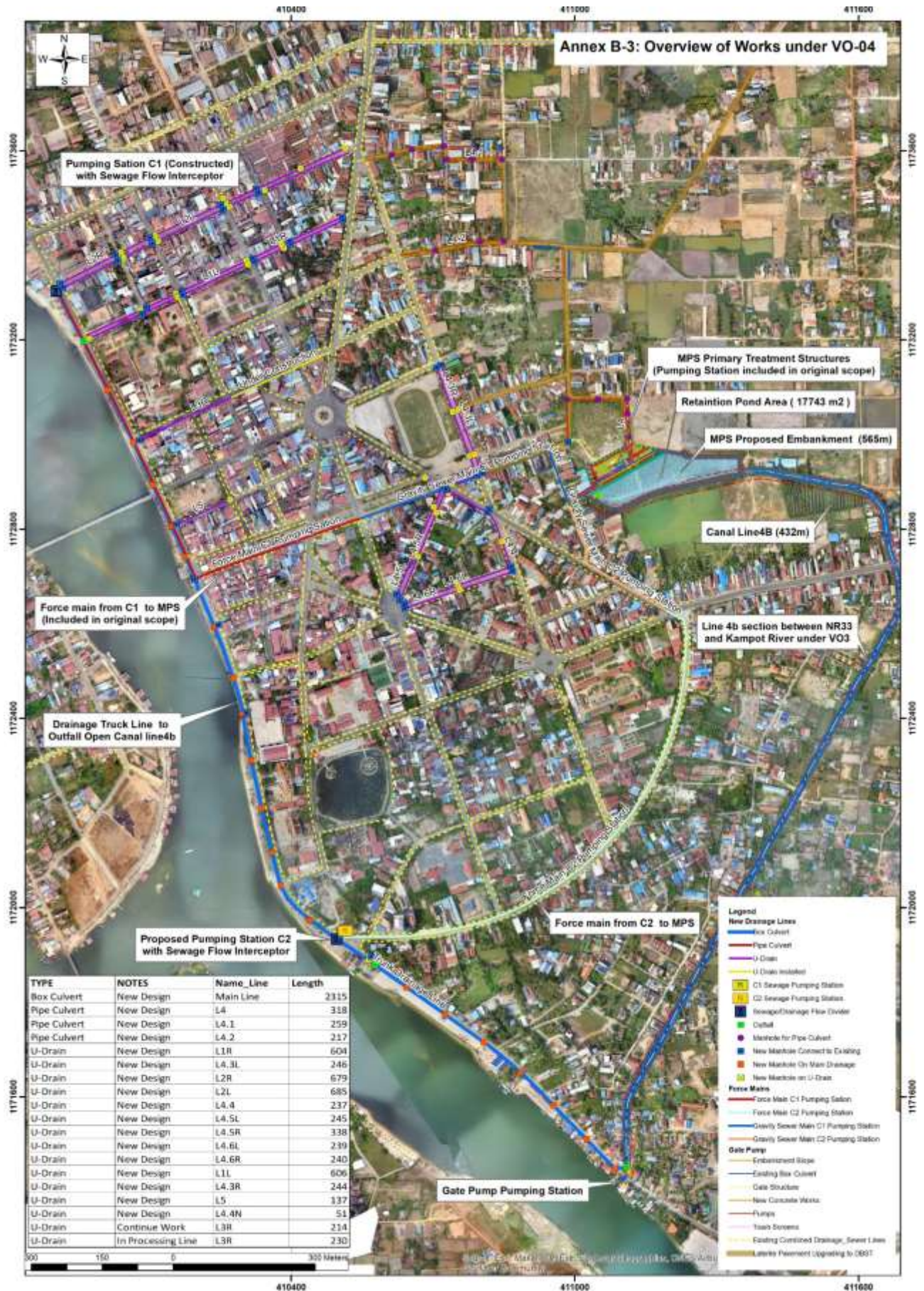


Figure 3: Kampot Scope Change and Variation Order Work Locations





III. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

22. The key institutions, organizations and stakeholders relevant to environmental safeguards are set out below.

23. The overall responsibility for EMP implementation and compliance with loan assurances lies with the Executing Agency, the Ministry of Public Works and Transport. The EA has established 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 subproject city. The PDPWT has established a Project Implementation Unit (PIU) in Kampot, comprising relevant provincial government representatives including the Provincial Department of the Environment.

24. A summary of the key functions for project implementation and environmental safeguards is presented in Table 2 and detail on the responsibilities of each function is in Table 3. To date the PMU has assigned a named Ministry of Public Works and Transport (MPWT) engineer with environmental and social safeguard experience to the role of PMU-ESO and a staff member has been nominated and named for the PIU-ESC role.³

Table 2 Key Functions 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	PMU-ESO	Phnom Penh within PMU	Existing MPWT staff seconded/assigned to the PMU for the environmental management of the Project EMP compliance across the subprojects for environmental safeguards – Full Time
Project Implementation Unit	PIU	Provinces within PDPWT	Responsible for subproject implementation
PIU Environmental Safeguard Counterpart	PIU-ESC	Provinces within PIU	Nominated person responsible for subproject environmental monitoring and support to PMU-ESO
Contractor Environmental, Health and Safety Officer	C-EHS	Construction Site	Mitigation measure implementation and reporting
Project Implementation Support & Capacity Building Consultants	PISCB	Phnom Penh	Project final design and implementation, support and capacity development Engineering supervision for all construction and reporting through engagement of a PISCB Construction Supervision Consultant (PISCB-CSC)
PISCB International and National Environment Specialists	PISCB -I/NES	Phnom Penh within PISCB 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

³ All PMU and PIU staff are named in Prakas No. 149 (21 March 2016) on the Establishment of Project Management Unity for 2nd Corridor Town Development Project under ADB's Loan by MPWT

Table 3: Responsibilities for Environmental Safeguards

Institution	Prior to Construction including Detailed Engineering Design	During Construction	During Operation and Decommissioning
Executing Agency	<ul style="list-style-type: none"> Ministry of Public Works and Transport responsible for ensuring the implementation of the mitigation in the EMP and for ensuring compliance with loan covenants Collaborate with the Ministry of Environment (MoE) for the Subproject's compliance with the Government's environmental safeguard requirements on IEIA and EMP implementation 		
PSC	<ul style="list-style-type: none"> Oversee implementation in conformity with the Project's development objectives and scope Assist in coordination among government agencies involved in Project implementation including MoE Ensure coordinated and efficient Project implementation activities including EMP implementation 		
PDPWT	Collaborate with Provincial Department of Environment (PDoE) & relevant provincial agencies on matters concerning the environmental management of the Subproject.		
PMU / PMU-ESO	<ul style="list-style-type: none"> Update IEE & EMP Coordinate with Design Consultant to ensure the incorporation of updated findings & mitigation measures in design & bidding documents. Ensure EMP is part of the bidding documents, EMP clauses are incorporated in bidding documents, contracts. Ensure MoE approval of IEIA Report has been secured prior to awarding of civil works. Review and clear contractor's Construction EMP (CEMP) against ADB and IEIA requirements Conduct affected people consultation Participate in training provided by PISCB 	<ul style="list-style-type: none"> Conduct inspections and spot checks to monitor the performance of the Contractor in implementing the CEMP/EMP Review & verify (through site visits) Monthly Environmental Progress Reports of Contractor EMP implementation site visits Review environmental quality monitoring results. Prepare the Project's Semi-Annual environmental Monitoring Reports for submission to ADB. Implement the Grievance Redress Mechanism (GRM) for environmental issues Conduct appropriate consultation and monitoring of effect of construction on affected people Participate in training provided by PISCB 	<ul style="list-style-type: none"> Review relevant operator monitoring reports. Prepare the Project's Annual Environmental Monitoring Report (EMR) for submission to ADB, until loan closure or as agreed. Ensure all GRM complaints are closed out to affect person's satisfaction
PIU-ESC	<ul style="list-style-type: none"> Coordinate and collaborate relevant provincial agencies, as necessary Support PMU-ESO Conduct affected people consultation Prepare draft Semi-Annual EMR. Submit to PMU for finalization for Project's EMR. Establish GRM for Environmental Issues Participate in training provided by PISCB 	<ul style="list-style-type: none"> Collate monthly EMRs of Contractor, and submit to the PMU. If a licensed laboratory will be engaged to do independent environmental quality monitoring, oversee & manage the quarterly conduct of the environmental effects monitoring Prepare the draft Semi-Annual EMR and submit to the PMU for finalization and incorporation to the Project's Semi-Annual EMR. Implement the GRM for environmental issues Conduct appropriate consultation and monitoring of effect of construction on affected people Participate in training provided by PISCB 	<ul style="list-style-type: none"> Review relevant operator monitoring reports Support reporting requirements of PMU. Ensure all GRM complaints are closed out to affect person's satisfaction
PISCB-N/IES	<ul style="list-style-type: none"> Provide technical advice/assistance, IEE/EMP update Review bidding documents, review CEMP against the EMP; confirm subproject readiness. Ensure environmental considerations included in Detailed Design 	<ul style="list-style-type: none"> Provide technical advice/assistance, e.g., preparation of Semi-Annual EMR for ADB, review of results of environmental effects monitoring. 	<ul style="list-style-type: none"> 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.

