

Environmental Management Plan

June 2015

Kingdom of Cambodia: Second Greater Mekong
Subregion Corridor Towns Development Project,
PPTA 8425

Sihanoukville Subproject

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CURRENCY EQUIVALENTS

(as of 26 March 2015)

Currency Unit	–	Riel R
R1.00	=	\$0.00025
\$1.00	=	R3,941

ABBREVIATIONS

ADB	-	Asian Development Bank
CEMP	-	Contractor Environmental Management Plan
DAFF	-	Department of Agriculture, Forestry and Fisheries
DOE	-	Department of Environment
DPWT	-	Department of Public Works and Transport
DOT	-	Department of Tourism
DOWRAM	-	Department of Water Resources and Meteorology
EA	-	Executing Agency
ECA	-	Environmental Compliance Audit
EIA	-	Environmental Impact Assessment
EMC	-	Environmental Monitoring Consultant
EMP	-	Environment Management Plan
EO	-	Environmental Officer
ERT	-	Emergency Response Team
EERT	-	External Emergency Response Team
GMS	-	Greater Mekong Subregion
Government	-	Government Of Cambodia
IA	-	Project Implementation Agency
IEE	-	Initial Environment Examination
IEIA	-	Initial Environmental Impact Assessment
PIU	-	Project Implementation Unit
MAFF	-	Ministry Of Agriculture, Forestry And Fisheries
MOE	-	Ministry Of Environment
MIME	-	Ministry Of Industry, Mines And Energy
MPWT	-	Ministry Of Public Works And Transport
MOT	-	Ministry Of Tourism
MOWRAM	-	Ministry Of Water Resources And Meteorology
PA	-	Project Administration Manual
PMIS	-	Project Management Implementation Support
PSC	-	Project Steering Committee
PPTA	-	Project Preparatory Technical Assistance
RP	-	Resettlement Plan
GRC	-	Royal Government Of Cambodia
SPS	-	ADB's Safeguard Policy Statement (2009)
SO	-	Safeguards Officer

WEIGHTS AND MEASURES

km	-	kilometer
kg	-	kilogram
ha	-	hectare

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

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I. INTRODUCTION

1. The environmental management plan (EMP) for the subproject in Sihanoukville, Preah Sihanouk province provided herein is one of two EMPs that have been prepared for the subprojects of the Second Greater Mekong Subregion Corridor Towns Development Project (the project) in Cambodia. The other EMP addresses the subproject in neighboring Kampot, Kampot province. A single Initial Environmental Examination (IEE) of both subprojects was prepared under separate cover. The separate EMPs are comprehensive and are developed as stand-alone management tools that are supported by the parent IEE.

A. Sihanoukville Subproject

2. The subproject in Sihanoukville consists of three components summarized in Table 1.

Table 1: Summary of subproject components of Sihanoukville

Component	General Specifications
Solid Waste Management	<ul style="list-style-type: none">• Renovated existing landfill• Improved solid waste management system;• Improved waste sorting process at landfill
Urban Drainage	<ul style="list-style-type: none">• New separated stormwater collection network

II. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

3. At the feasibility stage the management framework¹ for the implementation of the environmental management plan for the subproject is summarized as follows. The Ministry of Public Works and Transport (MPWT) which is the executing agency (EA) for the project will take overall responsibility for successful implementation of the EMP. The EA will establish a Phnom Penh-based Project Steering Committee (PSC). The General Department of Public Works (GDPW) will be the project implementation agency (IA) in which a project management unit (PMU) will be assigned for the entire subproject. The IA/PMU will implement the EMP with an internally assigned Safeguards Officer (SO). The PMU/SO will lead the implementation of the EMP in conjunction with the Environmental Officer(s) (EO) of the construction contractor(s).

4. The EA/PSC will provide operational guidance to the IA/PMU for implementation of the EMP and will liaise with the ADB on safeguard reporting and issues. The SO of the PMU/IA will oversee the work of the EO of the contractor(s) on the implementation of the CEMP² for particular construction packages.

5. External support for the implementation of the EMP will be provided by the International and National Environment Specialists (ES) of the Project Management Implementation Support (PMIS) who will have a budget for an external Environmental Monitoring Consultant (EMC). The EMC will conduct any required field sampling, and laboratory analyses of field samples (e.g., water quality, air quality) that cannot be performed by the contractor or PIU. Provided below is a summary of responsibilities for implementation of the EMP.

¹ Adapted from Interim Report 12/14.

² Contractor Environmental Management Plan prepared by contractor as part of bid documents based on updated EMP

6. The responsibilities of the EA as supported by PSC include:
 - Provide coordination for environmental and social safeguards and monitoring;
 - Liaise with ADB on the implementation of the EMP; and
 - Coordinate resolution with IA, and ADB if necessary with issues arising from the implementation of EMP.

7. The responsibilities of the Safeguards Officer (SO) of the PIU/PMU include:
 - Assist PMIS with updating the EMP to meet final detailed subproject designs;
 - Notify MPWT to verify that Government approvals of project are met, and that the EMP is compliant with requirements of Royal Government of Cambodia (RGC) sub-decree on EIA, No 72 ANRK.BK, issued by the Ministry of Environment (MOE, 1999);
 - Assist the PMIS with inclusion of CEMP requirements in bidding documents, including bid evaluations, based on the updated EMP;
 - Undertake day to day management of EMP implementation activities;
 - Work with EMC on implementation of monitoring plan of EMP;
 - Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as the GAP and resettlement plans);
 - Lead follow-up meetings with all affected stakeholders;
 - Prepare and submit quarterly reports on EMP implementation to the I/VEA;
 - Oversee implementation of the CEMP by contractor;
 - Coordinate with ES of PMIS for EMP implementation;
 - Undertake regular construction site inspections to ensure contractor implements the CEMP properly; and
 - Ensure the contractor's EO submits monthly reports on construction mitigations and monitoring.

8. The responsibilities of the Environmental Specialists of the PMIS are detailed in the Terms of Reference for the two positions in Annex 1. Their key responsibilities for the EMP are listed below:
 - Update the EMP to meet final detailed design requirements of subprojects;
 - Provide technical direction and support to SO/PMU for implementation of the EMP;
 - Oversee the design and delivery of capacity development and training of PMU staff and the contractor's EO ;
 - Provide advice and support to the EMC with their monitoring activities;
 - Review all reports prepared by the PIU and EMC for EA/PSC and ADB; and
 - Review and inspect the location of any possible contaminated sites near subprojects.

9. The responsibilities of Environmental Officer (EO) of Contractor include:
 - Implement the CEMP during the construction phase of subproject; and
 - Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental issues at construction sites.

