Environmental Management Plan

Project Number: 49387-002
September 2019

Lao People's Democratic Republic: Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project

Improvements to Access in Nakasang, and on Don Det/Don Khone Islands, Champasak Province, Lao PDR

Detailed Design

Prepared by the Ministry of Information, Culture and Tourism for the Asian Development Bank.

ABBREVIATIONS

ADB	Asian Development Bank
DICT	Department of Information Culture and Tourism
DPWT	Department of Public Works and Transport
DONRE	Department of Natural Resources and Environment
EA	Executing Agency
ECC	Environmental Compliance Certificate
EIA	Environment Impact Assessment
EMI	Environmental Monitoring Institute
EMP	Environment Management Plan
EMR	Environmental Monitoring Report
EERT	External Emergency Response Team
ERT	Emergency Response Team
ERTL	Emergency Response Team Leader
EO	Environmental Officer
IA	Project Implementing Agency
GMS	Greater Mekong Sub-Region
GPS	Global Positioning System
IEE	Initial Environmental Examination
MONRE	Ministry of Natural Resources and Environment
MPWT	Ministry of Public Works and Transport
O&M	Operation and Maintenance
PCU	Project Coordinating Unit
PIU	Project Implementation Unit
PMCES	Project Management & Civil Engineering Support Consultant
SS	Safeguard Specialist
UDAA	Urban Development and Administration Authority
USD	United States Dollar
UXO	Unexploded Ordnance

WEIGHTS AND MEASURES

km	Kilometre
kg	Kilogram
ha	Hectare
mm	Millimeter

Table of Contents

I. INTRODUCTION

1. The detailed design (DED) of the subproject of the second GMS Tourism Infrastructure for Inclusive Growth Project (TIIG) that will improve access and the port in Nakasang and access on Det and Khone islands, Lao PDR has been completed. The original IEE of the Feasibility Study (FS) of the subproject has been updated to meet the DED of the subproject and is reported separately. The environmental management plan (EMP) provided herein has been updated to support of the updated Initial Environmental Examination (IEE).

2. The primary purpose of the EMP for the subproject in Nakasang and on Det/Khone islands is twofold:

1) prescribe required mitigation and monitoring requirements for potential environmental impacts of the subproject that are identified by the updated IEE, institutional responsibilities for implementation of the EMP, and the cost of the EMP implementation; and
2) provide the needed guidance for contractor(s) to prepare their construction EMPs (CEMP) which they must include with their bids for construction package(s).

3. The EMP will be appended to contractor tender documents. The CEMPs will prescribe the mitigation and monitoring requirements for which contractors are responsible for their specific construction packages. As indicated above, the CEMPs will be reviewed and approved by the Project management and Civil Engineering Support Consultant (PMCES) and Project Implementation Unit (PIU).

Subproject components

4. The improvements to access and the port in Nakasang and access roads/footpaths on Det and Khone islands are summarized in Table 1.

Table 1. Components of subproject in Nakasang and Det/Khone islands

Nakasang Access Road and Port Rehabilitation	• Reconstruct 3.5 km X 6m access road with concrete & side drains including a turning area for buses; • Reinforce 45 m of existing riverbank protection with concrete; • Improve footpaths and ramps to pontoon pier for safer passenger access; • Relocate main drainage outfall 40m downriver; and • Reconstruct 60m X 3m riverside path
Don Det/Don Khone Access Improvements	• Pave 11 km X 3 m access roads and passing bays with concrete; • Pave 780 m^2 vehicle parking area serving island ferry ports; • Improve cycle track/footpaths with gravel; and • Install public lighting and safety rails on old railway bridge linking Don Det and Don Khone islands

II. REGULATORY FRAMEWORK AND GUIDELINES FOR NAKASANG-DET/KHONE SUBPROJECT

5. Specific regulations and guidelines for the subproject are summarized in Table 2. Reference environmental standards for Lao PDR are found in Appendix B.

Table 2. Relevant regulations and guidelines applicable to subproject.

Road Upgrades
• Lao PDR National Road Design Manual of April 2018. • Lao PDR Road Design Manual with reference to AASHTO A Policy on Geometric Design of Highways and Streets, 5th edition. • Road Development Authority (RDA's) standards incorporating relevant standards from the AASHTO Highway Drainage Guidelines. • MPWT (2006). Specifications for drainage system, culverts, street lighting and tree planting
Mekong Riverbank Works
• The Manual and Study on Mekong Riverbank Protection, Lao PDR. Draft Final Report. JICA September 2004. • California Bank and Shore Rocks Slope Protection Design, Practitioner's Guide and Field Evaluations of Riprap Methods Final Report No. FHWA-CA-TL-95-10, Caltrans Study No. F90TL03, Third Edition - Internet October 2000, Prepared in Cooperation with the US Department of Transportation Federal Highway Administration.
Occupational and Public Health and Safety
• MSLW, Lao PDR Occupational, Safety, and Health Guidelines Programme, Draft 2005-2010 • IFC/World Bank, 2007. Environment, Health, and Safety Guidelines (EHS) for Construction and Decommission, and Toll Roads
Environmental Standards
• Agreement on National Environmental Standards, Order No. 2734/PMO-MONRE, 7 Dec 2009. Appendix B excerpts standards relevant to the subproject

III. SUMMARY INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

6. The primary management framework responsible for the implementation of the environmental management plan (EMP) for the subproject is summarized below. The Ministry of Information and Culture and Tourism (MICT) which is the executing agency (EA) for the project will take overall responsibility for successful implementation of the EMP. The EA will establish a Project Coordination Unit (PCU) within the Tourism Development Department of MICT which, among other things, will provide Safeguards and Monitoring Coordination for the EMP.

7. The Implementing Agency (IA) for the subproject will be the provincial Department of Information Culture and Tourism (DICT). A provincial Project Steering Committee (PPSC) will be established comprised of representatives from the DICT, DPWT, Department of Finance (DOF), Department of Planning and Investment (DFI), Department of Natural Resources and Environment (DONRE), and representatives of other departments and agencies as required.

