

Semi-annual Report

August 2018

HIGHLANDS REGION ROAD IMPROVEMENT INVESTMENT PROGRAM -PROJECT 3 Gewa-Gembogl Road Sub-Project

Prepared by Department of Works for the Asian Development Bank

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Report: Semi-Annual

HIGHLAND REGION ROAD IMPROVEMENT INVESTMENT PROGRAM – PROJECT 3

Gewa-Gembogl Sub-Road Project

ENVIRONMENTAL SAFEGUARDS MONITORING REPORT

(January - June 2018)

Project Implementation Unit

Department of Works

National Capital District

Papua New Guinea

August 2018

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ABBREVIATIONS

ADB	-	Asian Development Bank
AIDS	-	Acquired Immune Deficiency Syndrome
AP	-	Affected People
CEMP	-	Construction Environment Management Plan
CRO	-	Community Relations Officer
PSC	-	Project Supervision Consultant
DBST	-	Double Bitumen-layer Surface Treatment
DC	-	Design Consultant
DOW	-	Department of Work
EA	-	Executive Agency
EMP	-	Environmental Management Plan
EO	-	Environmental Officer
ESSU	-	Environment and Social Safeguards Unit
GoPNG	-	Government of Papua New Guinea
GRC	-	Grievance Redress Committee
HCRN	-	Highlands Region Core Road Network
HIV	-	Human Immunodeficiency Virus
HRMG	-	Highlands Road Management Group
HRRIP	-	Highlands Region Road Improvement Investment Program
IA	-	Implementation Agency
IEE	-	Initial Environment Examination
ISS	-	International Safeguards Specialist
LLG	-	Local Level Government
MFF	-	Multi-tranche Financial Facility
MOA	-	Memorandum of Agreement
NRA	-	National Road Authority
PNG	-	Papua New Guinea
PRO	-	Public Relations Officer
PWM	-	Provincial Works Manager
ROW	-	Right of Way
RP	-	Resettlement Plan
SHP	-	Southern Highland Province
SIS	-	Socio-economic Impact Study
SPS	-	Safeguard Policy Statement
STDs	-	Sexual Transmitted Diseases
TOR	-	Terms of Reference

FACT SHEET:

Loan	ADB Loan: 3404/3408 and Grant 0485 PNG
Project Number	CSTB 3530
Subproject	Gewa-Gembogl Road Subproject
Executing Agency	The Department of Works (DOW) is the executing agency for the Highlands Region Road Improvement Investment Program (HRRIP). It has overall responsibility to manage the planning, implementation and monitoring for all road improvement works including environmental management and environmental compliance monitoring.
Implementing Agency/Unit	<p>The DOW will also be the Implementing Agency for the road improvement works. The DOW has delegated to the Highlands Road Management Group (HRMG), the responsibility to carry out the planning, implementation and monitoring for environmental management and environmental compliance monitoring, land acquisition and/or resettlement activities, as required. The more relevant delegated responsibilities include the following;</p> <p>Prior to the commencement of civil works:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Submit and indorse environmental assessments required for regulatory approval of the CEPA and require the Contractor to obtain approval, e.g., environmental clearance, environmental permit or permits from other statutory authorities as required by the Government. <input type="checkbox"/> Ensure that all regulatory clearances for the subproject are obtained from the relevant government authorities and are submitted promptly to ADB. <input type="checkbox"/> Ensure that the EMP is updated based on detailed design and included in the bidding document of the subproject and that all bidding Contractors have access to the environmental assessments and EMP. <input type="checkbox"/> Ensure that the EMP and all required mitigation measures during construction, including conditions stipulated in the CEPA's clearance or environmental permit, are included in BCD with requirements to update the EMP in response to any unexpected impacts and <input type="checkbox"/> That all selected Contractors have agreed to implement in full the requirements of environmental mitigation measures prescribed in the EMP <input type="checkbox"/> Provide training as required to HRMG in Mt Hagen and Contractor; <input type="checkbox"/> Receive environmental safeguard clearance on subproject(s). <input type="checkbox"/> Provide training to Contractor prior to preparation of

	<p>CEMP, safeguards requirements of ADB and regulatory requirements of CEPA.</p> <p><input type="checkbox"/> Approve CEMP for the subproject, after being cleared by PSC.</p> <p>During the implementation of civil works:</p> <p><input type="checkbox"/> Ensure that the CEMP including all proposed mitigation measures and monitoring and relevant provisions of the environmental assessments is updated as required,</p> <p><input type="checkbox"/> Conduct environmental management and compliance monitoring on a monthly basis in cooperation with the PSC.</p> <p><input type="checkbox"/> Review and assess the Contractor's monthly environmental monitoring report and compliances as contained in the CEMP.</p> <p><input type="checkbox"/> Assist the Engineer in the compliance of the submitted CEMP.</p> <p><input type="checkbox"/> Prepare the quarterly and semi-annual reports in cooperation with the PSC for submission to DOW and ADB.</p>
Coverage of the Environmental Monitoring Report	January to June 2018