10. The responsibilities of Environmental Monitoring Consultant (EMC) include:

- Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and PIU/PMU.
- Perform required laboratory analyses for the monitoring program detailed in EMP; and
- Prepare and submit quarterly reports to the PMIS and PIU on monitoring activities.

11. The implementation of the EMP as part of the overall environmental due diligence (DD) of the subproject is conducted alongside the separate parallel DD of the government. Table 2 reproduces the summary table of environmental due diligence from the IEE. Table 2 shows that the ADB IEE and loan is approved well before the government EIA/IEIA is initiated, and that the EA must approve the ADB IEE and EMP by formal letter. The ADB IEE/EMP is not contingent on compliance with any specific government regulation.

Table 2. Summary of environmental due diligence during project implementation

Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Cambodia	PMIS / Contractor	
Feasibility design				
Initial stakeholder disclosure & consultation	PPTA	EA assists		
Draft IEEs and EMPs	PPTA			Draft IEEs & EMPs completed
Finalize IEEs and EMPs	ADB review & approves IEE/EMPs			ADB approved IEE/ EMPs as per SPS (2009).
		EA reviews and approves IEE/EMPs		EA approved IEE/ EMPs with formal letter only. Compliance with specific RGC / EA regulations not required
Loan documents (PAM/RRP)	Document preparation, approval by ADB	Review & approval of PAM		Loan approval
Detailed engineering design				
Continued stakeholder disclosure & consultation		IA/PIU lead	ES support to PMIS	As per PCP (2012) ³ stakeholder disclosure and consultations continue throughout construction phase coincident with initiation of GRM.
Update EMPs		Support to ES	Lead by ES	Approval of updated EMP by EA and ADB
Initiation of Cambodia environmental DD		EA leads with oversight from MOE		DOE approved CAM IEE or IEIA follows independently

³ ADB Public Communication Policy (2012)



Design and Implementation	Environmental DD and Approvals			Milestones & Notes
	ADB / PPTA	Cambodia	PMIS / Contractor	
Tendering / contract award				
EMPs included in tender documents		Lead by EA/IU	Support by ES	
Tenders let and bids prepared		Lead by EA	Contractor drafts CEMP	CEMPs prepared and included in contractor bids
Construction packages	Input from ADB		CEMPs reviewed by ES/PMIS	Construction package awards
Construction & supervision				
Implementation of mitigation and monitoring plans		Support from IU/PIU	By contractor with support from ES	CEMP implemented by contractor, other aspects of EMP overseen by ES
Continued stakeholder disclosure and consultation		IA/PIU lead	Support from ES	As part of GRM
Monitoring reporting	To ADB	IA/PIU lead preparation of regular reports to ADB	Support from ES	Reports provide input for review missions

12. The Department of Environment (DOE) is the provincial agency which oversees environmental management of Sihanoukville. The DOE with district staff provide direction and support for environmental protection-related matters including application of the Law on Environmental Protection and Natural Resources Management, enacted by National Assembly, 1996, promulgated by Preah Reach Kram/NS/RKM-1296/36; and environmental standards

13. The ADB provides guidance to EA/PSC with any issues related to EMP and reviews quarterly reports on EMP activities compiled and submitted by the EA which are disclosed on ADB website pursuant to ADB Policy on Public Communication (2011).

A. Worker and Community Health and Safety

14. In 2003 the International Labour Organization (ILO) created the New Global Strategy for Occupational Safety and Health (OSH). Based on the OSH⁴, the Ministry of Labour and Vocational Training (MLVT) through the Department of Occupational Safety & Health is developing the Occupational Safety and Health Master Plan (OSHM; 2009-2013) of Cambodia.

15. The emerging OSHM, *inter alia*, addresses worker and public safety in the construction and operation of small-medium enterprises and notably rural roads. The EA/PSC as supported by the IUs must obtain and implement the directives of the OSH Master Plan. The pertinent associated law and directives is the Labour Law of Cambodia (1997) with specific reference to chapter VIII governing health and welfare of workers and the public.

⁴ ILO. 2009. Asean-Oshnet, Occupational Safety and Health Practices.

16. To supplement the OSHM the IFC/World Bank Environment, Health, and Safety Guidelines (2007) should also be consulted the IFC EHS guidelines currently provide the international standard for worker and public safety.

17. ADB assists the PSC with timely guidance at each stage of project implementation following agreed implementation arrangements and reviews all documents that require ADB approval including environmental safeguards.

B. Regulatory Framework for Sihanoukville Subproject Components

18. Regulations and guidelines that apply to the construction of the new WWTP, and renovated landfill in Sihanoukville are summarized in Table 3. The current environmental standards for Cambodia are provided in Annex 2. See the IEE for complete the legal and regulatory framework for environmental management in Sihanoukville province.

Table 3: Regulations and guidelines applicable to subproject.

Solid Waste Management
<ul style="list-style-type: none"> • Law on Environmental Protection and Natural Resources Management, enacted by National Assembly, 1996, promulgated by Preah Reach Kram/NS/RKM-1296/36; <ul style="list-style-type: none"> ○ Sub-decree on Water Pollution Control (1999): <ul style="list-style-type: none"> - Annex 4: Water quality standards for public water & biodiversity; ○ Sub-decree on Solid Waste Management, No 36 ANRK/BK (1999): • Directive for Managing Health Wastes in the Kingdom of Cambodia (MOH, 2008).

III. SUMMARY OF POTENTIAL IMPACTS

19. The potential impacts of the Sihanoukville subproject from the IEE are summarized in Table 4. Potential impacts concern the civil works during the construction phase of the subproject. The short-term disturbances of the construction and civil works activities will be noise, dust, reduced access, increased traffic and risk of traffic accidents, worker and public safety, soil erosion, and solid and liquid waste can be managed and mitigated.

Table 4: Summary of potential environmental impacts and mitigations of subproject

Pre-construction Phase
<ul style="list-style-type: none"> • No resettlement or land compensation
Construction Phase
<p><u>Upgraded drainage, and renovated landfill.</u></p> <ul style="list-style-type: none"> • Disturbances & impacts from civil works such as reduced and/or blocked public access to areas, disrupted business and recreation, noise, dust caused by increased truck traffic and heavy equipment use, soil and surface water pollution caused by equipment operation and

maintenance, public and worker accidents, increased traffic congestion & traffic accidents, land erosion, localized drainage and flooding problems, solid waste and domestic pollution from worker camps, and communicable disease and community problems caused by migrant workers.

