

# Environmental Monitoring Report

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Semi-Annual Report (January-June 2017)  
July 2017

## CAM: Provincial Roads Improvement Project

Detailed Design and Implementation Supervision (DDIS) Consulting Services

Prepared by: Korea Consultants International in association with Dainichi Consultant Inc., Sambo Engineering Co., Ltd. and Hankuk Engineering Consultants, and in Sub-consultancy with Moha Engineering & Consulting Co., Ltd; SBK; KACE; and SAWAC for the Ministry of Public Works and Transport, the Kingdom of Cambodia, and the Asian Development Bank.

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**KINGDOM OF CAMBODIA**



**MINISTRY OF PUBLIC WORKS AND TRANSPORT**

**PROVINCIAL ROADS IMPROVEMENT PROJECT  
ADB LOAN 2839-CAM (SF)/8254-CAM (SCF)**

**Consulting Services for  
Detailed Design and Implementation Supervision (DDIS)**

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**SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT**

**Covering Period from January to June 2017**

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**July 2017**

**KCI** **Korea Consultants International**

In association with

**Dainichi Consultant Inc., Sambo Engineering Co., Ltd. and Hankuk  
Engineering Consultants**

In Sub-consultancy with

**Moha Engineering & Consulting Co., Ltd., SBK, KACE and SAWAC**



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## ABBREVIATIONS

ADB	Asian Development Bank
AP	(Project) Affected Persons
BOD	biological oxygen demand
CBF	Cross Border Facility
CEMP	Contractor Environmental Management Plan
COI	Corridor of Impact
CW	Civil Work
DBST	Double Bituminous Surface Treatment
DDIS	Detailed Design and Implementation Supervision
EA	Executive Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
ESO	Environment and Social Office
GoC	Government of Cambodia
GGF	Good Governance Framework
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
KCI	Korea Consultants International
KEXIM	Korea Export and Import Bank
MCFA	Ministry of Culture and Fine Arts
MEF	Ministry of Economy and Finance
MOU	Memorandum of Understanding
MOE	Ministry of Environment
MRD	Ministry of Rural Development
MPWT	Ministry of Public Works and Transport
MT	motorized transport
NDF	Nordic Development Fund
NGO	Non-government Organization
NR	National Road
NTFP	non-timber forest products
PDOE	Provincial Department of Environment
PDRD	Provincial Department of Rural Development
PMU	Project Management Unit
PR	Provincial Road
PRIP	Provincial Road Improvement Project
PPE	Personal Protective Equipment
PPTA	Project Preparation Technical Assistance
RGC	Royal Government of Cambodia
ROW	Right of Way
RP	Resettlement Plan
SBST	Single Bituminous Surface Treatment
SDR	Special Drawing Right
SPS	ADB's Safeguard Policy Statement
STD	Sexually Transmitted Disease
TOR	Terms of Reference
UNESCO	United Nations Educational Scientific and Cultural Organization
WB	World Bank
UXO	Unexploded Ordnance

## EXECUTIVE SUMMARY

1. Asian Development Bank (ADB) approved Loan (ADB loan No. 2839-CAM (SF)/8254-CAM (SCF), approved on 16 December 2011) and Grant 0278-CAM for Improvement of Provincial Roads (PRIP) in southeastern and mid-west province in Cambodia as requested by the Government of Cambodia. This Project is a priority project in the Government's key infrastructure development agenda as it provides all-year access to provincial and rural agricultural communities of Prey Veng and Svay Rieng provinces of southeastern Cambodia, and Kampong Chhnang and Kampong Speu province in the Midwest of Cambodia.

2. The Project aims to rehabilitate of national/provincial roads in Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng provinces to climate resilient paved condition of provincial roads in the southeast and rural roads in the mid-west. The rehabilitation program will provide a safer, cost-effective provincial road network with all-year access from national road network to markets and other social services for provincial centers of southeastern and mid-western Cambodia. A new Cross Border Facility (CBF) will be constructed at Prey Var, Svay Rieng to facilitate efficient cross border transport and trade between Cambodia and Vietnam. The Project will support a sustainable road maintenance regime in the Ministry of Public Works and Transport (MPWT), community-based road safety measures, HIV/AIDS and human trafficking prevention program (HHTPP), and climate resilient measures.

3. The Provincial Roads Improvement Project (PRIP) will be implemented for a Contract period of 36 months, from September 1st, 2014 and will be completed at the ends of August in 2017. These are: CW-A: Improvement of NR13 (62.4km) located in Prey Veng and Svay Rieng province; CW-B1: Improvement of PR314D (25.5km) located in Svay Rieng province; CW-B2: Prey Var CBF; CW-C: Improvement of NR53, PR150B and PR151B (70.63km) located in Kampong Chhnang and Kampong Speu province which are under Civil Works Output; and CW-D1 and D4 located in Kampong Leaeng district Kampong Chhnang province which are under Climate Resilience Output.

4. The Subprojects (CW-A; CW-B1) at the southeast of Cambodia, in which located at Prey Veng and Svay Rieng provinces, the roads will be upgraded to DBST<sub>1</sub> road, 11m width with 7m carriage way & 2m shoulder in both sides. The Subprojects (CW-C), on the other hand, at the mid-west is location at Kampong Chhnang and Kampong Speu provinces, the roads will be upgraded to SBST<sub>2</sub> road, 8m width with 6m carriage way & 1m shoulder in both sides (Cross Section of NR-53, PR-150B & PR-151B). The project is also included reconstruction of bridges and installation of drainage structures such as box culverts and pipe culverts. Based on the results of IEE report which had been conducted as part of project preparation in accordance with ADB's Safeguard Policy Statement of 2009 (ADB SPS), the project is classified environmental **Category B**.

5. To monitor accurately documents in the semi-annual environmental monitoring report (SEMR), field monitoring and interviews were conducted by National Environmental Specialist in collaboration with International and National Social and Gender Specialist on 4 to 7 July 2017 to monitor ongoing construction works which being carried out by the Contractors for CW-A, CW-B1, CW-B2, CW-C, CW-D1, CW-D2 and CW-D4. During the monitoring, Environmental Specialist and Social-Gender Specialist has arranged meeting with RE, ARE of DDIS consultants in each subproject and also discussion meetings with the contractor's representatives. Furthermore, Local Authorities and Affected People were also interviewed. This Semi-annual report covers the period from January to June 2017, for review and

monitoring of all activities during construction stage of the subprojects of PRIP.

6. As a result of physical progress of the contracts by June 2017, progress indicated: 1) CW-A: Improvement of NR13 is progressing as a progress rate of 41.6%; 2) CW-B1 contract is progressing as a progress rate of 49.3%; 3) CW-C contract is progressing as a progress rate of 47.8%, 4) CW-B2 (CBF) is progressing rate of 0.6%, 5) CW-D1 is progressing rate of 49.7%, 6) CW-D2 is progressing rate of 95.0%, and 7) CW-D4 is progressing rate of 37.0%.

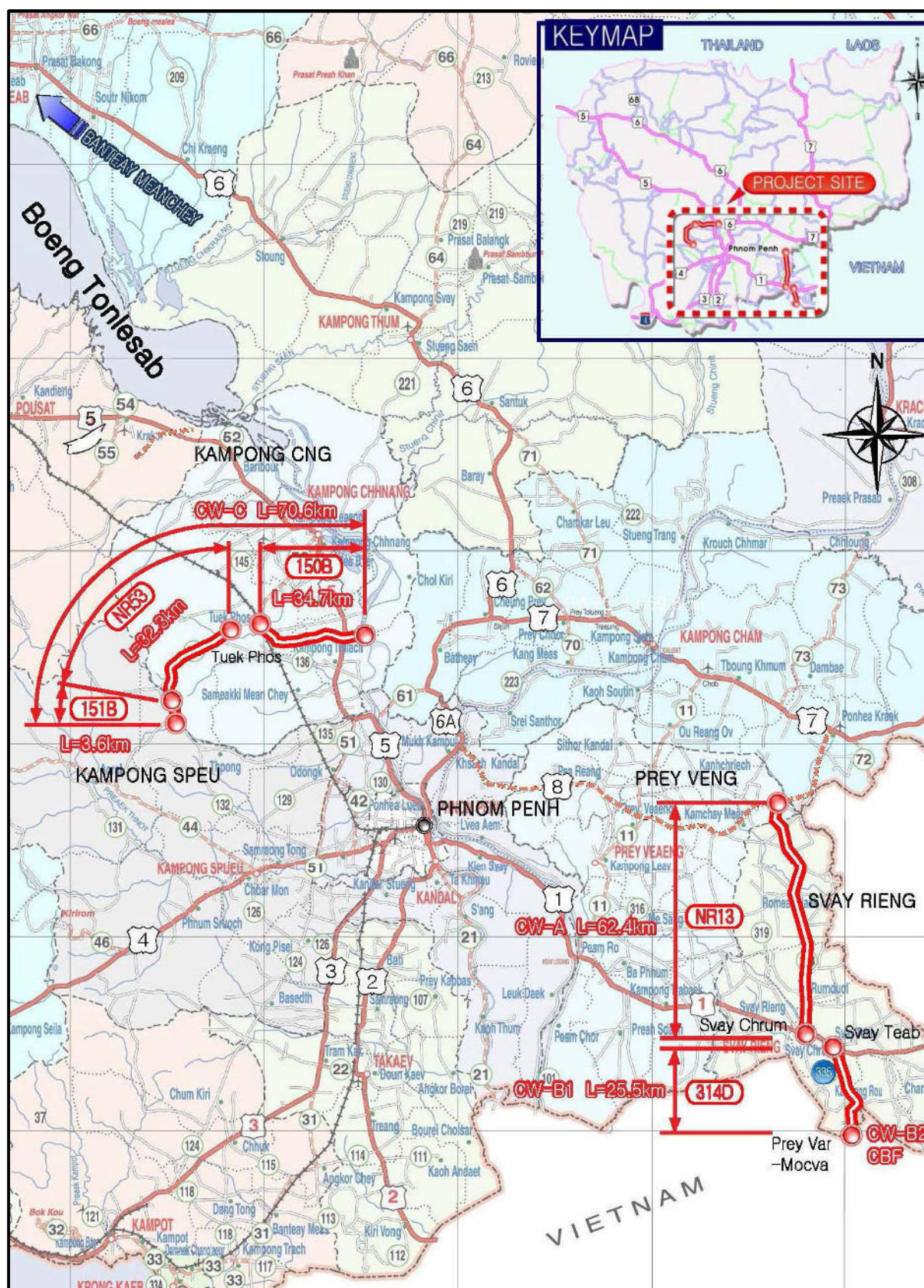
7. Environmental mitigation measures were being implemented based on the environmental checklist, and contractors are trying to minimize the impact to nearby structures as much as they could. During that time, regular sprinkling of water on the roads was rarely observed in each subproject. In addition, the regular monitoring for safeguards was carried out in actual field works i.e.: warning signs, traffic safety. Warning sign and traffic safety signs were installed at work activity area but absolutely insufficient at the dangerous areas even though site work activities were little during this period.

8. Previous major issue was the inappropriate location of a cement stabilized batching plant along NR 13 at PK 55+400 within a residential area without any approval and permission from DDIS and commune. The local communities very concerned to the delayed construction, muddy road in raining time and dusty road in dry season. The DDIS consultant has addressed non-compliance issues related EMP implementation to the Contractor to take immediate action for reducing of the adverse environmental impacts in compliance with IEE and EMP. Responding to the environmental issue, the Contractor has actively organized equipment and personnel to correct non-compliance issue. During the monitoring, it is observed that inappropriate location of a cement stabilized batching plant has been removed from the site by the contractor. Therefore, there is no major issue for the contract CW-A.

9. Based on the observation, it was found that no any complains exists regarding project impacts and donation to the project. The interview, however, shows that they are happy with the project that they prefer the new road with access road to facilitate in travelling and expressed their gratitude to all of the donors as well as Cambodia Government for improvement of their quality of life and reducing poverty.



## PROJECT LOCATION MAP





## **1. Introduction**

### **1.1 Project Description**

10. ABD has approved the Loan No.2839-CAM (SF)/8254-CAM (SCF) on 16 December 2011 and Grant 0278-CAM for Improvement of Provincial Roads at the southeastern and mid-west provinces in Cambodia as requested by Royal Government of Cambodia (RGC). This project is most important project to improve quality of people's life through improvement of roads and other infrastructures as it provides all-year access to provincial and rural agricultural communities of Prey Veng and Svay Rieng provinces of Southeastern Cambodia, and Kampong Chhnang and Kampong Speu province in the Mid-West of Cambodia.

11. The Provincial Roads Improvement Project (PRIP) will be implemented for a Contract period of 36 months, which commencement works from September 1st, 2014 and will be completed at the end of August in 2017, in selected national/provincial roads in 4 provinces of Cambodia, namely: (i) Svay Rieng, (ii) Prey Veng, (iii) Kampong Chhnang, and (iv) Kampong Speu. There are five (5) Contract packages to be implemented under the project in selected national roads and provincial roads in Cambodia in 4 provinces. These are: CW-A: Improvement of NR13 (62.4km) located in Prey Veng and Svay Rieng province; CW-B1: Improvement of PR314D (25.5km) located in Svay Rieng province; CW-B2: Prey Var CBF; CW-C: Improvement of NR53, PR150B and PR151B (70.63km) located in Kampong Chhnang and Kampong Speu province which are under Civil Works Output; and CW-D1 and D4 located in Kampong Leang district Kampong Chhnang province which are under Climate Resilience Output.