8. The Project Implementation Unit (PIU) will reside in the DICT Office with close coordination and support regarding infrastructure works as needed from the Department of Public Works and Transport (DPWT) and Khong Office of Public Works and Transport (OPWT). The PIU will assign a Safeguard Specialist (SS), and will be responsible for day to day implementation of the EMP for both subprojects. The PCU will coordinate agency safeguard support to the PIU and will liaise with the ADB on safeguard reporting and issues when necessary.

9. The PIU's Safeguards Specialist will oversee the work of the contractor's Environmental Officer (EO) for implementation of the contractor EMP (CEMP) for the construction package. External support to the PIU for implementation of the EMP will be provided by the Project Management and Civil Engineering Support Consultant's (PMCES) International and National Environment Specialists (IES/NES) and an external Environmental Monitoring Institute (EMI). The EMI will conduct environmental sampling and laboratory analyses specified by the EMP that cannot be performed directly by the contractor or PMCES.

10. The responsibilities of the different agencies in the management framework are listed in Appendix A. Below is a summary of responsibilities for implementation of the EMP.

11. Responsibilities of the EA include:

- Coordinate environmental and social safeguards and monitoring for IA/PIU;
- Oversee successful operation of Grievance Redress Mechanism (GRM) and resolve any submitted stakeholder grievances at project level if possible.
- With support from IA/PIU prepare reports on Grievance Redress Mechanism (GRM) as needed;
- Liaise with ADB on the implementation of the EMP;
- With support from IA/PIU complete and submit semi-annual environmental monitoring reports to ADB and
- Coordinate with IA, and ADB if necessary, on issues arising from the implementation of EMP and any required corrective actions or updates.

12. Responsibilities of IA include:

- Oversee and provide support for implementation of EMP by PIUs
- Liaise with PCU and EA on issues with safeguards and EMP identified by PIUs

- With assistance from PIU prepare reports to EA on EMP implementation including semiannual environmental monitoring reports for ADB

13. The responsibilities of the Safeguards Specialist (SS) of PIU include:

- Assist IES/NES of PMCES with any final updating of EMP before construction commences, and inform contractor;
- Notify DONRE to verify Government approvals of project are met, and that EMP is compliant with Environmental Compliance Certificate (ECC) of project;
- Assist PMCES with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
- With IES/NES of PMCES review and approve submitted CEMPs of contractors;
- Undertake day to day management of EMP implementation activities;
- Work with EMI on implementation of monitoring plan of EMP;
- Ensuring compliance with loan covenants and assurances in respect of all subprojects, including EMPs (as well as IPPs, GAPs and resettlement plans);
- Lead follow-up meetings with all affected stakeholders;
- Prepare and submit quarterly reports on EMP implementation to PCU;
- Oversee implementation of CEMP by contractor;
- Coordinate with IES/NES of PMCES for EMP implementation;
- Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
- Ensure EO of contractor submits monthly reports on construction mitigation and monitoring.

14. Key responsibilities of the IES/NES of the PMCES for the EMP are listed below:

- Perform any final updates to EMP prior to start of construction and inform contractor;
- Provide technical direction and support to PIUs for EMP implementation;
- Support PIUs with review of contractor CEMPs
- Oversee design and delivery of capacity development and training of PIU and contractor's EO;
- Provide advice and support to EMI with their monitoring activities;
- Receive monitoring reports from EMI and with SS/PIUs prepare semiannual monitoring reports for IA/EA for ADB; and

15. The responsibilities of Environmental Officer (EO) of Contractor include:

- Implement contractor's CEMP for construction phase of subproject; and
- Prepare and submit monthly reports on mitigation and monitoring activities of CEMP and any environmental and H&S issues at construction sites.

16. The responsibilities of Environmental Monitoring Institute (EMI) include:

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

17. The Department of Natural Resources and Environment (DONRE) is the provincial agency which oversees environmental management of Vientiane province. The DONRE with District staff provides direction and support for environmental protection-related matters including application of the Law on Environmental Protection No. 02/99/NA (1999), EIA, and environmental standards.

18. ADB provides guidance to EA/PCU/IA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by PCU which are disclosed on the ADB website pursuant to ADB's Public Communications Policy (2011). The ADB assists the PCU with timely guidance at each stage of project implementation following agreed implementation arrangements, and will review and approved detailed design documents, updated IEEs/EMPs, project progress reports, semi-annual safeguard monitoring reports and project completion report. ADB will field one or two missions per year depending on need.

A. Community health and safety

19. The contractors will implement the following measures:

(i) Temporary traffic management: A traffic control and operation plan for Nakasang access road, port area and for roads on the two islands road should be prepared with the local traffic police prior to initiation of construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid peak traffic hours, regulating traffic along Nakasang access road with an emphasis on ensuring public safety through clear signs, and controls.

(ii) Information disclosure: Residents and businesses in Nakasang and of the two island villages in which the second round of public consultations were conducted will be informed in advance through media of the construction activities, given the dates and duration of expected traffic disruption.

(iii) Nakasang and island access roads: Clearly marked signs will be placed on all affected roads to warn people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues. Heavy machinery will not be used after day light on access road and all such equipment will be returned to its overnight storage area/position before night. Open excavations along access roads should be fenced, and trenches covered where local public walk or vehicles must cross.

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20. *Special subproject sensitivity*

The upgrading of footpaths and the existing island road network on Det and Khone island will potentially hinder use of these conduits for tourists and residents. Construction should be sequenced to avoid road closure and scheduled to move equipment out of the way to not block these routes during specific scheduled times of the day. Sufficient clear signage should be installed to warn tourists and residents of the construction activities.

21. The upgrades to the embankment/road, and realigned stormwater drain in Nakasang will potentially impact the Mekong river. The concern is damage to aquatic habitat of the river, degraded water quality from pollution and sedimentation, and disruption of boat traffic and fishing or aquaculture.

The three subprojects are similar with respect to the potential magnitude of potential impacts on the aquatic environment, and the sensitivity of the affected aquatic environments. Thus, the

mitigation measures listed for roads/footpaths and parking lots apply as appropriate, along with the following specific mitigation measures:

- Shoreline berms or in-water silt curtains should be placed between the civil works activities for the retaining wall/road and realigned stormwater drain in Nakasang town and the Mekong river to minimize erosion and sedimentation of the river.
- No vehicles or heavy equipment should be operated in the water if possible.
- No vehicle or equipment maintenance should occur on the riverbank of the Mekong river.
- All construction materials, machinery fluids (gas, oil), and construction waste must be kept away from the river.
- The civil work areas near the water must be clearly marked to warn the public, boaters, and fisherman of the construction activities.

