

Semi-annual Report

January 2019

**PNG: HIGHLANDS REGION ROAD
IMPROVEMENT INVESTMENT PROGRAM
(TRANCHE 3)
Nipa-Munihu Road Sub-Project**

Prepared by Highlands Road Management Group (HRMG) of the Department of Works for the Asian Development Bank

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Abbreviations

ADB	-	Asian Development Bank
AIDS	-	Acquired Immune Deficiency Syndrome
AP	-	Affected People
CEMP	-	Construction Environment Management Plan
CEPA	-	Conservation Environment Protection Authority
CRO	-	Community Relations Officer
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
HRRIIP	-	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
MSDS	-	Material Safety Data Sheet
NRA	-	National Road Authority
NTU	-	Nephelometric Turbidity Unit
PCP	-	Public Communication Policy
PNG	-	Papua New Guinea
PRO	-	Public Relations Officer
PSC	-	Project Supervision Consultant
PWM	-	Provincial Works Manager
ROW	-	Right of Way
RP	-	Resettlement Plan
SFPC	-	Senior Field Project Coordinator
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 3531
Subproject	Nipa-Munihu 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. It also includes the acquisition of use rights for additional land to implement HRRIP subprojects, as well as compensation for damages on project-affected land DOW is also responsible for reporting to ADB and the recruitment of the organization to conduct independent 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).

	<ul style="list-style-type: none"> <input type="checkbox"/> Provide training to Contractor prior to preparation of CEMP, safeguards requirements of ADB and regulatory requirements of CEPA. <input type="checkbox"/> Approve CEMP for the subproject, after being cleared by PSC. <p>During the implementation of civil works:</p> <ul style="list-style-type: none"> <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, <input type="checkbox"/> Conduct environmental management and compliance monitoring on a monthly basis in cooperation with the PSC. <input type="checkbox"/> Review and assess the Contractor's monthly environmental monitoring report and compliances as contained in the CEMP. <input type="checkbox"/> Assist the Engineer in the compliance of the submitted CEMP. <input type="checkbox"/> Prepare the quarterly and semi-annual reports in cooperation with the PSC for submission to DOW and ADB.
Coverage of the Semi-Annual Environmental Monitoring Report	July to December 2018

1.0 EXECUTIVE SUMMARY

1. This semi-annual environmental monitoring report covered the period from July to December 2018. This report was carried out by the DOW through the Highlands Road Management Group (HRMG) and the monitoring results will be communicated to Asian Development Bank (ADB) and disclosure in accordance to ADB's Safeguards Policy Statement 2009 (SPS 2009) and Public Communication Policy 2011 (PCP 2011).
2. The Nipa-Munihi sub-project road is one of the four (4) sub-projects in Tranche 3 of the Highlands Region Roads Improvement Investment Program that is financed by ADB assisted road program. The sub-project is covered by CSTB contract # 3531 entered into by the Independent State of Papua New Guinea represented by the Department of Works and China Overseas Engineering Company LTD (COVEC China).
3. The project has commenced in December 11, 2017 with the mobilization of the Contractor. 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.
4. The CEMP, Occupational Health and Safety, and Traffic Management Plans were approved by DOW. The other safeguards associated plans were also been approved.
5. The Project Supervision Consultant (PSC) and HRMG has provided close monitoring on environmental issues including unwarranted disposition of spoils, better leaking sewages, employment of women and worker's privileges and rights were raised with the contractors.
6. There is a need to conduct monthly monitoring using in-situ equipment for the identified environment parameters. However, the contractor has to purchase the required equipment.
7. There is a need to revise and submit Quarry Management Plan for new quarries and the other associated plans.
8. The implementation of the CEMP and the associated plans should be done and a checklist of the monthly monitoring requirements need to be revised to accommodate the revisions made on these plans.
9. The application of Notices of Violation should be an option that needs PSC and HRMG vigilance to implement best practices in environmental management.
10. The review by PSC and HRMG of the Quarry Management Plans should be prioritized considering the environmental impact of these activities. The use of maps to ensure that environmental best practices in soil erosion and sedimentation management are recommended.

2.0 INTRODUCTION

2.1 Background

11. 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.

12. 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.

13. 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 (HRRIP) in tranches. The HRRIP 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.