EXECUTIVE SUMMARY

- I. This first Semi-annual environmental monitoring report covered the period from November to June 2018. This report was prepared Project Implementation Unit, Highlands Road Management Group (HRMG) for Department of Works (DOW) and submitted to Asian Development Bank.
- II. The Gewa-Gembogl road is one of the four (4) sub-projects of Tranche 3 of the Highlands Region Roads Improvement Investment Program (HRRIP), an ADB financed road program. The sub-project is covered by CSTB contract # 3530 entered into by the Independent State of Papua New Guinea represented by the Department of Works and China Harbour Engineering Company LTD (CHEC).
- III. The project commencement date was October 16, 2017 and civil works commenced in February 26, 2018.
- IV. An induction meeting was conducted for all the Contractors in June 12, 2017 by the Engineer and HRMG with the Project Supervision Consultant (PSC) to provide a background of the environmental management plans (EMPs) and compliance monitoring requirements. Topics included best practices for environmental management and mitigation, including sewage treatment, solid and hazardous waste management; and soil erosion control and management.
- V. An induction training was also conducted on October 31 to November 1, 2017 by PSC and HRMG to address Construction Environmental Management Plans formulation, Environmental Management, Environmental Monitoring and Best Practices for Environmental Mitigation at Kuri Lodge, Mt. Hagen. The training was attended by the contractor and environmental officers, HRMG, PSC and NRA.
- VI. Based on the monthly reports, most of the environmental issues are minor, including the solid waste management implementation, oil and lubricant contamination of soils, proper construction of septic tanks and leaching fields.
- VII. Issues of concern are the siting for spoils disposal and the sustainable provision of PPEs considering the minor accident where a construction worker's hand has been injured and had to be treated in a hospital due to the absence of first aid kits and trained medical personnel.
- VIII. Several seminars and trainings are proposed to provide capacity building activities to the Contractor's environmental officers, project management and HRMG staff to ensure that the environmental management and compliance monitoring requirements are done in an efficient and timely manner.

1.0 INTRODUCTION

1.1 Background

1. The Highlands Region of Papua New Guinea (PNG), comprising the Provinces of Western Highlands, Jiwaka, Southern Highlands, Hela, Eastern Highlands, Enga and Chimbu, is a major contributor to the PNG economy through its agricultural production and mineral resources. A well-maintained road network is essential to facilitate the movement of goods and people. The Government of PNG (GoPNG) has made significant investments in improving the road network but a lack of maintenance has resulted in the deterioration of the roads such that the Highlands Core Road Network (HCRN) is now in poor condition.
2. In order to address the deterioration of the HCRN, there is a clear need to: (i) implement a program of regular maintenance on all HCRN roads that are in good condition; and (ii) improve those roads that are in poor condition and (iii) ensure that maintenance begins on those roads as soon the improvement works are completed.
3. The GoPNG has negotiated a Multi-Tranche Financing Facility (MFF) loan with the Asian Development Bank (ADB) to implement the Highlands Region Road Improvement Investment Program (HRRRIIP) in tranches. The HRRRIIP includes projects to improve the HCRN, the preparation of long-term maintenance contracts for the HCRN, and the capacity development of road agencies. In total, 13 road sections are expected to be funded under the program.
4. Project 1 has included the improvement of two road sections and Project 2 is currently being implemented to upgrade three road sections while Project 3 proposes to rehabilitate four road sections comprising 113.3 km of the HCRN.
5. The Execution Agency (EA) for the program is the Department of Works (DOW) whilst the Highland Region Management Group (HRMG) is the Implementation Agency (IA) and it is based in Mt. Hagen in Western Province.
6. Tranche 3 (ADB 3043/3408 and EU Grant 0485) include the upgrading, rehabilitation and maintenance of four road sections namely, Henganofi-Napuru, Gewa-Gembogl, Nipa-Munihu, and Pagia-Wiru Loop in the Eastern Highlands Province (EHP), Chimbu Province and Southern Highlands Province (SHP).
7. The rehabilitation of the Gewa-Gembogl road in the Simbu province has a length of 21.025 km. The works proposed for the upgrading and rehabilitation of the Gewa-Gembogl Road such as earthworks, establishment and operation of quarry sites and extraction of materials, minor civil works and discharge of wastewater are Level 2 activities under the Environmental (Prescribed Activities) Regulation Act 2002 and requires an EP depending on the duration and scale of those activities.
8. The project commencement date was October 16, 2017. However, the civil works only started in February 26, 2018. The construction period of the project is 24 months. The Long Term Performance Based Maintenance Services is 60 months from the issuance of the Performance Certificate for the Improvement Work.
9. The Gewa-Gembogl Road Section is covered by CSTB contract # 3530 entered into by the Independent State of Papua New Guinea represented by the Department of Works and China Harbour Engineering Co. Ltd (CHEC LTD).

1.2 Sub-Project Description

10. The existing Gewa-Gembogl Road is the first part of the old Bundi Highway which runs in a north east direction from Kundiawa Town and eventually connects through to Bundi in Madang Province. The location of the Gewa-Gembogl Road is shown in Road. See **Error! Reference source not found.**
11. The IEE assessment has discovered that the first 10.6 kilometers from Kundiawa to Gewa has recently been improved. The report therefore covered the next 21 km section from Kokonigle Bridge, Gewa to Gembogl Station. The road serves as the primary access for the remote rural populations living in the northern part of Simbu Province to the township of Kundiawa. The road is the only link to the major tourist destination of Mt. Wilhelm, a major trout farm industry, and is used by the people to transport cash crops, coffee in particular. This is also the main supply route to two mines, located near Gembogl. The upgrading of this road is expected to improve vital commercial trade and promote agricultural activity, improve living standards and facilitate access for government services to reach the people. The route passes through eight villages of which Maupini (km18) and Williame (km 31) are the largest. There are also several smaller settlements that typically consist of clusters of up to six or so houses.

