



Initial Environmental Examination

Project Number: 51115

Date: January 2018

Timor-Leste: Baucau to Viqueque Highway Project

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Abbreviations and Acronyms

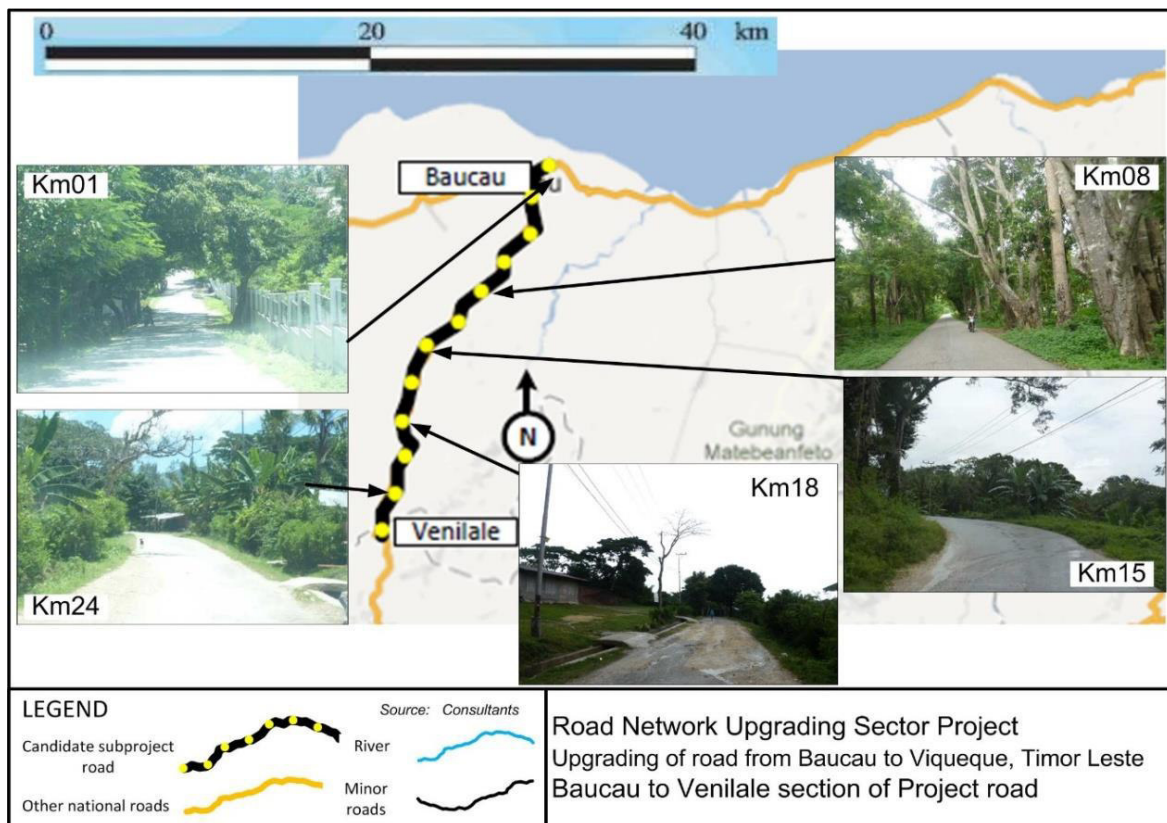
ADB	–	Asian Development Bank
ANPM	–	National Authority Petroleum and Minerals
CAFI	–	Conselho de Administração do Fundo Infraestrutura (CAFI)
CEMP	–	Contractors site-specific environmental management plan
CITES	–	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DEIA	–	Department of Environmental Impact Assessment (in NDE)
DRBFC	–	Directorate of Roads, Bridges and Flood Control
EA	–	Executing agency
EDTL	–	Electricidade de Timor Leste
EARF	–	Environmental assessment and review framework
EHS	–	Environmental Health & Safety Guidelines (of World Bank Group)
EIS	–	Environmental impact statement
ELL	–	Environmental Licensing Law (Decree No. 5/11)
EMP	–	Environmental management plan
ESO	–	Environment and safety officer (Contractor)
EO	–	Environment officer (in PMU)
GRC	–	Grievance redress committee
GRM	–	Grievance redress mechanism
GOTL	–	Government of Democratic Republic of Timor-Leste
IA	–	Implementing agency
IES	–	International environmental specialist
ICCAI	–	International Climate Change Adaptation Initiative
IIC	–	Included in Contract
ISS	–	International social safeguard specialist
IUCN	–	International Union for Conservation of Nature
MAFF	–	Ministry of Agriculture Fisheries and Forestry
MOF	–	Ministry of Finance
MPMR	–	Ministry of Petroleum and Mineral Resources
MPWTC	–	Ministry of Public Work, Transport and Communication
NEC	–	National Environmental Consultant
NSC	–	National Social Safeguard Consultant
NES	–	National environmental specialist
NGO	–	Non – government organization
PCCSP	–	Pacific Climate Change Science Program
PISC	–	Project implementation and supervision consultant
PMU	–	Project Management Unit in MPWTC
ROW	–	Right-of-way
RP	–	Resettlement plan
SEASEE	–	Southeast Asia Association of Seismology and Earthquake Engineering
SPS	–	Safeguard Policy Statement
SEIS	–	Simplified environmental impact statement
UNTAET	–	United Nations Transitional Administration for East Timor

1. Executive Summary

1. Overview. The Government of Timor-Leste (GOTL) has requested the Asian Development Bank (ADB) to provide financing to facilitate the upgrading of sections of the National Road comprising Baucau-Venilale (A06-01) and Venilale-Viqueque (A06-02). This SEIS covers the Project upgrading, rehabilitation and maintainance. The program is part of a comprehensive national development program to upgrade, rehabilitate and maintain priority road sections of the road network of Timor-Leste that provide links between major cities and towns; improvement that will be designed and implemented by Ministry of Public Works, Transport and Communication (MPWTC).

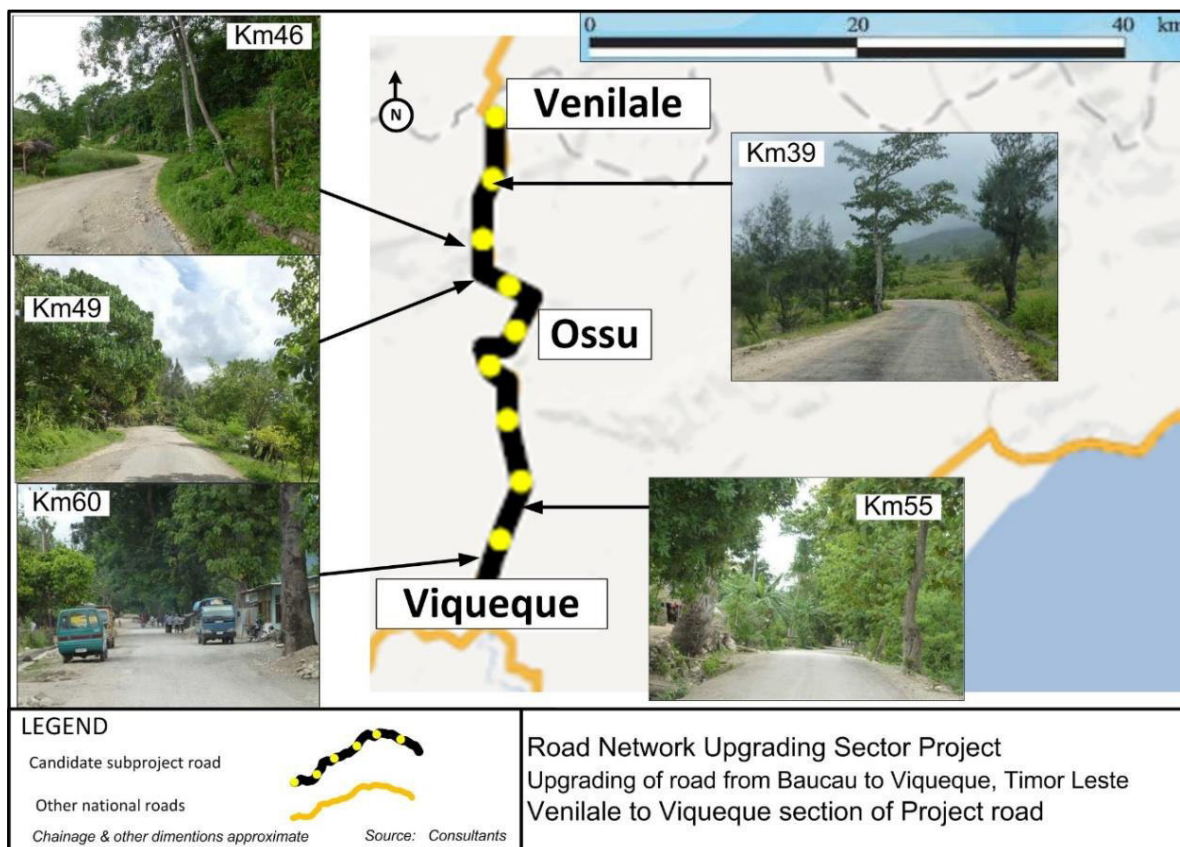
2. Implementation Arrangements. The executing agency for the rehabiliitation and improvements of Baucau to Viqueque road is the Conselho de Administração do Fundo Infraestrutura (CAFI) and the implementing agency will be MPWTC. Within MPWTC the key agency for implementation will be the Project Management Unit (PMU) established to manage and implement projects financed wholly or partially by GOTL's development partners. The PMU will be responsible for day to day management of the Project, including implementation of requisite safeguards measures. The PMU used consultants to assist in the preparation of this SEIS. The supporting team is presented in Section 3.

Figure 1.1A Location of Project Road Baucau to Venilale section



Source:Consultants.

Figure 1.1B Location of Project Road Venilale to Viqueque section



3. The Project. This SEIS covers the 58.27km of the Baucau-Viqueque road upgrading Project (A06-02) road in Baucau and Viqueque districts (Figure 1.1A and 1.1B). This road Project starts from the t-junction near the football stadium just south of Baucau on the Baucau to Venilale road and finishes in Viqueque at the t-junction to Dilor (next to the Monument 1969).

4. The Baucau- Viqueque road section has not been repaved for many years although some sections have recently received emergency repairs. The Project will be completed by: (i) improvement, road widening and upgrading along the existing alignment following international best practices and quality standards; (ii) providing one wider traffic lane per direction, with sealed hard shoulders and / or sidewalks in villages and repairs to bridges; (iii) clearing and improvement of culverts; (iv) installing a higher capacity drainage system along the corridor; (v) fine tuning alignment by widening curves (vi) introducing new road marking and signage and other measures to improve road safety. The estimated cost is approximately \$70million for the whole 58.2km route. Detailed design for the Baucau-Viqueque road has been prepared.

5. Legal Framework. The assessment and implementation of the Project will be governed by laws, regulations, and standards for environmental assessment and management of GOTL. The Basic Law of Environment (April 2012) covers all relevant aspects of environmental protection and the Decree Law 5/11 (2011) on environmental licensing covers environmental assessment requirements. In addition to GOTL's requirements the Baucau to Viqueque road improvements must comply with ADB's Safeguard Policy Statement 2009 (SPS). According to both Timorese law and the SPS, the Project can be classified as Category B because the potential adverse environmental impacts are site-specific, few if any of them are irreversible, and mitigation measures can be designed readily.

6. Consultation and Information Disclosure. Public consultation was undertaken during the preparation of this SEIS and social safeguards documents. The stakeholder consultation process disseminated information to all key stakeholders including the general public and the authorities through meetings and door to door surveys along the project corridor. Information

was provided on the scale and scope of the Project works and the expected impacts and the proposed mitigation measures through meetings and surveys. The process also gathered information on relevant concerns of the local community so as to address these in the project implementation stages. Project documentation will be disclosed in a place and language accessible to stakeholders.

7. **Grievance Redresses Mechanism.** The Project's grievance redress mechanism (GRM) procedures will be established in line with other projects managed by PMU; that can help resolve issues associated with the Project. The GRM will receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the environmental and social performance of the Project. Resolution of these issues and concerns will be undertaken expeditiously and according to the procedures of the GRM. The complaints/issues registry maintained at the site project office and by the contractor will be subject to monitoring. The GRM will aim to provide an accessible, time-bound and transparent mechanism for the affected persons to voice and resolve social and environmental concerns linked to the Project.

8. **Environmental Management Plan.** Mitigation measures, environmental monitoring, and capacity development are required to minimize the environmental impacts in the design, construction and operational phases. The main issues relate to planning and design of the Project road surface, roadside drainage and control of construction impacts such as spoil and waste disposal, extraction of construction materials, water quality impacts, health and safety concerns, traffic interruption, re-provisioning of utilities and irrigation, noise and dust during construction.

9. To ensure these impacts are mitigated to the greatest extent feasible, the PMU has incorporated the EMP into bid and contract documentation and the Contractor will be responsible for the implementation of mitigation measures. The PMU will also make sure that the Contractor updates the environmental management plan (EMP) that accompanies this SEIS based on detailed design in the pre-Construction Stage and includes the proposed working methods and integrates them into the Contractors EMP. Following induction provided by the PMU the contractor will prepare a contractors site-specific EMP (CEMP) detailing how they propose to implement the works. The CEMP will follow the format of the environmental management plan (EMP) that accompanies this SEIS and will include the Contractor's proposed actions to cover amongst others: (i) waste management and spoil disposal; (ii) tree removal and replanting (iii) utilities, irrigation and telecommunications re-provisioning; (iv) temporary drainage; (v) extraction of construction materials and management; (vi) runoff control and excavation protection; (vii) noise and dust control; (viii) temporary traffic management; and (ix) worker and public safety and (x) decommissioning plans (xi) training and capacity building for staff.

10. The operation of the project road should have beneficial effects on the surrounding environment overall. The improvement of the Project road will allow faster, more efficient travel and improved traffic flow. The improvement of crossing drains will reduce the chances of erosion due to uncontrolled run-off. The smoother asphalt pavement and improved road side gutters and drainage can be expected to reduce noise and the accumulation of road side dust and therefore air pollution from noise and disturbed dust should also be reduced.

Table 1.1 – Summary of Project Activities & Key Environmental Impacts.

Project activities giving rise to impacts	Mitigation measures to control environmental Impact from:	Measures / Method	Monitoring Responsibility
PRE –CONSTRUCTION			
Climate change adaptation	Risk of increased erosion and damage to road infrastructure	Include adaptation measures	PMU (design)
Contractor EMP prepared Awareness and orientation of Contractor	All foreseeable impacts captured in CEMP.	Review inspection of CEMP	PMU
PISC Check on legitimacy of material sources	Project complies with donor bank requirements, best practice and material suppliers are fit for purpose	Review inspection of CEMP	PMU
Surveying and demarcation of centre-line	Minor loss of vegetation during demarcation	Visual inspection	Contractor; PMU
Site clearance, digging, excavations	Discovery of cultural historical property	Stop work order	Contractor; PMU
	Removal of trees	After agreement is signed with owner that compensation will be paid.	Contractor; PMU
Mobilisation of contractor	Social disruption	Consultation	Contractor, PMU
	Health & safety management	Observation & consultation	Contractor, PMU
	Spread of communicable diseases	Pre-construction - check records	Contractor; PMU
CONSTRUCTION			
Operation of construction equipment	Emissions & dust from plant & materials	Visual inspection, complaints	Contractor; PMU
Works adjacent to water bodies or near coast	Erosion & physical changes to river bed & culverts and other areas.	Check design, visual observation consultation with users	Contractor; PMU
Sourcing of materials (river gravels, aggregates).	Extraction gravel, altering channel & erosion; quarries or borrow pits.	Location approval, visual inspection, review of extraction plan and rehabilitation	Contractor; PMU
Spoil disposal. discarded macadam pavement	Impacts to habitats & water courses	Visual inspection	Contractor; PMU
Clearing, cut & fill activities, embankments; Stockpile and staging areas lead to loss of land	Soil erosion & sediment contamination of rivers & turbidity.	Visual inspection	Contractor; PMU
Run-off, discharges, generation of liquid wastes	Impacts on water quality.	Visual inspection	Contractor; PMU
General activities - solid & liquid waste arising	Uncontrolled unmanaged waste disposal	Visual inspection	
Use of hazardous materials	Spillage, leakage, accidents	Inspection of storage & review emergency response plan.	Contractor; PMU
Accidental damage to existing services	Interference with existing infrastructure; water supply, power, telecommunications.	Plan with utility providers and avoid / re-provision.	Contractor; PCM
Activities outside road encroaches habitats.	Workers poach animals, eggs feathers gather fuel wood & impact habitats.	Inspections, camp & work sites check food supply, re-vegetation.	Contractor; PMU
Accidental impacts historical / cultural sites	Impacts on PCR or cultural property sites	Stop work & dealt appropriately	Contractor; PMU
Noisy construction plant and equipment	Impacts community & workers.	Consultation, review work schedule, GRM register.	Contractor; PMU
Vehicle parking, traffic safety and access to people's land	Traffic disruption & safety affected	Inspection, review traffic manag't	Contractor; PMU
General work activities	Worker health and safety risks	Inspection, review H&S Plan	Contractor; PMU
Presence of construction workers	Disruption, or antagonism, communicable diseases & community health	Inspection, review contractor staff management As required;	Contractor; PMU

Project activities giving rise to impacts	Mitigation measures to control environmental Impact from:	Measures / Method	Monitoring Responsibility
Site office, water use & electricity supplies.	Stress on existing resources and infrastructure	Consult with villages along road	Contractor; PMU;
OPERATION PHASE			
Operation of vehicles creating emissions	Emissions increase locally	Visual inspection & complaints;	MPWTC/DRBFC
Routine and ongoing maintenance	Blocked drains; gravel repair materials	Routine maintenance records;	MPWTC/DRBFC; ADB
Drainage	Alteration of natural flood cycles	Monitor wet periods. Review floods	MPWTC/DRBFC; ADB
Run-off from road	Loss of soils and water quality in rivers and near shore areas	Routine maintenance	MPWTC/DRBFC; ADB
Climate change issues	Unexpected and costly failure of road & Depletion.	Visual; Review rainfall & flooding	PMU
Easy access to previously difficult to reach areas	Hunting and poaching increases	Monitoring & consultations	MPWTC/DRBFC; ADB
Increased traffic	Noise, nuisance, accidents	Monitoring and evaluation, data collection	MPWTC/DRBFC; ADB
Spread of communicable diseases	Roads act as pathway for spread of communicable diseases such as HIV and STIs	2 x a year for 3 year, mid-term and post-eval. Consultations with villagers; Review health records (STI data)	MPWTC/DRBFC; ADB
Any other	Unintended or unanticipated impacts	As above, as required	MPWTC/DRBFC; ADB

¹ Mitigation measures will generally be carried out by the Contractor but will be monitored by the PISC. PMU is ultimately responsible for monitoring and will make inspections of the regular checking carried out and reported to PMU by the PISC.

11. Conclusion and Recommendations. No particular difficulties were encountered by the consultants in compiling the SEIS. The Project construction is restricted to areas within the road corridor and small areas for minor curve improvement. The impacts from construction and operation will be manageable and no insurmountable impacts are predicted because all the mitigation measures in the EMP are included in the contract documents and will be implemented thoroughly. MPWTC (assisted by PMU) shall ensure that the EMP is included in the contract documents, and the EMP provisions are implemented and monitored to their full extent. In the event that any design details change the locations or scope of the proposed Project works the environmental assessment and EMP shall be reviewed and revised accordingly. The findings of the SEIS are that the environmental impacts of the proposed rehabilitation of the Baucau to Viqueque road will be minor and manageable if the mitigation measures established in the EMP are implemented thoroughly. The SEIS also sets out the requirements for monitoring. A separate stand alone EMP document is also submitted for review to accompany the SEIS.

2. Project Proponent

12. The project proponent is the Government of Timor-Leste (GoTL). The executing agency for the rehabilitation and improvements of the project is Conselho de Administração do Fundo Infraestrutura (CAFI) while the implementing agency is the Ministry of Public Works, Transport and Communications (MPWTC). The Project Management Unit (PMU) is established within MPWTC to manage and implement projects financed wholly or partially by GOTL's development partners.

13. The PMU will be responsible for day to day management of the project, including implementation of requisite safeguards measures and requirements. The details of the project proponent are presented in Table 2.1.

Table 2.1 – Project Proponent Details

Address:	REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE, MINISTÉRIO DAS OBRAS PÚBLICAS, TRANSPORTES E COMUNICAÇÕES Avenida da Patria, Mandarin, Dili, Timor Leste.
Telephone:	3310330
Name	Ms. Odete da Costa, Project Manager.
Email:	pmu_adb@yahoo.com

3. EIA Consultants

14. The development partners secured the services of Dongshung Engineering Co. Ltd. (Dongshung) consultants to assist in the preparation of the environmental assessment as part of the feasibility study carried out earlier. The final environmental assessment was carried out and the SEIS was primarily prepared by the environmental specialists in the environmental team in PMU who received initial support from the the feasibility study and design consultant (Table 3.1).

Table 3.1 EIA Consultants

Name	Consultant	Qualifications
Roasalyn Fernandes	Dongshung	BSc
David Green	PMU MPWTC GoTL	BSc, PhD
Jose Paulo Angelo S. S. Pinto	PMU MPWTC GoTL	BEng
Joao Veniata G. Barreto	PMU MPWTC GoTL	Dip CLM

4. Description of the Project

4.1 Identification of the Project

15. This Simplified Environmental Impact Statement (SEIS) covers the total 58.2km of road that connects Baucau to Viqueque in the districts of Baucau and Viqueque passing several settlements on the way south of Baucau towards Viqueque.

16. The program is part of a comprehensive national development program to rehabilitate and maintain priority road sections of the road network of Timor-Leste that provide links between major cities and towns; improvements that are being designed and implemented by Ministry of Public Works, Transport and Communication (MPWTC).

17. The Project is financed by ADB's loan to Timor-Leste that included a feasibility study and detailed engineering design of the Baucau–Viqueque road. The implementation will be administered by ADB. Upgrading of this road is urgently needed to support road transport links to the major population centres between Baucau and Viqueque, as well as to provide access for development generally. The existing bitumen road will be improved and resurfaced to bring it up to standard. Detailed design for the Project has been prepared.

4.2 Category of the Project

18. For the purpose of environmental licensing categorization under Decree Law No.05/2011, the Project is classified as Category B as defined in the letter 167/DNCPA-DGA/II/2017 from DNCPA to PMU. The Project involves construction, reconstruction, and extension of existing road and construction of bridges less than 300m in length and the potential adverse environmental impacts are site-specific, few if any of them are irreversible, and mitigation measures can be designed readily.

4.3 Location and Scale of Project

19. The 58.2km section from Baucau to Viqueque runs along a winding route to the south in the Baucau Vila and Venilale sub-districts of Baucau District and the Ossu and Viqueque sub-districts of Viqueque District (Figure 4.1). The upgrading and rehabilitation will follow the existing alignment. The principal area of impact study is an envelope of 50 meters wide on each side over the entire length of the road section.

20. The Project begins at Km3+740 starting from the t-junction near the football stadium just south of Baucau on the Baucau to Venilale road and finishes in Viqueque at the t-junction to Dilor (next to the 1969 Monument). It ascends from an elevation of about 400m at Baucau to between 800m to 900m above sea level near Ossu. It descends to an elevation of about 1200m at Viqueque town. The existing alignment passes by some villages and isolated settlements.

21. The GPS coordinates at the beginning of this project at Baucau are: 8°20'01.67" S; 126°27'25.54" E. The end is at: 8°51'58.62" S; 126°21'50.89" E. Typical photographs of the alignment are shown in Appendix 1.

4.4 Villages

22. The road crosses four sub-districts, Baucau Vila, Venilale, Ossu and Viqueque and passes through communities in about fifteen different sucos or village administrations namely Buibau, Uailili, Gariuai (Baucau Vila); Uma Ana Ulu, Uma Ana Iku, Bahamori, Badoho, Uato Haco, Fatulia (Venilale); Ossu de Cima, Loihuno, Uabubo, Ossorua, Caraubalo and Uma Uain Craic. While there is a widely-used suco boundary map in Timor Leste suco affiliation is a cultural rather than a geographic boundary concept. Therefore, it is common to find communities that identify themselves as residents of a certain suco residing within the geographical boundaries of a different suco. Table 4.1 presents the districts and sucos affected.

Figure 4.1 - Location Baucau to Viqueque Project Road

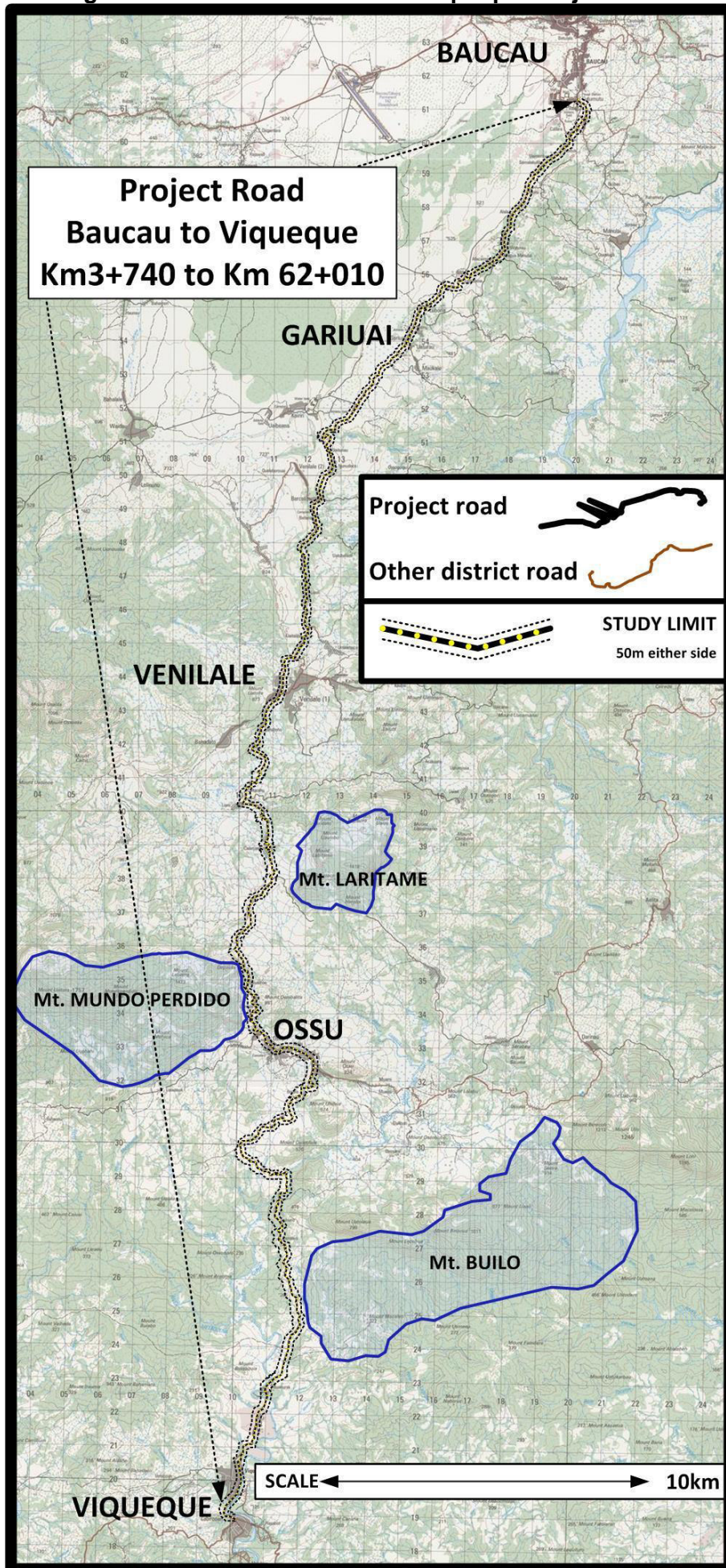


Table 4.1 Districts and Villages

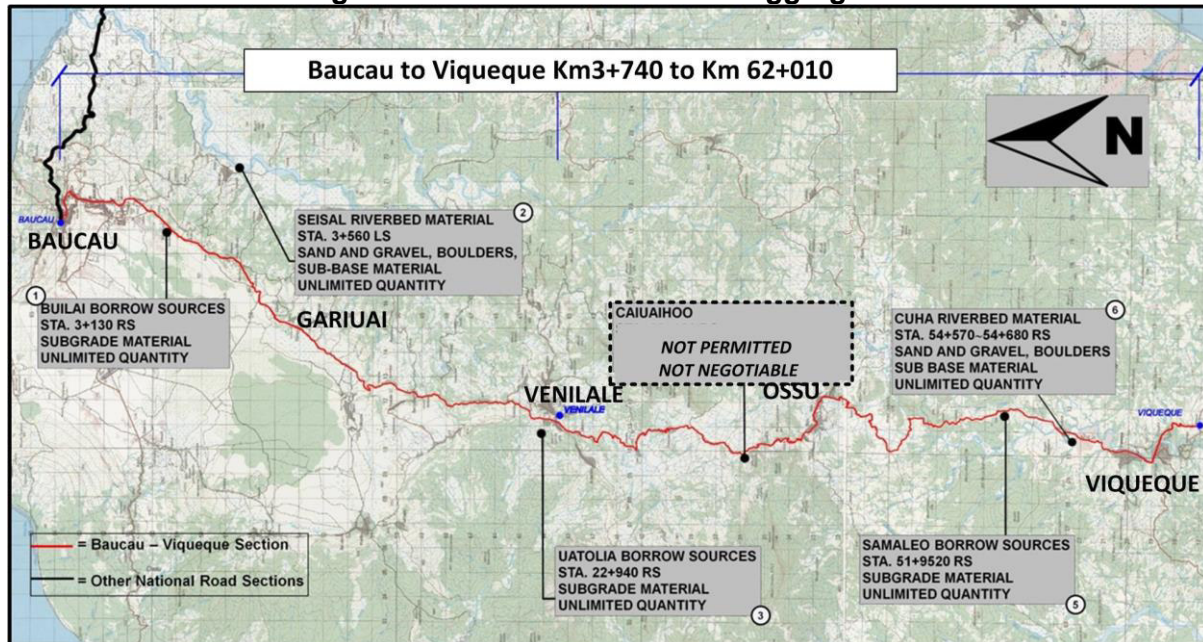
District:	Baucau, Viqueque
Sub-district	Baucau Vila, Venilale, Ossu, Viqueque
Villages/Suco	Buibau, Uailili, Gariuai (Baucau Vila) Uma ana Ulu, Uma ana Iku, Bahamori, Badoho, Uato Haco, Fatulia (Venilale) Ossu de Cima, Loihuno, Uabubo, Ossorua, Caraubalo, Uma Uain Craic

Source: PMU 2017.

23. The existing road from Baucau to Viqueque is mostly a standard 4.5m wide carriageway although actual width varies in many sections from 3.5m – 7m (Figure 4.2). Hard shoulders are from 0.5m to 1.0m wide with some parts especially in the hilly terrain shoulders have actual width less than 0.5m. The proposed widening of the Baucau – Lautem section will mostly add less than 6.0m and as little as 1.5m in some places.

24. Associated Facilities will be required in the course of the construction and the Contractor is likely to need to access construction materials from more than one location. Several existing sources of aggregates have been identified in the vicinity by the feasibility consultants (Figure 4.2, n.b. Caiuaihoo sta. 33+980 RS is not available). However whereas many of these facilities are located quite close to the road works, the appointed Contractor may decide to open up alternative or additional quarries and sources of construction materials as well as associated facilities for processing the construction materials such as crushers, batching plant, casting yards and asphalt mixing plant. Ministry of Petroleum and Mineral Resources (MPMR) National Authority for Petroleum and Minerals (ANPM) requires contractors to hold a mineral license for mineral extraction from land quarries including rivers and as a first step location approval must be obtained from ANPM.

Figure 4.2 Potential sources of aggregates.



25. **Riverbed Gravels.** Several rivers cross the project road, Venilale river, Cuha river and others. The major River Seical runs parallel in close proximity to the project draining a large catchment area from the north coast to the south of Venilale (approx. 450km²).

26. Generally, the local riverbed gravels are suitable as road construction materials. No laboratory tests were carried out therefore the suitability of materials is based on observation (subject to confirmation). Based on observation riverbed gravel in Seical river should contain enough strength as aggregates for asphalt concrete and suitable as mixture to any aggregates and sand. However, laboratory tests will be required to confirm its applicability. Sands from several rivers were observed as applicable for structural use.

27. **Existing Quarries.** Several existing quarries can be found within short travelling distance from the project. Builai Borrow Source – STA03+130Right; Uailili Borrow Source – 07+560Right; Should the need arise, the quarries can be reactivated with prior coordination with the MPMR and ANPM local land and property authority and land owners. The Ossu de Cima / Caiuaihoo borrow source is unavailable for further mining due to its location on the perimeter of Mount Mundo Perdido Protected Area (consultation with Department of Forested Area and National Park, Directorate General of Forestry, Ministry of Agriculture, Fishery and Forestry).

28. The suppliers of aggregates and asphalt must be licensed to operate by the GoTL to be eligible to supply the project. If the Contractor decides to operate its own plant the Contractor will need to follow the requirements of the environmental license, obtain location approvals and secure mineral licenses and complete a Site Specific Environment Management Plan to the satisfaction of the authorities for each and every new location from which construction materials are obtained for this project by the Contractor. The Contractor will also have to submit a site plan and operational methodology to the PISC as part of the Contractors Environment Management Plan (CEMP).

29. Mobilization of manpower needed for construction activity will include provisions and recruitment of manpower including engineers, technicians and surveyors, heavy equipment operators and assistants, mechanics, general laborers and security. As far as practicable manpower will be sourced using local people, especially for semi-skilled and unskilled work according to the contractor requirements.

30. The Project will involve clearing and grubbing of the existing carriageway to remove surplus materials and any obstructions including trees and stumps. Any available topsoil will be stockpiled for later use. Roots, logs, vegetation, wastes and debris will be satisfactorily disposed at designated and approved locations. Tree timber will be returned to the owner for reuse.

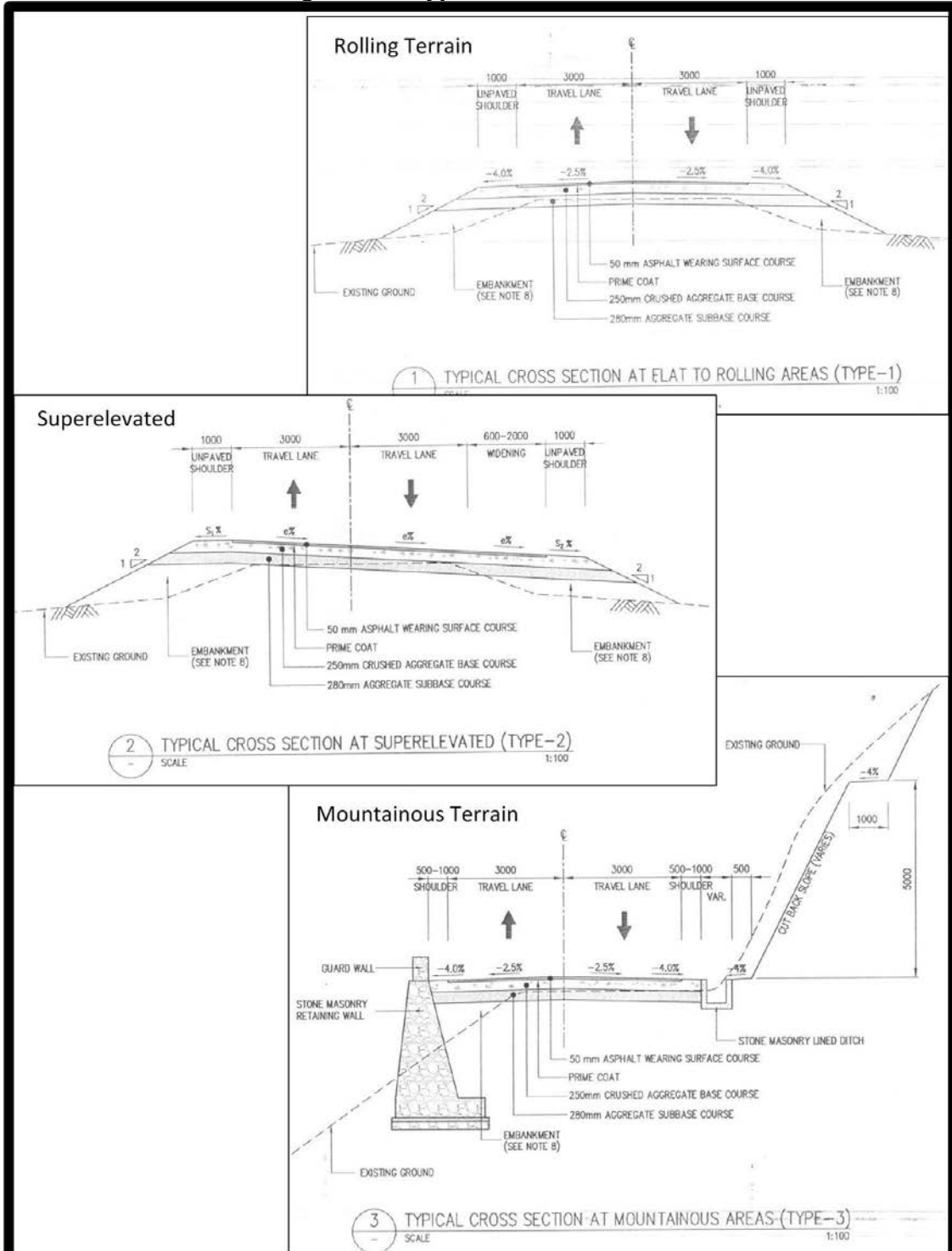
31. Structures and obstructions will be removed; wholly or in part and backfilling the resulting trenches, holes, pits. Satisfactory disposal at designated and approved locations of all building materials, fences, structures, old pavements, abandoned pipe lines, masonry ditches, culverts, bridge sections and any other obstructions which are not designated or permitted to remain, will be carried out.

32. Transfer and relocation of utilities may also be necessary in certain sections. These will be mainly power lines and community water supply lines. Relocation of power lines will generally be the responsibility of the EDTL, while relocation of community water lines shall be done with the assistance of the Contractor.

33. Part of the Contractor's obligation during the pre-construction stage is the preparation of a Construction Environmental Management Plan (CEMP), which is a detailed plan by the contractor on how they will implement the EMP that accompanies this SEIS. Guidelines on the format and specification for the CEMP are presented in Appendix 5.

34. The pavement types will be 5cm wearing course over 15cm base course. Sub-base will be repaired and replaced where necessary at different places along the Baucau Viqueque Road. The cross sections of three types of the several pavements designed are shown in the Figure 4.3.

Figure 4.3: Typical Cross Sections



Road Network Upgrading Sector Project
 Improvement of Road from Baucau to Viqueque, Timor Leste
 Typical Cross Sections

Source: Consultants

35. Drainage structures consist of culverts and roadside ditches. Many culvert pipes and drains are in acceptable physical condition and evaluated to accommodate design run-off. Culverts and line drains will be cleaned and repaired and some culverts and line drains will be replaced. For culverts that will be retained, improvement shall be through cleaning and repair of concrete in the wing wall, head wall, catch basin with protection as deemed necessary. Headwalls and wingwalls may be added at the end of culvert barrels for the following reasons.

- To improve hydraulic efficiency by streamlining the flow towards the opening.
- To provide structural stability by increasing the seepage path and thereby
- To retain fill materials and reduce erosion of embankments slopes.
- To offset the effect of uplift forces.

36. The Project road is designed with Construction Workswill include the following activities:

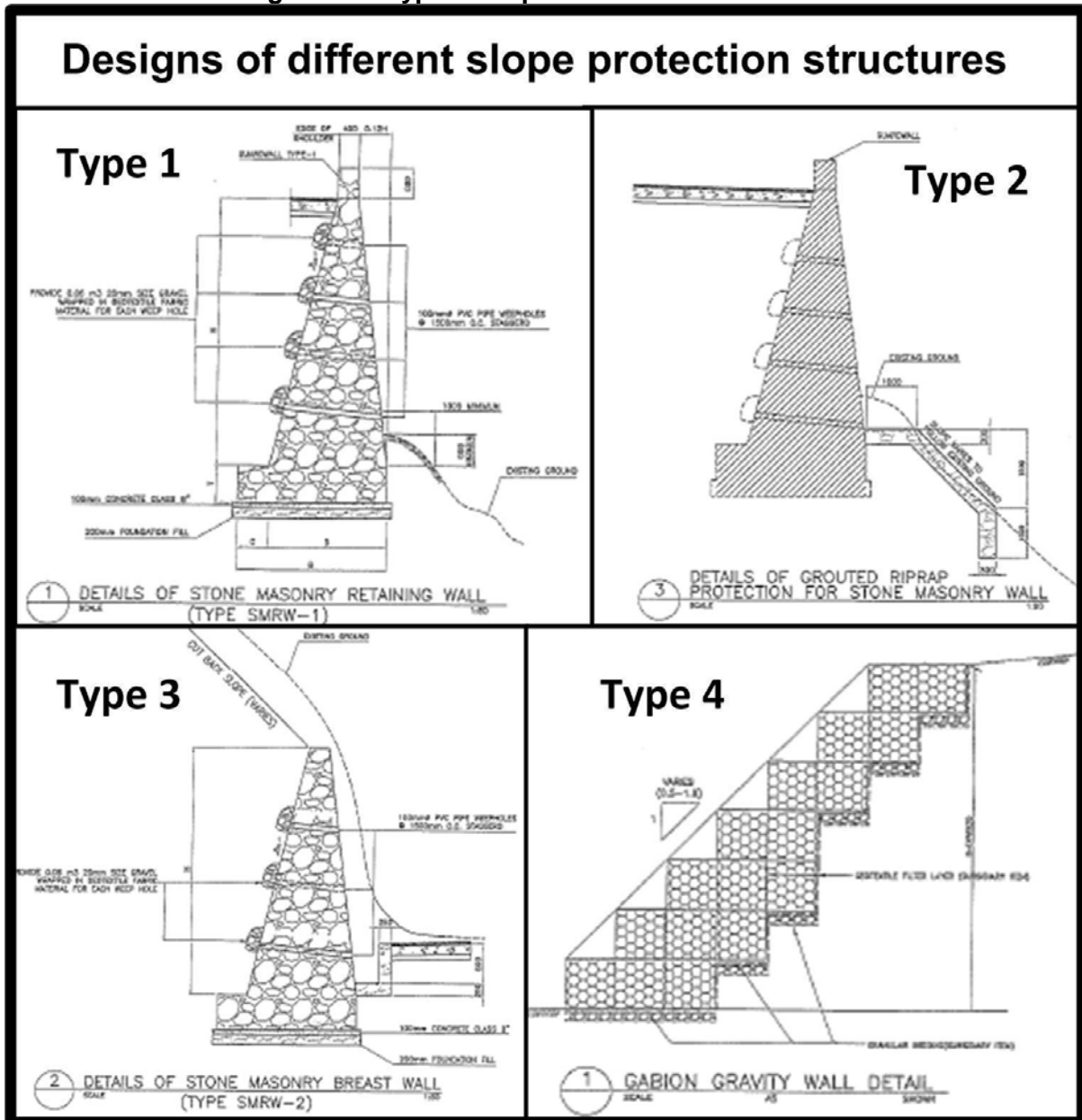
- Clearing and grubbing, marking and removal of trees
- Removal of macadam layer.
- Hauling and disposal of old macadam pavement materials
- Removal of unsuitable materials
- Excavation and supply of construction materials
- Hauling of construction materials
- Replacement of unsuitable road embankment (where necessary)
- Improvement of embankment
- Improvement of drainage and culverts (where needed)
- Laying and compaction of sub-base course and base course
- Application of prime coat
- Laying and compaction of asphalt
- Installation of Safety Features
- Application of pavement markings, side and center
- Installation of rumble strips
- Installation of signs

37. **Road Stabilization and Retaining Structures.** A number of sections along the project road are unstable and in some locations the road has failed and attempts to stabilize the road have been made through installation of gabion basket walls. A variety of factors might contribute to the situation, ranging from surface water damage, inadequate compaction and the use of inhomogenous filling material during previous rehabilitation work.

38. Road stabilization problems will be addressed through the use of careful detailed design incorporating different measures. For water-related damage, this includes constructing rehabilitating and repairs for road-side drainage and clearing and repair of culvert structures. Stronger embankment will be introduced in a few places as well as cleaning drainage structures to allow for better draining of the road during storms. Instabilities along the hilly terrain will be addressed through the installation of additional slope stabilization measures such as construction of retaining structures, further slope cut and bioengineering works.