14. 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 is rehabilitating four road sections comprising 113.3 km of the HCRN.

15. The Execution Agency (EA) for the program is the Department of Works (DOW) whilst the Highlands Region Management Group (HRMG) is the Implementation Agency (IA).

16. Tranche 3 (ADB 3043/3408 and EU Grant 0485) include the upgrading, rehabilitation and maintenance of four road sections namely, Henganofi-Napuru, Gewa-Gembogl, Pangia-Wiru Loop, and Nipa-Munihi in the Eastern Highlands Province (EHP), Chimbu Province and Southern Highlands Province (SHP).

17. The rehabilitation of the Nipa to Munihi road in the Southern Highlands province has a length of 28.55 km. The works proposed for the upgrading and rehabilitation of the Nipa to Munihi 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 EPAR and requires an EP depending on the duration and scale of those activities.

18. The CEMP was approved in February 5, 2018 and the project commencement date was February 23, 2018 with the mobilization of the Contractor. 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.

19. The Nipa-Munihi Road Section is covered by CSTB contract # 3531 entered into by the Independent State of Papua New Guinea represented by the Department of Works and China Overseas Engineering Group Co. Ltd (COVEC LTD).

2.2 Sub-Project Description

20. The Nipa to Munihu road, located in the Southern Highlands Province, commences at the junction with the Highlands Highway in Nipa and extends to Peane junction on the Mendi – Kandep road, a distance of 27.73 km. The road connects the two electorates of Nipa-Kutubu and Mendi-Munihu with the border located at an existing log bridge at km 18+850. The road traverse's hilly terrain from the commencement at Nipa to around Km 4 and again from Komal Bridge at Km 17+350 to the end of the road at Peane. The central portion of the road runs through mountainous terrain as the route crosses the Tondon Range. Within this central portion of the road the elevation rises to a maximum of 2,300 meters from the average mean sea level (amsl) to 1,950 meters at the end of the hilly sections.

21. The existing road comprises mainly of a silty clay subgrade covered with a gravel layer consisting of poorly graded limestone material which results in a rough running surface. There are also several sections where the subgrade has been exposed with no gravel layer. The road width varies from 3m to 4m in the mountainous section and 6 to 8 m in the hilly sections. Where widening of the road bench is necessary, the design is based on cutting existing slopes rather than widening embankments.

22. When completed, the improved road will facilitate the delivery of services to the population and stimulate economic growth through the reduction in travel times and costs of transporting goods to markets. The impacts of the improvements in what is already a highly disturbed environment will be minimal. Improvements will generally be restricted to a maximum 3 meter wide strip each side of the existing formation and implementation of the EMP will minimize the environmental impacts during construction. Restoration of quarry and dump sites upon completion and the planting of trees are an integral part of the works. See **Figure 1: Location Map of Nipa Munihu Road**.



Figure 1: Location Map of Nipa Munihu Road

23. The route crosses two rivers, the Nembi and the Lai River, both on Bailey bridges which are in good condition. There are 8 creeks crossing the alignment, all of which have log/timber bridges which will need to be replaced with Bailey bridges with steel deck. All of the creeks have well defined incised channels which are sufficient to contain flood flows

24. 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 Nipa-Munihu 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.

25. Based on the EMP presented in the IEE, a Construction Environmental Management Plan (CEMP) was prepared and approved by DOW-ESSU on February 5, 2018.

26. An Induction Meeting was conducted for all the Contractors in July 12, 2017 by the Project Supervision Consultants, HRMG and The Engineer to provide a background of the environmental management plans and compliance monitoring requirements.

27. Electronic reference materials were 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. Other important forms and documents were also provided such as sample forms and requirements for monthly monitoring report, Notice of Violation Form, and Logbook Sample Content.

28. 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's representative and environmental officers, HRMG, PSC and NRA.

29. 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. However, the monthly environment reports submitted to DOW are joint PSC and HRMG reports.