12. The project is expected to get more around 640,900 beneficiaries (Commune Database Online, 2010) residing in the areas covered by the project with the Ministry of Public Works and Transport (MPWT) as the Executing Agency (EA). The Project Management Unit 3 (PMU3), as part of the General Department of Public Works of MPWT, is the implementing agency of the Project. MPWT will be responsible for engaging consulting services and awarding civil works contracts. The Project Director of PMU3 will have overall administrative oversight of the consulting services and civil work contracts, and the Project Manager will have responsibility for day-to-day operations.

13. The road will provide an all-year road access from national road to other national roads and provincial town areas, and will provide greater accessibility to basic facilities and services. It will also strengthen the capacity of the MPWT to plan, manage and monitor road maintenance operations and implement the loan covenants and other conditions in the loan package. Environmental and Social Office (ESO) has been established in MPWT and this will be strengthened during the project. It is also intended to further involve the Provincial Department of Public Works and Transport (PDPWT) in project implementation and monitoring.

14. The road will upgrade target existing poor conditioned unpaved and paved roads of NR/PR in four provinces to a paved road standard with double bituminous surface treatment (DBST) and single bituminous surface treatment (SBST). The project will also improve bridges and other drainage structures such as box culverts, pipe culverts, and side drainage systems. For these subprojects no new roads will be built. The Project is classified as environment category B and an initial environmental examination (IEE) was conducted as part of project preparation in accordance with ADB Safeguard Policy Statement of 2009 (ADB SPS). The list of the subproject roads and work progresses is shown in table 1 and table 2.



**Table 1: List of Construction Work**

Contract	Road No.	Construction Works (road type)	Location			Work Scale (Length and Width )
			Province	Starting Point	End Point	
CW-A	NR13	DBST road	-Prey Veng, -Svay Rieng	St.0+000 (Kamchay Mear district, Prey Veng province, Junction NR.08)	St.62+400 (Prosot district, Svay Rieng province, Junction NR.01)	Length: 62.4 km Width: 11 m
CW-B1	PR314D	DBST road	-Svay Rieng	St.0+000 (Prosot district, Junction NR.01)	St.25+500 (Prey Vor, Cambodia-Vietnam Border)	Length: 25.5 km Width: 11 m
CW-B2		CBF	-Svay Rieng	Prey Var Cambodia-Vietnam Border		Area: 5 Ha
CW-C	PR150B-E	SBST road	-Kampong Chhnang	St.0+000 (Thnal Thor Thoung, Junction NR.05)	St.5+447.33 (Taches market, Boeung Tonle Sap)	Length: 5.447 km Width: 8 m
	PR150B-W	SBST road	-Kampong Chhnang	St.0+000 (Thnal Thor Thoung, Junction NR.05)	St.25+550 (Tuek Phos)	Length: 25.55 km Width: 8 m
	NR53	SBST road	-Kampong Chhnang	St.0+000 (Chi Prang)	St.31+879.41 (Thnal Kaeng)	Length: 31.879 km Width: 8 m
	PR151B	SBST road	-Kampong Speu	St.0+000 (Thnal Kaeng, Kampong Chhnang province)	St.3+581.25 (Amleang, Kampong Speu province)	Length: 3.581 km Width: 8 m
CW-D1 CW-D2 CW-D4		Dikes, Dredging, EMC	-Kampong Chhnang			- 3 dikes - 1 emergency center - 6 Safety places

**Table 2: Civil Works Progress by June 2017**

Contract	Contract Amount (US\$)	Work Period	Progress (%)	Implementation of Work during monitoring	Remarks
CW-A (NR13)	22,768,558.44	from Sep 2014 to Aug 2017	41.6	Bridge construction, embankment, sub-base, base course, and bituminous sealing	Sinohydro
CW-B1 (PR314D)	10,728,905.58	from Sep 2014 to Aug 2017	49.3	Drainage works, embankment, sub-base, and base course	Sinohydro
CW-B2 (CBF)	5,161,001.14	from Mar 2017 to Sep 2018	0.6	Mine/UXO clearance, clearing and grubbing	Tan Kim Eng Co., Ltd
CW-C (PR150B, NR53, PR151B)	18,513,806.09	from Sep 2014 to Jun 2018	47.8	Drainage works, Bridge construction, production of PSC deck, embankment, sub-base, base course, and bituminous sealing	Gumkang-Visvakam JV
CW-D1 (Climate resilience, Dikes)	756,115.74	from May 2016 to Mar 2018	49.7	Clearing and grubbing, earth works, and structure works	Royal Mekong
CW-D2 (Climate resilience, Dredging)	390,471.64	from Sep 2016 to Sep 2017	95.0	Dredging and disposal, Watergate, and grouted riprap	Tan Kim Eng Co., Ltd
CW-D4 (Climate resilience, EMC)	350,626.95	from Oct 2016 to Oct 2017	37.0	Building works for Emergency Management Center, backfill for safety areas	Tan Kim Eng Co., Ltd

Source: Monthly Progress Report June, 2017.

## 1.2 Objective of Environmental Monitoring

15. The Environmental Management Plan (EMP) report for the Provincial Road Improvement Project is required to conduct or implement the Environmental Monitoring Program/Plan (EMoP), including social safeguards monitoring during and after project maintenance stage. The consultant's environmental specialist has responsibility for environmental monitoring during and after construction or operating stage.

16. For the Provincial Road Improvement Project on the NR13 (62.4km), PR314D (25.5km) and NR53, PR150B and PR151B (70.63km), the Environmental Monitoring Program (EMoP) will be carried out throughout during implementing stage. The contractor will be responsible for all environmental monitoring activities under supervision from environmental monitoring team, with the collaboration of the MPWT's Environmental and Social Office (SEO). During road improvement project, the environmental and social monitoring program will provide information on:

- Identify the potential environmental impacts along the project route and at worker camps, with respect to the environmental and social safeguard management, especially within the national and provincial road improvement section
- The results of an initial environmental examination or impact assessment
- The potential impacts from all the project's improvement or construction activities compared to the normal condition before the project implemented;
- Supervision and inspection of implementation of mitigation measure by the contractor during the maintenance activity period in accordance with the EMP report.
- Assistance with the identification of alternative mitigation measures that may further reduce the negative impacts of the activities undertaken.
- Identifying issues or problems and complains from affected communities or parties,
- Providing comment and develop plans or measures for correcting operation actions for mitigating negative impacts.

## 2. Laws and Regulations

17. Overall environmental management is required to comply with the Cambodia National Environmental laws, overseen by the Ministry of Environment (MoE). Their main responsibility is for ensuring the implementation of the Law on Environmental Protection and Natural Resources Management. At provincial and city levels, corresponding provincial/city environment departments exist to oversee this role. These local departments have the responsibility for enforcing the environmental legislation, under the supervision of the MoE. However, the daily operation of these departments would normally be under the direct control of the provincial authorities. The EMoP should be conducted by the contractor, overseen by the project owner (i.e. MPWT), in collaboration with the environmental agencies.

18. In the sub-decree on EIA Process MoE 1999 of **Article 3**: The MoE has responsibilities as following: (i) Scrutinize and review the report of the Environmental Impact Assessment in collaboration with other concerned ministries; (ii) Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) while project construction is taking place and accede to their EIA/IEE report's approval. The Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the

Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP) while project construction is taking place and accede to their EIA report's approval. (Sub-Decree on EIA Process MoE, 1999)

19. Base on Sub-decree on EIA Process MoE, 1999. The follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP) while project construction is taking place and accede to their EIA/IEE report's approval. The legislations and guidelines for managing of the environmental aspect of this project, under responsible of MoE and relevant laws and regulations are shown below:

- Law on Environmental Protection and Natural Resource Management. MoE, December, 1996.
- Sub-decree on Environmental Impact Assessment. MoE, August, 1999.
- Sub-decree on Water Pollution Control. MoE, April, 1999.
- Sub-decree on Solid Waste Management. MoE, 1999.
- Sub-decree on Air Pollution Control and Noise Disturbance. MoE, July, 2000.
- Law on Land Traffic. MPWT, December, 2006.
- Land Law. MLMUPC, August, 2001.
- General Environmental Guideline (draft) for road maintenance work. MPWT/PAMP, 2008.
- Environmental Assessment Guideline. ADB, 2003.

### **3. Environmental Monitoring Mechanism**

#### **3.1 Introduction**

20. The Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programs have reasons and justifications which are often designed to establish the current status of an environment or to establish trends in environmental parameters. In all cases the results of monitoring will be reviewed, analyzed statistically and published. The design of a monitoring program must therefore have regard to the final use of the data before monitoring starts, (ADB, 2009).

21. Environment Monitoring Mechanism were established for mitigation measures and taken action on adverse environmental impacts during project's implementation, as full implementation of the IEE, and EMP of the project. Therefore, the environmental specialists (National Environmental Specialist) were mobilized for preparation of the semi-annual environment monitoring report of the civil works from July to December 2016. The report represented the activities of the contractors on the project sites in order to ensure compliance with ADB's Social Safeguard Policy Statement 2009. During site inspection, the DDIS consultants and the contractor's representatives were arranged for discussion meeting, at that time Local authorities, site managers, workers, and affected people who are living along the road project were short interviewed as well.

### **3.2 Environmental Management Plan (EMP) and CEMP**

22. An EMP (Environmental Management Plan) was included in the bidding documents of civil works during the procurement stage. The contractors were required to consider the requirements of the EMP when submitting their bids as the conditions in the EMP become contractually binding on the contractors.

23. The EMP included in the bidding documents is, of necessity, general in scope. This is because specific details such as location of contractors camps, borrow pit areas, batching plant, rock sources, crushing plants and the like are not known at the bidding stage. These details must be supplied by the contractor in his CEMP – Contractors Environmental Management Plan. All contractors had previously supplied a CEMP. This CEMP for the subprojects has been prepared to deal with mitigation and management measures to be taken during Project implementation to avoid, reduce, mitigate for adverse environmental impacts in compliance with the IEE and EMP in the Contract Documents.

### **3.3 Environmental Management Program**

24. The Follow up, monitor and take appropriate measures to ensure a Project Owner will follow the Environmental Management Plan (EMP) in including Environmental Monitoring Plan (EMoP). The Project Owners or contractors will follow the Environmental Management Plan (EMP) while project construction is taking place and accede to their EIA/IEE report's approval (Sub-Decree on EIA Process, MoE, 1999). The EMP during the construction phase will form the basis of contractual obligations to be carried out by the road maintenance/construction contractors. Field engineer under supervision of the Project Supervision Consultant will supervise and monitor the contractor performance (Environmental and Social Safeguards Policies, RAMP, MPWT, 2008). The Environmental Monitoring Program is included in the Environmental Management Plan and so the EMP can be considered as an Environmental Management and Monitoring Plan.

### **3.4 The Scope of Work**

25. The Scope of Work or Major Tasks for the environmental monitoring program in construction stage include:

- Reviewing the environmental report or monitoring report in previous monthly reports that prepared by contractors such as for: Sinohydro (CW-A and CW-B1); Gumkang Visvakam JV (CW-C); Royal Mekong Construction & Development (CW-D1); and Tan Kim Eng (CW-B2, CW-D2 and CW-D4)
- Presenting and guidance to MPWT's staff/PMU environmental engineers on environmental monitoring aspect, in the field practice;
- Field monitoring on road construction activities and contractor's environmental mitigation measure performance in all road projects;
- Consultation with local authorities and communities are along the road sites and including relevant agencies.
- Identifying impacts or issues will be happened during construction stage
- Recommend to contractors to implement all EMP as stated in IEE report and other environmental safeguards in construction contract documents; and



- Instruct to take an action to mitigate or rectify on other issues that find out in the construction stage.

26. The main purpose of environmental monitoring is to ensure that the environmental impacts of project activities are adequately addressed and mitigated. In addition, the project also needs to comply with ADB's SPS 2009 and Cambodia's environmental laws as indicated in the loan agreement. The contractors have a duty to comply with the relevant legislation. The DDIS consultant must check their activities and report to MPWT. In the event of non-compliance issues related EMP implementation, the DDIS Consultant can instruct the contractor to comply with the environmental safeguards guideline. Given the nature of the work activities most monitoring is based on visual observations.

### **3.5 Measurements**

27. Measurements system is a very important component to measure the progressive works especially during the construction stage. It may be necessary to carry out measurements to establish if the regulations are being met. There will be a "hierarchy" of monitoring and measurements. This would be based on measurements being made by persons in the following order:

- Contractors
- Consultants inspectors
- ESO, environmental staff from MPWT
- Ministry of Environment (MOE would only be involved if an official complaint was made to them),
- Local authorities and Communities.