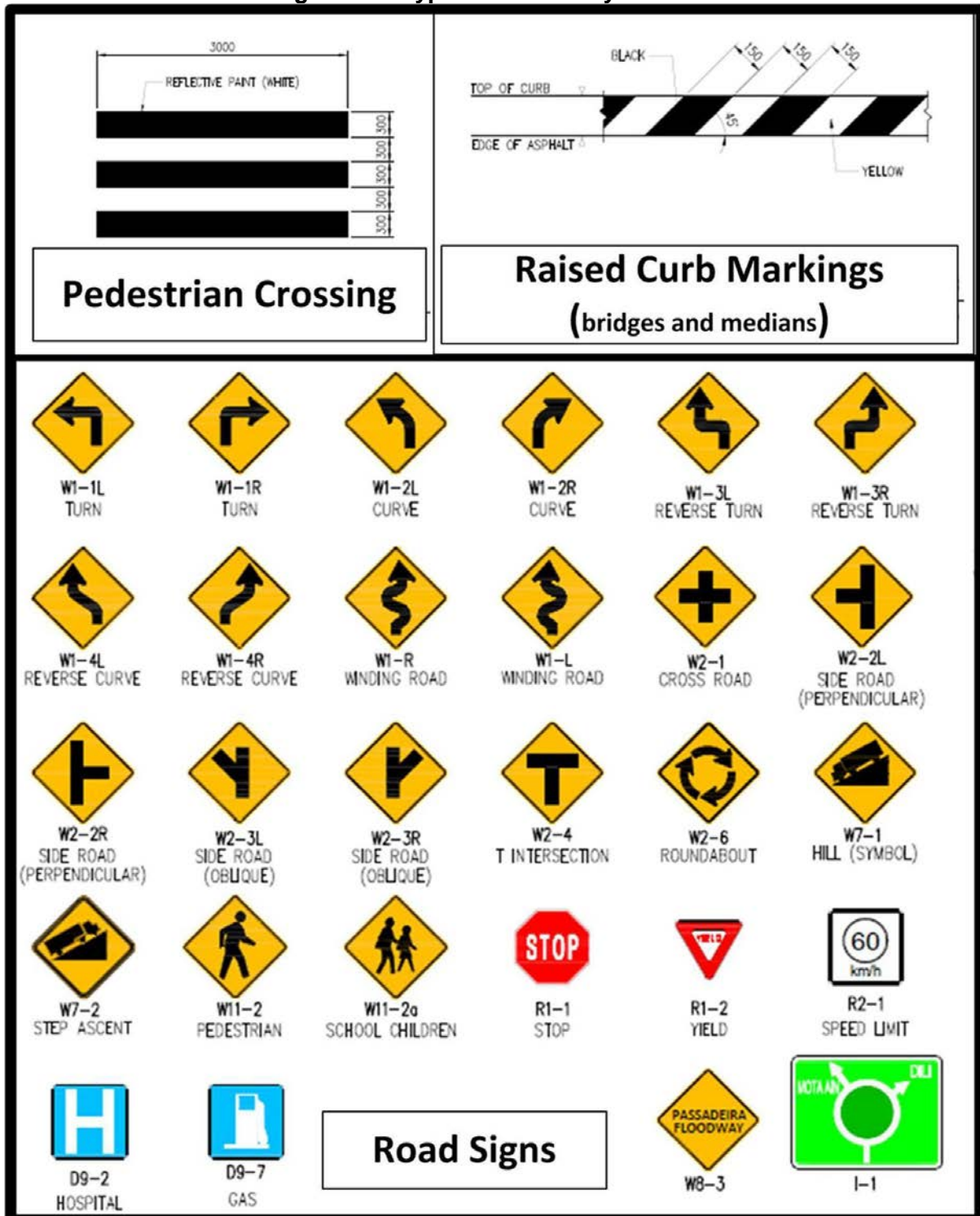
39. Typical slope stabilization structures are shown in Figure 4.3. These types of structures will be considered and include gabions, retaining walls and stone masonry combined with bio-engineering treatment.

Figure 4.3: Typical slope stabilization structures



40. **Road Safety Measures.** Road safety measures for this project involves provision for adequate and reflective pavement markings that will delineate the boundary between opposing and parallel traffic and pedestrians; covered drains adjacent to the road asphalt paved shoulders where pedestrians especially school children can walk; adequate road signs that will serve as warnings and information signs. In addition road safety features shall be provided such as metal guardrails, road signs and guideposts. Locations of these improvements shall be decided during the fine tuning of the design during implementation.

Figure 4.4: Typical road safety features



41. **Spoil Disposal.** The Contractor will need to identify spoil disposal sites. The land owner (if private) and the local community must be consulted. Spoil disposal sites must have been agreed with local land owners and the local authority and shall have the approval by the PISC and will be monitored accordingly. The methods for environmental management of spoils disposal sites shall be presented by the Contractor in the CEMP.

42. **Bio-engineering Measures.** Bio-engineering involves preparation of excavated back slopes and embankment slopes and combination of an engineering structure (e.g. geotextile or gabions) and planting of selected vegetation such as grasses and trees on the slopes that will help reduce soil erosion, improve soil stability, minimize seepage of water to the ground and help prevent landslides. Several techniques have been considered for use in the project as follows:

- Turfing on embankment slope to armour the surface;
- Grass slips (rhizome plantation) on embankment to armour the embankment slope;
- Brush layer of hardwood cuttings in embankment slope to reinforce the slope to avoid encroachment of the embankment by local people.

43. Bioengineering is targeted to be applied in several locations. The locations will be confirmed during the fine tuning of the design in the construction phase; in response to local conditions and factors.

44. **Operational Stage.** The Project is considered in the operations and maintenance stage upon the issuance of the Completion Certificate after the defects liability period. The regular maintenance work will involve patching of the pavements, trimming of vegetation along the roadside, maintenance of road safety features, e.g. pavement markings, drainage etc. Given the projected low volume of vehicular traffic, noise and air pollution are not expected to be a concern during the road's operational stage. No significant direct environmental impacts are predicted during this stage.

4.5 Justification and Need for the Project

45. The existing road infrastructure needs to be improved because the standards and conditions of many of the roads in Timor-Leste are inadequate to meet rapidly growing demand for efficient travel. This situation limits national development and economic growth

46. The GOTL has recognized the importance of developing physical infrastructure including road network as part of its program to reduce poverty in the country. This is specifically mentioned in the National Strategic Development Plan (2011-2030) where it is noted that "an extensive network of quality and well maintained roads is essential to connect our communities, promote rural development, industry and tourism, and provide access to markets."

47. The Baucau Viqueque Highway Project is a new project for the road network which aims to consolidate and accelerate economic opportunities in the target area served, promoting private sector growth, increased agricultural productivity and reduced poverty through the improvement of road connectivity to the district towns in an important area in Timor Leste.

48. Existing conditions of the Baucau to Viqueque road vary; it is fair in some places but poor and unacceptable in many others. Some parts of the road have completely lost the bitumen seal, due to water damage. Some sections are experiencing severe settlement leading to cracks and uneven pavement. The compacted shoulders are often in poor condition and overgrown with grass and other plants. Bridges will be repaired or reconstructed.

49. During the pre-independence period the road received maintenance and some of the bridges and cross drainage structures were constructed. Since independence (post 2002) the road has received basic emergency repair in severely damaged sections to keep it passable to vehicular traffic. However lack of strengthening and absence of bituminous overlay in some places has left this key road in very poor condition. An all weather gravel surface was laid on some parts of the road in 2015.

50. The Timor-Leste Strategic Development Plan (SDP) outlines GOTL's vision for rehabilitation of the national roads. The program of the Sixth Constitutional Government includes a major program of road rehabilitation, repair and improvement. Asian Development Bank (ADB) World Bank (WB) European Union (EU) and Japan International Cooperation Agency (JICA) are coordinating their support and several road projects are already completed and several more under implementation. The overall strategy aligns with the goals of the SDP

and envisages continuing support for a medium-term approach to the rehabilitation, rehabilitation, and maintenance of the core road network with emphasis on investment projects that are of national importance and which provide an inclusive pattern of economic growth, particularly by improving the transport links needed by agriculture and the rural economy. Asian Development Bank (ADB) will provide financing to facilitate the upgrading and the project will be administered under the requirements of the ADB. ADB has made adjustments to its country strategy to expedite this support in line with GOTL's priorities. Figure 4.5 shows the typical road conditions and the need for improvements.

Figure 4.5: Typical road conditions



4.6 Proponent's endorsement of the project.

51. The PMU confirms that it is in agreement with the findings and recommendations of the SEIS. Accordingly PMU is pleased to endorse the SEIS. If approved, the project will be implemented following the recommendations of the SEIS and the accompanying environmental management plan (EMP) to reduce adverse impacts of the Projects.

4.7 Structure of the SEIS Report and Methodology

52. This SEIS report has been presented in the following format. The report is organized into following Sections. A non-technical Executive Summary is also prepared and presented in the beginning of the report.

- Section 1 : Executive Summary
- Section 2 : Project Proponent
- Section 3 : EIA Consultants
- Section 4 : Description of the Project
- Section 5 : Policy, Legal, and Administrative Framework
- Section 6 : Description of the Environment (Baseline Data)
- Section 7 : Alternatives
- Section 8 : Climate Change
- Section 9 : Impact Assessment & Mitigation Measures
- Section 10 : Summary Environmental Management Plan
- Section 11 : Public Consultation, and Information Disclosure
- Section 12 : Difficulties Encountered
- Section 13 : Conclusion and Recommendation
- Section 14 : Non-Technical Summary
- Appendices contain information and details referred to in the main text.

53. The objectives of this SEIS are to:

- Identify and describe the existing environmental conditions in the project area including the identification of environmentally sensitive areas;
- Assess the proposed works and activities to identify their potential impacts, evaluate the impacts, and determine their significance; and
- Propose appropriate mitigation measures that can be incorporated into the proposed activities to minimize any adverse impacts, ensure that residual impacts are acceptable and establish the requirements for monitoring of the project.

5. Legal and Policy Framework

54. The proponent acknowledges and will require the selected Contractor to uphold the laws and regulations of Timor-Leste particularly those pertaining to environmental protection, specifically in regard to compliance with environmental laws, regulations and guidelines, be they national or local.

5.1 Environmental Law in Timor-Leste

55. **The Constitution.** The implementation of the Project will be governed by laws, regulations, and standards for environmental assessment and management of GOTL. The Constitution of Timor-Leste has clearly established the importance of protecting the environment. The Constitution of Timor-Leste establishes a healthy environment as a constitutional right. The Constitution stipulates that:

- Everyone has the right to a humane, healthy, and ecologically balanced environment and the duty to protect it and improve it for the benefit of the future generations.
- The State shall recognize the need to preserve and rationalize natural resources.
- The State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

56. **The Basic Law** on Environment (Decree-Law no. 26/2012) came into force in 2012. It sets the framework for other environmental legislation such as the Decree Law 05/2011 on Environmental Licensing (ELL) and pending laws and regulations including the draft biodiversity law.

5.2 Environmental Licensing Law.

57. The ELL implements a system of environmental impact assessment (EA) and licensing in Timor-Leste. Under the ELL, proponents of projects or activities that may impact the environment are required to undertake a process of environmental assessment; including preparation of an 'environmental impact statement' (EIS for Category A) or simplified environmental impact statement' (SEIS for Category B) depending on the level of likely impact of the project. Both EIS and SEIS include an environmental management plan (EMP) that must also be prepared as a stand alone document according to the procedure established through the ELL and submitted to National Directorate of Pollution Control and Environmental Impact (DNCPIA). If the Minister determines to approve the project or activity, based on the recommendations of DNCPIA, the proponent is granted an environmental license by DNCPIA to conduct the project or activity in line with the proposals in the EIS/SEIS and EMP. The SEIS (for a Category B project) is more or less equivalent to the initial environmental examination (IEE) required by ADB for a Category B project under ADB's Safeguard Policy Statement (SPS).

58. According to the ELL the Project is Category B because it involves construction, reconstruction, and extension of roads. To comply with the ELL, an environmental assessment and EMP must be prepared in the prescribed format and be submitted to the DNCPIA for approval. In this case the environmental assessment will be as a Simplified Environmental Impact Statement (SEIS) as required for Category B.

59. Article 18 of the ELL requires that the application for environmental license be made to the National Directorate of Pollution Control and Environmental Impact (DNCPIA). The proponent (in this case MPWTC) of a project classified as Category B initiates the procedure for SEIS and environmental license application with the submission of a Development Proposal Application Form (PDAF) and Project Document (PD) to the DNCPIA. The Project Document is prepared to describe the project in more detail and allow DNCPIA to categorize the project. The information to be included with the Project Document and SEIS includes: (i) name of the applicant, and their identifying information and contact details; (ii) location and scale of the project; (iii) plans and technical drawings of the project; (iv) technical study on the

feasibility of the project; (v) details of consultations and opinions or other documents on the project issued by other entities; and, (vii) the application for an environmental license.

60. Public consultation is not mandatory for Category B development projects under the ELL. However, the proponent must, in the event that the DNCPIA requires it, conduct public consultation, to discuss issues the project with relevant stakeholders. The proponent must also implement the EMP in accordance with the provisions of relevant legislation. In this case public consultation has also been conducted in line with ADB SPS requirements.

61. The GOTL's environmental classifications for environmental permitting requirements and environmental regulatory compliance required for Category B developments such as this Project are listed in Table 5.1.

Table 5.1 - Environmental Regulatory Compliance

Component Description				
Sector		Category A in accordance with DL5/11*	Scale	Environmental Assessment
		Construction of national and regional roads	>10km	EIS and EMP
Sector		Category B in accordance with DL5/11*	Scale	Environmental Assessment
Transportation.	V 1	Rehabilitation of an existing road, excluding community road (including toll roads, bridge crossing, each with two lanes	All	SEIS and EMP
Associated Activities				
Quarries				
Mining Sector	I 1	Exploitation of minerals (sand and gravel)	<30,000 m ³ /year &>5,000 m ³	SEIS and EMP
Mining Sector	I 2	Processing and refinement of minerals / quarrying (non-toxic)	<30,000 m ³ /year &>5,000 m ³	SEIS and EMP
Hot Mix Plant				
	IV 1	p) Other: Plant releasing environmental pollutant, noise, vibration, dust and/or smells, or plant handling flammable and/or hazardous materials (small scale, determined by the environmental authority).	Site <1ha and installation area >3000m ²	SEIS and EMP

*DL5/11 = Decree Law 5/2011 Environmental Licensing, EMP = Environmental Management Plan, EIS = Environmental Impact Statement, SEIS = Simplified Environmental Impact Statement, SPS = ADB Safeguard Policy Statement. N.B. Category A is not triggered.

62. Upon receipt of the PDAF and PD under the ELL the DNCPIA has 15 days to respond to receipt of the application for an environmental license. DNCPIA may suspend the review process if additional information is required.

63. Upon receipt of the SEIS under the ELL the DNCPIA has 30 days to respond to receipt of the application for an environmental license for Category B project. DNCPIA may suspend the review process if additional information is required and has 10 days to review the additional information or reject the application. The DNCPIA will also establish the conditions and restrictions deemed necessary to protect the environment as part of the environmental license.

5.3 Ministerial Diplomas for Licensing of Mineral Extraction

64. Ministry of Petroleum and Mineral Resources (MPMR) National Authority for Petroleum and Minerals (ANPM) requires contractors to hold a license for mineral extraction from land quarries including rivers on a site specific basis. ANPM currently acts under Ministerial Diploma 64/2016. All extraction of construction materials is classed as mining and mineral operations require a Mineral License which is issued by ANPM subject to several requirements. The mineral operation must provide among other documents (i) a Mining Plan

(ii) Business Registration documents (iii) letter of Recommendation from the National Directorate of Land and Property and Cadastral Services (NDLPCS) and (iv) satisfactory compliance with the environmental requirements of DNCPIA.

65. In December 2016 the MINISTRY OF COMMERCE, INDUSTRY AND ENVIRONMENT (MCIE) the MINISTRY OF PETROLEUM AND MINERAL RESOURCES (MPMR) and the MINISTRY OF PUBLIC WORKS, TRANSPORT and COMMUNICATIONS (MPWTC) reached an agreement to establish cooperative arrangements in the process of securing environmental and mineral licenses for the extraction of construction materials in order to accomplish the desire of the Government to complete the major investments being utilized for the rehabilitation of roads. The cooperative arrangements are called the memorandum of understanding (MOU).

66. In the MOU the three ministries agreed to recognize the Environmental License, including the Environmental Management Plan (EMP) and Simplified Environmental Impact Statement (SEIS) used to secure the Environmental License for the Project as evidence of satisfactory compliance with the environmental requirements of DNCPIA. The Environmental License obtained by MPWTC from MCIE for the road construction being evidence of compliance to the requirement of mitigating the environmental impact due to the construction of the road project including the incidental activities (associated facilities of quarrying; borrow pits; installation of asphalt plant, crushing plant, batching plant, fabrication plant and other facilities necessary for the road project).

67. When construction companies have identified a potential source, Location Approval must be sought from ANPM, as the first stage in the Mineral Licensing process. The Location can be approved by ANPM in principal at this stage for quarry extraction activities. Construction companies must then complete the requirements of the Ministerial Diploma 64/2016 as agreed in the MOU including Mining Plan and a Site Specific Environmental Management Plan (SSEMP) for each location and gain approval from ANPM to obtain the Mineral License. Construction companies will not be fully authorized without subsequently obtaining the Mineral License.

68. In practice the Mineral License will be issued subject to documents above being completed and that DNCPIA gives its endorsement of the mineral extraction activities and associated facilities.

5.4 National system for protected areas

69. Decree Law 05/2016 on the national system for protected areas came into force in March 2016 (Decreto Lei No. 5-2016 Sistema Nacional De Areas Protegidas. This identifies 44 terrestrial and 2 marine protected areas and supersedes UN regulation (UNTAET Regulation No. 2000/19) that was passed in 2000. The National Directorate for Forestry under the Ministry for Agriculture, Forestry and Fisheries (MAFF) has identified Mount Gugleur as a protected wild area. All protected areas are in various stages of biological assessment and planning. Most of the areas have not yet been systematically surveyed due to the Government's lack of personnel and financial resources. Formal boundaries have not been established. The issues of land ownership remain unresolved, which means the protected wild areas' are not consistently recognized in land use planning.

5.5 Other Institutional Legislation.

70. Occupational health and safety. Timor-Leste has not enacted laws or implemented regulations for working conditions, health and safety. UNTAET Regulation 2002/05, the Labour Code for Timor-Leste, is broadly relevant but it does not regulate health and safety. This Labour Code creates a National Labour Board with the mandate to provide independent advice on occupational safety and health matters as well as programs on vocational training and skills development, grant exemptions, set minimum wages and other related functions. However, the National Labour Board has not yet been established. The Occupational Health and Safety Law was drafted in 2004, but has not yet been enacted. Therefore during construction, the Project will conform to the Environmental, Health, and Safety General Guidelines published by World Bank unless the local legislation supersedes the international standards and health and safety requirements in the SEIS and EMP.

71. International Conventions. GOTL is a party to several international conventions that are relevant to environmental management. GOTL has signed and ratified three international conventions on preserving the natural environment: the United Nations Convention to Combat Desertification (UNCCD; August 2003), the UN Framework Convention on Climate Change (UNFCCC; Oct. 2006) and the UN Convention on Biodiversity (UNCBD; Oct. 2006). In late 2007, Timor-Leste signed the Kyoto Protocol to the UNFCCC, expressing its commitment to reduce global climate change.

72. None of these conventions have any direct or specific relevance for this SEIS as the Project does not encounter any areas of environmental sensitivity covered by the conventions.

5.6 Resettlement and Land Acquisition

73. National policies and legislation concerning resettlement and land acquisition are enshrined in the Constitution which states that the ownership, use and development of land are key factors for economic production and they shall be regulated by law. Section 54 of the Constitution covers the right to private property and provides that: (i) every individual has the right to private property and can transfer it during his or her lifetime or on death, in accordance with the law; (ii) private property should not be used to the detriment of its social purpose; (iii) requisitioning and expropriation of property for public purposes shall only take place following fair compensation in accordance with the law and (iv) only national citizens have the right to ownership of land.

74. The first land law of Timor-Leste was promulgated in March 2003 and was designed to serve as an umbrella law for the rest of the land and property regimen. The law established the Directorate of Land, Property and Cadastral Survey (DLPCS) as a legal entity and defined its jurisdiction, and articulated general rules concerning land tenure and property rights to be further developed by ensuing legislation. Law No. 1/2003 vests all land that belonged to the Portuguese state, and all state property acquired or built by the Indonesian regime, in the new state of Timor-Leste.

75. A decree issued by the Government in February 2011 provides for granting compensation to relocate unlawful occupants of State property based on humanitarian considerations. The Ministry of Justice (MOJ) through Ministerial Decree, which is in development, will establish the basis for calculating compensation. Another decree promulgated in July 2011 allows private property rights registration by landowners/persons in areas where cadastral surveys have been completed (following registration and verification of claims by the government) and confirmed that the claims to land are undisputed. Among the claims registered under the Ita Nia Rai program, which has been limited to urban areas, some 92 per cent of claims are undisputed. The Civil Code promulgated in 2011, which came into force in March 2012, includes a section that governs day-to-day land decisions such as the sale and lease of land.

76. The following three laws were passed by Parliament but returned by President in the past. These laws are being redrafted for resubmission to Parliament: (i) draft Land Law interprets who owns what land and in the case of conflicting claims, who has the strongest right to the land; (ii) draft Expropriation Law (EL) determines the conditions and establishes the procedures under which the state can take land for "public good" and under which it will provide fair compensation and (iii) draft Real Estate Finance Fund provides compensation as determined under the other laws.

77. The draft EL recognizes the right to private property and guarantee of fair compensation for expropriated land, as fundamental rights of citizens. Under the draft EL, the expropriation of property for public purposes will be only possible where it is not possible to acquire it amicably through private negotiations. The Council of Ministers, with advice of the Ministry of Justice, will be empowered to issue a notice of public purpose for expropriation.

78. However, land acquisition/resettlement activities under this project will follow the procedures outlined in the resettlement framework for the project, until such time as the draft EL is promulgated. The procedures in the RF are consistent with the principles and policy of the draft EL as well as with ADB policy.

5.7 Safeguard Guidelines

79. In addition to complying with country safeguards the Project will also need to comply with ADB SPS 2009 which sets out the policies and principles for protecting the environment and people by wherever possible avoiding impacts and mitigating and/or compensating for impacts that cannot be avoided.

80. The SPS represents the policy in respect of safeguards and avoiding, minimizing or mitigating adverse impacts on people and the environment. The SPS presents the safeguard framework to: (i) reflect the policy objectives and relevant policy principles and safeguard requirements governing preparation and implementation of projects and/or components; (ii) explain the general anticipated impacts of the project and/or components; (iii) specify the requirements that will be followed for Project screening and categorization, assessment, and planning, information disclosure, meaningful consultation, and grievance redress mechanism; (iv) describe implementation procedures, including budgets, institutional arrangements, and capacity development requirements; (v) specify monitoring and reporting requirements; and (vi) specify the responsibilities and authorities of the borrower/client, ADB, and relevant government agencies in relation to the preparation, submission, review, and clearance of safeguard documents, and monitoring and supervision.

81. The Project can be classified as Category B because the potential adverse environmental impacts are site-specific, few if any of them are irreversible, and mitigation measures can be designed readily. The appropriate level of environmental assessment for environment Category B proposals is an SEIS. There are no apparent potential institutional constraints or barriers that could adversely affect project success.

5.8 Contractual obligations

82. The Contractor will follow standard construction practices and comply with contractual requirements which will be monitored and supervised by PMU. The selected Contractor as main contractor will be responsible for the compliance of all Subcontractors with the Contract and Environmental Licence by implementing the EMP. The Contractor will assist the "Engineer" (or Project Implementation and Supervision Consultant - PISC) and shall monitor compliance of the EMP implementation. With the assistance of the Engineer, the MPWTC/PMU will monitor compliance of the EMP implementation by the Contractor.

83. The Contractor will update the EMP in the pre-construction stage with all specific locations for quarries and construction methodologies that are not known before. The updated document for construction is called the Contractors EMP (CEMP). The Contractor will be required to state in the updated Contractors EMP that they have carefully considered the requirements for environmental management contained in the original EMP when preparing the bid and pricing the items of Work. The Contractor will accept that the prescribed mitigation measures and clauses detailed in the EMP are an integral part of the specifications for relevant items of Work. Unless separate items are included in the Bill of Quantities, the Contractor will accept that separate payments will not be made in respect to compliance with the EMP. If the Contractor or Subcontractors fail to implement the EMP recommendations, the Proponent shall take necessary action(s) to ensure that the EMP is properly implemented and/or to rectify the damages caused by such negligence.

84. The Contractor will be required to provide the human and financial resources necessary to progress and achieve statutory compliance and implementation of the Contract and the EMP. The Contractor will conform with contract procedures and specifications and implementation of the EMP during construction and maintenance and PMU will monitor them carefully. The Contractor shall assist the PISC to discharge his duties as required in the EMP implementation including: (i) maintaining up to date records on actions taken by The Contractor regarding the implementation of EMP requirements (ii) timely submission of reports, information and data (iii) Participation in the meetings convened by the PISC, and (iv) any other assistance requested by the PISC.

85. The Contractor will provide monthly reports within 10 days of the following month to the PMU / PISC relative to the implementation of the requirements contained in the EMP and CEMP and the results of the environmental performance monitoring. The PISC will provide a

Monthly Environmental Monitoring Report to the PMU covering PISC monitoring of the implementation of the requirements contained in n the EMP and CEMP.

6. Description of the Environment

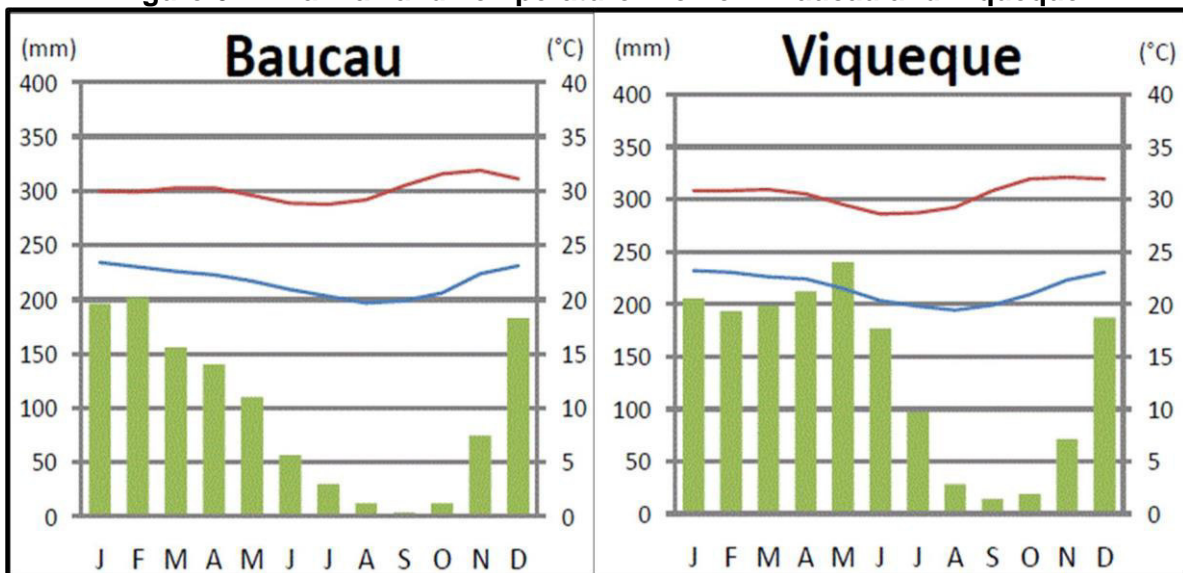
6.1 Physical Environmental Conditions

A. Climate

86. The climate is tropical, hot and humid and temperatures are largely affected by altitude. There is lower rainfall observed along the northern coast of Timor-Leste. The main rainy season is from December to March.

87. The FAO describes the climate of Timor-Leste as characterized by extreme conditions where the northern part receives little or no rain for almost eight months of the year. The island's climate is dominated by the monsoon season. The rainy season comes in with the northwest to southwest winds that prevail from December to March. The rest of the year is usually dry (April/May to November) as the southeast to northeast winds prevail, except at the south coast and the southern slopes where the wet season generally persists until July. Average annual rainfall is around 1 500 mm, extremely heavy rainfall occasionally occurs in Timor-Leste during relatively short time intervals.

Figure 6.1: Rainfall and Temperature Profile in Baucau and Viqueque



Source: Seeds of Life, derived based on modelled and measured historical data (1956-1979)

88. Typical of the tropic region, Timor-Leste experiences little temperature variation within a day or during different seasons. Relatively more significant temperature variations occur with altitude. Relative humidity varies between 70 and 80 percent, which makes the climate humid in general (MAFF, 2004). (http://www.fao.org/nr/water/aquastat/countries_regions/TLS/TLS-CP_eng.pdf).

89. The average monthly temperature and rainfall for Timor-Leste can be found at the link indicated and a summary is presented in Figure 6.1.

90. The calendar of climate and rain related hazards for Timor-Leste are shown in the Figure 6.2. Such hazards shall be considered during construction.

Figure 6.2. WFP Hazard Calendar (cited in ADPC, 2013)



Source: Consultants, ADB Road Network Upgrading Project (RNUP) 2015.

91. Tropical cyclones are among the natural hazards than occur near Timor-Leste. The formation of tropical cyclones generally occurs within a band between 5° and 25° from the equator and these bring exceptionally high rains and winds. In the past, they occasionally develop in the Banda, Arafura, Timor and Sawu seas, especially during April and May and move in a south-westerly direction. It is estimated that on average tropical cyclones occur over the Timor-Leste region about once in every 5 years.

B. Air quality.

92. Outdoor air pollution in Timor-Leste is not currently a problem. The ambient air quality concerns are limited to Dili. However there are some areas near Dili where air pollution is excessive. There is rapid growth in the urban population and on-going economic development in the country. Dili already accounts for 20 percent of the country's total population.

93. Smoke from domestic cooking in villages is another cause of local pollution however these fumes are generally well dispersed although they can accumulate indoors if cooking areas are not well ventilated.

94. Dust is a concern in the study area where the road has little remaining of the original macadam paving. Dust is a also concern in sections where remainders of slide materials cover the road and where pavements are covered or deteriorated. This is particularly a problem during the dry season.

C. Noise

95. The Project corridor is generally rural in character with low traffic volume and noise from motorized vehicles is intermittent and not a concern at the moment. Construction noise has generally not been a problem with the construction of other road sections as the works are intermittent and construction methods will be similar. The UNTAET guideline on ambient noise was introduced in 2002 for Timor-Leste is Leq55dB(A) for residential sensitive receivers and is the same as for World Bank. The World Bank standard applies an ambient criterion of Leq55dB(A) for residential areas, hospitals and schools. Where the background exceeds the ambient standards the criterion is background +3dB(A).

96. Based on observation in the settlements and towns where traffic is intermittent throughout the day the criterion of Leq55dB(A) for residential, school and hospital sensitive receivers is potentially exceeded at some times.

D. Topography

97. The Timor-Leste's landscape is dominated by mountain ranges which cover about 1/3 of the country's land area (UNESCAP, 2003). It is estimated that more than 40% of its land has more than 40% slope (MOI, 2009). Among the prominent mountain ranges is the Ramelau Range with the highest peak elevation of 3,037 m above sea level represented by Foho Tatamailau. Three prominent mountain ranges in the area are Mt Laretame, Mount Mundo Perdido and Mount Builo which are located either side of the Project area.

98. The central and eastern parts of the country contain low plateaus and coastal lowlands fringed by narrow coastal plain in the north and wider coastal plain in the south. The plateau and lowland areas represent about one third of total territory.

99. The topography of the area through which the project road runs is flat or gently rolling in the first 6km, ascending in the next 14km until it reach Venilale before it descends for about 3km. The road then ascends again leading to Ossu where it starts to descend toward Viqueque. The general topography along the road is shown in Table 6.1.

Table 6.1 – Terrain and Road Height Above Sea Level

STA Start	STA Finish	Terrain	Altitude (approx.)
03+060	10+060	F	400m or greater
10+060	23+380	M	400m to 800m
23+380	28+380	R	700m or greater
28+380	31+380	M	800m to 1000m
31+380	62+010	M	1000m to 80m

F= flat, M = mountainous, R= rolling, Vulnerable = Vulnerable to storm surge (<2masl and within 100m of coast)

100. Given the mountainous terrain of the Project corridor, one of the challenges of the rehabilitation work is the identification of spoil disposal sites. No tipping shall be allowed on the steep slopes without obtaining permission from the authorities and PMU.

E. Geology

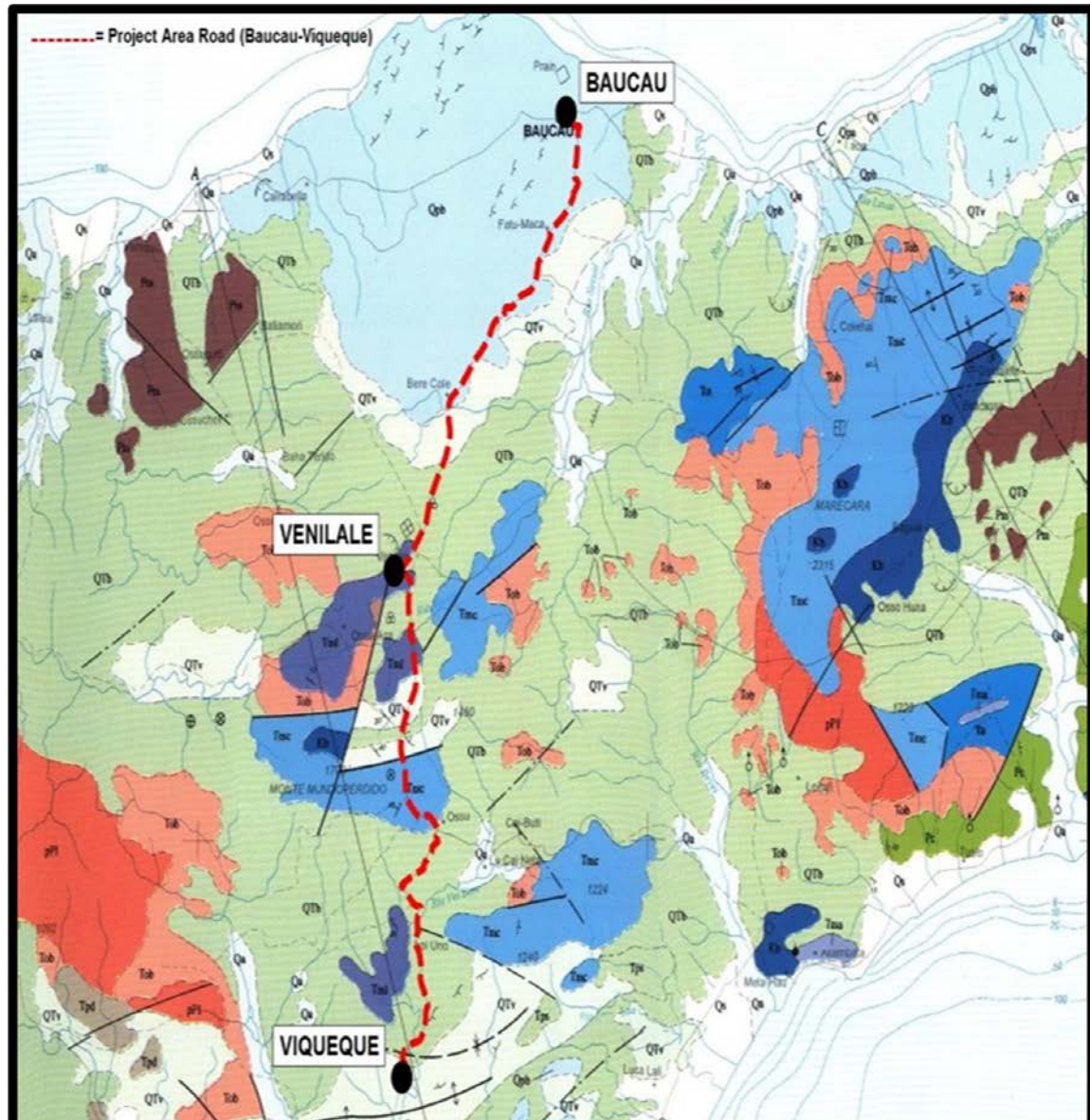
101. Timor Island is located in an active tectonic region where subduction of the Australian plate beneath the Eurasian plate is taking place. Timor Island originated due to the collision between the northwestern edge of the Australian continent and a former oceanic subduction zone and it is an aggregation of continental fragments (part of Australian plate), deep marine sediments, oceanic crust and Quaternary sediments. The formation of Timor Island is related to this subduction. The top layer of the sub-ducting plate is scraped and accreted with the accretion probably taking place from about 10 million years ago (mya) to about 3mya (Late Miocene and Early Pliocene). As the accretionary wedge thickened, it continued to be uplifted throughout to Pliocene and Pleistocene (3mya to about 0.3mya) reaching heights of over 3,000 meters above the sea level in some places.

102. Timor Island is located in a tectonic region known as the Banda Arc. The Banda Arc is a west facing horse-shoe shaped tectonic boundary to the east of Indonesia which marks the collision zone of the Indo-Australian Plate, the Pacific Plate and the Eurasian Plate. Seismic data suggests that Timor Island is an accretionary prism (or wedge) formed from marine sediments and slices of the old Australian cratonic rocks. Within the geologic region of the lesser Sunda, Timor is considered unique being a non-volcanic island in a region that is dominated by active volcanism.

103. The fluctuation of the sea level and subsequent land uplift during the Quaternary Period resulted to a sequence of shoreline features and fringing reefs in Timor Island. These included a well-developed shoreline located about 63 meters above sea level on Atauro Island. This geologic feature has been dated to have formed 120,000 years before present (Chappell and Veeh, 1978 cited in UNESCAP 2003). Based on this data, it is estimated that Atauro Island and Timor Island in general experienced an uplift rate of about 0.4m per 1000 years during the Quaternary Period (UNESCAP, 2003). Within the Project corridor, the geologic evidence of the recent land uplift (in geological context) of Timor island is the high mountainous hills.

104. The project area is underlined by a complex sequence of geological formations consisting of the Baucau formation (Qpb), Viqueque formation (QTV), Bobonaro formation (QTb), Lariguti formation (Tml) and Cablac formation (Tmc). The sequence of the formations is shown in the following figure with Baucau formation found significantly between Baucau and Venilale (first 23km) and Bobonaro formation found significantly between Venilale and Viqueque (Figure 6.3).

Figure 6.3 Geology between Baucau and Viqueque



Q_{pb} (Baucau formation): reefal limestone, calcirudite and calcarenite, Pleistocene and recent in age, up to 100m in thickness, deposited in the shallow marine environment; **Q_{tv} (Viqueque formation):** marly conglomerate, thinly bedded claystone with intercolations of chalky limestone, tuff, silt and sandstone, contains of foraminiferas, Pliocene to Pleistocene in age. It was deposited in lithoral to epineritic environment. Thickness of unit is more than 800m; **Q_{tb} (Bobonaro formation):** chaotic rocks of boulder sized fragments within scaly clay matrix, contains of foraminifera, Upper Miocene to recent in age. It was deposited in deep marine environment, with thickness of units vary from one place to another; **T_{ml} (Lariguti formation):** calcarenite and reefal limestone with bioherm structures, contains foraminifera, Late Miocene in age. Deposited in an epineritik environment, thickness up to 75m; **T_{mc} (Cablac formation):** calcilitite, oolitic, calcarenite and conglomeratic limestone, contains foraminifera, Early Miocene in age. It was deposited in an epineritic environment. Thickness of unit is more than 600m.

Source: Instituto Petróleo e Geolgia Timor Leste(2014), based on maps produced by Indonesian Geological Research and Development Center (1995).

F. Quarry Resources

105. Abundant quarry resources exist within a few kilometers of the Project corridor. Among these are the aggraded river beds near the first 4km. Removal of river materials through quarrying will help in restoring the bank full capacities of these rivers.

106. The rivers within the Project corridor section that maybe used as source of quarry materials are the River Seiçal and River Cuha river. The Seical runs parallel in fairly close proximity to the project draining a large catchment area from the north coast. The rivers are a common source of construction materials in Timor and several existing operations are present in Baucau District. However it is not clear if these materials are located and obtained under the licensing procedures of GoTL. Locations for quarry extraction activities to companies will not be authorized without first securing location approval from the ANPM and subsequently completing and obtaining approval of the Site Specific Environmental Management Plan (SEMP) and Mining Plan for each location.

G. Erosion and Sedimentation

107. The inherent weakness of the rocks, the steep terrain and the occurrence of intense rainfall makes erosion and sedimentation a very active geologic processes in the northern parts of Timor-Leste. Erosion and sedimentation in this part of the country consist of both the slow erosion-deposition and rapid mass wasting processes which includes debris flow, rock falls and landslides. After completion of the Project corridor and adjacent projects, the occurrence of landslide is expected to be minimized.

108. The very high sedimentation rate of the rivers within the northern part of Timor-Leste is quite obvious. This is indicated by the presence of uplifted river alluvial terraces and wide alluvial filled river channels, from the lower reaches to the headwater sections. The high sedimentation rate causes a river bed to aggrade and lead to reduction of the river's bank full capacity. As a consequence, banks are overtopped and flooding and river channel migration takes place.

H. Seismicity

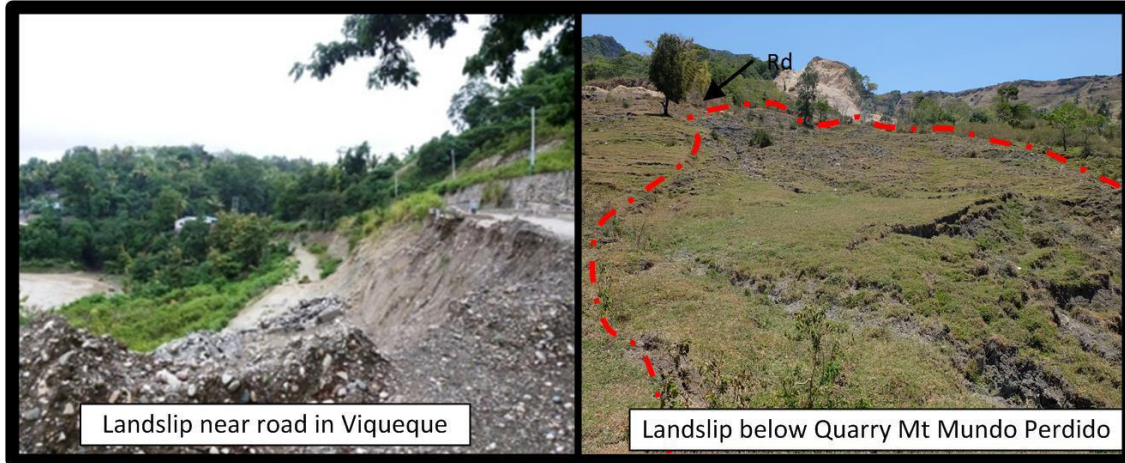
109. Earthquake related hazards (e.g. severe shaking, Tsunami, ground subsidence) are among the threats to Timor-Leste. Timor Island is prone to earthquakes being located in a tectonically active region, along the collision zone of the Australian plate and the Eurasian Plate. Compilation of major shallow earthquakes in Indonesia from 1897 to 1984 by the Southeast Asia Association of Seismology and Earthquake Engineering (SEASEE, 1985) showed a number of earthquakes (magnitude 6 to 6.9) with epicenters located offshore north of Timor Island. A magnitude 8 or greater was recorded in 1963 with epicenter located offshore southwest of Timor Island.

110. Instability and landslides. Timor-Leste is unique among the major islands of the Sunda archipelago in that it is not of volcanic origin. Timor-Leste is a continental fragment, composed largely of limestone and other sedimentary deposits. The island is geologically young, with steep and unstable slopes, deep valleys and prone to flash floods.

111. The young geological age and the high rate of tectonic uplift, combined with the presence of weak, poorly consolidated strata, produces intractable stability, slope failure, and erosion problems in many areas. Soil settling that results in uneven pavement and deep cracks on the bituminous surface is one of the most common environmental risks of the project area. This is mainly attributable to the poor drainage leading to interactions between water flow and soil. General inadequacy of previous road engineering are also contributing factors. Very wet conditions can trigger slope failures and in many areas road construction is feasible only during the dry season. The slopes along the road corridor are generally stable but ultimately this depends upon slope angle, the material constituting the slope, rock discontinuities and hydrological conditions. Instabilities are mainly attributable to the poor drainage leading to interactions between water flow and soil. There is no major potential landslide in Baucau-Venilale road section. However the Venilale-Viqueque section is more prone to land slide due to the soil, slope, hydrological and climate factors. Two examples are shown in Figure 6.5.

112. Landslides within the Venilale-Viqueque corridor have been identified as translational and rotational slides. The slope angles vary from 30-40 degree, the soil is thick and saturated with the seepage water flow. Further movement can be expected due to high intensity of rain and lack of vegetation cover to anchor the soil in some places. Wet conditions can trigger slope failures and road construction may be difficult except during the dry season.

Figure 6.4 Instability and Landslide



I. Water Resources

113. **Hydrology.** In Timor Leste, surface water is scarce as most rivers are intermittent. Lake Iralalero in the eastern part of the country is the only lake of significant size. The rivers, their tributaries, streams, rivulets and some small reservoirs in the foothills serve agriculture and domestic water supply but there are no capture fisheries for human consumption. Water levels in the rivers drop to nothing in the dry season. There is no reliable data on the quantity or quality of available groundwater resources in the country and baseline surface and ground water quality data are only available for very few areas in Timor-Leste.

Figure 6.5 Water Use in the vicinity of the Project road



114. The waterways discharge is a reflection of the catchment areas, lengths and difference in elevation. It is also a reflection of the watershed cover which comprises of bare surface, steep or rolling grassed areas or rocky surface areas. Prolonged exposure of the bare surface to rainwater saturates the surface material and allowed it to be easily carried out by run-off resulting in heavily silted discharge especially during the wet season.

115. **Surface water.** As many rivers flow intermittently and do not flow in the dry season, the presence of thick river gravel deposits in most of the rivers and streams suggests that water is diverted to interstitial and subsurface flow for most of the year (March to November).

116. Road alignment traverses a number of major rivers and crosses many small streams and creeks originated in springs up the hills. A major river, Seical River, runs parallel with the road between Baucau and Venilale about 2km east from the road. Along the alignment, streams have been channelled to serve as domestic and irrigation source of water for residents in the area. Quite a number of important springs are also located within 20m from existing alignment. Most of these springs have been protected with concrete box with added reservoirs for ease of use.

117. **Water quality.** Water quality is generally threatened by high levels of erosion and by the increasing amount of domestic waste that is discharged untreated into the environment. Widespread clearing of forests and other ground cover throughout the country has reduced the ability of the soil to retain water and will contribute to the scarcity of surface water.

118. The rivers near the project road is not subject to industrial pollution. Visually, the rivers are also relatively free of eutrophication, a common environmental issue found in waterbodies near established intensive agriculture. This situation could be attributed to low fertilizer input into the fields, as eutrophication is mostly caused by loading of inorganic materials (N, P, K) originated in excessive use of synthetic or organic fertilizer.

119. Water quality testing was not undertaken during the environmental assessment. Decree Law No. 5/2009, on Licensing Regulations, Sale and Quality of Drinking Water is the appropriate standard for comparison purposes for impacts on water supply for human consumption. No standards for ambient water quality or water quality criteria have yet been declared in Timor-Leste, therefore the World Bank's Environmental, Health, and Safety (EHS) General Guidelines will apply during the implementation of the Project.

120. The Project corridor in the north of Timor-Leste is drained by Seical River. In order not to compete with water supply of communities along this road section, the water supply for this sub-project, particularly for dust suppression, is likely to have to be sourced from local streams.