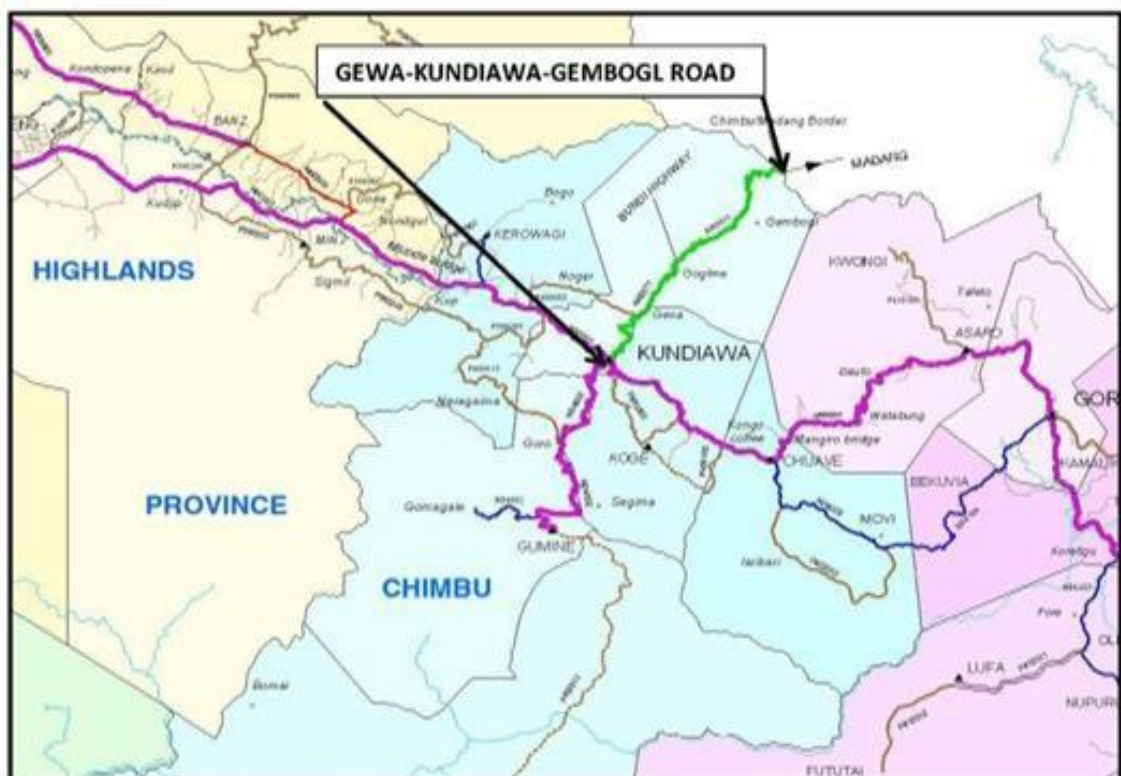


Figure 1: Location Map of Gewa-Gembogl Road

12. The alignment of the Gewa-Gembogl road runs along the valley of the Simbu River. The terrain is rugged and mountainous with very steep slopes and frequent rock outcrops. The road is benched into these slopes and there are steep drops to the river below and almost vertical cut faces above. The topography is such that sites for the development of settlements are limited. The alignment passes through 10 major and 12 minor villages/settlement areas, the largest of which is Womatne. These settlements are generally clusters of tribal houses, typically numbering

around 15 to 20 with additional linear development in major villages. Elsewhere along the route there are occasional structures, but the rugged terrain limits the areas where construction is feasible. Similarly, the opportunities for cultivation immediately adjacent to the road corridor are restricted.

13. The environmental impacts assessed at the time of preliminary design categorized the subproject as Category B for environment. The same category was confirmed by the in- depth environmental analysis conducted at the time of project preparation. The Initial Environment Examination (IEE) dated April 2016 has already been disclosed in the ADB web site. The IEE confirmed that environmental impacts of the rehabilitation of the Gewa-Gembogl subproject road are limited to the road corridor, are of minor scale and can be mitigated through the thorough implementation of the measures contained in the environment management plan. The impacts such as dust, noise, materials sourcing, storage, haulage, soil erosion, sedimentation and run-off are likely to occur mainly during the construction phase.
14. Based on the EMP presented in the IEE, a Contractor's Environment Management Plan (CEMP) has been prepared and submitted by the Contractor and ADB has provided a No Objection letter in January 23, 2018.
15. An Induction Meeting was conducted for all the Contractors in July 12, 2017 by the Engineer and HRMG with the PSC to provide a background of the environmental management plans and compliance monitoring requirements.
16. A reference compact disc (CD) was also provided to the Contractors during this meeting containing best practices for environmental management and mitigation, including sewage treatment, solid and hazardous waste management; and soil erosion control and management. Based on the experiences with Tranche 1 and Tranche 2, environmental laws including a summary presentation on the legal framework of PNG, CEPA Act, Environment Act of 2000, list of suggested environmental monitoring equipment, and PNG Water Quality Standards, was also provided in the CD. Further, also provided were sample forms and requirements on sample monthly monitoring report, Notice of Violation Form, and Logbook Sample Content.
17. An Induction Seminar and Workshop was also conducted by HRMG and PSC on October 31 and November 1, 2018 for the contractors, all environmental officers and HRMG personnel.
18. Internal monitoring will be conducted by the environmental specialist of the Construction Supervision Consultant (PSC) whereas independent monitoring will be conducted by the Environmental Officer (EO) of HRMG. The PSC, HRMG and Contractor are all required to provide monthly environment reports.

1.3 Proposed Scope of Works

19. The project proposes to rehabilitate the existing road and provide a 6.0 meter wide carriageway with DBST and 1.0 meter wide gravel shoulders which will be sealed as necessary to prevent possible scour/erosion. The horizontal and vertical alignments will follow the existing alignments as much as possible with improvements limited to those consistent with meeting the required pavement width and stopping sight distance requirements.
20. The route traverses through mountainous terrain and significant excavation will be required in existing cut slopes to widen the existing road bench to the required width.