28. Initially, contractors are required to check daily that all operations are being conducted correctly. In general "good housekeeping" must be employed. If contractor's camps are established, then overflowing of septic tanks must be checked by visual inspection. Dust must be controlled by covering of stockpiles and water sprays. Solid waste, engine oil and grease, must be taken away by waste removal contractors and records kept. For road construction operations, lack of dust suppression is usually the main sources of potential nuisance if activities take place near residential dwellings. Crusher plants and borrow areas can also be sources of noise and dust. Inspection of borrow areas should also include borrow roads used by contractors vehicles. After extraction from borrow areas is finished, reinstatement must be carried out. Warning signs must be erected to avoid drowning if deep ponds are left. Inspectors and ESO staff must make regular checks by visual inspection.

29. Checklists were established and controlled by Construction supervision inspectors who they are making daily spot checks and weekly formal checks on site operations. They check all of the above and view records for waste disposal. They must also investigate any pollution incidents and also taken action in all complaints from residents/Local Authorities if necessary. They are using checklists for record purposes and ensure that any complaints or incident are brought to the notice of the contractor immediately, verbally and with a follow up written notice.

30. During conducting environmental monitoring for Provincial Road Improvement Project, the monitoring team (National Environmental and Social-Gender Specialists) conducted field

monitoring for: CW-A, CW-B1, CW-B2 on 4 to 5 July 2017 and CW-C, CW-D1, CW-D2 and CW-D4 on 6 to 7 July 2017 along the construction roads and construction areas. Monitoring is including consultation or discussion with contactors, assistant resident engineers, site engineers, site investigation engineers, site construction leaders and workers, local communities located in along the project roads.

31. Initial monitoring is based on visual inspection and site assessment. Normally, implementation of “Good Housekeeping” and the contractor demonstrating a responsible attitude are sufficient to ensure an environmentally satisfactory operation.

32. The results must be submitted to ESO who will interpret them with respect to the relevant regulations. Discussions must then be held between ESO, the consultants’ inspectors and the contractor to determine how to resolve any problems and how to implement environmental management for mitigation negative impacts.

### **3.6 Time of Monitoring**

33. The timing of the monitoring is very important for taken action on time. The following list is for guidance and is indicative only.

- Liquid emissions from sites must be checked at least weekly for the Contractors and monthly for the DDIS Consultant or after heavy rain if overflowing is reported.
- Dust emissions on site must be checked weekly by visual inspection and monthly by examining records of water spraying. Ambient air quality must be checked over a 24h continuous period at sensitive receptors in the event of complaints.
- Noise levels must be checked at site perimeters in the event of a complaint, at night as well as during the daytime.
- Correct removal and disposal of food waste and waste engine oil and grease must be checked weekly by visual inspection of the camps and checking of records from the waste disposal contractors.
- Noise and vibration must be checked at sensitive receptors if blasting occurs or in the event of complaint. Before blasting commences warning notices must be posted to local residents.
- Reinstatement of borrow pits and quarries must be checked after closure of the facility.
- Implementation of EMP will be checked weekly by the Contractors and at least once a month, and preparation of semi-annual environmental report by the DDIS Consultant, and semi-annual. Contractors and the DDIS Consultant, as well as ESO have to carry out the last EMP monitoring checklist approval.

34. In addition to regular monitoring, unannounced spot checks must be made by ESO on contractors operations. All of the above procedures should be carried out by the site inspectors, in conjunction with ESO, and where appropriate MOE/DOE. The results should be formally recorded every week and compiled into a monthly report. This should be submitted to the Engineer, the Chief Resident Engineer and discussed with ESO and the contractors as necessary but at a minimum on a monthly basis. Monthly reports are being compiled into semi-annual reports for submission to ADB.

### **3.7 Monitoring of CEMP by Checklists**

35. The CEMP is monitored and enforced by the Supervision Consultants inspectors who use Checklists included in the EMP. By using the checklists consistency is maintained between the various packages. The checklists are compiled every month and the checklists for all Contract Packages for 1) CW-A: Improvement of NR31; 2) CW-B1: Improvement of PR314D; 3) CW-C: Improvement of PR150B, NR53, and PR151B; 4) CW-B2: Improvement of CBF Prey Var, 5) Climate Resilience: Dikes, Dredging lake, and Emergency Management Center. In general the semi-annual environmental report is conducted every 6 months (two times per year) by compiling monthly reports. Site inspection of all Environment aspects were sighted and reviewed by the National Environmental Specialist.

36. The checklists had been filled in correctly and reporting was thorough. No significant environmental issues were identified. Dust from roads was commented upon during dry patches but was not a significant issue and was remedied by increased frequency of water sprays. During the dry season it ceases to be an issue. However, much dust has been generated during monitoring. No noise complaints had been received. However, further remedial work for cement stabilized batching plant on NR13 and dust impact is required at the time of the inspections. No complaints from villagers were reported. The contractors rent local houses for their workers rather than establishing camps. This is easier for them and avoids issues over sanitation and water supply. This approach is actively encouraged and appears to be working well during construction stage.

### **3.8 Establishment of ESO**

37. Environmental & Social Office (ESO) is a division which has been established in the Department of Planning, MPW, 2009. There is now 06 staff within Environmental and Social Office (SEO): 1 Chief, 1 Vice chief, 2 Resettlement, 2 Environment & Social Safeguards. It is considered that this now makes them effective. ESO can act together with the DDIS consultant or independently to check contractor's activities. In the event of non-compliance issues related EMP implementation, ESO as part of MPWT can instruct the contractor to comply with the environmental safeguards guideline. During site inspection on Environmental Monitoring, the ESO should have cooperated with National Environmental Specialist if time availability.

## **4. Result of Environmental Monitoring**

38. The Semi-Annual Environmental Monitoring Report focuses on potential environmental and social resources, adverse environmental issues, and proposed mitigation measure were described in following paragraph, and the field record is included environmental monitoring checklist data from January to June 2017 attached in Appendices.

39. To verify the environmental assessments done by checklist, site visits were conducted to several selected roads by the National Environmental and international-national Social and Labor Specialists in cooperation with Resident Engineers, Assistant Resident Engineers of the subprojects and contractors, and also included discussion with site workers and local communities. The results of site observation are given in below:

#### **4.1 Contract CW-A: Improvement of NR13 in Prey Veng and Svay Rieng**

40. CW-A is the improvement of NR13 with structural works along the National Road No.13, the starting point of the project is the junction of NR8 (PK 0+000) in Prey Veng province and end point is the junction of NR1 (PK62+430) in Svay Rieng province. The road will be upgraded to DBST road of 62.4km and reconstruction of other road structures. SINOHYDRO Corporation Limited Co., Ltd is the Contractor for the project. Construction works commenced on 1st September 2014.

41. Site visit and inspection indicates that all the construction work activities are progressing slowly against planned. During raining season, there are not many construction work activities in the project sites, there were a few construction activities for bridge, embankment, sub-base, base course and bituminous work.

42. In June 2017, the rain comes continuously and the construction of NR13 was ongoing for some activities such as i) embankment, ii) sub-base, iii) base course, iv) bituminous, and v) bridge for BR-01 work. During rainy season, the embankment and sub-base work had been suspended and the other construction activities were also restricted.

43. **Air and Noise Emission:** some sections of the project area are located in the rural area, so the air quality is still good and no industries are near the project site, most of along the road areas are covered by rice field, agricultural farm, and rural resident. The contractor did not conduct air and noise monitoring because air and noise on the project area were very little emission. Air and noise would be affected short-time during construction. However, the contractors should be regularly implemented plan for checking and maintaining of construction machines/equipment to reduce negative impacts. There was no major air and noise issue during the monitoring.

44. **Soil Erosion:** In general, there was no sign of soil erosion during the site monitoring. Most of the embankment work along the road is far away from the water courses. Soil erosion can be increased little during the raining, however, there was no any erosion. On the other hand, there was no earthwork along the roads due to continuous raining for long period. There was no major issue during the monitoring.

45. **Borrow pits/quarries:** The activities of quarry and borrow pits was limited due to raining and inaccessibility to the borrow pits.

46. **Leaks and Spills Hazardous material and Non-Hazardous Waste:** The spills or generating of hazardous material waste (fuel waste from construction machine) storage facilities in safety bins or containers at SINOHYDRO's site camp are well managed. Both fuel storage facilities had an in charged person for daily operation and maintained with security and safety.

47. **Waste management:** The workshops and storage areas in Site Camp of the contractor have been limited with lack of garbage bins. The platform space of Contractor site camp is well cleaned. Most of the construction sites are limited to managing of solid waste. The solid wastes are regularly collecting, keeping in rubbish bins, and give to local licensed waste sub-contractor to transport out for disposal. The burning waste is prohibited and doesn't dispose into public filed, or water sources. The wastes shall be separated by hazardous and non-hazardous



wastes, temporary stored in the camp sites, and disposed.

48. **Water Quality:** During field observation, the water quality (in canals, streams, rice field, and other water body located at along the road) did not polluted. During rainy season, the construction activities were reduced as suspension of embankment work and little activity of sub-base and base course. There was no adverse sign of water quality.

49. **Dust generation:** During the monitoring of embankment works, dust generation was observed. The Contractor's regular sprinkling of water is being done at least two times per day at minimum. However, the number of water spray truck is inadequate to effectively mitigate dust generation along the project road when road surface is dried. During monitoring and according to the discussion with local authorities and people, they are concerned about dust pollution and delayed construction because it will be significantly impact to the local business during construction activities at market areas.

50. During the monitoring, it was observed that an inappropriate location of batching plant along NR13 within a residential area had been demobilized. Another concern to the excavated and stocked soil blocked existing access ways to the houses was observed. Contractor shall discuss with affected families and local authorities to select any other sites for stockpiling of soil material in order not to disturb existing access ways.

51. **Safety:** All the workshops and storage places have been equipped with extinguisher capacity of 4kg (at least 4 bottles). The oil water is collected and stored in safety tanks and handed over to local sub-contractor for reusing or recycling, it doesn't recharging and disposal to public fields or water bodies. During the inspection along the road, it was observed that the traffic sign boards and other safety sings at construction activity sections are limited.

#### **Pictures of Project Work Activities (CW-A)**





### Consultations List at Krabaov and Ampil Commune on NR13

No	Name	Sex	Village-Commune	Function	Phone
1	Ms. Sok Kha	F	Krabaov Commune	Villager	
2	Mr. Chhin Heng	M	-	Moto taxi	
3	Mr. Chea Sarorn	M	Ampil Commune	Commune chief	097 973 7247



No	Name	Sex	Village-Commune	Function	Phone
4	Ms. Kim Mey	F	-	Deputy village chief	
5	Ms. Say Saveth	F	-	Gender focus point	
6	Mr. Chap Noy	M	-	Deputy of Romeas Haek District Governor	
7	Mr. Nan Chhem	M	-	Commune Police chief	
8	Ms. Mom Sophea	F	-	Chief of District Gender Office	
9	Mr. Preap Chhet	M	-	Commune council	



Consultation with local people in Krabaov Commune, Kamchay Mear District, NR13



Consultation with local authorities and communities in Ampil Commune, Romeas Haek District, NR13

## **4.2 Contract CW-B1: Improvement of PR314D in Svay Rieng**

52. CW-B1 is the improvement of PR314D with the structural works along the road, the starting point of the project is the junction of NR1 in Svay Teap and the end point in the Kampong Ror is the Cambodia-Vietnam border, Prey Var CBF (25.20 km) and the road will be upgraded to DBST road. SINOHYDRO Corporation Limited Co., Ltd is the Contractor for the project. Construction works commenced on 1st September 2014.

53. The construction works shows progress delay due to contractor's lack of work team arrangement and continuous raining in this year. There were few construction activities during field monitoring such as embankment, sub-base, and drainage work.

54. Related the EMP implementation, Environmental monitoring of this subproject (CW-B1) was conducted by consultant team (International and National Gender-Labor and Environmental Specialists). According to the discussion with Assistant Resident Engineer, site engineer, and contractor, in this dry season, rain come frequently, so earthwork is difficult to proceed smoothly.









55. **Water quality:** During field observation, there was no sign of water laden into the rice field or water body nearby the embankment due to suspension of work. There is no any source to be significantly affected on the water quality in the project area. Disposal and discharging into the water bodies is prohibited. Based on the discussion with local people, there is no complaint regarding water quality.

56. **Dust management:** The embankment work for CW-B1 is under preparation to resuming, however, dust generation was observed when the road surface is dried. During the monitoring, the contractor tried to carry out regular sprinkling of water at least two times per day on the construction sections, however; the number of water spray truck is inadequate to effectively mitigate dust generation along the project road. There will be a negative impact due to dust generation to the environment and local business in urban and local market areas during construction activities. The delay of construction will create negative impact by muddy and dusty in these sections.

57. **Waste Management:** The waste is managed by contractor and sub-contractors. The waste water generation from the project is wastewater from the bathing and flushing toilet. Generally, the workers camp is equipped with bathing room and toilet. The bathing water is drained into the storage tanks. The toilet is built separated between men and women. The solid wastes are regularly collecting, keeping in rubbish bins, and disposed. There are no significant negative environmental issues.