J. Flooding

121. Flooding is another natural hazard in Timor-Leste especially in the low-lying coastal plains along the coastal regions. Interview of residents living near the Project corridor revealed that some areas are only occasionally prone to flooding. The rehabilitation of the Project corridor should alleviate this with the rehabilitation of the drainage. Flooding risk in the in the rest of the the Project corridor is considered relatively low due to high elevation and hilly terrain.

6.2 Ecological Components

122. The coastline is only near the Baucau end of the Project and the rest of the sub-project area consists of scattered village settlements, with scattered trees, and steep slopes.

A. Vegetation and Flora

123. It was estimated (2011) that forest cover makes up some 453,850 hectares of Timor-Leste's land area with primary forest vegetation covering a minimal 1 to 6% of the country's land area. The main types of forest in Timor-Leste according to the Ministry of Agriculture and Fisheries (MAF) are dry lowland forest, moist forest, montane forest and swamp. The typical trees of the lowland slopes according to MAF include *Sterculia foetida* (a tropical chestnut) *Callophyllum teysmannii* and *Aleurites moluccana* (candlenut) but the three dominant native

species are *Eucalyptus alba*, *Eucalyptus urophylla* and *Pterocarpus indicus* (narra). Narra *Callophyllum teysmannii* and sandalwood (*Santalum album*) are valuable species with *Santalum album* considered as a critically endangered species.

124. In terms of diversity there are more than 251 native tree species. The vegetation and land use map of Timor Leste (ALGIS 2008) shows presence of dry lowland forest in the mountainous region of the Project corridor.

Table 6.2 Recent Estimate of Land Cover in Timor Leste (NDF, 2013)

Land Use	Percent
Forest (Total)	58%
Dense forest ¹	21%
Sparse forest ²	37%
Very sparse forest ³	4%
Grassland	27%
Bare Land	3%
Rice Field	3%
Dry Farm	1.5%
Settlement	1.5%
Water Body	2%
TOTAL	100%

¹ Dense forest: forests with canopy density >60%

² Sparse forest: forests with canopy density between 20 - 60%

³ Very sparse forest: forests with canopy density between 5 - 20%

125. The land cover data of Timor-Leste gives an indication of its present condition. The latest estimation on the extent of land uses in Timor Leste came from the national forest resource study conducted by the Directorate General of Forestry with support from the Japan International Cooperation Agency (JICA) in 2011. The inventory study was conducted based on 2009 and 2010 high resolution satellite images with ground truthing conducted in 2011 in all 13 districts of Timor Leste. Results from the study indicated that forest use (dense and sparse forests) remains the largest land cover category in the country, occupying almost 60% of the total land area. Second largest land category is Grassland occupying almost 27% of the total land area. Rice field and Dry Farm cover a total of 4.3% while settlement covers close to 2% of the total land (Table 6.2).

126. The study suggested that deforestation is widespread in all districts especially when comparing the data with forest cover estimation from 2003 high resolution satellite images. Both dense and sparse forests are affected with reduction in dense forest coverage especially rampant in Lautem, Viqueque, Bobonaro and Manufahi districts. Much of the forests in Timor Leste are thought to have been heavily affected by human intervention. Recently, fragmented forests (a mosaic of land uses) are observed to be widespread in Viqueque, Baucau, Manufahi, Liquica and Covalima, most likely a direct result of patch clearing for shifting cultivation.

127. Another detailed forest inventory study employing systematic two-tiered sampling methodology was conducted for the districts of Bobonaro and Covalima in 2008 and 2009. The study was funded through grant from the Second Rural Development Project (RDP II). Results from this study shed lights on several aspects of the forests of Bobonaro and Covalima including biodiversity status, regeneration and evidence of fire, cuts and grazing in forest areas. The most troubling aspect of the forests of Bobonaro and Covalima was noted to be the sparse coverage of forested areas which was implied to be a result of extensive firewood extraction. Collection of fuel wood and burning will not be allowed for this Project.

128. The Project road stretches through agricultural areas, villages, one large town (Baucau), a rural educational town (Venilale) and runs close to another district town (Viqueque). Paddy fields and horticulture production are the dominant land use on the left and right side of the road. Horticulture production include vegetable, coconut, soy bean, red kidney bean, mung bean, peanut, cassava, taro, sweet potato and yums. Community as well as government-owned teak plantations can be found on the sides of the road as well.

129. Woodlands and farmland occur extensively at all altitudes. The roadside trees on Baucau – Viqueque road at lower levels are dominated by planted specimens of *Ficus*

benjamina (weeping fig tree), *Ficus albipila* (abbey tree), *Paraserianthes falcataria* (albizia), *Tectona grandis* (teak), *Cocos nucifera* (coconut), *Aleurites molluccana* (candlenut), shrubs and grasses. *Casuarina junghuhniana*, *Psidium guajava* (guava), *Citrus sinensis* (orange) and *Bambusa* sp. (bamboo) are also found at higher altitudes. The type of trees and vegetation in the Project area vary as topography and type of soil change except for perennial species that grow in all areas such as shrubs and grasses. Human impact on the vegetation is most pronounced in the villages and areas where grasslands created by cycles of forest clearance for agriculture, timber extraction and their reversion to fallow gradually transformed the forest to short grassland with some occasional trees and shrubs which have been maintained as grassland patches by intensive livestock grazing and burning. Typical roadside vegetation is shown in Figure 6.6.

Figure 6.6 Typical roadside vegetation along the Project Corridor



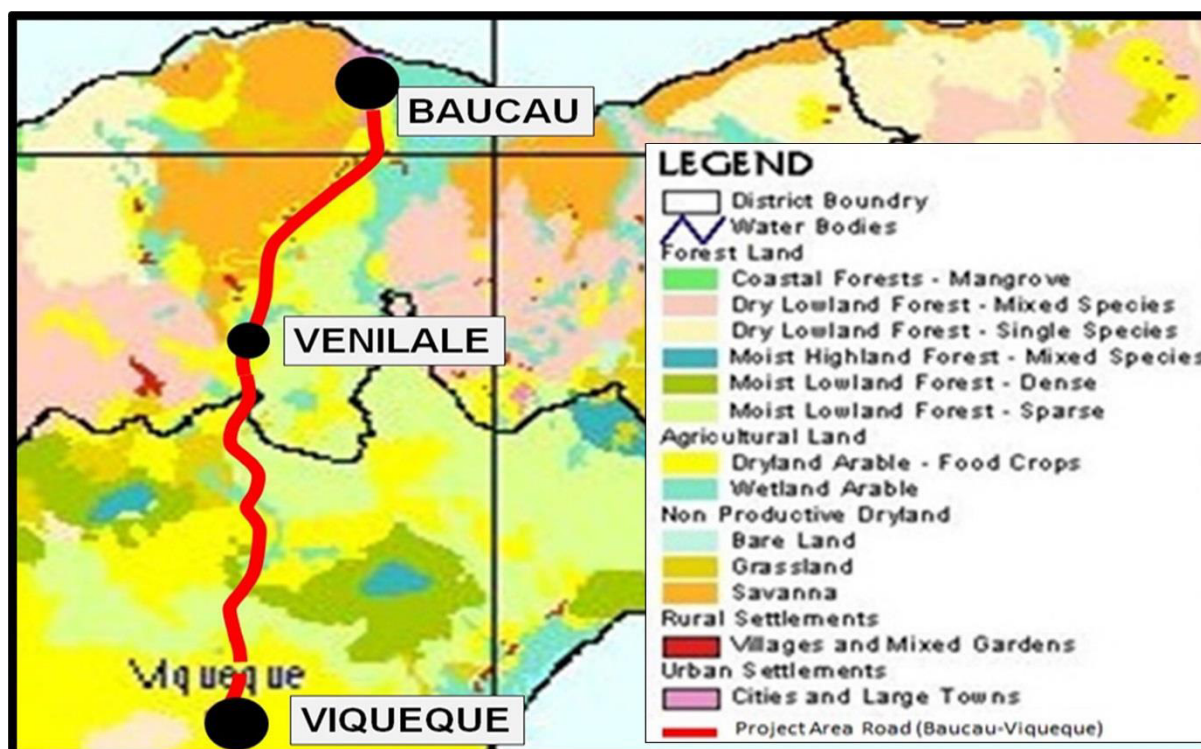
130. The area is also home to the tree *Ficus albipila*, locally known as “hali mutin”, a common species but with limited distribution in the country. The Department of Protected Area and National Park under the General Directorate of Forestry has asked that as much as possible, hali mutin should not be affected from the development. As a last resort after prior notification to the General Directorate of Forestry removal may be considered.

131. For the purpose of identifying potentially affected hali mutin along the alignment, an assessment was conducted with staff from the Department of Protected Area and National Park. The assessment identified at least six trees along the alignment with one to be affected at STA8+840R (Table 6.3 and Appendix 3).

Table 6.3 Location of *Ficus albipila* along Project Alignment

STA	Distance From Centre Line L/R	Location
8+840	1m R	Uailili (RoW)
9+260	20m L	Uailili
9+420	15m R	Uailili
9+660	6m L	Uailili
9+920	6m L	Uailili
40+480	10m R	Loihuno (Airterjun)

Figure 6.7 Major vegetation types near the project



Source: ALGIS, 2010

B. Fauna

132. **Protected species.** Section 3 of Regulation No. 2000/19 on Protected Places provides the species of animals that constitute endangered species within Timor-Leste. The animals are: (i) sea tortoises; (ii) sea turtles; (iii) marine mammals, including bottlenose dolphins, whales and dugongs; (iv) crocodiles; (v) all animal and plant species listed in the Convention on the International Trade in Endangered Species, Wild Fauna and Flora (CITES); and (vi) any other plant or animal species designated as endangered by the Transitional Administrator.

C. Protected Areas

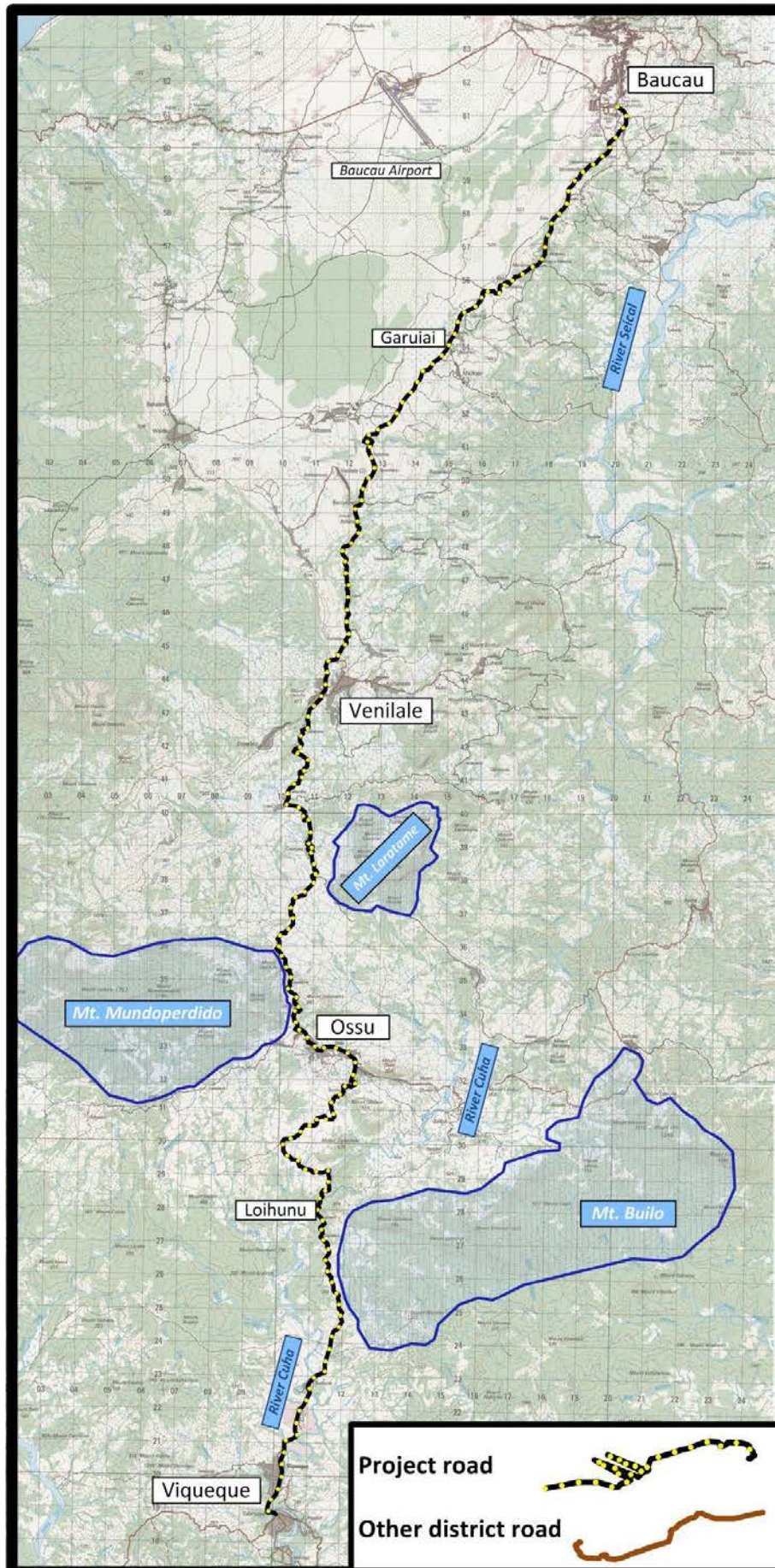
133. Timor-Leste is still in the process of developing its biodiversity protection and conservation legislation and it has acceded to international conventions. The country acceded to the United Nations Convention on Biological Diversity (UNCBD) on 10 October 2006, and became a Party to the Convention on 8 January 2007. It also acceded to the Convention to Combat Desertification (CCD) in 2003 and ratified the Framework Convention on Climate Change (FCCC) in 2006.

134. Decree Law 05/2016 on protected areas came into force in March 2016 (Decreto Lei No. 5-2016 Sistema Nacional De Areas Protegidas. Altogether 44 terrestrial and 2 marine protected areas are identified. Whereas the areas have not yet been systematically surveyed due to the Government's lack of personnel and financial resources; formal boundaries have not been established. The issues of land ownership remain unresolved, which means the protected wild areas' are not consistently recognized in land use planning.

135. With the effort of the government to preserve the remaining diverse land cover, a number of locations have been declared protected with some other sites declared as candidates for protection. Nearest protected areas to the Project road are shown in Figure 6.8.

136. The Project road runs past Mount Mt. Laritame PA, Mt. Mundo Perdido PA and (Mt.) Builo PA. The road runs within 500m from the eastern boundaries of Mt. Mundo Perdido Protected Area in Suco Ossu de Cima, Sub-district Ossu. Consultation with Department of Protected Areas under the Directorate General of Forestry noted that given the nature of the protected areas that are located in the peaks of the steep karst mountains, there will most likely be not much impacts from the development to the protected areas.

Figure 6.8 –Protected Areas near the Project Road



137. Hunting is prohibited, but it is noted that it is still a common means of food collection throughout the island. There is a consideration that these areas are to be managed in a way to allow activities in accordance with laws and tradition by local communities, such as a) the harvesting of non-timber forest products, b) the selective grazing of animals, c) the use of non-endangered animals and plants for religious and cultural ceremonies, d) the traditional hunting of non-endangered species and e) the traditional cutting of trees at elevations below 2000 meters, provided it is done in a sustainable manner and without the use of machinery.

138. The forested areas along the sub-project corridor are already accessible for such activities due to the presence of the road and settlements at the fringe of the forests. The presence of stacked firewood for sale along the road shows that firewood harvesting by the communities as a livelihood is quite active and without any viable alternative, this practice is expected to persist into the future.

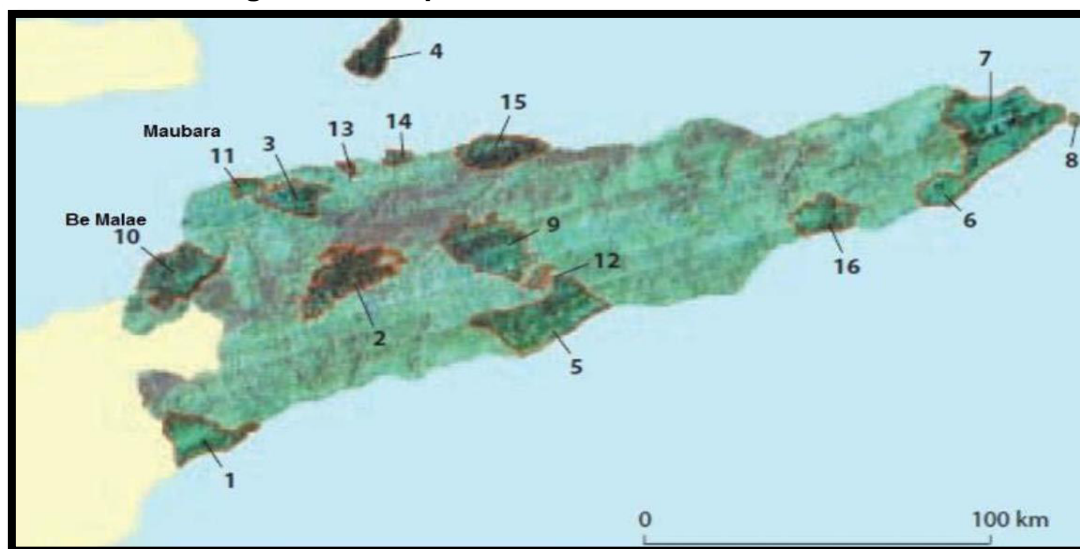
D. Important Bird Areas

139. Important bird areas. Important Bird Areas (IBAs) are sites of international biodiversity significance which support globally threatened birds, restricted-range birds, biome-restricted birds, or globally important population of congregatory species such as water birds. There are 16 IBAs in Timor Leste, none of them are located in Baucau district.

140. There are designated and candidate important bird areas (IBA) in Timor-Leste (Figure 6.9 and Appendix). None of these IBAs are located within the district of Baucau. The closest IBA is more than 5km southeast of Viqueque in the boundary of the district of Viqueque and the district of Lautem (on Figure 6.9 - IBA #16: Iliomar Forest/Irabere Estuary).

141. Timor Island lies in a bio-geographic region known as Wallacea and within the Timor and Wetar Island Endemic Bird Area (EBA). This area has been colonised by birds, animals and plants from both Asia and Australia, but through long isolation have developed exceptionally high levels of endemism. There are 35 restricted-range species as occurring in the Timor and Wetar Island region; 31 of which are found on Timor Island, 23 are endemic to the EBA and 8 are endemic to Timor.

Figure 6.9 – Important Bird Areas of Timor-Leste



Source: Timor Leste National Ecological Gap Assessment, 2009

6.3 Economic components

A. Agriculture

142. Most of the beneficiaries in the project target area are rural subsistence farmers who obtain a small amount of income by selling cash crops such as coffee, vegetables and fruits. In the districts through which the project road passes more than three quarters of the population is engaged in the agriculture or forestry sector. Vendors along the project road are

a common sight. Local resident trade their produce for cash with locals and the travelling public in make shift shelters or small market places built by the government. These markets are neither getting impacted by the planned activity for the project road nor do they pose any impact on the planned repair, restoration and bituminous overlay of the project road. The agricultural development is weak due to absolute dependence on monsoons, an inequitable land tenure system, lack of educated/trained farm workers and training for farmers.

B. Fisheries:

143. The FAO (2009) reported that small-scale coastal fisheries dominate the fisheries sector and are restricted to a relatively narrow area along the coastline. The common fishing gear used by subsistence fishermen are gill nets, fish traps, hook and line, crab pot and spear gun. Fishery is not an important livelihood activity along the project corridor but there are fisheries in the vicinity near the origin at Baucau and some fishponds near the road in Luihino (Viqueque District)..

C. Industrial development:

144. There is no industry in the Project corridor. A cement plant has recently been planned to open near the Project origin at Baucau.

D. Forest resources:

145. The reliance of the communities on forest products for cash income and domestic use of both timber and non-timber products is well recognized in Timor-Leste. Among forestry activities for livelihoods that most community members are commonly engaged in are collection of fuelwood, collection of palm kernels for wine making, production of palm stem panel for house walls, collection of palm leaves as roofing material, harvesting of bamboo for rattan, thinning forest and nursery of timber trees and gathering of honey.

E. Tourism:

146. Baucau has developed the hotels and local beaches with some local old prison as a tourist attraction with culture and history explained on several story boards in three languages inside the walls of the old Baucau prison / fort. The Parish Church of St Francis Xavier is another colonial age attraction at Viqueque.

147. Baucau is a possible location for recreational SCUBA diving but local divers report there are strong rip-tides in this area. Recreational divers have reported the presence of a good reef not too far from the Baucau prison. It seems likely that there are more diving spots along this coastline that are yet to be discovered. (<http://www.divetimor.com/divesites.php#2>).

F. Power and water supply:

148. All sucos along Baucau Viqueque Highway are connected to the grid up as far as Viqueque.

149. Along the project road, electrical power lines run on poles from the power stations at Hera and provide electricity supply to the villages. The National High Voltage Power Transmission Network Project is generally providing sufficient and stable power supply throughout most of the nation since the end of 2012. The low voltage distribution network runs on poles adjacent to the project road and will need to be protected during the works. Many of these poles and lines have been re-provisioned in recent years and are generally relocated away from the road. However, 108 of the poles have been identified to fall within the ROW and will need to be relocated prior to the commencement of the project improvement works. The project road works must be programmed not to create any impacts on these facilities and maintain security of power supply.

6.4 Social Components

A. Population:

150. In 2010 the national census indicated a total country population of 1,066,582 persons and an annual population growth rate of 2.41% since 2004. Baucau District has the highest population density in the country followed by Ermera and Manatuto districts. The population of Baucau is 111,694 (Census 2010) with a total density of 74persons/sq.km. Average household size (private HH) in Baucau is 5.14persons/HH and there has been a significant growth rate of 1.81% since 2004.

151. Baucau is comprised of six sub-districts and a total of 59 sucos. The project road traverses communities from about 30 aldeias that are part of thirteen sucos (Table 6.4). It should be noted that sucos and aldeias in Timor Leste is more of a cultural concept rather than a geographical concept. Therefore, while a widely used suco boundary map exist, on the ground, it is common to find communities that identify themselves as members of a different suco living within the administrative boundary of another suco. The total population of the sucos are presented in the following table.

Table 6.4- Population Data of Eight Sucos with Community along Project Alignment

District	Sub-district	Suco	Population (2010)
Baucau	Baucau vila	Buibau	3,708
		Uailili	3,519
		Gariuai	4,518
	Venilale	Uma Ana Ulo	2,609
		Uma Ana Iko	1,029
		Bahamori	2,174
		Badoho	1,549
		Uato Haco	2,502
		Fatulia	2,505
Viqueque	Ossu	Ossu de Cima	6,220
		Loihuno	1,576
		Uabubo	852
		Ossorua	563

Source: Population and Housing Census, Suco Report Vol. 4, 2010, Government of Timor-Leste

B. Education:

152. **Error! Reference source not found.** below gives an overview of the status of ducational facilities. The types of education establishment in the project districts The 2010 census indicates the percentage of educated population is about 71.94% for Baucau District meaning that the District fares better than the national average in terms of the portion of uneducated population. The portion of educated population (18 years and older) in the district of Viqueque, on the other hand, is only about half of the national profile (Table 4.6)

153. The proportion of females without education in the districts is 58% which is higher than that of males (42%). There is limited number of higher education facility in the district and Baucau town is the centre for higher education with the concentration of public and private high school, one private teacher college and at least two extension services from private universities in Dili.

Table 6.5 – Attendance at Education Establishments

Education level	Baucau District			Viqueque District		
	Male	Female	Total	Male	Female	Total
Pre-primary	4,716	4,449	9,165	128	119	247
Primary	30,137	25,149	55,286	3,149	2,688	5,837
Pre-Secondary	13,793	13,197	26,990	1,890	1,802	3,692
Secondary	28,155	24,629	52,784	3,101	2,210	5,311
Polytechnic/Diploma	1,335	912	2,247	234	101	335
University	12,705	8,566	21,271	572	256	828
Non Formal	277	335	612	207	223	430
Total	91,118	77,237	168,355	9,281	7,399	16,680
% educated ¹			71.94%			23.8%

¹Against total district population Source: Population and Housing Census, Suco Report Vol.4, 2010, Government of Timor-Leste

154. **Schools.** Schools are located at some distance from the road. Noise sensitive façades (classrooms) of the schools are mostly >50m from project alignment and no parts of the schools (fences, flag poles, or other structures) are within the RoW although four schools have been found to be within 10m from project alignment (Table 4.12). Given the vulnerability of schools to environmental impacts from construction activities, scheduling of works near schools should be conducted after discussion with school principals.

Table 6.6 - School sites along Project Alignment

Name	STA	Distance from Center Line of Existing Alignment*
Pre Secondary (SMP Negeri 2) Uailili	7+680	6m (Right)
Primary School (EBC) Maria Auxiliadora Uai.	9+500	50m (Left)
Primary School (EBF no.3) Gariuai	13+400	100m (Left)
Pre Primary Gariuai	13+540	10m (Right)
Pre Secondary Liaoli	23+820	100m (Left)
Secondary (ESSA) Venilale	26+960	7m (Right)
Pre-Secondary School (SMPK) Sta. Teresinha Ossu	43+140	100m (Right)
Primary School (EBC) Sta. Teresinha Ossu (Pe. Manuel Luis College)	43+360	15m (Left)
Pre Secondary Buanurak LoiHuno	52+120	6m (Left)
Primary School (EBC) 83 Buanurak	57+260	10m (Right)

*To the nearest classroom

6.5 Economic Components

A. Poverty Levels

155. Timor-Leste ranked number ranked 134th out of 187 countries listed in the United Nations Development Programme's 2013 Human Development Index. About half of the country's people live below the poverty line, and 70 per cent live in rural areas, where poverty rates are higher than in urban centres. Poverty is most severe in the central and western regions. Most of its workforce is engaged in agriculture, with the majority working on subsistence farms.

B. Land Tenure

156. About 25% of the land tenure out of 200,000 land parcels in the country are formally registered. The vast majority of land parcels have been held by traditional landowners, mostly communities defined as 'origin groups' (equivalent to indigenous people in other countries). Origin groups define themselves as first possessors of certain areas of land and have authority

over land in most parts of Timor-Leste. Within the system of origin group authority there are highly individuated rights to land. Residential, garden and plantation plots are 'owned' by families rather than the group itself and remain under family control. The first land law of Timor-Leste was promulgated in March 2003 via 'Law No. 1/2003', which has been designed to serve as an umbrella law or the rest of the land and property regime.

C. Historically Significant Features

157. No official record or listing existing in Timor-Leste, containing the official listing of historical and archaeological sites. However the government has plans to undertake a survey of archaeological, historical and cultural sites.

158. Nearby to the project impact area there are few colonial structures, including the Venilale is a popular destination due to its cooler temperatures and natural attractions such as hot springs. The striking Escola do Reino de Venilale is located in the town centre.

159. Another historically important site near the project impact area is the Venilale caves, built by the Japanese during World War Two. The caves are locally venerated for being used as a hiding place freedom fighters during the Indonesian occupation.

Figure 6.10 Historical buildings and caves in Venilale district



D. Culture and Tradition

160. The indigenous culture of Timor-Leste is centered on a traditional belief system, the Lulik. Timor-Leste's people consist of a number of indigenous groups with different languages, but they all share the common traditional belief of the Lulik. Lulik comes from the Tetun word that is literally translated as forbidden, holy or sacred. The Lulik's belief encompasses the existence of a divine creator, the spirits of the ancestors, the spiritual root of life as well as sacred rules and regulations that governs the relationships between people and people and nature; social interactions and moral standards with respect to people to people and the peoples relationship with nature. The Lulik demands that nature (land, water, trees/forest, rocks/stone) must be respected. This is the reason for ceremonies like the ritual after the harvest of corn and before planting. The ritual is meant to show gratitude and to value the fertility of the land such as the Sau Batar ceremony performed before the corn harvest; one of the important rituals of the Timorese people.

E. Tara Bandu

161. The Tara Bandu is a Timorese customary system linked to the Lulik which is meant for establishing social contracts based on spiritual beliefs. There are 3 categories of Tara bandu, (1) regulating people to people relationship; (2) regulating people to animal relationship; and (3) regulating people’s relationship to the environment. Local and international organizations are supporting this traditional system in communities as a means for strengthening natural resource management systems and addressing identified conflict drivers in communities.

162. There are several examples of Tara Bandu in existence which regulate the people relationship to the environment and these tara bandu are meant to regulate access and use of natural resources. This is an indigenous system for protection and management that ensures sustainable resource use. In the Tara Bandu process, communities set out the procedures and methods allowed when utilizing/harvesting natural resources and the penalties for those who violate them. No Tara Bandu has been identified near the road.

F. Religious Practices

163. Majority of the Timorese people are Roman Catholic and observe the religious traditions, rituals and ceremonies; Christian holy days and festivities such as Easter, Christmas, all saints day and commemorate significant religious events like the Immaculate Conception. Significant religious events are often marked by decorations along the road with the roads are being cleaned and decorated in the manner shown in the photo below. People take time off to participate in these events; as a consequence road works may be temporarily interrupted.

164. **Religious and cultural sites.** The project area is home to a number of religious and cultural sites including churches, one chapel and one "uma lulik" or customary store house. Interview of suco leaders and information solicited from community during public community meetings noted that no "fatin lulik" or sacred places are located within 25m from project alignment. The "uma lulik" is located close to existing alignment at STA9+340 (10mLeft), however, it is not within the RoW therefore will not be directly impacted from development. The churches and chapels are either catholic or protestant place of worships with main activities conducted on Saturdays and Sundays.

Table 6.7 Places of worship

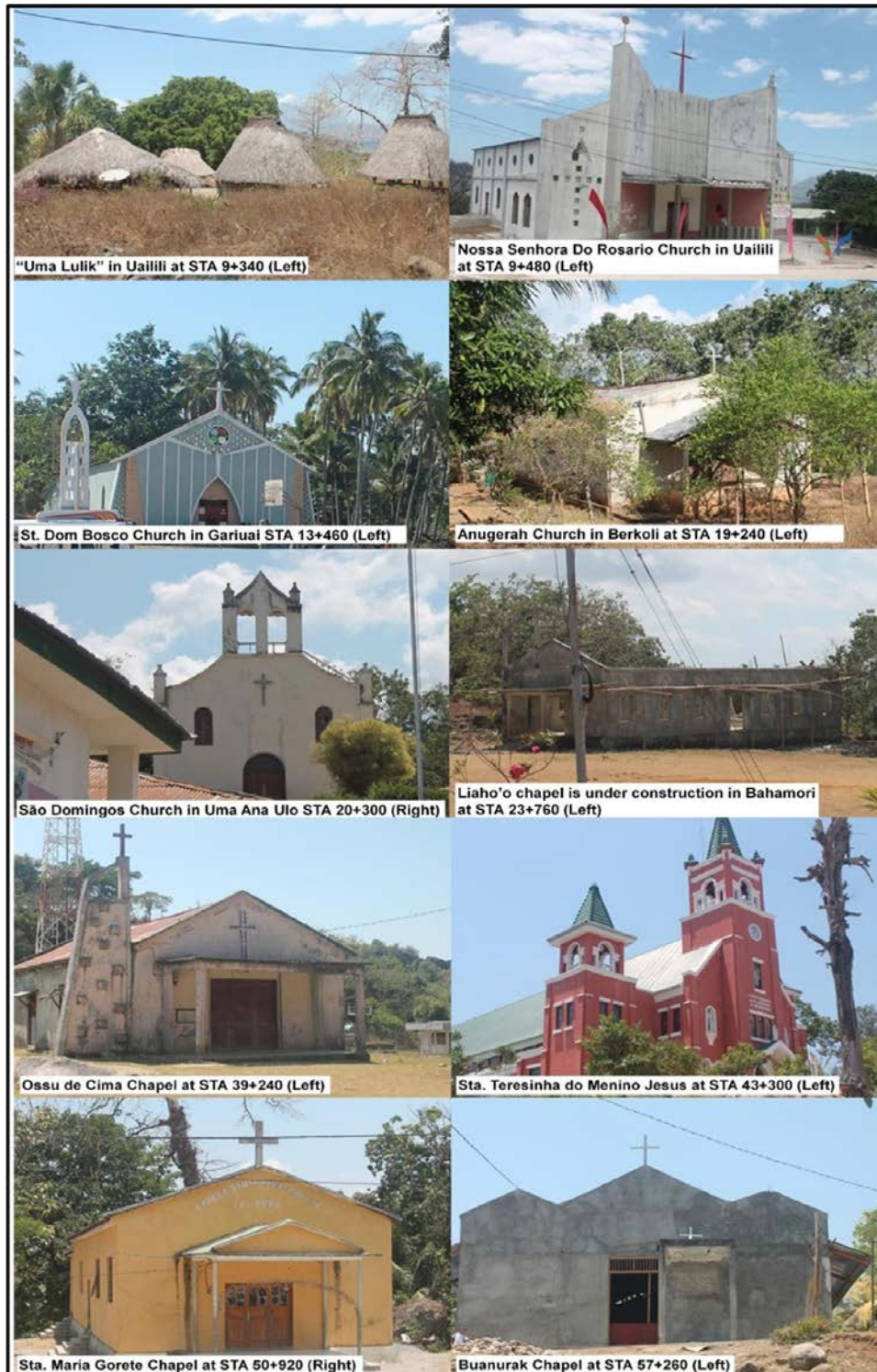
No	STA	Religious Site and Sacred Sites	Distance from Center Line of Existing Alignment*	Remarks
1	09+340	Nossa Senhora do Rosario de Fatima Church	6 m Left	No parts within RoW
2	13+460	St. Dom Bosco	200 m Left	No parts within RoW
3	19+240	Anugerah Church	50 m Left	No parts within RoW
4	20+300	São Domingos Church	15 m Right	No parts within RoW
5	23+760	Liaho'o Chapel	150 m Left	No parts within RoW
6	39+240	Ossu de Cima Chapel	20m Left	No Parts within RoW
7	43+300	St. Theresinha Church	5m Left	No Parts within RoW
8	50+920	Loi-Huno Church	15m Right	No Parts within RoW
9	57+260	Buanurak Chapel	10m Left	No Parts within RoW

165. **Cemeteries.** There are nine cemeteries visible from the project road generally associated with the sucos along the alignment. Four of the cemeteries are located within 10m from project alignment, however none of these are within the Right of Way. Table 4.11 presents cemeteries found along project alignment.

Figure 6.8 Cemeteries near Project Alignment

No	STA	Distance From Centre Line L/R	Remarks
1	14+340	50m L	Gariuai Suco Cemetery
2	20+840	6m R	Uma Ana Ico Suco Cemetery
3	24+040	5m L	Bahamori Suco Cemetery
4	26+760	6m R	Fatulia Suco Cemetery
5	29+500	6m R	Fatulia Suco, located near the bridge
6	35+600	30m R	Ossu de Cima Suco Cemetery
7	44+760	30m R	Stand-alone grave, Ossu de Cima Suco
8	50+260	25m L	Three isolated graves at Loihuno Suco
9	50+760	30m L	Loihuno Suco Cemetery

Figure 4.11 – Places of worship



166. **Housing and shops.** Roadside stalls, kiosks and houses are located at intervals all along the project road. Residential developments are typically continuous within villages. Some of the stalls, kiosks and houses are within the ROW and will have to be removed prior to construction. Road stalls and kiosks will be impacted the most, as current estimates in RP are in the hundreds. About 28 houses have been identified to be within ROW. Land acquisition will be required in many places as existing road width and current condition of slopes will require extensive land usage. Land acquisition requirements are determined in the Resettlement Plan (RP).

167. **Gender.** Men and women share responsibilities. In Timor Leste the gender role of men prevails in public affairs and women focus more on domestic affairs, trade and business, financial affairs, education, health care, purchasing goods, and social and marital affairs. Women are not usually well represented in some sectors of the economy.

168. The project features training and capacity building measures such as gender responsive HIV/AIDS/STI awareness building for Contractor staff in the pre-construction and construction phases. Anti-trafficking will also be reinforced with a contractor awareness programme during the pre-construction phase.

169. The impact of the project on women should not be significant. Threats to women's ability to trade from kiosks or roadside stalls will be compensated through the RP especially during construction. Stalls that are affected by land acquisition will be relocated and compensated. Another threat from the construction to women activities could come in the form of reduced access to collect water from springs and the river. This should also be addressed prior to construction especially in areas where households are dependent on water from unimproved sources.

170. Moreover, contractors will be encouraged to employ women wherever possible. Overall there should be positive impacts after construction period with better transportation between towns as the road conditions improved.

G. Community Facilities

171. There are some visible community facilities such as water supply systems (e.g. water sulppy pipes and concrete tanks located near the road, however the shallow dug wells are far from the road. The water supplies are generally from springs.

Figure 7.3 Features along the Project Road



7. Alternatives

173. Alternatives to the road rehabilitation have been considered including the “do nothing scenario”, alternative alignments, and alternative transport modes.

174. The “do nothing scenario” alternative is not practical as it would not satisfy the Government’s vision for rehabilitation of national roads. The “do nothing scenario” option is not recommended as the road is already in an advanced state of dilapidation and no action would frustrate economic and social development objectives. Although no direct cost would be incurred, the demerits of the “do nothing scenario” option are: (i) traveling time and transportation cost will increase as the road deteriorates (ii) the settlements and ecosystems near the road will be threatened by increased risk of traffic accidents (iii) sea water may be contaminated by fuel and other hazardous materials spills from accident vehicles resulting in damage to vulnerable fauna and flora.

175. Two alternative possible levels of road improvement have been considered. In general terms, Alternative 1 was the repair of deficiencies to bring the roads to acceptable condition, followed by a disciplined maintenance regime. Alternative 2 consisted of reconstruction or repair plus overlay, with widening also to be followed by effective maintenance. Alternative 2 was the best option with further analysis during the detailed design stage indicating that improvement the road from 4.5m to 6m will further enhance the benefits from the Project. The environmental and social assessments indicated that the limited improvement and minor realignment in selected sections will not have significant impacts compared to the original design. Thus, Alternative 2 with upgrading and improvement and minor realignment was adopted in the detailed design.

176. A viable alternative route does not exist without construction of a completely new road which would entail significant delays and much land acquisition. The existing route can be without major land acquisition and is the route considered early in the planning phase; as designated by the government. An alternative route will not contribute to the economic and social development of the communities in the existing road corridor. An alternative route would mean effectively abandoning the existing road linking the various villages which would then not benefit from economic development related to trade growth along the improved road.

177. Alternative transport modes are not viable at this stage and the infrastructure for rail, air or sea travel is not sufficiently developed and an alternative transport mode would not be in line with economic and social development objectives. The proposed Project is preferred based on economic, environmental, financial, and social factors. Considering strategic, environmental, social, economic and financial factors, there are no practical alternatives to the proposed project.

8. Climate Change

178. Climate change adaptation and resilience. Technical assistance provided to GOTL in Preparing the Road Network Development Project Climate Change Assessment (ADB TA 7100-TIM) identified some significant risks to infrastructure arising from climate change. In that study the most significant risks to the infrastructure, arising from the anticipated hydro-meteorological changes, were anticipated to be from sea level changes and increased storm surge wave height and increased intensity of short duration rainfall.

179. The report proposed an integrated solution for each of the roads under that study that are generally applicable to other national roads in Timor-Leste. The proposed integrated adaptation measures include both civil-engineering and bio-engineering solutions for each of the sample roads. Together, these are expected to provide the most efficient and appropriate set of treatment options for the project road to cope with anticipated (projected) climate change as well as bringing the roads up to a maintainable condition.

180. Considering sea level changes and storm surge, in low lying coastal areas the combined effects of higher sea levels and larger storm induced waves will increase the risk of damage to the road infrastructure. For the purpose of the TA7100 study the altitude of low lying areas is defined as less than or equal to 2m. The main impact of this hazard is erosion of the embankment by wave action and the frequency and severity of flooding. Flooding being due to inundation by seawater at high tide and storms and surface runoff after intense precipitation and the backwater effect from the high sea level. The impact of flooding is to saturate road pavement, embankment and sub-grade material leading to structural failure. In order to assume a conservative case and make an assessment of a worst case situation a trigger of 2masl or less was used to identify low lying areas near the coast potentially subject to flooding.

181. Where the intensity of short duration rainfall events is increased, runoff significantly increases in small catchments. The main impact of this hazard is an increased flooding incidence due to insufficient hydraulic capacity of the longitudinal and transverse drainage systems. While the extent of the flooding may be small, the impact of the flooding is significant in the area inundated. The main impacts are increased erosion, safety issues associated with water on the carriageway and weakening of the pavement due to saturation. The increased erosion will arise from the higher volume of runoff.

182. Erosion is already a serious problem in Timor-Leste due to steep topography, shallow soils and poorly consolidated geological sediments. The shallow soils, especially on the steep topography, result in lack of vegetation cover that increases runoff and provides little protection against erosion. The steep topography increases runoff and reduces the time of concentration for individual catchments. The poorly consolidated soils are susceptible to erosion due to the age of the geological formations and ongoing uplift. The increased runoff due to the higher precipitation and the shift in precipitation from the drier months to wetter months will exacerbate the problems. The main impacts of the increased erosion will be higher sediment loads and the risk of damage to the drainage system. The higher sediment loads will increase the deposition of sediment in the drainage system. The intensity of short duration precipitation events and increased runoff is a significant concern in this project.

183. The following is a brief overview of the projected climate change in Timor-Leste adopted from Kirono (2010). The projected change in climatic condition is based on published research using either global and/or regional climate models. These include the IPCC Fourth Assessment Report (IPCC 2007), report by Barnett et al. (2007) and other relevant regional studies. The salient projections on climate change in Timor are as follows:

- The central estimates (multi-model median) of projected changes in annual temperature are +0.8°, +1.5°C and +2.2°C for years 2020, 2050 and 2080 respectively, relative to 1990;
- The central estimates of projected changes in annual rainfall are +2%, +4% and +6% for 2020, 2050 and 2080 respectively, relative to 1990. By 2080, small increases are projected for December-February and March-May, with a small decrease for June-August, and no change for September-November;
- Extreme rainfall events are projected to become fewer but more intense

- Although on average the number of tropical cyclone is projected to decline, increases in intensity are indicated;
- The projections for sea level rise are 3.2 to 10.0 cm by 2020, 8.9 to 27.8 cm by 2050, and 18-79 cm by 2095, relative to 1990;

184. The projected decline in number of extreme rainfall events but increased intensity will have its corresponding effect/water rain induced geologic processes such as erosion and sedimentation. Increased rainfall intensities can translate to fewer events but higher magnitudes of landslides and erosion and siltation. These anticipated conditions have been considered in the rehabilitation plan. Low lying sections of the roads have been elevated and size of box culverts have been increased to accommodate increased flow and sedimentation.

185. As for the impacts of the projected sea level rise, its effect in Timor Island as a whole needs further analysis in view of the active tectonic uplift that the island is undergoing. There is clear geologic evidences of the active uplift being experienced by the island. Among these are the pro-grading coastlines, uplifted Holocene alluvial terraces, elevated Recent coralline limestone (noted in Tutuala) with uplifted erosional notches.

186. Engineering adaptation strategies have been developed for each significant infrastructure risk. These strategies focus on protecting the infrastructure from the impact of the environmental hazards resulting from climate change. The strategies involve a combination of capital and maintenance works to ensure a reliable and safe transport link is provided.

187. Sea level changes and increased storm surge wave height are a potential concern for this Project because the elevation is less than 2masl on some places. Therefore, the PMU and the project implementation and supervision consultant (PISC) supporting the PMU have included strategies to combat sea level changes and increased storm surge wave height.

188. The PMU and PISC have included the following strategies in the detailed designs to combat more intense short duration precipitation in are identified as vulnerable.

- Increase capacity of transverse drainage system: Where the intensity of short duration precipitation events increases, the capacity of transverse drainage system will be increased by providing additional relief culverts.
- Improved longitudinal drainage: The ability of the longitudinal drainage systems to accommodate the higher quantity of runoff due to the higher precipitation rates will be improved by lining drains and providing larger drains.
- Realignment: Where the elevation of the road is so low that the sea will intrude on both sides of the road the preferred strategy is to relocate the road away from the coast. Where horizontal realignment is not an option, realign the vertical alignment to raise all areas of the road above 2masl.
- Erosion protection: Areas in the vicinity of the road, at risk of erosion, will be protected using a combination of physical and bio-engineering techniques.
- Increased maintenance: The quantity of maintenance is increased in response to the faster rate of physical deterioration.

9. Impact Assessment & Mitigation Measures

9.1 Introduction

189. This assessment is based on the detailed drawings produced by the Detailed Engineering Design Consultant in June 2015. Determining the scale of impact depends on (i) spatial scale of the impact (site, local, regional, or national / international); (ii) time horizon of the impact (short, medium, or long term); (iii) magnitude of the change in the environmental component brought about by the project activities (small, moderate, large); (iv) importance to local human populations; (v) compliance with international, national, provincial, or district environmental protection laws, standards, and regulations; and (vi) compliance with guidelines, policies, and regulations of Timor-Leste and ADB.

190. Where potential major negative impacts are identified, mitigation measures are developed to reduce them to acceptable levels. Where this is not possible, major negative impacts can act as a trigger for further detailed environmental impact assessment. There are several types of impacts to be considered. Direct impacts are caused by a project activity, and occur at the same time and place and can be created during both project construction and operation. Indirect impacts, which may include growth-inducing impacts, are caused by a project activity, or the overall project, and while they are later in time or farther removed in distance, they are still reasonably foreseeable.

191. Short-term impacts, like the noise and fumes associated with heavy equipment occur during road construction and are usually without long-lasting effects. Long-term impacts, on the other hand, could affect regional land use and development patterns, lead to permanent loss of unique and sensitive habitats and even population mobility and migration. The project, however, is limited to relatively small-scale road rehabilitation works with additional maintenance (as required) and bridge constructing works. There is little scope for long-term environmental impacts arising from such works and measures in the project area.

192. Impacts created during construction activities are dependent on a number of factors including:

- The temporary use of land and its rehabilitation post-construction;
- 'Best practices' being employed during construction activities;
- Coordination and cooperation with local authorities in terms of impact management;
- Strict enforcement of environmental clauses and conditions included in project bid documents, the contract and technical specifications; and
- Adherence to the EMP contained in the SEIS and construction environmental management plan (CEMP) prepared by the contractor and submitted to, and reviewed by, PMU. This process is explained further in Section 8.