An average width of 2.5 m each side of the existing cleared area will be required to accommodate the earthworks. In practical terms this additional work will only be taken on one side of the road where cuttings will be made. It will also be necessary to provide slope protection and retaining structures to ensure the long term stability of the road.

21. A total of 92 additional culverts to discharge roadside drains are proposed in addition to the replacement of 29 existing culverts which are of inadequate capacity (typically 450mm diameter) while seven existing culverts are to be retained and rehabilitated with the capacity of 750 to 900 mm diameter to cope with the flows from roadside drains. Approximately 28,000 meters of lined roadside drain will be provided to cater for surface works run off from the road and adjacent slopes.
22. A total volume of 480,000 m³ of excavation will be necessary to accommodate the carriageway, shoulder and drainage. Of this volume, 50,000 m³ will be reused in embankment, 130,000 is expected to be unsuitable which will need to be disposed of together with approximately 300,000 m³ of surplus material. The selection and management of disposal sites will be of the utmost importance in the execution of the earthworks.
23. There are nine existing bridges within the road section, details of which are given in the Table 1. All of the bridges are in maintainable condition and will only require minor repairs, clean and painting and the provision of steel decking (apart from Kaer 2 Bridge)

Table 1: Bridges and Types along the Gewa-Gembogl Road.

BRIDGE NAME	CHAINAGE	SPAN	TYPE
Gewa	11+860	22.24	Standard Bailey
Yombai	13+704	21.61	Standard Bailey
Seme	17+440	27.73	Compact 200
Nununige	20+048	12.41	Standard Bailey
Kaer 2	23+520	34.04	Compact 200 with Steel Deck
Davai	24+786	18.58	Standard Bailey
Kombukme	26+628	15.42	Standard Bailey
Bendam	28+346	15.42	Standard Bailey
Akonige	30+825	23.00	Steel Truss

24. All rivers and streams carry clear water in the dry season. Communities along the road depend heavily on water courses for their domestic activities. The civil works will therefore have a high impact on the community and would necessitate the need to co-ordinate construction adjacent to water courses with community needs.
25. The rehabilitation and upgrading would approximately take 24 months and would involve the following:
 - (i) Transport, handling and storage of construction materials, fuel and lubricants and, machinery to site;
 - (ii) Preparation of Contractor's camp and work sites;
 - (iii) Establishment of ancillary facilities, i.e. identification and establishment of suitable material sources/quarries, batching, crushing and asphalt plants;
 - (iv) Clearing and grubbing (shoulders and drainage);
 - (v) Excavate defective sections and improve side drains as required;

- (vi) Excavation and/or filling to widen the existing road bench;
- (vii) Culvert removal, installation, extension and/ or replacement;
- (viii) Construct masonry retaining walls;
- (ix) Construction of gabion protection works;
- (x) Rehabilitate bridges which may include installation of new steel decks if necessary, removing rust and repainting and, construct a new bridge;
- (xi) Backfill and compact as required;
- (xii) Layout sub-base and base materials and compaction;
- (xiii) Install road furniture required (guardrails, pavement markings, etc.); and
- (xiv) Pave roadway with DBST.

- 26. It is estimated that the upgrading and rehabilitation works for the Gewa-Gembogl Road would require 216 people of which 105 unskilled workers will be sourced from the local communities in the area. Various machinery and heavy equipment will be required in the rehabilitation and upgrading works.
- 27. This works requires materials including fuel, lubricants, paint, bitumen, cement, aggregates, sand, timber, geotextile, steel plates, drainage pipes, gabion baskets, culvert pipes, trees and plants. All the materials will be sourced from approved suppliers whilst some locally procurable materials will be supplied by the community. Workers, including local women, will make gabions using local materials for embankment and bridge pier protection

1.4 Purpose

- 28. This report is written to present the status of the environment including compliance with the approved CEMP in respect of the Gewa-Gembogl road section covering January to June 2018. Semi-Annual environment safeguards monitoring reports is a requirement under the SPS. In addition, the report provides a clear picture with regards the implementation of CEMP activities as well as the environmental outcome.
- 29. Considering that the project civil works has just commenced in February, the compliance monitoring requirements enumerated in the monitoring findings are prospective and will be guided by the approved CEMP. The submitted CEMP was provided with a letter of no objection by ADB. However, an evaluation by the DOW-ESSB in March 22, 2018 indicate that the CEMP was not yet approved.
- 30. This report serves the client, ADB and other organizations to understand the environmental management process, its outcome, the corrective actions that are required and the impact of such actions on the environment.

1.5 Methodology

- 31. This three-month consolidated report is written using data gathered from several sources. These include (i) Contractor's interviews and monthly reports (ii) PSC monthly reports and; (iii) HRMG-PIU verification of site and observations.
- 32. This report is reviewed by the Supervision Consultant and HRMG-PIU prior to its submission to ADB. It also follows the format prescribed by ADB and a checklist for monitoring environmental compliance.

33. The list of reports reviewed is in Appendix 1 whilst names of people interviewed are in Appendix 2.

1.6 Institutional Arrangements

34. The Department of Works, as the executing agency, has the overall responsibility to manage the planning, implementation and monitoring related to acquiring use rights for additional land to implement HRRIP subprojects, as well as compensation for damages on project-affected land.
35. DOW established a Project Management Office (PMO) headed by a Project Director which manages the day to day activities of the program. Within the PMO, there are two units, the Project Management Unit (PMU) which is based in Port Moresby. The other is the Highlands Road Management Group (HRMG), the DOW's Project Implementation Unit (PIU) for HRRIP subprojects to carry out the planning, implementation and monitoring for land activities, as required and is based in Mt. Hagen City.
36. In the revitalized organizational chart (as of February 2017), the HRMG is headed by the Field Project Manager (FPM). Under the FPM are two sub-units, the construction unit headed by the "Engineer" and the social and environmental safeguards unit headed by the Senior Field Project Coordinator (SFPC).