All worker camps, fuel depots, construction material and aggregate storage areas must be rehabilitated to original state after construction is completed.

IV. SUMMARY OF POTENTIAL IMPACTS

22. The potential environmental impacts of subproject from the updated IEE are summarized in Table 3. The required mitigation measures for the three phases of the implementation of the subproject (pre-construction, construction, and operation) are detailed in the Mitigation Plan below.

Table 3. Summary of potential impacts of subproject in Nakasang and Det/Khone island

Pre-construction Phase
• None, no resettlement or land acquisition compensation is required
Construction Phase
Upgraded access roads, parking lots in Nakasang and roads/footpaths on Det and Khone islands: • Reduced and/or blocked public access, • Disrupted business and recreation, • Noise and dust caused by construction truck traffic and heavy equipment use, • Soil and surface (pond) water pollution caused by equipment operation and maintenance, • Worker, and increased risk of public accidents/injury, • Disruption of traffic and increased traffic accidents, • Local drainage and flooding problems, • Solid and domestic waste from worker camps and construction activities. • Social issues and community problems caused by migrant workers. Shoreline road/retaining wall, relocation of stormwater outfall, and steps & floating pier in Nakasang: • Erosion and sedimentation of Mekong river, • Destruction of nearshore aquatic habitat • Nearshore aquatic habitat damage, • Disrupted boating and fishing near the site.

Upgraded roads and footpaths on Don Det/Don Khone islands • Upgrading of roads and footpaths will potentially restrict or impede tourist and resident movement given the road and footpaths are the only way to travel the islands
Operation Phase
• Increased traffic and risk of traffic accidents primarily along Nakasang access road, and to minor extent on upgraded roads on Det and Khone islands. • Increased pollution of Mekong river from increased discarded solid waste from tourists, and bilge, gas, and oil from the anticipated increase in boat traffic to/from Nakasang. • Increased boat congestion along Mekong river shoreline.

V. PUBLIC CONSULTATION

23. The second series of public consultations on the subproject was conducted for the DED of the subproject in Nakasang and on Det/Khone islands in October / 2018. The issues and concerns of the consultations which are reported in the updated IEE are addressed by the EMP. Input from stakeholders will continue through to the operational phase of the completed which is summarized in Appendix C.

24. The well-defined grievance redress and resolution mechanism will be implemented to address any affected stakeholder's grievances and complaints regarding environment or social issues in a timely and satisfactory manner. All stakeholders will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through an effective public information campaign. The grievance redress mechanism and appeal procedures will also be explained in a project information booklet (PIB) that will be distributed to all stakeholders.

VI. ENVIRONMENTAL MANAGEMENT PLAN

25. The Environmental Management Plan for the subproject is presented in Table 3. The tabled Environmental Management identifies potential impacts, required mitigations, responsible parties, location, timing, and any indicative costs. The potential impacts identified in Mitigation Plan of Table 4 elaborate the impacts summarized in Table 3 which are taken from the updated IEE.

26. Note that Environmental Management Plan of Table 4 indicates that the responsibilities of the contractor(s) for implementation of the Environmental Management Plan are essentially restricted to the mitigation subplans of the Construction Phase, with the IA, and PMCES being responsible for the implementation of the mitigations measures of the Pre-construction and Operation Phases. This distinction will assist the contractors to identify the mitigation activities and subplans for which they are responsible to finalize and implement.

Table 4. Environnemental Management Plan

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Before construction commences								
Disclosure, & re-engagement of community	No community impacts	1. Confirm initiation Information Disclosure and Grievance Redress Mechanism of IEE and distribute construction activity schedule to affected community and businesses	For all construction sites.	A few weeks before construction starts	once	No marginal cost[2]	IA/PIU	PIU
Contact tourist & commercial boat companies	No negative impact	2. Inform tourist companies and commercial boat companies of schedule of civil works for river port, and all shoreline civil works.	Nakasang town and Don Det/Khone areas	Before construction	As required	No marginal cost	PMCES/PIU	PMCES/PIU
Government approvals	No negative impact	3. Confirm with DONRE for required project permits and certificates at appropriate time after contractors procured and before construction begins.	Entire subproject,	Before construction begins	once	No marginal cost	PIU/DONRE	DONRE

[1] Costs will need to be updated by contractors.
[2] No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of contractor bid documents

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Final design of subproject,	Minimize negative environmental impacts	4. PMCES[3] to ensure the following management measures are organized and in place: a) identification of spill management prevention plans, and emergency response plans for all construction activities at all sites in Nakasang and on both islands; b) locate concrete batch plant location(s) for access roads away from villages and individual households with fencing and access barriers d) ensure no disruption to water supply, utilities, and electricity to local villages with set contingency plans for any unavoidable disruptions planned; e) no disruption to normal pedestrian and vehicle traffic along all access roads with set of contingency alternate routes planned. f) Install signage along access roads & footpaths to inform public and motorists of construction activities and schedule, and of increased vehicle traffic. g) Install signage at Nakasang port and at boat landings on Det/Khone islands which provides boaters of construction activities, and construction schedule	Final siting	Before construction initiated	Once with final designs documents	No marginal cost	PMCES/EA	PMCES/PIU
		5. Review and ensure climate change resilience measures of DED are integrated with subproject implementation	Access roads, and stormwater drain at port					

[3] PMCES is Project management and civil engineering support consultant to be determined