9.2 Pre-Construction Impacts

193. Pre-construction impacts are limited to the following activities: climate change adaptation measures (incorporated into design); vegetation removal during surveying and demarcation of corridor and extent of works; site clearance, digging and excavations; and, restrictions on land use associated with foregoing and/or need for resources and materials. Planning for materials extraction and identification legitimate sources of materials must also take place in the pre-construction phase.

A. Contractors Environmental Management Plan (CEMP)

194. MPWTC/PMU shall ensure that the Contractor will be primed and instructed on the need to prepare a site specific Contractor EMP (CEMP) for construction stage impacts by including the EMP (including Table 10.3 of this SEIS) in the bidding and contract documentation for civil works and by providing disclosure of the SEIS. Prior to commencement of construction works the Contractor will prepare method statements or CEMP (based on the EMP) on how the Contractor will implement the mitigation measures in the EMP. The site

specific information will legitimate material included in the CEMP. The content of the CEMP mitigation measures is included in Appendix 5. The CEMP will demonstrate the manner (location, responsibilities, schedule/timeframe, budget, etc.) in which the Contractor will implement the mitigation measures specified in the EMP. The CEMP will be updated as necessary to respond to any unanticipated impacts that may arise as the project is implemented.

195. The CEMP will be agreed in advance with MPWTC/PMU in the project preconstruction phase. The requirements in the contract will include full implementation of the agreed CEMP based on the EMP in this SEIS. MPWTC shall require the Contractor to engage capable and trained staff and / or site agent to take responsibility as Environmental and Safety Officer (ESO) for the environmental management at the working level. One month before construction commences the Contractor will demonstrate to PMU that the CEMP will be properly resourced and a qualified/experienced safety officer has been identified by the Contractor as per the tender.

196. The PMU will audit the effectiveness of the implementation of the EMP for the design stage mitigation by PISC and contractor's implementation of the CEMP for construction phase and review mitigation measures as the project proceeds. The effective implementation of the CEMP will be audited as part of the loan conditions and the executing agency (MPWTC) will be prepared for this.

197. The following sections or method statements shall be included in the CEMP based on the EMP and the CEMP shall be prepared by the Contractor in the preconstruction stage for approval by PMU and implementation by the Contractor:

- A) Waste Disposal (covering spoil disposal, general waste and hazardous waste);
- B) Quarries, borrow areas and construction materials management;
- C) Blasting and vibration (if required);
- D) Asphalt, hot mix plant, rock crushers and bitumen supply;
- E) Erosion control and runoff;
- F) Bridge repairs and river protection;
- G) Water contamination prevention;
- H) Dust and noise minimization;
- I) Tree cutting and replanting;
- J) Enhancement planting;
- K) Construction camp operations, sanitation and diseases;
- L) Power and utilities protection;
- M) Drainage system, irrigation and water resources;
- N) Safety precautions - workers and public;
- O) Temporary traffic management;
- P) Accidental discovery of archaeological assets, sites or resources; and
- Q) Decommissioning, rehabilitation, revegetation and recontouring of quarries, borrow areas and construction materials processing areas.

B. Avoid impacts to social and cultural resources by realignment

198. An historically important site is located next to the project road at the the Venilale Caves (Figure 6.10). Built by the Japanese during World War Two, the caves are locally venerated for being used as a hiding place freedom fighters during the Indonesian occupation. The seven entrances to the caves are located between two blind corners at about Km22+600 (Right side)

199. Early in the construction phase consider a realignment of the road away from the caves near the Venilale Caves to reduce impacts in the construction phase and improve road safety in the operational phase.

- Early in the preconstruction phase consider to realign the are located between two blind corners at about Km22+600 (Right side) to avoid cutting the cliff face in which the caves are located.
- Provide a wider road section with pull-in or small parking area for tourists who want to view the caves. Provide a footpath for the viewing public.

C. PISC Check on legitimacy of material sources

200. The project has to comply with donor bank requirements and best practice in relation to material sourcing. Materials have to be fit for purpose determined through laboratory tests as applicable.

201. For GOTL all extraction of construction materials is classed as mining and mineral operations require a Mineral License which is issued by ANPM subject to several requirements. When construction companies have identified a potential source, Location Approval must be sought from ANPM, as the first stage in the Mineral Licensing process. The Location can be approved by ANPM in principal at this stage for quarry extraction activities. Construction companies must then complete the requirements of the Ministerial Diploma 64/2016 including the Mining Plan and a Site Specific Environmental Management Plan, as described in the MOU, for each location and gain approval from ANPM to obtain the Mineral License. Construction companies will not be fully authorized without subsequently obtaining the Mineral License.

D. Surveying and demarcation of center line

202. Minor impacts upon terrestrial habitats and flora of the project area are expected as a result of the surveying and demarcation of centre-line. Surveying and demarcation will cause minor degradation of local ecology through the clearance of small areas of this vegetation but in order to minimise loss of trees the specimens that are not within the paved area or hard-shoulder but are in the embankment will not be cut unless for justifiable engineering or safety reasons. The specimen trees at aldea Morae and aldea Dair (Figure 6.10) should be avoided if at all possible.

203. Plant species present within the impact area are either introduced species or ubiquitous native species, which are highly tolerant of disturbances. However there is no vegetation that has any conservation significance nor is it representative of the original vegetative cover. There are some gardens, plantations and individual trees, on or very close to the road that could require removal. The Resettlement Plan (RP) and assessment conducted by the environment team have estimated that households will lose timber and fruit trees and numerous non-productive trees that will be affected in one way or another by improvement of the road. However, experience on other projects being implemented by the proponent shows that not all specimens in the ROW need to be cut. Avoiding trees in the embankment as far as possible will reduce this number further. The compensation procedures have been prescribed in the RP.

204. Measures to be included in the project to ensure minimization of impacts from vegetation removal include:

- Vegetation clearance during surveying and demarcation activities, especially of trees along the river banks and road-side, will be minimized. Major trees (especially in suco areas) to be removed will be clearly marked, only marked trees will be removed;
- In order to minimize loss of trees the trees that are not within the paved area or hard-shoulder but are in the embankment will not be cut unless for justifiable engineering or safety reasons;
- The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project; and
- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible.

E. Site clearance, digging and excavations

205. Any site clearance, digging and excavation activities undertaken during pre-construction can unearth physical cultural resources (PCR) including archaeological and mass grave sites. In the event this occurs, work shall cease immediately and the relevant authorities shall be informed. Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue.

206. The Contractor shall be responsible for complying with the requirements of authorities, and the PMU shall monitor the same. The contractor will include a section on "chance finds" in the Contractors Environmental Management Plan (CEMP). Mitigation measures for potential impacts on PCR include:

- Site agents will be instructed to keep a watching brief for relics in excavations.
- Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area.
- The PMU with the assistance of the PISC will determine if that item is of potential significance and contact MPWTC to pass the information to the relevant department in GOTL (i.e. State Secretary of Art and Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection.

207. Until GOTL has responded to this invitation work will not re-commence in this location until agreement has been reached between GOTL and PMU as to any required mitigation measures, which may include structured excavation.

208. Removal of trees during site clearance has to be based on the schedule of trees to be cut made by PISC. Plans have to be incorporated in the CEMP for the removal of these trees incorporating owner consultation and compensation per Resettlement Plan (RP).

F. Mobilization of the Contractor and Construction Camp

209. The mobilisation of the contractor and initial establishment of site office, works yard and work sites will bring about interaction between local people and construction workers. Prior to contractor mobilization to the site, PMU will work with the contractor to establish the communications protocol between the project and communities as per the project's communications plan. The contractor will identify one member of their staff to be the liaison between the suco chiefs and elders and contractor, as well as between the contractor and PMU.

210. The contractor will adopt good management practices to ensure that fuels and chemicals, raw sewage, wastewater effluent, and construction debris/scarified material is disposed of in controlled conditions to reduce the risk of contamination. Measures to minimise disturbance by construction workers and presence of the works site/area include:

- Suco (village) protocols discussed with workers as part of awareness and mobilization training;
- The contractor is to ensure that workers' actions outside work site are controlled and Suco codes and rules of conduct are observed at all times;
- The contractor will identify one member of their staff to be the liaison between the Suco chiefs and elders and contractor, as well as between the contractor and PMU;
- Worker camp location and facilities will be located at least 500m from settlements and agreed with local communities and facilities approved by PMU and managed to minimize impacts;
- Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (especially children) entering the area;

- Hire and train as many local workers as possible by using labour from each suco as the work proceeds from suco to suco;
- Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas;
- Construction camp(s) will be established in areas with adequate drainage in order to prevent water logging at the camp and formation of breeding sites for mosquitoes in order to facilitate flow of the treated effluents;
- Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided. Separate toilets shall be provided for male and female workers;
- Portable lavatories (or at least pit latrines in remote areas) shall be installed and open defecation shall be prohibited and use of lavatories encouraged by cleaning lavatories daily and by keeping lavatory facilities clean at all times;
- Wastewater effluent from contractors' workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease contaminants will be removed before discharging it into natural streams. Oil and grease residues shall be stored in drums awaiting disposal in line with the agreed waste management section of the EMP;
- Predictable wastewater effluent discharges from construction works shall have the necessary permits from DNCPIA and local authorities before the works commence;
- As much as possible, food shall be provided from farms nearby or imported to the area. Bush meat supplies from protected areas will be banned to discourage poaching. Solid and liquid wastes will be managed in line with the provisions of the waste management section of the EMP;
- Use of guns and hunting equipment by workers will be banned and workers will be dismissed for taking or using green timber or hunting or being in possession of wildlife;
- Entry to the protected, IBAs and/or sensitive areas (beaches, mangrove areas) by workers will be banned;
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers as required by villagers, and signage or marking of the work areas;
- Provision of safe access across the works site (particularly during construction of drains) to people whose suco and access are temporarily affected during construction works;
- At all times workers should respect village and land owner's boundaries and recognize and follow village rules and terms of conduct, including those addressing women and elders;
- Avoid damage to productive trees and gardens, water resources and springs;
- As per provisions set out in Poverty and Social Assessment, implement HIV/AIDS/STIs awareness and prevention for the contractor's workers and adjacent communities;
- Land used for campsites shall be restored to the original condition as far as practicable and the area shall be planted with appropriate trees / shrubs as soon as practicable after it is vacated and cleaned; and
- Work and camp sites will be cleaned up to the satisfaction of and local community after use.

9.3 Construction Impacts on Physical Environment

A. Impacts on Air Quality from Operation of construction plant and vehicles generating emissions

211. As noted above, the air quality of the project area is good due to lack of industry and very low numbers of vehicles. During the construction phase the rehabilitation works will have a minor and temporary impact on local air quality through emission of exhaust from construction vehicles and aggregate crushing plant; as well as through dust generation from vehicles transporting materials and from exposed stock-piles of construction materials.

212. Earthworks and rock crushing activities will be the main sources of dust. The works in any given section of the road will generally be of short duration and in many locations there will be sufficient buffer distance such that no significant impact is expected from the construction works on residential sensitive receivers in terms of noise, vibration, and dust. Also works will not take place at night except in special circumstances justifiable to the PMU. Baseline data will be collected for monitoring of total suspended particulates (TSP).

213. Overall, the improvement of the road will result in reduction of dust emissions as a result of proper compaction and treatment of the road surface. There are a number of good engineering practices that can be employed to ensure that any air quality impacts generated during construction are mitigated. These include:

- Construction equipment being maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring;
- Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the project site;
- Material stockpiles being located in sheltered areas and to be covered with tarpaulins or other such suitable covering to prevent material becoming airborne and runoff of fine particles;
- Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the front, sides and tail of the vehicle) during transportation. This is especially important as there are a number of sucos along the road;
- Sprinkling of water on the road, where work is in progress within 100m of the sucos along the road and any roads being used for haulage of materials, during the dry season shall take place several times a day; and
- Periodic qualitative air quality monitoring.

B. Works in or Adjacent to Rivers and Streams

214. There are perennial and seasonal rivers, large and small along the project alignment.. During the works it will be necessary to carry out excavation of existing road pavement materials, for culverts and drainage works in the vicinity of rivers and streams. If the wet season cannot be avoided, where culverts are required, there could be the need to temporarily constrict water flows and dry out sections of rivers or streams depending on their size and water volumes carried, in order to place new structures. These activities can result in a risk of channel shifts and erosion, particularly of river banks that would lose their vegetation cover, most particularly during floods.

215. Stockpiled materials, if located within the floodplain, may be eroded and dispersed and patterns of water movements during 'normal' and flood flows affected. Movements of machinery and other activities can be expected to impact riverine fauna and flora, however because the rivers in the area are highly disturbed ecosystems, regularly subjected to flooding and channel shifts, impacts on these are likely to be minimal.

216. Potential impacts on the structure of river habitats, including their channels, banks and floodplains will be mitigated by:

- Material stock-piles will not be located within riverbeds or the islands in the centre of rivers. Similarly, they will not be located within the current area of floodplain of river in areas subject to regular flooding (i.e. once per year or more). All land used for stockpiles will be rehabilitated to its original or better condition upon completion of the works;
- Scour protection will be used as temporary measures, as needed, to ensure temporary structures do not damage river configuration;
- Movements of vehicles and machinery in river beds within the riverine habitats will be minimized at all times to reduce disturbance;
- No vehicles or machinery shall be washed in the river;
- In the event that the contractor causes damage to the river bank or other structural parts of a river, the contractor is solely responsible for repairing the damage and/or paying compensation to the riparian owners;
- Embankments and in-stream/river activities will be monitored for signs of erosion during construction;
- Re-vegetation with local fast growing species, or other plants will be carried out incrementally and as quickly as possible after work within any river habitat has been completed after consultation with the land owners and suco chiefs; and
- Spoils, rubbish or any other surplus material will not be disposed-off within any river system including riverbed, banks or floodplain areas. Suitable disposal sites will be designated in consultation with land owners and suco chiefs and approved by PMU.

C. Sourcing of materials

217. Sources of material (gravel, aggregate etc.) and quarry sites for the project will be agreed upon prior to commencement of works. The Contractor will be required to identify sources and prepare a sustainable extraction plan (materials management plan) as part of the CEMP, for all sources of material and spoil that will be used in road works. The aggregate extraction plan will be submitted to PMU, which will approve and monitor implementation of the extraction plan. The contractor must also obtain Mineral License for each and every location. Locations for quarry extraction activities will not be authorized without first securing location approval from the ANPM and subsequently completing and obtaining approval of the Site Specific Environmental Management Plan (SEMP) and Mining Plan for each location and obtaining the Minerals License.

218. To mitigate the impacts from extraction sites, in addition to the preparation of the site specific extraction plan by the contractor, the bid and contract documents will specifically require contractors to: (i) Balance cut and fill requirements to minimize impacts from extraction of aggregates; (ii) Prioritize use of existing quarry sites with suitable materials and update the list of quarries and borrow pits monthly and report to MPWTC/DRBFC and minimize impacts on other local resources; (iii) Procure materials only from quarries and borrow sites acceptable to PMU or licensed and authorized by DNCPIA; (iv) If the contractors shall operate the quarry site, required environmental licenses and permits shall be secured prior to operation of quarry/borrow areas; and (v) borrow/quarry sites shall not be located in productive land or forested areas.

219. To mitigate the impacts from extraction mitigation measures identified in the EMP include:

- Properly removed topsoil, overburden, and low-quality materials and stockpile near the site to be covered and preserved for rehabilitation.
- Stockpile topsoil for later use and fence and re-contour borrow pits after use

- Use quarries with highest ratio between extractive capacity (both in terms of quality) and loss of natural state.
- Use quarry sites lying close to the alignment not on slopes, with a high level of accessibility and with a low hill gradient;
- Reinstate damaged access roads, agricultural land and other properties upon completion of construction works at each section, if damaged due to transport of quarry/borrow materials, other construction materials or any other project-related activities;
- Provide adequate drainage to avoid accumulation of stagnant water during quarry/borrow site operation;
- Avoid use of quarry sites located on river beds. If it is not possible to locate quarries out of river beds, use only quarry sites lying on large rivers as approved by PMU;
- Avoid quarry sites lying on small rivers and streams.
- Choose alluvial terraces or alluvial deposits which lie on the river beds but not covered by water in normal hydrological conditions;
- Cut berms and terraces during and after extraction in quarries in the mountainous or hilly areas to stabilize slopes, wherever slopes are important, and implement a drainage system and vegetation cover for rehabilitation;
- Dewater and fence quarries and borrow pits as appropriate, upon completion of extraction activities to minimize health and safety risks;
- Do not open additional extraction sites and/or borrow pits without the restoration of those areas no longer in use;
- Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favourable for mosquito breeding;
- Refill borrow pits as required by DNCPIA using surplus inert material and excavated unsuitable soils;
- Mark refilled borrow pits and cover with topsoil and plant shrubs and trees to rehabilitate as required by PMU & DNCPIA Prevent accidental access and avoid drowning when pits become water-filled by implementing measures such as fencing, providing flotation devices such as a buoy tied to a rope, etc; and
- Conduct the excavation and restoration of sites and borrow areas, as well as their immediate surroundings in an environmentally sound manner to the satisfaction of the PMU. Sign-off to this effect by PMU will be required before final acceptance and payment under the terms of the contract.

D. Impacts from Spoil Disposal

220. In most locations the use of this immediately available material will reduce the need for additional extraction of rock based materials. The surplus material should be graded and the suitable cut materials directed for reuse as far as possible on the project road and subsequently on other roads and other local infrastructure projects. This will reduce the need to extract other rock and gravel resources from vulnerable hillsides and river beds. The surplus can then be stockpiled at locations agreed with local authorities for use on other local district projects or other nationally planned infrastructure. The surplus shall not be stockpiled at the side of the road or dumped over the crash barriers or side of slopes as is the current practice by some contractors. Areas for disposal shall be worked out and agreed with the suco leaders and local authorities.

221. The surplus rock and soil based materials for disposal must be controlled to avoid potential impacts due to improper disposal. The GEMP submitted by the contractor will be

based on the EMP in this SEIS and will include a section on spoil disposal to ensure waste from project road improvement is managed properly. Contractors will initially review the PMU's options for stockpiling and disposal locations for cut surface materials and reconfirm or propose alternative disposal locations for agreement with the PMU and local authorities. The CEMP will cover all aspects of construction waste disposal. It is preferred that Government land is used for stockpiling and dumping of material. If private land is to be used for the purpose of dumping it shall commence only after written permission from the land owner is checked and recorded by the PMU and agreeable to the local authority.

222. Mitigation measures will seek to control the impacts at source in the first place. The PISC will be responsible to report to PMU the monthly update of the cut and fill estimates in conjunction with asphalt and aggregate materials planning between the different areas and to advice on overall balancing for cut and fill materials to minimize impacts on local resources. (Mitigation measures for cut slopes are covered under erosion control).

223. The spoil disposal section of the CEMP will include; (i) locations and quantities of spoil arising; (ii) agreed locations for disposal / endorsement from DNCPIA and local groups; (iii) methods of transportation to minimize interference with normal traffic; (iv) establishment of acceptable working hours and constraints; (v) agreement on time scale and programme for disposal and chain of custody; (vi) programming issues including the time of year and available resources; (vii) discussion of the PMU inspection/monitoring role; and (viii) links to the grievance redress mechanism and complaints management system for duration of the works.

224. Mitigation measures will seek to prevent slope collapse impacts and control the impacts at source in the first place. The PMU assisted by the PISC will be responsible to monitor the progress of cutting slopes and the implementation of mitigation measures, to minimize impacts. The mitigation measures below also apply equally to discarded asphalt or macadam pavement surfaces. The mitigation measures in the CEMP will include but not necessarily be limited to:

- Spoil will be reused as far as possible for bulk filling;
- The surplus shall not be stockpiled at the side of the road near the works or dumped over the edge of the road or over the crash barriers;
- Spoil will not be disposed of in rivers and streams or other natural drainage path;
- Under no circumstances will spoil be dumped into any other watercourses (the sea, cliffs near the sea, rivers, streams, drainage, irrigation canals, etc.);
- Spoil disposal shall not cause sedimentation and obstruction of flow of the sea, watercourses, damage to agricultural land and densely vegetated areas;
- Spoil will not be disposed of on fragile slopes, flood ways, wetland, farmland, forest, mangrove and associated salt flats, beaches, religious or other culturally sensitive areas or areas where a livelihood is derived;
- Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community;
- Spoils shall only be disposed to areas approved by local authority;
- Spoil disposal will be monitored by PMU and recorded using a written chain of custody (trip-ticket) system to the designated disposal sites;
- Spoil will be disposed-off to disused quarries and abandoned borrow pits where practicable;
- Disposed spoil will be spread in 15 cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent erosion in line with best practice; and

- The spoil disposal site shall be located at least 50m from surface water courses and shall be protected from erosion by avoiding formation of steep slopes and grassing.

E. Impacts from clearing, grubbing, cut and fill activities and construction

225. The drainage system, irrigation and water resources on surrounding lands will be affected by construction activities as follows: a) local water supplies will need to be tapped to meet campsite and construction requirements, so bringing project based water use into competition with local use; b) surface and subsurface water resources near the selected project road sections could be contaminated by fuel and chemical spills, or by solid waste and effluents generated by the kitchens and toilets at construction campsites; c) irrigation channels run close to or cross the works areas and require re-provisioning, (d) natural streams may become silted by borrow material (earth) in the runoff from the construction area, workshops and equipment washing-yards.

226. The contractors will be required to implement the provisions of the CEMP and to provide drainage facilities to avoid ponding/flooding within the project site, construction camps, borrow/quarry areas, other areas used for project-related activities and adjacent areas. Potential impacts on water quality are already identified in the subsequent sections (e.g., under hazardous materials and hazardous waste disposal, water quality, etc.). In areas close to the sensitive receivers, the contractors will provide appropriate drains so that the outfalls of the surface run-off from the carriageway are diverted away from the sensitive receivers. Measures will also be taken by the contractors during the construction phase to ensure that storm drains and road drainage systems are regularly cleared to maintain storm water flow.

F. Impacts on Water Quality from run-off, discharges and generation of liquid wastes

227. Through works adjacent to rivers and streams (culvert replacement, bridge repair, major bridge works), project has the potential to create some temporary and minor adverse impacts on water quality including (i) increased turbidity and downstream siltation created during the removal of gravels; (ii) an increase in silt loads at culverts to be replaced and/or constructed; (iii) construction materials such as small gravels, sand, and fill, being 'washed out' into streams, rivers during rain; (iv) oil and fuel leakage and/or spills from vehicles and plant or workshop/storage locations; and, (v) discharge of waste-water and sewage from construction camp, site office and work yard to local streams and rivers.

228. Impacts can be reduced by confining activities to the dry season when there will be little or no water in the rivers and streams crossing the project road. It will be sufficient to monitor other physical mitigation measures in place at the major river crossings where bridge repairs and replacement will be undertaken as well as on river/stream sections close to construction camps (i.e., rivers that could receive run-off/discharge from construction/workers' camps).

229. In addition to a number of items outlined above and employed to mitigate soil impacts and erosion effects, the following measures will be included in the engineering design and EMP:

- Lubricants will be stored in containers / dedicated enclosures with a sealed floor >50m from water bodies;
- Work in rivers will be scheduled during dry season and work duration shall be as short as possible. Bare slopes shall be stabilized immediately after works are completed;
- Stockpile areas and storage areas for hazardous substances shall be located away from water bodies;
- Washing of machinery and vehicles in surface waters shall be prohibited;

- Sediment controls such as silt fences or other sediment reducing devices (rock dams or silt barriers), to prevent both siltation and silt migration during works being undertaken in the vicinity of streams and rivers;
- Sediment control devices will be cleaned and dewatered, discharges will not be to the rivers or streams. Consultation with land owners and suco chiefs will identify suitable land-based areas for settling ponds or discharge areas;
- Diversion ditches will be dug around material stockpiles;
- Minimizing interference with natural water flow in rivers, water courses or streams within or adjacent to work sites. Abstraction from rivers will only be allowed after permission from PMU. Pollution of water resources will not be permitted;
- Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from work sites will not be dumped in or near streams, rivers or waterways;
- Discharge of sediment laden construction water or material (including dredged spoil) directly into the rivers, sea, inter-tidal area or surface waters will not be permitted. All such construction water will be discharged to settling ponds or settling tanks with sufficient capacity to provide holding times that will allow settlement, prior to final discharge;
- Discharge zones from culverts and drainage structures will be carefully identified, and structures will be lined with rip-rap. Down-drains and chutes will be lined with rip-rap, masonry or concrete. Spillage ways will be lined with rip-rap to prevent under-cutting;
- Spoil and material stock piles will not be located near the coast, on the coastal side of the project road, or within 50 m of waterways, streams or rivers, or on the edge of slopes or hills above rivers or stream and will be surrounded by perimeter diversion drains;
- Hydro-carbons, fuel, and other chemicals as required for the works, will be stored in secure containers or tanks located away from the coast, surface waters, or streams;
- Hydro-carbons, fuel, and oil spills will be contained and immediately cleaned up as per the requirements of the emergency response plan to be prepared as part of the CEMP by the contractor (and approved by PMU at the pre-construction stage);
- Surplus used oil and waste hydrocarbons will be disposed of at the Tibar oil collection site and under no circumstances should oil be discharged to soil;
- Contractor's site office and works yard are to be equipped with portable sanitary latrines or septic tank that do not discharge directly to or pollute surface waters and waterways; and
- All water, waste-water and other liquids used or generated by project works and activities will be collected and disposed of in an approved manner and in an approved location. Such disposal will not be permitted to cause either pollution or nuisance.

230. The condition of rivers near the bridges will be reported by PMU at the end of the detailed design period, either in the detailed design report or in a dedicated baseline monitoring report before the bidding documents are completed.

231. The monthly monitoring report will however specify the time of the month when the monitoring of physical mitigation measures was undertaken. Time and date of monitoring, potential sources of contaminants/pollutants during the monitoring period shall also be included in the report. Actual location of the monitoring stations shall be described in the report and plotted on a map together with GPS readings.

G. General activities – solid and liquid waste management

232. Uncontrolled waste disposal operations can cause significant impacts. Mitigation measures will seek to reduce, recycle and reuse waste as far as practicable. The PMU will be responsible to monitor the contractor's progress of implementing the provision of the waste management section of the EMP and all mitigation measures. The waste management section of the CEMP will also include consideration of all matters related to solid and liquid waste disposal including the following: (i) expected types of waste and quantities of waste arising; (ii) waste reduction, reuse and recycling methods to be employed; (iii) agreed reuse and recycling options and locations for disposal / endorsement from DNCPIA and local groups; (iv) methods for treatment and disposal of all solid and liquid wastes; (v) methods of transportation to minimize interference with normal traffic; and (vi) establishment of regular disposal schedule.

233. The mitigation measures in the EMP will include but not necessarily be limited to the measures listed below. The contractors shall ensure implementation of these measures.

- Areas for disposal to be agreed with local authorities and suco leaders and checked and recorded and monitored by the PMU (but all waste oil will be taken to Tibar disposal site);
- No burning of waste associated with the project or the supporting activities. Burning of waste will not be allowed anywhere on the Project;
- Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses may be given to local farmers for fodder and fuel. Organics (biodegradables) shall be collected and disposed-off on-site by composting (burning waste not be allowed anywhere within the Project site footprint or in the camps);
- Recyclables shall be recovered and sold to recyclers;
- Residual general wastes shall be disposed of in disposal sites approved by local authorities and PMU;
- Construction/workers' camps shall be provided with garbage bins;
- Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest, mangrove, salt marsh, beaches, places of worship or other culturally sensitive areas or areas where a livelihood is derived such as canals, agricultural fields and public areas shall be strictly prohibited;
- There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in local authority designated waste disposal sites; and
- Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked.

H. Use of Hazardous Materials and Waste Disposal

234. Use of hazardous substances such as oils and lubricants can cause significant impacts if uncontrolled or if waste is not disposed correctly. Oils and lubricants discharged to mangroves can kill the roots and destroy the mangrove. Mitigation measures will seek to control access to and the use of hazardous substances such as oils and lubricants and control waste disposal. The PMU will be responsible to monitor the contractor's progress of implementing the hazardous materials and waste section of the EMP to avoid or minimize impacts from use of hazardous substances such as oils and lubricants.

235. The hazardous materials and waste management section of the EMP will include consideration of all matters related to hazardous waste disposal including the following: (i) expected types and volumes of hazardous materials and waste; (ii) methods for treatment and disposal of all hazardous wastes; (iii) approvals and environmental licenses required; (iv) methods of transportation to minimize interference with normal traffic; and (v) establishment of regular disposal schedule as agreed or as condition of granting of environmental license.

236. The mitigation measures identified in the EMP include:

- Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by PMU and have necessary approval/permit from DNCPIA and local authorities.
- Hydrocarbon, toxic material and explosives (if required) will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination.
- Equipment/vehicle maintenance and re-fueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency;
- Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant;
- Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations;
- Ensure all storage containers are in good condition with proper labelling in English and Tetum;
- Regularly check containers for leakage and undertake necessary repair or replacement;
- Store hazardous materials above flood level;
- Discharge of oil contaminated water shall be prohibited and separated oil shall be disposed of at Tibar disposal site;
- Used oil and other residual toxic and hazardous materials shall not be poured on the ground;
- Used oil and other residual toxic and hazardous materials shall be disposed of in an authorized facility off-site;
- Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination from mobile equipment of river channel beds;
- Washing of project vehicles in rivers and streams is strictly prohibited;
- Ensure availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored;
- Spillage, if any, will be immediately cleared with utmost caution using absorptive clean up materials to leave no traces;
- Spillage waste will be disposed at disposal sites approved by DNCPIA which is Tibar disposal site;
- All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory requirements;
- The contractors shall identify named personnel in their EMP in-charge of storage sites for hazardous materials and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization.

I. Construction activities causing accidental damage to existing services, Utilities and Infrastructure

237. The PMU and Contractor will consult with all relevant authorities to ensure that they minimise any disruptions to existing infrastructure and services. This includes suco water supplies, telecommunications infrastructure and electricity supply wherever applicable.

238. Plans will be obtained from utility/service providers showing all underground facilities and/or services in order to avoid damage or disruption during works. Where plans and drawings are not available, the contractor will review by field observation and report locations to PMU in the pre-construction stage. Mitigation measures to be included in the CEMP in the pre-construction stage will require the contractor to:

- Reconfirm power, water supply, telecommunications and irrigation systems likely to be interrupted by the works and any additional trees to be cut near utilities;
- Contact all relevant local authorities for utilities and local village groups to plan reprovisioning of power, water supply, telecommunications and irrigation systems;
- Relocate and reconnect utilities well ahead of commencement of construction works and coordinate with the relevant utility company at the district and sub-district levels for relocation and reconnection well before works commence and include for compensatory planting for trees;
- Inform affected communities well in advance;
- Arrange reconnection of utilities and irrigation channels in the shortest practicable time before construction commences; and
- If utilities are accidentally damaged during construction it shall be reported to the PMU / DRBFC and utility authority and repairs arranged immediately at the contractor's expense.

9.4 Construction Impacts on the Biological Environment

A. Impacts on precious ecology, marine & terrestrial habitats, flora & fauna

239. Impacts on habitat and flora. Minor impacts upon terrestrial habitats and flora of the project area are expected as a result of the road reconstruction and rehabilitation. Habitat fragmentation occurs when a road cuts through an ecosystem; the core project road has existed for some time and though its original construction would have caused habitat fragmentation, ecosystems have re-established albeit as altered and/or smaller units around the road.

240. There will be limited and minor, if any, impacts on habitat, flora or fauna. Rehabilitation work will directly cause minor degradation of local ecology through the clearance of small areas of vegetation at work sites and ancillary sites such as materials extraction sites, and material stockpiling areas. Construction activities will impact only a narrow band of vegetation within the existing road corridor.

241. Plant species present within the impact area are either introduced species or ubiquitous native species, which are highly tolerant of disturbances. There is no vegetation adjacent to the Project road that has any conservation significance nor is it representative of the original vegetative cover. There are some gardens, plantations and individual trees, including banana, mango and teak close to the road that will require removal. They are non-endemic, common and have no special characteristics to merit protection.

242. Therefore, in light of the nature of the project and the types of works envisaged, there will be no significant loss of valuable flora or habitat. Rehabilitation activities will take place entirely within the existing ROW or within areas already subjected to clearing in the past.

243. Impacts on fauna. In terms of impacts on fauna, there is the potential for construction workers to poach edible animals and birds of the locality. The contractor will be responsible

for providing enough food and adequate information to workers regarding the protection of fauna and imposing sanctions on workers trapping, killing or wounding birds or other wildlife.

244. Field observations, research, and consultations indicate that the streams and rivers have limited aquatic macro-fauna except for the saltwater crocodile (*Crocodylus porosus*). Works and material extraction will create minor impacts although prudent practices by implementation of identified measures in the EMP are required.

245. The PMU will supervise and monitor to check that the contractors carry forward the mitigation measures and environmental enhancements identified in the CEMP as well as routine matters such as avoiding unnecessary removing of trees and compensatory and enhancement planting.

246. Invasive species shall not be introduced. During replanting/revegetation works, new alien plant species (i.e., species not currently established in the region of the project) shall not be used unless carried out with the existing regulatory framework for such introduction. All replanting and compensatory tree planting will be planned in full agreement with the local forest authority.

247. Measures to be included in the project to ensure protection of flora and fauna within the project area include:

- Contractor's site office, work yard, rock crushers, material storage, borrow pits, and quarries will all be located as approved by PMU in consultation with local authorities and will not be permitted in any ecologically important sites or areas valuable for conservation;
- Vegetation clearance during construction activities, especially of trees along the road-side, will be avoided or minimized;
- Under no circumstances is the contractor or any of his sub-contractors or employees permitted to enter nearby forests or the mangrove communities to fell or remove mangroves wood;
- Vegetative cover cleared from the roadside during rehabilitation activities will be stockpiled and kept for bioengineering and mulching in the re-vegetation works. Contractors will be responsible for re-vegetation in cleared areas;
- The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not marked as requiring to be cleared by the project, by construction workers for the term of the project;
- The contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. Contract documents and technical specifications will include clauses expressly prohibiting the poaching of fauna by construction workers and making the contractor responsible for imposing sanctions on any workers who are caught trapping, killing, poaching, being in possession of or having poached fauna;
- The PMU will supervise and monitor a ban on use of forest and mangrove timber and workers shall be prohibited from cutting trees and mangrove for firewood or collecting wood from mangrove areas; and
- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees unless justified on engineering grounds and marked for cutting as approved by PMU.

B. Accidental encroachment into historical/cultural sites

248. Consultations and research indicated that there will be six cultural sites that will be directly affected by the work. One of sites, however has been spared from development through re-alignment of the RoW. The five sites will require implementation of proper customary rituals prior to commencement of work in the area. No main parts of churches will

be affected from rehabilitation work, however, given the close proximity of the religious sites to the alignment, careful consideration should be given as not to disturb them during construction and to preserve access for devotees. Depending on the specific locations of gravel and material extraction site, consultation with suco chiefs as well as resource owners is also required to ensure that there are no PCR or sites in the locations proposed for materials extraction.

249. Any accidental discovery of PCR will be handled as per the provisions set out above. In the event this occurs, work shall cease immediately and the relevant authorities shall be informed. Activities shall not re-commence until the authorities have signed-off that the site/resources have been dealt with appropriately and that work may continue.

250. The Contractor shall be responsible for complying with the requirements of authorities, and the PMU shall monitor the same. The contractor will include a section on "chance finds" in the CEMP. Mitigation measures for potential impacts on PCR include:

- No spoil materials or other waste will be stockpiled near or disposed near the cultural sites.
- Works will not obstruct access to cultural sites.
- Site agents will be instructed to keep a watching brief for relics in excavations.
- Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area.
- The PMU with the assistance of the PMU will determine if that item is of potential significance and contact MPWTC to pass the information to the relevant department in GOTL (i.e. Secretary of State for Art and Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection.

251. Until GOTL has responded to this invitation work will not re-commence in this location until agreement has been reached between GOTL, PMU and MPWTC as to any required mitigation measures, which may include structured excavation.

9.5 Construction Impacts on Social Environment

A. Operation of construction plant and equipment creating noise

252. Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation, location and function of equipment. During construction, there will be temporary adverse impacts due to the noise of the construction equipment, especially heavy machinery, when construction activities are carried on in the vicinity of the sucos. The most sensitive receptors along the project road include the suco residential areas, churches, health clinics and schools. Cooperation between the contractor and the residents is essential and it is the responsibility of the contractor to arrange meetings between these parties and arrange such matters as work schedules (hours of equipment operation etc.), locations of work camps and material storage areas, and the locations of rock crushers and asphalt plant >500m from settlements in the sucos.

253. Clearing of vegetation, bulldozing, compaction equipment, excavation of existing pavement materials, and grading will produce noise. Aggregate processing is one of the noisiest activities required in construction processes, however, this will be undertaken at a designated site located at least 500m away from the nearest sensitive receivers.

254. Noise impacts may be short lived, although can be very intrusive if not controlled properly. Noise measurement shall be undertaken in response to noise complaints using hand held noise meter at the same sites sampled for TSP and shall follow the methodology specified by the manufacturer. Noise shall be measured in dB(A) over 24 hours covering the different periods (i.e., 6h to 18h, 18h to 22h and 2h to 6h). Measurement will also be taken to establish if the World Bank criterion of Leq55dB(A)1-hour is exceeded at the measurement points. If it is exceeded by the existing noise a criterion of background +3dB(A) will be applied in the impact monitoring. Works are not expected to be carried out at night but if this is unavoidable

for unexpected reasons separate measurements will also be taken before construction commences to establish if the World Bank criterion of $Leq45dB(A)$ 1-hour is exceeded and the monitoring assessment criteria will be established accordingly.

191 **Measures to be included in the project to mitigate the effects of noise include:**

- Baseline data on noise levels shall be collected before commencement of civil works;
- The EMP and contract documents will require that all vehicle exhaust systems and noise generating equipment be acoustically insulated and maintained in good working order and that regular equipment maintenance will be undertaken to minimize noise emissions;
- The contractor will prepare a schedule of operations that will be approved by suco chiefs and PMU. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction activity and identify the types of equipment to be used;
- Workers will be provided with ear defenders as may be required; and
- Any complaints regarding noise will be dealt with by the contractor in the first instance through the communications plan and if unresolved they shall be referred through the grievance redress mechanism.

C. Vehicles & equipment creating impacts on access & traffic safety

255. The project will cause temporary negative impacts through presence of vehicles and equipment. Inconvenience, minor disruptions to traffic on the road as well as on local access to and from the villages along the project road during the construction period. Mitigation of impacts on access and traffic will include:

- The contractor will prepare and submit to PMU, a traffic management plan detailing diversions and management measures;
- Signs and other appropriate safety features will be used to indicate construction works are being undertaken;
- Contract clause specifying that care must be taken during the construction period to ensure that disruptions to access and traffic are minimized and that access to villages along the project road is maintained at all times; Provincial Works and village officials will be consulted in the event that access to a village has to be disrupted for any time and temporary access arrangements made;
- Construction vehicles will use local access roads, or negotiate access with land owners, rather than drive across vegetation or agricultural land, to obtain access to material extraction sites. Where local roads are used, they will be reinstated to their original condition after the completion of work;
- The road will be kept free of debris, spoil, and any other material at all times;
- Disposal sites and haul routes will be identified and coordinated with local officials;
- Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; and
- Provision of safe access across the work site to people whose villages and access are temporarily affected during road re-sheeting activities.

D. General activities, handling of equipment and plant, construction vehicles impact workers' health and safety

256. The project's construction phase can cause a range of health and safety impacts. The SPS requires that health and safety impacts on workers and the community are identified and mitigation measures proposed. Air pollution and noise, which is also relevant to health and safety aspect, have already been discussed. Traffic safety issues have been discussed above. The risk of spread of communicable disease is dealt with in the next section.

257. Worker occupational health and safety is generally governed by the new Labour Code of Timor-Leste and the UNTAET National Labour Code (1 May 2002). As of 2009 the then current National Labour Code has been in a reform process. The International Labour Organisation (ILO) has supported the drafting the new Labour Code to include the fundamental principles of rights at work. It is expected that the Labour Code will have been approved by the Council of Ministers and Parliament before implementation of the project. The contractor's EMP will address worker health and safety and will establish routine safety measures as required by World Bank Group's EHS Guidelines, Labor Code of Timor-Leste and by good engineering practice.

258. Observing general health and safety requirements, including provision of safety and protective gear and equipment to workers, will reduce the risk of accidents at the work sites. The construction camp will be equipped with a health post which will include first-aid and basic medical supplies. To reduce the risk of incidents at the camp, access to construction camps by other than those authorized will be prohibited.

259. Mitigation measures for reducing and avoiding impacts on worker health and safety include:

- At least one month before construction commences the contractors will demonstrate to the PMU they are properly resourced and a qualified/experienced environment and safety officer (ESO) will be identified by the contractors in the bid;
- Establishment of safety measures as required by law and by good engineering practice and provision of first aid facilities at work sites, in vehicles and establishment of an first aid/health post at the camp;
- The contractor will conduct training (assisted by PMU) for all workers on safety and environmental hygiene at no cost to the employees. The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities;
- Instruction and induction of all workers shall be carried out for all operatives before they start work in health and safety matters, including road safety;
- The contractor will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene;
- Workers shall be provided with appropriate personnel protection equipment (PPE) such as safety boots, helmets, reflector vest, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers;
- Fencing will be installed on all areas of excavation greater than 1m deep and sides of temporary works;
- Reversing signals (visual and audible) shall be installed on all construction vehicles and plant.
- Provision of potable water supply shall be maintained at all times in all work locations;
- Fencing on all excavation, borrow pits and sides of temporary bridges;

- Scheduling of regular (e.g. weekly tool box talks) to orientate the workers on health and safety issues related to their activities as well as on proper use of PPE;
- Where worker exposure to traffic cannot be completely eliminated, protective barriers and warning signs shall be provided to shield workers from passing vehicles. Another acceptable measure is to install channeling devices (e.g., traffic cones and barrels) to delineate the work zone and trained flag men at each end of the current working zone ; and
- Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained and cleaned regularly to encourage use and allow effective operation and emptied regularly so as never to overflow.

E. Presence of construction workers impacts on community health and safety

260. The works could create various impacts on the health and safety of communities. The presence of construction workers and work camps can induce or increase risk of spread of communicable diseases. Transmission of sexually transmitted infections (STIs) and Human Immuno-Deficiency Virus (HIV) is a potential impact of the construction phase posed by construction workers engaging in either commercial sex or sexual relationships with local people.

261. Potential sanitation and impacts from disease will need to be controlled by maintaining hygienic conditions in the worker camps and implementing the social and health awareness programs for the Project.

262. Public safety, particularly of pedestrians and children can be threatened by the excavation of the trenches for side drain construction. Within 500m of settlements and towns fencing will be installed prior to excavation work commencing on all sides of temporary excavations. The plans will include provisions for site security and guards, trench barriers and covers to other holes and any other safety measures as necessary. The contractor will provide warning signs at the periphery of the site warning the public not to enter. The contractor will restrict the speed of project vehicles and also control traffic by contra-flow and provide flag men and warning signs at either end of the works where the traveling lanes must be temporarily reduced.

263. The contractors will provide information boards near the work sites to inform and instruct the public on how to conduct themselves and to be aware of their surroundings if they must approach the works. Information boards will be refreshed as necessary and also show the name and telephone contacts in PMU and contractors offices for complaints about the works. Information boards will also state that the PMU and contractor have an open door policy as regards complaints. The contractors will implement the following safety measures for the public:

- The contractor will appoint an ESO to address health and safety concerns and liaise with the PMU and sucos within the Project area;
- Barriers (e.g., temporary fence), and signs shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points;
- Adequate signage and security will be provided at the site office and works yard and prevention of unauthorized people (including children) entering work areas and camp. Warning signs will be provided at the periphery of the site warning the public not to enter;
- The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and these sites will have a watchman at the entrance to keep public out;

- Speed restrictions shall be imposed on project vehicles and equipment traveling within 50m of sucos and sensitive receptors (e.g. residential, schools, places of worship, etc.);
- Upon completion of construction works, borrow areas will be backfilled or temporarily fenced, awaiting backfilling;
- Provisions will be made for site security, safety barriers and signs will be erected outside trenches deeper than 1m and covers will be placed over other holes. Other safety measures will be installed as necessary;
- Drivers will be educated on safe driving practices to minimize accidents and to prevent spill of spoil, hazardous substances (fuel and oil) and other construction materials during transport;
- Contractors will ensure that no wastewater is discharged to local rivers, streams, lakes and irrigation channels and any other water bodies;
- Measures to prevent proliferation of mosquitoes shall be implemented (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water. Standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside);
- The contractor shall make provision to ensure the construction workforce attends STI and HIV/AIDS prevention workshops provided through an approved service provider. The workshops will be delivered to the contractor's workforce prior to commencement of any civil works; and
- Suco-based community awareness raising about transmission of STIs and HIV, reproductive health and safe sex. The program will be implemented after contractor mobilization when training staff are in post and prior to construction works commencing,

9.6 Operation Impacts on Physical Environment

A. Operation of vehicles creating emissions

264. Gaseous emissions. Vehicle emissions as indicated by concentration of oxides of nitrogen will be the main air pollution sources during operation. Following the rehabilitation of the road its use will create air pollution such as hydrocarbons, carbon monoxide, nitrous compounds, sulphur dioxide and particulate matter. The current volume of traffic and forecasted traffic growth are such that emissions will be low enough to not have a noticeable effect on ambient air quality. The anticipated levels of traffic, excessive capacity of the road network, and subsequent lack of congestion and concentration of traffic, are unlikely to result in adverse impacts on air quality. There will be few other sources of emissions near the project road other than from domestic fuel burning. Sensitive receivers are set far enough back from the project road to allow adequate dispersion that there will be no significant impacts at the sensitive receivers.

265. Particulate emissions. Particulate contamination such as dust and fumes will also be air pollution sources during operation however toxic residues from vehicle emissions near the project road are unlikely to accumulate or create significant impacts.

266. Dust from existing road will be reduced due to the better asphalt surface for the new road.

267. The conclusion in respect to air quality is that the project road is likely to continue to operate at well under its design capacity and no significant air quality impacts warranting mitigating actions are anticipated during operation and maintenance phase.

