

Environmental Monitoring Report

Semi-Annual Report (January - June 2015)
July 2015

CAM: Rural Roads Improvement Project

Detailed Design and Implementation Supervision (DDIS) Consulting Services

Prepared by Korea Consultants International in association with Filipinas Dravo Corporation for the Ministry of Rural Development, the Kingdom of Cambodia, and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 1 July 2015)

Currency unit	–	riel (KR)
KR1.00	=	\$0.000245
\$1.00	=	KR4,086

NOTE

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

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

KINGDOM OF CAMBODIA



MINISTRY OF RURAL DEVELOPMENT

ADB LOAN 2670-CAM (SF)

RURAL ROADS IMPROVEMENT PROJECT

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

SEMI-ANNUAL ENVIRONMENT MONITORING REPORT

Covering January to June 2015

July 2015



KOREA CONSULTANTS INTERNATIONAL
in association with Filipinas Dravo Corporation

PROJECT MANAGEMENT UNIT (PMU)**Report Control Form**

Project Name: Rural Roads Improvement Project
ADB Loan No. 2670-CAM(SF)

Report Name: **Semi-annual Environment Monitoring Report for January-July 2015**

PREPARATION, REVIEW AND AUTHORISATION

Prepared by: KIM Il Hwan

Signature: 

Position: Team Leader - DDIS Consultants

Date: 30 July 2015

Reviewed by: SONG Sophal

Signature: 

Position: Project Manager, PMU

Date: 30/07/2015

Approved by: CHAN Darong

Signature: 

Position: Project Director, PMU

Date: 30/7/2015

ISSUE REGISTER**Distribution List**

Ministry of Rural Development
Asian Development Bank, Manila
Asian Development Bank, CaRM
Ministry of Economy and Finance
DDIS Office
KCI Head Office

No. of Copies
3
2
1
Original
Soft Copy

REVISION, PREPARATION, REVIEW ISSUE				
Revision	Date	Prepared by	Reviewed by	Issued to Distribution List by:



KOREA CONSULTANTS INTERNATIONAL

in association with PHILIPINAS DRAVO CORPORATION

Detailed Design and Implementation Supervision

RURAL ROADS IMPROVEMENT PROJECT, ADB LOAN NO.2670-CAM (SF)
MINISTRY OF RURAL DEVELOPMENT

30 July 2015

H.E. Dr. CHAN Darong

Director General for Technical Affairs

Project Director

Ministry of Rural Development

Corner of Street 169 & Russian Federation Blvd

Phnom Penh, Cambodia

RURAL ROADS IMPROVEMENT PROJECT	
DATE RECD	30 / 07 / 15
FILE NO	DOC NO 224 RRIP

Our Ref No. KCI-RRIP-15-101

Ref: Rural Roads Improvement Project: ADB Loan 2670-CAM (SF)

**Subject: Submission of Semi-Annual Environment Monitoring Report
Covering the Period from January to June 2015**

Dear Sir,

The DDIS consultants would like to submit herewith the semi-annual environment monitoring report of the project for the period covering 6 months from January to June 2015.

All civil works under RRIP have been completed during the reporting period. The International Environmental Specialist, Dr. David G. Lees and national environment specialist, Mr. Nin Vanntha, were mobilized for semi-annual environment monitoring of the civil works between 18th May and 28th May 2015. The DDIS consultants, jointly with PMU, SEO and PDRD conducted semi-annual environment monitoring of the civil works. During the environment monitoring with SEO, PDRD and Contractors, checklists of EMP implementation for ongoing civil works contract packages were reviewed and the inspection team made a site inspection to the project sites in order to ensure compliance with Environment Management Plan of the Project and ADB's Safeguard Policy Statement (SPS) 2009.

Through the environment monitoring on the completed sites of the Project, and it has been evaluated there are no adverse environmental issues associated with the project implementation.

Sincerely yours,



KIM II Hwan

Team Leader

Detailed Design and Implementation Supervision

Korea Consultants International

Contents

1	EXECUTIVE SUMMARY	iii
2	Environment Monitoring Mechanism	4
2.1	Introduction	4
2.2	Environmental Management Plan (EMP) and CEMP	4
2.3	Environmental Monitoring Program	4
2.4	Measurements	4
2.5	Timing of Monitoring	5
2.6	Monitoring of CEMP by Checklists	6
2.7	Establishment of SEO	6
3	Results of Monitoring	6
3.1	Contract CW-C: Battambang	7
3.2	Contract CW-C: Pursat	9
3.4	Contract CW-D: Kampong Cham	12
3.5	Contract CW-E: Kampong Cham	13
3.6	Contract CW-F: Kampong Cham	13
4	Corrective Actions	17
5	Outstanding Issues	17
6	Conclusion	17