### **Pictures of Activities of PR314**



	
	
Construction activities and condition of PR314 in the urban area of the local markets	
	
	
Present road and environmental condition of PR314	



### Consultation List with Sino Hydro at Camp site

No	Name	Sex	Institution	Function	Phone
1	Ms. Ester Filix	F	KCI Consultant	Inter Social and Gender	
2	Mr. Pen Thay	M	KCI Consultant	National Social and Gender	
3	Mr. Yim Chamnan	M	KCI Consultant	National Environment	
4	Mr. Kit Sokha	M	KCI Consultant	A - Resident Engineer	
5	Mr. Lin Xu Bo	M	Sino Hydro	Chief Engineer	
6	Mr. Dang Peng	M	Sino Hydro	Vice manager of Safety and Quality	
7	Ms. Shao Fei	F	Sino Hydro	Interpreter	

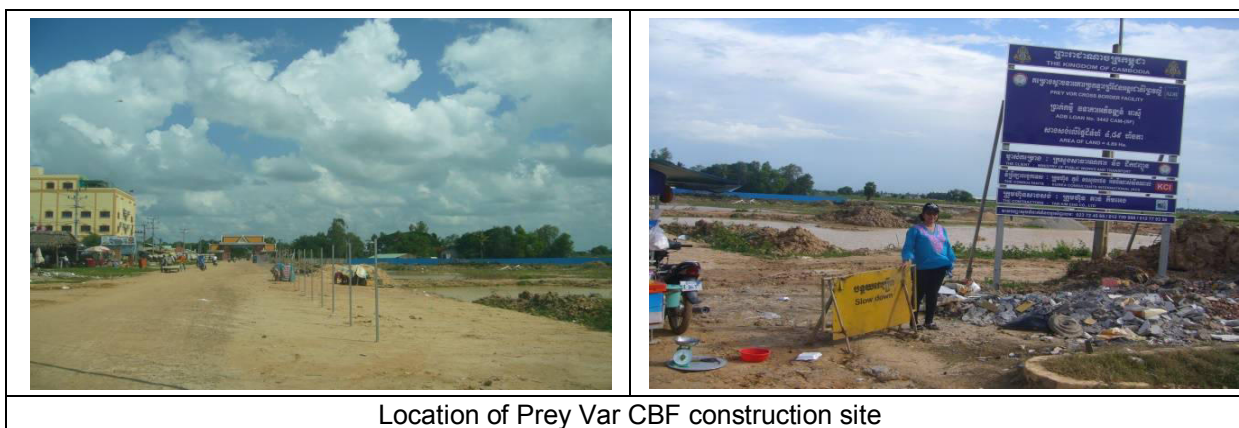






#### 4.3 Contract CW-B2 (CBF) for Improvement of the Prey Var Prey Var CBF

59 The Cross Border Facility (CBF) will be constructed at Prey Var, Svay Rieng to facilitate efficient cross border transport and trade between Cambodia and Vietnam. During the field visit, it was observed the CBF project has just started at March 2017 and there are a few activities due to continuous raining such as site survey, clearing and grubbing, and excavation for foundation. The implemented contractor is Tan KIM ENG Co., Ltd. There is no any negative impact on the environmental and social resources (air, water quality, soil, and safety) because construction is initial stage. However the construction shall be prepared the environmental and social mitigation measures such as i) check and maintain the construction equipment concerning to smoke and noise, ii) allocate and provide safety zone and other public safeties, iii) provide safety materials at construction site and to all staffs-workers, and iv) manage all waste generation from project, collect, store, and dispose by local licensed sub-contractor to reduce any negative impact which will be happened.



#### Consultation list on Prey Var CBF

No	Name	Sex	Institution	Function	Phone
1	Mr. Tit Sophal	M	KCI	Inspector	
2	Mr. Oung Kim Cheng	M	KCI	ARE	
3	Ms. Say Kong Ke	F	KCI	Secretary	
4	Mr. Sovanna	M	Tan Kim Eng	Project Engineer	



#### 4.4 Contract CW-C: Improvement of PR150B, NR53, and PR151B in Kampong Chhnang and Kampong Speu

58. CW-C is the improvement of PR150B, NR53, and PR151B with structures work along the provincial roads located in Kampong Chhnang and Kampong Speu province (70.6 km) and the road will be upgraded to SBST road. The Gumkang-Visvakam JV is the contractor for the project. Construction works commenced on 1st September 2014 and the expected completion date is June 2018.

59. Site work activities show slow progress due to raining and inaccessible to borrow pits. During field monitoring on early July 2017, it was observed few construction activities such as an installation of pipe culvert, sub-base, base course, and bituminous work.

60. **Waste management:** During the site monitoring in the construction camp sites, most of the Contractor's camp sites are moderately managed solid waste. The garbage bins/recycle bins at work sites and the contractor's office were equipped. The solid waste management at the consultant's site camps and construction camps is collected and temporary store in the rubbish bins and give to local licensed waste sub-contractor to take out for disposal.

61. **Leaks and spills of hazardous material and oil waste:** Improper oil/fuel container storage or change engine oil was observed. The contractor should have provided a suitable tank, including concrete platform, wall, and security equipment and fence around the fuel storage. At the workshops and storage area, it was observed that i) improper oil/fuel drum storage, and ii) insufficient housekeeping. The oil waste shall be provided to subcontractor to take out for reuse or recycle.

62. **Water quality:** During field observation, there was no sign of water laden into the rice field or water body due to the earthwork activities was not carried out. Embankment work was not proceeding smoothly due to inaccessibility to borrow pits. Scarifying of soil in surface layer is observed during this monitoring.

63. **Air pollution:** Dust generation was observed along the project road during site inspection, while water spray trucks are standby on the road. Water spraying should be focused on populated areas and sensitive locations such as school zones, residential areas

and health care centers. The air pollution of smoke, noise and vibration from construction machines is not significant issue, however, check and maintain plan of construction machines/equipment must be regularly implemented by the contractors. Air pollution by dust generation is not issued during the monitoring from local authorities. According to the discussion with local people, they consider dusty in some sections during dry season and muddy surface during raining. The contractor should be regularly checked and provide water sprinkling on the dried surface on the road.

64. No major adverse environmental issues were found on the road sites and there was no any major complaint from local authorities and communes. However, the contractor is neglected to take the correct action for the non-compliance of EMP implementation which has been addressed by ADB Loan Review Missions even though DDIS consultant continuously reminded contractor to take correct action.

65. Traffic Safety: During the monitoring by consultant team, it was observed that the traffic signs and other safety signs for public safety are limited on the construction section. Most of the construction areas are not equipped warning signs and any safety devices and barriers for the road safety. Also road signs to reduce traffic speed should be in place at the dangerous areas such as deep excavations and narrow areas especially at bridge widening activity sections. The result of discussion with local communes, they worry about increasing of dust when road surface is dried and muddy surface road during raining because it will affect negatively to the local road traffic movements.

#### **Pictures of Project Work Activities (CW-C)**



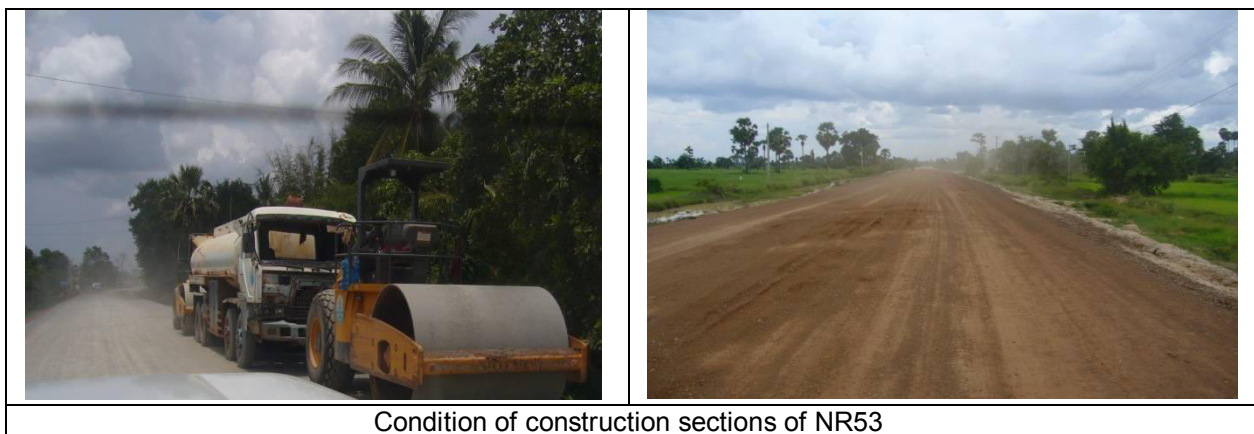




Present condition of road 150B



Construction activities and dusty in road section, 150B



Condition of construction sections of NR53

**Consultation List at CW-C, Kampong Chhnang province**

No	Name	Sex	Institution	Function	Phone
1	Ms. Sos Mai Sam	F	Ta Cheas Commune	Seller	
2	Ms. Mat Srey Mom	F	-	-	
3	Mr. Yep Savy	M	-	-	
4	Ms. Chou Phary	F	-	Food seller	
5	Ms. Touch Hach	F	-	Fish seller	
6	Ms. Ly Tin	F	-	Villager	
7	Ms. Ngy Vandy	F	-	-	



Consultation with communities in Ta Cheas Commune



Consultation with communities and Resident engineer



#### **4.5 Contract CW-D1: Climate Resilience, Reconstruction of Portanorn, Bakdao and Srok Dikes in Kampong Leaeng**

66. CW-D1 is the subproject for Climate Resilience output located at Kampong Leaeng District Kampong Chhnang Province, and 3 dikes will be reconstructed. Royal Mekong Construction & Development Pte., Ltd is the Contractor for the project. Construction works commenced on 9 May 2016 and the expected completion is by March 2018. The purpose of reconstruction of 3 dikes namely Portanorn Dike, Bakdao Dike and Srok Dike is to improve water management in reservoirs, provide water for irrigating rice fields, and provide water for local community use during dry season.

67. During field monitoring and discussion with Project Manager and Site Engineer, construction is in progress at Bakdao, Portanorn and Srok dike. There are construction activities for: i) clearing and grubbing of Srok dike, and ii) embankment for Portanorn and Srok dike, structure work for Watergate and spillway of Bakdao and Portanorn dike. No major adverse environmental issue was observed on the site.

#### **4.6 Contract CW-D2: Climate Resilience, Dredging of Khsaet Lake**

68. This climate change resilience output is dredging of the Khsaet Lake. The project is located in Khsaet Commune, Samaky Meanchey District, Kampong Chhnang province. This subproject is constructed by Tan Kim Eng Co., Ltd. During the site monitoring, the dredging work was completed, and Watergate work also has been completed. Outstanding work is only slope protection at some section and surface backfill for last layer. There is no significant affect on the environment and social. And there is no any complaint or issue from local communes, and they are supported with the project.

#### **4.7 Contract CW-D4: Climate Resilience, Construction of Emergency Management Center and Safety Areas in Kampong Leaeng**

69. CW-D4 is the subproject for Climate Resilience output located at Kampong Leaeng District Kampong Chhnang Province. There are 1 Emergency Center and 6 Safety Areas. The Emergency Center (EMC) is building in Kampong Hau Commune, Kampong Leaeng District Town, Kampong Chhnang Province and contractor is Tan Kim Eng Co., Ltd. The sub-project of Climate Change output is shown in table below.

Subproject	Location	Remarks
Emergency Center	Kampong Leaeng District Town, Kampong Chhnang	- Two stories building - Scale (12.5m X 14m)
Safety Area 1	Nearby Control Building	
Safety Area 2	In Kos Kaek Pagoda Area	
Safety Area 3	Daun Vet Pagoda Area	
Safety Area 4	Kos Ka Ek Pagoda Area	
Safety Area 5	Samrong Sen Pagoda Area	
Safety Area 6	Pralay Meas Pagoda Area	



70. During the field monitoring, roof work for the Emergency Management Center is in progress, and backfill work for the 3 safety areas has been completed. However, outstanding work for remained 3 safety areas is suspended due to increased water level. No major adverse environmental issue was observed during the site monitoring.



**Consultation List at Climate Change EMC, Kampong Chhnang province**

No	Name	Sex	Institution	Function	Phone
1	Mr. Tan One	M	KCI	Lab. engineer	
2	Mr. Heng Vannarith	M	KCI	Inspector	
3	Mr. Teng Sophat	M	Tan Kim Eng	Site engineer	077 959 247
4	Mr. Nut Kimsan	M	Royal Mekong	Site manager	015 989 299
5	Ms. Ester Filex	F	KCI	Int. Social-Gender	
6	Mr. Pen Thay	M	KCI	Nat. Social-Gender	
7	Mr. Yim Chamnan	M	KCI	Nat. Environment	

**5. Review of Environmental Parameters**

71. Environment parameters were checked and reviewed for three contract packages. All civil works have been evaluated satisfactory and no major environmental issues were found. The reviewing of results on environmental parameters of each contract package is shown in **Table 3**.