B. Routine and Ongoing Maintenance

268. Constriction of water flows from debris blocking the flow in the drainage structure could result in damage to culverts and drainage structures, riverbanks or land through altered flow patterns. DRBFC will ensure that all culverts and drainage structures are adequately maintained so that debris does not build up causing waters to deviate around the structures stranding them and resulting in severe erosion and loss of land; and

269. There will be a need for gravel extraction for on-going river maintenance. DRBFC will ensure that extraction will incorporate measures to protect habitats, river and river banks.

270. Standing water might be formed as a result of construction. DRBFC should drain and fill these areas as part of ongoing maintenance activities.

271. There are unlikely to be any significant impacts on soil during the operation phase of the project as long as the structures are properly maintained. Naturally occurring stream bank erosion could in fact be reduced as a result of the project if selective road sealing, gabion baskets and rip-rap are used to stabilize the river banks and protect the road where it passes close to the rivers. Rip-rap, gabion baskets or bio-engineering alternatives will also be used to reduce scour and erosion in identified sections.

272. Increasing awareness about the need to maintain vegetative cover of areas adjacent to the road in terms of both assisting in reducing silt laden run-off to waterways and the inter-tidal area and contributing to the stability of river banks and the foreshore area, can be included as a component of the project's communication plan and identified as part of the maintenance activities.

C. Drainage and Alterations to river flow

273. Alterations and restrictions of natural flood cycle by temporary storage of floodwaters and restricted flood plain movements. These impacts need proper maintenance of river profile to ensure silt and debris do not collect and lead to damage to banks and nearby land.

274. Scour protection and other measures to ensure normal flood behaviour should be maintained.

275. Soil erosion will be prevented by developing a comprehensive suite of engineering controls in the detailed designs to prevent and maintain erosion. A system will be devised and engineered to control erosion and flooding on either side of the embankments in case of heavy rains. Apart from affecting the community lands and resources, this would otherwise cause natural streams and irrigation channels to become silted.

276. Measures will also be taken during the operational phase to ensure that the frequency of maintenance is increased and that storm drains and highway drainage systems are periodically cleared to maintain clear drainage to allow rapid dispersal of storm water flow. An adequate system of monitoring, reporting and maintenance will be developed.

D. Run-off from road

277. Potential impacts on water quality or availability of water for domestic or agricultural use are not expected to occur. During operation negative impacts on water quality could be caused by accidental spills.

278. There is a very minor risk of impacts on sedimentation and water quality through improving drainage from the road and areas landward of it in the few months when there is significant rainfall. At other times there will be virtually no runoff but the drains will need to be kept clear of dry matter constricting the drains. The project will lead to longer term environmental benefits for water quality created by the project through proper compacting of the road and surface and reducing mobilisation of surface dust during rain. The dust that are resuspended and mobilized will be captured where required in sediment traps to limit the amounts finding their way to rivers. The maintenance contractor will be responsible for regular clearing of drainage structures to keep them effective. Additional plantings around drains will be appropriate and will help to retain surface particles on land.

279. Water quality may show slight improvements after rehabilitation and maintenance due to reduced erosion from improved embankments on the slopes, stabilization by rip-rap or gabion baskets, and re-vegetation to prevent erosion. However any improvements are unlikely to be detectable in water samples due to the infrequency of rainfall. To cater for the times when there is heavy rain, the replacement of dilapidated or damaged culverts will facilitate passage of high flows and reduce scouring and remove overland flows, ensuring the integrity of the surface of the road pavement and removing a potential hazard from overflowing.

280. The area of impervious surface is not being significantly increased by project and therefore increased runoff due to rehabilitation activities (if any) will be negligible in the project area.

9.7 Operation Impacts on the Biological Environment

A. Improved access to previously inaccessible or difficult to reach areas

281. The operation of the project is not likely to induce people to the area to poach or hunt timber, flora or fauna as it does not comprise provision of additional access to previously inaccessible areas. The road already exists and does not provide access to the interior and still forested areas.

282. Deforestation is not an impact attributable to the project because (i) single selective logging for traditional and/or cultural purposes is permitted; and (ii) logging companies purchase licenses to fell trees within prescribed areas and construct their own roads to provide access to these areas, and in any case logging has not been a major activity in the project area. Therefore there will be no impacts on flora and fauna as a consequence of road rehabilitation during the operational phase.

283. There are no rare or endangered fauna that could be impacted by the operation of a rehabilitated road.

284. There will be no impacts on existing or proposed conservation area as a result of the road rehabilitation.

9.8 Operation Impacts on the Social Environment

A. Spread of Communicable Disease

285. In terms of risk of transmission of communicable diseases during operation, roads have the potential to pose a risk as a pathway for disease transmission only if they carry a large volume of traffic, including high proportions of heavy traffic such as trucks, are routes that connect cities, towns or large numbers of villages, especially roads or highways with international borders where improved access to major markets can facilitate international trade, and there is a hospitality service industry established that is geared towards large numbers of truck drivers and mobile populations.

286. The road does not provide linkage to Indonesia. Therefore the conclusion, in terms of risk of transmission of communicable diseases during operation, is that the project road has the potential to pose, a low risk as a pathway for disease transmission. This small risk is considered to be mitigated by implementation of the project's STIs/HIV/AIDS awareness and prevention campaign.

B. Any other impacts

287. Other unanticipated impacts might happen in the future. Routine maintenance by DRBFC will be able to recognize these previously unforeseen impacts. Pro-active untipication measures should be put in place.

9.9 Need for Grievance Redress Mechanism

288. MPWTC assisted by PMU will establish a grievance redress mechanism (GRM) for the sector project to facilitate resolution of complaints by affected people and grievances about the project's environmental performance, in line with the requirement of SPS. The GRM will

be facilitated by the PMU and be applicable to all contractors who will be required to maintain a grievance registry or record. The PMU or designated officer in liaison with the Suco leaders and committees at the district level.

289. The public will be made aware of the relevant contact numbers and contact person in PMU and each contractor through media publicity, notice boards at the construction sites, and local authority offices. The public will be made aware that the contractors and the PMU have an open door policy and that the complainant can remain anonymous if requested. The GRM will address affected people's concerns and complaints promptly, using an understandable and transparent process based on traditional methods for resolving conflicts and complaints. The GRM shall provide a framework for resolving complaints at the project level as well as beyond the project (that is, involving relevant government offices such as District and Suco committees, DNCPIA, etc.), using the existing judicial or administrative remedies. The GRM will be detailed in the SEIS and other safeguard reports as required (such as Resettlement Plan).

290. The GRM to be established to receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the social and environmental performance at the level of the project. The PMU will maintain an open door policy to accept complaints at all levels concerning the environmental performance of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

291. A project information brochure will include information on the GRM and shall be widely disseminated throughout the project corridor by the safeguards officers in the PMU. Grievances can be filed in writing or by phone with any member of the PMU, construction sites and other key public offices, all of which will accept complaints.

292. Existing arrangements for redress of grievances for affected persons are through complaints to the village and suco committees up to the district level and then through the PMU and back to the agency which implements a project. This indirect route will remain in place to preserve the usual administrative remedies. There will be a need to deal with complaints and grievances during construction for this project.

9.10 Steps and Procedures for the GRM

293. First tier of GRM. The contractor and/or PMU are the first tier of GRM which offers the fastest and most accessible mechanism for resolution of grievances. One of the two safeguards officers or designated officer in the PMU shall be the key officers for grievance redress. Resolution of complaints will be done within fifteen working (15) days. The safeguards officers in PMU will provide the support and guidance in grievance redress matters. Investigation of grievances will involve site visits and consultations with relevant parties (e.g., affected persons, contractors, traffic police, etc.). Grievances will be documented and personal details (name, address, date of complaint, etc.) will be included unless anonymity is requested.

294. A tracking number shall be assigned for each grievance, and it will be recorded including the following elements: (i) initial grievance record (including the description of the grievance), with an acknowledgement of receipt handed back to the complainant when the complaint is registered; (ii) grievance monitoring sheet, describing actions taken (investigation, corrective measures); and (iii) closure sheet, one copy of which will be handed to the complainant after he/she has agreed to the resolution and signed-off. The updated register of grievances and complaints will be available to the public at the PMU office, construction sites and other key public offices along the project corridor (offices of the suco and districts). Should the grievance remain unresolved it will be escalated to the second tier.

295. Second Tier of GRM. The PMU will activate the second tier of GRM by referring the unresolved issue (with written documentation) to the PMU who will pass unresolved complaints upward to the Grievance Redress Committee (GRC). The GRC shall be established by MPWTC before commencement of site works. The GRC will consist of the following persons: (i) Project Director; (ii) representative of District and Suco; (iii) representative of the affected person(s); (iv) representative of the local land office; and (v) representative of the National Directorate Environment (DNCPIA) (for environmental related

grievances). A hearing will be called with the GRC, if necessary, where the affected person can present his/her concern. The process will facilitate resolution through mediation.

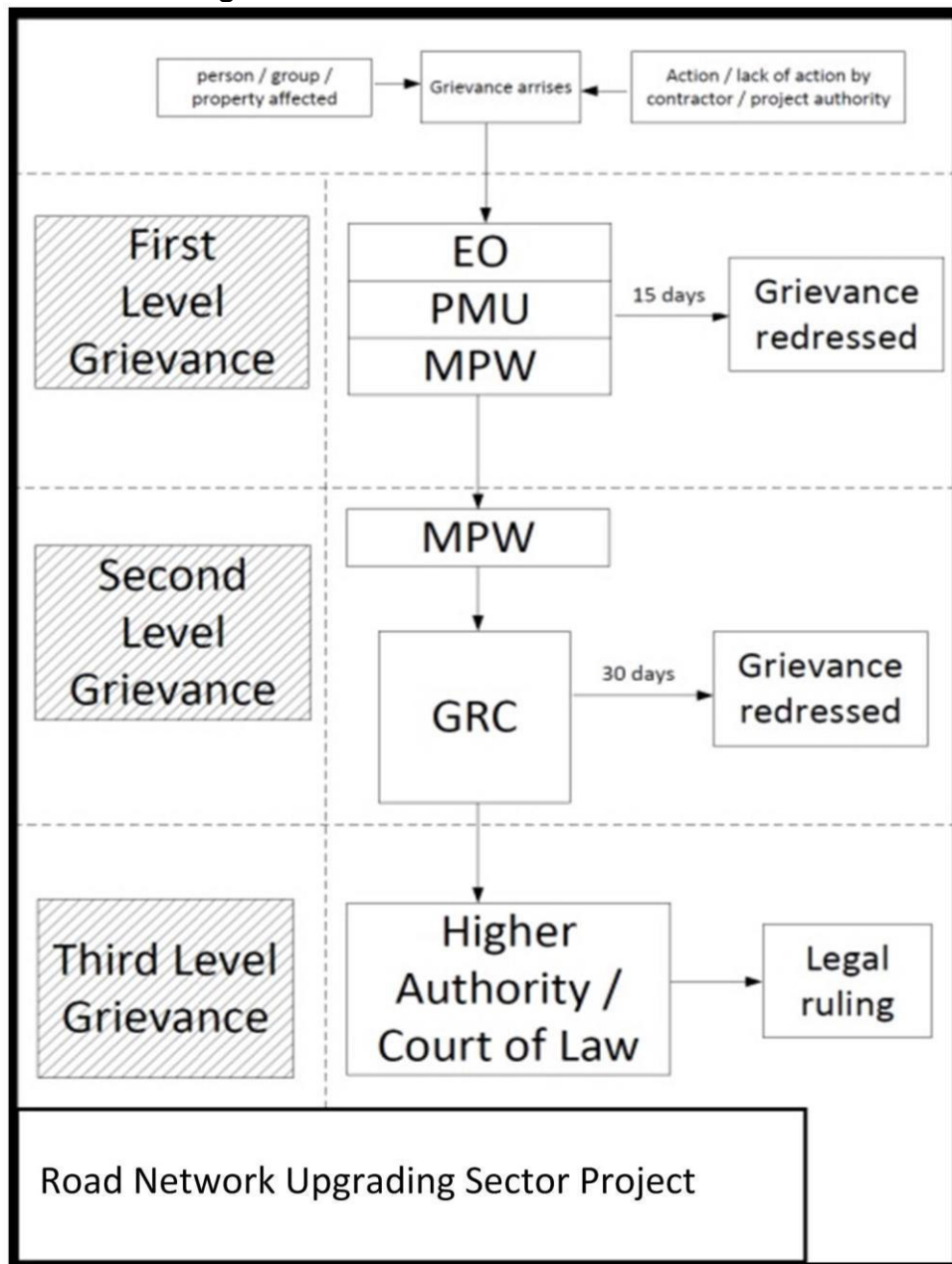
296. The GRC will meet as necessary when there are grievances that cannot be solved at the first tier and within thirty (30) working days will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision and a timeframe that must be adhered to. The functions of the GRC are as follows: (i) resolve problems and provide support to affected persons arising from various environmental issues and including dust, noise, utilities, power and water supply, waste disposal, traffic interference and public safety as well as social issues land acquisition (temporary or permanent); asset acquisition; and eligibility for entitlements, compensation and assistance; (ii) reconfirm grievances of displaced persons, categorize and prioritize them and aim to provide solutions within a month; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

297. The PMU will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out. The contractor will have observer status on the committee. If unsatisfied with the decision, the existence of the GRC shall not impede the complainant's access to the GOTL's judicial or administrative remedies.

298. Third tier of GRM. In the event that a grievance cannot be resolved directly by the contractor or PMU officers (first tier) or GRC (second tier), the affected person can seek alternative redress through the Suco or District committees under the existing arrangements for redress of grievances for affected persons. The PMU or GRC will be kept informed by the district, municipal or national authority.

299. Monitoring reports shall include information about the GRM including: (i) the cases registered, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) an appendix which lists cases in process and already decided upon may be prepared with details such as name, ID with unique case serial number, date of notice/registration of grievance, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending) and if it is a repeat of a previous grievance. The grievance redress mechanism and procedure is depicted in Figure 9.1.

Figure 9.1 - Grievance Redress Mechanism

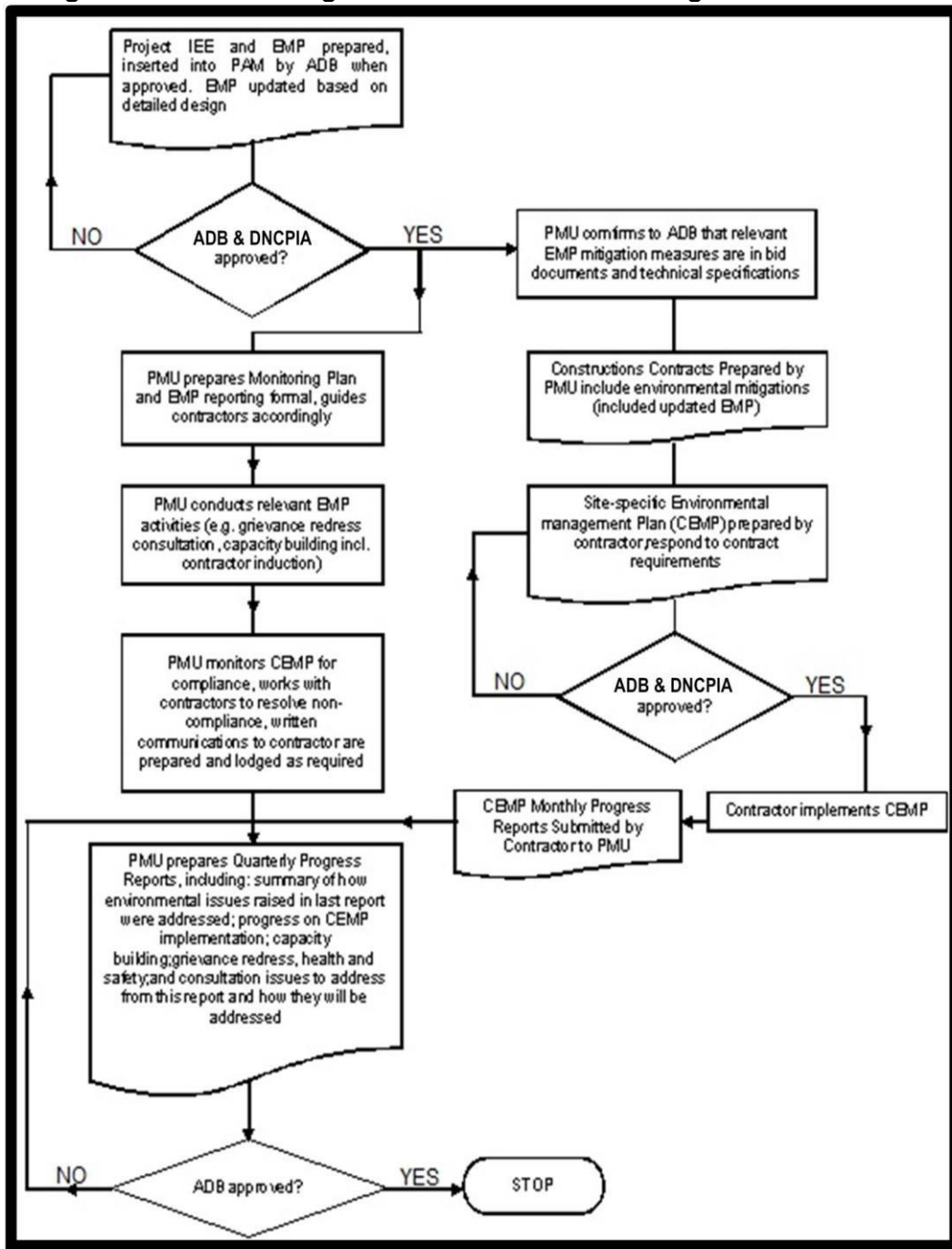


10. Environmental Management Plan

10.1 Overview of Environmental Management Plan

300. The Environmental Management Plan (EMP) contains a number of components crucial to effective environmental management within the project. These include: (i) organizational responsibilities (for various aspects of EMP implementation); (ii) consultation and information disclosure; (iii) plan for mitigation of impacts (during pre-construction, construction and operation); and, (iv) monitoring. These are explained in detail in the sub-sections below. Figure 10.1 provides a flow diagram for the environmental management documents, showing the process for preparation, submission, and approval of various documents as well as the monitoring and reporting required for environmental management of the project.

Figure 10.1 – Flow Diagram of Environmental Management Documents



10.2 Institutional Arrangements and Responsibilities

301. This sub-section of the EMP presents a discussion of the environmental management structure and activities that will be undertaken as part of overall Project implementation. The roles and responsibilities of various agencies in undertaking these activities are then defined and the institutional strengthening activities that will be required to allow those organizations to fulfil their nominated roles and responsibilities are identified. An environmental monitoring program has been prepared and the cost associated with its implementation has been identified (refer to Section 10.5).

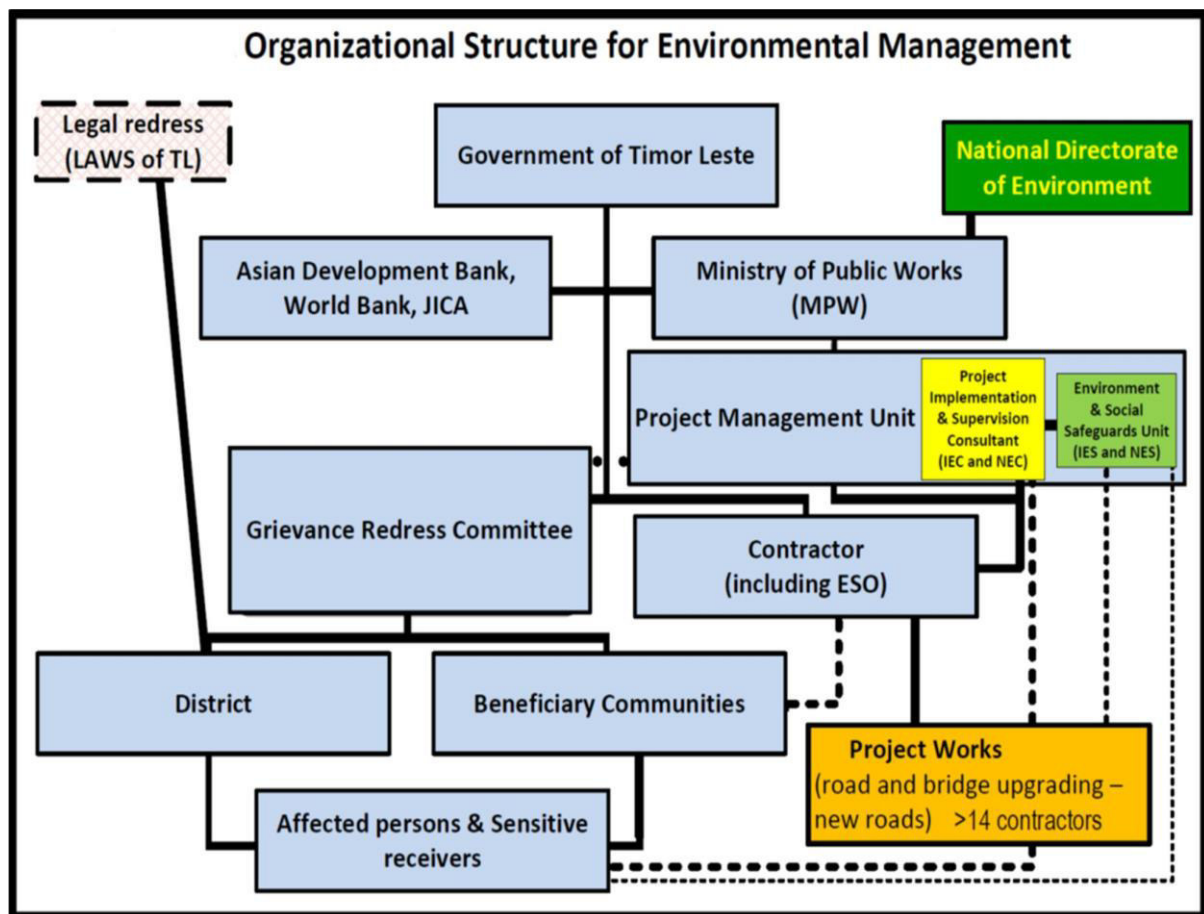
A. Overall Monitoring Responsibilities and Activities

302. The PMU will be responsible for monitoring of the project construction activities; assisted by the PISC environmental specialists on a day to day basis. PISC will carry out regular daily and weekly inspections of construction activities and monitoring of mitigation measures. PMU will carry out spot checks to compliment the activities of PISC. Together this will provide an efficient use of the environmental monitoring resources available to the project.

B. Organization Roles and Responsibilities

303. The overall organizational structure for environmental management for the project is shown in Figure 10.2.

Figure 10.2 - Organizational Structure for Environmental Management



C. Role of Ministry of Public Works

304. As implementing agency (IA) for the Project, MPWTC has overall responsibility for preparation, implementation and financing of environmental management and monitoring tasks as they pertain to the project and inter-agency coordination. MPWTC will exercise its

functions through the PMU which will be responsible for general project execution, and which will be tasked with day-to-day project management activities, as well as monitoring.

305. A consulting firm has been hired to provide services for detailed engineering design, construction supervision, and other assignments, as needed.

306. Project Management Unit. The PMU is already established in MPWTC and has been augmented in November 2013 to implement the project and manage detailed design and supervision of construction. The PMU is headed by a full-time Project Manager and supported by a team consisting of staff and consultants engaged under different project arrangements. The PMU will be responsible for the following: (i) assisting the IA in implementing the Project; (ii) carrying out procurement and engaging design and supervision consultants (PISC) and contractors; (iii) as required liaising and coordinating with the DRBFC; and (iv) managing the contractors, and liaising with other stakeholders, on the day to day implementation of Project activities. The PMU, through the PISC, will retain experienced consultants to monitor and report on contractor compliance with the approved CEMP.

307. Road project implementation has evolved to the point that PMU needs to recruit safeguards staff who can receive training and capacity building under various projects financed by development partners. PMU has established an Environmental and Social Unit (ESU) that is co-financed from loans by ADB, WB and JICA. ESU staff – national environment specialist (NES) and national social safeguards specialist (NSS) - will receive capacity building and training from two international specialists financed under the project (one environment (IES) and one resettlement and social (ISS)).

308. Wherever possible future projects - irrespective of financing - will provide support to PMU staff rather than national consultants brought on for specific projects. This will provide long term institutional support and develop the PMU.

309. In the implementation of environmental management and monitoring tasks specific technical assistance will be provided by environmental specialists that are part of the PMU. The specialists will assist in all aspects of implementation of environmental assessment and management, internal monitoring and evaluation (M&E), and training of MPWTC and MECM and other relevant government agencies.

310. PMU will prepare and submit to MPWTC and ADB Quarterly Progress Reports, these will incorporate the main items raised in contractor's monthly reports and the environmental monitoring reports prepared by PMU environmental specialists and NES, as well as all other items required by MPWTC and ADB.

311. Project Implementation and Supervision Consultant (PISC). The PMU will be supported by a PISC. The PISC will comprise international specialists as required to supplement existing PMU resources and deliver a capacity building program. In respect of safeguards the PISC will include an international environment consultant (IEC) and international resettlement and social development specialist for 6 months each intermittent. National environment consultant (NEC) will also be required full time to monitor contractor's mitigation measures on a daily basis. The first inputs of each international specialist will be 2 months to maximize capacity building efforts across a number of activities required in first phases of implementation as well as for more general awareness raising and training needs. The NEC should be in place by the time the Contractor is mobilized.

312. A capacity building program in environmental assessment and management will be delivered by the IEC and NEC. Staff in the MPWTC, PMU, NEC and contractors will receive training and capacity support from the IEC to ensure learning and development, as well as smooth and effective implementation of the CEMP.

D. Role of National Directorate of Pollution Control and Environmental Impact

313. The DNCPIA, the agency responsible for environmental management, was consulted at the onset of the SEIS process and will be consulted on the confirmation of the categorization of the project. Under the provisions of the ELL, the SEIS will be reformatted into the SEIS and submitted to DNCPIA for review and issuance of environmental clearance. Ongoing consultations with DNCPIA will be required during the construction of the project and DNCPIA will be asked to assist in the monitoring of implementation of the CEMP and ensure that

environmental management and mitigation of the project is undertaken to an acceptable standard. Periodic inspections will take place with DNCPIA, PMU, PISC and Contractors.

E. Role of the Contractor

314. The civil works contractor will be responsible for responding fully to all contract conditions including those covering environmental mitigation, social mobilisation and awareness and monitoring. The contractor will then be responsible for implementing all environmental, health and safety actions included in the EMP and relevant clauses in the bidding documents and contract during the pre-construction and construction period.

315. The contractor will prepare the contractors EMP (CEMP) based on the site-specific construction methodologies they propose to use and the EMP in this SEIS. The CEMP will further develop the EMP contained in this SEIS and will detail measures for all impacts covered in the EMP including but not limited to traffic management, waste management, hazardous material and waste management and health and safety. The PMU will review and approve the CEMP before the commencement of construction.

316. The contractor will appoint an Environmental and Safety Officer (ESO) who will be responsible for site inspections on a daily and weekly basis to check compliance with the approved CEMP and ensuring implementation of all health and safety requirements, these will be documented and subject to monitoring by PMU and DNCPIA. The responsibilities of the Contractor include:

- Participate in induction on EMP and mitigation measures to be delivered by PMU prior to preparation of the CEMP;
- Appointing an ESO and Deputy ESO, sending letter to PMU confirming that these positions have been filled and by whom before construction commences (the bidding documents and contract specify the roles and tasks of the ESO);
- Seeking training and support from PMU on any aspects of environmental management, as required;
- Coordinating with PMU for preparing and submitting the CEMP following detailed design, the ESO will be responsible for ensuring that the Contractor complies with the clauses in the contract and bidding documents in respect of environment, health and safety;
- As required, preparing, and submitting for approval, appropriate plans (tree cutting, aggregate extraction, traffic management etc.);
- Engaging an approved service provider to undertake STIs and HIV/AIDS briefings and awareness raising amongst the contractor's employees and communities, and reporting on the same;
- Coordinating with PMU in respect of community consultation i.e. establishing GRM etc; and
- Undertaking daily and weekly site inspections (by the ESO) recording the findings in a site diary, and participating in monitoring and coordinating with PMU to ensure that environmental management activities are reported in Monthly Progress Reports as required.

10.3 Assessment of Institutional Capacity

317. A capacity assessment of the MPWTC for application of environmental safeguards in donor assisted projects was carried out. Environmental management for earlier donor assisted projects has been with support of consultants. MPWTC has built up some experience in preparation of environmental assessment documents and the experience of the conformance to the DNCPIA requirements in recent years; largely as DNCPIA is still developing as the regulatory agency under the ELL.MPWTC and DRBFC's current approach to tackling environmental issues is on a project level basis and varies with the requirements of the funding agency.

318. In Timor-Leste, the environmental assessment process is established but environmental awareness and capability for implementation of EMP in infrastructure projects of both the executing agency (MOF) and the implementation agency (MPWTC) are still developing. MPWTC's PMU has accumulated experience with several ongoing road sector projects for WB and ADB investments in rehabilitation and improving the road network.

319. The Rural Roads Policy (2009), still awaiting endorsement, has a main objective to "develop rural road infrastructure in an environmentally sustainable way". The need to institutionalize environmental assessments in the design and implementation of rural roads has been identified and close cooperation with the DNCPIA is anticipated. This policy is focused on rural roads but makes several significant commitments as follows:

- MPWTC is committed to mitigate negative environmental impacts at all stages of provision and production of the rural road infrastructure;
- MPWTC will develop comprehensive guidelines that will be followed by all involved in the planning and development of rural road infrastructure; and
- MPWTC will mainstream environmental safeguards into the planning and development of rural road infrastructure, followed up during the implementation.

320. If this policy is supported and applied to other road infrastructure there is a basis for environmental management infrastructure projects in the medium term. However, consultations with the various agencies indicate that there will not be a permanent structure or division to handle environmental concerns or issues in project planning and implementation during the term of this project.

321. Therefore the most significant challenge for environmental management on this project is the lack of human and financial resources and necessary infrastructure in MPWTC as the line agency for implementation. The institutional capacity in terms of environment, currently existing is largely that of the existing PMU created for implementation of ongoing development partner funded projects in the transport sector.

322. Training and orientation programs on environmental aspects have been largely through the capacity building initiatives taken up as part of projects, and these have been mostly one at a time and have been limited to awareness workshops.

323. National minimum environmental standards have not yet been declared but guidelines already exist and need to be applied. The former practice in MPWTC was that engineering officers may occasionally be delegated to check environmental matters on an ad hoc basis but the day to day environmental management of projects is undertaken by the PMU. However the current capacity of MPWTC to address environmental issues at headquarters and regional offices are insufficient and need to be augmented. At present there are two staff employed by PMU with direct responsibility for addressing environmental issues on donor bank funded projects.

324. The in-house capacity in MPWTC to check the adequacy of the Project EMPs is limited, or that they are being implemented effectively by a contractor. In the long term it is recommended that a new unit responsible for environmental management be set up to improve capacity in the MPWTC.

325. The proposed capacity building includes (a) awareness training of the MPWTC and PMU (including management) and contractors on environmental management as per GOTLand ADB requirements; (b) capacity building programs to improve the capability of environment staff at all levels in carrying out monitoring and implementing environmental management measures; and (c) capacity building programs on environmental issues including pollution control and guidance on obtaining environmental licenses. The training programs will be conducted in Baucau and district capitals as agreed with MPWTC and PMU.

326. Contractor training workshops are being conducted periodically as every new contractor is engaged during the first year and every six months for the second and third years, to share experience in the implementation of the works and the monitoring report on the implementation of the EMP, to share lessons learned in the implementation and to decide on remedial actions, if unexpected environmental impacts occur. In the medium to long term as

the environmental responsibilities of MPWTC develop, dedicated staff officers will be trained and developed with the aim of taking over the role currently undertaken by consultants and specialists.

10.4 Mitigation of Impacts

327. The SEIS has been prepared to identify and assess environmental and social impacts and has also set out a range of measures to avoid and/or mitigate those impacts (Section 5). The mitigation of impacts during the pre-construction phase will be the responsibility of MPWTC and the contractor, the mitigation of impacts during the construction phase will be the responsibility of the contractor, and the mitigation of impacts during the operations phase will be the responsibility of MPWTC and DRBFC.

328. A CEMP will be prepared by the contractor and submitted to PMU and ADB for review for approval prior to commencement of works. Table 10.3 includes the overall EMMP for the Project within a matrix of mitigation measures and responsibilities of implementation. Parts of the EMP such as the pre-construction and construction elements - will be used following completion of detailed design, as the basis for the contractor's CEMP. The overall process is shown previously in Figure 10.1. Costs have been included where these are known. A number of mitigation measures will be the responsibility of the contractor who will be required to identify the best means for mitigating an impact and include these in the CEMP, therefore these costs will be borne by the contractor as part of the construction cost (Included in the Contract/IIC).

Table 10.1 - Responsibilities for Environmental Management & Monitoring

Agency	Responsibilities
Ministry of Public Works, Transport and Communications (MPWTC)	<ul style="list-style-type: none"> • Overall responsibility for project construction and operation • Ensure that sufficient funds are available to properly implement all agreed environmental safeguards measures • Ensure that the project, regardless of financing source, complies with the provisions of ADB's Safeguard Policy Statement (SPS) 2009 • Ensure that Project complies with GOTL environmental laws and regulations • Ensure that tender and contract documents for civil works include all relevant parts of the environmental assessment and project agreements • Submit at least quarterly safeguards monitoring reports to ADB
Project Management Unit (PMU)	<ul style="list-style-type: none"> • Ensure that EMP provisions are implemented to mitigate environmental impacts to acceptable levels • Ensure that Project complies with ADB's SPS (2009) and government laws and regulations • Engage and retain two full time staff within PMU as environmental safeguards officer (ESO) and social safeguards officer (SSO) • Ensure that environmental protection and mitigation measures in the SEIS and EMP are incorporated into the detailed design including climate change adaptation measures. • Ensure that requisite measures from the SEIS and EMP are incorporated into the bid and contract documents • Undertake environmental management capacity building activities for MPWTC and orientation and awareness training for contractors • Ensure that MPWTC has obtained necessary environmental license(s) from DNCPIA/DEIA prior to award of civil works contracts. • Ensure that contractors obtain necessary environmental license(s) from DNCPIA/DEIA prior to commencement of civil works contracts. • Assist MPWTC to establish an environmental grievance redress mechanism, as described in the SEIS, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Project's environmental performance

Agency	Responsibilities
	<ul style="list-style-type: none"> • Undertake monitoring of the implementation of the EMP (mitigation and monitoring measures). • Prepare quarterly or semi-annual environmental monitoring reports for submission to ADB and other co-financiers as necessary • Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB and other co-financiers as necessary • Implement all mitigation and monitoring measures for various project phases specified as PMU's tasks in the EMP • Work with DRBFC to undertake any additional environmental assessment for Projects prior and submit to ADB and DNCPIA for review and clearance
<p>Project Implementation & Supervision Consultant (PISC)</p>	<ul style="list-style-type: none"> • Provide training and capacity building to MPWTC and PMU staff (including management) and provide training to contractors prior to the submission of contractor's CEMP. • Engage and retain two full time staff within PISC as national environmental consultant officer (NEC) and national social safeguards consultant (NSC) • Incorporate into the project design the environmental protection and mitigation measures identified in the EMP for the design stage including climate change adaptation measures included in the SEIS. • During detailed design phase provide all necessary information to the MPWTC to facilitate obtaining environmental licenses from DNCPIA prior to award of civil works contracts • During detailed design notify PMU of any change in alignment or project design/components and provide all necessary information to the PMU to facilitate preparation of any additional environmental assessment prior to project construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the SEIS prepared during loan processing, etc.) • Update, based on detailed design, the EMPs and other environmental protection and management measures to be incorporated in bid and contract documents • Assist PMU in the review and approval of the contractor's CEMP for each road section • Assist PMU to undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) including incorporation of reports from the contractors • Assist PMU to prepare quarterly progress reports and semi-annual safeguards monitoring reports for submission to ADB and MPWTC as necessary including incorporation of reports from the contractors and corrective action requests to contractor • Based on the results of CEMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB and other co-financiers as necessary
<p>Contractors</p>	<ul style="list-style-type: none"> • Participate in induction training on EMP provisions and requirements delivered by the PMU • Prepare the CEMP and submit to PMU for approval • Obtain necessary environmental license(s) from DNCPIA for associated facilities for Project works, quarries, hot-mix plant etc. prior to commencement of civil works contracts • Ensure that all workers, site agents, including site supervisors and management participate in training sessions delivered by PMU and PISC. Maintain a record of training and conduct of awareness sessions for staff to ensure compliance with

Agency	Responsibilities
	environmental and safety statutory and contractual obligations including the approved CEMP <ul style="list-style-type: none"> • Ensure compliance with environmental statutory and contractual obligations and proper implementation of ADB requirements including approved CEMP • Based on the results of CEMP monitoring, cooperate with the PMU to implement environmental corrective actions and corrective action plans, as necessary. • Based on the results of EMP monitoring, cooperate with the PMU to implement environmental corrective actions and corrective action plans, as necessary. • Respond promptly and efficiently to requests and instructions from PMU for environmental corrective actions and corrective actions and implement additional environmental mitigation measures, as necessary. • Provide sufficient funding and human resources for proper and timely implementation of required mitigation measures in the EMP.
National Directorate of Environment (DNCPIA)	<ul style="list-style-type: none"> • Review and approve environmental assessment reports required by the GOTL • Issue, and renew environmental licenses as required by the GOTL during the life of the project • Undertake monitoring of the project's environmental performance based on their mandate

329. In respect of staffing the IES will be financed through the PISC fee paid for by the loan, the first three years salary of the EO will be also financed out of the loan, after which time the MPWTC -PMU will cover the cost of the salary as with other full-time staff.

330. The budget for the environmental management costs for the Project is presented in Table 10.2 below. The government counterpart funding required, covering the costs for environmental licensing, will be borne by Government. Tree planting (re-vegetation) is included as a separate line item and will require clarification at the detailed design stage.

10.5 Environmental Monitoring and Reporting

331. Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the environment. In response to the impacts identified during the feasibility study, an environmental monitoring plan has been developed and is presented in Table 10.3. The contract documents will contain a list of all required mitigation measures, the EMP and a time-frame for the compliance monitoring of these activities as per table 10.3. The monitoring will comprise surveillance to check that the contractor is meeting the provisions of the approved CEMP and all other contractual obligations during construction.

332. The environmental specialists of PMU will supervise the monitoring of implementation of mitigation measures during the construction stage and compliance with the CEMP. The PMU during project implementation will be required to:

- Develop an environmental monitoring protocol for the construction period, and formulate a detailed plan;
- With assistance from the Engineer, conduct regular environmental monitoring, including review of daily and weekly site inspections undertaken by the contractor and items recorded in the ESO's site diary (the main parameters to be monitored are outlined in Table 10.3); and
- Prepare environmental monitoring reports covering the above and prepare and submit inputs for the Quarterly Progress Reports.

333. Responsibilities for the implementation of the monitoring requirements of this SEIS are shown in Tables 10.1 and the EMP table (10.3). Implementation of mitigation measures during the construction stage will be the responsibility of the contractor in compliance with the bid

documents, contract clauses and technical specifications. The monitoring plan is incorporated into the EMP and is presented in Table 10.3.

10.6 Environmental Management Costs

334. The estimated costs for environmental management include costs for staffing, mitigation, monitoring during construction and permitting costs. Most mitigation measures to be implemented during the construction phase will be included in the construction contract and be covered by the contractor. Implementation of mitigation measures will be part of the construction costs, and will be included in the Bill of Quantities (BOQ) as a monthly line item for implementation of CEMP. The costs for training proposed include the costs incurred towards the site visits, travel to the training program by the participants, printing of training materials and other logistic arrangements. The costs involved towards preparation of training material and imparting of training are covered in the PMU costs.

Table 10.2 - Summary of Estimated Costs for EMP Implementation

Item	Estimated cost (US\$)	Costs covered by
International Environmental Specialist in PISC ESC – 6 months intermittent	90,000	PISC
Environmental specialist in PISC ESC – 24 months full-time	24,000	PISC
Environmental impact monitoring ¹	50,000	Contract
CEMP implementation (construction mitigation measures) ²	120,000	Contract
Environmental Permitting ³	TBC	MPWTC /PMU

Notes:

- 1 Assumes \$5000 per month for 24 months;
- 2 Expenditure on environmental licensing procedure are the responsibility of the state according to Article 43 of DL5/2011 therefore cost of permits for environmental license as clearance certificate under DL5/2011 required from DEIA should be nil.