	<ul style="list-style-type: none"> • Environmental related training for PMU, PIU, contractors and other stakeholders • Incorporate mitigation measures in design & bidding documents • Incorporate EMP as part of bidding documents, EMP clauses in bidding documents, contracts • Support PMU/PIU with appropriate consultation 	<ul style="list-style-type: none"> • Environmental related training for PMU, PIU, contractors and other stakeholders • Support PMU/PIU with appropriate consultation • Site visits to check on construction, EMP implementation and affected people, in collaboration with PMU 	
ADB	<ul style="list-style-type: none"> • Review and clear updated IEE/EMP • Review bidding documents, confirm readiness of subproject. 	<ul style="list-style-type: none"> • Review Project EMRs. • Carry out review missions 	
Contractor	<ul style="list-style-type: none"> • Prepare a C-EMP that addresses as minimum the requirements of the EMP. 	<ul style="list-style-type: none"> • Appoint a qualified Environment Health and Safety (C-EHS) staff member to be responsible for EMP implementation and reporting • Implement mitigation measures & conduct internal EMP implementation monitoring. • Conduct environmental quality monitoring as prescribed in SPS-compliant EMP. (If an independent Licensed Laboratory will not be engaged.) • Prepare Monthly EMRs. 	
Operator			<ul style="list-style-type: none"> • Implement mitigation measures & conduct internal EMP implementation monitoring. • Prepare Monthly and Annual EMRs.
Licensed Lab (if used)	<ul style="list-style-type: none"> • Conduct environmental quality monitoring as prescribed in the EMP 		<ul style="list-style-type: none"> • Conduct monitoring as specified by the operator
MoE/PDoE	<ul style="list-style-type: none"> • Review, comment on approve IEIA Report 	<ul style="list-style-type: none"> • Monitor compliance with approved IEIA & EMP. 	<ul style="list-style-type: none"> • Monitor compliance with environmental standards.
Municipality	<ul style="list-style-type: none"> • Facilitate obtaining the necessary inputs from and/or participation/cooperation of, concerned communes and villages through collaboration with their Commune Councils. • Facilitate (& participate in) GRM dissemination and implementation 	<ul style="list-style-type: none"> • Participate in the monitoring of the performance of Contractor in EMP implementation. • Review EMRs & results of environmental effects monitoring • Facilitate & participate in GRM dissemination and implementation. 	
Commune Councils	<ul style="list-style-type: none"> • Facilitate & participate in GRM dissemination and implementation 	<ul style="list-style-type: none"> • Participate in the monitoring of the performance of Contractor in EMP implementation. • Review EMRs & results of environmental effects monitoring. • Facilitate & participate in GRM dissemination and implementation. 	

3.1 Institutional Capacity Review and Needs

25. 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).

26. During the update of this EMP the team checked the capacity and experience at MPWT and found that there are a number of people who have fulfilled the role of 'focal point' for safeguards on project by project basis. The project will co-ordinate with this existing environmental safeguard office (ESO) in MPWT and will include ESO staff in training and reviews.

27. In addition, through understanding existing municipal services and operations in Kampot, 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; (ii) lack of staff and (iii) insufficient budget.

28. 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.

29. The PISCB-I/NES will perform key roles in supporting the PMU-ESO in implementing the EMP and ensuring the pre-construction requirements are in place.

30. Table 4: Capacity building and training requirement

Subject / Content	Participants	Trainer/Organization	When/Frequency	Days / event	# of participants	Cost (\$) USD
EMP development and implementation EMP function Roles and responsibilities, EMP monitoring (Site Visits) Reporting on Environmental Safeguards	PMU, PIU, contractors	PISCB -I/NES	Twice - Once before, and once 6 months after construction starts	2	10	10,000
Consultation with Affected People Consulting during construction, types of consultation, methods	PMU, PIU	PISCB -I/NES	Once before to construction	0.5	6	
Grievance Redress Mechanism – roles, responsibilities and implementation	PMU, PIU, contractors, Commune Councils	PISCB -I/NES	Twice - Once before, and once 6 months after construction starts	1	10	
Environmental protection Pollution control on construction sites (air, noise, wastewater, solid waste)	PMU, PIU, contractors	PISCB -I/NES	Once (during project implementation)	2	10	
Environmental monitoring -Monitoring methods, data collection and processing, reporting systems	PMU, PIU, contractors,	PISCB -I/NES & MoE (environmental analyst)	Once (at beginning of project construction)	2	10	
Drainage System and Wastewater collection and WWTP	Included as part of the annual budget from Waste water unit under provincial department of transportation. The scope of the training is currently under discussion with MPWT and will include Operation and Maintenance of WWTP and an exposure visit to an operational site in Sihanoukville and Siem Reap province.					

IV. MITIGATION PLAN

31. The mitigation measures of the EMP are presented in Table 5. The mitigation plan is organized by the pre-construction; construction; and post construction / operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings

32. **Construction Environmental Management Plan.** The Contractor is expected to develop a Construction Environmental Management Plan (CEMP) based on Table 5 which represents minimum mitigation measure requirements for construction contractors.

33. **CEMP subplans and method statement.** As part of the CEMP, the Contractor will provide: (i) a specific Method Statement for waste removal from the open canal; and (ii) detailed activity specific subplans which set out the contractor's approach to mitigating the highest risks, as identified by the Environmental Impacts section of the IEE. The Contractor will follow the requirements in Appendix 3 of this EMP with regards to the subplans. The subplans required are detailed in the Mitigation Measures for the Contractor below under 'Construction CEMP' as follows.