1.7 Report Organization

37. The report consists of the foregoing introduction and 2 other sections as follows:
- i) Section 1 – Executive Summary
 - ii) Section 2 - Introduction,
 - iii) Section 3 – Monitoring results and finding
 - iv) Section 4 – Conclusions and recommendations and appendices

2.0 MONITORING RESULTS AND FINDINGS

38. The main findings of monitoring shall include the assessment of environmental impacts during the review period and proscriptive requirements are presented in this section.
39. The basis for monitoring are the parameters that would be considered in the CEMP of which there are 18 as follows:
- Contractor's camp and yard
 - Erosion and sedimentation
 - Water quality
 - Air quality
 - Noise
 - Waste management
 - Hazardous material management
 - Aggregates extraction
 - Tree removal and vegetation management
 - Socio-economic issues (workers)
 - Socio-economic issues (community)
 - Public safety

- Health and safety issues
- Traffic management
- Prevention of HIV/AIDS and STDs
- Existing Infrastructure Issues
- Environment Related Grievances
- Training and Mentoring

40. The summary of non-compliance from the monthly reports prepared jointly by HRMG and PSC is provided in Table 2. Environment Officers from HRMG with PSC should prepare the Notices of Violation if warranted based on the standards set during a meeting for this purpose.

Table 2: Summary of Non-Compliance for January to June 2018 for Gewa-Gembogl Road.

NON-COMPLIANCE	MONTHS					
	J	F	M	A	M	J
Conduct monthly environmental monitoring and compare it with previously conducted environmental baselines.	X	X	X	✓	X	✓
Need for a permanent contractor's Environmental Officer	X	X	X	X	X	X
Unapproved HIV-AIDS Plan	X	X	X	X	X	X
Provision of PPE to all workers	X	X	X	✓	✓	✓
Absence of soil erosion management and sediment traps to contain spoils being transported to water bodies.	X	X	X	X	X	X
Leaking sewage system of the contractor could contaminate community's water system.	X	X	X	X	X	X
Proper maintenance of vehicles and equipment to prevent excessive generation of smoke.	X	X	X	X	X	X
Absence of camp clinic with nurse or appropriate health personnel to provide first aid assistance.	X	X	X	X	X	X
Submit or revise other plans including the HIV-AIDS Plan, Quarry Management Plans, Quarry Permits and others.	-	X	X	X	X	X

2.1 Contractor's Camp and Yard

41. The Contractor's camp at Goglme is almost complete as of June and contains offices and living quarters of the expatriate community and other workers (Photograph 1). A Site Development Plan has not been provided to review its sewage facilities among others. The preservation of the scraped topsoil in the camp site should be used for future rehabilitation after the project.
42. The Contractor's Solid, Liquid and Hazardous Waste Management Plans were not approved by DOW-ESSB based in its review of March 22, 2018. The contractor has to address the necessary revisions for approval. Compliance monitoring will focus on the provisions of these plans and best management practices.
43. Reports of foul odor and the possible contamination of the local community's water system from the leaking sewage of the contractor is possible (Photograph 2).

2.2 Erosion and Sedimentation Control

44. The major factor that would be considered for this section is soil erosion and the deposition of sediments in water bodies such as streams and rivers and food gardens. The disposal spoils at sites site along Ch. 12+520 has been a cause for concern due to the steep slope and its impact on a river (Photograph 3).
45. A spoils disposal agreement has been signed with the landowner, however, the contractor has been advised to select better and less environmentally harmful site.



Photo 1. The contractor's camp site.



Photo 2: Leaking sewage near the water supply



Photo 3: Dumping of spoils at Ch 12+520.

2.3 Water Quality

46. The monthly monitoring activities for April and June using in-situ equipment show that dissolved oxygen is below the PNG standards for sampling stations 1, 3, 4 and 5 including those water bodies not previously identified only for the month of June. These results could be an anomaly resulting in a defective equipment or erroneous calibration (Photograph 4).
47. It is important that monitoring activities should be done in areas where the project is on-going to provide the monitoring team with empirical data on the impact of the construction activity.
48. The contractor has obtained in-situ water quality monitoring equipment. On-site training is necessary to ensure that environmental procedures, equipment calibration and sampling protocols would be followed.
49. The PNG Environmental Water Quality Regulations of 2002 will be used as basis for baseline establishment and monthly compliance monitoring.

2.4 Air Quality

50. The baseline for air quality was also gathered for the identified sampling sites. The use of the newly purchased in-situ air quality measurement has to be conducted to ensure that the project complies with PNG air quality standards.



Photo 4: Water sampling and in-situ environmental monitoring.



Photo 5: Water spraying truck to reduce dusts during construction.

2.5 Noise

51. The baseline for noise levels has also been obtained by the contractor with the assistance of HRMG. Using the newly purchased in-situ environmental monitoring equipment, sound levels were measured in the road at Station 1 near the market and the Sumburu quarry. Sound levels were below 80dB for these areas.
52. There were no reports on excessive noise from the community and schools near the project area. However, constant monitoring of heavy equipment and the provision of PPEs for the heavy machine operator will be monitored.

2.6 Waste Management

53. The disposal of wastes from clearing and grubbing indicate that these are not disposed of in the approved disposal sites (Photograph 6).
54. A memorandum of agreement with the owner of a disposal site at Ch.12+520 was too steep and has affected a stream which is being used for drinking water for Baizengigl village. The owner has denied signing the agreement although there is evidence of his concurrence. An environmental complaint has been prepared for this incident.
55. Additional waste bins need to be provided to ensure that solid waste segregation and disposal is done. The Contractor's Solid Waste Management Plan has not been approved by DOW-ESSB and would require revision. A report from HRMG indicated that there were piles of used and damaged tires at the contractor's camp at Wina Lodge.