2.3 Proposed Scope of Works

30. The project intends to improve the existing Nipa to Munihu Road through the provision of a 5.5 meter wide pavement, sealed with DBST and 0.25 meter gravel shoulders which will be sealed where necessary to prevent erosion. Earthworks will be required to provide an adequate bench for construction of the pavement and associated drainage and will also be required where improvements are required in the vertical alignment to ensure adequate stopping sight distance. An average additional width of 2.5 m on each side of the existing cleared width will be required to accommodate the improvement works. The estimated volume of excavation is 196,000 cu.m. of

which 86,000 cu.m. will be reused for embankments and the remainder is expected to be partly surplus and partly unsuitable and therefore to be disposed of. Approximately 40,000 cu.m. of borrow will be required for the balance of embankment construction.

31. Approximately 850 linear meters of retaining wall will be required at various locations throughout the road length to provide adequate formation width and avoid extensive embankment construction. The improvements will include the provision of road safety features including signs, pavement markings and guardrails.

32. A total of 55 additional culverts are proposed in addition to the replacement of 56 existing culverts which are of inadequate capacity (typically 450mm diameter) while 65 existing culverts are redundant and will be removed. Approximately 28,000 meters of lined roadside drain will be provided to cater for surface water run-off from the road and adjacent slopes. The rehabilitation and upgrading would approximately take 24 months.

33. The rehabilitation and upgrading would involve the following activities:

- (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.

34. The upgrading and rehabilitation works for the Nipa to Munihi Road would require approximately 231 people of which 120 unskilled workers. They will be sourced from the local communities within the impacted area. Various machinery and heavy equipment will be required in the rehabilitation and upgrading works. This would range from 4WD vehicles to bulldozers and represents the manpower complement and machinery and equipment required for the works.

35. The works require materials including fuel, lubricants, paint, bitumen, cement, aggregates, cement, sand, timber, geotextile, drainage pipes and culverts. All materials will be sourced from approved suppliers. Workers, including local women, will make gabions using local materials for embankment and bridge pier protection:

2.4 Purpose

36. This report is written to present the status of the environment including compliance with the approved CEMP in respect of the Nipa - Munihi road section covering July to December 2018. Semi-Annual environment safeguards monitoring reports is a requirement under the SPS. In addition, the report provides a clear picture with regard to the future implementation of CEMP activities as well as the environmental outcome.

37. Since the project has just commenced, the compliance monitoring requirements enumerated in the monitoring findings are prospective and will be evaluated with the approved CEMP.

38. Furthermore, the report serves the client, ADB, other organizations and the public to understand the environmental management process, its outcome, the corrective actions that are required and the impact of such actions on the environment.

2.5 Methodology

39. This three-month consolidated report is written using data gathered from several sources. These include (i) Contractor's interviews and monthly reports; (ii) Monthly monitoring report of the Project Supervision Consultant's Environment Specialist and (iii). Monthly HRMG-PIU verification of site and observations.

40. This report is reviewed and prepared by the Project Supervision Consultant and HRMG-PIU prior to its submission to DOW. It also follows the format prescribed by ADB and a checklist for monitoring environmental compliance.

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

2.6 Institutional Arrangements

42. 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.

43. 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, monitoring and reports preparation for land activities, as required and is based in Mt. Hagen City.

44. 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).

2.7 Report Organization

45. 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

3.0 MONITORING RESULTS AND FINDINGS

46. The main findings of monitoring shall include the assessment of environmental impacts during the review period and proscriptive requirements are presented in this section.

47. The basis of monitoring are the 18 parameters as specified in the CEMP and mostly during construction works. These are 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

48. The summary of non-compliance from the monthly reports prepared jointly by HRMG and PSC is provided in Table 1. 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 1. Summary of Non-Compliance for July to December 2018 for Nipa - Munihi.

NON-COMPLIANCE	MONTHS					
	J	A	S	O	N	D
Conduct monthly environmental monitoring and compare it with previously conducted environmental baselines.	✓	X	X	✓	X	X
Wastes from clearing and grubbing are dumped into environmentally rivers and streams.	X	X	X	X	X	X
Absence of soil erosion and sedimentation mitigation measures.	X	X	X	X	X	X
Procurement of environmental in-situ equipment to conduct field measurements.	✓	✓	✓	✓	✓	✓
Absence of appropriate PPEs for the majority of workers.	X	X	X	X	X	X
Presence of trained first aid provider.	X	X	X	✓	✓	✓
Presence of traffic personnel and warning signages in the road project.	X	✓	✓	✓	✓	✓
Conduct of HIV-AIDS services.	X	✓	✓	✓	✓	✓

3.1 Contractor's Camp and Yard

49. The Contractor has completed and occupied its camp at Mt. Wiru during the first quarter of last year. The observation on coming up with the proper site development including sewage treatment design was not provided.