- Subplan A - Spoil Management ;
- Subplan B - Solid and Liquid Waste Management;
- Subplan C - Occupational Health and Safety and Emergency Response;
- Subplan D - Construction Workers and Camp Management; and
- Subplan E - Community Health and Safety and Urban Access

Table 5: EMP Mitigation Measures

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
PRE-CONSTRUCTION					
Confirmation of required resettlement, relocations, & compensation	No negative environmental impacts	1. 34 Affected households well informed ahead of subproject implementation on a timescale in accordance with the project Resettlement Action Plan.	See resettlement plans	Inter ministerial Resettlement committees	EA/IA
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE at Kampot City	Include in project cost	PMU	PMU
GRM Dissemination	-	3. Provide contractor with GRM contact details to be used for: A. GRM sign boards B. GRM Contact Cards for Affected People	Included in Project cost	PMU	PMU
		4. Erect sign boards at the construction site entrance with: A. Project details B. GRM procedures and contact details 5. Print 'GRM Contact Cards' for all workers to give to complainants and keep cards with all vehicles, machinery and site managers/foremen 6. Affected People Training. 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'	Included in Bid Price	Contractor	PMU
Final Design	Climate Change	7. Final design of storm drainage uses published reports and available data to quantify the anticipated climate change impact on each phenomenon for the design of town drainage flooding. 8. 1.8m high fill for WWTP site to avoid flooding (flash flood and rain flood).	Included in Project cost	PISCB	EA
Final IEE	All	9. The most up to date version of the IEE for the subproject will be provided to the successful contractor on contract signing.	Included in Project cost	PMU	EA
Construction EMP (CEMP)	All	10. The contractor(s) will develop a Construction EMP (CEMP) that includes the mitigation measures set out in this table as a minimum and will include detailed individual management subplans for: A. Spoil Management; B. Solid and Liquid Waste Management; C. Occupational Health and Safety and Emergency Response; D. Construction Workers and Camp Management (if required) and. E. Community Health and Safety and Urban Access. 11. The CEMP will include a map of each construction site, with copies held by the Contractor and PIU, showing as a minimum: a). Access routes, b). Storage areas for waste, c). Storage area for chemicals and fuels, d) concrete and asphalt mixing, e) stockpile storage	Included in Bid price	Contractor (C-EHS)	PMU/ PISCB

