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ANNEXES

ABBREVIATIONS AND ACRONYMS

CEMP	-	Contractors Site Specific Environmental Management Plan
DRBFC	-	Directorate of Roads, Bridges and Flood Control
EA	-	Executing Agency
EARF	-	Environmental Assessment and Review Framework
EHS	-	Environmental Health and Safety Guidelines
EIS	-	Environmental Impact Statement
ELL	-	Environmental Licensing Law (Decree No. 5/11)
EMP	-	Environmental Management Plan
ESO	-	Environment and Safety Officer (Contractor)
EO	-	Environmental Officer (PMU)
GRM	-	Grievance Redress Mechanism
GRC	-	Grievance Redress Committee
GoTL	-	Government of Timor Leste
IA	-	Implementing Agency
IES	-	International Environmental Specialist
IIC	-	Included in Contract
IOL	-	Inventory of Losses
ISS	-	International Social Safeguards Specialist
JMP	-	Joint Monitoring Program
MAFF	-	Ministry of Agriculture, Fisheries and Forestry
MOF	-	Ministry of Finance
MPWTC	-	Ministry of Public Works, Transportation and Communications
NDPCEI	-	National Directorate for Pollution Control and Environmental Impact
NEC	-	National Environmental Consultant
NES	-	National Environmental Specialist
NGO	-	Non-Governmental Organization
NRUP	-	National Roads Upgrading Program
PSC	-	Project Supervision Consultants
PMU	-	Project Management Unit
REA	-	Rapid Environmental Assessment
ROW	-	Right of Way
RP	-	Resettlement Plan
SEASEE	-	Southeast Asia Association of Seismology and Earthquake Engineering
SPS	-	Safeguard Policy Statement
SEMP	-	Site Specific Environmental Management Plan
SEIS	-	Simplified Environmental Impact Statement
TOR	-	Terms of Reference
UNCBD	-	United Nations Convention on Biological Diversity
UNCCD	-	United Nations Convention on Combating Desertification
UNFCCC	-	United Nations Framework Convention on Climate Change
UNTAET	-	United Nations Transitional Administration for East Timor
WHO	-	World Health Organization

EXECUTIVE SUMMARY

This Site Specific Environmental Management Plan (SEMP) has been prepared as part of the Project Implementation and Support Consultants for the Construction of Suai - Beaco Highway Road Project, Section 1: Suai-Fatukai/Mola Section (Sta.3+920-Sta.34+275). This Environmental Management Plan is a response to the requirements for Site Specific Environmental Management Plan (SEMP) identified in the Simplified Environmental Impact Statement (SEIS). The SEMP is the primary environmental document for the implementation of extraction activities to produce gravel, sand and filling materials for the Project that is supported by other environmental requirements identified in the SEIS.

The purpose of the Simplified Environmental Management Plan (SEMP) for the river and borrow pits including processing/manufacturing areas such as, asphalt mixing plants, concrete batching plants, washing and crushers will support enhancement to the existing road network is to ensure that social and environmental impacts, risks and liabilities identified during the Environmental Impact Assessment (EIA) process during the design stage are effectively managed during the construction, operation and decommissioning of the project. The SEMP specifies the mitigation and management measures to which this project is committed, and shows how the project will mobilize organizational capacity and resources to implement these measures. The SEMP also shows how mitigation and management measures will be scheduled.

Economic and social development in the area is significantly dependent on efficient road transport infrastructure which facilitates delivery of agricultural products, merchandise and commodities to markets as well as easy access to basic services (health, schools, water, trading centers, and administrative offices, etc.) by the people.

The key objectives of the Environmental Management Plan are to:

a. Formalize and disclose the program for environmental and social management.
b. Provide a framework for the implementation of environmental and social management initiatives.
c. Present guiding principles and generic measures for the detailed development of the final EMP, which will include detailed method statements.
d. Provide mitigation measures
e. Specify roles and responsibilities for implementing the SEMP.