50. Following this observation, it was observed that during the third quarter of the year, the septic tank had been leaking which drained directly into the Nembi River (Photograph 1).

51. The contractor has initially implemented a waste collection and segregation scheme. However, this has to be monitored since reports indicate that these are dumped in an open dumpsite.

52. The implementation of simple solid waste management including recycling and use of kitchen refuse and biodegradables in a compost pit has been encouraged providing the contractor with manuals and instructions.

53. The proper containment of used oil and lubricants need to be followed and closely monitored due to a recurring problem of spillage and improper disposal which has been observed flowing into the storm drain (Photograph 2).



Photograph 1. Septage flows directly to Nembi River from Nipa Camp.



Photograph 2. The workshop's drain indicate waste oil discharges.

3.2 Erosion and Sedimentation Control

54. The recurring issue of improper waste disposal from clearing and grubbing has resulted in the deposition of spoils along the road side resulting in soil erosion and sedimentation of water bodies (Photograph 3).

55. The contractor has to follow the CEMP guidelines on proper spoils disposal. Despite repeated warnings, the contractor has provided excuses and need to be closely monitored by the environmental officers concerned.



Photograph 3. Spoils dumped along roadsides affecting food gardens at Ch 6+100.

3.3 Water Quality

56. The environmental officers of the contractor, HRMG and PSC have conducted monthly monitoring of water quality for the months of July and October 2018. The results of the monitoring activities for temperature and pH are summarized in Table 2.

57. The monitored values of pH for October indicate that it has slightly increased from its baseline values. However, the changes are surmised to be due to normal fluctuations since there were no observed disturbances in the sampling sites.

Table 2. Environmental parameters for temperature and pH.

Months	Temperature						PNG Standards	pH													
	S1		S2	S3	S4	S5		S6	S1		S2		S3		S4		S5		S6		
								< 2°C increase	S	B	S	B	S	B	S	B	S	B	S	B	
July			23.8			23.3							8.95				9.07				
August																					
September																					
October			24.5			23.8							8.05	7.65			8.79	7.44			
November																					
December																					

Temperature: There has been no increase of temperature greater than 2°C.

pH: PNG standard advocates no alteration of pH based on the baseline values. Where S = Water Sample; B = Baseline Value

58. Monitoring for dissolved oxygen and turbidity were also conducted for the same sampling stations covering the same periods (Table 3).

59. It was observed that dissolved oxygen is above the prescribed requirements of PNG's water guidelines. In the case of turbidity, all the samples were below the PNG guideline of no alteration greater than 25 NTU (Nephelometric Turbidity Unit). It was observed that the elevated turbidity was caused by rainfall events upstream which has caused sediment deposition into the water body.

Table 3. Environment parameters for dissolved oxygen and turbidity.

Months	Dissolved Oxygen						PNG Standards	Turbidity						PNG Standards
	S1	S2	S3	S4	S5	S6	Samples should not be less than 6 mg/L	S1	S2	S3	S4	S5	S6	No alteration greater than 25 NTU
July			8.79		8.76					43.1		34.6		
August														
September														
October			8.65		8.76					41.3		28.5		
November														
December														

3.4 Air Quality

60. The baseline for air quality was done using particulate pollution sampling for PM_{2.5} and PM₁₀. Monitoring was done for the months of July and October; however, PNG standards are not available (Table 4). The World Health Organization (WHO) Air Quality Guidelines for annual mean concentrations should not be greater than 10 µm/m³ for PM_{2.5} and 20 µm/m³ for PM₁₀.

61. It is recommended that monthly monitoring should be conducted using the in-situ equipment in environmentally sensitive receptor sites such as communities and schools.

Table 4. Environmental parameters for total suspended particulates (TSP).