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		<p>areas (on & off site), f) first aid kit and equipment used in emergency response, g) location of worker camps (if required).</p> <p>12. The CEMP will include a Method Statement for:</p> <ol style="list-style-type: none"> removal of waste from the open canal to prevent the waste entering the river during clean up. transport and installation of pre-fabricated canal sections and an associated Risk Assessment for this method statement. Coffer dam and dewatering process. 			
Obtain & activate permits and licenses	Compliance obligations	<p>13. Contractors to comply with all statutory requirements set out by Government for use of construction equipment, and operation construction plants.</p> <p>14. Contractor to ensure all required permits including materials extraction permits or permissions for materials extraction from quarry (10°41'12.80"N, 104°12'28.15"E) are in place prior to construction.</p>	Include in bid price	Contractor	PMU
UXO CLEARANCE	-	<p>15. Obtain clearance from the Military confirming that no UXO is present in the project sites including:</p> <ol style="list-style-type: none"> All land to which is used for resettlement purposes (for people/businesses/farmland) All construction sites including 50 m either side of any access roads 	Included in Bill of Quantities	Military	PMU
Construction EMP (CEMP) Approvals	All	16. Approval of CEMP and individual subplans (A to E) including site maps as required by CEMP.	Include in Project cost	PMU/ PISCB	EA
CONSTRUCTION PHASE					
Spoil Management SubPlan A	Contamination and degradation of land, agricultural areas, and surface waters	<p>17. Measures in the subplan related to spoil management will include as a minimum:</p> <ol style="list-style-type: none"> A map of where spoil will be disposed Preference must be given to use of spoil other construction sites, or disposed in spent quarries or borrow pits Uncontaminated spoil to be disposed of in Government approved sites, which will not be on agriculturally productive land, within 50m of a water course, including stream, river or irrigation channel, on sloped land, within 50 m of cultural heritage sites, within 100 m of any other culturally or ecologically sensitive feature. Contaminated spoil disposal must be tested for contaminants then follow Government regulations including handling, transport, treatment (if necessary), and disposal and will be isolated from human contact and environmental receptors by plastic sheeting or similar. A record of type, estimated volume, and source of disposed spoil must be recorded 	Included in bid price	Contractor	PMU / PDOE
Implementation of Solid and Liquid	Contamination of land and surface waters	<p>18. Subplan will include measures to explain how the contractor will:</p> <ol style="list-style-type: none"> Manage general solid and liquid waste from construction in line with Government regulations, and will cover, collection, handling, transport, 	Included in bid price	Contractor	PIU/ PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
Waste Management SubPlan B	from construction waste and drain clearance	<p>recycling, and disposal of waste created from construction activities and worker force.</p> <p>b) Make clear arrangements for storage and transportation of all hazardous and non-hazardous waste to an authorized and approved disposal point (approved by Provincial Department of Environment).</p> <p>c) Segregate recyclables at source and given/sold to recycler (plastic, metal, card, paper as a minimum)</p> <p>d) Store all solid waste in containers with lids, more than 25 m from all surface water, water supplies, and cultural and ecological sensitive receptors.</p> <p>e) Prohibit burning of waste at all times;</p> <p>f) 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 drainage ditches</p> <p>g) Provide a schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible.</p> <p>h) All spills must be cleaned up completely with all contaminated soil removed and handled in accordance with Spoil Management SubPlan A</p> <p>i) For cleaning of the existing drainage system the contractor will ensure that the subplan for waste will</p> <p>A) determine the quantity of all debris, silt, and accumulated solids removed from the drainage.</p> <p>B) define how and where the debris will be transported and disposed</p> <p>C) provide the necessary authorizations or agreements for drainage debris disposal</p> <p>Under no circumstances shall the removed sewage or solids be dumped onto streets or into ditches, catch basins, storm drains, sanitary or combined drainage manholes, or otherwise improperly disposed.</p>			
Implementation of Occupational Health and Safety and Emergency Response SubPlan C	Human health and safety	<p>19. Occupational H&S measures to be included in the management subplan will include:</p> <p>a) Assurance that all workers are equipped with, and use Personal Protective Equipment (PPE).</p> <p>b) Specifications for the PPE to be used on site and the contractors' approach to enforcement of its use by workers</p> <p>c) Sufficient signage giving occupational health and safety warnings and information disclosure within all construction sites – subplan to include example warnings.</p> <p>d) Details of worker education and awareness seminars for construction hazards will be given. A construction site safety program will be developed and distributed to workers.</p> <p>e) Details of daily toolbox meetings (safety briefings)</p>	Included in bid price	Contractor	PIU/ PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		<p>f) Details of the site accident record book which will be maintained where all major or minor accidents and incidents are recorded with actions taken.</p> <p>g) An Environment Health and Safety qualified engineer or staff member will be engaged for the contract and adequate first aid equipment provided on site.</p> <p>h) 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.</p> <p>i) Drinking water must be provided at all construction sites</p> <p>20. The Emergency Response Plan will set out detailed Preventative Measures for all types of incidents covered in the Emergency Plan. This will include:</p> <p>j) Prevention of Injury and Accidents – to include Personal Protective Equipment requirements for construction workers, training requirements</p> <p>k) 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.</p> <p>l) Prevention of Fire – to include measures for Ignition Sources including prevention of smoking on construction site, management of flammable materials and liquid.</p> <p>m) Other Incidents – prevention measures relevant to other issues considered relevant by the contractor</p> <p>21. The Contractor will develop Emergency Response Procedures prior to construction. The procedures will cover actions to be taken in case of:</p> <p>n) Worker injury (e.g. construction or traffic accident)</p> <p>o) Spillage (e.g. fuel spillage or sewage spillage from drain clearance)</p> <p>p) Fire (e.g. fuel or chemicals storage area); and</p> <p>q) Any other incidents anticipated by the contractor.</p>			
Implementation of Construction Workers and Camp Management SubPlan D	Contamination of water, soil, waste production and social issues	<p>22. If a camp for construction workers is required the contractor will set out a management plan which includes:</p> <p>a) A map showing camp lay out, welfare facilities, and first aid kit locations.</p> <p>b) Accommodation facilities including separate toilets for male and female workers, adequate drainage to prevent flooding, security including a no weapons policy and waste disposal areas.</p> <p>c) Pit latrines to be located at least 200m from surface waters, and in areas of suitable soil profiles and above the groundwater levels</p> <p>d) A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times.</p>	Included in bid price	Contractor	PIU/ PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		<ul style="list-style-type: none"> e) Worker camps will have adequate drainage. f) Providing firefighting equipment will be provided in all camps and will have adequate signage and prescribed testing intervals. g) Plan of how camp areas will be restored to original condition after construction completed <p>23. If a construction camp is not required, the contractor will not require a Management Plan but will:</p> <ul style="list-style-type: none"> h) Provide adequate waste disposal facilities including garbage cans for workers. i) Provide welfare facilities including water for washing, drinking and include facilities for male and female workers j) Provide toilets for male and female construction workers with a cleaning schedule k) The contractor will give priority to local labor force and retain evidence of how local labor recruitment efforts were undertaken. <p>24. The contractor will ensure training is delivered to construction workers on the following and the contractor will provide a training schedule:</p> <ul style="list-style-type: none"> l) HIV Aids education awareness m) COVID-19 prevention and management n) Cambodian laws for foreign labor regarding: hunting, fishing and traffic rules o) Grievance Redress Mechanism – how to deal with affected people who make a complaint to a worker p) Occupational Health and Safety and Emergency Procedures. <p>25. The contractor will follow the additional COVID-19 requirements set out in the SUPPLEMENTARY TABLE A below.</p>			
Implement Community Health, Safety and Urban Access subplan E	Community and Business Access and health and safety	<p>26. Community H&S measures to be included in the management subplan will include:</p> <ul style="list-style-type: none"> a) Details of appropriate fencing or protective barriers, lighting and buffer zones which will be provided around all construction sites including barriers with lighting where needed on access roads and populated locations. b) Sufficient signage and information disclosure, and site supervisors and should be placed at all sites. c) Details of Warning signs which 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. d) Details of signage and speed controls if public roads are to be affected by construction traffic. e) Details of sufficient signage giving community dangers / warnings and information disclosure outside all construction sites, include example warnings. 	Included in bid price	Contractor	PIU/PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		<p>f) Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by construction vehicles.</p> <p>27. For urban excavations (sewers and drainage) measures to be included in the subplan will detail how the contractor will ensure:</p> <p>g) Access will be safely maintained for pedestrians and vehicles to schools, markets, houses, pagodas and commercial establishments</p> <p>h) Temporary safe access will be constructed by the contractor where needed.</p> <p>i) No temporary access shall be greater than 3:1 slope to allow access to all.</p> <p>25. For WWTP construction measures to be included in the subplan will detail how the contractor will ensure access to farm land surrounding the WWTP</p>			
Drain clearance	Water and land quality	<p>28. The contractor will specify the methodology for drain clearance and measures to prevent a spillage</p> <p>29. If sewage is unintentionally spilled, discharged, leaked or otherwise deposited in the open environment, the contractor will be responsible for any clean-up and disinfection of the affected area.</p> <p>30. The contractor will follow the Solid and Liquid Waste Management subplan B requirements for disposal of the material from drain clearance</p>	Included in bid price	Contractor	PIU/PMU
Open Canal Clearance and Stabilisation	Water quality	<p>31. The contractor will specify the methodology in the CEMP for waste clearance and house foundation removal to reduce further mobilisation of waste into the water body, through use of screens or other simple techniques to control waste emission from the canal;</p> <p>32. Where possible the works will be undertaken in the dry season.</p>	Included in bid price	Contractor	PIU/PMU
Earthworks and excavations	Noise and Air Quality, Soil resources, traffic	<p>33. Water will be sprayed at least twice per day on construction sites, material handling areas when fugitive dust is noticeably generated.</p> <p>34. All topsoil and overburden removed should be stockpiled for later restoration</p> <p>35. The contractor will provide a Traffic Management Plan to the PMU for approval which will include:</p> <p>a) How the contractor will inform the community and businesses of construction traffic routes</p> <p>b) Any advice/information the contractor will give to affected people during construction</p> <p>c) How the contractor will manage traffic including any road closures specifying management around Kampot Market, Kampot Night Market and Kampot Fish Market.</p> <p>36. Trained traffic marshal will be used to direct vehicle movements on and around construction sites and in all urban areas.</p> <p>37. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work is completed</p>	Included in bid price	Contractor	PIU/PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
Raw material extraction (quarries and borrow sites)	Noise, dust, habitat, landform	<p>38. Any new borrow site established shall be in an area which is not: close to housing areas or any isolated residential property; covered with mature established vegetation; close to surface water.</p> <p>39. Relevant permissions will be obtained prior to establishment of a borrow site</p> <p>40. If an existing borrow site is used, the mitigation measures for 'Transport, Storage and Use of Construction Materials' shall apply (below)</p>	Included in bid price	Contractor	PIU/ PMU
Transport, Storage and Use of Construction Materials	Air pollution, Community Health & Safety, Traffic	<p>41. Define and schedule how materials are extracted from quarry, transported, and handled and stored at sites.</p> <p>42. Define and schedule how fabricated materials such as steel, wood structures will be transported and handled.</p> <p>43. Define access route for delivery truck, crane and pre-fabricated concrete structures to the open canal line 4b.</p> <p>44. Trucks carrying dry construction materials such as earth; aggregate will be covered with tarpaulins or other suitable cover.</p> <p>45. Driving on unmade roads, trucks will be limited to 15 kph. Warning sign to inform road users of turning heavy vehicles will be used where trucks cross or turn off the National Road #3.</p> <p>46. 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.</p> <p>47. Water will be sprayed on material storage areas where fugitive dust is generated and where vehicles are transporting materials on unmade roads, generating dust, where human receptors are within 300m.</p>	Include in bid price	Contractor	PISCB/ PIU
Use of Machinery & Equipment	Noise, Water Quality	<p>48. Maintain all exhaust systems in good working order; undertake regular equipment maintenance;</p> <p>49. Restrict construction activities using heavy machinery between 7 am-5 pm; In particular are activities such as pile driving.</p> <p>50. Provide advance warning to the community on timing of noisy activities including all cultural, education and health receptors listed in this EMP. Seek suggestions from community members to reduce noise annoyance, particularly related to noise sensitive activities at receptors</p> <p>51. Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated.</p> <p>52. Ensure noise monitoring is undertaken near sensitive receptors, particularly dwellings when construction machinery is operational</p> <p>53. Construction vehicles and machinery will be maintained to a high standard to minimize emissions</p> <p>54. All construction workers will use appropriate Personal Protective Equipment (PPE) including ear defenders when operating machinery;</p>	Included in Bid Price	Contractor	PIU/ PMU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		55. No washing or repair of machinery within 50m of surface waters including rivers.. 56. Vehicles and machinery to be turned off when not in use. 57. Construct temporary noise barriers around excessively noisy activity areas where possible.			
Storage and Use of chemicals and fuels	Water quality Soil quality	58. Refueling only in designated areas which are to be 50 m from a water course and drip trays to be used when refueling or topping up / changing machinery fluids 59. Construction fluids such as oils, and fuels should be stored and handled on a bunded impermeable surface; a bund will be provided around any above ground fuel storage tanks with a capacity of 110% of the largest single tank. 60. All chemicals and fuels will be in labeled containers.	Included in Bid Price	Contractor	PIU/ PMU
Civil Works	Loss or disruption of utilities and services	61. Develop plan of days and locations where outages in utilities and services will occur, or are expected. 62. Contact local utilities and services providers with schedule, and identify possible contingency back-up plans for outages. 63. Contact affected community to inform them of planned outages. 64. For any unavoidable outages, schedule during low use time between 24:00 and 06:00.	Include in Bid cost	Contractor	PIU & Utility company
Flora	Damage or loss of trees, vegetation, and landscape	65. Only vegetation will be cleared from within the WWTP site boundary and within the design width open canal line 4b. 66. Any other unanticipated vegetation removal requires approval from the PMU	Include in Project cost	Contractor	PMU/ PIU
All Activities	Damage to public areas, roads, infrastructure or private property	67. Restoration and Repair: <ul style="list-style-type: none"> a. The contractor will repair any damage caused such as damage from heavy vehicles to local roads, on completion of construction. The repairs will be to pre-project condition or better at the cost of the contractor. Pavement reinstatement will take place as specified in the Construction Contract. b. The contractor will provide a plan of how camp / staging areas will be restored to original condition after construction completed c. The contractor will retain topsoil to support vegetation screening/regrowth; d. The contractor will remove waste, spoil and any contaminated land e.g. oils spills. 	Included in Bid Price	Contractor	PIU/PMU
Open Canal Line 4b renovation and WWTP Site Civil Works near water bodies	Sedimentation of Kampong Bay river and Kbal Romeas river and loss of soil through erosion	68. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 69. Earthworks should be conducted during dry periods. 70. Maintain a stockpile of topsoil for reuse	Include in Project cost	Contractor	PISCB & PIU