The construction of the proposed new highway project and improvement of existing facilities have potential negative effects to the physical environment and social well being of the communities as well as natural habitats. Among the potential negative impacts from road construction projects could include: environmental pollution from construction activities, risk to health and safety of the residents and employees, demand of construction materials such as water, wood, gravel and hard stones; increased run off, socio-cultural changes including loss of farming land, changes of domestic and wild animals access to water point, demolition of structures, displacement of human settlement or commercial centers, interference with animal reserves and foot paths, increased traffic, increased ambient air pollution, increased potential for road accidents, increased surface run-off, flooding and associated disasters among other impacts. Other anticipated impacts from the road project will be disruption of natural habitats by interference of food chains and breeding sites and habitats, risks of fatal wildlife attack, displacement or extinction of species, destruction of land, vegetation, introduction of exotic species and possible interference with natural eco-balance.

In view of the above observation, environmental concerns need to be given an important role during the construction process in this project. This can be achieved by complying the guidelines set forth in the issuance of Environmental Compliance Certificate (ECC) from the Government of the Republic Democratic of Timor-Leste (RDTL) through the Department of Environment after the EIA study as summarized below. Appropriate remedy shall be integrated in the project implementation and the effectiveness of the remedy is managed and monitored with the guidance of the Environmental Management and Monitoring Plan (EMMP).

COVEC-CRFG hereby make the commitment to implement all the requirements of this Specific Environmental Management Plan (SEMP). COVEC-CRFG will deliver company environmental policy in and update this SEMP if necessary. This SEMP is presented by COVEC-CRFG in partial fulfillment of environmental obligations under the Environmental Licensing Law (ELL - Decree Law 05/2011). The SEMP when accepted under the environmental laws of Timor Leste will form part of the Contract. Adherence to this EMP will not absolve COVEC-CRFG from other obligations under the Laws of Timor-Leste (TL) as may be updated and amended from time to time. This SEMP may also be updated and amended to take account of any unforeseen impacts or changes in the requirements of Government of Timor Leste guidelines and initiatives as may be promulgated from time to time.

This SEMP summarizes the impacts and mitigation measures for consideration by the National Directorate for Pollution Control and Environment Impact (NDPCEI) at the earliest stage. The SEMP requirements will therefore form part of the Environmental License and the details prescribed in the SEMP will be both mandatory in nature and also contractually binding. The SEMP will also be equally applicable to Subcontractors, including nominated Subcontractors, if any.

At the bidding stage COVEC-CRFG were instructed to carefully consider the requirements for environmental management when preparing the bid and pricing the items of Work. COVEC-CRFG therefore accepts that the prescriptions and clauses detailed in the SEMP are an integral part of the specifications for relevant items of Work. COVEC-CRFG is aware that in case of failure to implement the SEMP recommendations, the Employer shall take necessary action(s) to ensure that the SEMP is properly implemented and/or to rectify the damages caused by such negligence. Any cost thus incurred will be recovered from the COVEC-CRFG certificate of payments.

The river and borrow pits including processing/manufacturing areas such as, asphalt mixing plants, concrete batching plants, washing and crushers will support enhancement to the existing road network. The impacts are largely on-site and restricted to quarrying and manufacturing aggregate materials for road improvement along the existing road corridor. The impacts are at off-areas for the pits, crushers, washing, concrete batching and hot mix plant. The areas of land required have been agreed with the local authorities. COVEC-CRFG will make arrangements to implement payment of compensation to affected people for lost assets.

All the anticipated environmental impacts and recommended mitigation measures during the pre-construction and implementation phases as shown in SEIS have been accounted for and presented in this SEMP. Table 1 presents a summary of the key activities creating impacts. The SEMP will be implemented by COVEC-CRFG and accepts that the prescriptions detailed are mandatory in nature and also contractually binding and that the SEMP will also be equally applicable to COVEC-CRFG Subcontractors including nominated Subcontractors, if any. COVEC-CRFG will be responsible for the

compliance of requirements of the SEMP. COVEC-CRFG with team environment consultant will implement and monitor all mitigation measures necessary for compliance with the SEMP and implementation by COVEC-CRFG will be monitored by PMU with the assistance of the Engineer.