Figures

Figure 1	Completed view of 1BB1	7
Figure 2	1BB1 Rectangular Borrow pits left as water ponds. Sides correctly sloped	7
Figure 3	Completed view of 1BB1, New houses built along the road	8
Figure 4	Slope protection works along 1BB2	8
Figure 5	Start of Road 1BB3 leading to 1BB4	8
Figure 6	Mid Point and End Point of 1BB4	9
Figure 7	Begin Point and End Point of 154D	9
Figure 8	Interview with residents at Camp Site 154D	9
Figure 9	Empty drum of bitumen to be removed on 154D.	10
Figure 10	Road 155D shoulders and graded borrow pit	10
Figure 11	Road 1PS2 Begin Point and End point	11
Figure 12	Road 155C Begin Point and End point	11
Figure 13	Beginning point of Road 152E and end point view	12
Figure 15	Beginning point of road and inspection team	12
Figure 21	Interviews with land owners and contractors staff	13
Figure 22	Beginning point and end point of Road KC2 (CW-E)	13
Figure 23	Beginning point of Road KC11 with concrete road section	14
Figure 23	End Point of KC11 and cleared contractors camp.	14
Figure 24	End Point of KC-11 and cleared contractor's camp	14

Tables

Table 1.	List of Project Roads	3
Table 2	Environmental Parameters Contract Packages CW-A, B, C, D, E and F	15

ABBREVIATIONS

ADB	Asian Development Bank
AP	(Project) Affected Persons
APL	Angkor Protected Landscape
APSARA	Authority for Protection and Management of Angkor/ Region of SiemReap
BOD	biological oxygen demand
COI	Corridor of Impact
DBST	double bituminous surface treatment
DDIS	Detailed Design and Implementation Supervision
EIA	environmental impact assessment
EMP	Environmental Management Plan
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
MRD	Ministry of Rural Development
MOE	Ministry of Environment
MT	motorized transport
NDF	Nordic Development Fund
NGO	Non-government Organization
NTFP	non-timber forest products
PDRD	Provincial Department of Rural Development
PMU	Project Management Unit
PPTA	Project Preparation Technical Assistance
PSP	Prasat Sambour Preikuk
RGC	Royal Government of Cambodia
ROW	Right of Way
RP	Resettlement Plan
SDR	Special Drawing Right
SEO	Social and Environment Office
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

1 EXECUTIVE SUMMARY

1. The Rural Roads Improvement Project (RRIP) started in 2011 and is being implemented for a period of 5 years. The works will be completed in 2015 and the loan closing date is 30 June 2016. The Project has five (5) key components, namely: (i) improvement of 505 km of 22 project rural roads, (ii) improved road asset management, (iii) road safety and safeguards, (iv) climate change adaptation and (v) efficient project management.

2. The roads will provide an all-year road access from provincial towns and agricultural areas, and will provide greater accessibility to basic facilities and services. The Project will also strengthen the capacity of the MRD to plan, manage and monitor road maintenance operations and implement the loan covenants and other conditions in the loan package including establishing and strengthening a Social and Environmental Office (SEO) in MRD, and increasing linkages and involving the Provincial Department Rural Development (PDRD) in project implementation and monitoring.

3. The Project is upgrading targeted existing unpaved rural roads in eight provinces to a paved road standard with double bituminous surface treatment (DBST) without widening or improving alignment. The Project is also improving drainage structures such as box culverts and pipe culverts, but reconstruction of bridges are limited to existing wooden bridges. 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).

4. The civil works comprise the improvement of 22 existing roads, earth or gravel surfaced roads in eight provinces. The project is covered by ADB Loan 2670-CAM(SF) (Contract CW-B and Contract CW-C in four provinces of Kampong Speu, Kampong Chhnang, Pursat and Battambang started in Dec 2011) and Korea EXIM Bank Loan KHM-11(Contract CW-A in three provinces of Tbong Khmum, Kampong Thom and Siem Reap started in January 2012). The three additional contracts, (CW-D, CW-E and CW-F) in Kampong Cham and Tbong Khmum Province financed by ADB Loan 2670-CAM(SF), were awarded in January 2014 and started construction in February 2014.

5. The International Environmental Specialist and national environment specialist conducted semi-annual environment monitoring of the civil works between 18 May and 28 May 2015. They reviewed the activities of the contractors in the project sites in order to ensure compliance with ADB's Social Safeguard Policy Statement 2009 and EMP. They were accompanied by the SEO and PDRD staff of MRD and the DDIS consultants and the contractor's representatives.

6. There are currently 7 staffs within SEO: 1 chief, 1 deputy-chief, 1 resettlement, 2 environment and 2 gender officers. The SEO is currently fully effective in operation for monitoring activities of civil works contractors in resettlement, environment and gender mainstreaming. SEO implement monitoring jointly with the DDIS consultant or independently to check contractor's activities. In the event of noncompliance with EMP, SEO through PMU may issue instructions to the contractors to comply with the EMP.