Table 10.3 – Environmental Management and Monitoring Plan

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
PRE-CONSTRUCTION PHASE							
Climate change adaptation	Risk of increased erosion and damage to road infrastructure	<ul style="list-style-type: none"> Ensure all measures incorporated in design are implemented 	PMU/PISC design Contractor	Included in Contract (IIC)	Designs and works implemented	Visual inspection	PMU
Realignment to avoid caves	Damage to venerated caves at Km22+600 R-S	<ul style="list-style-type: none"> Early in the preconstruction phase consider to realign the two blind corners at about Km22+600 (Right side) to avoid cutting the cliff face in which the caves are located. Provide a wider road section with pull-in or small parking area for tourists who want to view the caves. Provide a footpath for the viewing public. 	PMU/PISC design Contractor	Included in Contract (IIC)	Designs and works implemented	Review inspection of design	PMU
Contractor prepared EMP and Awareness orientation of Contractor	All foreseeable impacts captured in CEMP.	<p>The following sections or method statements shall be included in the CEMP based on the EMP and the CEMP shall be prepared by the Contractor in the preconstruction stage for approval by PISC and endorsement by PMU and implementation by the Contractor:</p> <ul style="list-style-type: none"> A. Waste Disposal (covering spoil disposal, general waste and hazardous waste); B. Quarries, borrow areas and construction materials management; C. Blasting and vibration; D. Asphalt, hot mix plant, rock crushers and bitumen supply; E. Erosion control and runoff; F. Bridge repairs and river protection; G. Water contamination prevention; H. Dust and noise minimization; I. Tree cutting and replanting; J. Enhancement planting; K. Construction camp operations, sanitation and diseases; L. Power and utilities protection; 	PISC – and Contractor compile CEMP based on the EMP in the SEIS and the CEMP shall be prepared by the Contractor assisted by PISC as necessary.	IIC	CEMP prepared and endorsed	Review inspection of CEMP	PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		M. Drainage system, irrigation and water resources; N. Safety precautions - workers and public; O. Temporary traffic management; P. Accidental discovery of archaeological assets, sites or resources; and Q. Decommissioning, rehabilitation, revegetation and recontouring of quarries, borrow areas and construction materials processing areas.					
PISC Check on legitimacy of material sources	Project complies with donor bank requirements, best practice and material suppliers are fit for purpose	PISC checks legitimacy of material supplies proposed by Contractor in the CEMP Contractor identifies construction material sources and obtains location approval and applies for mineral licenses.	PISC & Contractor	Project IIC	CEMP prepared and endorsed. Application for mineral license	Review inspection of CEMP	PMU
Surveying and demarcation of centre-line	Minor loss of vegetation during demarcation	<ul style="list-style-type: none"> Vegetation clearance during surveying and demarcation activities, especially of trees along the river banks and road-side, will be minimized. Major trees (especially in suco areas) to be removed will be clearly marked, only marked trees will be removed; In order to minimize loss of trees the trees that are not within the paved area or hard-shoulder but are in the embankment will not be cut unless for justifiable engineering or safety reasons; The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project; and Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible. 	PMU Contractor	Project IIC	Area of vegetation; area of felled trees/vegetation removal	During survey and activities - visual inspection before, during and after	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
Site clearance, digging, excavations	Accidental discovery of Physical & Cultural Resources (PCR) or cultural property sites	<ul style="list-style-type: none"> Contractor's CEMP to include section on "chance finds" Site agents will be instructed to keep a watching brief for relics in excavations. Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area. The Contractor with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GOTL (i.e. Secretary of State for Art and Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection. The PMU/PISC and Contractor will identify the necessary work to avoid impacts in the vicinity of the protected caves (Km22+600) & maintain road safety. 	Contractor	IIC	Sites and/or resources discovered and protected	During activities - stop work order issued; - site/resources dealt with appropriately	PMU; Sec. of State for Art and Culture/ PMU
	Removal of trees	<ul style="list-style-type: none"> Based on the schedule of trees that are unavoidably to be cut made by PISC make a plan to remove trees and include this in the CEMP. Consultation with owner and compensation as per Resettlement Plan (RP) 	PMU	In Resettlement Plan (RP)	No residual effect of loss; owner satisfaction with compensation	Following provision of compensation	PMU
Mobilisation of contractor, presence of construction workers, establishment of camp, associations with local people	Social disruption	<ul style="list-style-type: none"> Suco (village) protocols discussed with workers as part of awareness and mobilization training; At all times workers should respect village and land owner's boundaries and recognize and follow village rules and terms of conduct (especially addressing women and elders), avoiding damage to productive trees and gardens, and access to the resources and springs; The contractor is to ensure that workers' actions outside work site are controlled and Suco codes and rules of conduct are observed at all times; 	Contractor		Complaints of incidents between workers and villagers; No. of children entering camp; Number and effectiveness of signs	During activities - checking records for complaints - consultation with workers about protocols	PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> The contractor will identify one member of their staff to be the liaison between the Suco chiefs and elders and contractor, as well as between the contractor and PMU; Worker camp location and facilities will be located at least 500m from settlements and agreed with local communities and facilities approved by PMU and managed to minimize impacts; Adequate signage and security provided at the site office and works yard and prevention of unauthorized people (especially children) entering the area; Hire and train as many local workers as possible by using labour from each suco as the work proceeds along the road from suco to suco. 					
	Health & safety	<ul style="list-style-type: none"> Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas; Potable water, clean water for showers, hygienic sanitation facilities/toilets with sufficient water supply, worker canteen/rest area and first aid facilities will be provided. Separate toilets shall be provided for male and female workers; Portable lavatories (or at least pit latrines in remote areas) shall be installed and open defecation shall be prohibited and use of lavatories encouraged by cleaning lavatories daily and by keeping lavatory facilities clean at all times; Wastewater effluent from contractors' workshops and equipment washing-yards will be passed through gravel/sand beds and all oil/grease traps and contaminants will be removed before discharging it into natural streams. Oil and grease residues shall be stored in drums awaiting disposal 	Contractor	IIC	Camp, yard, streams/rivers	Monthly observation, consultation	Contractor PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<p>in Tibar in line with the agreed waste management section of the EMP and the Environmental License;</p> <ul style="list-style-type: none"> • Predictable wastewater effluent discharges from construction works shall have the necessary permits from NDE and local authorities before the works commence; • As much as possible, food shall be provided from farms nearby or imported to the area. Bush meat supplies from protected areas will be banned to discourage poaching. Solid and liquid wastes will be managed in line with the provisions of the waste management section of the EMP; • Use of guns and hunting equipment by workers will be banned and workers taking or using green timber or hunting or in possession of wildlife should be dismissed; • Entry to the protected areas, IBAs and/or sensitive areas (woodland and forest areas) by workers will be banned; • Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; • Provision of safe access across the works site to people whose suco and access are temporarily affected or disconnected during construction works (especially across drainage works in sucos); 					
	Spread of communicable diseases	<ul style="list-style-type: none"> • Construction camp(s) will be established in areas with adequate drainage in order to prevent water logging at the camp and formation of breeding sites for mosquitoes and in order to facilitate flow of the treated effluents; • Implementation of HIV/AIDS awareness and prevention program – community (villages) 	Contractor & Approved service provider	To be Advised (TBA)	STI/HIV/AIDS prevalence Increased awareness about transmission and prevention	Prior to construction - check contractor records, consultation with employees,	PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
CONSTRUCTION PHASE						discussions with NGO	
Operation of construction plant and vehicles generating emissions	Emission of exhaust from vehicles and machinery; Dust from aggregate crushing plant; generated by heavy vehicles transporting materials on roads; Uncovered loads on trucks; Dust from exposed stockpiles	<ul style="list-style-type: none"> Construction equipment will be maintained to a good standard. The equipment will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring; Prohibition on the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at the Project site; Material stockpiles being located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent dusty material becoming airborne; Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the front, sides and tail of the vehicle if necessary) during transportation. This is especially important as there are a number of suco along the road; Damping down of the road, especially within 100m from the sucos along the road and any roads being used for haulage of materials, during the dry season shall take place at least four times per day; and Periodic qualitative air quality monitoring. 	Contractor	IIC	Air quality, emissions, dust, particulate matter; Use of tarpaulins and loading of vehicles; Stockpiles	Monthly or after complaint - periodic visual inspection; Any particulate matter and smoke managed as per EMP	Contractor; PMU
Works in, or adjacent to, rivers and streams	Erosion of riverbanks; Effects on river structure including (i) changes to river water flows, including levels and velocity; (ii)	<ul style="list-style-type: none"> Material stock-piles will not be located within riverbeds or the islands in the centre of rivers. Similarly, they will not be located within the current area of floodplain in areas subject to regular flooding (i.e. once per year or more). 	Contractor	Including in Contract (IIC)	Temporary structures removed; River training/scour protection;	Monthly or as required after event; Check designs;	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
	<p>changes to channel depth, structure & location resulting from excavations; and (iii) changes to riverbanks;</p> <p>Increased turbidity of river waters due to gravel extraction;</p> <p>Increased siltation at culverts;</p> <p>Construction materials are washed out into rivers and other areas</p>	<ul style="list-style-type: none"> All land used for storage will be for temporary uses and will be rehabilitated to original condition or better condition upon completion of the works to the satisfaction of PMU; Scour protection will be used as temporary measures, as needed, to ensure temporary structures do not damage river configuration; Movements of vehicles and machinery, and hence disturbance, within the riverine habitats will be minimized at all times; Work in known crocodile habitats should be conducted in full surveillance of the predator. Any sighting should be reported to local authority and crocodile task force. No vehicles or machinery shall be washed in the river; In the event that the contractor causes damage to the river bank or other structural parts of a river, the contractor is solely responsible for repairing the damage and/or paying compensation; Embankments and in-stream/river activities will be monitored during construction for signs of erosion; Re-vegetation with local fast-growing species, or other plants in consultation with the land owners and suco chiefs, will be carried out incrementally and as quickly as possible after work within any river habitat has been completed; and Spoils, rubbish or any material will not be disposed of within any river system including riverbed, banks or floodplain areas. Suitable disposal sites will be designated in consultation with land owners and suco chiefs and approved by PMU. Contractor prepare bridge decommissioning plan incorporating all of the above measures. 			<p>No stockpiling in riverbeds, river islands or floodplains;</p> <p>Flooding frequency;</p> <p>Localised erosion</p>	<p>Visual observation of culverts, bridges and in-stream/river work areas;</p> <p>Consultation with users</p>	

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
Sourcing of materials (river gravels, aggregates etc.)	Extraction of river gravels from the beds or active channels of rivers changes hydrology, altering channel & causing erosion; Extraction from quarries or borrow pits leaves unusable land, exposed water table, attracts rubbish dumping, reduces visual values	<ul style="list-style-type: none"> Contractor to identify locations for construction materials as part of CEMP; Contractor to obtain mineral licenses for locations approved by ANPM at the pre-construction stage and include progress in CEMP; Contractor to prepare river training and materials extraction plan as part of mining plan for Mineral License and include summary in the CEMP; Excavation for river training purpose should be conducted within the perimeters of the planned locations approved by ANPM All borrow soil should be sourced from materials excavated from the river training, subject to confirmation of suitability by laboratory testing. Stockpile topsoil for later use and fence and re-contour borrow pits after use. Properly remove topsoil, overburden, and low-quality materials and stockpile near the site to be covered and preserved for site rehabilitation; Should additional material is sourced from river gravels, excavation shall not be conducted within 10m of the river bank or within 200m upstream or downstream from a bridge in line with the mineral license and mining plan approved by ANPM; Gravel and alluvial material shall not be removed to a depth of greater than 2m or as specified in the mining plan approved by ANPM and holes in river bed shall be re-contoured when extraction is complete; Alluvial terraces or alluvial deposits which lie on the river beds but not covered by water in normal hydrological conditions; shall be preferred; Use quarry with the highest ratio between extractive capacity (both in terms of quality) and loss of natural state; 	MPW, Contractor, PMU	IIC	Materials only obtained from designated sites (locations and method) as per extraction plan; Rehabilitation is conducted as per extraction plan	Monthly - visual inspection; Review of extraction plan; Re-vegetation and rehabilitation	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> • Use quarry sites lying close to the alignment, with a high level of accessibility not on slopes and with a low hill gradient; • Reinstate upon completion of construction works at each section damaged access roads, agricultural land and other properties due to transport of quarry/borrow materials, other construction materials and any other project-related activities; • Provide adequate drainage to avoid accumulation of stagnant water during quarry/borrow site operation; • Avoid use of quarry sites located on river bed. If it is not possible to locate quarries out of river beds use only quarry sites lying on large rivers as approved by PMU. Quarry sites lying on small rivers and streams shall be avoided; • Cut berms and terraces during and after extraction in quarries in the mountainous or hilly areas to stabilize slopes, or wherever slopes are important, and implement a drainage system and vegetation cover for rehabilitation; • Dewater and fence quarries and borrow pits as appropriate, upon completion of extraction activities to minimize health and safety risks; • Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding; • Prevent accidental access and avoid drowning when pits become water-filled by implementing measures such as fencing, providing flotation devices such as a buoy tied to a rope, and backfill as soon as practicable; and 					

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> Additional extraction sites and/or borrow pits will not be opened without the restoration of those areas no longer in use; Refill borrow pits as required by ANPM using inert surplus spoil material and Mark refilled borrow pits and cover with soil and plant vegetation as required by ANPM. The excavation and restoration of sites and borrow areas, as well as their immediate surroundings, will be undertaken in an environmentally sound manner to the satisfaction of the PMU. Sign-off to this effect by PMU will be required before final acceptance and payment under the terms of the contract. Decommissioning of all accommodation, plant and construction materials processing areas will include removal of all residual contamination, waste, machinery and constructed facilities. Decommissioning plan will be included in the CEMP covering rehabilitation, revegetation and recontouring of quarries, borrow areas and construction materials processing areas. 					
Spoil disposal. The mitigation measures also apply equally to discarded asphalt of macadam pavement surfaces.	Improper disposal impacts habitats and water courses	<ul style="list-style-type: none"> Contractor's CEMP to include section on spoil disposal Spoil will be reused as far as possible for bulk filling; Spoil shall not be stockpiled at the side of the road or dumped over the road edge or the crash barriers; Spoil will not be disposed-off in rivers and streams or other natural drainage path; Under no circumstances will spoil be dumped into any other watercourses (rivers, cliffs near the rivers, streams, drainage, irrigation canals, etc.); 	Contractor	IIC	Disposal at designated sites; proper compaction, erosion prevention and other measures to avoid impacts have been implemented;	Monthly - visual inspection; Review of disposal record; Landscaping and rehabilitation	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
		<ul style="list-style-type: none"> • Under no circumstances will spoil be temporarily dumped into any other watercourses (rivers, streams, drainage, irrigation canals, etc.); • Spoil disposal shall not cause sedimentation and obstruction of flow of watercourses, damage to agricultural land and densely vegetated areas; • Spoil will not be disposed-off on fragile slopes, flood ways, wetland, farmland, forest, mangrove and associated salt flats, beaches, religious or other culturally sensitive areas or areas where a livelihood is derived; • Surplus spoil will be used where practicable for local repair works to fill eroded gullies and depression areas and degraded land in consultation with local community; • Spoils shall only be disposed to areas approved by land owner, local authority, PISC and PMU; • Spoils shall only be disposed to areas that have acceptable ecological and engineering safety as approved by PISC and PMU; • Spoil will be disposed-off in disused quarries and abandoned borrow pits where practicable; • Disposed spoil will be spread in 15 cm layers and compacted to optimum moisture content, covered with topsoil, landscaped and provided with drainage and vegetation to prevent erosion in line with best practice; • The spoil disposal site shall be located at least 10m from the road works and 20m from surface water courses and shall be protected from erosion by avoiding formation of steep slopes and by grassing and other planting. 					

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Clearing, grubbing, cut and fill activities, construction of embankments; Gravel extraction from rivers leads to erosion; Stockpile and staging areas lead to loss of land use	Soil erosion & silt generation; Increased runoff / erosion; Sediment contamination of rivers; Turbidity	<ul style="list-style-type: none"> All required materials will be sourced in strict accordance with GOTL laws, guidelines and the EMP; Material stock-piles, borrow pits and construction camps will only be located on unused land or non-agricultural land following consultation with PMU, land owners and suco chiefs. All land will be rehabilitated to its original condition or better condition upon completion of the project works; Excavated material will be reused and surplus will be used to refill borrow pits; In the event that the contractor causes damage to agricultural land, productive land or gardens, the contractor is solely responsible for repairing the damage and/or paying compensation based on the rates in the approved resettlement plan; Embankments and in-stream/river activities will be monitored during construction for signs of erosion. A standby pile of stones and rocks should be kept on hand to be used in the event that there is bank or channel erosion for work in location of stream and river; Gabion baskets, rip-rap or bio-engineering methods will be used to both strengthen the road and to prevent erosion upstream and downstream of bridge abutments; Re-vegetation of riverbanks will be carried out with fast growing species, or other plants in consultation with land owners and suco chiefs, as quickly as possible after work has been completed; Random and uncontrolled fly-tipping of spoil, or any material, will not be permitted. Suitable dump sites will be designated in consultation with land owners and suco chiefs. Dump sites will not be permitted within 50m of rivers or streams or on garden land 	Contractor	IIC	Reduced erosion; Damaged culverts replaced; Reduced flooding and overtopping; Vegetation clearance minimized; No garden or agricultural land used; No dump sites near waterways or coast	Monthly - visual inspection	Contractor; PMU

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		<p>or in areas used for livelihood production by suco residents; and</p> <ul style="list-style-type: none"> Obtaining all necessary permits or approvals for location of construction camps, material extraction sites and sources of construction materials from NDE and other government agencies prior to works commencing. 					
Run-off, discharges, generation of liquid wastes	Impacts on water quality; Increased siltation at culverts and bridges; Construction materials washed out into rivers	<ul style="list-style-type: none"> Lubricants will be stored in containers / dedicated enclosures with a sealed floor >50m from water bodies; Fuel tanks 5000 litres or less will be stored in dedicated areas with a sealed floor >50m from water bodies; Fuel tanks greater than 5000 litres will be stored in a covered walled enclosure with a sealed floor and bunds >50m from water bodies including rivers and streams; Work in rivers will be scheduled during dry season and work duration shall be as short as possible. Bare slopes shall be stabilized immediately after works are completed; Stockpile areas and storage areas for hazardous substances shall be located away from water bodies; Washing of machinery and vehicles in surface waters shall be prohibited; Sediment controls such as silt fences or other sediment reducing devices (rock dams or silt barriers), to prevent both siltation and silt migration during works being undertaken in the vicinity of streams and rivers; Sediment control devices will be cleaned and dewatered, discharges will not be to the rivers or streams. Consultation with land owners and suco 	Contractor	IIC	Discharge of waste as per waste management plan; Occurrence of erosion	Monthly - visual inspection of culverts, and in-stream/river work areas	Contractor; PMU

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		<p>chiefs will identify suitable land-based areas for settling ponds or discharge areas;</p> <ul style="list-style-type: none"> • Diversion ditches will be dug around material stockpiles to catch runoff; • Minimizing interference with natural water flow in rivers, water courses or streams within or adjacent to work sites. Pollution of water resources will not be permitted; • Abstraction from water resources may be permitted after prior approval from PMU in consultation with local suco leaders and local authorities. • Solid wastes, debris, spent oil or fuel from construction machinery or plant, construction material, or waste vegetation removed from work sites will not be dumped in or near streams, rivers or waterways • Discharge of sediment laden construction water or material (including dredged spoil) directly into the rivers, sea, inter-tidal area or surface waters will not be permitted. All such construction water will be discharged to settling ponds or tanks prior to final discharge; • Discharge zones from culverts and drainage structures will be carefully identified, and structures will be lined with rip-rap. Down-drains and chutes will be lined with rip-rap, masonry or concrete; • Spoil and material stock piles will not be located within 10m of the Project road, or within 15 m of waterways, streams or rivers, or on the edge of slopes or hills above rivers or stream or the Project road; • Hydro-carbons, fuel, and other chemicals as required for the works, will be stored in secure containers or tanks located >50m away from surface waters, or streams. Any spills will be 					

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		<p>contained and immediately cleaned up as per the requirements of the emergency response plan prepared by the contractor (and approved by the Engineer; and</p> <ul style="list-style-type: none"> All water, waste-water and other liquids shall be disposed of after treatment in line with the Environmental License. 					
General activities - solid and liquid waste generation	Uncontrolled and un-managed waste disposal impact soil, ground and surface water quality	<ul style="list-style-type: none"> Contractor's CEMP to include section on waste disposal, recycling and re-use of materials from the project; Areas for disposal to be agreed with local authorities and checked and recorded and monitored by the PMU; Segregation of wastes shall be practiced. Cleared foliage, shrubs and grasses may be given to local farmers for fodder and fuel. Organic (biodegradables) shall be collected and disposed of on-site by composting; NO Burning. Waste associated with the project or the supporting activities is NOT allowed to be burned anywhere ; Burning of construction and domestic wastes shall be prohibited; Recyclables shall be recovered and sold to recyclers; Residual general wastes shall be disposed of in disposal sites approved by local authorities; Construction/workers' camps shall be provided with garbage bins; Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest, mangrove and associated salt flats, beaches, places of worship or other culturally sensitive areas or areas where a livelihood is derived, canals, 	Contractor	IIC	Waste handling as per waste disposal plan, recycling and adequate rehabilitation work at disposal sites.	Monthly; visual inspection of work and disposal sites	Contractor, PMU

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		<p>agricultural fields and public areas shall be strictly prohibited;</p> <ul style="list-style-type: none"> • There will be no site-specific landfills established by the contractors. All solid waste will be collected and removed from the work camps and disposed in the local authority designated waste disposal sites; and • Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked if required. 					
Use of hazardous materials	Oil and other hazardous chemicals are spilled into the environment resulting in pollution; Hydrocarbon leakage or spills from construction camps and workshops; Accidents placing people at risk	<ul style="list-style-type: none"> • Emergency Response Plan (as part of EMP) shall be prepared as part of the CEMP by Contractor to cover hazardous materials/oil storage, spills and accidents; • Ensure that safe storage of fuel, other hazardous substances and bulk materials are agreed by PMU and have necessary approval/permit from NDE and local authorities. • Hydrocarbon, toxic material and explosives (if required) will be stored in adequately protected sites consistent with national and local regulations to prevent soil and water contamination. • Equipment/vehicle maintenance and re-fueling areas will be confined to areas in construction sites designed to contain spilled lubricants and fuels. Such areas shall be provided with drainage leading to an oil-water separator that will be regularly skimmed of oil and maintained to ensure efficiency; • Fuel and other hazardous substances shall be stored in areas provided with roof, impervious flooring and bund/containment wall to protect these from the elements and to readily contain spilled fuel/lubricant; • Segregate hazardous wastes (oily wastes, used batteries, fuel drums) and ensure that storage, 	Contractor, PMU (to approve plan)	IIC	EMP and emergency response plan; Ensure storage sites are using existing concrete base; Spills cleaned and area rehabilitated	Monthly or after event or as required - review and approval of emergency response plan; Visual Inspection of storage facilities;	Contractor; PMU

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		<p>transport and disposal shall not cause pollution and shall be undertaken consistent with national and local regulations;</p> <ul style="list-style-type: none"> • Ensure all storage containers are in good condition with proper labeling at least in English and Tetum; • Regularly check containers for leakage and undertake necessary repair or replacement; • Store hazardous materials above flood level; • Discharge of oil contaminated water shall be prohibited and all oily waste shall be taken to Tibar oil disposal facility as required by DNCPIA; • Used oil and other residual toxic and hazardous materials shall not be poured on the ground; • Used oil and other residual toxic and hazardous materials shall not be disposed-off to other sites locally but shall be taken in sealed drums to Tibar oil disposal facility as required by DNCPIA; • Adequate precautions will be taken to prevent oil/lubricant/ hydrocarbon contamination of river channel beds; • Ensure availability of spill clean-up materials (e.g., absorbent pads, etc.) specifically designed for petroleum products and other hazardous substances where such materials are being stored; • Spillage, if any, will not be washed away but will be immediately cleaned up using absorbent cleaning materials with utmost caution to leave no traces; • Spillage waste to disposal sites approved by local authorities and approved by PMU; • All areas intended for storage of hazardous materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulations; 					

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		<ul style="list-style-type: none"> The contractors shall identify named personnel in their CEMP in-charge of storage sites for hazardous materials and ensure they are properly trained to control access to these areas and entry will be allowed only under authorization. 					
Construction activities causing accidental damage to existing services	Interference with existing irrigation, infrastructure; water supply contaminated, and power and telecommunications supplies disrupted through knocking over poles or breaking of pipelines or exposing water table during works.	<ul style="list-style-type: none"> Consult with service providers to minimize physical impacts on public infrastructure and disruption to services; Reconfirm power, water supply, telecommunications and irrigation systems likely to be interrupted by the works and any additional trees to be cut near utilities; Contact all relevant local authorities for utilities and local village groups to plan re-provisioning of power, water supply, telecommunications and irrigation systems; Relocate and reconnect utilities well ahead of commencement of construction works and coordinate with the relevant utility company at the district and district levels for relocation and reconnection well before works commence and include for compensatory planting for trees; Inform affected communities well in advance; Arrange reconnection of utilities and irrigation channels in the shortest practicable time before construction commences; and If utilities or irrigation channels are accidentally damaged during construction it shall be reported to the PMU, DRBFC and utility authority and repairs arranged immediately at the contractor's expense. 	Contractor	IIC	Services damaged and rehabilitated/reinstated; Services re-routed; Service disruptions	As required - visual inspection, consultation with service providers	Contractor; PMU
Encroachment into precious ecology, disturbance of marine and terrestrial habitats,	Impacts on terrestrial habitats; Workers poach animals for food or feathers etc.;	<ul style="list-style-type: none"> Invasive species shall not be introduced. Contractor's site office, work yard, rock crushers, material storage, borrow pits, and quarries will all be approved by PMU and will not be permitted in 	Contractor	Including in Contract (IIC)	Check for poaching and unnecessary vegetation clearance;	Spot inspections; monthly - visual inspection of	Contractor; PMU

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effects on flora and fauna	Protected or sensitive areas affected	<p>any protected areas, ecologically important sites or areas valuable for conservation;</p> <ul style="list-style-type: none"> • Vegetation clearance during construction activities, especially of trees along the river banks and roadside, will be minimized and no greater than the absolute minimum in line with the detailed designs; • Under no circumstances is the contractor permitted to fell or remove mangroves; • Contractors will not cut any trees within or outside the project at the request of the local land owners or suco leaders without prior approval from PMU; • Vegetative cover cleared from the roadside during rehabilitation activities will be kept for land protection and re-vegetation. Contractors will be responsible for re-vegetation in cleared areas; • The contractor will be responsible for providing adequate knowledge to construction workers in relation to existing laws and regulations regarding illegal logging. Contract documents and technical specifications will include clauses expressly prohibiting the felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project; • The contractor will be responsible for providing adequate knowledge to construction workers in respect of fauna. Contract documents and technical specifications will include clauses expressly prohibiting the poaching of fauna by construction workers and making the contractor responsible for imposing sanctions on any workers who are caught trapping, killing, poaching, or being in possession of or having poached fauna; • The PMU will supervise and monitor a ban on use of forest and mangrove timber and workers shall be 			Progress of re-vegetation of work areas; Adequate fuel supplies in camp; Training of workers in information related to sensitive habitats and flora/fauna in the area.	camp and work sites; Re-vegetation activities as per EMP; Consultations with villagers and workers	

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		<p>prohibited from cutting trees and mangroves for firewood; and</p> <ul style="list-style-type: none"> Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees unless justified on engineering grounds and approved by PMU. 					
Accidental encroachment into historical / cultural sites	Impacts on PCR or cultural property sites	<ul style="list-style-type: none"> Contractor's CEMP to include section on "chance finds" Site agents will be instructed to keep a watching brief for relics in excavations. Should any potential items be located, the PMU will immediately be contacted and work will be temporarily stopped in that area. The contractor with the assistance of the PMU will determine if that item is of potential significance and contact MPW to pass the information to the relevant department in GOTL (i.e. Secretary of State for Culture) who will be invited to inspect the site and work will be stopped to allow time for inspection. 	Contractor;	IIC	Sites and/or resources discovered and the protection measures being put in place	<p>During activities</p> <ul style="list-style-type: none"> - stop work order issued; - site/resources dealt with appropriately 	Contractor; Sec. of State for Culture/, PMU
Operation of construction plant and equipment creating noise	Noise in community; Impacts on construction workers	<ul style="list-style-type: none"> Baseline data on noise levels shall be collected before commencement of civil works. Rock crushers and asphalt plant to be located at least 500m from sensitive receivers. Requirements in the EMP and contract documents that all vehicle exhaust systems and noise generating equipment be acoustically insulated and maintained in good working order and that regular equipment maintenance will be undertaken; The contractor will prepare a schedule of operations that will be approved by suco chiefs and PMU. The schedule will establish the days, including identifying days on which there should be no work, and hours of work for each construction 	Contractor	IIC	Adherence to agreed schedule; Complaints (no. logged with resolution); Workers safety equipment	<p>Monthly or after complaint - review schedule Consultation (ensure schedule being adhered to) GRM register</p>	Contractor; PMU

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		activity and identify the types of equipment to be used; <ul style="list-style-type: none"> Workers will be provided with ear defenders and noise abatement equipment as may be required; and Temporary noise barriers will be used if necessary as approved by the PMU Any complaints regarding noise will be dealt with by the contractor in the first instance through the GRM. 					
Presence of vehicles and equipment in villages, use of people's land for access to construction site, traffic and safety issues	Traffic and access disrupted during construction; Traffic safety affected	<ul style="list-style-type: none"> The contractor will prepare, and submit to PMU, a traffic management plan detailing diversions and management measures; Signs and other appropriate safety features will be used to indicate construction works are being undertaken; Contract clause specifying that care must be taken during the construction period to ensure that disruptions to access and traffic are minimized and that access to villages along the project road is maintained at all times; Provincial Works and village officials will be consulted in the event that access to a village has to be disrupted for any time and temporary access arrangements made; Construction vehicles will use local access roads, or negotiate access with land owners, rather than drive across vegetation or agricultural land, to obtain access to material extraction sites. Where local roads are used, they will be reinstated to their original condition after the completion of work; The road will kept free of debris, spoil, and any other material at all times; Disposal sites and haul routes will be identified and coordinated with local officials; 	Contractor, Sucos	IIC	No. of accidents or events; Maintenance of access; Signage; Road free of materials and debris; Haulage routes rehabilitated	During activities - Visual inspection; Consultations; Review of traffic management plan	Contractor; PMU

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		<ul style="list-style-type: none"> Provision of adequate protection to the general public in the vicinity of the work site, including advance notice of commencement of works, installing safety barriers if required by villagers, and signage or marking of the work areas; and Provision of safe access across the works site to people whose villages and access are temporarily affected during road re-sheeting activities. 					
General activities, handling equipment and plant; construction vehicles	Worker health and safety risks	<ul style="list-style-type: none"> At least one month before construction commences the contractors will demonstrate to the PMU they are properly resourced and a qualified/experienced environment and safety officer (ESO) will be identified by the contractors in the bid; Establishment of safety measures as required by law and by good engineering practice and provision of first aid facilities at work sites, in vehicles and establishment of an first aid/health post at the camp; The contractor will conduct training (assisted by PMU) for all workers on safety and environmental hygiene at no cost to the employees. The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities; Instruction and induction of all workers by the contractor in health and safety matters, including road safety is required for all operatives before they start work; The contractor will instruct and induct all workers in health and safety matters (induction course) including construction camp rules and site agents will follow up with toolbox talks on a weekly basis. Workforce training for all workers starting on site will include safety and environmental hygiene; 	Contractor with some assistance from PMU	IIC	No. and types of trainings conducted, safety measures being established.	Spot inspections; Monthly - visual inspection of camp and work sites; training records, consultation with workers regarding trainings.	Contractor; PMU

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		<ul style="list-style-type: none"> Workers shall be provided with appropriate personnel protection equipment (PPE) such as safety boots, helmets, reflector vest, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers; Fencing will be installed on all areas of excavation greater than 1m deep and on sides of temporary works; Fencing will be installed on all excavation, borrow pits and sides of temporary bridges; Reversing signals (visual and audible) shall be installed on all construction vehicles and plant. Provision of potable water supply in all work locations; Scheduling of regular (e.g. weekly tool box talks) to orientate the workers on health and safety issues related to their activities as well as on proper use of PPE; Where worker exposure to traffic cannot be completely eliminated, protective barriers shall be provided to shield workers from passing vehicles. Another measure is to install channeling devices (e.g., traffic cones and barrels) to delineate the work zone; and Construction camps shall be provided with toilets/sanitation facilities in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. To ensure these facilities never overflow they shall be well maintained and cleaned regularly to encourage use and allow effective operation and emptied regularly at disposal site approved by PMU. 					

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Presence of construction workers	Various social impacts including: (i) social disruption; (ii) possibility of conflicts or antagonism between residents and workers; (iii) spread of communicable diseases including STIs and HIV/AIDS; (iv) children are potentially exposed to exploitation; (v) impacts on community health and safety	<ul style="list-style-type: none"> The contractor will appoint an ESO to address health and safety concerns and liaise with the PMU and sucos within the Project area; Barriers (e.g., temporary fence), and signs shall be installed at construction areas to deter pedestrian access to the roadway except at designated crossing points; Adequate signage and security will be provided at the site office and works yard and prevention of unauthorized people (including children) entering work areas and camp. Warning signs will be provided at the periphery of the site warning the public not to enter; The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation and these sites will have a watchman at the entrance to keep public out; Speed restrictions shall be imposed on project vehicles and equipment traveling within 50m of sucos and sensitive receptors (e.g. residential, schools, places of worship, etc.); Upon completion of construction works, borrow areas will be backfilled or temporarily fenced, awaiting backfilling; Provisions will be made for site security, trench barriers and covers to other holes and any other safety measures will be installed as necessary; Drivers will be educated on safe driving practices to minimize accidents and to prevent spill of spoil and hazardous substances (fuel and oil) and other construction materials during transport; Contractors will ensure that no wastewater is discharged to local water bodies, mangroves, rivers, streams or lakes; 	Contractor, Suco Chiefs, PMU; approved service provider	IIC + costs for program (already identified)	HIV/STIs awareness campaign implemented; ESO recruited; Training implemented; Provision of safety equipment; Signage and security to prevent unauthorized people entering camp; Signage installed as required;	As required; Monthly or after complaint - ESO recruited; Training records; Staff records; Visual inspection; Consultations with villagers; Checking of complaints; Consultations with workers re: training	Contractor; PMU;

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		<ul style="list-style-type: none"> Measures to prevent proliferation of mosquitoes shall be implemented (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside); The contractor will make prior provision to ensure the construction workforce attends STI and HIV/AIDS prevention workshops provided through an approved service provider. The workshops will be delivered to the contractor's workforce prior to commencement of any civil works; and Suco-based community awareness-raising about transmission of STIs and HIV, reproductive health and safe sex. The program will be implemented after to contractor mobilization and staff are in post but prior to the commencement of civil works. No child labour will be used 					
Site office and works yard and use of water and electricity supplies	Stress on resources and existing infrastructure	<ul style="list-style-type: none"> Site office and works yard located, if possible, in areas better supplied with infrastructure and services; Contractor to supply temporary facilities i.e. health post, accommodation, water and electricity, telecommunications, and sanitation 	Contractor	IIC	No. concerns raised and resolution; Service supply to camp and office	Ongoing - consult with villages along project road to monitor environmental concerns	PMU
OPERATION PHASE							
Operation of vehicles creating emissions	Hydrocarbons, Carbon Monoxide, Nitrous compounds, Sulphur Dioxide and particulate matter increase through increased traffic	<ul style="list-style-type: none"> Forecasts of traffic growth indicate that emissions will be low and not have a noticeable effect on air quality; Landscaping along roadside to reduce dust impacts 	DRBFC; routine maintenance contractor	IIC	Air quality; Particulates and smoke; No. complaints; incidents logged with resolution	Monthly or as required - consultation and visual observations; Complaints;	Maintenance Contractor; PMU

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Routine and ongoing maintenance	Constriction of water flows through structures blocking water flow; The need for gravel for on-going road maintenance leads to acquisition of new source areas affecting properties; Standing water degrades road and surrounding environment	<ul style="list-style-type: none"> Maintenance of structures to ensure debris does not collect and result in damage to culverts and drainage structures, riverbanks, or land through altered flow patterns (see below); MPW will negotiate with resource owners and prepare an MOU acceptable to all parties; Drain and fill areas where water can pool as part of ongoing maintenance activities 	DRBFC; routine maintenance contractor	IIC	Satisfaction with MOUs; Condition of road	As required or as per PSA - MOUs; Routine maintenance records; Visual inspection; As per monitoring framework included in PSA	MPW/DRBFC; ADB
River training and drainage	Alterations to river flow; Restriction of natural meandering of streams; Restriction of natural flood cycles by temporary storage of floodwaters and restricted flood plain movements	<ul style="list-style-type: none"> Proper maintenance of structures to ensure river debris does not collect and result in damage to banks and land; Scour protection; Good design to ensure normal flood behaviour maintained as closely as possible through use of transparent structures and relief culverts Frequency of maintenance is increased and that storm drains and highway drainage systems are periodically cleared to maintain clear drainage to allow rapid dispersal of storm water flow. An adequate system of monitoring, reporting and maintenance will be developed. 	MPW/DRBFC; routine maintenance contractor	IIC	Erosion; Flooding patterns; Culverts and drainage structures cleared of debris	2 times a year for 3 year, mid-term and post-eval. monitoring - check designs; Visual assessment; Review of flooding patterns/records	MPW/DRBFC; ADB
Run-off from road	Use of the road results in problems with runoff, loss of soils and other forms of erosion; Water quality in rivers and near-shore areas is affected by use of the new roads (debris laden run-off and silts etc.)	<ul style="list-style-type: none"> Maintenance of erosion control structures, preventing debris build-up and ensuring good vegetation cover; Roads will be better compacted, covered and provided with culverts and drains; Awareness of the value of maintaining vegetation cover will be undertaken 	DRBFC; routine maintenance contractor	IIC	Water quality in streams and rivers; Suspended solids from road or areas of erosion, if identified	2 x year for 3 year, mid-term and post-eval. monitoring - visual assessment; Consultations or complaints	MPW/DRBFC; ADB

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Climate change issues	Unexpected and costly failure of road; Impacts on rainfall, groundwater depletion, or carbon emissions not expected	Note: The Project will not induce climate change; Climate-change adaptation works implemented to accommodate extreme weather events.	DRBFC; routine maintenance contractor	IIC	Tidal, stream/river heights and velocities; Flooding frequency; Localised erosion	Visual; Review rainfall and flooding records	Contractor; PMU
Improved access to previously inaccessible, or difficult to reach, areas	Hunting and poaching increases	<ul style="list-style-type: none"> Lack of through-route access and low traffic volumes means it is unlikely there will be any impacts on flora and fauna; There are no rare or endangered species that could be affected by operation; There is no direct access from the project road to protected areas near the Project area 	DRBFC; routine maintenance contractor	IIC	Increases in hunting activity; Reduced sightings of fauna	2 x year for 3 year, mid-term and post-eval. monitoring - visual assessment; Consultations	MPW/DRBFC; ADB
Increased traffic	Increases in noise nuisance for residents; Increased traffic volumes and higher speeds leads to accidents	<ul style="list-style-type: none"> Low traffic forecasts and the low population density means that ambient noise levels will not significantly increase General safety will be improved through providing a shoulder and widening within ROW Installation of road safety signage Work with police to carry out enforcement of traffic regulations once road is upgraded Awareness raising through village meetings will be needed to create road safety programs Ongoing community awareness ascertain village concerns regarding traffic calming & management 	MPW/DRBFC; Local police	IIC	Accidents and collisions; Safety issues discussed in schools; Effectiveness of traffic calming measures	2 x year for 3 year, mid-term and post-eval. monitoring - consultation and visual observations; Complaints; Collect road accident data	MPW/DRBFC; ADB
Spread of communicable diseases	Roads act as pathway for spread of communicable diseases such as HIV and STIs	<ul style="list-style-type: none"> At expected traffic volumes, risk of spread of such diseases are not expected 	DRBFC; routine maintenance contractor	IIC	Health status of people; No. of cases of STIs etc.	2 x year for 3 year, mid-term and post-eval. Consultations with villagers; Review health records (STI data)	MPW/DRBFC; ADB

IMPACT MITIGATION					IMPACT MONITORING		
Project activities	Environmental Impact	Mitigation measures to be included in EMP	Mitigation Responsibility	Mitigation Cost (US\$)	Parameter to be monitored	Frequency and means of verification	Monitoring Responsibility
Any other	Unintended or unanticipated impacts	<ul style="list-style-type: none"> As required to avoid or reduce effects or impacts 	DRBFC	TBA	TBA	As above, as required	MPW/DRBFC; ADB

11. Public Consultation and Information Disclosure

11.1 Introduction and Stakeholder Identification

335. The objectives of the stakeholder consultation process are - (i) to disseminate information on the project and its expected impact, long-term as well as short-term, among primary and secondary stakeholders and (ii) to gather information on relevant issues so that the feedback received could be used to address these issues at early stages of project design. Another important objective was to determine the extent of the concerns amongst the community, to address these in the Project implementation and to suggest appropriate mitigation measures. The feedback received has been used to address these issues at early stages of project design.

336. Stakeholders consulted for the project included local affected persons, suco leaders, district and sub-district authorities, educational institutions, health care providers, water supply officers and other groups with an interest in the project corridor where the improvements will be implemented. Individuals representing numerous family groups in the sucos along the alignment were informed about the project and invited to comment on their environmental concerns. These stakeholders were considered to be representative of the community living in the area, the road users, the business associated with the road and the locally elected representatives. Consultations have taken place in two phases with these stakeholders.

337. The first phase of disclosure took place through one on one consultations with relevant agencies and authorities within Baucau and Viqueque districts. The meetings were held in June, 2015. Stakeholders met with consist of Baucau Vila Sub-District Administrator (Sra. Regina de Sousa), Venilale Sub-District Administrator (Sr. Julio Ximenes), Ossu Sub-District Administrator (Sr. Candido H. da Silva) and head of villages along the alignment. During the meetings, the environmental and social consultant team shared the basic concept and scope of the preparatory survey. Those consulted generally support the upcoming work and provided input related to environmental issues, land acquisition and resettlement.

338. The second phase of consultation took place within September 4 and September 30, 2015 in all sucos along project alignment. These public consultation meetings informed the public generally on the technical aspects of the project and explained in more detailed relevant environmental and socio-economic issues. Participants included suco and aldeia leaders, as well as property owners and other potentially affected communities living close to the existing alignment. A detailed report on those attended the suco meetings are provided in Appendix 1.

339. The third consultation phase is a special stakeholder consultation that was held on October 17th, 2015 with the Department of Protected Area and National Park under the National Directorate of Natural Conservation, Directorate Geral of Forestry, Ministry of Agriculture, Fishery and Forestry. This consultation was for the purpose of identifying potential environmental issues related to activities for the rehabilitation work near Mt. Mundo Perdido Protected Area as well as to identify the potential for the existence of *Ficus albipila* (locally known as hali mutin) trees along project alignment. Results on the distribution of *Ficus albipila* along project alignment are reported in Section 4.2 Biological Environment.

11.2 Concerns Raised and Responses

340. The communities along the project road generally indicated they would support the rehabilitation and improvement project. Some suggestions were made on the alignment, rehabilitation activities and the need to preserve water resources (irrigation and water supply sources) along project alignment. The main environmental concerns included erosion problems, safety measures and dust problems. Most of the concerns were related to impacts during construction activities, no much significant operational phase impacts were identified. Table 11.1 contains a summary of comments from participants during the second phase of public consultation.

Table 11.1 Comments from participants at the second phase of public consultation

Technical Aspect	
1.	I think this development plan is good and will help the areas here developed more.
2.	The community is happy for this project because it conducts public consultation meeting. We have also noticed that the project is progressing fast, after consultation meeting, detailed data collection is happening in the next week. Community is excited to know this.
3.	The road will be widened to the right and left sides, by how many meters?
4.	Can the alignment road change? Because there is an alternative road built on community land that community can offer. Currently, the alternative road has not been sealed with asphalt but the road has been hardened and is passable. If the alternative road is being rehabilitated rather than current alignment, it will save many properties along the current alignment.
5.	Suggestion: regarding alternative road, we suggest that the team consider it because it will save a lot of houses and structures along current alignment. The church which has recently been rehabilitated might also be affected (Note: the church referred to in this comment is the Uailili Church at STA9+480Left and will not be affected)
6.	The curves along the road should be smoother if the road was to accommodate faster traffic.
7.	The Road Network Upgrading Sector Project (RNUSP) is funded by ADB, the quality of the project should be international standards.
8.	The widening of the road could be to the right or left side depending on the design. If the road is widened to the left side, in this village, many houses will be spared (Note: comments was from Suco Uma Ana Ulo/Uma Ana Ico as well as Suco Ossu de Cima. Much of the widening is actually conducted as suggested).
9.	Will the design parameters of the upcoming national road widening be consistent with the design parameters of existing road construction?
Environment	
1.	Rural water sources (water supply and irrigation lines) might be affected by project operations. Mitigating measures should be prepared to minimize impacts to these natural resources.
2.	There are sacred springs near to existing road, if it is affected, please coordinate with local authority and customary caretaker (<i>lia nain</i>) to organize ritual events before removing the sacred water, otherwise the community will get in trouble.
3.	There are impacts on public health due to dust from construction activities. Usually what happen in Timor Leste, contractor does not want to be bothered by it.
4.	During previous road rehabilitation work, contractor mobilized heavy machinery near houses and some structures are affected (ruptures on the walls). I hope during this project, the contractor will do better and no structures will be affected like that.
5.	Community does not dispute the road widening program. Just be aware about our public springs near the road.
Land Acquisition & Resettlement	
1.	Just want to say that at this time, I do not want to comment much (related to compensation). But when implementation is on-going, I might comment more based on my observation
2.	Some areas along the road within the suco were eroded so community planted trees, some are teak, others are non-productive trees such as Ai Hali. These trees have been doing its job holding up erosion along the road. If affected, will the trees be compensated?
3.	Concerning <i>fatin lulik</i> (sacred space/land/tree) and other things near the road, these can be relocated or removed. However, agricultural activities are our livelihood and need to be maintained. Just want to emphasize that crops and paddy fields that are affected need to be compensated.
4.	Suggestion: the coordination for implementation of the road project should always be updated to community and local authority so community is clear of what is coming up next.
5.	The cemetery in this suco (Uma Ana Ulo/Uma Ana Ico) is near to the road side on the right. If affected, the cemetery can be relocated to other place but need to provide funds for adat ceremony as well.
6.	How about productive trees/plants? Will they get compensation? Previously, during implementation of the electricity project, the contractor was cutting down many trees without compensation.
7.	Just want to comment, the community is confused of the different types of projects that are happening in the community (related to the previous electricity project). I think, any program runs by the government should be conducted in a consistent manner. When it is different like this, the community is not happy.
8.	The community is ready to contribute for the national road project. Even without compensation is fine. What we request is a declaration letter from the government saying that this certain person has contributed this number of trees and this much land for the development of the road.

341. Concerns about destruction of crops and gardens, structures near the road and other environmental impacts such as erosion and loss of water supply system has been brought up by the community during the participation meeting. The main environmental issues raised are addressed in the environmental management plan, as far as reasonably practicable at this stage. A resettlement plan has also been prepared to compensate for affected property or

assets. Unforeseen impacts will also be captured by the requirements to update the environmental management plans and inform PMU/NDE in response to any unpredicted impacts. The main environmental and social concerns raised and the responses are presented in the following table. Compensation issues dominated the second phase of community consultation.

Table 6.2 – Concerns Raised and Responses

Concern raised	Response
Environmental Concern	
<p>There are 3 points of landslide in this suco, two are far from the project side but one is very close</p>	<p>Thanks for the info. We will assess the landslide area. Assessment has been conducted, the landslide prone area is between STA 24+540 and STA24+680 . The area is locally called <i>Rai Manu Ten</i>, literally means “chicken manure land” an attribution to the soft and erosion prone nature of the land. Measures for stabilization have been included in design.</p>
<p>Some houses have been built in landslide-prone areas (Suco Fatulia), they can be impacted from climate change and it might be fatal for the community. In this case, what should we do and what can the contractor do?</p>	<p>Landslide is part of environmental risks in areas with steep slopes like this village. And what was stated was right, climate change cause changes in rainfall. Rainfall could be more concentrated in a shorter period of time and this can lead to landslide. When possible, do not build in steep slope area. When this is not possible, community can develop terraces, drainage lines and plant trees to help with the erosion risk. For road construction, to prevent landslide, the contractor will construct retaining structures, implement bioengineering measures and provide adequate drainage structures.</p>
<p>In my experience during previous construction work, contractor dumped a lot of leftover asphalt in front of my house. This causes declining soil quality and leads to ponding during the rainy season. Not happy about that.</p>	<p>Leftover asphalt and other spoils should not be dumped in front of people’s properties. They should be dumped at proper places previously designated in coordination with local authority. However, sometimes, even though contractor has been made clear of the need to protect the environment and local community, they still do otherwise. When this kind of things happen, local community can complaint to chefi de suco who can complaint to the contractor directly or to the consultants that are supervising activities on the ground.</p>
<p>There are impacts on public health due to dust from construction activities. Usually what happen in Timor Leste, contractor does not want to be bothered by it.</p>	<p>Contractor will be obligated by contract to protect local community from getting impacted from dust. Prolonged or severe dust exposure could cause Respiratory Tract disease that could severely affect the health of children and older residents. So the contractor is obligated to spray more than once a day in villages or areas where there are concentration of population.</p>
<p>During previous road rehabilitation work, contractor mobilized heavy machinery near houses and some structures are affected (ruptures on the walls). I hope during this project, the contractor will do better and no structures will be affected like that.</p>	<p>Thanks for the notification. Vibration impacts could cause ruptures to structures and mobilization of heavy machinery shuld be carefully conducted near concentration of structures. This will definitely be noted in the EMP and should this kind of things happen again, community should report to local authority.</p>
<p>How do we relocate water springs that are near the road side? Technically, how to remove natural spring (<i>bee moris</i>) from the project area?</p>	<p>Depending on the structure of the aquifers that make up the spring, that is, how water is seeping out of th rock layer as well as the size of the aquifer, some springs can be relocated away from the road and some can not. In the case there are springs, especially important springs providing water to many HHs around, the spring will be protected. Realignment of road can be done to protect the spring.</p>
<p>How about irrigation lines, will they be removed before rehabilitation?</p>	<p>All public utilities (irrigation, water supply and electricity lines) that are near the road and affected from the development will be relocated prior to the start of construction activities.</p>
<p>The teak trees is along the road (STA 47+000 to STA56+800 with other tree communities in between) most of them belong to the government. Only very little belong to the community. I was wondering, if there are affected trees, will they be compensated. If so, the project might pay the compensation to Forestry. As a community though, I was wondering whether the affected trees once they are cut can be donated to the community.</p>	<p>Thanks for the input. For ownership of teak trees need to confirm to forestry directorate of Viqueque. They will determine whether the trees can be donated to the community or not. When there are affected teak trees that belong to community, it will be compensated directly to the owner.</p>
Social Safeguarding Concern	

Concern raised	Response
My family's customary house ("uma lulik") is located very close to existing alignment. Worried that the structure might be affected and wondering that for customary houses, how much compensation will be paid? Is it the same as affected residential structure?	Compensation for affected customary store house (Uma Adat/Uma Lulik) is different from compensation for affected residential structure. For uma lulk, there will be additional consideration since rebuilding will likely require customary ritual and gathering of the clan.
In the case that an affected house can not be rebuilt on the same plot because the rest of the plot is on steep slope and prone to landslide, how will the team resolve this issue?	Re: affected houses that can not be restructured on the same plot, the team will conduct detailed survey that will be coordinated with Public Work, the PMU, local leader and affected HH to find a suitable property to build the new house. The principle is to provide solution that is fair and just for the owner of affected property. So, when there is problems, we will look for solution that is fair for everybody.
The team talked about the 5m RoW. How will we measure the 5m, will we measure it from the centerline?	The 5m RoW will be measured from the side of existing road.
Community never heard the 5m RoW policy before. Concerned about the paddy fields because the fields have been passed down for different generations so they should be counted as property of the community members.	Currently, land ownership law is still not being approved yet. Once it is approved we can say for sure that the 5m RoW is based on law in effect. It is actually an international practice in different countries that lands immediate to the sides of the road should be clear from development to accommodate future expansion of the road. GoTL adopted the same policy.
How about houses or productive trees built/plant after detailed survey. Will it get compensation?	Compensation list will be based on detailed survey that will be conducted in about a month; If there are newly constructed structure/plants that were built after detailed survey, it will not be compensated.
Those properties with land deeds from Indonesian time, will it still be recognized?	For properties with land deeds from Indonesian time, the land deeds are valid and can be presented during detailed survey. However, the 5m RoW will still be in effect.
<ul style="list-style-type: none"> • The soccer field and basketball court (STA13+360 to STA 13+560) could be affected. Can we save them? • There are houses in front of the soccer field. If we the road was going to be widened, better be towards the soccer field because it is empty land. • It is better to widen the road toward the soccer field because across the road, there are houses and also the suco office which is currently also being used as pre-school and kindergarted for the children. 	<p>Thank you for the input. We will note all that has been suggested. <u>The consultant team checked the detailed drawing and this road section will be widen towards the soccer field so generally in line with the majority of community's input.</u></p>

342. Due to the close proximity of a section of the road to Mt. Laritame, Mt. Mundo Perdido and Mt. Builo Protected Areas, a special stakeholder consultation was held with the Department of Protected Area and National Park to identify several important points relevant to construction activities and protection of cultural and ecological resources within the national park. Important input from the consultation are:

- The Protected Areas' coverage are mostly on the peaks of the mountains. Therefore, the Protected Area and National Park department is not that concern about potential encroachment into the protected areas.
- Teak plantation especially around Ossu, is government owned. If teak trees near the road are affected, contractor or PMU should coordinate with the Forestry division in Viqueque.
- Mt. Laritame and Mt. Mundo Perdido Protected Areas could be delineated as one protected area in the future with appropriate zoning according to existing and potential uses. This has also been identified in the National Ecological Gap Assessment (NEGA, 2010). However, not much efforts have been made toward this as the department is focusing on the upgrade of the Mt. Cablaque Protected Area into a National Park.
- Existing quarry near the boundary of Mt. Mundo Perdido (STA36+120Right) should not be further mined for RNUSP rehabilitation work. Current mining activities have been protested by the *chefi de suco* of Ossu de Cima as well.