Upgraded Drainage

- Street disruptions caused trench method of drainage upgrades minimized by starting and completing finite sections of drains.
- Disturbances to public area from enhancements minimized with disclosure of construction schedules for resident and business planning

Operation Phase

Solid Waste Management

- Groundwater quality contamination from renovated landfill avoided with regular monitoring of groundwater quality with site bore wells, and from sufficient O&M to maintain landfill in good working order

Improved Drainage

- Flooding events prevented with regular cleaning and maintenance of upgraded drains.

A. Public Consultation

20. The stakeholder consultation strategy that was developed for the IEE will be continued with the start of the pre-construction phase of the subproject. The first step will be the disclosure of the draft IEE to the affected stakeholders that were consulted to obtain their review and comment.

1. Follow-up Consultation

21. As indicated in the IEE, the primary concern of the public and stakeholders of the subproject were disturbances during construction phase of the subproject components. These issues will be reviewed during follow-up consultations throughout the pre-construction, construction, and operation of the completed subproject components.

IV. MITIGATION PLAN

22. The mitigation measures of the EMP are presented in the mitigation plan for the subproject in Table 5. Following the structure of the IEE, the mitigation plan is organized by the three development phases of the subproject defined by the pre-construction; construction; and the post construction operational phase. The mitigation plan addresses the environmental issues and concerns raised at the stakeholder meetings.

23. The mitigation plan combines common construction phase impacts of the renovated existing landfill, and improved drainage for which single mitigation measures are prescribed. In this way redundant mitigation measures are not re-stated numerous times. However, impacts and required mitigations specific to a subproject component are identified. Or, common mitigations that are particularly important for a subproject component are underscored. The mitigation plan identifies potential impacts, required mitigations, responsible parties, location, timing, and indicative costs. The mitigation plan is decidedly comprehensive in order for it to be easily updated at the detailed design phase to fully address the potential impacts of the final subproject designs.

Table 5: Environmental impact mitigation plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
<i>Pre-Construction, Detailed Design Phase</i>								
Confirmation of no required resettlement, relocations, & compensation	No negative environmental impacts	1. Affected persons well informed well ahead of subproject implementation.	All affected persons in subproject areas	Before project implemented	See resettlement plans	See resettlement plan	EA/IA	Resettlement committees
Disclosure, & engagement of community	No community impacts	2. Initiate Information Disclosure and Grievance process of IEE	For all construction sites.	Beginning of project	Quarterly	No marginal cost ⁶	PMU	PIU
Government approvals	No negative impact	3. Notify DOE of subproject initiation to complete EA requirements, and obtain required project permits and certificates.	Entire subproject	Before construction	As required	No marginal cost	PIU/DoE	DoE
Detailed designs of subproject,	Minimize negative environmental impacts	4. Work with PMIS ⁷ to complete detailed designs of the, landfill renovations, and upgraded drainage. Ensure the following measures are included: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) no, or minimal disruption to village water supplies along access roads, utilities, and electricity with contingency plans for unavoidable disruptions; d) no, or minimal disruption to normal pedestrian and vehicle traffic along all road segments with contingency alternate routes; e) for residential areas include specific plan to notify & provide residents and merchants of construction activities & schedule to minimize disruption to normal commercial and residential activities.	Final siting	Before construction initiated	Once with detailed designs documents	No, marginal cost	PMIS	IA/PPIU
Update EMP	Positive environmental impacts	5. Review and finalize draft TOR for required groundwater study at existing landfill site. Contact potential consultants in Phnom Penh. 6. Identify any new potential environmental impacts of	All sites	Before construction initiated	Once with detailed designs documents		PMIS	PMU/PIU

⁵ Costs will need to be updated during detailed design phase.

⁶ No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

⁷ PMIS is detailed design and supervision consultant.



Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
		<p>subproject and include in EMP.</p> <p>7. Update mitigation measures and monitoring requirements of EMP where necessary to meet detailed designs, and to protect affected environments.</p> <p>8. Submit updated EMP with new potential impacts to ADB to review.</p> <p>9. Develop individual management subplans for: a) Construction drainage; b) Erosion; c) Noise and Dust; d) Contaminated Spoil Disposal; e) Solid and Liquid Waste Disposal; f) Construction & Urban Traffic; g) Utility and Power Disruption; h) Worker and Public Safety; i) Tree and Vegetation Removal and Site Restoration; j) Construction Materials Acquisition, Transport, & Storage, and k) Cultural chance finds.</p>						
Create awareness of physical cultural resources in area	No negative environmental impact	10. Dept of Tourism to review potential locations of physical cultural resources, and explain possible PCR to contractors and PMIS	All subproject areas	Before construction begins	Once	No marginal cost	DoT	DOT/PIU
UXO survey, & removal	Injured worker or public	11. Ensure Government is consulted for UXO, and clears areas where necessary	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	PMU/PIU	Government
Obtain & activate permits and licenses	Prevent or minimize impacts	12. Contractors to comply with all statutory requirements set out by Government for use of construction equipment, and operation construction plants such as concrete batching.	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Develop bid documents	No negative environmental impact	13. Ensure updated EMP is included in contractor tender documents, and that tender documents specify requirements of CEMP must be budgeted. 14. Specify in bid documents that contractor must have experience with implementing EMPs, or provide staff with the experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMIS	PIU
Capacity development	No negative environmental impact	15. Develop and schedule training plan for (PIU/SO) to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 16. Create awareness and training plan for contractors whom will implement mitigation measures.	All subproject areas	Before construction begins	Initially, refresher later if needed	No marginal cost	PMIS	PMIS
Recruitment of workers	Spread of sexually transmitted	17. Use local workers as much as possible thereby reducing number of migrant worker	All work forces.	Throughout construction phase	Worker hiring stages	No marginal cost	PMU/PIU	Contractor's bid documents