TABLE 1. SUMMARY OF PROJECT ACTIVITIES AND KEY ENVIRONMENTAL IMPACTS

PROJECT ACTIVITIES GIVING RISE TO IMPACTS	MITIGATION MEASURES TO CONTROL ENVIRONMENTAL IMPACT
PRE-CONSTRUCTION	
Use of Public and Private Land	Identifying suitable land with sufficient supplies of rock based material & testing rock quality
	Establishing acceptable agreements with land owners for land use and tree felling
	Planning and developing a sustainable design of the Project excavation, mechanical structures and control of operational impacts
Surveying and demarcation of manufacturing area boundary.	Loss of vegetation during demarcation
Site Clearance, Digging, Excavations	Discovery of cultural historical property
	Removal of trees
Mobilization of contractor	Social disruption
	Health and safety risks and management
	Spread of communicable diseases
CONSTRUCTION	
Clearing, cut & fill activities for manufacturing working areas, stockpile and staging areas lead to loss of land	Soil erosion & sediment contamination of rivers & turbidity
Operation of construction equipment	Emissions & dust from plant &materials
Spoil overburden discarded un-useable rock base material	Impacts to habitats & water courses
Run-off, discharges, generation of liquid wastes	Impacts on water quality.
General activities - solid & liquid waste arising	Uncontrolled unmanaged waste disposal
Use of hazardous materials	Spillage, leakage, accidents
Accidental damage to existing services	Interference with existing infra-structure; water supply, power, telecommunications
Presence of construction workers	Disruption, or antagonism, communicable diseases & community health
Site office, water use & electricity supplies	Stress on existing resources and infrastructure
COMMISSIONING AND DE-COMMISSIONING	
Sourcing of materials (quarry aggregates).	Extraction gravel, altering contours & runoff & erosion; quarries & borrow.
Operation of construction equipment	Emissions & dust from plant & materials
Operation of crushers, conveyors, batching & asphalt mixing equipment	Emissions & dust from plant & materials
Spoil overburden discarded un-useable rock base material	Impacts to habitats & water courses
Run-off, discharges, generation of liquid wastes	Impacts on water quality
General activities - solid & liquid waste arising	Uncontrolled unmanaged waste disposal
Use of hazardous materials	Spillage, leakage, accidents
Activities outside manufacturing areas encroaches habitats	Workers poach animals, eggs feathers gather fuel wood & impact habitats
Chance Finds of historical/cultural sites	Impacts on PCR or cultural property sites

COVEC-CRFG will assist the Engineer to discharge their duties as required

(i) Maintain up to date records on the implementation of SEMP
(ii) Submit environmental monitoring reports and data in a timely manner
(iii) Participation in meetings with the Engineer.

COVEC-CRFG will include a summary of quarrying and manufacturing aggregate materials in the monthly reports submit to the MPWTC through the Engineer relative to the implementation of the requirements contained in this SEMP and environmental performance monitoring.

The project will not create any impacts on cultural or heritage sites. COVEC-CRFG will implement the project carefully, though the community affected is not in a highly populated areas. Implementation of appropriate measures during construction and maintenance will minimize negative impacts to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures are included in the Contract.

COVEC-CRFG will follow standard construction practices and comply with a series of contract requirements to follow the SEMP and Environmental License, which will be monitored and supervised by the Employer through the PMU. The construction and operational impacts should be predictable and manageable with appropriate mitigation in few residual impacts. COVEC-CRFG will allocate necessary human and financial resources in advance to progress and achieve statutory compliance with the Environmental License, the mitigation measures in the SEMP and implementation of the Contract. COVEC-CRFG's conformity with contract procedures and specifications and implementation of the approved SEMP and Environmental License during construction will be carefully monitored.

1 INTRODUCTION

1.1. The Project

The proposed Suai-Beaco Highway Road project is one of the South Coast Highway Improvement project of the Democratic Republic of Timor-Leste. The proposed highway road is split into four sections, namely: Section 1: Suai-Fatukai/Mola. Section 2: Fatukai/Mola-Betano. Section 3: Betano-Clacuc. Section 4: Clacuc-Beaco. This section 1: Suai-Fatukai/Mola project is under Ministry of Public Works, Transport, and Communication of the Democratic Republic of Timor-Leste (MPWTC). MPWTC as implementing agency will fund totally this project. Hereinafter, the proponent will need to extract construction materials to satisfy the construction requirements particularly on earthworks and aggregates courses from **River and Borrow Pits,** which requires the **Processing/Manufacturing areas such as, Asphalt Mixing Plants, Concrete Batching Plants, Washing and Crushers** in different location within the project stretch.