343. Consultations will continue throughout preconstruction and construction phase as per project's communications plan. Records including reports on environmental and social complaints and grievances will be kept in a simple database in the PMU Project Office. There are no significant potential constraints of public or private groups for the project.

11.3 Information Disclosure

344. Information disclosure will be undertaken as per the requirements of SPS 2009. In disclosing the environmental documents to the public, the MPW through the PMU is responsible for (i) providing the SEIS to ADB for review and an SEIS to NDE for clearance; (ii) ensuring that all environmental assessment documentation, including the environmental due diligence and monitoring reports, are properly and systematically kept as part of the project specific records; (iii) disclosing all environmental documents, and making documents available to public, on request; and (iv) providing information to the public and stakeholders as per the Project's communications plan.

345. Disclosure of relevant environment safeguards documents will be in an appropriate form, manner, and language and at an accessible location to be understandable to the affected people and local stakeholders.

346. Where indigenous people or a linguistic group requires translation assistance, the Project will ensure that translators and translation of information materials will be available. This will be done in a manner to ensure full consultation with and disclosure to affected people, stakeholders and communities regarding the requirements for environment mitigation and monitoring as well as for land acquisition.

347. The following safeguard documents to be prepared and submitted by the PMU shall be publically disclosed by GOTL including posting on ADB's website:

- Draft and final SEIS or other environmental assessments;
- New or updated environmental assessment reports if prepared to reflect significant changes in the project during design or implementation;
- Corrective action plan prepared during project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and
- Quarterly safeguards monitoring reports and other reports submitted by the PMU during project implementation (PISC will report monthly to PMU).

12. Difficulties Encountered

348. No particular difficulties were encountered by the consultants in compiling the SEIS. Limitations. Lack of environmental laboratory services is one of the limitations to completing environmental assessment in Timor-Leste. The Rural Water Sanitation Service (SAS) under the Ministry of Public Works, can perform water quality analysis but its laboratory capability is limited. Another limitation in conducting environmental studies in Timor-Leste is the absence of baseline ambient environmental data. However the regulatory framework, including that for environmental protection is now in place.

13. Conclusion and Recommendations

13.1 Findings and Conclusions

349. The improvement of the 58.2km section of Road Baucau-Viqueque offers a robust option for the enhancement of the existing road network. The works are restricted to the existing road corridor and whereas there may be some small areas of land required where the road geometry is improved, these will be very limited as there is no road widening proposed and there is not likely to be any significant additional land required to complete the construction. Due diligence has been prepared and a resettlement review concluded there will not be any compensation needed for affected people for lost assets. No particular difficulties were encountered by the consultants in compiling the SEIS.

350. The road is an existing piece of infrastructure and does not traverse any protected areas or areas of conservation value, including primary forests, terrestrial reserves, important bird areas or community managed marine protected areas. The Project will not create any impacts on cultural or heritage sites and neither does it pass through densely populated areas or an area subject to heavy development. The proposed Project will not create conflicts with natural resource allocation.

351. The construction impacts should be very predictable and manageable and with appropriate mitigation, few residual impacts are likely. Additional human and financial resources will be required to improve environmental capability and to progress and achieve necessary statutory compliance and environmental clearance and the associated activities that also require environmental permits under the environmental laws of Timor-Leste. The EMP is based on the type, extent and duration of the identified environmental impacts.

352. Implementation of appropriate measures during the design, construction, and operation phases will minimize negative impacts to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures will be included in the contract specification. Contractors' conformity with contract procedures and specifications and implementation of the approved CEMP during construction will be carefully monitored. The contractor will be required to follow standard construction practices and comply with a series of contractual requirements which will be monitored and supervised by PMU. Environmental monitoring of the project will be undertaken regularly through the first three years of its operation to ensure that the measures are being implemented properly.

353. The Project will have an overall beneficial impact, improving access, reducing coastal erosion, reducing dust, reducing travel time and travel costs, while improving socio-economic conditions. It will have insignificant negative impacts that will nevertheless be carefully monitored and adequately mitigated. A major benefit of the Project is the accessibility to the social services being provided.

354. The overall conclusion is that the Project complies with environmental categorization B, and therefore, the completion of this SEIS fully meets GOTL and ADB's requirements and no further environmental study is required for the core Project road.

13.2 Recommendations

355. The recommendations of this SEIS are: (i) the SEIS be accepted by ADB and DNCPIA as the statement of project's environmental effects and how they will be mitigated; (ii) Contractor to prepare a CEMP based on the pre-construction and construction parts of the EMP included in this SEIS detailing their specific construction methodologies and submit to PMU for review and approval; and, (iii) the project impacts and mitigation thereof, be monitored as per the monitoring plan.

356. The background information provided by the PMU and design consultants has been reviewed and the policy, legal, and administrative framework has been described.

357. The project has been described and the rehabilitation of the Baucau – Viqueque road offers a robust option for the enhancement of the existing national road network. The

improvement works are restricted to the existing road corridor. There is no major realignment other than the short section at Km22+600 to avoid the caves..

358. The environment has been described and the project is mostly an existing piece of infrastructure and does not traverse any protected areas or areas of conservation value, including forests, terrestrial reserves or community managed marine protected areas. The project will pass through some wooded areas that have trees that have previously been thinned out that are regenerating naturally. The Project finishes more than one kilometre north of the mountain areas identified earlier as important bird areas. The project will not create any impacts on cultural or heritage sites. The proposed project will not create conflicts with natural resource allocation.

359. The anticipated environmental construction impacts have been described in the design, construction, and operational phases and they should be very predictable and manageable and, with appropriate mitigation, few residual impacts are likely. Additional human and financial resources will be required to improve environmental capability and to progress and achieve necessary statutory compliance and environmental clearance and the associated activities that also require and environmental permits under the environmental laws of Timor-Leste. The mitigation measures are described in the EMP and they are based on the type, extent and duration of the identified environmental impacts.

360. The EMP explains the proposals for the implementation of appropriate measures during the design, construction, and operational phases that will minimize negative impacts to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures will be included in the contract specification.

361. The contractor's conformity with contract procedures and specifications and implementation of the approved CEMP during construction will be carefully monitored. The contractor will be required to follow standard construction practices and comply with a series of contractual requirements which will be monitored and supervised by PMU. Environmental monitoring of the project will be undertaken regularly through the first three years of its operation to ensure that the measures are being implemented properly.

362. The project will have an overall beneficial impact, improving access, reducing coastal erosion, reducing dust, reducing travel time and travel costs, while improving socio-economic conditions.

363. The project will have some negative impacts that will be confined to the project corridor and nevertheless will be adequately mitigated and carefully monitored. A major benefit of the project is the accessibility to the social services in Dili being provided by faster access along the north coast road.

364. Information has been disclosed, participation of stakeholders has been encouraged and there has been consultation with the public, local authorities and persons affected by the project. There is generally good public support for the project. A GRM, based on procedures working well under other projects, is proposed in order to deal with complaints during implementation. The GRM will be implemented by the PMU and contractor and the process will be elaborated in the CEMP.

365. The overall conclusion is that the project complies with environmental categorization B, and therefore, the completion of this SEIS fully meets both GOTL and ADB requirements.

366. Recommendations. The recommendations of this SEIS are: (i) the SEIS be accepted by ADB and DNCPIA as the statement of project's environmental effects and how they will be mitigated; (ii) the contractor to prepare a CEMP based on the pre-construction and construction parts of the EMP detailing their specific construction methodologies and submit to PMU and PISC for review and approval; (iii) the project impacts and mitigation thereof, be monitored as per the monitoring plan; and (iv) the reporting requirements as set out in this SEIS be followed by the PMU, PISC and contractor







14. Non Technical Summary

	English	Tetum
1	Introduction: The Government of Timor-Leste (GOTL) will be supported by the ADB International Cooperation Agency (ADB) to finance the upgrading of National Road No.6 as part of a comprehensive program of road rehabilitation for priority roads in Timor-Leste that links major cities and towns; implemented by Ministry of Public Works, Transport and Communications (MPWTC). This SEIS report covers 58.2km of the A06 (Baucau to Viqueque). The rest of the national road alignment is also a priority for follow up study and will be a subject of another SEIS. The Project Management Unit (PMU) within MPWTC will manage and implement the project as it is financed by one of GOTL's development partners including implementation of environmental safeguards, mitigation measures and other requirements.	Introdusaun. Governu Timor-Leste (GoTL) sei hetan suporta husi ADB Agencia Cooperasaun Internasional (ADB) atu financia melhoramentu Estrada Nasional No.6 hanesan parte ida husi programa komprensivu rehabilitasaun estradas prioridades iha Timor-Leste ne'ebe liga munisipius no cidades sira; implementa husi Ministério Obras Públicas, Transportes e Comunicações (MOPTC). Relatoriu DIAS ida ne'e kobre km58.2 A06 (Baucau ba Viqueque). Estrada nasional seluk mos sei sai prioridade no sei continua halo estudo DIAS seluk. Unidade Jestaun Projetu (PMU) iha MOPTC sei jere no implementa projetu ne'ebe financia husi GoTL nia parseiru dezenvolvimentu ida, inklui implementasaun husi salva guarda ambientais, medidas mitigasaun no rekezitus sira seluk.
2	The Proponent is the Government of Timor-Leste, Ministry of Public Works, Transport and Communications.	Proponente mak Governu Timor-Leste, Ministériu Obras Públicas, Transportes e Comunicações.
3	The EIA environmental consultants who completed the SEIS are identified.	Konsultór EIA ambiental ne'ebé kompleta DIAS ne 'e identifika tiha ona.
4	Project description: The Project will improve and rehabilitate 58.2km of the A06 (Baucau-Viqueque) by widening and resurfacing to bring it back up to standard following international best practices and quality standards and providing one wider traffic lane per direction, with sealed hard shoulders and / or sidewalks in villages and improved bridges. Drainage will also be cleaned and improved, curves will be widened and new road markings and signs will improve road safety.	Deskrisaun Projetu. Projetu ne'e sei melhora no reabilita 58.2km husi A06 (Baucau-Viqueque) ho haluan no rekapa atu nune'e bele atinji fila fali padraun tuir praticas Internasional no padraun kualidades no fornese liña trafikku ne'ebe luan kada dirasaun, no fui hametin Estrada nia ninin / trotoar iha aldeias no halo melhoraun ba pontes. Drainaze mos sei hamos no hadia, kurvas sei halua no marka no sinais estrada foun sei aumenta seguransa trafikku.
5	Legal framework: The implementation of the Project is governed by laws, regulations, and standards for environmental protection and management of GOTL including the Basic Law of Environment (April 2012) and the Decree Law 5/11 on environmental licensing. In addition to GOTL's requirements the Project must comply with ADB's Guidelines for Environmental and Social Considerations. According to both Timorese law and the ADB's Guidelines, the Project is classified as Category B because the potential adverse environmental impacts are site-specific and mitigation measures can be designed readily.	Kuadru Legal: Implementasaun Projetu sei baseia tuir Lei, matadalan no padraun ba jere no proteje ambiental husi GoTL inklui Lei Basiku do Ambiental (Abril 2012) no Dekreto Lei 5/11 konaba licenciamentu ambiental. Alende ho rekezitus GoTL nian Projetu tenki kumpri mos Matadalan ADB nian konaba Konsiderasaun Ambiental no Social. Bazeia ba Lei Timor-Leste no matadalan ADB nian, Projetu refere klasifika ona ho kategoria B tamba potensia adversaun impaktu ambiental situ-espesifiku no medidas de mitigasaun bele desenha ona.
6	Description of Environment: The environmental setting for the Project in terms of the surrounding physical and biological features is described including social and economic conditions, livelihoods and quality of life.	Deskrisaun Ambiental: Kondisaun ambiental ba Projetu iha termus karakterizasaun fiziku no biolojiku deskrebe ona inklui kondisaun social ekonomia, moris lor-loron no kualidade da vida.
7	Alternatives to the road upgrading including the "do nothing scenario", alternative alignments, and alternative transport modes have been assessed. The viable alternative is a widened road with widening parts of the existing route. This route will contribute to the economic and social development of the communities near the existing road corridor. Alternative transport modes are not viable at this stage.	Alternativas ba hadi'a estrada inklui "senáriu la halo buat ida", alinamentus alternativus, no modas transportes alternativus avalia ona. Alternativu viabel mak haluan estrada ho haluan ba partes sira husi dalan ejisti. Dalan ida-ne'e sei kontribui ba dezenvolvimentu ekonómiku no sosiál ba komunidadas sira besik koridor dalan ejisti. Modas transporte alternativu sira la viabel iha faze ida-ne'e.
8	Climate change. The impacts of relevant climate change predictions and considerations for Timor Leste and relevant adaptation measures and considerations for the Project are discussed.	Mudansa klimatikas: Impaktus relevantes husi predisaun no konsiderasaun ba mudansa klimatika iha Timor Leste no medida adaptaun no konsiderasaun ne'ebe relevante ba Projeto diskuti ona.
9	Environmental impacts short and long term are reviewed from pre-construction through construction phase to operational phase with corresponding mitigation measures.	Impaktus ambiental ba termus badak no naruk halo ona revizaun husi pra konstrusaun ba faze konstrusaun to'o faze operasionál ho medidas mitigasaun korrespondenti.
10	Environmental Management Plan: The environmental impacts from the Project will be controlled by making the contractor provide mitigation measures to minimize environmental impacts	Planu de Jestaun Ambiental: Impaktus ambiental husi Projetu sei kontrola ho halo kontraktor fornese medidas mitigasaun hodi minimiza impaktus ambiental to'o nivel ne'ebe

	English	Tetum
	to acceptable levels. Controls on construction impacts such as dust and noise, waste disposal, water quality impacts, health and safety concerns, tree felling, traffic interruption, preservation of water and electricity supplies will be monitored on a regular basis by the PMU. Training will be provided as necessary to ensure these impacts are mitigated to the greatest extent feasible.	aceitavel. Kontrola ba impaktus konstrusaun hanesan rai rahun no baruilhu, soe lixu, impaktus ba kualidade be'e, interes saude no seguransa, tesi ai, interupsaun trafiku, prezersaun be'e no fornese eletricidade mos sei monitoriza regularmente husi PMU. Treinamentu sei fornese necessariu atu garante impaktus hirak ne'e mitigadu tuir dalan ne'ebe diak liu.
11	Public consultations were undertaken during the preparation of this SEIS to give information on the scale and scope of the Project to interested parties including the general public and authorities; covering the expected impacts and the proposed mitigation measures. Information was gathered on concerns of the local community to be included in the project implementation stages. Project documentation will be disclosed in a place and language accessible to stakeholders.	Konsultasaun publikus hala'o ona durante preparasaun ba DIAS ida ne'e hodi fo informasaun konaba eskala no eskopu projetu nian ba partes hotu ne'ebe interesada inklui publiku jerais no autoridades; akumula espektasaun impaktus no proposta medidas mitigasaun. Informasaun ne'ebe hetan iha interese atu inklui comunidade local iha faze implementasaun projetu. Dokumentasaun projetu sei publika ou divulga iha fatin ho linguajen acessivel ba partes interessadas.
12	Difficulties were not encountered, but a few very minor limitations are described such as absence of baseline ambient environmental data.	Difikuldades sira laapanha, maibe iha limitasaun kiik balu ne' ebe deskreve hanesan la iha dadus ba baze ambiental.
13	Conclusion and Recommendations: The operation of the Project road should have beneficial effects on the surrounding environment overall with shorter travelling distance, faster more efficient travel and improved traffic flow. The smoother asphalt surface will reduce noise and the accumulation of road side dust and therefore air pollution from noise and disturbed dust should also be reduced and improved road side gutters will improve drainage. The Project construction is restricted to areas within the road corridor and the uninhabited land required for the short-cut and improvements for curve widening. The impacts from construction and operation will be manageable and no insurmountable impacts are predicted, provided that the mitigation measures are implemented thoroughly. The overall recommendation of this SEIS are that: this report be accepted by ADB and NDPCEI as the statement of Project's environmental effects and how they will be mitigated; that the Contractor is required to prepare to mitigate environmental impacts by including the required mitigation measures in specific construction methodologies that will be subject to PMU approval; and, (iii) that Project impacts and mitigation measures are monitored regularly as required.	Konkluzoens no Rekomendasoens: Operasaun projetu estrada tenki iha efeitus beneficiu ba ambiente sorin-sorin hotu ho distansia viajem ne'ebe badak liu, lais liu no viajen ne'ebe eficiente liu no iha hasa'e trafiku. alkatraun ne'ebe kaber liu sei redus barulhu no akumulasaun husi rai rahun iha estrada ninin tamba ne'e polusaun ar husi barulho no rai rahun mos sei redus no hadia dadalak estrada ninin sei melhora drainaze. Konstrusaun Projeto sei limita iha deit area koridor estrada no rai ne'ebe laiha habitante presiza ba dalan korta no haluan kurva. Impaktus husi konstrusaun no operasaun sei jere ho diak no la iha prediksaun impactus bot no susar atu hadia, prepara ho diak katak medidas mitigasaun sira bele utiliza hotu. Rekomendasaun jeral husi DIAS ida ne'e mak hanesan: (i) relatoriu ne'e hetan aceita husi ADB no (DNCPIA) nudar deklarasaun husi efeitus environmental Projeto nian no oinsa bele mitiga efeitus sira ne'e (ii) katak Kontraktor presija atu prepara atu mitiga impaktus environmental hodi inklui medidas mitigasaun ne'ebe presija ho metodolojia konstrusaun ne'ebe spesifiku ne'ebe sei sujere ba aprovasaun husi PMU; no (iii) katak impaktus Projeto no medidas mitigasaun sei monitoriza regular tuir ninia presija.

APPENDICES

Appendix 1–Selected Photos

	
<p>Photograph 1 Km3+900 looking south</p>	<p>Photograph 4 Km34+800 looking east - Mt. Laratame</p>
	
<p>Photograph 2 Km13+400 looking south</p>	<p>Photograph 5 Km34+700 looking s/w Mundo Perdido</p>
	
<p>Photograph 3 Km22+600 Venilale Caves - Uma Ana Ico</p>	<p>Photograph 6 Km43+340 looking south Ossu</p>

Appendix 2 – Protected Areas and Important Bird Areas

Appendix 2A – Protected Areas in Baucau and Viqueque districts (shaded)

No.	Protected Area	Districts	Sub District	Sucos	Area (ha)
2.	Monte Legumau	Lautem	Luro	Vairoke	35.967
				Afabubo	
		Baucau	Laga	Barikafa	
				Atelari	
3.	Lago Maurei	Lautem	Iliomar	Trilolo	500
		Viqueuque	Uato Carbau	Irabinletaria	
4.	Be Matan Irabere	Viqueque	Uato Carbau	Bahatata	
				Irabinleteria	
				Irabindecima	
5.	Monte Matebian	Baucau	Quelical	Laissorulai	24.000
				Vaitame	
				Afaca	
				Nama Nei	
			Laga	Guruca	
				Sagadati	
			Baguia	Atelari	
				Alawa Leten	
		Lavateri			
		Alawa Kraik			
		Defa Uassi			
		Osoo-Huna			
		Afalical			
		Samalari			
		Viqueque	Uatolari	Haeconi	
				Babulo	
Uatocarbau	Vessoro				
	Afaloical				
6.	Monte Mundo Perdido	Viqueque	Ossu	Osso De Cima	25.000
				Loihuno	
				Liaruca	
				Builale	
7.	Monte Laretame	Viqueque	Osso	Uaguia	16.429
				Ua Bubu	
		Baucau	Venilale	Waioli	
				Watu-Hako	
8.	Monte Builo	Viqueque	Osso	Loihuno	8.000
				Uaguia	
			Uatolari	Ossu Rua	
				Matakoi	
9.	Monte Burabo	Viqueque	Uato Carbau	Afaloical	18.500
				Wani Uma	
				Irabin De Baixo	
10.	Monte Aitana	Viqueque	Lakluta	Ahik	17.000
				Lalini	
11.	Monte Bibileo	Manatuto	Laleia		19.000
		Viqueque	Lakluta	Bibileo	
				Dilor	

Source: Ministry of Agriculture and Fisheries.

Appendix 2B – Existing and Proposed Important Bird Areas (IBA)

IBA code	IBA Name
TL 01	Tilomar
TL 02	Tata Mailau (Ramelau)
TL 03	Fatumasin (under review - residential development since 2008)
TL 04	Atauro Island-Manucoco
TL 05	Clere River
TL 06	Lore
TL 07	Mount Paitchau and Lake Iralalero
TL 08	Jaco Island
TL 09	Mount Diatuto
TL 10	Be Malae-Atabae
TL 11	Baucau
TL 12	Mount MakFahik and Mount Sarim
TL 13	Tasitolu (under review - subject to heavy residential development since 2003)
TL 14	AreiaBranca ("Cristo Rei") Beach and hinterland (review - heavy development.)
TL 15	Mount Kuri
TL 16	Irabere Estuary and Ilomar Forest
Candidate IBA	Saboria Mountain (above 2,000 m)
Candidate IBA	Talobu/Laumeta Mountain (above 2,000 m)
Candidate IBA	Mount MudoPeridido
Candidate IBA	Mount Matebian (above 2,000 m)
Candidate IBA	Mount Cablaque

Appendix 3 – Sensitive receivers visible from the existing Baucau to Viqueque National Road

FIELD MONITORING SHEET BAUCAU-VENILALE-VIQUEQUE - MARCH 2017

SENSITIVE RECEIVERS	DIST	KM	DIST	SENSITIVE RECEIVERS
LEFT SIDE				RIGHT SIDE
		4+280		Petrol Station
		4+390		Furniture Construction
		4+400		Junction
		4+700		Ficus sp. Tree
Indonesian army cemetery	80m	5+000		
		5+840		Group Ficus benjamina Trees
		7+680	15m	Shop & School further from road
		7+690		Water pipe along road to Km 8+100
		8+840	1m	Ficus albipila
Ficus albipila		9+260		
		9+420		Ficus albipila
		9+480		Church near the junction
School at base of slope	50m	9+560		
Ficus albipila	6m	9+660		
Ficus albipila	6m	9+920		
Agriculture land		11+000		Agriculture land
Casual market		11+750		
		12+830		Water tank
Sink hole		13+050		
School	100	13+400		
Market	5m	13+420		
Church	200m	13+460		
bat roosting area Gariuai	150m	13+500		
		13+540	10m	School
Agriculture Land		14+100		Agriculture Land
Cemetery	50m	14+250		
Rice mills	10m	16+740		
Church	50m	19+240		
		20+200	20m	Fixed Market
		20+300	15m	Church
		20+840	6m	
Agriculture Land	5m	21+060		
		21+400	2m	Irrigation canal
		21+940	10m	Spring water source
		22+600	2m	caves used in World War II era
Church	150m	23+760		
School	100m	23+820	10m	Brick making
Cemetery	5m	24+040		
		25+120	10m	Spring water source
		25+560	7m	Spring
		26+760	6m	Cemetery
		26+960	7m	School
Market	5m	27+000		
		27+240	25m	Spring water source
		29+500	6m	Cemetery
		35+600	30m	Cemetery
		36+120		Mount Mundo Perdido
		37+200		moving slope
		38+300		Quarry
Church	20m	39+240		
		40+480	10m	Ficus albipila
		43+140	100m	School
Church	5m	43+300	10m	Clinic & Water tank
School	15m	43+360		
		43+420	20m	Market

SENSITIVE RECEIVERS	DIST	KM	DIST	SENSITIVE RECEIVERS
		45+620	15m	Furniture making
		46+320		60m length moving slope
Loihuno Bridge		50+700		Loihuno Bridge
Cemetery	30m	50+760		
		50+920	15m	Church
Loihuno Waterfalls	7m	51+000		Irrigation channels and fish ponds
School	6m	52+120		
		52+750	10m	Furniture making
		54+500	20m	Quarry
Futudo bridge		55+300		Futudo bridge
		56+900	10m	Brick making
Furniture making	10m	56+920		
Chapel	10 m	57+260	30m	School
Buanurak Bridge		57+700		Buanurak Bridge
Bae bridge		57+900		Bae bridge
Weredek bridge		59+600		Weredek bridge

Appendix 4 Public Consultation Meetings

Road Network Upgrading Sector Project (RNUSP): Baucau – Venilale (A06-01)
Suco Uailili Public Consultation Meeting Record September 04th, 2015

Name of meeting	:	Public Consultation Meeting for Environmental and Social Economic Survey in Suco Uailili Sub-district Baucau	Note by	:	Ms. Dirce M. Pereira (National Environment Specialist)
Date	:	04/09/2015	Presenter	:	1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Dirce M. Pereira (National Environment Specialist)
Place	:	Suco Uailili Office	Number of participants	:	Total = 43 (M= 19, F= 24)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Uailili 2. Chief of Aldeia in Suco Uailili 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mrs. Maria Jose <ul style="list-style-type: none"> ➤ The affected house will get compensation. What happen to the houses that are not affected, should we move out or stay? ➤ The road will be widened to the right and left sides, how many meters? <p>Response:</p> <ul style="list-style-type: none"> ★ The affected house will have compensation according to the type of houses/residences; which are temporary house, semi-permanent house and permanent house. Houses that are not affected could stay where they are, residents do not have to worry. ★ Physical implementation of improvement works includes widening of existing road to achieve a width of 10 to 12 meters on the flat sections and a width of 12 to 14 meters on the ridge or hillside section, consisting 6 meters wide of carriageway and about 1 meter wide shoulders on each side. There could also be drainage lines or embankment/slope retaining walls depending on the design. <p>Mr. Marito</p> <ul style="list-style-type: none"> ➤ Can the alignment road change? Because there is an alternative road built on community land that community can offer. Currently, the alternative road has not been sealed with asphalt but the road has been hardened and is passable. If the alternative road is being rehabilitated rather than current alignment, it will save many properties along the current alignment. ➤ My family's customary house ("uma lulik") is located very close to existing alignment. Worried that the structure might be affected and wondering that for customary houses, how much compensation will be paid? Is it the same as affected residential structure? <p>Response:</p> <ul style="list-style-type: none"> ★ The current alignment can change because currently we are in detailed design stage. But to change from existing alignment into alternative road, we need to assess in more detail. So what we will do is, we will go and see the alternative road, note it in the plans and report to the engineers that are developing the detailed design in Dili. But community has to keep in mind that final decision to rehabilitate which road is in the hand of Ministry of Public Work not the consultant. So we will assess and discuss this in Dili. ★ Compensation for affected customary store house (Uma Adat/Uma Lulik) is different from compensation for affected residential structure. For Uma Lulik, there will be additional consideration since rebuilding will likely require customary ritual and gathering of the clan. 2. Mrs. Cesaltina F. Ximenes <ul style="list-style-type: none"> ➤ Suggestion: regarding alternative road, we suggest that the team consider it because it will safe a lot of houses and structures along current alignment. The church which has recently been rehabilitated might also be affected. ➤ Question: if the veranda of a house is the only part affected, does it also get compensation? <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you for the suggestion. We will seriously look into the alternative road issue. The alternative road has been preliminarily assessed with results reported to the engineers. Uailili Church located at STA09+480(20mLeft) will not be affected from the rehabilitation work. 			

	<ul style="list-style-type: none">★ For structures affected, there will be compensation. For residential structures, even if only the veranda is affected, the whole structure will be measured and compensation calculation will be considered for the whole structure. <p>3. Mrs. Catarina da Piedade</p> <ul style="list-style-type: none">➤ In the case that an affected house can not be rebuilt on the same plot because the rest of the plot is on steep slope and prone to landslide, how will the team resolve it?➤ Just want to say that at this time, I do not want to comment much. But when implementation is on-going, I might comment more based on my observation <p>Response:</p> <ul style="list-style-type: none">★ Regarding affected houses that can not be restructured on the same plot, the team that will conduct detailed survey will coordinate with Public Work, the Project Management Unit that is under Public Work, local leader and affected person/household to find a suitable property to build the new house. The principle of social safeguarding is to provide solution that is fair and just for the owner of affected property as well as the government who has to pay compensation. So when there are problems, we will look for solution that is fair for everybody.
Photographs	: 

Attendance Sheet to Socialization Meeting, Suco Uailili

Sub-project: Road Network Upgrading Sector Project Venue: Uailili Suco Administrative Office, Baucau, Baucau District Date: September 04th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Hernani De J.A. Ribeiro	M	Chief suco of Uailili	Samalaculiba	+670 77310755
2	Jose João M. D. C.	M	Community	Samalaculiba	+670 77259779
3	Pancrácio F. Guterres	M	Community	Uai-Monoboe	-
4	Cesaltina Fernandes X.	f	Teacher	Samalaculiba	-
5	Sergio De Jesus	M	Community	U.R de Cima	-
6	Fransisca Maria Fernandes	f	Community	U.R de Cima	-
7	Maria Jose Freitas	f	Teacher	Afagua	-
8	Beatriz da C. X.	f	Community	Ledatame	-
9	Juleita do Rosario Freitas	f	Community	Samalaculiba	-
10	Antonio Fatima	M	Chief of Aldeia	U.R de Baixo	-
11	Norberto Ximenes	M	Community	U.R de Cima	-
12	Jorge Freitas	M	Chief of Aldeia	U.R de Cima	-
13	Olga De A. Ribeiro	f	Community	Samalaculiba	+670 77327434
14	Cireneu Da Costa Freitas	M	Student	Alala	+670 77409749
15	Custodio M. Belo	m	Chief of Aldeia	Manulai	-
16	Ricardo	m	Community	Manulai	-
17	Cancio Henrique Belo	m	Community	Uatu- Bala	+670 77717144
18	Marcelino Evaristo Freitas	m	Community	U.R de Cima	+670 77447503
19	Catarina Piedade	f	Community	Manulai	-
20	Aquelina F. Fraga	f	Community	Uatu-Bala	+670 78015282
21	Maria Freitas Ximenes	f	Community	U.R de Cima	+670 77990935
22	Mario Pereira	m	Community	Manulai	+670 77066032
23	Nicolau Marques	m	Community	U.R de baixo	+670 77464792
24	Jose de Jesus	m	Community	Ledatame	+670 78866339
25	Josefina Da Costa	f	Community	U.R de Baixo	-
26	Maria Pasquela Freitas	F	Community	U.R de Baixo	-
27	Maria Madalena M.	f	Community	Ledatame	-
28	Felicidade Filipe Marques	f	Teacher	U.R de Baixo	-
29	Ana Bemvinda da Costa F.	f	Community	U.R de Baixo	+670 78015000
30	Albertina Castro	f	Community	Samalaculiba	-
31	Josefina Serra	f	Community	Samalaculiba	-
32	Macay Gusmão de Piedade	M	Civil Society	Samalaculiba	+670 77341675
33	Saturnina F. Xavier	F	Community	U.R de Baixo	+670 77532319
34	Carlos Augusto Amaral	m	Community	U.R de Baixo	+670 77306868
35	Francisca da Costa Tilman	f	Community	Samalaculiba	-
36	Selita Sarmiento	f	Community	Samalaculiba	-
37	Zefarina	f	Community	Samalaculiba	-
38	Jose De Sousa Xavier	m	Chief of Aldeia	Afalaimau	+670 77965297
39	Domingos Ximenes	m	Community	Afalaimau	+670 77619139
40	Alice Correia	f	Community	Afagua	-
41	Isabel Da Piedade	f	Community	Afagua	-
42	Dirce Madalena Pereira	f	Nat. Env. Sp	Dili	+670 78487307
43	Rosalyn Fernandes	f	Inter. Env. Sp	Dili	+670 73058357

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale – Viqueque Section
Suco Gariuai Public Consultation Meeting Records (September, 04th 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Gariuai, Sub-district Baucau	Note by	:	Ms. Dirce M. Pereira (National Environment Specialist)
Date	:	04 September 2015	Presenter	:	1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Dirce M. Pereira (National Environment Specialist)
Place	:	Socu Gariuai Office	Number of participants	:	Total = 35 M=26, F=9
Participants	:	<ol style="list-style-type: none"> 1. Chefe de Suco Gariuai 2. Chefi de Aldeias of Suco Gariuai 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Jose Freitas <ul style="list-style-type: none"> ➤ How wide will the new road be? <p>Response:</p> <ul style="list-style-type: none"> ★ Improvement works will widen existing road to achieve 6m wide asphalt, however, the total width of the road could reach 10 to 12m on the flat sections because we need to add road shoulders on the left and right side of the road, drainage and embankment walls. Along the ridge and hillside section, the road could be between 12 to 14m because there is a need to cut the hills, install drainage and retaining walls. 2. Mr. Jose Maria Freitas <ul style="list-style-type: none"> ➤ The team talked about the 5m of RoW. How will we measure the 5m, will we measure it from the centerline? ➤ For compensation payment, when can we get it? ➤ How about houses or productive trees built/plant after detailed survey. Will it get compensation <p>Response:</p> <ul style="list-style-type: none"> ★ 5m of RoW will be measured from the side of existing road (sides of asphalt). ★ First of all, we need to emphasize again that only those that are affected will get compensation. How will we know those that get compensation? There will be a detailed survey in about one month from now. The compensation will be paid to the affected household/person before road rehabilitation activities start. ★ Compensation list will be based on detailed survey that will be conducted in about a month; If there are newly constructed structure/plants that were built after detailed survey, it will not be compensated. 3. Mr. Paulo Da Costa Guterres <ul style="list-style-type: none"> ➤ For those properties with land deeds from Indonesian time, will it still be recognized? <p>Response:</p> <ul style="list-style-type: none"> ★ For properties with land deeds from Indonesian time, the land deeds are valid and can be presented during detailed survey. However, the 5m RoW will still be in effect. 4. Mr. Jose Gomes Belo <ul style="list-style-type: none"> ➤ When will the road construction start? <p>Response:</p> <ul style="list-style-type: none"> ★ Road construction might be happen in 2 or 3 more years from now. Prior to that, compensation payment will be implemented. 5. Mr. Jorge da Piedade Gusmão <p>Suggestion:</p> <ul style="list-style-type: none"> ➤ Accident prevention: the curve road should be smoother. ➤ Road National Upgrading Sector Project (RNUSP) is founded by ADB, the quality of the project should be international standards. <p>Response:</p> <ul style="list-style-type: none"> ★ Thanks for your suggestion. 			

	<p>6. Mr. Jose Freitas (Lia Nain) ➤ The soccer field and basketball court (STA13+360 to STA13+560) could be affected. Can we save them? Response: ★ We will look into the detailed design and the community will know for sure whether the soccer field and basketball court will be affected during the detailed survey.</p> <p>7. Mr. Florimundo Gusmão ➤ There are houses in front of soccer field. If the road is going to be widened, better be towards the soccer field because it is empty land. Response: ★ We will check the detailed drawing. The principle is to save as many properties as possible, but road widening will also be according to certain engineering principles, for example, curves have to be smoother and certain road has to be widened toward certain direction to ensure faster moving traffic. So, we will check the detailed design but also note community's preference. Sometimes we can follow community's preference but other times we have to stick to the design.</p> <p>8. Mr. Paul da Costa Guterres ➤ Yes, I think it is better to widen toward the soccer field because across the road, there are a lot of houses and also there is the suco office which currently also being used as pre-school and kindergarten for the children. Response: ★ Thank you for the input. We will note all that has been suggested. Checked the detailed drawing and the road section between STA13+360 and STA13+560 will be widen towards the soccer field so generally in line with the majority of community's input.</p> <p>9. Mr. Elvino ➤ Some areas along the road within the suco were eroded so community planted trees, some are teak, others are non-productive trees such as Ai Hali. These trees have been doing its job holding up erosion along the road. If affected, will the trees be compensated? Response: ★ When it is productive trees, they will be compensated. Now the question, whose trees are they? For this kind of cases, we will discuss closely with local authority so we can determine who the compensation should be paid to.</p>
<p>Photographs :</p>	


Attendance Sheet to Socialization Meeting, Suco Gariuai

Sub-project: Road Network Upgrading Sector Project Venue: Gariuai Suco Administrative Office, Baucau, Baucau District Date: September 04th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Ambrosio Freitas	M	Community	Uatu-Rau	-
2	Armando Freitas	M	Community	Gari-Uai	-
3	Jorge da p. Gusmão	M	Community	Gari-Uai	+670 77263962
4	Jose Freitas	m	Community	Gari-Uai	-
5	Bonifácio José Maria	M	Community	Uatu-Rau	+670 77278843
6	Domingos Sequera	M	Traders	Uatu-Rau	+670 78624533
7	Graciano Freitas	M	Community	Gari-Uai	+670 77402403
8	Celestina X. Belo	f	Community	Uatu-Rau	-
9	Nazario J. E. Ximenes	M	Chief of Aldeia	Maucale	-
10	Jerafin Marcal	M	Community	Gari-Uai	-
11	Almeida D. Marcal	M	Community	Gari-Uai	+670 77322715
12	Marselino Freitas	m	Chief of Aldeia	Gari-Uai	-
13	Clarimundo Gusmão	m	Chief of Aldeia	Uatu-Rau	+670 77358839
14	Bemvindo Belo	m	PAAS	Baha-Mori	+670 77759763
15	Placido Freitas	m	Teacher	Uatu-Rau	-
16	Patricio Freitas	m	Teacher	Uatu-Rau	+670 77386637
17	Lourenço Freitas	M	Community	Uatu-Rau	-
18	Cesarina F. Freitas	f	Rep. Feto Rua	Uatu-Rau	-
19	Salvador da Luz	m	Agriculture	Cai-Riri	+670 77422950
20	Julio Boavida Belo	M	Chief of Aldeia	Cai-Riri	+670 77474855
21	Maria Lidia de Jesus B.	f	Chief of Suco	Gari-Uai	+670 77314817
22	Jacinto Freitas	m	Chief of Aldeia	Baha-Mori	-
23	Paulo da Costa Guterres	M	Community	Cai-Riri	+670 77055580
24	Adelia Freitas Ferreira	F	Community	Cai-Riri	-
25	Jose Marcal Freitas	M	Community	Gari-Uai	+670 77363233
26	Jose Freitas	M	Lia nain	Gari-Uai	-
27	Manuela do Rosario	f	Community	Uatu-Rau	+670 77268587
28	Luciana Freitas	F	Community	Uatu-Rau	+670 77405125
29	Barbara Belo	F	Community	Uatu-Rau	-
30	Mariano Andre Freitas	m	Community	Baha-Mori	+670 77407057
31	Simplicio X. Sarmiento	m	Community	Baha-Mori	+670 77267980
32	Roberto Freitas	m	Community	Gari-Uai	+670 77494020
33	Jose Gomes Belo F.	M	Community	Gari-Uai	+670 77239851
34	Dirce Madalena P.	F	Dongsung	Dili	+670 78487307
35	Rosalyn Fernandes	F	Dongsung	Dili	+670 73058357

Road Network Upgrading Sector Project (RNUSP) Baucau - Venilale - Viqueque
Suco Fatulia Public Consultation Meeting Records (September, 05th 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Fatulia, Sub-district Venilale	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	05 September 2015	Presenter	:	1. Mrs. Roslyn Fernandes (International Environment Specialist) 2. Ms. Dirce Pereira (National Environment Specialist)
Place	:	Community center at Fatulia suco	Number of participants	:	Total=29 (M= 24, F=5)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Fatulia 2. Chief of Aldeias of Suco Fatulia 3. Community Member 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Domingos Pereira Ximenes <ul style="list-style-type: none"> ➤ I think this development plan is good and will help the areas here developed more. ➤ How is the compensation for productive trees and paddy fields be paid? ➤ There are sacred springs near to the RoW, if it affected please coordinate with authority local and Lia nain to organize cultural event before removing the sacred water, otherwise the community will get in trouble. ➤ Some houses had been built in landslide-prone areas, they can be impacted from climate change and it might be fatal for the community. In this case what should we do and what can the contractor do? <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you for your support to the development. ★ Productive trees and paddy fields will be compensated according to a price table produced by Ministry of Agriculture. So what we do related to compensation are all according to regulations and procedures that are being coordinated with competent ministries. This way we ensure that the implementation is the same whether the project is in Liquica or in Baucau or in Lautem. ★ Thanks for information. Environment team will do assessment to the sacred water spring, if it might be affected will coordinate with Lia Nain and Authority Local. The spring is more than 50m from the side of the road. ★ Landslide is part of environmental risks in areas with steep slopes like this village. And what was stated was right, climate change cause changes in rainfall sometimes the rain is more concentrated in a shorter period of time and leads to landside. When possible, do not build in steep slope area but we do understand that sometimes community has no option. What community can do, community can develop terraces, drainage lines and plant trees so help with the erosion. ★ For road construction, to prevent landslide, we will construct retaining wall, implement bioengineering measures and provide drainage lines. 2. Mr. Jose Ximenes <ul style="list-style-type: none"> ➤ I heard that in Dili the compensation for affected house is flat at certain rate e.g. USD2,500. So, how much compensation for affected houses will be paid by this project? <p>Response:</p> <ul style="list-style-type: none"> ★ We have heard this type of comment during Public Community Meeting in other sucos. We would like to state that the compensation will not be at flat rate like mentioned. Compensation will be according to the size of the house and the type of material used to construct the house. The houses/structures will be categorized into – (i) temporary, (ii) semi-permanent and (iii) permanent. So, compensation will be different for affected houses. 3. Mr. Thomas Modesta de Castro <ul style="list-style-type: none"> ➤ Does regular house will be compensate? ➤ In my experience during previous construction work, contractor dumped a lot of leftover asphalt in front of my house. This causes declining soil quality and leads to ponding during the rainy season. Not happy about that. <p>Response:</p> <ul style="list-style-type: none"> ★ Any type of affected houses will be compensated. ★ Leftover asphalt and other spoils should not be dumped in front of people's properties. They should be dumped at proper places previously designated in coordination with local authority and district officer of NDE. Sometimes, even though contractor has been made clear of the need to protect the environment and local community, they still do otherwise. When this kind of things happen, local community can complaint to chéfie de suco who can complaint to the contractor directly or to the consultants that are supervising activities on the ground. 			

	<p>4. Mr. Domingos Pereira Ximenes ➤ Impact on public health, especially due to dust from construction activities. Usually what happen in Timor Leste, contractor doesn't want to be bothered by it. Response: ★ Contractor will be obligated by contract to protect local community from getting impacted from dust. Prolonged or severe dust exposure could cause Respiratory Tract disease that could severely affect the health of children and older residents. So, the contractor is obligated to spray and compact, more than once a day in villages or areas where there are concentration of population.</p> <p>5. Mr. Domingos Jose Do Rego ➤ During previous road rehabilitation work, contractor mobilized heavy machinery near houses and some structures are affected (ruptures on the walls). I hope during this project, the contractor will do better and no structures will be affected like that. Response: ★ Thanks for notification. Vibration impacts could cause ruptures to structures like mentioned and mobilization of heavy machinery should be carefully conducted near concentration of structures. This will definitely be noted in the Environmental Management Plans and should this kind of things happen again, community should not hesitate to complain to the chefi de suco who will complain to the contractor or consultant that is overseeing the construction activities.</p> <p>6. Mr. Raimundo Pereira ➤ There is a spring near my house, will it be removed? Response: ★ Springs located near the road project will be protected as much as possible, especially those springs that are providing water to households because water is important.</p>
Photographs	:  The photographs show community engagement activities. The left photo shows a group of people sitting on colorful plastic chairs in an outdoor setting. The middle photo shows a group of people sitting on chairs in front of a simple, single-story house with a corrugated metal roof. The right photo shows a group of people sitting on chairs outdoors, with some individuals holding documents or papers.