Months	PM _{2.5}						PNG Standards	PM ₁₀ With vehicles						PNG Standards
	S1	S2	S3	S4	S5	S6	No Standards	S1	S2	S3	S4	S5	S6	No Standards
July	3.4	2.6	1.9			2.1		3.8	4.1	3.1	3.1.7		2.5	
August														
September														
October	3.3	4.6	3.0	2.5	2.8	23.1		4.8	5.3	5.1	3.3	3.7	25.6	
November														
December														

Note: WHO Air Quality Guidelines for annual mean concentrations should not be greater than 10 µm/m³ for PM_{2.5} and 20 µm/m³ for PM₁₀.

3.5 Noise

62. The results of noise level monitoring was done for July and October (Table 5).

Table 5. Environmental parameters for noise levels

Months	Noise Levels (dB)*											
	S1		S2		S3		S4		S5		S6	
	With	Without	With	Without	With	Without	With	Without	With	Without	With	Without
July	36.8	34.6		41.6			52.7	36.7			56.8	41.1
August												
September												
October	40.5	37.3	53.5	43.6	59.8	45.9	56.7	43.1	63.4	38.5	67.8	39.9
November												
December												

* With and without cars/trucks.

63. The ambient noise levels for the sampling stations fall within the prescribed 45-60dB. Some sampling sites however go beyond where trucks are passing through. More critically, it is important to monitor the quarry areas where noise levels could go beyond 85dB. These noise levels when exposed for prolonged periods could cause impaired hearing.

3.6 Wastes Management

64. The categories of wastes generated from the project consists of overburden from construction sites and improper disposal of spoils from excavation and other earth moving works such as clearing and grubbing. The contractor has obtained permission from landowners for the waste disposal however, the dumping of waste along the roadside is still a recurring problem (Photograph 4).

65. Reports on the old sewage pond outside the camp needs to be investigated to ensure that it does not pose risks to the environment. The Sewerage Management Plan has to be strictly implemented.



Photograph 4. Waste earthworks dumped directly into the river Ch. 27+500.

3.7 Hazardous Materials Management

66. The storage and ultimately disposal for fluorescent bulbs, computers and peripherals, printers and other equipment has not been properly monitored. Other monitored waste will include used batteries, battery fluids, oils, lubricants, and asphalt products.

67. There are several instances of burning of used tires (Photograph 5). The contractor has to strictly implement the provisions of the submitted Hazardous Waste Management Plan. The Materials Safety Data Sheet (MSDS) for these wastes will also be part of the HWMP to ensure the proper handling of these materials.



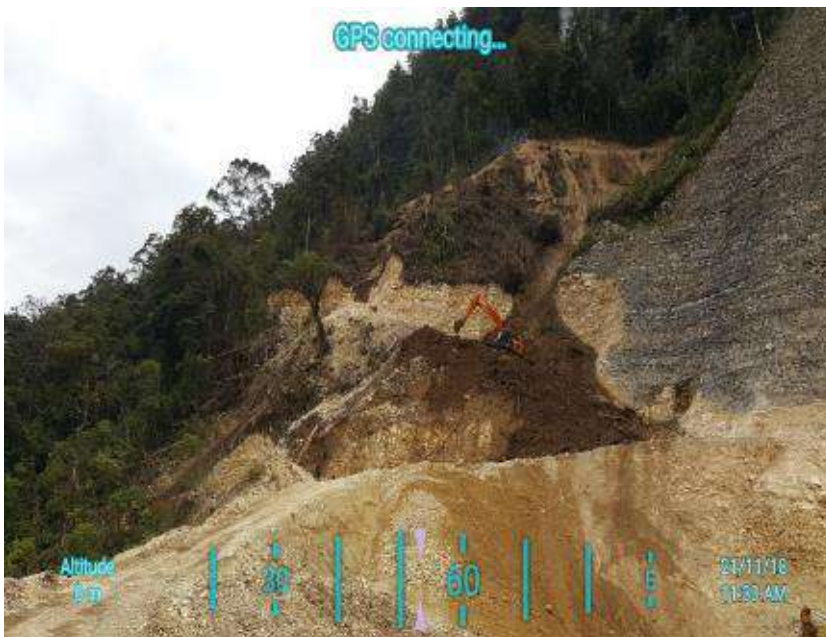
Photograph 5. Evidence of used tires being burned at the camp.

3.8 Aggregates Extraction

68. The Quarry Management Plan for all quarries have to be prepared individually. In cases where the quarry exceed set by PNG, a separate CEPA permit needs to be obtained.