7. The CEMP has been monitored and enforced by the DDIS Consultants who use

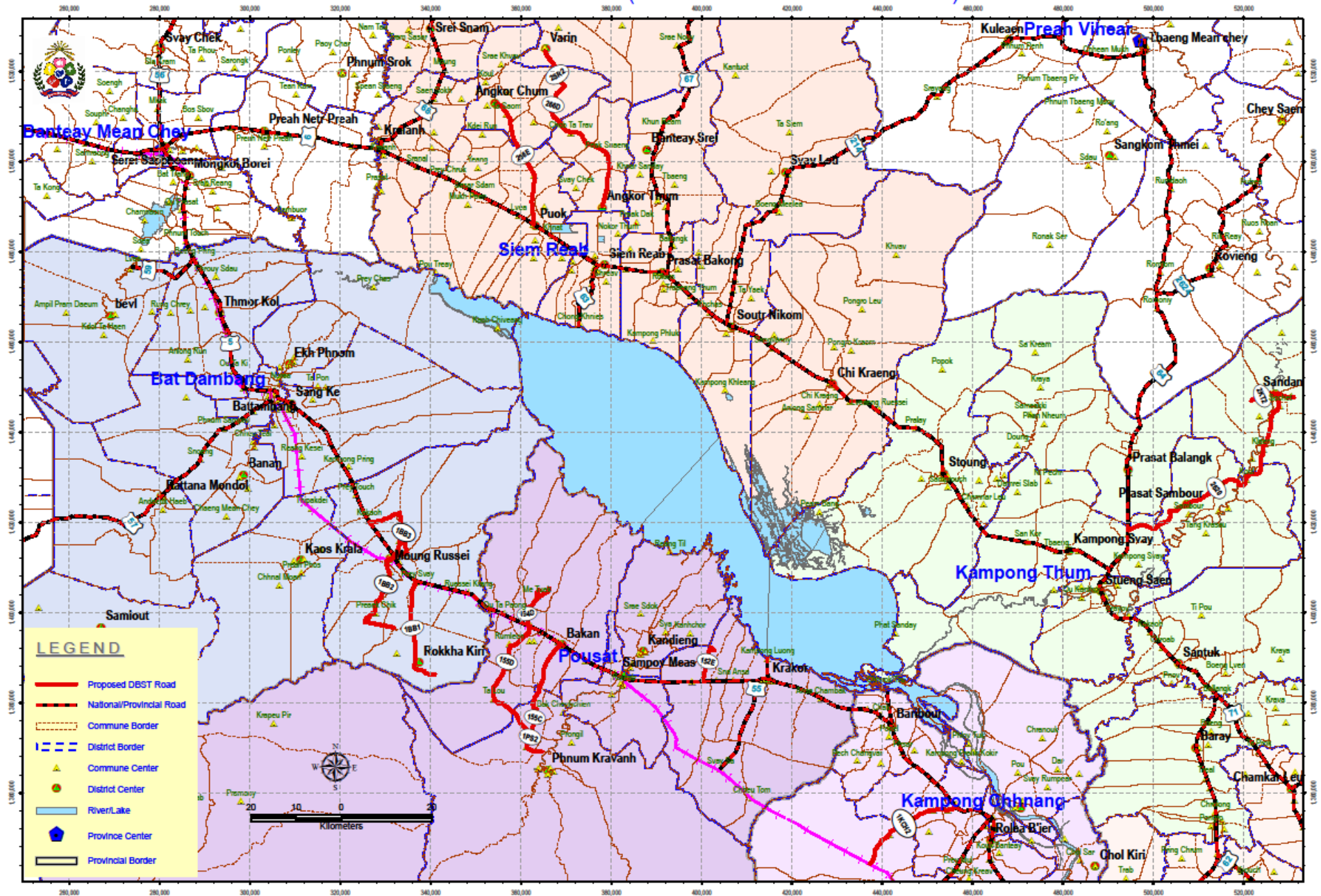
checklists included in the EMP. By using the checklists, consistency is maintained between the various packages. The checklists are compiled every month and the checklists for all relevant contract packages for the period from January to May 2015 were sighted and reviewed by the International Environmental Specialist. The checklists had been filled in correct manner and reporting was thorough. No environmental issues were identified. No complaints from villagers were reported. This was supported by roadside interviews as well whereby villagers mainly commented positively on the shorter time to travel to markets.

8. In order to confirm the environmental conditions of the project roads, several project roads recently completed were visited. Construction has been entirely completed. In general environmental conditions were acceptable. Some left over materials from demobilized contractors remain and contractors have removed.