Attendance Sheet to
Socialization Meeting, Suco Fatulia

Sub-project: Road Network Upgrading Sector Project
Venue: Fatulia Suco Administrative Office, Venilale, Baucau District Date: September 05th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Constancio J. Do Rego	m	Chief of Suco	Fatulia-Ana	+670 77274506
2	Domingos Do Rego	m	Community	Oso-Uague	+670 77280794
3	Tomas Modestade Castro	m	Teacher	Oso-uague	+670 78193115
4	Martinho Ruas da Silva	M	Teacher	Uai-Tobonu	+670 77493188
5	Jose Ximenes	M	Community	Uai-Tobonu	+670 77108870
6	Alfredo da Costa Pereira	M	Community	Baha-Dato	-
7	Wilson Monteiro Soares	m	Partisipant	Baha-Dato	+670 77883609
8	Alexandro Monteiro S.	M	Community	Baha-Dato	+670 77326539
9	Alarico de Castro	m	Community	Uai-Tobonu	-
10	Jose Lino Pereira	m	Community	Baha-Dato	-
11	Raimundo Pereira	m	Community	Uai-Tobonu	-
12	Joaquim Alberquerque	m	Community	Uato-Liana	-
13	Armindo de Castro	m	Community	Baha-Dato	-
14	Agostinha Pereira	f	Community	Uai-Tobonu	-
15	Amandina P. Ximenes	f	Community	Uai-Tobonu	+670 78033141
16	Dolorosa Florida Pereira	f	Community	Uai-Tobonu	+670 77333845
17	Matias X. Cardoso	M	Community	Baha-Dato	-
18	João da Silva	m	Community	Baha-Dato	-
19	Bernardino Dos Reis	m	Community	Uai-Tobonu	-
20	Domingos Pereira X.	M	Community	Uai-Tobonu	-
21	Francisco do Rego	m	Community	Uato-Liana	-
22	Agapito Amaral Ximenes	m	Community	Uai-Tobonu	-
23	Manuel Rangel	m	Community	Baha-Dato	-
24	Elvino do Rosario Ruas	m	Community	Baha-Dato	-
25	Ronaldo de Carvalho	m	Community	Baha-Dato	-
26	Joanico De Sousa S.	m	Community	Uai-Tobonu	-
27	Jose Ximenes	m	Community	Uai-Tobonu	-
28	Dirce Madalena P.	f	Dongsung	Diii	+670 78487307
29	Rosalyn Fernandes	f	Dongsung	Diii	+670 73058357

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale - Viqueque
Suco Uato-Haco Public Consultation Meeting Records (September, 10th, 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Uato-Haco, Sub-district Venilale	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	10 September 2015	Presenter	:	<ol style="list-style-type: none"> 1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Dirce Pereira (National Environment Specialist) 3. Ms. Maria P.Ribeiro (National safeguard Specialist) 4. Mr. Carlos De Deus (PMU)
Place	:	Community Centre at Uataco Suco	Number of participants	:	Total=23 (M=16, F=7)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Uataco 2. Chief aldeias of Suco Uataco 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Alexandre Manuel da Cruz <ul style="list-style-type: none"> ➤ How do we relocate water springs that are near the road side? ➤ Will affected houses including customary house/Uma Adat be compensated? ➤ Construction/rehabilitation road always cause dust. The community is worried about it. ➤ For next meetings and any other activities please continue to coordinate with chefi suco and community. <p>Response:</p> <ul style="list-style-type: none"> ★ Depending on the structure of the aquifers that make up the spring, that is, how water is seeping out of the rock layer as well as the size of the aquifer, some springs can be relocated away from the road and some can not. In the case there are springs, especially important springs providing water to many households around, the springs should be protected as much as possible. Realignment of road can be done to protect the spring. ★ All affected houses will be compensated including uma adat/uma lulik. Affected regular houses will be compensated according to what has been explained before – based on size and material. For uma adat, there will additional compensation for ritual that needs to be conducted since rebuilding uma adat requires more than just material. ★ Yes, dust is one of the most common environmental impacts usually felt by local community. To help reduce dust, the contractor will be required to spray the area more than once a day for village area or other areas where there are high concentration of people. ★ We will continue to coordinate with local authorities related to the preparation and construction activities. Thanks for the input. 2. Mr. Tonito Tomas de Sousa <ul style="list-style-type: none"> ➤ Technically how to remove natural springs water from the project area? ➤ Suggestion: please coordinate with technical team to relocate the springs near the road. ➤ How about irrigation lines, will they be removed before rehabilitation? <p>Response:</p> <ul style="list-style-type: none"> ★ Terima kasih atas informasinya. Mata air yang ada akan kami cek dan lapor ke teknisi. ★ The environmental team will assess the springs near the road in this suco and then we will know for sure whether there will be a need to relocate the springs or not. Most likely, when there is affected important springs, we will notify the engineers that if possible, road plans be adjusted to save the springs because it will be hard to relocate springs. Assessment of the springs have been conducted at STA25+120 (two springs on the right side separated about 20m from each other, one with larger debit of water than the other one) and the other one is located at STA25+400 (5m Right). None of the springs will be affected from development. ★ Thanks for the suggestion. We will coordinate all activities conducted related to this project with chefi de suco and chefi de aldeia. ★ All of public utilities (Irrigation, electricity lines and water supply pipes) that are near the road and affected from the development will be relocated prior to the start of construction activities. 3. Mr. Jose de Carvalho <ul style="list-style-type: none"> ➤ Concerning fatin lulik and other things near the road, these can be relocated or removed. However, agricultural activities are our livelihood and need to be maintained. Just want to emphasis that crops and paddy fields that are affected need to be compensated. 			

	<p>Response:</p> <ul style="list-style-type: none"> ★ We should actually say all productive plants will be compensated so it is not only productive trees that will be compensated. So, rice plants and even peanuts will be compensated when they are affected. As we mentioned, the compensation will be different for different types of plants, according to a table produced by the Ministry of Agriculture. <p>4. Mr. Manuel Bento da Silva (Chief of Suco)</p> <ul style="list-style-type: none"> ➤ Community does not dispute the road widening program. Just be aware about our public springs near the road. ➤ How about unproductive plants such as Ai Hali, Ai Café and Ai Nitas that have been planted by community, would these trees be compensated as well? <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you for your input. ★ Unproductive trees or plants that cannot be eaten or sold in the market will not be compensated. We are aware that some of these trees have been planted by local community and some were planted for good reasons, for example, to arrest erosion near the road. When determined as affected, these trees will be cut and the timber be returned to the owner. Unfortunately, these trees will not be compensated because we can not compensate for everything, it would be very expensive. There has got to be a boundary somewhere. <p>5. Mr. Claudino da Silva</p> <ul style="list-style-type: none"> ➤ Community never heard of the policy of 5m RoW before. I am a bit concerned especially related to paddy fields, these fields have been passed down for different generations so they should be counted as belonging to the community members. ➤ Suggestion: the coordination of implementation road project should always be updated to community and local authority so community is clear of what is coming up next. <p>Response:</p> <ul style="list-style-type: none"> ★ Currently, land ownership law is still not being approved yet. Once it is approved we can say for sure that the 5m RoW is based on law in effect. It is actually an international practice in different countries that lands to the left and right sides of the road should be clear from development to accommodate future expansion of the road. Therefore, the government of TL took the same policy. ★ Thank you for the input. Project consultation meetings between community, local leaders and consultant will continue until the final of process compensation payment.
<p>Photographs :</p>	

Attendance Sheet to Socialization Meeting, Suco Uato-Haco

Sub-project: Road Network Upgrading Sector Project Venue: Uato-Haco Suco Administrative Office, Venilale, Baucau District Date: September 10th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Manuel Bento da Silva	m	Chief of Suco	Uato-Haco	+670 77909687
2	Alexandre M. da Cruz	m	Chief of Aldeia	Uai-Talibu	+670 78012326
3	Martinho Soares	m	Community	Uai-Talibu	-
4	Agostinho Ximenes	M	Community	Uai-Talibu	+670 77802529
5	João do Amaral	M	Community	Uai-Talibu	-
6	Gaspar Guterres	M	Community	Uai-Talibu	-
7	Claudiano da Silva	M	Community	Uma Ico	-
8	Jose Fransisco Matos	M	Community	Uai-Talibu	-
9	Timotio Tomas De Sousa	m	Community	Uai-Talibu	-
10	Zito Amaral Guterres	m	Community	Uai-Talibu	-
11	Jose De Carvalho	m	Community	Uai-Talibu	-
12	Agustino da Cruz	m	Community	Uai-Talibu	-
13	Pedro Amaral	m	Community	Uai-Talibu	+670 77275122
14	Manuel Monteiro	m	Community	Uai-Talibu	+670 77509604
15	Mateus X. D.C. Soares	m	Community	Uai-Talibu	-
16	Maria Ines da Silva	f	Community	Uai-Talibu	-
17	Domingas Guterres	f	Community	Uai-Talibu	-
18	Teresa da Cruz	f	Community	Uai-Talibu	-
19	Marquita Madalena G.	f	Community	Uai-Talibu	-
20	Dirce M. Pereira	f	Dongsung	Dili	+670 78487307
21	Rosalyn Fernandes	f	Donsung	Dili	+670 73058357
22	Maria P. Ribeiro	f	Dongsung	Dili	+670 75406125
23	Carlos A. De Deus	m	PMU	Dili	+670 77549584

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale Section
Suco Uma Ana Ulo & Uma Ana Ico Public Consultation Meeting Records (10 September 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Uma Ana Ulo & Uma Ana Ico, Sub-district Venilale	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	10 September 2015	Presenter	:	1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Maria P. Ribeiro (National Social Safeguard Specialist) 3. Mr. Carlos De Deus (PMU)
Place	:	Suco Uma Ana Ulo administrative office	Number of participants	:	Total=20 (M= 12, F= 8)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Uma Ana Ulo 2. Chief of Suco Uma Ana Ico 3. Chief aldeias of Suco Uma Ana Ulo and Uma Ana Ico 4. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Martinho Ricardo Freitas <ul style="list-style-type: none"> ➤ Waidaeoli area is Landslide area, usually happen during the rainy season. <p>Response:</p> <ul style="list-style-type: none"> ★ Thanks for the information. The team will do assessment. 2. Mr. Domingos da Costa Freitas <ul style="list-style-type: none"> ➤ During the rehabilitation work, dust will usually be generated. Contractor must take care of it. <p>Response:</p> <ul style="list-style-type: none"> ★ Thanks for the input. Dust is actually the most common environmental impact to the community living near the project road. To suppress dust, the contractor is required to spray the road more than one time a day in areas near villages. 3. Mr. João Bosco de Sousa <ul style="list-style-type: none"> ➤ Affected houses from road widening will be compensates, but if the road is realigned to the left, how about houses on the right? Will it be demolished or not? <p>Response:</p> <ul style="list-style-type: none"> ★ Widening of the road will be based on design, it can be to both sides of the road or just one side depends on detailed engineering. Compensation is only being paid to affected houses only. 4. Mrs. Sildonia Belo <ul style="list-style-type: none"> ➤ My house might be affected, but if so I still have vacant land to build a house. <p>Response:</p> <ul style="list-style-type: none"> ★ So, if your house is affected and there is vacant land to build a new house, that is good. The compensation is structured so that community will have enough funds to build the same type and size of the house. 5. Mr. Tiago Pereira (Chief of Aldeia Betu-Nau) <ul style="list-style-type: none"> ➤ The widening of the road could be to the right or left side depending on the design. If the road is widened to the left side, in this village, many houses will be spared. ➤ The cemetery is near to the road side on the right. If affected, the cemetery can be relocated to other place but need to provide funds for adat ceremony as well. <p>Response:</p> <ul style="list-style-type: none"> ★ If there is vacant land on left side, usually the road will be widened to that side but it is also dependent on soil conditions and topography. ★ Thanks for notification related to cemetery. In this case, we will coordinate with the family, lia nain and also chefi de suco. Usually, when a cemetery is affected, the road will be realigned to save the cemetery. So the cemetery will not be affected. When the road can not be realigned we will have to compensate. 			



Attendance Sheet to Socialization Meeting, Suco Uma Ana Ulo

Sub-project: Road Network Upgrading Sector Project Venue: Uma Ana Ulo Suco Administrative Office, Venilale, Baucau District Date: September 10th, 2015


No	NAME	GENDER	POSITION	Aldeia	contact number
1	Domingos da C. Freitas	m	Teacher	Uaitu-Nau	+670 77487600
2	Ernesto de Sousa	m	Agriculture	Betu-Nau	-
3	Evaristo Manuel G.	m	Trader	Uai-Te	-
4	Iligio Jose da Costa	m	Anciao	Betu-Nau	-
5	João Bosco	m	Trader	Betu-Nau	-
6	Martinho R. Freitas	M	Chief of Suco Uma Ana Ulo	Betu-Nau	+670 77295938
7	Tiago da Costa	m	Chief of Aldeia	Betu-Nau	-
8	Sildonia Belo	f	Community	Uai-Te	-
9	Aduzinda Belo	f	Community	Uai-Te	-
10	Dirce M. Pereira	f	Dongsung	Dili	+670 78487307
11	Rosalyn Fernandes	f	Dongsung	Dili	+670 73058357
12	Maria P. Ribeiro	f	Dongsung	Dili	+670 75406125
13	Carlos A. De Deus	m	PMU	Dili	+670 77549584

Attendance Sheet to Socialization Meeting, Suco Uma Ana Ico

Sub-project: Road Network Upgrading Sector Project Venue: Uma Ana Ico Suco Administrative Office, Venilale, Baucau District Date: September 10th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Vicente de Sousa B.	m	Chief of Suco Uma Ana Ico	Oso-Qiuqui	+670 77337331
2	Moises da Costa B. L	m	Community	Oso-Qiuqui	-
3	Luis da C. M. Belo	m	Community	Venilale	-
4	Dirce M. Pereira	f	Dongsung	Dili	+670 78487307
5	Rosalyn Fernandes	f	Dongsung	Dili	+670 73058357
6	Maria P. Ribeiro	f	Dongsung	Dili	+670 75406125
7	Carlos A. De Deus	m	PMU	Dili	+670 77549584

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale Section
Suco Bahamori Public Consultation Meeting Records (15 September 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Bahamori, Sub-district Venilale	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	15 September 2015	Presenter	:	1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Maria P. Ribeiro (National Social Safeguards Specialist)
Place	:	Community member's house	Number of participants	:	Total=16 (M= 12, F= 4)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Bahamori 2. Chief aldeias of Suco Bahamori 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Sebastião Maria Magno <ul style="list-style-type: none"> ➤ Will affected residential house get compensation? ➤ There are 3 points of landslide in this suco, two are far from project side but one is very close. <p>Response:</p> <ul style="list-style-type: none"> ★ Affected houses will be compensated based on the size and type of material being used. So, if affected, houses will be measured and the material used to construct the house will be noted whether it is temporary, permanent or semi-permanent. Compensation will be calculated based on this. ★ About places where there are landslide, we will assess especially those that are close to the road. Add STA Rai Manu Ten <ol style="list-style-type: none"> 2. Mr. Ernesto S. Magno <ul style="list-style-type: none"> ➤ Taman makam pahlawan itu bagaimana? ➤ A martires da patria monument is near by the road, how it will be treated? ➤ Response: ★ Thanks. If the monument is affected, the team will coordinate with family and chefi de suco to organize an event for reallocation of the monument. But as much as possible it will be spared from getting affected from the rehabilitation work. 			
Photographs	:				

Attendance Sheet to Socialization Meeting, Suco Bahamori

Sub-project: Road Network Upgrading Sector Project Venue: Bahamori Suco Administrative Office, Venilale, Baucau District Date: September 15th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Sebastião Maria Magno	m	Rep. Chefe Aldeia	Lia-Oli	+670 77398939
2	Moises Magno	m	Community	Lia-Oli	-
3	Joaquim da Silva Freitas	m	Teacher	Badoho'o	-
4	Vecinte M. Magno	m	Lia Nain	Lia-Oli	-
5	João Guterres	M	Catequis	Lia-Oli	+670 78198960
6	Carlos Luis Alberto	M	Teacher	Lia-Oli	+670 77352015
7	Estanislau Guterres	m	Chiefe Suco Bahamori	Bahamori	-
8	Elias Magno Guterres	m	Lia Nain	Lia-Oli	-
9	Genoveva de Jesus F.	f	Housewife	Lia-Oli	-
10	Zito Costódio Henrique	m	Lia Nain	Lia-Oli	-
11	Estanislau Guterres	m	Chief of aldeia	WaiRoque	+670 77497261
12	Ernesto S. Magno	m	Education Staff	Lia-Oli	+670 77469070
13	Cancio Freitas	m	Community	Lia-Oli	-
14	Maria Poppy Ribeiro	f	National Safeguard Sp.	Dili	+670 77050000
15	Dirce Madalena P.	F	National Environmental Sp.	Dili	+670 78487307
16	Rosalyn Fernandes	f	Inter. Env. Sp	Dili	+670 77344251

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale Section
Suco Buibau Public Consultation Meeting Records (18 September 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Buibau, Sub-district Baucau	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	18 September 2015	Presenter	:	1. Mrs. Rosalyn Fernandes (International Environment Specialist) 2. Ms. Maria P. Ribeiro (National Social Safeguards Specialist)
Place	:	Community member's house	Number of participants	:	Total=39 (M= 31, F= 8)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Buibau 2. Chief aldeias of Suco Buibau 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Sebastião Marçal da Costa <ul style="list-style-type: none"> ➤ How about productive trees/plants will they get compensation? Previously, during implementation of the electricity project, the contractor was cutting down many trees without compensation. <p>Response:</p> <ul style="list-style-type: none"> ★ First of all, we have to explain that there is a difference between this project and previous projects that took place within this community. The previous electricity project was funded by the government at that time with the objective of providing electricity to the community as fast as possible. This project, on the other hand, is funded through loan from Asian Development Bank (ADB). ADB is a development partner of many countries in Asia and they have their own policy related to development activities. One of those policies is that affected environment and the community should be protected from too much negative impacts from development activities. That is why currently we are consulting the community and discuss about potential environmental and social negative effect to local community. ★ Regarding productive trees or plants, when affected they will be compensated. How much will be given in compensation, will be based on a table produced by Ministry of Agriculture. So, we can make sure that the compensation will be the same whether it is being implemented in Liquica, Ermera or in Baucau. 2. Mr. Julio da Costa Ornai <ul style="list-style-type: none"> ➤ We are not satisfied with the previous electricity project that was handled by local company. Many trees were cut with no compensation. Does local company have budget to implement the project? <p>Response:</p> <ul style="list-style-type: none"> ★ We have heard the same complaint in different places that we consulted. Unfortunately, we can not comment much on that. Regarding payment for compensation, for this project a budget is already being prepared for the payment of compensation but we need to know for sure how much will be paid, that is why we will conduct a detailed survey in the coming month. 3. Mr. Sebastião Marçal da Costa <ul style="list-style-type: none"> ➤ About road widening, why there has to be a requirement of right of way of 5m to the left and right sides of the road? <p>Response:</p> <ul style="list-style-type: none"> ★ The requirement is needed to ensure that in the future, we can widen, do other improvement as well as rehabilitation to the road without much problem. As we all know, roads tend to be damaged or insufficient after a few years because of increasing traffic. By having the 5m RoW requirement, we are anticipating for future work that will be needed. 4. Mr. Salustiano Ximenes <ul style="list-style-type: none"> ➤ The community is ready to contribute for the national road project. Even without compensation is fine. What we request is a declaration letter from the government saying that this certain person has contributed this number of trees and this much land for the development of the road. <p>Response:</p> <ul style="list-style-type: none"> ★ Thanks for the input. We understand that there are always members of the community that would allow their properties be taken away for free for development. This project, however, would like to make sure that what is conducted is fair for everybody everywhere in the country. 5. Mr. Salustiano Ximenes <ul style="list-style-type: none"> ➤ Will ai-kafe be compensated? There are many of it along the road. <p>Response:</p> 			

	<p>★ Ai-kafe is considered unproductive trees therefore will not be compensated. There is a list that we based our assessment on and unless there is a very convincing reason that a tree should be compensated, we can not just add to the list because the list is produced by Ministry of Agriculture.</p>
Photographs	: 

Attendance Sheet to Socialization Meeting, Suco Buibau

Sub-project: Road Network Upgrading Sector Project Venue: Buibau Suco Administrative Office, Baucau, Baucau District Date: September 18th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Francisco Ximenes	m	Chief of Suco Buibau	Loidua	+670 77540096
2	Daniel da Costa	m	Chief of Aldeia	Samalaculiba	-
3	Helder A. D. C.	m	Community	Samalaculiba	-
4	Adolfino B. Ximenes	m	Community	Samalaculiba	-
5	Ameta	m	Community	Samalaculiba	-
6	Celestino Sarmiento	M	Community	Samalaculiba	-
7	Sebastião Marçal D. C.	m	Community	Samalaculiba	-
8	Cancio Ximenes	m	Community	Samalaculiba	-
9	Bendita Ximenes	f	Community	Samalaculiba	-
10	Sanhio da Costa	m	Community	Samalaculiba	-
11	Aguida Fatima	f	Community	Samalaculiba	-
12	Alfredo M. D. C	m	Community	Samalaculiba	-
13	Domingos Rodrigues	m	Community	Samalaculiba	-
14	Bidal N. Sarmiento	m	Community	Samalaculiba	-
15	Julio D. C. Ormai	m	Community	Samalaculiba	-
16	Mateus Freitas Ribeiro	m	Community	Builai	+670 77642868
17	Isabel D. Costa	f	Community	Builai	-
18	Sabino Sarmiento	m	Community	Samalaculiba	-
19	Manuel D. Costa	m	Community	Builai	-
20	Afonso da Costa	m	Community	Builai	+670 77439238
21	Afonso Manuel D. Costa	m	Community	Samalaculiba	-
22	Domingos Martins	m	Community	Samalaculiba	-
23	Salustiano Ximenes	m	Community	Alala	-
24	Francisco Freitas	m	Community	Builai	-
25	Afonso D. C. Tilman	m	Community	Builai	-
26	João M.	m	Community	Builai	-
27	Domingos A. Fraga	m	Community	Builai	-
28	Basilio M.	M	Community	Builai	-
29	Januario do R. Quintas	m	Chief of Aldeia	Builai	-
30	Carlos F. X.	m	Community	Alala	-
31	Manuel A. X.	m	Community	Builai	-
32	Hegas Freitas	m	Community	Alala	-
33	Julet C. Belo	f	Community	Alala	-
34	Antonio F.	m	Community	Alala	-
35	Mariana F.	f	Community	Alala	-
36	Mariano Do Rosario	m	Community	Builai	+670 77329566
37	Maria Poppy Ribeiro	f	Nat. Soc Safeguard Sp.	Dili	+670 77050000
38	Dirce Madalena P.	F	Nat. Environmental Sp.	Dili	+670 78487307
39	Rosalyn Fernandes	f	Inter. Env. Sp	Dili	+670 77344251

Road Network Upgrading Sector Project (RNUSP) Baucau – Venilale Section
Suco Badoho'o Public Consultation Meeting Records (30 September 2015)

Name of meeting	:	Public Consultation Meeting for Environmental and Social Survey in Badoho, Sub-district Baucau	Note by	:	Ms. Dirce Pereira (National Environment Specialist)
Date	:	18 September 2015	Presenter	:	1. Mr. Carlos De Deus (PMU) 2. Ms. Maria P. Ribeiro (National Social Safeguards Specialist)
Place	:	Community member's house	Number of participants	:	Total=18 (M= 13, F= 5)
Participants	:	<ol style="list-style-type: none"> 1. Chief of Suco Badoho'o 2. Chief aldeias of Suco Badoho'o 3. Community members 			
Taking Points	:	<ol style="list-style-type: none"> 1. Mr. Anselmo B. Amaral <ul style="list-style-type: none"> ➤ Just want to comment, the community is confused of the different types of projects that are happening in the community. Previously, during implementation of the electricity project, project implementer cut community trees without compensation. I think, any program runs by the government should be conducted in a consistent manner. When it is different like this, the community is not happy. <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you for the comment. We have to explain that the road rehabilitation project from Baucau to Viqueque is different from other projects that has happened before in the community. For this project, funding comes from the Asian Development Bank (ADB). The ADB has its own policies that has to be obeyed to by the government. Among the policies is the social and environmental and safeguarding policy which provide protection to the affected environment and local community along the project. So, because of different funding arrangement, the implementation activities are also different. <ol style="list-style-type: none"> 2. Mr. Crispin Lopes <ul style="list-style-type: none"> ➤ The community is happy for this project because it conducts public consultation meeting. We have noticed that the project is progressing fast, after consultation meeting, detailed data collection is happening in the next week. Community is excited to know this. <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you. We are happy that the community is excited about the upcoming development. <ol style="list-style-type: none"> 3. Mr. Claudino da Silva <ul style="list-style-type: none"> ➤ The community will not hinder the national road rehabilitation project. Community is grateful for the compensation and community want to value their contribution with a declaration letter from government. ➤ Community of Suco Badoho is fully understanding of the National road rehabilitation. Other suco is still building house near to road (STA 27+040). Do they know about this project? ➤ Community here have heard about the road rehabilitation project from public consultation meetings conducted in sucos nearby before. We were wondering though, there are community members in other sucos that continue to build their house near the road even though they know that the road will be widened. Their suco has been consulted before. Why do they still do this? <p>Response:</p> <ul style="list-style-type: none"> ★ Thank you for supporting the upcoming development. We will note your request related to the declaration letter from the government. ★ (Context: Mr. da Silva is specifically referring to a construction at STA 27+040 (Right) in Suco Fatulia). Actually, after the consultation meeting, the person that was going to construct his new house consult with us whether he should continue to build or not given the upcoming project. We consulted our alignment and he was actually outside of the new alignment so he can continue to construct. <ol style="list-style-type: none"> 4. Mr. Manuel Soares (Chief of Suco) <ul style="list-style-type: none"> ➤ Suggestion: the survey team who collect affected data should explain the details to the affected person. <p>Response:</p> <ul style="list-style-type: none"> ★ Thanks for input, we will keep coordinating with local leader and community 			



Attendance Sheet to Socialization Meeting, Suco Badoho

Sub-project: Road Network Upgrading Sector Project - Venue: Badoho'o Suco Administrative Office, Venilale, Baucau District Date: September 30th, 2015

No	NAME	GENDER	POSITION	Aldeia	contact number
1	Anselmo B. Amaral	m	Agriculture	Uma Ana Ico	-
2	Carlota Amaral	f	Agriculture	Uma Ana Ico	-
3	Igimo de Sousa	m	Agriculture	Uma Ana Ico	-
4	Filomena da Costa	f	Agriculture	Uma Ana Ico	-
5	Pedro Amaral	M	Agriculture	Uma Ana Ico	-
6	Florinda Ximenes	M	Agriculture	Uma Ana Ico	-
7	Armindo Lopes	m	Agriculture	Uma Ana Ico	-
8	Jeronimo Lopes	m	Agriculture	Uma Ana Ico	-
9	Crispin Lopes	m	Agriculture	Uma Ana Ico	-
10	Claudino Da Silva	m	Agriculture	Uma Ana Ico	+670 77383586
11	João Baptista Amaral	m	Agriculture	Uma Ana Ico	-
12	Justinho Lopes	m	Agriculture	Uma Ana Ico	-
13	Antonia Amaral	f	Agriculture	Uma Ana Ico	-
14	Cancio Soares	m	Agriculture	Fatubelaoli	-
15	Joaquim Amaral	m	Agriculture	Fatubelaoli	-
16	Maria Poppy Ribeiro	f	Nat. Soc Safeguard Sp.	Dili	+670 77050000
17	Dirce Madalena P.	F	Nat. Environmental Sp.	Dili	+670 78487307
18	Carlos A. De Deus	m	PMU	Dili	+670 77549584

Appendix 5 Guidance on CEMP Sections and Method Statements

A) Waste Disposal (general waste, spoil disposal and hazardous waste)

1. The Waste Disposal section of the CEMP will include methods for waste management and spoil disposal for handling, storage, treatment, transport and disposal of solid and liquid wastes, hazardous materials, hazardous wastes and excavation spoils. The CEMP will also provide details of a trip ticket system to ensure that Contractor dispose excavation spoils in approved areas. Such system will be designed so that the PMU and PISC could readily monitor the volume and disposal site of excavation spoils, and to ensure that the total volume of spoils disposed will not exceed the maximum capacity of disposal sites approved by local authorities.

2. The Waste Disposal - General Waste section of the CEMP will include method statements and consideration of all matters related to general solid and liquid waste disposal including:

- i) Expected types of waste and quantities of general waste arising;
- ii) Waste reduction, reuse and recycling methods to be employed;
- iii) Agreed reuse and recycling options and locations for disposal / endorsement from NDE and local groups;
- iv) Methods for treatment and disposal of non-hazardous solid and liquid wastes;
- v) Methods of transportation to minimize interference with normal traffic;
- vi) Establishment of complaints management system for duration of the works;
- vii) Programme for waste disposal at the areas designated in the Environmental license (e.g. Tibar landfill etc if required by NDE).

3. The Waste Disposal - Spoil Disposal section of the CEMP will include method statements and consideration of the following:

- i) Locations and quantities of spoil arising.
- ii) Agreed locations for disposal / endorsement from NDE and local groups.
- iii) Methods of transportation to minimize interference with normal traffic.
- iv) Establishment of acceptable working hours and constraints.
- v) Agreement on time scale and programme for disposal and chain of custody.
- vi) Agreement on publicity/public consultation requirements and use of signed waiver (for disposal on private land and advance permission / signing etc.).
- vii) Details of a trip ticket system to ensure that Contractor dispose excavation spoils in approved areas. Such system will be designed so that the PMU and PISC could readily monitor the volume and disposal site of excavation spoils, and to ensure that the total volume of spoils disposed will not exceed the maximum capacity of disposal sites approved by local authorities.
- viii) Programming issues including the time of year and available resources.
- ix) Discussion of the PMU/MPWTC inspection/monitoring role.

4. The Waste Disposal - Hazardous Waste section of the CEMP will include method statements and consideration of all matters related to hazardous solid and liquid waste disposal including:

- i) Methods for collection, handling, treatment and disposal of solid and liquid hazardous wastes.
- ii) Establishment of regular disposal schedule and constraints for hazardous waste.
- iii) Discussion of the PMU/MPWTC inspection/monitoring role.
- iv) Programme for waste disposal at areas designated in the Environmental License. As much as possible the designated area should be within the District of Liquica.

B) Quarries, borrow areas and construction materials management.

5. In the preconstruction stage the Contractor will review the requirements for provision of construction materials and include it in the Quarries, Borrow Areas and Construction

Materials Management section of the CEMP. The CEMP will seek, as far as is reasonably practicable, to minimize the use of non-renewable resources and rock based materials and also to balance cut and fill requirements and contribute to the minimization of impacts due to extraction of rock based materials. As a first priority, where surplus materials arise from the removal of the existing surfaces these will be used elsewhere on the project or other projects for fill (if suitable) before additional rock, gravel or sand extraction is considered. The PISC team has estimated that almost 100% of cut materials may be reusable as bulk fill in many areas.

6. The Quarries, Borrow Areas and Construction Materials Management section of the CEMP will include method statements and details of arrangements to be made to facilitate the timely production and supply of construction materials to avoid impacts due to unnecessary stockpiling outside the project site.

7. The CEMP will include as a minimum consideration of the following:

- i) Required volume of materials, potential sources and estimated quantities available.
- ii) Impacts to identified sources and availability.
- iii) Excavated slope material for reuse and recycling methods to be employed.
- iv) Required endorsements that should be obtained by the Contractor from NDE and local groups for use of legitimate sources.
- v) Measures to be employed to mitigate nuisances to local residents.
- vi) Methods of transportation to minimize interference with normal traffic.
- vii) Constraints of regular delivery schedule to reduce stockpiling on site.
- viii) Programme for reuse of slope excavated material for reuse
- ix) Programme for delivery of quarry and borrow materials.
- x) Discussion of the PMU/MPWTC inspection/monitoring role.
- xi) Agreement on publicity/public consultation requirements.

C) Blasting and vibration.

8. There is no reason to expect that blasting will be required at this stage however it may be required in special circumstances. Alternatively the Contractor may wish to keep open the option to use blasting if unexpected conditions are encountered that prevent the use of powered mechanical equipment to remove rock. In the event that blasting is to be considered, even if only in special circumstances, the Contractor shall include a section on Blasting in the CEMP that will include method statements and consideration of the following matters:

- i) Use of only controlled blasting methods in line with the rules set down by the local authorities and NDE.
- ii) Limitations to permissible times and intervals between blasting
- iii) Details of the prescribed manner of blasting and precautionary measures to be included.
- iv) Prior notice to all local residents.
- v) Undertaking prior condition surveys of residences within 500m of the blast sites. All residents within 500m of the blast sites.
- vi) Measures to keep LGUs and public informed of the plans and progress of blasting.
- vii) Measures for temporary evacuation and provisions for alternative accommodation if required.
- viii) Discussion of the PMU/MPWTC inspection/monitoring role.

D) Asphalt, hot mix plant, rock crushing and bitumen supply

9. The rock crushing activities will generate noise and dust and pavement works will generate gas and odour from the asphalt hot-mix plant and noise from the compaction of the pavement. The Contractor shall include a section on Asphalt, hot mix plant, Rock crushing and Bitumen supply in the CEMP that will include method statements and consideration of the following matters:

- (i) Estimation of volumes of rock based material and asphalt required.
- (ii) Use of existing cement batching, aggregate and hot mixing plant or proposals for new installations.

- (iii) Locations of cement batching and aggregate mixing plant as far as possible from settlements and habitation.
- (iv) Locations of cement batching and aggregate mixing plant in agreement with the local town or municipality and to be approved by PMU.
- (v) Licences for operation of plant and approval from the relevant local authority and NDE.
- (vi) Dust suppression equipment to be installed.
- (vii) Proposals for storage, handling, use and disposal of residual bitumen in line with the waste disposal section of the CEMP.
- (viii) Duration and timing of the proposed operation and cement batching and aggregate mixing plant.
- (ix) Discussion of the PMU/MPWTC inspection/monitoring role.

E) Erosion control and runoff

10. Erosion Control section of the CEMP will include method statements to ensure that construction works will not cause excessive runoff and siltation of adjacent waterways within the project site. The Erosion Control section of the CEMP and slope stabilization measures in the detailed designs will be implemented and maintained by the Contractor during construction to protect the works. The CEMP will have sufficient provisions to ensure stabilization of cut slopes and other erosion-prone areas, minimize hydrological impacts, flooding and erosion of river banks and adjacent areas and to protect the works under construction. The CEMP will include the following to control erosion and runoff:

- i) Climate and rainfall for the area and checking weather forecasts.
- ii) Terrain and typical locations particularly susceptible to erosion and runoff.
- iii) Protection of the works and potential impacts to the environment.
- iv) Erosion control methods to be employed, locations and installation timing.
- v) Limits to stockpiling on sites near waterways and irrigation channels.
- vi) Discussion of the PMU/MPWTC inspection/monitoring role.
- vii) Agreement on publicity/public consultation requirements.

F) Bridge repairs and river protection

11. The project proposes to repair or construct new bridge as well as repair or construct new culverts. Careless construction and poor material control can cause physical blockage to rivers and streams resulting in adverse impact on water quality and flow regime. Therefore the CEMP will have sufficient provisions to ensure control of physical aspects of Bridge Repairs and River Protection including the following matters:

- i) Programme for work near rivers (for the dry season as far as practicable).
- ii) Avoidance of blocking rivers and streams through improper disposal of rock based materials.
- iii) Methods to be used to avoid dropping bridge sections or culvert into rivers/streams.
- iv) Covering of open surfaces to reduce runoff and bank erosion.
- v) Dewatering and cleaning of cofferdams.
- vi) Location of settling basins or containment units.
- vii) Discussion of the PMU/MPWTC inspection/monitoring role.

G) Water contamination prevention

12. Work near rivers and streams have the potential to cause water pollution. In order to prevent water contamination the CEMP will include coverage of the following to be undertaken by the Contractor:

- i) Disposal of solid waste from construction activities away from rivers.
- ii) Design of storage areas with sufficient lining for lubricants and other construction storage/stockpiles.
- iii) Handling of stockpiled materials to avoid leakage and prevent runoff.
- iv) Location of stockpiling or borrow sites and storage for hazardous substances.
- v) Responses to complaints, complaints monitoring and investigation of water quality.
- vi) Scheduled work duration in near rivers shall be as short as possible.
- vii) Immediate stabilization of slopes after works are completed.

- viii) Prohibition of washing of machinery and vehicles in surface waters.
- ix)

H) Dust and noise minimization

13. Earthworks and rock crushing activities will cause dust impacts. All construction works will involve some noisy activities and it is good practice to control dusty materials and noisy activities at source so that nuisances do not occur. The Dust and Noise control section of the CEMP will include method statements and minimize impacts to sensitive receptors (residential areas, schools, hospitals, etc.) due to construction works, sourcing and transport of construction materials, and other project-related activities. In order to prevent dust and noise nuisances the Dust and Noise control to section of the CEMP will include the following:

- i) Use and availability of water for damping down dust in wet and dry seasons.
- ii) Alternative use of dust barriers / segregation between the works and sensitive receivers.
- iii) Locations and timing of works within 500m of settlements including night works.
- iv) Reporting of complaints to PMU in line with the grievance redress mechanism discussed in section 7.
- v) Compliance of heavy equipment and machinery with best practice on pollution.
- vi) Ban on smoke belching vehicles and equipment.
- vii) Covering vehicles transporting loose construction materials.
- viii) Speed limits on vehicles unpaved areas near works.
- ix) Methods to reduce the need for large stockpiles and planning of supplies of as per the Construction Materials Management section of the CEMP.
- x) Location of stockpiles and enclosing or covering when not in use.
- xi) Description of any monitoring proposed by Contractor in addition to the PMU/DSC monitoring role.

I) Tree Cutting and Replanting

14. All areas either side of the project road are already disturbed. Near the settlements this is due to clearance for agriculture. In many other places the natural vegetation inside and immediately outside the ROW for a few metres has been cut down to make way for power distribution poles that were set out in recent years. The habitats outside this corridor are vulnerable to further loss due to increasing pressure (limited extent and over-exploitation) for fuel, timber and food. This underscores the need for mitigation measures to protect the remaining habitats from exploitation during the project construction.

15. Tree-cutting and Replanting section of the CEMP will include method statements in line with the usual procedures of DRBFC to ensure there is no indiscriminate tree-cutting by clearly defining areas where vegetation removal is necessary. Tree-cutting should be based on project requirements and that replanting or remuneration paid to local tree owners shall be completed after consultation with owner and compensation as per Resettlement Framework and usual DRBFC process (in-kind following consultation and negotiation). The Tree-cutting and Replanting section of the CEMP will include method statements in line with the agreed procedures for:

- i) Advance notice to PMU on any trees that need to be cut to complete the detailed designs.
- ii) Confirmation and identification of trees to be cut and locations by chainage following the detailed designs.
- iii) Planning cutting and any replanting and compensatory planting with the local forest authority and District DRBFC.
- iv) Ban use of wood as a fuel for the execution of any part of the project works.
- v) Avoiding construction camps, asphalt mixing plants, material storage sites in forests, near springs, sacred sites or other previously identified sensitive areas.
- vi) Control of accidental fires and ban on burning of waste.
- vii) Prohibitions on workers entering mangrove communities and forests for taking firewood.
- viii) Justification for tree cutting as an alternative to road realignment.
- ix) Obtaining permissions from land owners, authorities, and permits from NDE for cutting.
- x) Methods for marking, protection of uncut trees and limitations to cutting.
- xi) Methods and timing for safe cutting to minimize interference with normal traffic.
- xii) Methods to remove trees, cut timber and avoid stockpiling cut brushwood on site.
- xiii) Methods to avoid under cutting adjacent tree lined slopes.
- xiv) Preliminary programme for cutting trees and enhancement planting (to be updated in progress reports).
- xv) Discussion of the PMU/MPWTC inspection/monitoring role.
- xvi) Agreement on publicity/public consultation requirements.

J) Enhancement planting

16. Environmental enhancements such as on-site planting at used worker camps, or off-site tree planting for long term soil stabilization included in the detailed designs will be identified in the CEMP by the Contractor. The enhancement Planting section of the CEMP will include:

- i) Locations of enhancement planting required in detailed design.
- ii) Provide enhancement planting at construction worker campsites after use.
- iii) Maintenance and monitored for planted specimens as agreed with the PMU
- iv) Discussion of the PMU/MPWTC inspection/monitoring role.

K) Construction camps, sanitation and diseases

17. The operation of the Contractor worker camps will cause impacts from generation of raw sewage, wastewater effluent, and construction debris/scarified waste materials for disposal, air and noise pollution. Waste and control of other impacts will be in line with other sections of the CEMP. Additional measures included in the construction camps section of the CEMP will include:

- i) Proposed location of construction worker camps to be agreed with local communities and PMU.
- ii) Hiring and training of local workers.
- iii) Provisions to be made for potable water, clean water for showers, hygienic sanitation facilities/toilets, worker canteen/rest area and first aid facilities.
- iv) Provisions for adequate accommodation for workers.
- v) Provisions for wastewater effluent capture and treatment from worker facilities and Contractor workshops and equipment washing-yards before discharging.
- vi) Solid and liquid waste managed in line with waste disposal practices agreed in the CEMP.
- vii) Use of borrow pits and natural depressions for construction camp waste disposal and options for completely or partially recycling wastes.
- viii) Provision of food from local farm / suppliers.
- ix) Ban on hunting and bush meat supplies to discourage poaching and gathering of green timber.
- x) Ban on entry to the mangrove areas, forests and protected areas by workers.
- xi) Provisions to clean construction worker camp sites after use and dispose of all waste materials to approved disposal sites.
- xii) Provisions to restore land used for campsites and the area be planted with appropriate trees / shrubs as enhancement.

18. Sanitation and diseases will mainly be concerns at the construction worker camps. The contractor will ensure that additional measures to maintain hygienic conditions in the camps and implement the social and health programmes for the project are included in the CEMP:

- i) Measures to prevent proliferation of mosquitos.
- ii) Temporary and permanent drainage facilities to prevent the accumulation of surface water ponds.
- iii) Implementation of the social and health programmes for the project (e.g. HIV-AIDS education as required in line with social programmes.

L) Power and utilities protection and reprovisioning

19. The power and utilities protection and reprovisioning section of the CEMP will include method statements and to minimize interruption to power, water supply and telecommunications to protect them during the works. The requirements need to reassessed and reconfirmed by the Contractor before works commence. Therefore the Contractor will include measures to protect power and utilities in the CEMP as follows:

- i) Consultation with PMU and MPWTC and utility providers to reconfirm power, water and telecommunications systems likely to be interrupted by the works and any additional trees to be cut to make room for replacement utilities.
- ii) Contact points in all relevant utilities, local authorities and local village groups to plan reprovisioning.
- iii) Approach to coordinating relocation of utilities ahead of construction works with the relevant utility company at the district and district levels and reconnection.
- iv) Information to be provided to affected communities should be timed well in advance.
- v) Emergency provisions and action plan for immediate repairs to utilities if accidentally damaged.

M) Drainage system, irrigation and water resources

20. The natural streams and drains, irrigation channels running close to works areas and water resources on surrounding lands may be affected by construction activities. Local water supplies will need to be tapped to meet campsite and construction requirements. This section of the CEMP will include method statements and to prevent ponding/flooding within the project site, construction camps, borrow/quarry areas, other areas used for project-related activities and adjacent areas. The Contractor will be required to implement drainage management and provide measures to mitigate adverse impacts on water resources and surface drainage patterns and describe them in the CEMP. The Drainage System, Irrigation and Water Resources section of the CEMP will include method statements covering the following:

- i) Provision of appropriate temporary drains and measures to keep storm drains and road drainage systems clear of construction debris.
- ii) Identification of any irrigation channels to be avoided or reprovisioned and timing for reprovisioning in advance of the commencement of road works to the satisfaction of PMU in MPWTC and local community.
- iii) Availability of water for the works including consultation with the local authorities
- iv) Arrangements to bring in water by tanker without depleting local village supplies
- v) Guidelines to minimize the wasting of water during construction operations and at campsites.
- vi) Preparations (in case of obstruction or damage due to the works) for immediate clearance or repairs to drainage channels, irrigation ditches and supply ponds.
- vii) Arrangements for close liaison with local communities to ensure that potential conflicts related to common resource utilization are resolved quickly.

N) Safety precautions for workers and public

21. Workers and Public Safety section of the CEMP will include method statements to identify safe working practices and interfaces between the works and public to ensure worker and public safety and prevent accidents due to the construction works. Workers and Public Safety section of the CEMP will include:

- i) Statutory requirements for worker occupational health and safety as governed by the labour codes of Timor Leste and National Labour Code as amended principles of rights at work.
- ii) Method statement of how the Contractor work practices will comply with statutory requirements.
- iii) Arrangements to protect public safety

O) Temporary Traffic Management

22. Arrangements for vehicles accessing the project area will be formulated to avoid community disturbance and severance and will at least retain a passing lane along all roads used during construction. The Temporary Traffic Management section of the CEMP will include method statements and to minimize disturbance of vehicular traffic and pedestrians during construction including consideration of the following:

- i) Lane availability and minimizing interference with traffic flows past the works site.
- ii) Establishment of acceptable working hours, constraints and public safety issues.
- iii) Agreement on time scale and establishment of traffic flow/delay requirements.
- iv) Programming issues including the time of year and available resources.
- v) Discussion of the PMU/MPWTC inspection/monitoring role.
- vi) Establishment of complaints management system for duration of the works
- vii) Agreement on publicity/public consultation requirements (advance signing etc.).

P) Accidental discovery of archaeological assets, sites or resources.

23. Timor Leste has an archaeological heritage and therefore the contractor will establish precautionary measures to be included in the CEMP implemented to avoid disturbance of any unexpected finding of archaeologically valuable artifacts.

Q) Decommissioning, rehabilitation, revegetation and recontouring of borrow areas and construction material processing areas

24. Borrow areas and construction material processing areas should be decommissioned and rehabilitated toward the end of the construction activities. Borrow pits should be reclaimed with suitable material while construction material processing areas be cleaned up from spoil, scarified materials, bituminous spill and other atypical materials. Recontouring should be pursued in areas that are severely impacted as not to create hazardous condition for local community. Cut slopes should be left in non-hazardous state with proper cut angle according to the type of material. Revegetation should be pursued on suitable locations with

local fast-growing species or other species in consultation with land owner or village chiefs. Replanting should be conducted as early as possible to allow for sufficient early care needed for the plants to grow well.