**Table 3: Environmental Parameters Contract Packages CW-A, CW-B1, CW- B2, CW-C, and CW-D**

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B1	Contract Packages CW-B2	Contract Packages CW-C	Contract Packages CW-D
ADB requirement	Notification of EMP to contractors	General requirements	ADB Social Safeguards Policy Statement 2009	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.	Completed. EMP included in Tender Documents issued to contractors.
ADB requirement	Submission of CEMP from contractor to MPWT	Specific details must be supplied by contractor on construction camps, borrow areas and roads, quarries, crushing and screening plants	ADB Social Safeguards Policy Statement 2009	Submitted by contractor.  NR13 completed.	Submitted by contractor.  PR314D completed.	N/A	Submitted by contractor.  PR150B, NR53, PR151B Completed	Submitted by contractor.  CW-D1 completed.
EMP requirement	Monthly Checklists	All environmental parameters	As per individual checklists given in EMP	Checklists completed by Engineer with contractor for July to December 2015. Checklists reviewed and confirmed to be in order. No environmental issues identified except	Checklists completed by Engineer with contractor for July to December 2015. Checklists reviewed and confirmed to be in order. No environmental	N/A	Checklists completed by Engineer with contractor for July to December 2015. Checklists reviewed and confirmed to be in order. No environmental issues identified.	Not implemented yet
Sub-decree on Water Pollution Control	Water Quality	BOD	< 50mg/L	No visual evidence was sighted of impacts on water quality. No spills were observed. There are no major water courses near project roads. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed. There are no major water courses near project roads. No remedial action is required. No sampling or measurements of water is required.	N/A	No visual evidence was sighted of impacts on water quality. No spills were observed. There are no major water courses near project roads. No remedial action is required. No sampling or measurements of water is required.	No visual evidence was sighted of impacts on water quality. No spills were observed.
		SS	< 50mg/L					
		Temperature	<45°C					
		pH	6-9					
		Oil & Grease	< 5mg/L					
		Dissolved Oxygen	> 4mg/L					

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B1	Contract Packages CW-B2	Contract Packages CW-C	Contract Packages CW-D
Sub-decree on Air and Noise Pollution Control	Air Quality	TSP	< 0.33 mg/m <sup>3</sup>	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	N/A	No major air quality issues identified. Dust suppression on roads improved by more water spraying.	No major air quality issues identified.
	Noise Quality	Leq	75dB(A)					
		Leq	65dB(A)					
No Regulation	Vibration	PPV	< 1mm/sec	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local commune	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local	N/A	No blasting taking place. Blasting will be carried out by commercial quarry owner with permission of local commune	N/A
Sub-decree on Solid Waste Management	Solid Waste	Food Waste	Properly Removed	Site camps acceptable. Attention to be given to oil storage and handling.	Site camps acceptable. Attention to be given to oil storage and handling.	N/A	Site camps acceptable. Attention to be given to oil storage and handling.	Site camps acceptable. Attention to be given to oil storage and handling.
	Liquid Waste	Waste Oil, Grease	Properly Controlled After Removed by Subcontractor					
No Regulation	Septic Tank	Smell, Sewage	No Smell, No Overflowing	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.	N/A	Workers camps acceptable. Where possible installed on the residential land are being rented for setting up camps.	Workers camps acceptable. Where possible houses are being rented rather than setting up camps.
No Regulation	Borrow Pits	Condition of Borrow Pits	Filled after Project Completion, Topsoil resurfaced	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion	N/A	No issues identified. But shall be fenced after Project Completion	No issues identified. But shall be fenced after Project Completion
No Regulation	Borrow Pits	Depth of Borrow pits	No Drowning Hazard	No issues identified	No issues identified	N/A	No issues identified.	No issues identified
No Regulation	Borrow Road	Location for Borrow Road	No complaints from residents	No issues identified	No issues identified	N/A	No issues identified.	No issues identified
No Regulation	Quarries	Condition of Quarries	Quarries reinstated	N/A	N/A	N/A	N/A	N/A
No Regulation	Trees if Cut	Number of Trees	Tree Replanted	N/A	N/A	N/A	N/A	N/A



## 6. Correct Action

72. Most of the Corrective Actions are complying with the CEMP, and also implemented by the Contractors or Sub-contractors, while the other minor non-compliance issues or negative impacts will be corrected from July to December 2017.

## 7. Outstanding Issues

73. There are outstanding issues involved in environmental management in CW-A, CW-B1 and CW-C contract package.

74. **CW-A:** There is no major outstanding issue to the cement stabilized batching plant to avoid noise and dust negative impact to the resident because plant has been removed from the site. However, attention shall be provided to the another locations of cement stabilized batching plants. Sufficient road safety devices are necessary to install at all site activity area immediately.

75. **CW-B1:** The contractor should take correct action during construction stage to the non-compliance of EMP implementation. Use proper mitigation measures to reducing dust generation. Sufficient road safety devices are necessary to install at all site activity area immediately.

76. **CW-C:** The contractor should have taken correct action during construction stage to the non-compliance of EMP implementation which has been addressed by DDIS consultant and ADB Loan Review Mission as well. Use proper mitigation measures to reducing dust generation. Sufficient road safety devices are necessary to install at all site activity area immediately, especially site activity area for bridge widening sections.

## 8. Conclusion

77. All above results of the semi-annual environment monitoring to the ongoing civil works of the Project observed no significant impact. However, outstanding issues have been found to the CW-A, CW-B1 and CW-C contract package. The Contractor shall implement the environmental management and mitigation measures in compliance with the EMP/CEMP properly.

78. Strictly implement approved dust control plan such as: Construction equipment and vehicles shall be used new equipment/machines and regularly well maintained to reducing air pollution. The emission of smoke /air, and noise shall meet MPWT's technical standards and MoE's national emission standards.

79. Separate solid waste into hazardous, non-hazardous, and reusable waste streams and store temporary on site. Provide sufficient and safety waste tanks/bins in the camp. Undertake regular collection and disposal of waste to site approved by authority. Office building shall be provided with toilets and septic tanks to handle domestic sewage. The solid wastes shall be collected and temporary stored in safety rubbish tanks in camp sites and disposal shall be collaborated or delivered to local licensed waste sub-contractor to transport and dispose to local dumping sites under permitting from national / local authority. Provide education of understanding for proper waste management (collection and sanitation) in main camp sites and site construction camp sites.

80. Implementing the construction safety policy: Construction personnel shall be provided with safety gears such as protective hard cap and other safety uses, Traffic management, to secure traffic safety, shall be planned and implemented, The safety single poles shall be provided around the construction sites, and accident response plan shall be prepared in working sites such as: materials, medicines, skill staffs, and other public safety measures are presented in EMP report.

81. Use the local labors sources for road construction works, for providing local jobs and increasing income of local communities. The female workers are used and equally treated from project. Limit working time or open alternative ways for urban residents where markets, shops or restaurants are located on the road shoulder or on the RoW in road construction site. Good collaboration and with local authorities during construct period works, providing project construction planning and activities.

82. Inform and follow-up work closely with local authorities and communities of working scheduled (timing, location, and any issues can be happened) for negotiating or mitigating these issues. Provide enough traffic safeties and other safety use on the construction sites. Provide safety materials and advise protection for construction staffs and workers. Prepared emergency response plan in the constructions sites such as: safety materials/equipment, responsible staffs, and emergency places.

83. Related to the EMP implementation, air pollution mitigation has been carried out continually to reduce dust generation and gaseous emissions from road construction work activities and machineries by the Contractor at the construction sites. Among of monitoring items, worker camps and quarry & borrow pit sites operation are the most important to determine the effects of the project activities. As the results of the monitoring on site camp of the Contractors, it is observed in good condition. Moreover, there are no any environmental issues or influences caused by the project during construction stage. Therefore, the construction activity has been continually carried out strictly follow the environmental monitoring in the EMP and CEMP and other relevant environmental contracts. DDIS consultants' field monitoring to ensure compliance with the requirements in the EMP and CEMP shall be implemented frequently and closely whether the contractor's field activities are compliance with the requirements in the EMP and CEMP.

## **Appendix A: Checklist of EMP Implementation for Contract CW-A**

# ENVIRONMENTAL MONITORING CHECK LIST

January - June 2017

Provincial Road Improvement Project  
ADB Loan No.2839-CAM (SF)/8254-CAM  
Contract Package CW-A: **Improvement of NR13**





**Table:** Checklist of EMP Implementation for Contract **CW-A**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<b>1. Community Facilities (power lines, irrigation canals, etc.)</b>																			
Interruption of utility services are minimized by laying out new lines prior to transfer	√				√			√			√			√					
Replacement structure are constructed prior to demolition of existing structure	√			√			√			√			√						
Temporary facilities to maintain adequate services are in place	√			√			√			√			√						
Coordination with local company or local offices	√			√			√			√			√						
Affected parties are informed in advance	√			√			√			√			√						
<b>2. Air Quality (Dust and Gaseous Emissions)</b>																			
Vehicles and equipment are well maintained and in good condition.	√			√			√			√			√						
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√			√			√			√						
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√			√			√			√						
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√			√			√			√						
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials	√			√			√			√			√						
Dust barriers are installed as necessary	√			√			√			√			√						
Storage areas of construction materials such as sand, gravel, cement, etc. , have			√			√			√			√			√				

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provisions that prevent them from being blown away towards sensitive receptors																			
Trucks transporting construction materials(i.e. sand,soil, cement, gravel, etc) are tightly covered			√			√			√			√			√				
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works			√			√			√			√			√				
Stockpiling of spoils near sensitive receptors is prohibited		√			√			√			√			√					
Construction vehicles have speed limits(typically 25 km/hour or less) along areas where sensitive receptors are located	√			√			√			√			√						
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material			√			√			√			√			√				
Cement and other fine-grained materials delivered in bulk are stored in closed containers			√			√			√			√			√				
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed																			
Weigh hoppers are vented with a suitable filter											√								
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area		√			√			√						√					
Smoke belching vehicles and equipment are not used for the project	√			√			√			√			√						
Construction vehicle trips and travel distances for material deliveries are minimized (e.g., by using local materials and labor sources).	√			√			√			√			√						
Construction access roads are temporarily		√			√			√			√			√					

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paved or sealed																			
<b>3. Noise Levels</b>																			
Prior notification to the community on construction schedule	√			√			√			√			√						
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√			√			√			√						
Vehicles and equipment are well maintained and checked by the contractor every 6 months		√			√			√			√			√					
Only vehicles and equipment that are registered and have necessary permits are used	√			√			√			√			√						
Noisy equipment are completely enclosed whenever possible	√			√			√			√			√						
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√			√			√			√						
Noisy construction activities within 200m of a settlement are only daytime	√			√			√			√			√						
Suitable noise control barriers are used d in the vicinity of house, school, temples, medical facilities and other sensitive receptors	√			√			√			√			√						
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√			√			√			√						
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√			√			√			√						
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√			√			√			√						
Speed limits on construction vehicles are imposed		√			√			√			√			√					
Construction traffic routes are defined in cooperation with local communities and	√			√			√			√			√						

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traffic police																			
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors		√			√		√			√				√					
4. Vibration Levels																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√			√			√			√						
Heavy equipment are operated away from vibration-sensitive areas	√			√			√			√			√						
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√			√			√			√						
Alternative equipment is used	√			√			√			√			√						
Use of vibrating rollers near vibration-sensitive structures are avoided	√			√			√			√			√						
5. Erosion and Sedimentation																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge pier foundation and construction activities at waterways	√			√			√			√			√						
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√			√			√			√			√						
Spoils (excavated soil, rocks, removed asphalt, etc.) stockpiles are located at least 50 m from watercourses	√			√			√			√			√						
A bund is placed around the spoils stockpile area	√			√			√			√			√						
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√			√			√			√						
Grading is avoided or minimized during the rainy season particularly in areas of steep	√			√			√			√			√						

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topography and/or adjacent to water courses																			
Phased grading schedule is implemented to limit the area subject to erosion at any given time	√			√			√			√			√						
Appropriate erosion control and stabilizing measures (such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/ temporary landscaping) are used in disturbed areas and on graded slopes	√			√			√			√			√						
Construction works (bridges, culverts, drainage, etc.) on or near watercourses do not cause obstruction of channel flow	√			√			√			√			√						
Slopes along water channels are stabilized	√			√			√			√			√						
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√			√			√			√						
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√			√			√			√						
6. Spoil Disposal																			
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc.) are immediately transported to disposal sites approved by local authorities		√			√			√			√			√					
Temporary spoils stockpiles near paddy fields have bund or silt fence around them		√			√			√			√			√					
Temporary spoils stockpile that are planned to be used longer than six months are sodded.		√			√			√			√			√					
Height of spoils stockpile are limited to minimize windblown dust		√			√			√			√			√					
7. Soil and Ground Water Contamination																			
Maintenance shops, fuel and oil depot		√			√			√			√			√					

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have impermeable flooring with sump																			
Refueling and servicing of equipment are carried out only in adequately equipped areas	√			√			√			√			√						
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√			√			√			√						
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√			√			√			√						
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√			√			√			√						
Availability of spill clean-up materials specifically designed for petroleum products and other hazardous substances	√			√			√			√			√						
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√			√			√			√						
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures	√			√			√			√			√						
At least weekly check for leakage in containers and immediate repair or replacement when necessary	√			√			√			√			√						
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained	√			√			√			√			√						
Discharge of oil-contaminated water into the environment is prohibited	√			√			√			√			√						