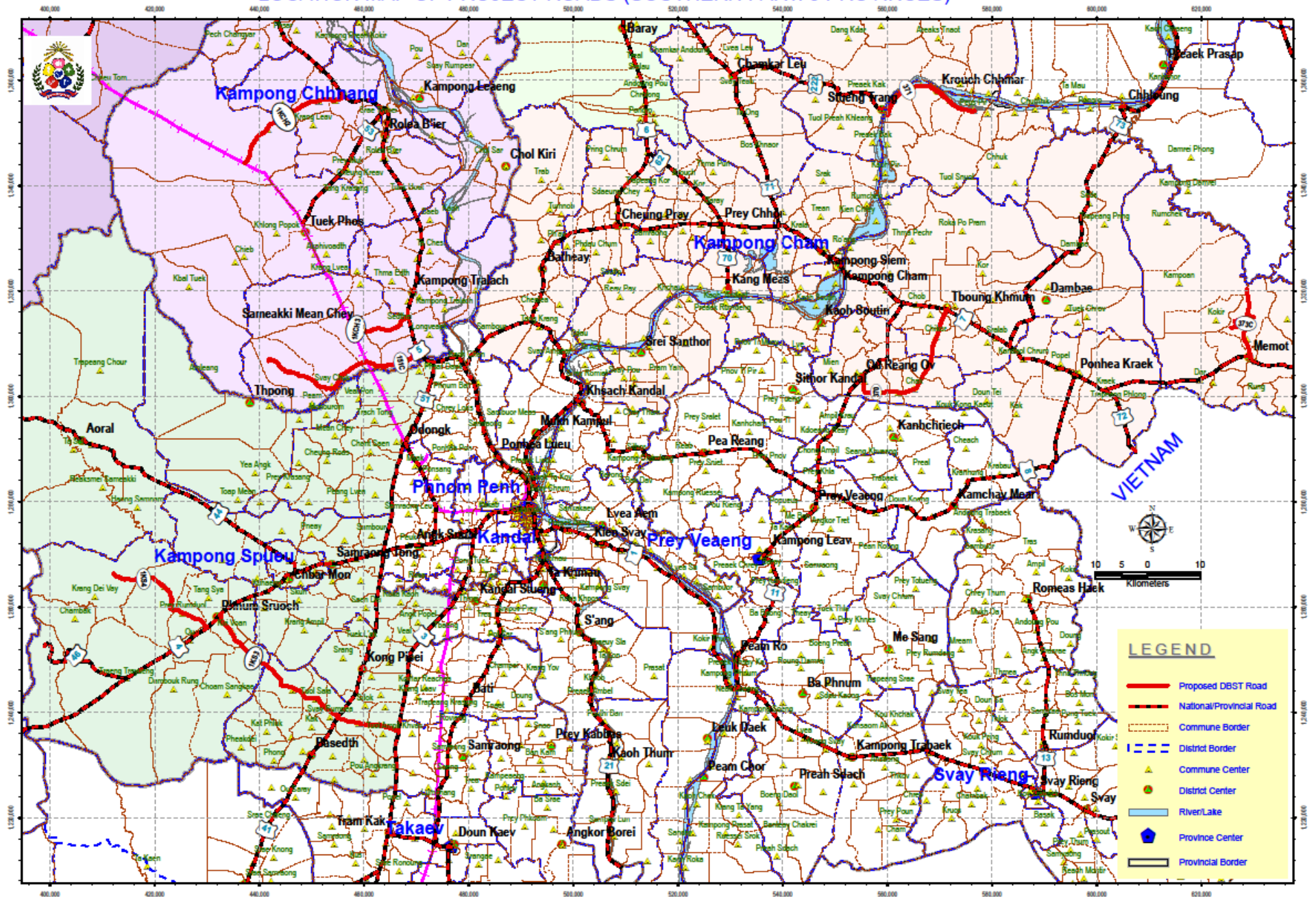
9. Following the semi-annual environment monitoring on the ongoing civil works sites of the Project by the international environment specialist and SEO of MRD, at the present time there are no adverse environmental issues associated with the project implementation. Many of the roads are now completed and in good environmental condition.

10. DDIS consultants together with SEO will continue to inspect the sites frequently and closely monitor the contractor's field activities to ensure compliance with the requirements in the EMP and CEMP. Another review will take place after 6 months or at project completion.

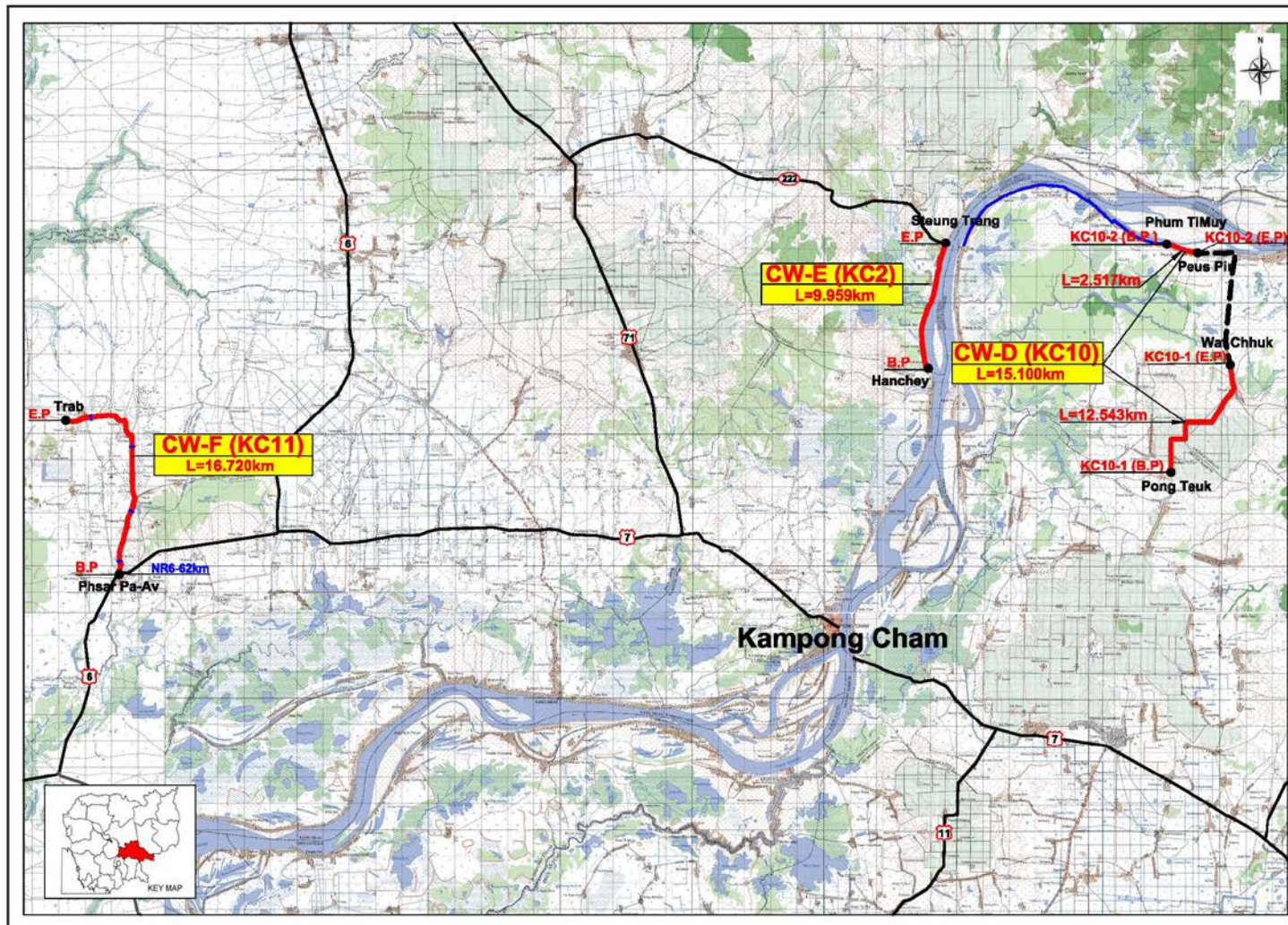
LOCATION MAP OF PROJECT ROADS (NORTHERN PART: 4 PROVINCES)