69. A technical assistance meeting was conducted to provide outlines and explanation on best practices for QMP preparation.

70. The need for better quarry management could cause environmental harm from land slips and destruction of forests (Photograph 6).



Photograph 6. Persistent excavation can make the slope unstable resulting in a landslide.

3.9 Trees Removal and Vegetation Management

71. The felled trees from the clearing and grubbing operation were given to the respective land owners which were then turned into lumber and sold along the road side (Photograph 7).

72. However, the contractor needs to comply with the inventory and marking of all trees destined for removal. These should be marked together with the Environmental Officer of HRMG and only the marked trees are allowed to be removed. No tree shall be removed without the prior approval of the Engineer and any competent authority.



Photograph 7. Firewood sold along the roadside for K 5 per bundle.

3.10 Socio-economic Issues of Workers

73. The data for employment showed that a total of 662 employees were employed by the contractor. However, women only consisted of 5% for the period covered. The contractor is encouraged to provide additional employment opportunities for women.

Table 6. Disaggregated Employment and Wages from July to December 2018

Month	Employed by Gender (Number)		
	Men	Women	Total
January	50	4	54
February	52	4	56
March	69	5	74
April	130	6	136
May	160	6	166
June	170	6	176
Total	631	31	662
Average	105	5	110
Percentage	95%	5%	100%

74. The project also tried to capture women employment from road construction activities in minor road works such as gabions, rip-raps and head walls (Table 5).

Table 7. Women involvement in Non – Payroll Activities from July to December 2018.

Month	Gabions	Rip Raps	Head Walls	Total
July	2	2	2	6
August	2	2	1	5
September	2	2	2	6
October	5	3	4	12
November	7	3	5	15
December	12	5	8	25
Total	30	17	22	69

3.11 Socio-Economic Issues of Community

75. The community benefit for the community is contained in Table 6 wherein expenditures from the camp in terms of purchases of food, construction materials, other purchases and other local expenses are detailed for the period (Table 6). Efforts should be made to determine the accuracy of the total purchases which amounted to K 2.4 million.

76. Other benefits including royalties to the community for quarry land leases are detailed in Table 7. The benefits from quarry activities are given to the land owners. However, the project should also consider the provision in their operations for environmental management considering the damages to the environment.

77. The rent for the Contractor's camp is K 3,000 for each camp site. The previous semi-annual report was K2,000. An environmental concern was the disposal of wastes in the road side during the clearing and grubbing. This should be noted since the table did not indicate payments to land owners for the site disposal agreements.

78. Community meetings are required to inform the communities of the project's presence and to provide information and education campaign activities. A community meeting for Negia village is being conducted (Photograph 8).

Table 8. Monthly Expenditures for local purchases from July – December 2018.

Month	Purchases of Food (K)	Construction Materials (K)	Other Purchases	Other Local Expenditure	Total
July	13,251.00	41,286.00	120,356.26	184,133.20	359,026.46
August	10,662.00	20,494.60	113,965.10	219,733.10	364,854.80
September	11,826.80	135,347.43	152,361.00	194,630.20	494,165.43
October	12,547.60	65,780.50	125,260.35	175,455.30	379,043.75
November	14,785.30	87,284.60	117,220.00	187,268.20	406,558.10
December	13,285.40	92,314.20	137,290.45	168,274.30	411,164.35
Total	76,358.10	442,507.33	766,453.16	1,129,494.30	2,414,812.89

Table 9. Royalty payments for quarry activities covering July – December 2018.

Month	Quarry 1- Wapun Suoro	Quarry 2 Haren	Quarry 3 Heremi	Quarry 4	Total (m ³)	Estimated Value (Kina)*
July	3,550	1,300	260	1,260	6,370	9,555.00
August	1,460	1,950	420	850	4,680	7,020.00
September	1,560	2,650	500	650	5,360	8,040.00
October	3,400	2,850	520	420	7,190	10,785.00
November	4,510	3,150	0	1,100	8,760	13,140.00
December	10,460	3,260	0	800	14,520	21,780.00
Total	24,940	15,160	1,700	5,080	46,880	70,320.00

* Calculation using K1.50/m³ rate.

Table 10. Summary of Lease Rentals Paid to Customary Land Owners.