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Final EMP	Positive environmental impacts	6. Finalize IEE and this EMP where necessary to meet any late changes to subproject final design to protect affected environments. If changed submit final IEE and EMP to ADB to review and approval prior to bidding.	All sites	Before construction initiated	Once with detailed designs documents	No marginal cost	PMCES	EA/PIU
Confirm Government approved construction waste disposal sites, and borrow pits	No negative impact	7. Notify DONRE & DPWT to confirm locations of disposal areas for construction waste, and borrow pit if required in Nakasang, and obtain required permits. Confirm use of existing disposal site and borrow pit on Khone island.	For entire subproject	Before construction	As required	No marginal cost	PIU/DONRE/ DAF/DICT	PIU
UXO survey, & removal	Injured worker or public	8. Ensure Government and UXO LAO is consulted and clears areas where necessary in subproject area	All construction sites.	Beginning of subproject	Once	See Monitoring Plan below	EA/PIU	UXO LAO
Develop bid documents	No negative environmental impact	9. Ensure this updated EMP is included in contractor tender documents, and that tender documents specify requirement for site-specific, budgeted CEMP. 10. Specify in bid documents that contractor must have experience with implementing EMPs and provide designated environment, health and safety staff with experience.	All subproject areas	Before construction begins	Once for all tenders	No marginal cost	PMCES/EA	PIU
Obtain & activate permits and licenses	Prevent or minimize impacts	11. Contractors to comply with all statutory requirements of 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	PMCES	PIU & contractors

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Capacity development	No negative environmental impact	12. Finalize and schedule training plan for PIU/SS to be able to fully implement EMP, and to manage implementation of mitigation measures by contractors. 13. 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	PMCES	PMCES/PIU
Recruitment of workers	Spread of sexually transmitted disease	14. Use local workers as much as possible thereby reducing number of migrant workers. This directive should be included in tender documents	All construction areas.	Throughout construction phase	Worker hiring stages	No marginal cost	EA/PIU	Contractor's bid documents
Prepare CEMP	Prevent or minimize impacts	15. Prepare site-specific CEMP(s) for different potential impacts of construction phase of all subproject components.	All construction sites	Ahead of construction	Once	No marginal cost	PMCES/PIU	Contractors
Construction Phase								

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Worker camps	Pollution and social problems	16. Locate worker camps away from Det and Khone villages and individual houses in Nakasang. 17. Ensure adequate housing and waste disposal facilities including pit latrines and garbage cans. 18. A solid waste collection program must be established and implemented that maintains clean worker camps 19. Locate separate pit latrines for male and female workers 50m from worker living and eating areas. 20. A clean-out or infill schedule for pit latrines must be established and implemented to ensure clean operable latrines are available at all times. 21. Worker camp must have adequate drainage. 22. Local food should be provided to worker camps. Guns and weapons not allowed in camps. 23. Interaction of transient workers with local community should be discouraged. HIV Aids test and education should be given to workers. 24. Camp areas must be restored to original condition after construction completed.	All worker camps	Throughout construction phase	Monthly	No marginal cost	PMCES/PIU	contractor
Training & capacity	Prevention of impacts through education	25. Implement training and awareness plan for PIU/SS and contractors on local civil and environment protection laws..	PIU office, construction sites	Beginning of construction	After each event	No marginal cost	PMCES	PMCES/PIU

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Construction materials acquisition, transport, and storage sub-plan	Pollution, injury, increased traffic, disrupted access	26. All topsoil and overburden removed for subproject should be stockpiled on site for later restoration. 27. Any unstable slope conditions on bank of Mekong river should be rectified with tree planting, or quicker growing grasses if necessary . 28. Define & schedule how needed material from bank on Mekong river is to be extracted, moved, and stored on site. 29. All piles of aggregates along access road and along Mekong river must be covered. 30. All aggregate loads on trucks transported from outside subproject area must be covered.	For all construction areas.	Throughout construction phase	Monthly	No marginal cost	PMCES/PIU	contractor
Excavated spoil management sub-plan	Contamination of soil and Mekong river or ponds from excavated spoil, and construction waste	31. Any uncontaminated excavated spoil that needs to be disposed outside of subproject area must be disposed of in DONRE-designated sites. 32. A record of type, estimated volume, and source of disposed spoil must be recorded. 33. Any excavated contaminated soil must be handled following DONRE regulations including transport, treatment (if necessary), and disposal site selection.	All excavation areas	Throughout construction phase	Monthly	See Monitoring Plan for contaminated soil analyses	PMCES & PIU & DONRE	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Solid and liquid construction waste sub-plan	Contamination of land Mekong river from construction waste	34. Management of general construction solid and liquid waste from subproject sites must follow DONRE regulations, and will cover, collection, handling, transport, recycling, and offsite disposal of waste created from construction activities and worker force. 35. Offsite disposed of construction waste should be catalogued for type, estimated weigh, and source. 36. Construction sites should have sufficient large garbage bins in a designated site that are covered, and which enable separation of recyclables from waste that must be disposed in DONRE-approved sites. 37. A schedule of solid and liquid construction waste pickup and disposal all subproject sites must be established and implemented to ensure construction sites are clean as possible. <u>Hazardous Waste</u> 38. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow DONRE regulations. 39. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 40. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition 30m from construction activity areas, Mekong river, and nearby villages. 41. All spills must be cleaned up completely with all contaminated soil removed and handled as contaminated spoil.	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PMCES & PIU & DONRE	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Noise and dust sub-plan	Dust Noise	42. Regularly apply wetting agents (e.g., water, $CaCl_2$) as needed to exposed soil, access roads, and footpaths when dust created. A water truck must be on site in Nakasang and on the islands for immediate watering as needed. 43. Cover or keep moist all stockpiles of construction aggregates, and all truckloads of aggregates. 44. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately. 45. As much as possible restrict working time between 07:00 and 17:00. In particular are activities such as pile driving. 46. Maintain vehicles and equipment in proper working order with a monthly service schedule 47. Replace unnecessarily noisy vehicles and machinery. 48. Vehicles and machinery to be turned off when not in use. 49. Construct temporary noise barriers around excessively noisy activity areas.	All construction sites.	Fulltime	Monthly	No marginal cost	PMCES & PIU	contractor
Implement utility and power disruption sub-plan	Loss or disruption of utilities and services to local villages such as water supply and electricity	50. Develop plan of days and locations where outages in utilities and services will occur, or are expected. 51. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 52. Contact affected Det and Khone villages, and affected residents in Nakasang to inform them of planned outages. 53. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Fulltime	Monthly	No marginal cost	PMCES & PIU & Utility company	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Tree and vegetation removal, and site restoration sub-plan	Damage or loss of trees, vegetation, and landscape	54. Contact provincial forestry department for advice on how to minimize damage to trees and vegetation. 55. Restrict tree and vegetation removal to within RoW of access roads and footpaths. 56. Minimize tree removal, and install protective physical barriers around trees that do not need to be removed. 57. ROW of access roads/footpaths, and affected bank of Mekong river needs to re-vegetated and landscaped after construction completed. Consult provincial forestry department ahead of all earthworks to determine the most successful restoration strategy and techniques.	All construction sites.	Beginning and end of subproject	Monthly	No marginal cost	PMCES & PIU	contractor
Erosion control sub-plan	Land erosion	58. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas to contain erosion. 59. Earthworks should be conducted during dry periods if possible. 60. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PMCES & PIU	contractor