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
Construction Phase of Renovations to Existing Landfill, and Upgraded Drainage								
Initiate EMP & sub-plans,	Prevent or minimize impacts	18. Initiate updated EMP & CEMP including individual management sub-plans for different potential impact areas that are completed in pre-construction phase (see sub-plan guidance below). 19. Locate worker camps away from human settlements. 20. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 21. A solid waste collection program must be established and implemented that maintains a clean worker camps and separate pit latrines for male and female workers away from worker living and eating areas. 22. Locate separate pit latrines for male and female workers away from worker living and eating areas. 23. A clean-out or infill schedule for pit latrines must be established and implemented to ensure working latrines are available at all times. 24. Worker camps must have adequate drainage. 25. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 26. Transient workers should not be allowed to interact with the local community. HIV/Aids education should be given to workers. 27. Camp areas must be restored to original condition after construction completed.	For all construction sites	Beginning of construction	Once	No marginal cost	PMIS	PIU & contractors
Worker camps	Pollution and social problems		All worker camps	Throughout construction phase	Monthly	No marginal cost	PMIS/PIU	contractor
Training & capacity	Prevent of impacts through education	28. Implement training and awareness plan for PIU/SO and contractors.	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMIS	PMIS/PIU
DBST production, and application (if used)	Air pollution, land and water contamination, and traffic & access problems,	29. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non-traffic areas 30. Stored DBST materials well away from all human activity and settlements, and cultural (e.g., schools, hospitals), and ecological receptors. Bitumen production and handling areas should be isolated. 31. Contractors must be well trained and experienced with the production, handling, and application of bitumen. 32. All spills should be cleaned immediately and handled as per hazardous waste management plan, and according to Government regulations. 33. Bitumen should only be spread on designated road beds, not on other land, near or in any surface waters,	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
Implement spoil management subplan	Contamination of land and surface waters from excavated spoil, and construction waste	<p>or near any human activities.</p> <p>34. Bitumen should not be used as a fuel.</p> <p>35. Uncontaminated spoil to be disposed of in Government-designated sites, which must never be in or adjacent surface waters. Designated sites must be clearly marked and identified.</p> <p>36. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, or on/near any other culturally or ecologically sensitive feature.</p> <p>37. Where possible spoil should be used at other construction sites, or disposed in spent quarries or borrow pits.</p> <p>38. A record of type, estimated volume, and source of disposed spoil must be recorded.</p> <p>39. Contaminated spoil disposal must follow Government regulations including handling, transport, treatment (if necessary), and disposal.</p> <p>40. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per Government regulations.</p> <p>41. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.</p>	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMIS & PIU & DoE	contractor
		<p>42. Management of general solid and liquid waste of construction will follow Government regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.</p> <p>43. Areas of disposal of solid and liquid waste to be determined by Government.</p> <p>44. Disposed of waste should be catalogued for type, estimated weight, and source.</p> <p>45. Construction sites should have large garbage bins.</p> <p>46. 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>47. Solid waste should be separated and recyclables sold to buyers in community.</p> <p><u>Hazardous Waste</u></p> <p>48. Collection, storage, transport, and disposal of</p>						

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ³ (\$)	Responsibility	
							Supervision	Implementation
		<p>hazardous waste such as used oils, gasoline, paint, and other toxics must follow Government regulations. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents)</p> <p>49. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors.</p> <p>50. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.</p> <p>51. Regularly apply wetting agents to exposed soil and construction roads.</p> <p>52. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates.</p> <p>53. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work is completed.</p> <p>54. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving.</p> <p>55. Maintain equipment in proper working order</p> <p>56. Replace unnecessarily noisy vehicles and machinery.</p> <p>57. Vehicles and machinery to be turned off when not in use.</p> <p>58. Construct temporary noise barriers around excessively noisy activity areas where possible.</p> <p>59. Develop carefully a plan of days and locations where outages in utilities and services will occur, or are expected.</p> <p>60. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages.</p> <p>61. Contact affected community to inform them of planned outages.</p> <p>62. Try to schedule all outages during low use time such between 24:00 and 06:00.</p> <p>63. Contact provincial forestry department for advice on how to minimize damage to trees and vegetation</p> <p>64. Restrict tree and vegetation removal to within ROWs.</p> <p>65.</p>						
Implement noise and dust sub-plan	Dust Noise		All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor
Implement utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity		All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU & Utility company	contractor
Implement tree and vegetation	Damage or loss of trees, vegetation, and		All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
removal, and site restoration sub-plan	landscape	<p>66. Within RoWs minimize removals, and install protective physical barriers around trees that do not need to be removed.</p> <p>67. All RoWs to be re-vegetated and landscaped after construction completed. Consult provincial forestry department to determine the most successful restoration strategy and techniques. Three trees should be replanted for each tree that has to be removed.</p>						
Implement erosion control sub-plan	Land erosion	<p>68. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas.</p> <p>69. Earthworks should be conducted during dry periods.</p> <p>70. Maintain a stockpile of topsoil for immediate site restoration following backfilling.</p> <p>71. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready.</p> <p>72. Re-vegetate all soil exposure areas immediately after work is completed.</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Implement worker and public safety sub-plan	Public and worker injury, and health	<p>73. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites.</p> <p>74. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites.</p> <p>75. Worker and public safety guidelines Government should be followed. See draft Occupational Safety & Health Master Plan of Ministry of Labor & Vocational Training (MLVT).</p> <p>76. Population near blast areas should be notified 24 hrs ahead, and evacuated well before operation. Accepted Government blast procedures and safety measures implemented.</p> <p>77. 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 in Sihanoukville.</p> <p>78. Standing water suitable for disease vector breeding should be filled in.</p> <p>79. Worker education and awareness seminars for construction hazards should be given at beginning of construction phase, and at ideal frequency of monthly. A construction site safety program should be developed and distributed to workers.</p>	All construction sites.	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
		<p>80. Appropriate safety clothing and footwear should be mandatory for all construction workers.</p> <p>81. Adequate medical services must be on site or nearby all construction sites.</p> <p>82. Drinking water must be provided at all construction sites.</p> <p>83. Sufficient lighting be used during necessary night work.</p> <p>84. All construction sites should be examined daily to ensure unsafe conditions are removed.</p>						
Civil works	Degradation of water quality & aquatic resources	<p>85. Protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and nearby surface waters.</p> <p>86. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion.</p> <p>87. Earthworks should be conducted during dry periods.</p> <p>88. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters.</p> <p>89. No waste of any kind is to be thrown in surface waters.</p> <p>90. No washing or repair of machinery near surface waters.</p> <p>91. Pit latrines to be located well away from surface waters.</p> <p>92. No unnecessary earthworks in or adjacent to water courses.</p> <p>93. No aggregate mining from rivers or lakes.</p> <p>94. All irrigation canals and channels to be protected the same way as rivers, streams, and lakes</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works	Degradation of terrestrial resources	<p>95. All construction sites should be located away forested or all plantation areas as much as possible.</p> <p>96. No unnecessary cutting of trees.</p> <p>97. All construction fluids such as oils, and fuels should be stored and handled well away from forested and plantation areas.</p> <p>98. No waste of any kind is to be discarded on land</p> <p>99. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights.</p> <p>100. Post speed limits, and create dedicated construction vehicle roads or lanes.</p> <p>101. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads.</p>	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Implement construction and urban traffic sub-plan	Traffic disruption, accidents, public injury		All construction sites	Fulltime	Monthly	No marginal cost	PMIS & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ⁵ (\$)	Responsibility	
							Supervision	Implementation
		102. Delineate additional locations where pedestrians can develop road crossings away from construction areas. 103. Increase road and walkway lighting. 104. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 105. Manage to not allow borrow pits and quarries to fill with water. Pump periodically to land infiltration or nearby water courses. 106. Install temporary storm drains or ditches for construction sites 107. Ensure connections among surface waters (ponds, streams) are maintained or enhanced to sustain existing storm water storage capacity. 108. Protect surface waters from silt and eroded soil. 109. As per detailed designs all civil works should be located away from all cultural property and values. DoT identified potential sites and types of PCR in pre-con phase.						
Implement construction drainage sub-plan	Loss of drainage & flood storage		All areas with surface waters	Design & construction phases	Monthly	No marginal cost	PMIS & PIU	contractor
Civil works: cultural chance finds sub-plan	Damage to cultural property or values, and chance finds	110. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 111. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DoT notified by telephone if valuable. 112. Work at find site will remain stopped until DoT allows work to continue.	All construction sites	At the start, and throughout construction phase	Monthly	No marginal cost	PMIS & PIU	contractor
Post-construction Operation of Renovated Landfill								
Improved garbage collection and transport	Increased risk of accident or injury.	130. Enforce well marked speed limits along road where needed, and educate local villages on road safety.	Existing collection and access roads	Fulltime	Biannual	O&M		DPWT
	Increased air pollution & noise	131. Ensure vehicles maintained in proper working condition						
Operation of renovated landfill	Contamination of groundwater	132. Groundwater wells installed during groundwater study should be maintained and used to monitor influence of renovated landfill on groundwater quality	At existing landfill	Throughout live span of landfill	Biannual	O&M		DPWT
Post-construction Operation of Upgraded Drains								
Operation of	Periodic back-	133. Improved drains must be regularly cleaned and	Along all	Before/after	Biannual	O&M		DPWT