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Waste oil, used lubricant and other hazardous wastes are stored in tightly sealed containers with proper labeling	√			√			√			√			√						
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration	√			√			√			√			√						
8. Water Availability																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.				√			√			√			√						
9. Water Quality																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards	√			√			√			√			√						
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards	√			√			√			√			√						
Bentonite slurry and sludge, mud and other materials and wastes from drilling are collected and processed to avoid pollution of surface water	√			√			√			√			√						
Bentonite slurry sludge, mud and other materials and wastes from drilling are not discharged into watercourses	√			√			√			√			√						
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system	√			√			√			√			√						
Proper disposal of bentonite-containing spoils as fill material in appropriate sites	√			√			√			√			√						
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens	√			√			√			√			√						
Water from bridge foundation dewatering is not discharged directly into a water body	√			√			√			√			√						
Total suspended solids content of		√			√			√			√			√					

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discharges into water bodies comply with applicable standards																			
Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√			√			√			√						
Equipment service and maintenance yards are provided with impermeable flooring and collection sump	√			√			√			√			√						
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√			√			√			√						
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√			√			√			√						
Paving operations are restricted during wet weather	√			√			√			√			√						
Use of sediment control devices downstream of paving activities	√			√			√			√			√						
Use of mobile fueling/maintenance units for construction equipment whenever feasible	√			√			√			√			√						
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√			√			√			√			√						
Use of berms, ditches, and/or impervious liners, etc. Material storage vehicle/ equipment maintenance and fueling areas.	√			√			√			√			√						
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√			√			√			√						
Facilities for solid and domestic liquid waste management are used and maintained	√			√			√			√			√						
10 Solid Waste																			

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Garbage bins and temporary storage facilities for construction wastes, domestic solid wastes and segregated wastes are provided in the project site	√			√			√			√			√						
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√			√			√			√						
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√			√			√			√						
Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√			√			√			√						
11. Borrow Pits																			
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√			√			√			√						
Topsoil are properly removed, stockpiled and preserved for later use during site restoration and provision of vegetation cover to minimize erosion	√			√			√			√			√						
Stable side slopes are provided during excavation of the borrow pits	√			√			√			√			√						
Quarry sites lying on small rivers and streams are avoided	√			√			√			√			√						
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√			√			√			√						
Borrow pits are left in a tidy state with stable side slopes and proper drainage	√			√			√			√			√						
Quarry sites and borrow pits are restored and rehabilitated after use	√			√			√			√			√						
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√			√			√			√						

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Flag persons are employed to regulate traffic especially in potentially hazardous areas			√			√			√			√			√				
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities		√			√			√			√			√					
Sufficient lighting at night within and in the vicinity of construction sites are provided		√			√			√			√			√					
Regular monitoring of traffic conditions along access roads to ensure that project vehicles are not causing congestion	√			√			√			√			√						
Schedules are observed for different types of construction traffic trips (e. g., transport of pre-cast sections, haulage of spoils, delivery of construction materials, etc.)	√			√			√			√			√						
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√			√			√			√						
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>	√			√			√			√									
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards		√			√			√			√			√					
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√			√			√			√						

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Existing access routes are maintained (whenever feasible)	√			√			√			√			√						
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided		√			√			√			√			√					
Adequate informational and directional signage to improve alternative access function	√			√			√			√			√						
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√			√			√			√						
At least one safe through lane is maintained at all times in construction areas	√			√			√			√			√						
<b>13. Damage to Properties and Community Facilities</b>																			
Local roads used by the project are upgraded prior to use	√			√			√			√			√						
Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project	√			√			√			√			√						
Contractor immediately repairs and/or compensates for any damage to properties	√			√			√			√			√						
<b>14. Accidental Discovery of Artifacts</b>																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM	√			√			√			√			√						
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps	√			√			√			√			√						
Work is resumed only after MCI has provided official notification	√			√			√			√			√						
<b>15. Occupational Health and Safety</b>																			
Orientation for construction workers	√			√			√			√			√						

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regarding health and safety measures, emergency response and prevention of HIV/AIDS and other diseases																			
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√			√			√			√						
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be provided	√			√			√			√			√						
Preparation and implementation of a waterway safety plan, approved by the agencies in charge	√			√			√			√			√						
Contractor complies with the waterway traffic safety during construction	√			√			√			√			√						
First aid facilities that are readily accessible to workers	√			√			√			√			√						
Fire-fighting equipment at construction camps and work areas, as appropriate	√			√			√			√			√						
Adequate drainage in workers' camps	√			√			√			√			√						
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√			√			√			√						
Separate sleeping quarters for male and female workers	√			√			√			√			√						
Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√			√			√			√						
Separate hygienic sanitation facilities/ toilets and bathing areas with sufficient water supply for male and female workers	√			√			√			√			√						
All waste water from workers' and construction camps and project-related activities/facilities are treated consistent with national regulations	√			√			√			√			√						
Proper collection and disposal of solid wastes within the workers'/construction	√			√			√			√			√						



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camps																			
Sturdy fencing on all excavation areas greater than 2 m deep	√			√			√			√			√						
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.	√			√			√			√			√						
Reversing signals are installed on all construction vehicles	√			√			√			√			√						
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening	√			√			√			√			√						
16. Public Safety																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians	√			√			√			√			√						
Security personnel are deployed in hazardous areas to restrict public access	√			√			√			√			√						
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√			√			√			√						
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport	√			√			√			√			√						
Safe access to properties and establishments affected by construction works	√			√			√			√			√						
Safe passageways for pedestrians crossing the construction site	√			√			√			√			√						
Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved		√			√			√			√			√					Cross pipe culvert excavate half of existing road. Installed direction traffic

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All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√			√			√			√						
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.	√			√			√			√			√						
17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority																			
Tree-cutting permit is secured, as necessary	√			√			√			√			√						
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>• Inventory of the number of species of trees proposed for removal</li><li>• Identifying and documenting quantity, variety, and location of replacement trees</li><li>• Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>• Monitoring and maintenance program to ensure effectiveness of the plan</li><li>• Adopting remedial measures where appropriate (e.g., replacing dead/damaged replanted trees)</li></ul>																			
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department			√			√			√			√			√				
Cutting of trees for firewood and for use in project is prohibited.	√			√			√			√			√						
New alien plant species are not used for replanting/revegetation without an existing	√			√			√			√			√						

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	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
regulatory framework																			
Invasive species are not introduced into new environments	√			√			√			√			√						
Workers are prohibited from hunting wild animals and collecting forest products	√			√			√			√			√						
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic resources	√			√			√			√			√						
Contractors do not buy or use wood from illegal sources (illegal logging)	√			√			√			√			√						
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√			√			√			√						
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√			√			√			√						
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√									√						
Road improvement works are restricted to the existing ROW boundaries	√			√									√						
Grading methods and facilities i.e., rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal.	√			√									√						
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board	√			√									√						

**Source:** Monthly Progress Reports January to June 2017. Sinohydro Bureau 15 Cambodia

Inspector's name and signature:

Bao po:

THANAWCIH Nithis:

*Acting Project Manager*

*Resident Engineer*

## **Appendix B: Checklist of EMP Implementation for Contract CW-B1**

### ENVIRONMENTAL MONITORING CHECK LIST

January - June 2017

Provincial Road Improvement Project  
ADB Loan No.2839-CAM (SF)/8254-CAM  
Contract Package CW-B1: **Improvement of PR314D**





**Table:** Checklist of EMP Implementation for Contract **CW-B1**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<b>1. Community Facilities (power lines, irrigation canals, etc.)</b>																			
Interruption of utility services are minimized by laying out new lines prior to transfer		√			√			√			√			√					
Replacement structure are constructed prior to demolition of existing structure	√			√			√			√			√						
Temporary facilities to maintain adequate services are in place	√			√			√			√			√						
Coordination with local company or local offices	√			√			√			√			√						
Affected parties are informed in advance	√			√			√			√			√						
<b>2. Air Quality (Dust and Gaseous Emissions)</b>																			
Vehicles and equipment are well maintained and in good condition.	√			√			√			√			√						
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√			√			√			√						
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√			√			√			√						
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√			√			√			√						
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials			√			√			√			√			√				
Dust barriers are installed as necessary		√			√			√			√			√					
Storage areas of construction materials such as sand, gravel, cement, etc., have			√			√			√			√			√				

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
provisions that prevent them from being blown away towards sensitive receptors																			
Trucks transporting construction materials (i.e. sand, soil, cement, gravel, etc) are tightly covered			√			√			√			√			√				
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works			√			√			√			√			√				
Stockpiling of spoils near sensitive receptors is prohibited	√			√			√						√						
Construction vehicles have speed limits (typically 25 km/hour or less) along areas where sensitive receptors are located	√			√			√						√						
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material			√			√			√			√			√				
Cement and other fine-grained materials delivered in bulk are stored in closed containers			√			√			√			√			√				
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed																			
Weigh hoppers are vented with a suitable filter.																			
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area		√			√			√			√			√					
Smoke belching vehicles and equipment are not used for the project	√			√			√			√			√						
Construction vehicle trips and travel distances for material deliveries are minimized (e.g., by using local materials and labor sources).	√			√			√			√			√						
Construction access roads are temporarily paved or sealed		√			√			√			√			√					

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
3. Noise Levels																			
Prior notification to the community on construction schedule (informing)	√			√			√			√			√						
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√			√			√			√						
Vehicles and equipment are well maintained and checked by the contractor every 6 months		√			√			√			√			√					
Only vehicles and equipment that are registered and have necessary permits are used	√			√			√			√			√						
Noisy equipment are completely enclosed whenever possible	√			√			√			√			√						
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√			√			√			√						
Noisy construction activities within 200 m of a settlement are only during daytime	√			√			√			√			√						
Suitable noise control barriers are used in the vicinity of house, school, temples, medical facilities and other sensitive receptors	√			√			√			√			√						
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√			√			√			√						
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√			√			√			√						
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√			√			√			√						
Speed limits on construction vehicles are imposed		√			√			√			√			√					
Construction traffic routes are defined in cooperation with local communities and traffic police	√			√			√			√			√						



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors	√			√			√			√			√						
4. Vibration Levels																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√			√			√			√						
Heavy equipment are operated away from vibration-sensitive areas	√			√			√			√			√						
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√			√			√			√						
Alternative equipment is used	√			√			√			√			√						
Use of vibrating rollers near vibration-sensitive structures are avoided	√			√			√			√			√						
5. Erosion and Sedimentation																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge pier foundation and construction activities at waterways	√			√			√			√			√						
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√			√			√			√			√						
Spoils (excavated soil, rocks, removed asphalt, etc. ) stockpiles are located at least 50 m from watercourses	√			√			√			√			√						
A bund is placed around the spoils stockpile area	√			√			√			√			√						
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√			√			√			√						
Grading is avoided or minimized during the rainy season particularly in areas of steep topography and/or adjacent to water courses.	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Phased grading schedule is implemented to limit the area subject to erosion at any given time										√			√						
Appropriate erosion control and stabilizing measures (such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/ temporary landscaping) are used in disturbed areas and on graded slopes	√			√			√			√			√						
Construction works (bridges, culverts, drainage, etc.) on / near watercourses do not cause obstruction channel flow	√			√			√			√			√						
Slopes along water channels are stabilized	√			√			√			√			√						
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√			√			√			√						
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√			√			√			√						
<b>6. Spoil Disposal</b>																			
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc. ) are immediately transported to disposal sites approved by local authorities		√			√			√			√			√					
Temporary spoils stockpiles near paddy fields have bund or silt fence around them		√			√			√			√			√					
Temporary spoils stockpile that are planned to be used longer than six months are sodded.		√			√			√			√			√					
Height of spoils stockpile are limited to minimize windblown dust		√			√			√			√			√					
<b>7. Soil and Ground Water Contamination</b>																			
Maintenance shops, fuel and oil depot have impermeable flooring with sump	√			√			√			√			√						
Refueling and servicing of equipment are	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
carried out only in adequately equipped areas																			
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√			√			√			√						
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√			√			√			√						
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√			√			√			√						
Availability of spill clean-up materials specifically designed for petroleum products and other hazardous substances	√			√			√			√			√						
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√			√			√			√						
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures	√			√			√			√			√						
At least weekly check for leakage in containers and immediate repair or replacement when necessary	√			√			√			√			√						
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained	√			√			√			√			√						
Discharge of oil-contaminated water into the environment is prohibited	√			√			√			√			√						
Waste oil, used lubricant and other hazardous wastes are stored in tightly	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
sealed containers with proper labeling																			
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration	√			√			√			√			√						
<b>8. Water Availability</b>																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.	√			√			√			√			√						
<b>9. Water Quality</b>																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards	√			√			√			√			√						
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards	√			√			√			√			√						
Bentonite slurry and sludge, mud and other materials and wastes from drilling are collected and processed to avoid pollution of surface water	√			√			√			√			√						
Bentonite slurry and sludge, mud and other materials and wastes from drilling are not discharged into watercourses	√			√			√			√			√						
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system	√			√			√			√			√						
Proper disposal of bentonite-containing spoils as fill material in appropriate sites	√			√			√			√			√						
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens	√			√			√			√			√						
Water from bridge foundation dewatering is not discharged directly into a water body	√			√			√			√			√						
Total suspended solids content of discharges into water bodies comply with	√			√			√			√			√						