1.2. The Project Proponent

The proponent of the project is China Overseas Engineering Group Co., Ltd. in joint venture with China Railway First Group Co., Ltd. of the People's Republic of China here in after called the "COVEC-CRFG JV" as contractor, signed the contract known to be the Construction of Suai - Beaco Highway Road Project, Section 1: Suai-Fatukai/Mola Section (Sta.3+920-Sta.34+275) , and is supported by the Project Supervision Consultants (PSC) the Katahira Engineering International in joint venture with Renardet S.A. in the Environmental Impact Assesment (EIA) that carried out the project study in the early stage of this project implemetation and prepared SEIS and EMP to provide environmental management and implement of environmental monitoring at the working level.

The EMP shall be provided by COVEC-CRFG, updated and submitted to NDPCEI for re-approval annually until project ends. Project proponent engaged its company for updating of the EMP. Data collection for the update of the SEMP should focus on HSE and vicinity water quality assessment.

NDPCEI can review results from monitoring activities and compare them with baseline results collected during EMP preparation. Complains from community should also be taken into consideration and appropriate assessment and data collection take place to formulate proper ways to address the complaints.

TABLE 2. PROJECT PROPONENT DETAILS

Name of Company:	China Overseas Engineering Group Co., Ltd. in joint venture with China Railway First Group Co., Ltd. (COVEC-CRFG)
Address:	Floor 2, Seaview Apartment & Office Building, Av. de Portugal, Dili, Timor-Leste
Telephone:	+670 331 0997
Name:	Mr. Alex Lin Mingming, General Manager, COVEC-CRFG JV Lda. Timor Leste

1.3. Training and Organization for Environmental Management

1.3.1. In preparing to implement the EMP, COVEC-CRFG will ensure that the Engineer staff follow awareness training programs to be provided for engineers of COVEC-CRFG by the PMU and PSC covering:

- Relevance and procedures for environmental assessment and licensing;

- Fundamentals of environmental management;
- Environmental Management Plan of the Project and Contractors EMP:

1.3.2. Orientation of engineering staff on environmental management for the project, particularly the following:

- Construction impacts
- Air pollution, noise and water pollution avoidance and minimization;
- Waste management;
- Fuel and hazardous materials management;
- Construction camp management;
- Community relations and public consultation procedures; and
- Labor Safety: Requirements for training and regular reinforcement on safety issues related to road rehabilitation
- Monitoring and reporting requirements and checklists: The training will include the methodology for site observation and reporting of monitoring results.

1.4. Summary of Impacts

Likely environmental impacts for the stone crushing plants are related to operational activities that involve stone mining and crushing of the rocks. As previously explained, stoen mining is done mechanically through the use of heavy extraction equipment. Stone crushing is similarly done, mechanically through feeding of the raw stones into the hopper where the stones are being shaken to clean them from impurities. From the hopper, stones are then fed into the primary, secondary and tertiary crusher where the size of the stones being reduced until they reach desirably specifications. No chemical or other physical treatments (e.g. heating) are involved in the operation.
The following table presents all potential impacts from the development, major or otherwise grouped based on mining or crushing activities.

Table 3: Impacts from Quarrying and Rock Crushing Activities

	Extraction Activities			**Rock Crushing Activities**	
	Impact	**Nature of Impact**		**Impact**	**Nature of Impact**
1	Loss of flora and fauna.	Negative, direct, long term impacts related to top soil removal during excavation of rocks.	1	Air quality from particulate matter	Negative impacts related to the handling of raw rocks and crushing of rocks. Most likely become a problem during dry season from June to November.
2	Erosion	Negative, direct, could be long term impacts related to the mining activities that leave open areas in the mining sites. Erosion is especially a high risk during the rainy season (impacts are likely to happen during rainy season from December through May).	2	Sedimentation	Negative impacts similar to the above impact, related to the movement of earth that is settled by the rain, therefore will become a problem especially during the rainy season.
3	Sedimentation	Negative, direct, could be long term impacts related to the movement of soil settled by the rain, therefore will become a problem especially during the rainy season.	3	Surface and ground water quality	Negative impacts related to the use of lubricants for heavy equipment and diesel fuel for power generation. Also related to storage of the fuel and lubricating oil.