Month	Camp 1	Camp 2	Stockpile Sites	Disposal Sites	Total
July	3,000.00	3,000.00	0	0	6,000.00
August	3,000.00	3,000.00	0	0	6,000.00
September	3,000.00	3,000.00	0	0	6,000.00
October	3,000.00	3,000.00	0	0	6,000.00
November	3,000.00	3,000.00	0	0	6,000.00
December	3,000.00	3,000.00	0	0	6,000.00
Total	18,000.00	18,000.00	0	0	36,000.00



Photograph 8. Public consultation at Negia Village.



Photograph 9. Interview with the local mothers bringing their produce to the market.

3.12 Public Safety

79. The risks to public safety in terms of accidents tragically resulted in death in the previous reporting period. The risks from erosion and sedimentation of water bodies and home gardens should also be assessed. In some cases even the road construction project is at risk from landslides (Photograph 10).

80. The Contingency Emergency Response Plan needs to be followed upon by the contractor to prevent such risks and hazards. ern and the attendant potential risks and hazards.



Photograph 10. Mudslide at Mt. Wiru of Mendi-Kandep road.

3.13 Workers Health and Safety

81. Despite repeated instructions, most of the workers in the site are not provided with PPEs. It is recommended that precautions should be taken by the Contractor to ensure the safety and protection against accidents of all staff and labor engaged in the works (Photograph 11).

82. The Contractor should follow the approved Health and Safety Plan (HSP) which was approved by DOW-ESSU with operational details addressing health and safety concerns during his Works.



Photograph 11. Workshop employees with no PPEs.

3.14 Traffic Management

83. The Contractor has provided traffic signs or traffic aides for its project implementation in line with the requirements of the approved Traffic Management Plan (Photograph 12).

84. The contractor has been advised to provide the required traffic management resources including standard traffic signages based on its stated TMP.



Photograph 12. Traffic aide providing signages.

3.15 Prevention of HIV/AIDS and STDs

85. The Contractor has submitted an HIV/AIDS and STDs plan to DOW-ESSU. The identified service provider is the Munihi Health Centre.

86. The contractor's HIV/AIDS activities are summarized in Table 9. Condom is also provided free of charge.

Table 11. Monthly HIV – AIDS Activities from July – December 2018.

Month	HIV – AIDS Activity	Number of Participants	Issues and Concerns
July	1 batch conducted	60	No issues, questions asked.
August	1 batch conducted	55	No issues, questions asked.
September	1 batch conducted	80	No issues, questions asked.
October	1 batch conducted	60	No issues, questions asked.
November	1 batch conducted	70	No issues, questions asked.
December	Not conducted	0	
Total	5	325	

3.16 Existing Infrastructure Issues

87. A field verification activity was conducted for affected assets and payments are being worked out by HRMG.

3.17 Environment Related Grievances

88. There have been at least 22 reports of environment related grievances and have been resolved. However, details of the resolution needs to be documented.

Table 12. Recorded Environmental Grievances from July – December 2018.

Month	Environmental Grievance	Person / Organization	Resolution
July	2	persons	Both for improvements – Sorted by HRMG
August	2	persons	Both for improvements – Sorted by HRMG
September	2	persons	Both for improvements – Sorted by HRMG
October	3	persons	All for improvements – Sorted by HRMG
November	5	persons	3 improvements sorted, 2 further damage
December	8	persons	5 improvements sorted, 3 further damage
Total	22	22	



Photograph 13. Landowner complain of spoils dumped in his land without approval Ch 6+500.

89. A meeting was held at Nipa station between the local representatives and the implementing agency on the 24th of August 2018 (Photograph 14). . The agenda was the continuous stop work caused by the locals. During the meeting, the local leaders assured the team that there won't be any more issues.



Photograph 14. Meeting with local representatives.

3.18 Training and Mentoring

90. A workshop on Technical Report Writing was held at the Kuri Lodge on the 30th October 2018. It was conducted by the International Social Safeguards and Environment specialists and attended by the contractors, the supervision team and HRMG officers



Photograph 15. Seminar-Workshop on Technical Report Writing.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

91. The contractor has not complied with the monthly monitoring of environmental parameters following the approved CEMP. The other related plans also needs to be implemented and monitored as well.