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
applicable standards																			
Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√			√			√			√						
Equipment service and maintenance yards are provided with impermeable flooring and collection sump	√			√			√			√			√						
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√			√			√			√						
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√			√			√			√						
Paving operations are restricted during wet weather	√			√			√			√			√						
Use of sediment control devices downstream of paving activities	√			√			√			√			√						
Use of mobile fueling/maintenance units for construction equipment whenever feasible	√			√			√			√			√						
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√			√			√			√			√						
Use of berms, ditches, and/or impervious liners, etc. in material storage, vehicle/equipment maintenance and fueling areas	√			√			√			√			√						
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√			√			√			√						
Facilities for solid and domestic liquid waste management are used and maintained	√			√			√			√			√						
10 Solid Waste																			
Garbage bins and temporary storage	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
facilities for construction wastes, domestic solid wastes and segregated wastes are provided within the project site																			
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√			√			√			√						
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√			√			√			√						
Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√			√			√			√						
11. Borrow Pits										√									
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√			√			√			√						
Topsoil are properly removed, stockpiled and preserved for later use during site restoration and provision of vegetation cover to minimize erosion	√			√			√			√			√						
Stable side slopes are provided during excavation of the borrow pits	√			√			√			√			√						
Quarry sites lying on small rivers and streams are avoided	√			√			√			√			√						
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√			√			√			√						
Borrow pits are left in a tidy state with stable side slopes and proper drainage	√			√			√			√			√						
Quarry sites and borrow pits are restored and rehabilitated after use	√			√			√			√			√						
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√			√			√			√						
Flag persons are employed to regulate			√			√			√			√			√				

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
traffic especially in potentially hazardous areas																			
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities		√			√			√			√			√					
Sufficient lighting at night within and in the vicinity of construction sites are provided		√			√			√			√			√					
Regular monitoring of traffic conditions along access roads to ensure that project vehicles are not causing congestion	√			√			√		√				√						
Schedules are observed for different types of construction traffic trips (e.g., transport of pre-cast sections, haulage of spoils, delivery of construction materials, etc. )	√			√			√		√				√						
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√			√		√				√						
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>	√			√			√		√				√						
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards		√			√			√			√			√					
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√			√			√			√						
Existing access routes are maintained	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
(whenever feasible)																			
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided		√			√			√			√			√					
Adequate informational and directional signage to improve alternative access function	√			√			√			√			√						
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√			√			√			√						
At least one safe through lane is maintained at all times in construction areas	√			√			√			√			√						
<b>13. Damage to Properties and Community Facilities</b>																			
Local roads used by the project are upgraded prior to use	√			√			√			√			√						
Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project	√			√			√			√			√						
Contractor immediately repairs and/or compensates for any damage to properties	√			√			√			√			√						
<b>14. Accidental Discovery of Artifacts</b>																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM	√			√			√			√			√						
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps	√			√			√			√			√						
Work is resumed only after MCI has provided official notification	√			√			√			√			√						
<b>15. Occupational Health and Safety</b>																			
Orientation for construction workers regarding health and safety measures.	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
emergency response and prevention of HIV/AIDS and other diseases																			
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√			√			√			√						
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be provided	√			√			√			√			√						
Preparation and implementation of a waterway safety plan, approved by the agencies in charge	√			√			√			√			√						
Contractor complies with the waterway traffic safety during construction	√			√			√			√			√						
First aid facilities that are readily accessible to workers	√			√			√			√			√						
Fire-fighting equipment at construction camps and work areas, as appropriate										√			√						
Adequate drainage in workers' camps	√			√			√			√			√						
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√			√			√			√						
Separate sleeping quarters for male and female workers	√			√			√			√			√						
Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√			√			√			√						
Separate hygienic sanitation facilities/toilets and bathing areas with sufficient water supply for male and female workers	√			√			√			√			√						
All waste water from workers' and construction camps and project-related activities/ facilities are treated consistent with national regulations	√			√			√			√			√						
Proper collection and disposal of solid wastes within the workers'/construction camps	√			√						√			√						
Sturdy fencing on all excavation areas	√			√			√			√			√						



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
greater than 2 m deep																			
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.	√			√			√			√			√						
Reversing signals are installed on all construction vehicles	√			√			√			√			√						
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening	√			√			√			√			√						
<b>16. Public Safety</b>																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians	√			√			√			√			√						
Security personnel are deployed in hazardous areas to restrict public access	√			√			√			√			√						
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√			√			√			√						
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport	√			√			√			√			√						
Safe access to properties and establishments affected by construction works	√			√			√			√			√						
Safe passageways for pedestrians crossing the construction site	√			√			√			√			√						
Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved		√			√			√			√			√					Cross pipe culvert excavated (half of existing road). Installed to warn and direct traffic

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√			√			√			√						
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.	√			√			√			√			√						
17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority																			
Tree-cutting permit is secured, as necessary	√			√			√			√			√						
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>• Inventory of the number of species of trees proposed for removal</li><li>• Identifying and documenting quantity, variety, and location of replacement trees</li><li>• Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>• Monitoring and maintenance program to ensure effectiveness of the plan</li><li>• Adopting remedial measures where appropriate (e. g. , replacing dead or damaged replanted trees)</li></ul>																			
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department			√			√			√			√			√				
Cutting of trees for firewood and for use in project is prohibited	√			√			√			√			√						
New alien plant species are not used for replanting/revegetation without an existing	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
regulatory framework																			
Invasive species are not introduced into new environments	√			√			√			√			√						
Workers are prohibited from hunting wild animals and collecting forest products	√			√			√			√			√						
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic resources	√			√			√			√			√						
Contractors do not buy or use wood from illegal sources (illegal logging)	√			√			√			√			√						
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√			√			√			√						
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√			√			√			√						
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√			√			√			√						
Road improvement works are restricted to the existing ROW boundaries	√			√			√			√			√						
Grading methods and facilities i.e., rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal	√			√			√			√			√						
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board	√			√			√			√			√						

**Source:** Monthly Progress Reports January to June 2017. Sinohydro Bureau 15 Cambodia

Inspector's name and signature:

Bao po:

THANAWCIH Nithis:

*Acting Project Manager*

*Resident Engineer*

## **Appendix C: Checklist of EMP Implementation for Contract **CW-C****

### ENVIRONMENTAL MONITORING CHECK LIST

January - June 2017

Provincial Road Improvement Project  
ADB Loan No.2839-CAM (SF)/8254-CAM  
Contract Package **CW-C: Improvement of PR150B, NR53, and PR151B**





**Table:** Checklist of EMP Implementation for Contract **CW-C**

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
<b>1. Community Facilities (power lines, irrigation canals, etc.)</b>																			
Interruption of utility services are minimized by laying out new lines prior to transfer		√			√			√			√			√					
Replacement structure are constructed prior to demolition of existing structure	√			√			√			√			√						
Temporary facilities to maintain adequate services are in place	√			√			√			√			√						
Coordination with local company or local offices	√			√			√			√			√						
Affected parties are informed in advance	√			√			√			√			√						
<b>2. Air Quality (Dust and Gaseous Emissions)</b>																			
Vehicles and equipment are well maintained and in good condition.	√			√			√			√			√						
Borrow areas, casting yard and other project facilities are duly licensed and have all the necessary environmental approvals	√			√			√			√			√						
All construction vehicles and equipment are tested for compliance with relevant emission standard and properly licensed	√			√			√			√			√						
Parked vehicles on the site works have their engines turned off. Unnecessary engine idling of vehicles and equipment is prohibited.	√			√			√			√			√						
Water spraying of roadways, working areas and other construction-related facilities near sensitive receptors and handling of all raw sand and aggregates, and other similar materials	√			√			√			√			√						
Dust barriers are installed as necessary		√			√			√			√			√					If necessary, will install

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Storage areas of construction materials such as sand, gravel, cement, etc. , have provisions that prevent them from being blown away towards sensitive receptors	√			√			√			√			√						
Trucks transporting construction materials (i.e. sand, soil, cement, gravel, etc) are tightly covered		√			√			√			√			√					Will cover during transpotation
Roadways are regularly cleaned of tracked in mud, cement, etc. from construction works	√			√			√			√			√						
Stockpiling of spoils near sensitive receptors is prohibited	√			√			√			√			√						
Construction vehicles have speed limits (typically 25 km/hour or less) along areas where sensitive receptors are located	√			√			√			√			√						
Areas where there is a regular movement of vehicles have an acceptable hard surface and are clear of loose surface material	√			√			√			√			√						
Cement and other fine-grained materials delivered in bulk are stored in closed containers	√			√			√			√			√						
Conveyor belts are fitted with wind-boards, and conveyor transfer points and hopper discharge areas are enclosed		√			√			√			√			√					Mixing plant site is 900m far from house
Weigh hoppers are vented with a suitable filter		√			√			√			√			√					Mixing plant site is 900m far from house
Wheel washers are used to clean delivery/ haul trucks of mud and dirt as they exit the work area		√			√			√			√			√					On dry season the truck's wheels are cleaned.
Smoke belching vehicles and equipment	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
are not used for the project																			
Construction vehicle trips and travel distances for material deliveries are minimized (e. g., by using local materials and labor sources).	√			√			√			√			√						
Construction access roads are temporarily paved or sealed		√			√			√			√			√					No have quantities in BOQ
<b>3. Noise Levels</b>																			
Prior notification to the community on construction schedule	√			√			√			√			√						
Vehicle and equipment are fitted with emission control and silencers to meet national noise standard	√			√			√			√			√						
Vehicles and equipment are well maintained and checked by the contractor every 6 months	√			√			√			√			√						
Only vehicles and equipment that are registered and have necessary permits are used	√			√			√			√			√						
Noisy equipment are completely enclosed whenever possible	√			√			√			√			√						
Stationary equipment that produce high noise level are positioned as far as is practical from sensitive receptors.	√			√			√			√			√						
Noisy construction activities within 200m of a settlement are only during daytime	√			√			√			√			√						
Suitable noise control barriers are used in the vicinity of house, school, temples, medical facilities and other sensitive receptors		√			√			√			√			√					Minimize the noise in the vicinity of house, school, temple, hospital, and other sensitive

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance receptors
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Noisy construction activities are avoided near school during examination period and coordinated with school administration	√			√			√			√			√						
Noisy construction activities are avoided in the vicinity of sensitive receivers	√			√			√			√			√						
Suitable noise level reduction measures are installed by the contractor if construction activities are disruptive	√			√			√			√			√						
Speed limits on construction vehicles are imposed	√			√			√			√			√						
Construction traffic routes are defined in cooperation with local communities and traffic police	√			√			√			√			√						
Asphalt concrete batching plants and crushing plant are located at least 500 m away from inhabited areas and other sensitive receptors			√		√			√			√			√					Purchase from other quarries
<b>4. Vibration Levels</b>																			
Fully loaded trucks are rerouted away from roadways that go through heavily built areas	√			√			√			√			√						
Heavy equipment are operated away from vibration-sensitive areas	√			√			√			√			√						
Simultaneous activities like demolition, ground impacting and earth moving are avoided	√			√			√			√			√						
Alternative equipment is used	√			√			√			√			√						
Use of vibrating rollers near vibration-sensitive structures are avoided	√			√			√			√			√						
<b>5. Erosion and Sedimentation</b>																			
Suitable soil erosion control measures are implemented prior to excavation of the bridge pier foundation and construction activities at waterways	√			√			√			√			√						



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Silted water carried with the spoils during excavation and construction of bridge foundation are properly treated	√									√			√						
Spoils (excavated soil, rocks, removed asphalt, etc. ) stockpiles are located at least 50 m from watercourses	√			√			√			√			√						
A bund is placed around the spoils stockpile area	√			√			√			√			√						
Spoil disposal does not cause sedimentation and obstruction of water flow, damage to agricultural land and densely vegetated areas	√			√			√			√			√						
Grading is avoided or minimized during the rainy season particularly in areas of steep topography and/or adjacent to water courses	√			√			√			√			√						
Phased grading schedule is implemented to limit the area subject to erosion at any given time	√			√			√			√			√						
Appropriate erosion control and stabilizing measures(such as geotextiles, mats, fiber rolls, soil binders that are not toxic to the environment, or vegetation measures/temporary landscaping) are used in disturbed areas and on graded slopes	√			√			√			√			√						
Construction works (for bridges, culverts, drainage, etc. ) on or near watercourses do not cause obstruction of channel flow	√			√			√			√			√						
Slopes along water channels are stabilized	√			√			√			√			√						
Dumping of soil, rocks, construction materials and debris onto watercourses is prohibited	√			√			√			√			√						
When construction works cause obstruction of watercourses, the obstruction is immediately cleared to restore channel flow	√			√			√			√			√						
6. Spoil Disposal																			