Photo 6: Deposition of spoils into river at Chainage 11+400.

2.7 Hazardous Materials Management

56. The management of hazardous wastes include their storage and ultimately disposal for fluorescent bulbs, computers and peripherals, printers and other equipment will

be monitored. Other monitored waste will include used batteries, battery fluids, oils, lubricants, and asphalt products. The submitted Hazardous Waste Management Plan (HWMP) has not been approved by DOW-ESSB.

57. Drums of fuel and lubricants are stored at the camp with direct ground contact (Photograph 7). The surface of the storage area should be cemented to prevent contamination from leaks and bunds to prevent leaks from spreading. The Materials Safety Data Sheet (MSDS) for these wastes will also be part of the HWMP to ensure the proper handling of these materials. A report from HRMG show that the contractor need to mitigate oils spills at its camp at Wina Lodge.



Photo 7: Leaking fuel drums at temporary camp site at Wina Lodge.

2.8 Aggregate Extraction

58. The contractor shall be extracting gravel materials from the Sumburu Quarry which is located along the Koglnige River at Ch 24+500 (Photograph 8). The area will also accommodate the bitumen and crusher site. Another potential quarry site was identified at Bamunda.
59. Baseline environmental data have been obtained for the Koglnige River (Table 3) for comparison during the monthly monitoring. The Quarry sites must not be occupied, prepared or operated before the necessary land occupation permit and Environmental Permits have been obtained from the CEPA and other authorities as required.



Photo 8: Proposed Sumburu Quarry and Crusher Site.

Table 3: Baseline environmental data for Koglnige River

Sumburu Quarry Baseline Data									
Stations	Surface velocity (m/seconds)	pH	Temp °C	DO	Turbidity (NTU)	Air Quality		Noise	
						PM _{2.5}	PM ₁₀	No Vehicle	With Vehicle
Station 1: Davai Bridge	10.21	7.8	16.3	6.8	3.1	1.4	5	51.6	-
Station 2: Crusher Site	14.10	6.9	16.6	7.3	3.8	2.5	5	54.7	-
Station 3: Kaer Bridge	07.91	10.2	16.9	8.5	5.3	3.0	10	52.4	-

2.9 Tree Removal and Vegetation Management

60. The project has just commenced its clearing operations and trees along the corridor have been marked by the Resident Engineer for cutting. These trees are given back to the landowner for domestic use.
61. A seminar workshop on Tree Planting and Management has been conducted by PSC last March 8, 2018 to ensure that this activity would be done properly and during the project period.
62. The contractor has been advised to replace the trees cut and prepare its tree planting program for early implementation.

2.10 Socio-economic Issues of Workers

63. The socio-economic data were also collected to reflect the direct benefits of the road construction project. The total number of workers hired for the period was 723 consisting of 604 males and 120 females or 84% and 16% respectively Table 4. This is below the ADB recommended 30% hiring requirement for women.
64. The total wages realized for the period was PGK 126,588. However, it would be of relevance to provide the wages given to men to determine any disparity for both sexes. Data for women's participation in non-payroll activities are also provided in Table 5 whereby a total of 222 women were hired.

Table 4: Summary of disaggregated employed workers from January – June 2018.

Month	Male	Female	Total	Displaced Persons Employed	Estimated Female Wages (Kina)
January	40	10	50	30	9,240.00
February	45	12	57	31	11,088.00
March	81	24	105	70	22,176.00
April	136	28	164	120	25,872.00
May	266	38	404	288	35,112.00
June	121	25	146	150	23,100.00
Total	604	120	723	521	126,588.00
Monthly Average	173	34	207	149	21,098
Percentage %	84	16	100	21	

Table 5: Women involvement in Non – Payroll Activities from January to June 2018.

Month	Gabions	Line Drains	Rip Raps	Head Walls	Total
January	0	0	0	0	0
February	0	0	0	0	0
March	0	0	0	0	0
April	0	0	0	0	0
May	10	30	12	42	94
June	12	56	15	45	128
Total	22	86	27	87	222
Average	11	43	13.5	43.5	111

2.11 Socio-Economic Issues of Community

65. The Contractor has spent a total of PGK 1,624,250 for local purchases of food, construction materials, other items and other local expenditures the period (Table 6).
66. It is important that documentation is provided for socio-economic benefits and issues. For those non-quantifiable benefits such as retail stores efforts need to be made to provide at least gross monthly sales of these stores (Photograph 9).

67. There were no reported payments for quarry extraction for the period. The Contractor needs to provide documentation for payments of rents for base camps, royalties, and volumes of materials extracted from the quarries.

Table 6: Monthly Expenditures for local purchases from January – June 2018.

Month	Purchases of Food (K)	Construction Materials (K)	Purchases of other items (K)	Other Local Expenditure (K)	Total
January	36,000	100,000	17,000	10,000	73,000
February	40,000	100,000	19,000	12,000	171,000
March	40,000	168,000	21,000	13,250	242,250
April	50,000	250,000	24,000	17,000	341,000
May	60,000	280,000	23,000	18,000	381,000
June	70,000	300,000	25,000	21,000	416,000
Total	296,000	1,198,000	129,000	91,250	1,624,250
Monthly Average	49,333	184,667		15,208	270,708
Percentage	18%	68%	0.001%	5.6	100



Photo 9: Road site market near construction site.