92. The PSC needs to closely monitor the implementation of the plans and provide corrections and best practices when needed.

93. The contractor has only conducted two monthly monitoring activities for the identified environmental parameters. A monthly monitoring schedule is a project requirement.

94. There is a need to conduct monthly monitoring using in-situ equipment for the identified environment parameters. However, the contractor has to purchase the required equipment.

95. A potential problem is the sewage treatment facilities which do not conform to best practices and should be repaired immediately since it contaminates environmentally sensitive receptors such as water bodies.

96. The wastes from the clearing and grubbing activities are dumped into environmentally sensitive receptors including rivers and streams. This should be stopped and the spoils deposited in the agreed upon disposal sites.

97. The absence of soil erosion and sedimentation mitigation measures. This needs to be addressed by the contractor following the best management practices.

98. The contractor needs to provide the appropriate PPEs to its workers especially the local work force.

4.2 Recommendations for Implementation and Corrective Actions

99. The experience from Tranche 1 and Tranche 2 indicate that the personnel recruited by the Contractor need capacity building. An intensive training and seminar activity will be conducted for the first quarter of 2019. The participants will include Contractor's staff with the assistance of DOW-HRMG together with the PSC (Table 11).

100. The importance of identifying environmental harm and mitigating or remediating these harmful activities need corrective action. The procedure followed by the project is the identification of environmental non-compliance by PSC and HRMG. The repeated infractions or severity of the environmental harm will be the basis for the issuance of a Notice of Violation of PSC and or HRMG. This NOV becomes the basis for the preparation by the contractor of a Corrective Action Plan to address the violations.

101. 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 12).

Table 13. 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-CONTRACTOR	February 2019
2	Echo Seminar-Workshop on Traffic Safety.	DOW-HRMG-PSC-CONTRACTOR	February 2019
3	Echo Seminar-Workshop on First Aid Procedures	HRMG-PSC-CONTRACTOR	March 2019
4	Echo Seminar-Workshop on Environment Health and Safety Best Practices.	HRMG-PSC-CONTRACTOR	March 2019
5	Seminar Workshop on Status, Issues and Concerns in the Implementation of the CEMP and other plans.	HRMG-PSC-CONTRACTOR	March 2019

Table 14. Recommendations for Implementation and Corrective Action.

Non Compliance	Recommendations for Implementation	Corrective Actions Plan	In-Charge	Date of Implementation
Irregular 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 these equipment.	PSC HRMG	January - June 2019
Wastes from clearing and grubbing are dumped into rivers and streams.	Issue appropriate Notices of Violation for repeated offenses.	With the RE and HRMG, identify the concerns raised identify official disposal sites.	PSC HRMG CONTRACTOR	January 2019
Absence of PPEs for majority of the workers.	Issue Notices of Violation for repeated non-compliances.	For contractor to prioritize PPEs in project .	CONTRACTOR	January 2019
Absence of soil erosion management and sediment traps to contain spoils being transported to water bodies.	Issuance of NOV to the contractor for failure to implement soil erosion control measures such as establishment of sediment traps and tree and grass seeding or planting.	Contractor to be assisted in the preparation of action plan with detailed activities.	CONTRACTOR	January – February 2019
Absence of camp clinic with nurse or appropriate health personnel to provide first aid assistance.	Delegate the contractor's officer who attended the Seminar on First Aid to provide assistance.	The contractor needs to provide a plan to implement the designation process and provide the necessary resources.	CONTRACTOR	January – February 2019
Revise and get approval for the lacking Quarry Management Plans.	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.	CONTRACTOR	January – February 2019

Appendices

Appendix 1: List of References

1. Initial Environmental Examination for Nipa - Munihi Road section (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 Nipa - Munihi Road. Contract Number CSTB 3533.
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. HIV Semi Annual Report
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 Pangia Wiri Loop Road.

Appendix 2: List of People Interviewed

1. Mr. Bienvenido Mirang – Resident Engineer PSC
2. Alphonse Niggins, Senior Field Coordinator, HRMG
3. Steven Sukot – National Environment Specialist, PSC
4. Paul Nombri, Manager, Technical Services, HRMG
5. G a r r y D u m , Environmental Officer, HRMG
6. Saul Nol – Environmental Officer, HRMG