LOCATION MAP OF PROJECT ROADS (SOUTHERN PART: 3 PROVINCES)



Location Map of 3 New Contracts



1.0 Introduction

1. As the remote rural economy is becoming increasingly dependent on the improved national road network, the rural road network continues to deteriorate due to lack of adequate road maintenance, combined with rapidly growing traffic, lack of maintenance financing, poor road maintenance standards, inadequate institutional capacity in road maintenance and management, lack of private contractor capacity, and design and construction deficiencies.

2. The Rural Roads Improvement Project (RRIP) will be implemented for a period of 5 years, from 2011 and will be completed in 2015. The Project has five (5) key components, namely: (i) improvement of 541.9 km of 22 project rural roads; this was originally 19 roads, but 3 extra roads (42.0 km) have been added later; (ii) improved road asset management; (iii) road safety and safeguards (iv) climate change adaptation and (v) efficient project management.

3. The Rural Roads Improvement Project (RRIP) is being implemented for selected rural roads in 8 provinces¹ of Cambodia, namely: (i) Kampong Speu, (ii) Kampong Chhnang, (iii) Pursat (iv) Battambang, (v) Siem Reap (vi) Kampong Thom (vii) Kampong Cham and (viii) KboneThmum. The project is covered by ADB Loan2670-CAM (SF) (Contract CW-B and Contract CW-C in four provinces of Kampong Speu, Kampong Chhnang, Pursat and Battambang started in Dec 2011) and Korea EXIM Bank Loan KHM-11 (Contract CW-A in three provinces of Kampong Cham, Kampong Thom and Siem Reap started in January 2012). The three additional contracts, (CW-D, CW-E and CW-F) in Kampong Cham Province financed by ADB Loan2670-CAM (SF), were awarded in January 2014 and started in February 2014. It will continue through until May 2015 and beyond if necessary. The new roads are included in this assessment. The ongoing civil works comprise the improvement of 22 existing earth or gravel surfaced roads in the seven provinces to a bitumen sealed standard using a double bituminous surface treatment (DBST), including placement as necessary of sub-base and road base, using unbound materials for the road pavement. In some cases the elevation of the road is being raised as protection against currently occurring flooding. This also reflects future climate change related environmental factors.

4. The project is expected to benefit about 560,000 beneficiaries residing in the areas covered by the project with the Ministry of Rural Development (MRD) as the Executing Agency (EA). The road will provide an all-year road access from provincial towns and agricultural areas, and will provide greater accessibility to basic facilities and services. It will also strengthen the capacity of the MRD to plan, manage and monitor road maintenance operations and implement the loan covenants and other conditions in the loan package. The Social and Environmental Office (SEO) has been established as a permanent organization for monitoring and evaluation within the MRD. Since establishment, the SEO has been strengthened its capacity during implementation of the project.

5. The Project will upgrade targeted existing unpaved rural roads in eight provinces to a paved road standard with double bituminous surface treatment (DBST) without widening or changing alignment. The Project will also improve drainage structures such as box culverts and pipe culverts, but reconstruction of bridges is limited to existing wooden bridges. 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

¹ Originally, seven provinces, Kampong Cham, Kampong Speu, Kampong Chhnang, Pursat, Battambang, Siem Reap and Kampong Thom. Later in 2014, Kampong Cham province has been split into two provinces, kampong Cham and Tbong Khmum.

with ADB Safeguard Policy Statement of 2009 (ADB SPS). The list of project roads is shown in Table 1.