2.12 Public Safety

68. The contractor has provided visual safety aids such as visual tapes and painted posts for hazardous areas (Photograph 10). The risks to public safety in terms of erosion and sedimentation of water bodies and home gardens need to be assessed for future road work activities. The use of Geographic Information Systems could serve as a tool for this activity.
69. A Contingency Emergency Response Plan has also been submitted by the Contractor focusing on the construction works that they will undertake in their specific areas of concern and the attendant potential risks and hazards.



Photo 10: Warning signage for public safety.

2.13 Workers Health and Safety

70. An accident has been reported in March 2018, when one of the local workers injured his hand while handling aluminum roofing without wearing hand gloves (Photo 11). This incident highlights the need to educate and provide PPE and medical first aider to all employees.
71. The Contractor has prepared an Occupational Health and Safety Management Plan which (OHSMP) with operational details and was approved by DOW-ESSB last March 22, 2018.
72. The Contractor has provided protective clothing and safety equipment or Personnel Protective Equipment (PPE). A number of these PPE have been purchased (Photo 12). An inventory of its use and distribution should also be made to inform local employees on correct use of PPEs.



Photo 11: Injury encounter due to negligence on the use of PPE.



Photo 12: Some of the PPEs purchased by the contractor.

2.14 Traffic Management

73. The Contractor has submitted a Traffic Management Plan which has been approved by DOW-ESSB last March 22, 2018. This will be the basis for the monitoring activities of HRMG and PSC.
74. The contractor has hired women traffic aides to provide traffic warning signs to motorists (Photograph 13).



Photo 13: Women traffic aide provides traffic signage.

2.15 Prevention of HIV/AIDS and STDs

75. The Contractor has submitted its HIV-AIDS Plan but require improvement and revision. It has also proposed to engage the services of a HIV/AIDS and STDs service provider Gande STI HIV-AIDS and General Patient Clinic to comply with the requirements for the plan and its subsequent implementation.
76. There has been no HIV-AIDS activity except for a billboard that has been erected in May (Photograph 14).



Photo 14: HIV-AIDS awareness displayed on bill board.

2.16 Existing Infrastructure Issues

77. For the monitoring period from January to June 2018, there were no issues in terms of public or private services, utilities or similar facilities damaged or interrupted by the Works.
78. However, the District Administrator has started a Reassessment Exercise to determine whether other Displaced Persons or infrastructure facilities have been impacted by the project.

2.17 Environment Related Grievances

79. An agreed spoil disposal site is located on top of a stream used for drinking by the local community which had materials eroded into it due to rainfall at Ch.12+520. This caused the local community to complain. The resolution of this issue is solely with the contractor who needs to refer this to a local Environmental Grievance and Redress Committee. The issue will be closely monitored.

2.18 Training and Mentoring

80. A seminar workshop on Solid, Liquid and Hazardous Waste Management was conducted by the International Environment Specialist on February 20, 2018 at the Kuri Lodge, Mt. Hagen City. The seminar was attended by participants from the contractors of Tranche 2 and 3 and Environmental Officers from HRMG (Photograph 15).
81. The International Environment Specialist has also organized a Seminar Workshop on Tree Planting and Management and Quarry Management Plan on March 8, 2018 at the Kuri Lodge, Mt. Hagen City. The seminar was attended by participants from the contractors of Tranche 2 and 3 and Environmental Officers from HRMG (Photograph 16).

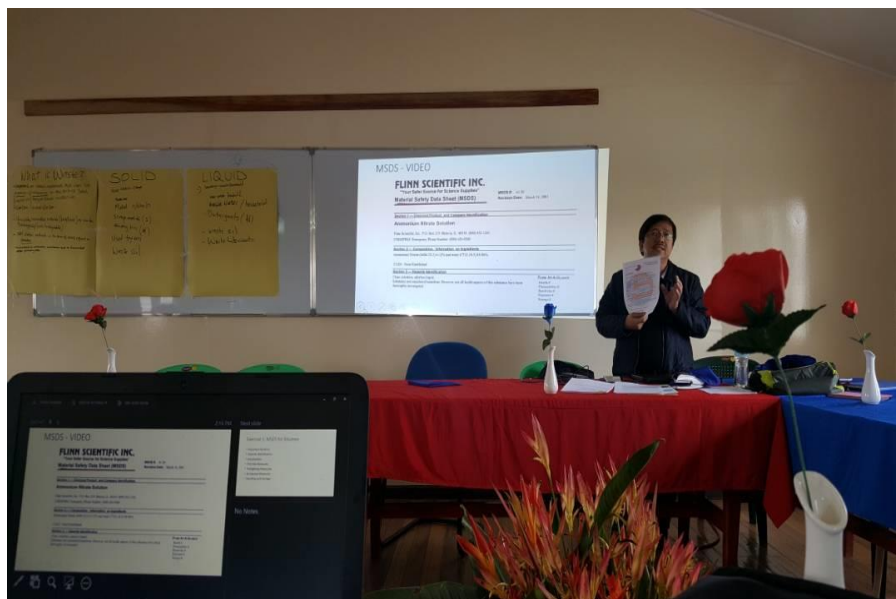


Photo15: Safeguards Workshop on Solid, Liquid and Hazardous Waste Management.



Photo 16: Safeguards Workshop on Tree Planting and Quarry Management.

82. A meeting was also conducted by the IES on the issues of Notice of Violations and Corrective Actions and the problems of quarry management last May 31, 2018 at Kimininga Hotel. The meeting was attended by all the Resident Engineers, Team Leader, Contractor's Representative, CSC Environment Specialist, HRMG Environment Officers, Contractor's Environment Officers and other participants (Photograph 17).