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		71. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready especially for earth construction drainage channels and WWTP dyke. 72. Rip rap in areas of steep slope liable to erosion in wet season at WWTP site 73. Re-vegetate or reinstate all areas of exposed soil immediately after work is completed using native species.			
POST-CONSTRUCTION					
Operation of drainage system	Periodic back-up and local flooding	1. Improved drains must be regularly cleaned and surfaced to maintain design capacity flows. The operator will: a) Detail and implement an inspection and cleaning schedule for all drains and outfall debris screens b) Detail and implement a schedule of maintenance or drains and man hole covers and ensure all repairs are completed before the start of each rainy season	O&M cost	DPWT	MPWT
All WWTP operations	Site based H&S	1. The operator will develop site specific H&S procedures which will ensure the operator will <ul style="list-style-type: none"> Develop and implement a comprehensive H&S training programme Undertake risk assessments for high risk processes and roles and appropriate mitigation measures Use of appropriate PPE including measures to enforce its use and PPE for specific situations including handling chemicals; Electrical safety testing of WWTP equipment prior to use Undertake health assessments (annual medical) for workers and analysis of results to identify trends Emergency Procedures – actions required under emergency situations including worker accident, fire, chemical spill and other measures as required by the operator. 2. Give access to first aid and appropriate health and safety information for all staff.	O&M cost	DPWT	MPWT
All WWTP operations (operation and maintenance (O&M))	Water quality, odor, soil quality	2. As part of O&M manual, the operator will provide clear methods and procedures for all aspects of the WWTP operation, including the following key issues: <ul style="list-style-type: none"> all stages of wastewater treatment all stages of septic tank evacuation at WWTP sludge management and options for sludge reuse preventative maintenance & inspection program for all site plant and machinery (include: key spare parts, power supply maintenance, inspections program, on site drainage, pumping stations) environmental analysis program and procedures (effluent, sludge, surface water analysis) 	O&M cost	DPWT	MPWT

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Estimated Cost (\$)	Responsibility	
				Implementation	Supervision
		<ul style="list-style-type: none"> • solid waste management (containment, storage, transport, disposal) • disposal of screenings, grit and sand; • Site maintenance including: 3. other aspects appropriate to the site operation			

34. **COVID-19.** WHO⁴ defines '*quarantine*' as the separation of a person who is not ill but who may have been exposed to an infectious person, with the objective of monitoring their symptoms and ensuring the early detection of cases. '*Isolation*' is the separation of a person who is showing symptoms or has confirmed COVID-19 to prevent the spread of infection or contamination. **Contractors must ensure the safe quarantine or isolation of workers and that this does not impact on their employment status.**

EMP SUPPLEMENTARY TABLE A: Construction site working conditions Mitigation measures for COVID-19	
1. COVID-19 Planning	<ul style="list-style-type: none"> • Develop and communicate a work plan on safe working for COVID-19. • Train team members on the basic principles for the formulation and implementation of occupational safety and health preventive and control measures.
2. Risk assessment to decide when to work, who works and how	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Avoid physical interaction and remain socially distant. • 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 meters and organize one-way systems. This includes sleeping areas which must be a minimum of 2 meters 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 close proximity to one another.
4. Regularly clean and disinfect	<ul style="list-style-type: none"> • Increase the frequency of cleaning and disinfection, in particular heavily trafficked areas and common areas, including work camps.

⁴WHO (19 March 2020) Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19) https://apps.who.int/iris/bitstream/handle/10665/331497/WHO-2019-nCoV-IHR_Quarantine-2020.2-eng.pdf

	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 afterwards.
6. Provide personal protective equipment (PPE) and inform workers of its correct use	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 : <ul style="list-style-type: none"> ○ 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	<ul style="list-style-type: none"> • 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.

	<ul style="list-style-type: none"> • Implement prevention and control measures for the use and storage of chemicals, particularly those used for disinfection during COVID-19.
9. Review emergency preparedness plans	<ul style="list-style-type: none"> • Develop an emergency plan adapted to COVID-19 and regularly review it.
10. Review and update preventive and control measures as the situation evolves	<ul style="list-style-type: none"> • 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. • Construction Workers and Camp Management.
Source: Adapted from: ILO, ⁵ WHO, ^{6 7, 8} Canada Construction Association, ⁹ and UK Government. ¹⁰	

⁵ ILO (May 2020) Practical Guidance: Safe Return to Work. Ten Action Pointsyy.

⁶ WHO (19 March 2020) Getting your workplace ready for COVID-19.

⁷ WHO (17 March 2020) Home care for patients with COVID-19 presenting with mild symptoms and management of their contacts.

⁸ WHO (16 April 2020) considerations in adjusting public health and social measures in the context of COVID-19.

⁹ Canada Construction Association (April 2020, version 4) COVID-19 Standardised protocols for all Canadian construction sites.

¹⁰ www.gov.uk (19 May 2020) Working safely during coronavirus COVID-19: Construction and other outdoor work

V. MONITORING AND REPORTING PLAN

35. During project implementation, monitoring will be reported to the PMU and will form the basis of the required reporting. The monthly reports will provide the majority of the information for the semi-annual reports. Templates are provided by the support consultants to assist the responsible roles for monitoring and reporting.

36. The key monitoring mechanisms and costs are shown in Table 6. The monitoring plan focuses on all three phases (pre-construction, construction, post-construction operation) of the subproject components, and consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject.

Table 6: Monitoring Type and Cost

Monitoring	Purpose	Estimated Cost or Source of Budget
1. Project readiness monitoring	Monitoring to check progress on project readiness and close gaps through corrective actions See Table 8.	No additional cost, part of project activities
2. Project phase 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 See Table 9.	Pre-Construction \$16,750 During Construction per year \$18,750
3. EMP compliance monitoring	Monthly monitoring to be conducted by the Construction Supervision Company. Monthly EMP Issues and Health and Safety monitoring to be provided by the Contractor PIU-ESC to verify EMP compliance during project implementation through site visits See Table 10	No additional cost, part of project implementation activities
4. Affected People monitoring	A consultative approach. This is to be conducted by the PIU via consulting affected people on the impacts during construction. See Table 10	No additional cost, part of project implementation activities
5. Operational phase environmental quality monitoring	This is required as part of the operation of the drainage system and wastewater collection and WWTP will be undertaken by the PDPWT See Table 9	Included in operator O&M costs

37. 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.