Table 1. List of Project Roads

Contract	Province	Road No.	District(s)	Name of Road	Length (km)
CW-A	Siem Reap	266E	Puok- Angkor Chum	Puok- Angkor Chum	29.5
		266D & 2SR2	Angkor Thum/Angkor Chum/Varin	Leang Dai - Svay Sa	46.2
	Kampong Thom	2620/2KT2	PrasatSambour&Sandán	PrasatSambour – Sandán	65.9
	Kampong Cham	370	TboungKhmum-OuReangOv	Cheung Lang -OuReangOv	29.4
		371	KrouchChhmar	PeusPir-KdolLeu	21.2
		373C	Memot	National Road 7-Kabbas	17.3
CW-B	Kampong Speu	1KS3	Phnom Sruoch-Basedth	PhsarTrapeangKraloeng-PhsarPangkassei	44.9
		1KS4	Phnom Sruoch	Kiri Reaksmei - DakPor	24.4
	Kampong Chhnang	1KCH2	RoleaB'ier - TuekPhos	PhsarPongro - Ra KrangSkear	25.2
		151C	Sameakki Mean Chey	PhsarTrach-Phnom PrahTheat	34.9
		1KCH3	Sameakki Mean Chey	Spean Pou - Ra Mean Nor	12.4
CW-C	Pursat	154D	Bakan	BoengKhmar-MeToeuk	9.6
		152E	KanDieng	Kantuot - Kampong po	8.8
		155D	Bakan	BoengKhmar-Taluo	19.4
		155C	Kravanh	TrapaingChong - Phtas Rung	22.3
		1PS2	Bakan	Samraong - Talou	18.7
	Battambang	1BB1	MoungRuessei-Rukhakiri	Prey Svay - Prey Tralach	24.7
		1BB2	MoungRuessei-Rukhakiri	NR5 – PrekChik – Chong Por	23.6
		1BB3 & 1BB4	MoungRuessei	Chrey - TaloasKakoah	23.9
CW-D	Kg. Cham	KC10	TboungKhmum& Kroch Chmar	Pong Teuk-WatChhuk	15.0
CW-E	Kg. Cham	KC2	SteungTrang	Hanchey-SteungTrang	10.0
CW-F	Kg. Cham	KC11	Batheay	PhsarPaav -Trab	17.0
Total	7 Province	22 Roads	24 Districts		541.9

2 Environment Monitoring Mechanism

2.1 Introduction

6. The International Environmental Specialist, Dr. David G. Lees and national environment specialist, Mr. Nin Vanntha, were mobilized for semi-annual environment monitoring of the civil works between 18th May and 28th May 2015. They reviewed the activities of the contractors on the project sites in order to ensure compliance with ADB's Social Safeguard Policy Statement 2009. They were accompanied by the staff of the SEO of MRD, PDRD staff of MRD, the DDIS consultants and the contractor's representatives.

2.2 Environmental Management Plan (EMP) and CEMP

7. 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.

8. 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 areas, 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. No updates to the CEMP had taken place and were not considered necessary. For the new roads CEMPs had been submitted.

2.3 Environmental Monitoring Program

9. The Environmental Monitoring Program is included in the Environmental Management Plan and so the EMP can be considered as an EMMP - Environmental Management and Monitoring Plan.

10. The essence of monitoring is to ensure compliance with environmental legislation. The contractors have a duty to comply with the relevant legislation. The DDIS consultant must check their activities and report to MRD. In the event of noncompliance with EMP, MRD can instruct the contractor to comply. Given the nature of the work activities most monitoring is based on visual observations.

2.4 Measurements

11. 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
- SEO environmental staff from MRD
- Ministry of Environment (MOE would only be involved if an official complaint was made to them)

12. 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 and noise control are 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. Borrow pit slopes must be graded into gentle slopes. Vertical slopes must be removed to prevent children drowning. Warning signs must be erected to warn of drowning if deep ponds are left. Inspectors and SEO staff must make regular checks by visual inspection.

13. Construction supervision inspectors 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 or complaints. 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.

14. Initial monitoring is based on visual inspection and site assessment. Measurements require specialist equipment and this is only needed if a significant incident occurs. Normally, implementation of "Good Housekeeping" and the contractor demonstrating a responsible attitude are sufficient to ensure an environmentally satisfactory operation.

15. If vibration measurements or dust measurements are required then specialized equipment will be needed. The responsibility for requesting the measurements will be the consultant's. SEO will liaise with MOE and DOE to arrange the measurements. MOE have vibration equipment for measurement of traffic and blasting vibrations. So far no specialized monitoring equipment has been needed.

16. If dust measurements are needed then a two stage process must be adopted. A high volume sampler (HVS) will be deployed by MOE. After a suitable period, usually 24 hours, the filter in the HVS will be retrieved by MOE staff and transported to the laboratory for the second stage which is analysis. This requires highly specialized equipment which MOE possess in Phnom Penh. The MOE will charge for this service. These charges must be covered by the contractor.

17. The results must be submitted to SEO who will interpret them with respect to the relevant regulations. Discussions must then be held between SEO, the consultants' inspectors and the contractor to determine how to resolve any problems.

2.5 Timing of Monitoring

18. The timing of the monitoring is important. The following list is for guidance and is indicative only.

- Liquid emissions from sites must be checked every three months or after heavy rain if overflowing is reported. Measurements in streams and water courses must be made.
- 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 24 hour 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.