Implement worker and public safety sub-plan	Public and worker injury, and health	61. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites to protect public. 62. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 63. Worker and public safety guidelines should be followed (Lao PDR OSH Programme section III) as well as the IFC EHS OHS guidelines for Toll Roads and Construction and Decommission. 64. 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. 65. Standing water suitable for disease vector breeding should be filled in. 66. 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. 67. Appropriate safety clothing and footwear should be mandatory for all construction workers. 68. Adequate medical services must be on site or nearby all construction sites. 69. Drinking water must be provided at all construction sites. 70. Sufficient lighting must be used during necessary night work. 71. All construction sites should be examined daily to ensure unsafe conditions are removed. Unsafe conditions should be recorded in SLF construction diary	All construction sites.	Fulltime	Monthly	No marginal cost	PMCES & PIU	contractor
Civil works	Degradation of water quality of	72. Earthen berms, plastic sheet fencing, or in-river silt curtains must be placed between all earthworks for shoreline retaining wall/road, stormwater drain	Mekong river sites	Throughout construction	Monthly	No marginal cost	PMCES & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
	Mekong river	relocation, and new pier steps and the Mekong river 73. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 74. Earthworks must be conducted during dry periods. 75. All construction fluids such as oils, and fuels should be stored and handled inland from the top of riverbank of Mekong river. 76. No waste of any kind is to be thrown in the Mekong river 77. No washing or repair of machinery on or near the riverbank of the Mekong river 78. Pit latrines to be located well away from the river		phase				
Cultural chance finds sub-plan	Damage to cultural property or values, and chance finds	79. As per detailed designs all civil works should be located 50m from all cultural property and values. DICT identified potential sites and types of PCR in pre-construction phase. 80. Chance finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 81. Upon a chance find all work stops immediately, find left untouched, and PIU notified to determine if find is valuable. Culture section of DICT notified by telephone if valuable. 82. Work at find site will remain stopped until DICT allow work to continue.	All construction sites	At the start, and throughout construction phase	Monthly	No marginal cost	PMCES & PIU	contractor

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
Construction and urban traffic sub-plan	Traffic disruption, accidents, public injury	83. Schedule construction vehicle activity during light traffic periods. Create adequate traffic detours, and sufficient signage & warning lights along all access roads and footpaths. 84. Post enforced speed limits, and create dedicated construction vehicle roads or lanes along access roads if possible. 85. Install signage on access roads indicating construction activities and schedule. 86. Create pedestrian walkway areas around construction sites.	All construction sites	Fulltime	Monthly	No marginal cost	PMCES & PIU	contractor
Construction drainage sub-plan	Loss of drainage & flood storage	87. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 88. Install temporary storm drains or ditches on construction sites where necessary 89. Ensure natural stormwater runoff at all construction sites is maintained and not disrupted.	All areas with surface waters	Design & construction phases	Monthly	No marginal cost	PMCES & PIU	contractor
Operation of completed subproject								
Management of solid waste generated in Nakasang port area	Contamination of land Mekong river	90. Solid waste management – ensure and enforce that waste is not dumped in public areas, through awareness of regulations to the Nakasang community and through awareness raising activities 91. Update and improve management and collection process of waste. Update of agreement with garbage collection truck, monthly fee collection for collection.	At port area	Throughout the construction and operation phases	Monthly	O&M	PIU / DoNRE	
Operation of upgraded Nakasang port area	Boat accidents due to increased traffic	92. Dedicated shoreline lanes should be set for different boat type and sizes. Enforced speed limits for all boats should be posted in area.	At port area	Fulltime	Biannual	O&M	DPWT	

Subproject Activity	Potential Environmental Impacts	Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[1] (USD)	Responsibility	
							Supervision	Implementation
	Water pollution from boaters & tourists	93. Boats and tourists that use marina must be required to dispose of all garbage in dedicated bins at the marina. 94. Gas and oils should be kept away from water as much as possible						
Operation of all upgraded access roads	Increased traffic accidents & air pollution	95. Enforce clearly post speed limits on all roads. 96. Mandate regular vehicle inspections to ensure all vehicles kept in good working condition. 97. Upgraded access road drainage culverts or ditches must be regularly cleaned and maintained	All upgraded access roads	Biannually	Annually	O&M	DPWT	

VII. MONITORING PLAN

26. The environmental monitoring plan for the subproject is provided in Table 5. The monitoring plan consists of environmental indicators, the sampling locations & 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, to document any unexpected positive or negative environmental impacts of the subproject, and to determine the proper functioning of the components of the subproject. The indicative costs of monitoring are shown in Table 6.

A. Monitoring strategy

27. The strategy for monitoring some environmental parameters such as dust levels is to conduct continuous or daily *qualitative* observations, not periodic (e.g., quarterly) quantitative measurements that provide limited information and which require expensive laboratory analyses. When the common occurrence of dust on construction sites and along roads is observed by contractor staff or the public from for example truck traffic, excavation operations, or from wind-blown aggregate piles, the problem should be remediated immediately by the contractor with wetting agents that are on standby for quick and immediate application. Similarly, when noise levels are considered too high either qualitatively or from a portable onsite sound meter the equipment/vehicle producing the noise should be immediately checked for working condition and repaired immediately. Or, the equipment operation stopped and rescheduled.

28. Environmental standards for ambient water quality in urban areas in Lao PDR (Appendix B) are provided by the National Environmental Standard Order No. 2734/PMU-WREA (2009). The environmental standards provided by the Environmental, Health and Safety Guidelines of the IFC/World Bank (2007) (e.g., ambient air quality & noise) should be followed to supplement standards that are not provided by the Government.