38. The operator, PDPWT, will be responsible for operation and the cost is included in annual budget plan.

5.1 Project Readiness Monitoring

Before construction, the PISCB Consultant will monitor the project's readiness on environmental management based on a set of indicators and report it to ADB and PMU, see

39. **Table 7.** 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 7: Project Readiness Assessment Indicators

Indicator	Criteria	Are the Criteria met? Yes/No	If No, What Corrective action is needed?	Date for Corrective Action Completion
1. EMP update	EMP updated after domestic IEIA approval and detailed design & approved by ADB/MoE	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 MPWT staff as set out in the Institutional Arrangements for this EMP	Y/N		
	Nomination of government staff for PIU roles as set out in the Institutional Arrangements for this EMP	Y/N		
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 Appendix 3)	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

40. During construction, the impact on the sensitive environmental receptors will be monitored and compared against the relevant national standard. During operation, the relevant operator will be expected to maintain an adequate budget to ensure environmental monitoring can be undertaken as specified in **Table 8**.

Table 8: Environmental Quality Monitoring

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD) Per Year
					Implement	Supervision	
PRE-CONSTRUCTION							
A) Ambient air quality (2 samples): CO, NO2, SO2, TSP, O3, Pb, PM 10 and PM 2.5. B) Ambient noise and Vibration C) Surface water quality: Kbal Romeas river (1 point), Prek Kampong Bay (2 points) water quality: pH, TDS, TSS, DO, BOD5, COD, Oil and Grease, Detergent, SO4, TN, TP, Pb, AS, Cd, Hg and Total Coliform. D) Sewerage water: pH, TSS, BOD5, COD, Oil and Grease, Detergent, TN, TP, NH3 and Coliform.	A & B) • Main pumping station (x=411050, Y=1172290); • WWTP site (X=413914, Y=1176221) C) • Kbal Romeas river (X=414377, Y=1176433); • Prek Kampong Bay Sample 1 (X=410301, Y=1172212) • Prek Kampong Bay Sample 2 (X=409296, Y=1173844). D) • (X=409862, Y=1173289)	Using field and analytical methods approved by MoE.	A & B & C &D Once before construction phase starts	Once baseline report before construction phase starts.	PISCB	PMU	A & B: \$6,500 <

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD) Per Year
					Implement	Supervision	
Kbal Romeas river (1 point), Prek Kampong Bay (2 points) water quality: pH, TDS, TSS, DO, BOD5, COD, Oil and Grease, Detergent, SO ₄ , TN, TP, Pb, AS, Cd, Hg and Total Coliform. I) Sewerage water: pH, TSS, BOD5, COD, Oil and Grease, Detergent, TN, TP, NH ₃ and Coliform.	(during construction of drainage/sewage network at these locations) H) • Kbal Romeas river (X=414377, Y=1176433); • Prek Kampong Bay Sample 1 (X=410301, Y=1172212) • Prek Kampong Bay Sample 2 (X=409296, Y=1173844). I) • X=409862, Y=1173289						
J) Field observation from related Ministry or department e.g. MoE, DoE	Project location	Using field observation	Every 3 month		Contractor	MoE/DoE	\$ 5,700 ¹¹
Sub-Total (Construction) Per Year:							\$21,700
OPERATION PHASE							
WWTP							
K) Surface water quality: Kbal Romeas river (downstream and upstream of outfall),	K) • WWTP site (X=413914, Y=1176221)	Using field and analytical methods approved by DoE.	Every 3 month	Every Six month during operation.	PDPWT	MPWT	Annual budget
L) Odor	Resort to North of site	Using field observation and Meeting with Resort Management	Every 3 month	Annually	PDPWT	MPWT	Annual budget
M) Household Connections to Sewerage	PDPWT	Site visit to houses to check connections and public awareness and communications to encourage connections	Every month within the first year of full operation, after this every 6 months	Annually	PDPWT	MPWT	Annual budget
Drainage							
N) Condition of drainage network and refuse removal	All of network	Field Observations	Start and end of dry season and cleaning according	Annually	PDPWT	MPWT	Annual budget

¹¹ Budgets for MoE staffs to monitor on environmental problem during construction stage

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD) Per Year
					Implement	Supervision	
			to schedule (specified in EMP Mitigation Measures)				

5.3 EMP Compliance and Affected People Monitoring

In order for the EMP to be effective, all its mitigation measures in the EMP must be monitored to ensure they are implemented. Table 9 defines the responsibilities of the PIU and Contractor in monitoring the monthly progress against the EMP during construction. Note this applies to construction only; during operation, it is the responsibility of the appropriate ministry or its line department to ensure monitoring of operational facilities is incorporated in the operations and maintenance manual and carried out routinely. The contractor will provide a basic monthly monitoring report focusing on Health and Safety and identify any potential issues with future EMP compliance. This will not duplicate the more detailed monitoring and reporting to be undertaken by the PISCB-CSC. Locally based PIU-ESC is responsible for site visits to check on the actual impacts on people of the project and identify any adjustments in the EMP required.

5.4 Environmental Policy and Standards

41. The construction and operation phases of the projects shall follow relevant environmental quality standards. These are presented in Appendix 4 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 9: EMP Compliance and Affected People Monitoring- Construction Phase

Environmental Indicators	Location	Method & Frequency	Implemented By:	Verified By:	Budget Source
Air Quality & Noise	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget
Flora	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget
Water Quality	Civil works sites	Monthly checking against mitigation measures specified in this EMP	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget

Resource use and natural resource contamination	Implementation location for Spoil Management SubPlan A Implementation location for Solid and Liquid Waste Management SubPlan B	Monthly checking against mitigation measures specified in this EMP	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget
Human health and safety	Implementation location for Occupational Health and Safety and Emergency Response SubPlan C Implementation location for Community Health and Safety and Urban Access SubPlan E	Monthly checking against mitigation measures specified in this EMP	PIU-ESC Contractor EHS	PISCB –NES / PMU-ESO	Included in Contractor's contract /PIU budget
Contamination of water, soil, waste production and social issues	Implementation location for f Construction Workers and Camp Management SubPlan D	Monthly checking against mitigation measures specified in this EMP	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget
Community Issues - At all construction locations <ul style="list-style-type: none"> • Environmental impacts of civil works (e.g., solid & liquid waste, erosion, local flooding, pollution). • Any unforeseen impacts caused by accidentally e.g. through spillages • Civil nuisance (e.g., noise, disrupted 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 		Consultation interview with Affected People Using the form in Appendix 1 and Site Observations. 4-6 weeks after construction starts Monthly until end of construction	PIU-ESC	PISCB –NES / PMU-ESO	PIU budget

5.5 Reporting

42. Environmental monitoring reports will be prepared semi-annually for the EA by the Project Management and Implementation Support consultants in collaboration with PMU's Environmental Safeguard Officer and sent to MPWT's Environmental Safeguard Office, 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 during the project implementation.

Table 10. Monitoring and Reporting Requirements

No.	Report	Frequency	Purpose	From	To
1	Contractors' Environment Health and Safety Progress Report	Monthly	EHS Progress	Contractor	PMU
2	Site Visit Report on EMP Implementation	Monthly	Verify EMP implementation Confirm EMP and GRM are working (consultation and observation)	PIU-ESC with CSC support	PMU-ESO/PISCB
3	Environmental Quality Monitoring	Varies - as per monitoring table in EMP	Relevant environmental parameters	Contractor (or laboratory)	PMU (PMU-ESO to send to EA)
4	Environmental Safeguards Monitoring Report	Semi-Annual	Full EMP Implementation and Adherence to Environmental Covenants/Conditions	PMU	MoE/ADB

VI. PUBLIC CONSULTATION AND PARTICIPATION

43. The Consolidated IEE for this subproject contains details of the consultation undertaken during preparation of these subprojects. This includes:

- (i) Consultation during project preparation in 2014
- (ii) Consultation at detailed design phase in 2018 during the preparation of the final EMP.