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ^c (\$)	Responsibility	
							Supervision	Implementation
drains	up and local flooding	surfaced to maintain design capacity flows	upgraded drains	rainy season				

V. MONITORING PLAN

24. The environmental monitoring plan for the EMP is provided 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 2 summarizes the responsibilities for monitoring during the construction-implementation of the subproject.

A. Environmental Standards for Subproject Components

25. Environmental standards for ambient water quality for Cambodia are found in Annex 2. The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) (e.g., ambient air quality and noise) should be followed to supplement standards that are not provided by the Government.

26. An independent environmental monitoring consultant (EMC) will be required to implement the environmental monitoring program. The EMC will be responsible for the sampling of environmental parameters that must be analyzed in a laboratory. The SO and EO will coordinate with the EMC. The PMIS/PIU will provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

B. Performance Monitoring

27. Performance monitoring is required to assess the overall performance of the EMP. A project performance monitoring system will be developed by the EA for the entire subproject. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 7.

VI. REPORTING

28. Regular reporting on the implementation of mitigation measures and on monitoring activities during construction phase of the subproject is required. Reporting is the responsibility of PIU and should be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Table 5 and Table 66) summarize proposed timing of reporting. A report on environmental monitoring and implementation of EMP will be prepared quarterly for the EA/PSC by the IA. The IA report will compile monthly reports provided by the EO of contractor, the reports of the EMC on monitoring, and input from the ES of the PMIS. The IA report will also be sent to the DOE and to the PSC for consolidation and transmission to ADB quarterly.

29. The reports will assess all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 7), and will include relevant Government environmental quality standards. Templates for the monitoring reports to be prepared by the EO, PIU, and EMC will be developed by the ES of the PMIS at detailed design. Annex 3 provides a monitoring report template for the PIU that the PIU with assistance from the PMU and PMIS must complete and attach as part of regular PIU reporting to the PMU/IA.

Table 6: Environmental monitoring plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated ⁸ Cost (USD)
					Supervision	Implementation	
Pre-construction Phase – Update Baseline Conditions							
Where needed update baseline on sensitive receptors (e.g., cultural property & values, schools or hospitals, critical habitat)	A) Town centre	Contact DOE, community consultations	Once	Once	PMU/PIU	Environmental Monitoring Consultant	\$1,000.
A) Qualitative air quality: dust, noise, wind, and vibration levels	A): Town centre	Using field and analytical methods approved by DoE.	One day and one night measurement during rainy & dry seasons.	One baseline supplement report before construction phase starts	PIU	Environmental Monitoring Consultant	A) \$1,000. B) \$30,000
B) Water table depth and groundwater quality (see groundwater study TOR in Appendix E IEE)	B): At existing landfill site						
Inventory of present and past land uses that could cause contaminated soil.	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoE.	Once	Once	PIU	Environmental Monitoring Consultant	\$500.
Construction Phase of all Subproject Components							
Analysis of soil quality (heavy metals (As, Cd, Pb, oil & grease, hydrocarbons).	Possible contaminated lands at all excavation sites	Using field and analytical methods approved by DoE.	Once if needed	Once	PIU	Environmental Monitoring Consultant	\$2,000.
A) Qualitative air quality: dust, noise, wind, temperature, and vibration levels	A): Baseline sites of pre-construction phase.	A: Using field and analytical methods approved by DoE. Include visual observations of	A): Quarterly during construction periods	Monthly		A):	

⁸ Estimated costs will need to be updated with the EMP at detailed design stage.

ENVIRONMENTAL EFFECTS MONITORING								
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated ^a Cost (USD)	
					Supervision	Implementation		
B) Analysis of soil quality (heavy metals (As, Cd, Pb, Hg, Mn) and hydrocarbons. C) Domestic (worker) and construction solid waste inside & outside construction sites including worker camps. D) Public comments and complaints E) Incidence of worker or public accident or injury	B) At sites where contaminated soil is suspected. C) All construction sites and worker camps D) Using hotline number placed at construction areas E) At all construction areas	dust and noise from contractor & public reports. C) Visual observation D) Information transferred by telephone hotline number posted at all construction sites. E) regular reporting by contractors/PIU	Daily visual records B) Once at start of excavations C) Monthly D) Continuous public input E) Continuous		PIU	Monitoring Consultant	A: \$1,000./yr C: \$0.0	
					(E & F) & daily observations:			D: \$1,000./yr E: \$0.0
					PMU/PIU	contractor		
Operation of Renovated Landfill								
Groundwater quality (see groundwater study in Appendix E of IEE Traffic accidents	Bore wells at landfill. Access roads.	Using field and analytical methods approved by DoE. Regular record keeping.	Biannually for 5 years Continuously	Biannual For each event	DPWT DPWT	\$2000. /yr \$0.0		