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Spoils (excavated soil and rocks, cut vegetation, removed pavement such as asphalt, etc. ) are immediately transported to disposal sites approved by local authorities		√			√			√			√			√					Excavated soil and rock removed pavement such as asphalt the villagers need
Temporary spoils stockpiles near paddy fields have bund or silt fence around them	√			√			√			√			√						No have
Temporary spoils stockpile that are planned to be used longer than six months are sodded.	√			√			√			√			√						No have
Height of spoils stockpile are limited to minimize windblown dust	√			√			√			√			√						No have
7. Soil and Ground Water Contamination																			
Maintenance shops, fuel and oil depot have impermeable flooring with sump	√			√			√			√			√						
Refueling and servicing of equipment are carried out only in adequately equipped areas	√			√			√			√			√						
Only minimal chemicals, hazardous substances and fuel are stored on site works, within an enclosed and covered secure area that has an impervious floor and impervious bund around it	√			√			√			√			√						
Storage area for chemicals, hazardous substances and fuel are located away from watercourses, flood-prone areas, work camps, and danger areas	√			√			√			√			√						
Oil-stained refuse such as oily rags, spent oil filters and used oil are collected and disposed of through recyclers/authorized waste handlers and disposed in authorized waste facilities	√			√			√			√			√						
Availability of spill clean-up materials	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
specifically designed for petroleum products and other hazardous substances																			
Immediate cleanup of spills or leaks of petroleum products and/or hazardous substances	√			√			√			√			√						
Training of relevant construction personnel in handling of fuels/hazardous substances and spill control procedures	√			√			√			√			√						
At least weekly check for leakage in containers and immediate repair or replacement when necessary	√			√			√			√			√						
Equipment maintenance and fuel storage areas are provided with drainage to an oil-water separator that is regularly skimmed of oil and maintained		√			√			√			√			√					Maintain in the garage
Discharge of oil-contaminated water into the environment is prohibited	√			√			√			√			√						
Waste oil, used lubricant and other hazardous wastes are stored in tightly sealed containers with proper labeling		√			√			√			√			√					Maintain in the garage
Removal and treatment or proper disposal of oil contaminated soils is included in work sites restoration		√			√			√			√			√					Maintain in the garage
8. Water Availability																			
Temporary canals/irrigation channels to prevent disruption of water supply to farmlands.	√			√			√			√			√						
9. Water Quality																			
Suitable settling/retention ponds are constructed prior to operation of asphaltic concrete batching plants and casting yards		√			√			√			√			√					Not yet started
Settling/retention ponds are properly operated and maintained to ensure effluent quality meets applicable effluent standards		√			√			√			√			√					No have
Bentonite slurry and sludge, mud and other		√			√			√			√			√					No use

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
materials and wastes from drilling are collected and processed to avoid pollution of surface water																			
Bentonite slurry and sludge, mud and other materials and wastes from drilling are not discharged into watercourses		√			√			√			√			√					No use
Drilling solutions (e.g., bentonite slurry) for bridge construction, abutment construction, piling, etc. are processed in a closed system		√			√			√			√			√					No use
Proper disposal of bentonite-containing spoils as fill material in appropriate sites		√			√			√			√			√					There is no bentonite
Spilled bentonite mud in agricultural land is cleaned immediately before it cakes and hardens		√			√			√			√			√					There is no bentonite
Water from bridge foundation dewatering is not discharged directly into a water body	√			√			√			√			√						
Total suspended solids content of discharges into water bodies comply with applicable standards	√			√			√			√			√						
Sanitation facilities with sufficient capacity are provided to handle and treat sewage generated by workers	√			√			√			√			√						
Equipment service and maintenance yards are provided with impermeable flooring and collection sump		√			√			√			√			√					Maintain in garage
All equipment maintenance shops are provided with water-tight receptacles for waste oil, oily rags, spent oil filters, solvents and oily containers	√			√			√			√			√						
Disposal of all waste oil, oily rags, spent oil filters, solvents and oily containers are through authorized waste handlers and recyclers	√			√			√			√			√						
Paving operations are restricted during wet weather	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Use of sediment control devices downstream of paving activities		√		√			√				√			√					Not yet started
Use of mobile fueling/maintenance units for construction equipment whenever feasible	√		√			√				√			√						
Accurate and up-to-date written inventories and labels for all stored hazardous materials	√		√			√				√			√						
Use of berms, ditches, and/or impervious liners, etc. in material storage, vehicle/equipment maintenance and fueling areas	√			√			√			√			√						
Material storage, maintenance and fueling areas and septic systems are at least 30 m from storm drains and surface waters	√			√			√			√			√						
Facilities for solid and domestic liquid waste management are used and maintained	√			√			√			√			√						
10 Solid Waste																			
Garbage bins and temporary storage facilities for construction wastes, domestic solid wastes and segregated wastes are provided within the project site	√			√			√			√			√						
Waste segregation (hazardous, non-hazardous, reusable) is practiced	√			√			√			√			√						
Regular collection and disposal of wastes (by contractor or authorized third party) to sites approved by local authorities	√			√			√			√			√						
Wastes are not dumped into watercourses, agricultural land and surrounding areas	√			√			√			√			√						
11. Borrow Pits																			
Borrow areas are not located in productive land, forested areas and near water courses such as rivers, streams, etc.	√			√			√			√			√						
Topsoil are properly removed, stockpiled and preserved for later use during site		√			√			√			√			√					After excavation



EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
restoration and provision of vegetation cover to minimize erosion																			
Stable side slopes are provided during excavation of the borrow pits			√			√			√			√			√				The owner of borrow pit need it
Quarry sites lying on small rivers and streams are avoided	√			√			√			√			√						
Quarry sections located on the river bed are avoided or reduced if unavoidable	√			√			√			√			√						
Borrow pits are left in a tidy state with stable side slopes and proper drainage			√			√			√			√			√				Stable side slopes are provided drainage for borrow pits will be provided
Quarry sites and borrow pits are restored and rehabilitated after use			√			√			√			√			√				Will be restored and rahabilitated
12. Traffic Management and Local Access																			
Signs advising that construction is in progress are provided, particularly where the alignment crosses existing roads and where construction related-facilities are located	√			√			√			√			√						
Flag persons are employed to regulate traffic especially in potentially hazardous areas		√			√			√			√			√					Don't have potentially hazardous areas
Traffic advisory signs (to minimize traffic build-up) are posted in coordination with local authorities			√			√			√			√			√				If necessary will provided
Sufficient lighting at night within and in the vicinity of construction sites are provided		√			√			√			√			√					If necessary will provided
Regular monitoring of traffic conditions	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
along access roads to ensure that project vehicles are not causing congestion																			
Schedules are observed for different types of construction traffic trips (e. g. , transport of pre-cast sections, haulage of spoils, delivery of construction materials, etc. )	√			√			√			√			√						
Delivery of construction materials and equipment and transport of spoils are during non-peak hours	√			√			√			√			√						
Interactions between construction works, traffic flows and pedestrians are minimized by the following safety measures: <ul style="list-style-type: none"><li>• Temporary signals or flag controls</li><li>• Adequate lighting</li><li>• Fencing</li><li>• Signage</li><li>• Road diversion</li><li>• Traffic cones</li><li>• Barricades</li></ul>			√			√			√			√			√				Will be installed more
Use of escort vehicles and warning signs/lights to increase public awareness of potential hazards			√			√			√			√			√				If necessary will provided
Construction activities and schedules are coordinated in advance with local agencies, community representatives, businesses, schools	√			√			√			√			√						
Existing access routes are maintained (whenever feasible)	√			√			√			√			√						
Provision of alternative access and/or parking when impacts to principal access routes and parking areas cannot be avoided	√			√			√			√			√						
Adequate informational and directional signage to improve alternative access function	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
Construction operations are scheduled to avoid or minimize conflicts with local uses/activities	√			√			√			√			√						
At least one safe through lane is maintained at all times in construction areas	√			√			√			√			√						
<b>13. Damage to Properties and Community Facilities</b>																			
Local roads used by the project are upgraded prior to use		√			√			√			√			√					Will be upgraded after using
Local and access roads used by the project are repaired and maintained regularly and fully restored at the end of the project		√			√			√			√			√					Will be upgraded after using
Contractor immediately repairs and/or compensates for any damage to properties	√			√			√			√			√						
<b>14. Accidental Discovery of Artifacts</b>																			
Immediate stoppage of operations on road section where artifacts/ archaeological finds are unearthed; contractor informs the DDIS and CIPM		√			√			√			√			√					Not found yet
CIPM notifies Ministry of Culture and Information (MCI) to obtain advice regarding the next steps		√			√			√			√			√					Not found yet
Work is resumed only after MCI has provided official notification		√			√			√			√			√					Not found yet
<b>15. Occupational Health and Safety</b>																			
Orientation for construction workers regarding health and safety measures, emergency response and prevention of HIV/AIDS and other diseases	√			√			√			√			√						
Workers at the bridge site are provided with life vests/buoyancy devices at all times	√			√			√			√			√						
Stable footpaths/access with sturdy guardrails to the bridge work sites shall be	√			√			√			√			√						

EMP Requirement (Mitigation Measures)	Compliance Status																		Remarks/ Reasons for Partial or non- compliance
	January 2017			February 2017			March 2017			April 2017			May 2017			June 2017			
	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	Yes	No	Partial	
provided																			
Preparation and implementation of a waterway safety plan, approved by the agencies in charge		√			√			√			√			√					No have
Contractor complies with the waterway traffic safety during construction	√			√			√			√			√						
First aid facilities that are readily accessible to workers		√			√			√			√			√					Keep in office
Fire-fighting equipment at construction camps and work areas, as appropriate	√			√			√			√			√						
Adequate drainage in workers' camps	√			√			√			√			√						
Adequate and clean housing and sanitation facilities for all workers at the workers'/ construction camps	√			√			√			√			√						
Separate sleeping quarters for male and female workers	√			√			√			√			√						
Reliable supply of water for drinking, cooking and washing purposes at the workers' camps	√			√			√			√			√						
Separate hygienic sanitation facilities/toilets and bathing areas with sufficient water supply for male and female workers	√			√			√			√			√						
All waste water from workers' and construction camps and project-related activities/ facilities are treated consistent with national regulations	√			√			√			√			√						
Proper collection and disposal of solid wastes within the workers'/construction camps	√			√			√			√			√						
Sturdy fencing on all excavation areas greater than 2 m deep			√			√			√			√			√				will provided if necessary
Workers are provided and use appropriate and complete safety equipment such as safety boots, protective clothes, breathing mask, ear protection, helmets, gloves, etc.			√			√			√			√			√				Safety equipment is provided

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Reversing signals are installed on all construction vehicles	√			√			√			√			√						
Fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening		√			√			√			√			√					Will be installed warning sign
<b>16. Public Safety</b>																			
Signage are installed at the periphery of the construction site to warn and direct traffic and pedestrians			√			√			√			√		√					Provide at detour road
Security personnel are deployed in hazardous areas to restrict public access		√			√			√			√								will provided if necessary
Speed limits are imposed on construction vehicles along residential and other sensitive areas(typically 25 km per hour)	√			√			√			√									
Drivers are taught safe driving practices to minimize accidents and prevent spill of hazardous and other construction materials during transport	√			√			√			√									
Safe access to properties and establishments affected by construction works	√			√			√			√			√						
Safe passageways for pedestrians crossing the construction site	√			√			√			√			√						
Excavated areas are immediately backfilled, covered (e. g. , with metal plates) and/or repaved	√			√			√												
All construction vehicles and equipment are secured during non-working periods to prevent unauthorized access or use	√			√			√			√			√						
Appropriate safety barriers and warning signs are installed in areas that pose safety risks such as open excavations, cut slopes, erosion-prone slopes, manufactured slopes, drainages, etc.			√			√			√			√			√				will provided if necessary

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17. Flora and Fauna																			
Vegetation removal is coordinated with forest authority		√			√			√			√			√					Within RoW
Tree-cutting permit is secured, as necessary	√			√			√			√			√						
Tree planting and landscaping plan that includes: <ul style="list-style-type: none"><li>• Inventory of the number of species of trees proposed for removal</li><li>• Identifying and documenting quantity, variety, and location of replacement trees</li><li>• Replanting at the outer portions of the ROW and in other locations agreed with local authorities</li><li>• Monitoring and maintenance program to ensure effectiveness of the plan</li><li>• Adopting remedial measures where appropriate (e. g. , replacing dead or damaged replanted trees)</li></ul>		√			√			√			√			√					Don't have
Clearing of trees is limited to areas that are only necessary based on the project design and as approved by the forestry department	√			√			√			√			√						
Cutting of trees for firewood and for use in project is prohibited	√			√			√			√			√						
New alien plant species are not used for replanting/revegetation without an existing regulatory framework																			
Invasive species are not introduced into new environments	√			√			√			√			√						
Workers are prohibited from hunting wild animals and collecting forest products	√			√			√			√			√						
Bridge works are scheduled in dry season to minimize adverse impacts to aquatic	√			√			√			√			√						



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resources																			
Contractors do not buy or use wood from illegal sources (illegal logging)																			
No construction camps, asphalt mixing plants, material storage sites and other construction facilities are located in protected areas	√			√			√			√			√						
Construction camps, asphalt mixing plants, material storage sites and other construction facilities are located at least 1 km from the boundaries of national parks and class 1A and 1B watershed designated areas	√			√			√			√			√						
Precautions are adopted to ensure that damage to vegetation is avoided should fires resulting from execution of the works occur	√			√			√			√			√						
Road improvement works are restricted to the existing ROW boundaries																			
Grading methods and facilities i. e. , rounding, benching, terracing and retaining walls are used to reduce earthwork and related topographic alteration/vegetation removal	√			√			√			√			√						
Suitable wildlife crossing structures are installed at locations agreed with the park management boards and National Environmental Board		√			√			√			√			√					Not park

**Source:** Monthly Progress Reports January to June 2017, Gumkang-Visvakam JV

Signature

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