44. In addition, consultation will take place during implementation. The PIU and PMU will collaborate to 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 Environmental Monitoring Plan provided in the Environmental Management Plan for each subproject.

45. Informal monitoring interviews with affected people will focus on complaints about community disturbance from construction activities, such as construction noise, dust, solid waste and wastewater, as well as public concerns about ecological protection, soil / land concerns and access issues. A sample Environmental Monitoring Interview Form is given in Appendix 1. This will contribute to project monitoring

VII. GRIEVANCE REDRESS MECHANISM

7.1 Objective

46. 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 and is free of charge.

47. The GRM is set out here in accordance with the approved approach established during Project Preparation, which remains valid. This is a separate grievance system to that managed by General Department of Resettlement which deals with resettlement issues only.

7.2 Proposed Approach

48. The following roles and responsibilities for the GRM is set out in Table 11.

Table 11: GRM Roles and Responsibilities

Role	Responsibilities in GRM
MPWT / Executing Agency	<ul style="list-style-type: none"> Establish the GRM Set up a Grievance Redress Committee (GRC)
Grievance Redress Committee (GRC)	<p>Members:</p> <ul style="list-style-type: none"> Sangkat representative Village leaders or representative PIU-ESC PMU-ESO Municipality representatives Provincial representatives <p>Function:</p> <ul style="list-style-type: none"> GRM Access Point and Decision Making Monitor and record complaints
PMU-ESO	<ul style="list-style-type: none"> Oversight of GRM implementation and use Co-ordination with PIU-ESC GRM Record keeping and document storage of all GRM complaints (Formal or Informal) Contact with ADB if Affected People appeal the process GRM reporting
PIU-ESC	<ul style="list-style-type: none"> GRM implementation at the town level Responsible for keeping the PMU informed
Contractor	<ul style="list-style-type: none"> Entry point for people during construction
Local Government Institutions and representatives (village, Sangkat, municipality)	<ul style="list-style-type: none"> Entry point for people during construction

49. Table 12 shows Sangkats/communes and villages within the project area. Representatives such as Village Chief will be included in the GRM committee and will be key access points for GRM implementation:

Table 12: Sangkats and Villages for GRM Access and Implementation

Subproject Component	District/ town	Commune / Sangkat	Village
Wastewater and Drainage Networks	Kampot Town	Kampong Bay	Kampong Bay Choeung
			Kampong Bay Tbong
		Kraing Ampil	Kraing
			Svay Thum
		Kampong Kandal	Mouy Ousaphea
			Sovann Sakor
WWTP Site	Tuek Chhou	Kampong Samrong	Kampong Samrong

50.

7.3 Access to the Mechanism and Communication

51. The PMU-ESO and counterparts in the PIUs, will ensure that:

- The public, especially the residents and business owners, in the main areas of influence of the subprojects, are aware of their rights to access, and will have access to, the GRM free of administrative and legal charges;
- The GRM is fully disclosed prior to construction: (a) in public consultations or social/community events, (b) through posters displayed in the offices of the PMU, PIU, Kampot Municipality and concerned Villages/Sangkats and at strategic places within the main areas of influence of subprojects (posters to include names and contact details of the PMU-ESO and PIU-ESC); and (c) sign boards at construction sites.
- Access points will participate in GRM issues and will include:
Village representative, e.g. Village Chief
Sangkat representative e.g. from Sangkat Committee
Municipal government representative
PIU-ESC and PMU-ESO

52. The GRM will be communicated to the public and affected people as a Project Hotline; this is considered to be more resonant with people than a 'grievance redress mechanism'. This will include a project hotline notice board to be located in each active construction site for all subprojects which must include three locations around the town in for the drainage and sewage network construction and construction camps and staging areas.

53. The project hotline notice board will include the following information and will require a designated telephone number which is for the project and not personal to individual members of staff

Project Hotline

Project: Construction of [drainage and sewage network / Wastewater Treatment Plant / or landfill] in [town]

For suggestions, questions or problems related to the project, please contact any of these phone numbers: Call, SMS or Telegram

Name	Role or Company	Phone Number
	Project Management Office, Ministry of Public Works and Transport, Phnom Penh,	
	Project Implementation Office, Phnom Penh, Department of Public Works and Transport, [Town]	
	Sangkat [town]	
	Village Chief, [village]	
	Construction Contractor, [company name]	
	Construction Site Supervisor, Project Management and Implementation Consultants	

You can also contact ADB directly:

ADB, Phnom Penh Office:
[Name] and [Phone Number] and [email address]

ADB Southeast Asia Department of ADB, Manila, Philippines:
[Name] and [Phone Number] and [email address]

7.4 GRM Steps and Timeframe

54. **Informal Approach.** Informally, an affected person (AP) can lodge complaint directly to the Contractor during construction or Operator during operation.

55. The contractor will initially ensure its worker /staff member hands a GRM Contact Card (required by this EMP) to the complainant. The contractor will also immediately inform the PMU of the complaint. If possible, the contractor will rectify the problem within one day of the complaint.

56. The PMU will screen the complaint within one day of receipt. If screening reveals the complaint as Project-related and valid, the Contractor will act within three days from confirmation that the complaint is valid, by PMU, if the problem was not rectified immediately.

57. For at least a week after confirmation of completion, the PIU will monitor the effectiveness of the action/resolution taken. After which, PIU will secure a written confirmation of satisfaction from the AP

58. Formal Approach. If informally lodged complaint is valid but is not acted on within four days from receipt of complaint, or if AP is not satisfied with the resolution undertaken by the Contractor/Operator, AP can access the formal mechanism, which comprises of four stages.

First Stage. For valid environmental complaints, the steps and timeframe involved in addressing complaint at the first stage are presented below.

Step 1	AP Complaint (Day 1)
	<ul style="list-style-type: none"> Complaint is filed by Access Point at Kampot town level, verbally or in writing, with an access point. Complaint is passed to PMU-ESO
Step 2	Screening (Day 2)
	<ul style="list-style-type: none"> PMU-ESO screens complaint AP is immediately informed of the screening results An AP with complaint screened as non-Project-related and/or invalid will be advised that he/she can raise his/her complaint to the second stage; and receiving agent will formally forward the complaint to the Kampot District Office
Step 3	Investigation, Discussion and Agreement (Day3-4)
	<ul style="list-style-type: none"> PIU, Contractor and AP will discuss the complaint at the site within 2 days of screening. Agreement on actions and measures and time involved will be made with the AP. Agreement will be documented and filed by PMU-ESO; PIU, AP, Contractor/Operator will have copies.
Step 4	Implementing the Agreed-on Resolution (Day 5-10)
	<ul style="list-style-type: none"> If required action is minor, i.e., not requiring further investigation and would be quick and easy to implement, the Contractor/Operator will immediately implement the agreed action. (starting Day5) If required action is major, i.e., requiring further investigation and/or procurement of supplies/parts, the Contractor/Operator will: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact (starting Day 5); and (ii) start work on the major action within 5 days from discussion (or not later than Day 10 since receipt of complaint). AP will be advised by the PIU that his/her complaint may be raised to the second level of the GRM, if he/she so prefers when: (i) minor action is not implemented on time; (ii) interim measure is not implemented on time; or (iii) major action is not implemented on time.
Step 5	Confirmation of Completed Action
	<ul style="list-style-type: none"> Contractor/Operator will secure a written confirmation of completed action from the AP and furnish the PIU a copy.
Step 6	Confirmation of Satisfaction (1 week after confirmation of completed action)
	<ul style="list-style-type: none"> The PIU will monitor the effectiveness of the resolution for at least a week after receipt of confirmation of completed action from the Contractor/Operator. After which, PIU will secure a written confirmation of satisfaction from the AP.