Table 7. Performance monitoring indicators for Sihanoukville subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation and Disclosure	Affected public and stakeholders	Meetings with stakeholders contacted during IEE & new stakeholders convened for follow-up consultation and to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Updated EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP) ⁹	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of PMU/PIU/SO	Training course(s) & schedule	By end of preconstruction phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Construction Phase			
All subproject areas	Critical habitat, rare or endangered species <i>if present</i>	All <i>present</i> critical habitat and R & E species if unchanged, and unharmed	Monitoring by EMC ¹⁰
Groundwater quality	Heavy metals, coliform bacteria, TDS, H ₂ S, BOD ₅ , TN, NH ₃ , TP, nutrient forms of N & P ¹¹	Government environmental standards and criteria met	Monitoring by EMC
Air quality	Dust, noise, vibration	Levels never exceed pre-construction baseline levels	EMC & contractor monitoring reports,
Soil quality	Solid and liquid waste	Rigorous program of procedures and rules to collect and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Hazardous materials and waste	Oil, gasoline, grease, alum, chlorine, soda	Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	Contractor and EMC monitoring reports
Public and worker safety	Frequency of injuries	Adherence to Government policy and site-specific procedures to prevent accidents ¹²	Contractor reports
Cultural property	Incidence of damage or complaints	No valued cultural property, or unearthed valuable relic is harmed in any way	Public input, contractor reports, public input, EMC reports
Traffic	Frequency of disruptions and/or blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Operation of Renovated Landfill			

⁹Contractor Environmental Management Plan developed from EMP in contractor bidding document

¹⁰Environmental Monitoring Consultant hired to assist implementation of Environmental Monitoring Plan

¹¹ See Annex 2 for environmental standards, analyzed by laboratory facilities in Phnom Penh.

¹² MLVT's new Occupational Safety & Health Master Plan needs to be applied , or IFC World Bank EHS (2007)

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Groundwater quality	Heavy metals, coliform bacteria, TDS, H ₂ S, BOD ₅ , TN, NH ₃ , TP, nutrient forms of N & P	No deviation from background levels, compliance with standards Appendix 2	DPWT/DOE
Public safety	Incidence of traffic accidents on access roads	No deviation from baseline frequency	DPWT

VII. ESTIMATED COST OF EMP

30. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures during the construction phase are included with the construction costs in contractor bid documents.

31. From Table 6 the preliminary costs for the implementation of the EMP for the passenger pier development in Sihanoukville are summarized in Table 8. These costs include per diem technician fees. Note that a margin of cost uncertainty/contingency to the total EMP cost has been added. These costs include per diem technician fees.

32. An estimated budget of \$30,000 is allocated for the groundwater study including bore hole construction at the new and old landfill sites (Appendix E of IEE). An estimated budget of \$10,000 is required for capacity building and training for environmental management for PIU/PMU in conjunction with other capacity development activities of the subproject. The costs will need to be reviewed and updated by the PMIS in conjunction with the PIU during the pre-construction phase.

Table 8: Estimated costs for environmental monitoring plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	\$1,000
environmental quality	\$2,500
groundwater study at landfills and WWTP	\$30,000
Construction Phase	
environmental quality	\$4,000
public consultation	\$2,000
Post-construction Operation Phase	
environmental quality	\$10,000
public input	\$0.0
Training and capacity development	\$10,000
Total	\$59,500

VIII. EMERGENCY RESPONSE PLAN

33. The Contractor must develop emergency or incident response procedures during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

- i) Emergency Response Team (ERT) of the Contractor as initial responder;
- ii) The District fire and police departments, emergency medical service, the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

34. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 9: Roles and responsibilities in emergency incident response

Entity	Responsibilities
Contractor Team (ERT)	<ul style="list-style-type: none"> - Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary & requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	<ul style="list-style-type: none"> - Solves the emergency/incident
Contractor Resources	<ul style="list-style-type: none"> - Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of subproject progress.

35. The ERT will be led by the Contractor's senior engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

36. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

37. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PSC/PIU, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

- i) Subproject sites;
- ii) construction time frame and phasing;
- iii) any special construction techniques and equipment that will be used; i
- iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
- v) the Contractor's Emergency Management Plan
- vi) names and contact details of the ERT members



38. The objective of this meeting is to provide the ultimate response institutions the context for:

- i) their comments on the adequacy of the respective Emergency Management Plans
- ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
- iii) the arrangements for coordination and collaboration.

39. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

- i) set up the ERT;
- ii) set up all support equipment and facilities in working condition
- iii) made arrangements with the EERT;
- iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force;
- v) conduct orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and
- vi) conduct drills for different possible situations.

40. To sustain effective emergency response throughout subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

A. Alert Procedures

41. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: (i) audible alarm (siren, bell or gong); (ii) visual alarm (blinking/rotating red light or orange safety flag); (iii) telephone (landline); (iv) mobile phone; (v) two-way radio; and (vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

- (i) Whoever detects an emergency situation first shall immediately :
 - call the attention of other people in the emergency site,
 - sound the nearest alarm, and/or
 - report/communicate the emergency situation to the ERT.
- (ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.
- (iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: (i) the type of emergency situation; (ii) correct location of the emergency; (iii) estimated magnitude of the situation; (iv) estimated persons harmed; (v) time it happened; (vi) in case of a spill, which hazardous substance spilled; and (vii) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

For an effective reporting/alerting of an emergency situation:

- (i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
 - Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
 - EERT institutions/organizations
 - Concerned village authority/ies
 - PIU Office, SS
- (ii) All subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.
- (iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

B. Emergency Response Situations

45. The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 10: Evacuation procedure

Procedure	Remarks
<ul style="list-style-type: none"> • Move out as quickly as possible as a group, but avoid panic. 	<ul style="list-style-type: none"> • All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
<ul style="list-style-type: none"> • Evacuate through the directed evacuation route. 	<ul style="list-style-type: none"> • The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
<ul style="list-style-type: none"> • Keep moving until everyone is safely away from the emergency site and its influence area. 	<ul style="list-style-type: none"> • A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
<ul style="list-style-type: none"> • Once outside, conduct head counts. 	<ul style="list-style-type: none"> • Foremen to do head counts of their subgroups; ERTL/Deputy ERTL of the ERT.
<ul style="list-style-type: none"> • Report missing persons to EERT immediately. 	<ul style="list-style-type: none"> • ERTL/Deputy ERTL to communicate with the EERT.
<ul style="list-style-type: none"> • Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group 	<ul style="list-style-type: none"> • ERT to manage injured persons to ensure proper handling.
<ul style="list-style-type: none"> • If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed by the EERT. 	<ul style="list-style-type: none"> • ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 11: Response procedure during medical emergency