29. An independent environmental monitoring institute (EMI) will be required to perform the groundwater sampling and laboratory analyses that cannot be conducted by the IA, PMCES or contractors. The SS will coordinate with the EMI under the direction of the PMCES/PIU who will provide logistical support to the EMI where necessary. The PMCES will be given a budget for the EMI which will come from the loan. The budget for the work of the EMI will become the costs for monitoring which are estimated in Table 7.

1. Performance Monitoring

30. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally 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 6.

2. Reporting

31. 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 (Tables 4 and 5) summarize proposed timing of reporting. A report on environmental monitoring and implementation of EMP will be prepared quarterly for the EA/PCU by the PIU. For the quarterly report the PIU report will compile monthly reports provided by the EO of contractor, the reports of the EMI on monitoring, and input from the IES/NES of the PMCES. The PIU reports will be compiled into the semi-annual environmental safeguards monitoring report that the EA/PIU submits to the ADB and DONRE.

32. The reports will track all indicators measured in the EMP monitoring plan, including performance monitoring indicators (Table 6) and will include relevant Government environmental quality standards.

Table 5. Environmental Monitoring Plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	**Location**	**Means of Monitoring**	**Frequency**	**Reporting**	**Responsibility**		**Estimated Cost[4] (USD)**
					Supervision	**Implementation**	
Just before Construction Commences - Update Baseline							
Remaining public and stakeholder issues and concerns of construction activities including construction schedule.	Nakasang and Det and Khone villages and households on Det/Khone islands.	Repeated community consultations	Once	Once	EA/PIU	PIU	$500.
Water quality in Mekong river at port: pH, oil & grease, TSS, turbidity, dissolved oxygen, BOD, Fe, Zn	Two sites on shoreline of Mekong river at port area.	Using methods approved by DONRE and implemented by Lao National University				EMI	$260.
Construction Phase subproject							
A) Water quality in Mekong river at port: pH, oil & grease, TSS, turbidity, dissolved oxygen, BOD, Fe, Zn B) Qualitative dust and noise levels C) Qualitative level of unmanaged and uncontained worker (domestic) and construction solid waste. D) Public comments and complaints	A) Shoreline sites of pre-construction sampling Mekong river at port B) Along all access roads to be upgraded. C) All construction sites, worker camp living and pit latrine areas D) From all project-affected community areas, from hotline telephone number placed at all construction sites.	A & B): Using field methods approved by DONRE. C) Visual inspections including complaints from local community or workers. D) Information transferred by hotline telephone number, through GRM, and direct public complaint at construction site.	A) quarterly to end of construction B - E) Continuously daily	A): Quarterly B – E): Monthly	A – D): PMCES/PIU E): EA/PIU	A): EMI B - E): Contractor, & contractor to mitigate issue immediately PIU and contractor, with issue addressed immediately	A): $2,080 B – E): Management overhead cost

[4] Units costs of parameter analyses conducted for DED by Lao National University (Appendix D)

E) Incidence of worker or public accident or injury	E) At all construction areas	E) Regular reporting by contractors	observations recorded		E): EA/PIU	PIU and contractor, with issue addressed immediately	
Operation of Completed Subproject							
Vehicle traffic accidents including boats Incidence of road flooding	Mekong river between Nakasang and Det/Khone islands, and along upgraded subproject roads.	Regular record keeping.	Continuous	For each event	DPWT		O&M

Table 6. Performance monitoring indicators for subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation and Disclosure	Affected public and stakeholders	Continued meetings with stakeholders contacted during DED and through GRM	Minutes of meeting, and participants list
EMP	EMP finalized	No significant environmental contamination or problems	Contractor, EMI, and DPWT reports
Bid Documents	Completed with appended EMP [5]	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
CEMP(s)	CEMP(s) prepared by contractor(s)	CEMP(s) reviewed and approved by PMCES/PIU	Bid documents and PMCES/PIU
Training of PIU/SS	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
Background quality of Mekong river	Parameters identified in Monitoring Plan	Understanding basis for potential impact of construction at port area	EMI
Construction Phase			
Air quality at along access roads	Qualitative dust, noise	Levels managed to minimum	contractor monitoring reports,
Public and worker safety	Frequency of injuries	Adherence to Government policy and site-specific procedures to prevent accidents	Contractor reports
Traffic	Frequency of disruptions, accidents, and blocked access	Disruptions, stoppages, or detours are managed to minimum.	Public input, contractor reports,
Operation of Completed Subproject			
Public safety	Incidence of traffic accidents on access road	No deviation from baseline frequency	DPWT

VIII. ESTIMATED COST OF EMP

33. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. From Table 5 the estimated costs for the implementation of the EMP summarized in Table 7. The costs of the qualitative environmental monitoring during construction phase is easily assumed by management overhead. The water sampling costs (USD) are based on the parameter unit costs of the analyses conducted for the DED of the separate Vang Vieng subproject (Appendix D).

34. An estimated budget of $5,000.00 is required for capacity building for environmental management in conjunction with other capacity development activities of the subproject. The costs will need to be updated by the PMCES in conjunction with the PIU just before the construction phase begins.

[5]Contractor Environmental Management Plan developed from EMP in contractor bidding document

Table 7: Estimated costs for environmental monitoring plan of EMP

Activity Type	Estimated Cost[6] (USD)
Pre-construction Phase	$2,760
Construction Phase	$7,080
Post-construction Operation Phase	$5,000
Capacity development and training	$6,000
Total	**$20,840.00**

IX. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

35. Currently there is insufficient understanding, experience and capacity for environmental management among provincial and municipal authorities responsible. i.e., DICT / PIU for overseeing successful implementation of the EMP, and for environmental management of the completed subproject. The required capacity development and training of DICT / DPWT operation and management of completed subproject components will be developed from by the future PMCES that will be retained by the project (Norconsult pers. communication, 2018) and beyond the scope here.

36. No dedicated environmental experts are currently appointed to DICT/DPWT. The PMCES (NES) with assistance from the SS of the subproject will develop and deliver training courses to the DICT/DPWT staff responsible for the implementation of the subproject. The purpose of the course(s) is to strengthen abilities of PIU to oversee implementation of the EMP by construction contractors, and EMI.

37. The SS 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.

38. Training on the implementation of an EMP should address two thematic areas. The first area should introduce 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 the Government with specific focus on the preparation of an EMP, and contractor EMPs (CEMP). Table 7 lists the indicative course topics and target participants. The estimated budget of USD $5.000 is listed in Table 7.