Second Stage. For actions not taken within the agreed timeframe and when AP is dissatisfied with the action taken at the First Stage, AP can raise his/her complaint to the District Office GRC Representative. The District Office has 15 days within which to resolve the complaint to the satisfaction of all concerned. If the complaint cannot be solved at this stage, the District Office will bring the case to the Provincial Grievance Redress Committee representative.

Third Stage – Provincial Level Appeal. If the AP remains 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.

Within 30 days of the submission of the grievance, the Provincial GRC representative must make a written decision and submit copies to the MPWT, GRC members and the AP. 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.

Fourth Stage – ADB 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

Accountability Mechanism of the ADB. In addition, affected people may always contact the Complaints Receiving Officer of the ADB:

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

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

59. The Project's GRM should not impede access to the country's jurisdiction or administrative remedies. Accessing the country's legal system and GRM can be done at the same time. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, AP has the right to directly discuss his/her concern/complaint with the ADB's Urban Development and Water Division, Southeast Asia Department through the ADB Cambodia Resident Mission.

60. The PMU, PIU and GRC will keep records of all lodged and documented/referenced complaints, actions/resolutions taken, AP's written confirmations of completed action and satisfaction, complaints raised to higher levels, lessons learned. The number of grievances recorded and resolved and the outcomes will be displayed at the offices of PIU, PMU and Municipality and reported in the monthly progress reports, semi-annual monitoring reports during construction and annual monitoring reports during operation, submitted to ADB.

61. The PMU will do periodic review of the effectiveness of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address complaints. All costs involved in resolving complaints (meetings, consultations,

communication and reporting/information dissemination) will be borne by the PMU. In cases where AP does not have the writing skills or are unable to express their grievances verbally, he/she may seek third-party assistance of his/her choice.

IX. CONCLUSION

62. 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 operator. The implementation of this EMP will be closely monitored and reported on by the relevant stakeholders in the project.

63. The most significant impacts from the project will arise from wastewater collection and WWTP operation. As a result, there is a comprehensive training and capacity building component to the project which is essential for ensuring the investment is financially and environmentally sustainable and beneficial which will mean effective WWTP operation and effective maintenance of the drainage network.

64. A robust Grievance Redress Mechanism will be established. It will ensure that all unplanned impacts which cause grievances for affected people are managed swiftly and a satisfactory outcome brought about.

65. Overall, the project is anticipated to bring environmental benefits to the city and its residents. It will serve to improve the current waste management situation and will provide long term environmental improvements.

Appendix 1 Affected Person Monitoring Form

Consultation / Interview Form

Date of Interview		Interviewer Name	
Interview Site: <i>Where is the interview held? In school, on the road, in shop</i>		Stakeholder Name & Status: <i>Full name, status is business owner, 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. <i>Where did the noise come from? E.g. traffic, machinery, people, music</i> <i>When did it disturb the person? E.g. all day, at night, intermittently</i>	
During the construction, is the person disturbed by noise from the project? If yes, explain how and when. <i>What type of noise and where did the noise come from? All day, at night, intermittently?</i>	
If noise from construction is a problem, what changes does the person suggest are made?	
2. AIR QUALITY	Record of Discussion
Before the project started, was the person affected by air pollution or dust? If yes, explain how and when. <i>Where did the pollution or dust come from? E.g. traffic, machinery, construction, burning garbage, cooking stoves</i> <i>When was the dust or pollution a problem? E.g. all day, at night, intermittently</i>	
During the project, is the person disturbed by dust or pollution? If yes, explain how and when. <i>What type of noise and where did the noise come from? E.g. increased traffic congestion, construction machinery, construction workers, burning construction garbage etc</i> <i>When did it disturb the person? E.g. all day, at night, intermittently</i>	
If dust or air pollution from the construction is a problem, what changes does the person suggest are made?	

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

Appendix 2 GRM – Complaint Recording Form

PIU Staff Responsible: (name and role)	
Date: (of this record)	
Date of Complaint:	
Date Resolution Required by (5-10 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)	

Appendix 3 Particular Conditions (for Bidding Documents)

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

67. 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 subplans:

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

68. The management subplans 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 subplans at all times unless prior agreement has been given by the PMU under extenuating circumstances.

69. 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.

70. 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.

Appendix 4: Environmental Standards for Cambodia

(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)	8 hours	mg /m ³	20
Ozone (O ₃)	1 hours	mg /m ³	0.2
Lead (Pb)	24 hours	mg /m ³	0.005
TSP	24 hours	mg /m ³	0.33
PM 2.5 (use WHO value in Cambodia)	24 hours	mg /m ³	0.025
PM 10 (use WHO value in Cambodia)	24 hours	mg /m ³	0.05

A comparison with international standards (WHO) is as follows:

Pollutant	CAM averaging Period	Sub-decree No. 42 (ug/m ³)	WHO Averaging Period	WHO Ambient Air Quality Guidelines (ug/m ³)
Sulphur Dioxide (SO₂)	1 hour	500	10 min	500
	24 hour	300	24 hour	20
	Annual	100		
Nitrogen Dioxide (NO₂)	1 hour	300		
	24 hour	100	1 hour	200
			Annual	40
Carbon Monoxide (CO)	1 hour	40,000		
	8 hour	20,000		
Ozone (O₃)	1 hour	200	8 hour	100
Lead (Pb)	24 hour	5		
			Annual	
Benzo-a-pyrene (C₂₀H₁₂)				
Particulate Matter (PM₁₀)			24 hour	50
			Annual	20
Particulate Matter (PM_{2.5})			24 hour	25
			Annual	10
Total suspended particles	24 hour	330		
	Annual	100		

(2) Ambient Noise Standards

Source: Sub-decree **No. 42 ANRK.BK** on Air Pollution Control and Noise Disturbance, MoE , 2000 and WHO. Bold highlights most stringent standard to be followed.

Areas	Time Period (24 hours)	Standard	
		National Standard (dB(A))	WHO Community Noise (dB(A))
RES: Residential Area MIX: Mixed Residential and Small Industries Area I&C: Industrial and Commercial	Day time (from 6:00am to 6:00pm)	RES: 60 MIX: 75	RES: 55 (serious annoyance) RES: 50 (moderate annoyance) I&C: 70 (hearing impairment)
	Evening Time (from 6:00pm to 10:00pm)	RES: 50 MIX: 70	RES: 55 (moderate annoyance) I&C: 60 (hearing impairment)

	Night time (from 10:00pm to 6:00am)	RES: 45 MIX: 50	RES: 45 (moderate annoyance) I&C: 60 (hearing impairment)
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(3) Surface Water Quality Standard

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

Annex 2 of Sub-decree on Water Pollution Control

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

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	OC	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 60	< 120
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (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 (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0
36	Polychlorinated Byphenyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DDT	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

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

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

a) River

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

b) Lakes and Reservoirs

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

Annex 5 of Sub-decree on Water Pollution Control:

(5) Water Quality Standard (ground and surface water) in public water areas for public health protection (not non-potable water)

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

(6) Groundwater Quality Standard (for drinking) from Ministry of Handicrafts and Industry Based on WHO (2003) Standards

No 1	Parameter	Standard	
		Unit	Value
2	pH	-	6.5-8.5
3	Turbidity	NTU	5.0
4	Chloride (Cl-)	mg/l	250
5	Sulphate (SO ₄)	mg/l	250
6	Aluminum (Al)	mg/l	0.2
7	Copper (Cu)	mg/l	1.0
8	Iron (Fe)	mg/l	0.3
9	Manganese (Mn)	mg/l	0.1
10	Zinc (Zn)	mg/l	3.0
11	Total Coli form	MPN/100ml	0
12	Mercury (Hg)	mg/l	0.001
13	Lead (Pb)	mg/l	0.01
14	Arsenic (As)	mg/l	0.05
15	Nitrate (NO ₃)	mg/l	50
16	Nitrite (NO ₂)	mg/l	3