19. In addition to regular monitoring, unannounced spot checks must be made by SEO on contractors operations. All of the above procedures should be carried out by the site inspectors, in conjunction with SEO, 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 SEO 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.

2.6 Monitoring of CEMP by Checklists

20. 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 January to June 2015 were sighted and reviewed by the International Environmental Specialist. 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 rainy season it ceases to be an issue. No noise complaints had been received. No further remedial works were required at the time of the inspections. No complaints from villagers were reported. Where possible 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 is working well. The contractors of CW-D, CW-E and CW-F have adopted this approach as the scales of contract are rather small.

2.7 Establishment of SEO

21. There is now 7 staff within SEO: 1 Chief, 1 Vice chief, 1 Resettlement, 2 Environment and 2 Gender persons. It is considered that this now makes them effective. SEO can act together with the DDIS consultant or independently to check contractor's activities. In the event of noncompliance with EMP, SEO as part of MRD can instruct the contractor to comply. During the environmental inspections by the International Environmental Expert the SEO accompanied the team and so gained On the Job Training. When workers camp sites were visited the SEO was asked to do the initial environmental audit, present the results and observations, and then a discussion was held. They are improving in their skills and are being encouraged to carry out inspections on their own and submit the results to the IES for review.

3 Results of Monitoring

22. In order to confirm the environmental assessments done by checklist, site visits were made to several selected roads by the International Environmental Specialist accompanied by staff from MRD / SEO. Observations are given below.

3.1 Contract CW-C: Battambang Province

23. All of the roads in Battambang were inspected. The consultants drove down the entire length of the roads stopping to make observations when necessary.

24. **Road 1BB1** is the longest road among the four roads in Battambang. It has been completed and is being made ready for being handed over. Borrow pits have been graded and residual debris removed. The roads and slopes are cleaned and there are no environmental issues.



Figure 1 Completed view of 1BB1



Figure 2 1BB1 Rectangular Borrow pits left as water ponds.

25. **Road 1BB2** has been completed. Borrow pits have been graded and residual debris removed. Slope protection works along the project roads at Sta. 6+700-6+800 and Sta. 7+805- 7+875 which have been eroded by flood water have been safely finished. The roads and slopes are cleaned and there are no environmental issues.



Figure 3 Completed view of 1BB1, New houses built along the road



Figure 4 Slope protection works along 1BB2

26. **Roads 1BB3 and 1BB4** are contiguous and have been completed. The roads and slopes are cleaned, and all contractor's temporary camp and debris have been removed. There are no more dusts and no environmental issue was found.



Figure 5 Beginning point of Road 1BB3 leading to 1BB4



Figure 6 Mid Point and End Point of 1BB4

3.2 Contract CW-C: Pursat Province

27. **Road 154D** has been completed. The roads shoulders are cleared, borrow pit slopes graded, and there are no environmental issues connected with the road. The majority of the debris has been removed however some remains. The contractor's camp near the main bridge has been demobilized. 30 oil drums left on the site that contained bitumen and those drums have been removed by the contractor.



Figure 7 Beginning Point and End Point of 154D



Figure 8 Interview with residents at Camp Site 154D



Figure 9 Empty drum of bitumen to be removed on 154D.

28. **Road155D** runs south from NR5 for 19.4 kms and then becomes **Road 1PS2** for 18.7kms. A spur from 1PS2 designated **Road 155C** of length 22.3kms runs back to NR5. A camp site was located near the end point of 155C. This has been closed and cleared. The roads have been completed, road shoulders cleared, borrow pit slopes are graded, debris has been removed and there are no environmental issues.



Figure 10 Road 155D shoulders and graded borrow pit

29. **Road 1PS2** is connected with 155D, and runs for 18.7 kms and terminates at the cross point with provincial road. The roads have been completed, road shoulders cleared, borrow pit slopes are graded, debris has been removed and there are no environmental issues



Figure 11 Road 1PS2 Beginning Point and End point

30. **Road 155C** starts from national road No.5 and runs to south until meet with 1PS2 and the length is 22.3 kms. A camp site has been located near the end point of 155C and bridge site. These temporary camps have been closed and cleared. The roads have been completed, road shoulders cleared, borrow pit slopes are graded, debris has been removed and there are no environmental issues



Figure 12 Road 155C Beginning Point and End point

31. **Road 152E** runs north from Sovann Mouly pagoda on NR5 for 8.8 kms. The road has been completely. The roads have been completed, road shoulders cleared, debris has been removed and there are no environmental issues



Figure 13 Beginning point of Road 152E and end point view

3.4 Contract CW-D: Tbong Khmum

32. **Road KC10** of 12.5 kms length has been constructed under Contract CW-D, one of three additional civil works packages which started in February 2014. All the works of the road KC10 have been completed., The contractor maintained workers camp for remaining activities by renting narrow piece of land between residential properties. Good use has been made of the available space and in general the site displays a high standard of housekeeping. The land has been vacated in June 2015.



Figure 14 Beginning point of road and inspection team



Figure 15 Interviews with land owners and contractor's staff

3.5 Contract CW-E: Kampong Cham

33. **Road KC2** of length 10kms, one of three additional civil works packages which started in February 2014, has been completed in February 2015. No environmental issues were observed on the road.