Table 8. Indicative training on EMP Implementation

Course Topic Areas	Target Participants	Period
Introduction to EIA, Lao PDR EIA policy framework & procedures, and environmental standards, and ADB Safeguard Policy	EA, PIU/SS,	Pre-construction phase: shortly after PMCES is hired
Purpose and content of an EMP. Development and implementation of the EMP	EA, PIU/SS, contractor EOs	Construction phase shortly after construction packages are let

[6] To be updated with EMP at Detailed Design Phase

Course Topic Areas	Target Participants	Period
for subproject. Review of contractor CEMPs		
Protection of aquatic and terrestrial environment from road construction, and Mekong riverbank civil works	PIU/SS, contractor EOs	Construction phase shortly after construction packages are let
Grievance Redress Mechanism, & public consultation	EA/PIU/SS, contractor EOs, Nakasang and Det and Khone village leaders	Construction phase shortly after construction packages are let
Occupational and community health and safety	PIU/SS, contractor EOs	Construction phase shortly after construction packages are let
Traffic management and safety on roads	PIU	Operation phase shortly before subprojects are completed

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X. EMERGENCY RESPONSE PLAN

39. 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) 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.

40. 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)	- 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 / helps during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools & funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response

Entity	Responsibilities
	& adequate protection, by keeping them informed of Subproject progress.

41. The ERT will be led by the senior contractor 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.

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

43. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the PCU/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

44. 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.

45. 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) make arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted 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) conducted drills for different possible situations.

46. 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

47. 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; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions.

48. For an effective reporting/alerting of an emergency:

(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

49. The following tables suggest general procedures that will be finalized just before construction commences, and will be described in more detail in the Emergency Management Plans of the Contractor.

Table 10: Evacuation procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL & immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.

Procedure	Remarks
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation & hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.
▪ If injury warrants special care, DO NOT MOVE them, unless necessary & instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 11: Response procedure during medical emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: - Safety first of both the rescuer and the victim. - Do not move an injured person unless: - 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 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.
▪ Call the EERT emergency medical services &/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - 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.
▪ If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 12: Response procedure in case of fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: - 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

Procedure	Remarks
	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 to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control fire from spreading.	▪ 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.
▪ Call the nearest fire & police stations &, if applicable, emergency medical services.	▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - 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.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

APPENDIX A: INDICATIVE RESPONSIBILITIES OF KEY MANAGEMENT UNITS OF EMP

EMP Implementation organizations	Roles and Responsibilities
Executing agency (EA) (MICT)	➢ Overall responsibility for the execution of the project ➢ Reviews the project implementation progress ➢ Reviews and endorses any proposed change in the project scope or implementation arrangements ➢ Supervises compliance with loan covenants
Project Coordination Unit (PCU), inside MICT	➢ Project preparation, including the setting up of financial and management systems and procedures, and the procuring of PCU office equipment ➢ Consultant recruitment and supervision ➢ Review and approval of goods and civil works contracts, including bid documents ➢ Coordination between the concerned agencies at the national and provincial levels ➢ Coordination of activities of the PIUs and the inputs of concerned stakeholders ➢ Coordination of all reporting aspects of the project ➢ Coordination of institutional strengthening measures ➢ Ensuring compliance with ADB Loan covenants, assurances and safeguard requirements, as well as with national and provincial policies and regulations ➢ Provision of administrative and technical support to the PIUs ➢ Preparation of consolidated Project accounts to be forwarded to ADB ➢ Advice to PIUs on revenue-enhancing activities related to the recovery of costs of constructing, operating, and maintaining Project facilities and equipment; ➢ Coordination of project audits ➢ All specified monitoring, evaluation and reporting activities ➢ Communication of Project's outcomes, outputs, and activities to all stakeholders ➢ Provide coordination for safeguards and monitoring for PIU
Provincial Project Steering Committee (PPSC)	➢ Ensuring that concerns of all stakeholders are adequately reflected in the project ➢ Coordination of project implementation between the concerned agencies ➢ Confirming compliance with local regulations and provincial policies ➢ Overseeing budgeting and disbursement of counterpart funds ➢ Overseeing implementation of resettlement plans, compensation schemes and all other project safeguard procedures
Project Implementation Units (PIU) DICT, DPWT	➢ Coordination and supervision of consultants' inputs on the appraisal of feasibility studies, and conceptual and detailed designs construction ➢ Procurement of goods and civil works contracts, including the preparation of bid documents and bid evaluations ➢ Approving payments to contractors and maintaining disbursement records7 ➢ Ensuring that institutional-strengthening and capacity-building initiatives involving DMOs, private partners, SMEs and CBTOs are implemented in line with agreed Project designs, schedules and budgets ➢ Ensuring compliance with loan covenants and assurances in respect of all sub projects, including updating of IEEs, EMPs, IPPs, GAPs, resettlement plans ➢ Oversee implementation of EMP by contractor EO, and EMI ➢ Prepare quarterly reports on EMP implementation for PCU ➢ Coordinate with PMCES to design and deliver capacity development & training. ➢ Meetings with all concerned stakeholders ➢ Quarterly progress and monitoring-and-evaluation reporting to the PCU
Project Management & Supervision Consultant (PMCES)	➢ Completes detailed designs of subprojects with PIU ➢ Update EMP to meet final detailed designs of subprojects ➢ Supervises and assists PIU with contractor management

EMP Implementation organizations	Roles and Responsibilities
	➢ Provides technical advice and support when needed to PIU and EMI ➢ Designs and oversees delivery of all training and capacity development of PIU for construction and operation of completed subprojects including EMP. ➢ Provides advisory role for implementation of EMP by PIU and EMI
Environmental Monitoring Institute(EMI)	➢ Implements environmental sampling for EMP ➢ Conducts laboratory analyses of environmental quality samples from field sampling ➢ Prepares periodic monitoring reports for PIU
Environmental Officer (EO) of Contractor	➢ Implements the CEMP for the construction phase ➢ Maintains a daily log of environmental issues at the construction sites ➢ Prepares brief monthly summaries of mitigation activities and environmental issues at constructions site to PIU.
ADB	➢ Assists PCU through timely guidance at each stage of project implementation following agreed implementation arrangements ➢ Review all documents that require ADB approval ➢ Review of monitoring reports on EMP implementation to ensure EMP meets SPS (2009) ➢ Approval of procurement activities ➢ Periodic project review missions, a mid-term review and a completion mission for the project ➢ Ensuring compliance of all loan covenants ➢ Timely processing of withdrawal applications and release of eligible funds ➢ Ensuring compliance of financial audit recommendations ➢ Regularly updates project information disclosure on the ADB website

APPENDIX B: REFERENCE ENVIRONMENTAL STANDARDS

Ministry of Natural Resources and Environment, No 81 / MONRE, Vientiane, 21 February 2017

Decree on the National Environmental Standards

Article 1. Objectives

The objective is to define indicators measurement and concentration values of pollution in the national environmental standard for the scientific reference, environmental quality and pollution control on air, soil, air and water including the disturbance impact on livelihood, human health, animal and environment.