Procedure	Remarks
<ul style="list-style-type: none"> • Administer First Aid regardless of severity immediately. 	<ul style="list-style-type: none"> • Fundamentals when giving First Aid: <ul style="list-style-type: none"> - Safety first of both the rescuer and the victim. - Do not move an injured person unless: <ul style="list-style-type: none"> - victim is exposed to more danger when left where they are, e.g., during fire, chemical spill - it would be impossible for EERT to aid



Procedure	Remarks
	<ul style="list-style-type: none"> victims in their locations, e.g., under a collapsed structure - instructed or directed by the EERT. • First Aid to be conducted only by a person who has been properly trained in giving First Aid.
<ul style="list-style-type: none"> • Call the EERT emergency medical services &/or nearest hospital. 	<ul style="list-style-type: none"> • ERTL/Deputy ERTL or authorized on-site emergency communicator
<ul style="list-style-type: none"> • Facilitate leading the EERT to the emergency site. 	<ul style="list-style-type: none"> • ERTL/Deputy ERTL to instruct: <ul style="list-style-type: none"> - an ERT member on-site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. - Other ERT members to clear access road for smooth passage of the EERT.
<ul style="list-style-type: none"> • If applicable, vacate site & influence area at once, restrict site, suspend work until further notice. 	<ul style="list-style-type: none"> • Follow evacuation procedure.

Table 12: Response procedure in case of fire

Procedure	Remarks
<ul style="list-style-type: none"> • Alert a fire situation. 	<ul style="list-style-type: none"> • Whoever detects the fire shall immediately: <ul style="list-style-type: none"> - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) - report/communicate the emergency situation to the ERTL/Deputy ERTL.
<ul style="list-style-type: none"> • Stop all activities/operations and evacuate. 	<ul style="list-style-type: none"> • All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
<ul style="list-style-type: none"> • Activate ERT to contain fire/control fire from spreading. 	<ul style="list-style-type: none"> • Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
<ul style="list-style-type: none"> • Call the nearest fire & police stations &, if applicable, emergency medical services. 	<ul style="list-style-type: none"> • When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
<ul style="list-style-type: none"> • Facilitate leading the EERT to the emergency site. 	<ul style="list-style-type: none"> • ERTL/Deputy ERTL to instruct: <ul style="list-style-type: none"> - an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. - some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
<ul style="list-style-type: none"> • ERT to vacate the site as soon as their safety is assessed as in danger. 	<ul style="list-style-type: none"> • Follow appropriate evacuation procedure.

IX. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

46. Currently there is little experience and capacity for environmental assessment and management amongst national counterparts responsible for the implementation of the EMP, i.e., the DPWT/PMU in Sihanoukville province. No dedicated environmental staff exist in the DPWT and thus the PIU. The PMIS with assistance from the safeguards specialists of the subproject will develop and deliver training courses to the PIU/PMU staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen the ability of the PIU/PMU to oversee implementation of the EMP by construction contractors, and the EMC. The safeguards specialists, who will be full-time environmental member of the PIU, as well as the EO of the contractor, should attend training courses as required. Costs for training should be included with costs for implementation of the EMP.

47. Training on the implementation of an EMP should address two thematic areas. The first area should be principles environmental management focused on the potential impacts of subproject activities on the natural and social environment. The second area should be environmental safeguard requirements of the ADB and Government, with specific reference to the EMP.

ANNEX 1: INDICATIVE TORS FOR ENVIRONMENTAL SPECIALISTS OF PMIS

International Environmental Specialist. With assistance from the national environmental specialist the international consultant will be responsible for updating the subproject EMP at detailed design, and assisting the PIU with overall environmental management of the implementation of the subproject in Sihanoukville. The consultant will: (i) update environmental management plan (EMP) for the subproject in Sihanoukville to ensure that EMP addresses the detailed designs and engineering of the subproject. Updates to EMP include mitigation and monitoring plans, budget, and capacity development needs of executing agency (EA and IA (DPWT); (ii) with national consultant design comprehensive training plan for safeguards officer/PIU and on principles of EIA, and the purpose, content, and roles and responsibilities for implementation of updated EMPs highlighting environmental issues of subprojects; (iii) ensure that all relevant safeguards of the EMPs are adequately addressed in the bidding documents (instruction to bidders), and in the evaluation criteria for awarding contracts; (iv) Coordinate and work with the PIU to ensure that contractors finalize their respective site-specific CEMPs based on the updated EMP and the actual site conditions; (v) oversee the implementation of all safeguards of the EMP relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) Coordinate with the DPWT to finalize the groundwater monitoring program and landfill closure program for the new and old landfills; (vii) coordinate with the DPWT on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (viii) prepare ToR(s) for survey, detection, and removal of unexploded ordnance (UXO) at all civil works sites. Ensure that EA and/or IA consult Government authorities to assist with TOR development and implementation; (ix) with PIU, prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. Of particular concern is upgrades to access roads; (x) prepare TOR(s) for external national environment monitoring consultant (EMC) for conducting water and air quality sampling, and laboratory analyses for the monitoring plans for the provincial EMPs; (xi) coordinate with DPWT to address vehicle traffic issues; (xii) advise PIU on environment-related concerns arising during subproject construction, and recommend corrective measures; (xiii) with DPWT ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xiv) assist EA and IA prepare a table of contents for regular reports IA must submit to the EA on implementation of EMPs, environmental, issues, and corrective actions; (xv) assist PIU prepare simple report template for construction contractors to report monthly on mitigation activities, and environmental issues that occur during construction phase; and (xvi) prepare a quarterly status report on implementation of EMPs, environmental issues, and public safety protection to be submitted through the PIU and EA to the DPWT and ADB. The consultant should have an advanced university degree the environmental sciences and at least 7 years experience implementing and managing environmental assessment of infrastructure projects in southeast Asia countries (preferably Cambodia) including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with and supervising the activities of provincial and national environmental management agencies with environmental safeguards; and c) designing and delivering training and capacity development programs to provincial environment, subproject implementing units.