Figure 16 Beginning point and end point of Road KC2 (CW-E)

3.6 Contract CW-F: Kampong Cham

34. **Road KC 11** is of length 16.7kms, one of three additional civil works packages which started in February 2014, has been completed in March 2015. No environmental issues were observed on the road. The contractor's camp has been removed and all debris cleared from the site. No environmental issues were observed on the road.



Figure 17 Beginning point of Road KC11 with concrete road section



Figure 24 End Point of KC11 and cleared contractors camp.

3.5 Review of Environmental Parameters

35. Environment parameters were checked and reviewed for six contract packages. All civil works have been evaluated satisfactory and no environmental issues were found. The review of results on environmental parameters of each contract package are shown in Table 2.

Table 2 Environmental Parameters Contract Packages CW-A, B, C, D, E and F.

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B	Contract Packages CW-C	Contract Packages CW-D	Contract Packages CW-E	Contract Packages CW-F
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.	Completed. EMP included in Tender Documents issued to contractors.
ADB requirement	Submission of CEMP from contractor to MRD	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. All works completed.	Submitted by contractor. All works completed.	Submitted by contractor. All works completed.	Submitted by contractor. All works completed.	Submitted by contractor. All works completed.	Submitted by contractor. All works completed.
EMP requirement	Monthly Checklists	All environmental parameters	As per individual checklists given in EMP	Works has been completed in 2014	Works has been completed in 2014.	Checklists completed by consultant's inspectors for January to April 2015. No environmental issues identified.	Checklists completed by consultant's inspectors for January to May 2015.. No environmental issues identified.	Works has been completed in 2014.	Checklists completed by consultant's inspectors for January to February 2015. No environmental issues identified.
Sub-decree on Water Pollution Control	Water Quality	No oil spill, smell	No smell, No specific color	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.	Works have been completed. No visual evidence was sighted of impacts on water quality. No spills were observed.
Sub-decree on Air and Noise Pollution Control	Air Quality	TSP	< 0.33 mg/m ³	Works have been completed. Air quality has been greatly improved after paving.	Works have been completed. Air quality has been greatly improved after paving.	Works have been completed. Air quality has been greatly improved after paving.	Works have been completed. Air quality has been greatly improved after paving.	Works have been completed. Air quality has been greatly improved after paving.	Works have been completed. Air quality has been greatly improved after paving.
	Noise Quality	Leq	75dB(A) 65dB(A)						

Regulation	Environmental Issue	Parameter	Standard	Contract Packages CW-A	Contract Packages CW-B	Contract Packages CW-C	Contract Packages CW-D	Contract Packages CW-E	Contract Packages CW-F
No Regulation	Vibration	PPV	< 1mm/sec	No blasting taking place	No blasting taking place	No blasting taking place	No blasting taking place	No blasting taking place	No blasting taking place
Sub-decree on Solid Waste Management	Solid Waste	Food Waste	Properly Removed	Workers camps have been closed and cleared .	Workers camps have been closed and cleared .	Workers camps have been closed and cleared .	Workers camps have been closed and cleared .	Workers camps have been closed and cleared .	Workers camps have been closed and cleared .
	Liquid Waste	Waste Oil, Grease	Properly Controlled After Removed by Subcontractor						
No Regulation	Septic Tank	Smell, Sewage	No Smell, No Overflowing	Workers camps have been closed.	Workers camps have been closed..	Workers camps have been closed.	Workers camps have been closed.	Workers camps have been closed.	Workers camps have been closed.
No Regulation	Borrow Pits	Condition of Borrow Pits	Filled after Project Completion, Topsoil resurfaced	No issues identified.	No issues identified.	No issues identified.	No issues identified.	No issues identified.	No issues identified.
No Regulation	Borrow Pits	Depth of Borrow pits	No Drowning Hazard	No issues identified	After Closure warning signs to be erected.	No issues identified	No issues identified.	No issues identified.	No issues identified.
No Regulation	Borrow Road	Location for Borrow Road	No complaints from residents	No issues identified	No issues identified	No issues identified	No issues identified.	No issues identified.	No issues identified.
No Regulation	Quarries	Condition of Quarries	Quarries reinstated	No issues identified	No issues identified	No issues identified	No issues identified.	No issues identified.	No issues identified.
No Regulation	Trees if Cut	Number of Trees	Tree Replanted	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

4 Corrective Actions

36. All Corrective Actions were implemented and the contractors are complying with the CEMP.

5 Outstanding Issues

37. There is no outstanding issue involved in environmental management.

6 Conclusion

38. Following the semi-annual environment monitoring on the ongoing civil works sites of the Project by the international environment specialist and national environment specialist together with SEO of MRD, at the present time there are no adverse environmental issues associated with the project implementation. All the civil works under ADB financing and KEXIM financing have been completed. Contractor's camp sites have been cleared and there is no environment issues and no complaints from authorities or people along the project roads as well. DDIS consultants together with SEO will continue to inspect the sites regularly during defect liability period to ensure that contractor's repair works are complied with the requirements in the EMP and CEMP. Another review will take place within 6 month for completion report.