Article 2. National Environmental Standards

The National Environmental Standards is defined indicators measurement, chemical concentration values and its polluted mixed in the air, soil, and water included disturbance covered various environmental and pollution control standards as a tool scientific technique and for other sector references to use as a standard value combination on protecting and pollution control.

This Decree will apply to the IEE in Champasack province (Nakasang, Don Det and Don Khone Access Road Improvement Sub-Projects, According to the environmental and social aspects and an appropriate mitigation measures, which will be applied during the construction and operation phases of the sub-projects.

Groundwater Standards for other consume

No.	Parameters	Symbols	Standard Values	Unit
1	Color,	Not determined	15	Not determined
2	Turbidity	Not determined	20	NTU
3	Potential of Hydrogen	pH	6.5-9.0	Not determined
4	Iron	Fe	1.0	mg/l
5	Manganese	Mn	0.5	mg/l
6	Copper	Cu	1.5	mg/l
7	Chromium Hexavalent	$Cr6^{+}$	0.05	mg/l
8	Zinc	Zn	15.0	mg/l

9	Sulphate	SO_{42-}	250	mg/l
10	Chloride	Cl^-	600	mg/l
11	Fluoride	F^-	1.0	mg/l
12	Nitrate	NO_{3-}	45	mg/l
13	Total Handness	as $CaCo_3$	500	mg/l
14	Hardness	Non-carbonate as $CaCo_3$	250	mg/l
15	Total Suspended Solid	TSS	1.200	mg/l
16	Arsenic	As	0.01	mg/l
17	Cyanide	CN^-	0.07	mg/l
18	Lead	Pb	0.01	mg/l
19	Mercury	Hg	0.001	mg/l
20	Cadmium	Cd	0.003	mg/l
21	Selenium	Se	0.01	mg/l
22	Bacteria (Standard Plate Count Method)	Not determined	500	Colonies/cm^2
23	Coliform Bacteria	Not determined	2.2	MPN/$100cm^3$
24	E.coli Bacteria	Not determined	Mustn't be available	Not determined

Surface Water Quality Standards

No.	Parameters	Symbols	Type of Standard Values					Unit	Analysis Methods
			1	2	3	4	5		
1.	Color, Odor and Taste	Not	n	n'	n'	n'	Not	Not determined	Not determined
2.	Temperature	t°C	n	n'	n'	n'	Not determined	°C	Thermometer

3.	Potential of Hydrogen	pH	6-8	6-8	5-9	5-9	Not determined	Not determined	Electrometric pH Meter
4.	Dissolved Oxygen	DO	More than 7	6.0	4.0	2.0	Less than 2	mg/L	Azide Modification
5.	Electroconductivity	Ec	Less than 500	Less than or equal 1000	Less than or equal 2000	Less than or equal 4000	More than 4000	µS/cm	Ec meter
6.	Chemical oxygen demand	COD	Lerss than 5	5-7	7-10	10-12	More than 12	mg/L	Potassium Dichromate Digestion: Open Reflux or Closed Reflux
7.	Total coliform bacteria	Not determined	n	5000	20.000	Not Determined	Not Determined	MPN/ 100 ml	Multiple Tube Fermentation

APPENDIX C: INDICATIVE PLAN FOR REMAINING PUBLIC CONSULTATION

Organizer / support	Format	Frequency	Topic	Attendees
Just Before Commencement of Construction				
PIU / PMCES	Same public consultation format used during FS and DED stages, including site visits and informal interviews as needed	Once just before construction commences (public meetings), and as needed (site visits, informal interviews with business persons including Mekong fishers) and thereafter during construction phase as needed	Presentation of planned construction activities and schedule; anticipated impacts and mitigation measures; and GRM	Same affected households, district representatives, and participants from consultations for DED.
Operational Stage				
PIU / PMCES	Public consultation and site visits	Once in the first year	Effectiveness of mitigation measures, impacts of operation, comments and suggestions	Same affected households, district representatives, participants from consultations of DED
PMCES / PIU	Public satisfaction survey if desired or needed	Once just before Project Completion Report (PCR) issued	Public satisfaction with EMP implementation comments and suggestions	Same affected households, district representatives, participants from consultations of DED

APPENDIX D: UNITS COSTS FOR WATER QUALITY ANALYSES

Lao National University Unit Costs

	Parameters	Unit Cost (US$)
1	Temperature	7.00
2	pH	7.00
3	Conductivity EC	15.00
4	Chemical Oxygen Demand $(COD)_{Cr}$	15.00
5	Total Dissolves Suspended (TDS)	15.00
6	Arsenic (As)	27.00
7	Cadmium (Cd)	20.50
8	Iron (Fe)	20.50
9	Lead (Pb)	20.50
10	Zine (Zn)	20.50
11	Copper (Cu)	20.50
12	Oil and grease	20.50
13	Total and faecal coliform bacteria (MPN)	23.50
14	Total Nitrogen (T-N)	16.00
15	Ammonia ion (NH_4^+)	13.00
16	Nitrate (NO_3^-)	13.00
17	Nitrite (NO_2^-)	13.00
18	Total Phosphorus (T-P)	16.50
19	Phosphate (PO_4^{3-})	16.50
20	Hydrogen sulphide H2S	13.00
21	Subtotal	333.50
5% Management fee of Faculty of Natural Science (FNS)		16.68
	TOTAL	350.18