National Environmental Specialist. Provide assistance to the international environmental specialist including acquisition of information new information to update the subproject EMP at detailed design, and work with the PIU with overall environmental management of the implementation of the subproject in Sihanoukville. The national consultant will assist with: (i) updating environmental management plan (EMP) for subproject in Sihanoukville to ensure that EMP addresses the detailed designs and engineering of subproject; (ii) deliver initial training to DPWT/PMU on the purpose, content, and roles and responsibilities for implementation of updated EMP; (iii) ensure relevant safeguards of the EMP are addressed in the bidding documents in accurate local language and in evaluation criteria for awarding contracts; (iv) help PIU to ensure that contractors prepare their respective site-specific plans based on the updated EMP and the actual site conditions; (v) help the international consultant oversee the implementation of all safeguards of the EMP relating to construction phase activities including handling of construction spoil and waste, water and air quality protection, public nuisance impacts (noise, dust, traffic, blocked access, workers, and camps), and public safety; (vi) assist coordination with the DPWT on all relevant environmental regulatory compliance issues (e.g. noise and dust from construction sites, sanitation in workers campsite etc); (vii) with PIU prepare TORs for the follow-up interviews and consultations with the same affected stakeholder and local residents contacted during the PPTA on issues and concerns arising during project construction. Of particular concern is upgrades to access roads; (viii) assist DPWT to address vehicle traffic issues; (ix) with the international consultant advise the PIU on environment-related concerns arising during subproject construction, and recommend corrective measures; (x) with PIU ensure dissemination to stakeholders the results of environment quality monitoring and implementation of safeguards, especially among households or small businesses near the civil construction works areas; (xi) assist with all reporting for the EMP. The consultant should have a university degree in the environmental sciences and at least 5 years with environmental assessment of infrastructure projects in Cambodia including: a) understanding of ADB and national environmental safeguard requirements; b) experience working with international consultants; and c) delivering training and capacity development programs to subproject implementing units.

ANNEX 2: ENVIRONMENTAL STANDARDS FOR CAMBODIA

From Government Sub-decree on Water Pollution Control (1999)
<http://www.wepa-db.net/policies/law/cambodia/02.htm>

Table 1. Effluent standard for pollution sources discharging wastewater to public water areas or sewer access

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer
1	Temperature	°C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD5 (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO3)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO4)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO4)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
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 (NH3)	mg/l	< 5.0	< 7.0
35	DO	mg/l	> 2.0	> 1.0

36	Polychlorinated Biphenyl	mg/l	< 0.003	< 0.003
37	Calcium	mg/l	< 150	< 200
38	Magnesium	mg/l	< 150	< 200
39	Carbon tetrachloride	mg/l	< 3	< 3
40	Hexachloro benzene	mg/l	< 2	< 2
41	DTT	mg/l	< 1.3	< 1.3
42	Endrin	mg/l	< 0.01	< 0.01
43	Dieldrin	mg/l	< 0.01	< 0.01
44	Aldrin	mg/l	< 0.01	< 0.01
45	Isodrin	mg/l	< 0.01	< 0.01
46	Perchloro ethylene	mg/l	< 2.5	< 2.5
47	Hexachloro butadiene	mg/l	< 3	< 3
48	Chloroform	mg/l	< 1	< 1
49	1,2 Dichloro ethylene	mg/l	< 2.5	< 2.5
50	Trichloro ethylene	mg/l	< 1	< 1
51	Trichloro benzene	mg/l	< 2	< 2
52	Hexachloro cyclohexene	mg/l	< 2	< 2

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

Table 2: Water Quality Standard in public water areas for bio-diversity conservation

I. For River

No	Parameter	Unit	Standard Value
1	pH	mg/l	6.5 – 8.5
2	BOD5	mg/l	1 – 10
3	Suspended Solid	mg/l	25 – 100
4	Dissolved Oxygen	mg/l	2.0 - 7.5
5	Coliform	MPN/100ml	< 5000

II. Lakes and Reservoirs

No	Parameter	Unit	Standard Value
1	pH	mg/l	6.5 – 8.5
2	COD	mg/l	1 – 8
3	Suspended Solid	mg/l	1 – 15
4	Dissolved Oxygen	mg/l	2.0 - 7.5
5	Coliform	MPN/100ml	< 1000
6	Total Nitrogen	mg/l	– 0.6
7	Total Phosphorus	mg/l	0.005 – 0.05

III. Coastal Water

No	Parameter	Unit	Standard Value
1	pH	mg/l	7.0 – 8.3
2	COD	mg/l	2 – 8
3	Dissolved Oxygen	mg/l	2 - 7.5
4	Coliform	MPN/100ml	< 1000

5	Oil content	mg/l	0
6	Total Nitrogen	mg/l	- 1.0
7	Total Phosphorus	mg/l	0.02 – 0.09

Table 3. Water Quality Standard in public water areas for public health protection

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

ANNEX 3: MONITORING REPORT TEMPLATE FOR PROJECT IMPLEMENTATION UNIT

Safeguards Monitoring Report

This report is to be completed by the PIU with assistance from the PMIS and PMU. The report forms part of the regular reporting of PIU to PMU and ultimately to the EA and ADB.

1. Introduction and Project Overview

Project Number and Title:		
Safeguards Category	Environment	B
	Indigenous Peoples	C
	Involuntary Resettlement	C
Reporting period:		
Last report date:		
Key sub-project activities since last report:	<i>This section can include, among others, the following:</i> <ul style="list-style-type: none"> • Activities of PIU/PMU • Progress of work (% physical completion) • Changes of surrounding environment • Status of permits / consents 	
Report prepared by:		

2. Environmental Performance Monitoring

a. Summary of Compliance with EMAP Requirements (Environmental Performance)

Monitoring Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
<i>Use tabled performance monitoring indicators of EMP</i>			

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
<i>List of monitoring or mitigation measures or activities not completed</i>			

<i>(last column of previous table)</i>			
New Issues from This Report			

c. Other activities

- Other issues not covered by mitigation or monitoring plans of EMP
- Any additional environmental monitoring required (e.g., air quality, water sampling)

3. Occupational, Health and Safety (OHS) Performance Monitoring

a. OHS for worker

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

b. Public Safety

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			

New Issues from This Report			

4. Information Disclosure and Socialization including Capability Building

Prepare brief summary of the information below where applicable

- Field visits conducted (sites visited, dates, persons met)
- Public consultations and meetings conducted (date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training conducted (nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media releases
- Material development/production (e.g., brochure, leaflet, posters)

5. Grievance Redress Mechanism

Summary:

- Number of new grievances, if any, since last monitoring period: _____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

6. Conclusion

- Important results from the implementation of mitigation and monitoring of EMP
- Recommendations to improve EMP implementation

7. Attachments

- Consents / permits
- Monitoring data (water quality, air quality, etc.)
- Photographs
- Maps