Photo 17: Meeting on Non-compliance on safeguards for Tranche 2 and 3 projects.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusion

83. This semi-annual report indicates that for 2018, civil works has just started and that the CEMP is being implemented substantially and the contractor provides remedies and mitigation for environmental notices of violation.
84. Based on the monthly reports, most of the environmental issues are minor including the solid waste management implementation, oil and lubricant contamination of soils, proper construction of septic tanks and leaching fields.
85. The contractor has almost completed its camp and needs to ensure that the septic tanks and drains are done properly with efficient leaching fields.
86. The contractor has to ensure that all permits and quarry management plans are done properly with mitigation measures in place and need to be checked by PSC and HRMG.
87. The contractor has not provided complete PPEs and needs to provide the appropriate PPEs to ensure that accidents would be eliminated or minimized.
88. There have been observations with regards the need to optimize the siting for spoils disposal to ensure that water bodies downstream are not affected.
89. The minor accident where a construction worker's hand has been injured and had to be treated in a hospital due to the absence of first aid kits and trained medical personnel highlight the importance of providing first aid and trained medical personnel to address such accidents.
90. Several seminars and trainings are proposed to provide capacity and capability building activities to the Contractor's environmental officers, project management and HRMG staff to ensure that the environmental management and compliance monitoring requirements are done in an efficient and timely manner.

3.2 Recommendations for Implementation and Corrective Actions

91. The experiences from Tranche 1 and Tranche 2 indicate that the personnel recruited by the Contractor need capacity building. It is therefore important that these trainings, seminars and workshops need to be done as soon as possible to ensure that the Contractor's staff with the assistance of DOW-HRMG together with the PSC would benefit from these capacity and capability building activities (Table 7).
92. The importance of identifying environmental harm then mitigating or remediating these harmful activities needs corrective action. In this case, corrective action could be categorized into two; corrections mean that there is immediate relief or action to an environmental problem. Corrective action refers to actions that would ensure that these environmental problems are not repeated either through policy or application of environmental management best practices (Table 8).

Table 7: Recommended Seminars and Trainings for Capacity Building.

Activity Number	Item and Recommended Action	Responsibility	Completion Date
1	Training on the use of environmental In-situ equipment for monitoring.	HRMG-PSC-CWYC	August 2018
2	Seminar-Workshop on Traffic Safety.	DOW-HRMG-PSC-CWYC	August 2018
3	Seminar-Workshop on Environment Health and Safety Best Practices.	HRMG-PSC-CWYC	August 2018
4	Seminar-Workshop on Compliance Monitoring Reports, Documentation and Technical Writing.	HRMG-PSC-CWYC	September 2018
5	Seminar Workshop on Status, Issues and Concerns in the Implementation of the CEMP and other plans.	HRMG-PSC-CWYC	September 2018

Table 8: Recommendations for Implementation and Corrective Action.

Non Compliance	Recommendations for Implementation	Corrective Actions Plan	In-Charge	Date of Implementation
Absence of monthly monitoring for identified environmental parameters.	Advise the contractor to conduct environmental monitoring using in-situ equipment.	Assist the contractor's Environmental Officer in the use of their equipment.	PSC HRMG	July-August 2018
Defective sewage system and discharges to the storm drain.	Contractor to repair defective sewage system.	Implementation of best practices for sewage treatment facility.	COVEC	July-August 2018
Absence of a permanent Environmental Officer	Hire an experienced EO and provide housing and other incentives.	Contractor needs to provide the proper compensation to ensure the employee would stay.	COVEC	July-August 2018
Absence of PPEs for majority of the workers.	Site Environmental Specialist to review with the contractor the need for PPEs.	For contractor to prioritize PPEs for its workers.	COVEC	July-August 2018
Absence of soil erosion management and sediment traps to contain spoils being transported to water bodies.	Contractor to implement immediate establishment of sediment traps and tree and grass seeding or planting.	Contractor to provide action plan with detailed activities.	COVEC	August – September 2018
Absence of camp clinic with nurse or appropriate health personnel to provide first aid assistance.	Advise the contractor to provide the required appropriate health personnel and provide first aid medicines.	Review with the contractor the submitted Health and Safety Plan	CSC-RE COVEC	August – September 2018
Submit or revise other plans including the HIV-AIDS Plan, Quarry Management Plans, Quarry Permits and others.	Review with the contractor the pending plans and assist in their accomplishment.	Provide a written notification to the contractor to submit and revise these plans.	COVEC	August – September 2018

4.0 APPENDICES

Appendix 1: List of References

1. Initial Environmental Examination for Gewa-Gembogl Road sup-project (2016).
2. Department of Works Specification for Road and Bridge Works 1995
3. Department of Works Specification for Road and Bridge Works 2015 Edition
4. Back to Office Report of HRMG Environmental Officer
5. Conformed Documents for the Improvement Works and Long Term Performance Based Maintenance Service (LTPBM) for Gewa-Gembogl Rd.
6. Scherer, Thomas F. 2016. North Dakota State University Extension Service. Reviewed and Reprinted October 2016.
7. DOWL. 2015. Erosion and Sediment Control Best Management Practices Manual. Montana Department of Transportation.
8. General Construction Waste Management and Hazardous Materials Handling and Waste Disposal DEC 1997.
9. Sample Environmental Baseline Procedure for Tranche 3 Projects. The Case of Gewa-Gembogl Road.

Appendix 2: List of People Interviewed

1. Mr. Ben Mirang – Resident Engineer PSC
2. Alphonse Niggins, Senior Field Coordinator, HRMG
3. Joseph Maiya, Environmental consultant, PSC
4. Paul Nombri, Manager, Technical Services, HRMG
5. Paraka Newman, Environmental Officer, HRMG
6. Ms. Maricel Babayen-on, PSC Cost Engineer
7. Ms. Joyce Kupul – HRMG Environmental Officer