4	Air quality	Negative, direct, could be long term related to the movement of earth during excavation. Most likely become a problem during dry season from April to November.	4	Loss of flora and fauna	Negative impacts related to changes in land use to industrial rock crushing site.
5	Noise and vibration	Negative, direct, short term, related to operation of equipment.	5	Noise and vibration	Negative impacts related to equipment operation.
6	Preservation of cultural or archaeological resources	Negative, direct, could be long term related to excavation for rock mining activities.	6	Occupational health and safety	Negative impacts related to the operation of heavy equipment,
7	Occupational health and safety	Negative, direct, could be long term to workers' health. Related to the day to day extraction activities.			

1.5. Summary of Potential Impacts

Likely environmental impacts for the stone crushing plants are related to operational activities that involve stone mining and crushing of the rocks. As previously explained, rock mining is done mechanically through the use of heavy extraction equipment. Stone crushing is similarly done, mechanically through feeding of the raw stones into the hopper where the stones are being shaken to clean them from impurities. From the hopper, stones are then fed into the primary, secondary and tertiary crusher where the size of the stones being reduced until they reach desirably specifications. No chemical or other physical treatments (e.g. heating) are involved in the operation. The following table presents all potential impacts from the development, major or otherwise grouped based on quarrying or crushing activities.

Table 4: Summary of Potential Impacts

No.	Potential Impacts	Nature of Impacts	Scope of Impacts	Impact Indicator	Design and Methodology to Assess Impacts
Extraction/Quarrying Activities					
1	Loss of flora and fauna.	Negative, direct, long term impacts related to top soil removal during excavation of rocks.	Localized to the areas cleared. Since the location of mining activities is not part of sensitive habitat or ecologically important areas, impacts are predicted not be significant.	Areas of vegetation cleared, type and extent of vegetation cleared.	Field assessment
2	Erosion	Negative, direct, could be long term impacts related to the mining activities that leave open areas in the mining sites. Erosion is especially a high risk during the rainy season (impacts are likely to happen during rainy season from December through May).	Localized at the mining area, large scale erosion might impact the lower facility area. Depending on the scale of erosion, impact can be significant.	Broken soil area, eroded open pits, evidence of earth movement especially during the rainy season.	Field assessment
3	Sedimentation	Negative, direct, could be long term impacts related to the movement of soil settled by the rain, therefore will become a problem especially during the rainy season.	Sediment can be carried by runoff affecting the mountain area and near water area. The scope of the sedimentation will depend on the scope of eroded soil from mining operation.	Turbidity of waters.	Visual

2	Air quality	Negative, direct, could be long term related to the movement of earth during excavation activities. Most likely become a problem during dry season from April to November.	Localized around the mining area, however, fugitive dust can be blown by the wind into the national road affecting passersby.	Particulate matter in the air, complaints from workers related to upper respiratory tract infection.	Visual, laboratory test
5	Noise and vibration	Negative, direct, short term, related to operation of equipment.	Localized to workers in the facility. Since the closest community lives 6 km away, no noise and vibration impacts are expected to affect local communities.	Level of noise and vibration.	Complaint from worker and local community
6	Preservation of cultural or archaeological resources	Negative, direct, could be long term related to excavation for rock mining activities.	Localized to the area being excavated. Archaeological excavation in nearby areas have found remains of past communities	Usually indicated by findings of certain archaeological artefacts such as animal pens, terraces and housewares in the excavated areas.	Visual
7	Occupational health and safety	Negative, direct, could be long t to the day to day mining activities related to the day to day quarrying activities.	Localized to workers as well as visitors in the facility.	Whether a facility is considered to be running a safe operation or not is usually indicated by the number of work related accidents in a certain period of time.	Complaint from worker, worker's health and safety record.
Rock Crushing Activities					
1	Air quality from particulate matter	Negative impacts related to the handling of raw rocks and crushing of rocks. Most likely become a problem during dry season from April to November.	Localized around the mining area, however, fugitive dust can be blown by the wind into the national road affecting passersby.	Particulate matter in the air	Visual, laboratory testing
2	Sedimentation	Negative impacts similar to the above impact, related to the movement of earth that is settled by the rain, therefore will become a problem especially during the rainy season.	Sediment can be carried by runoff affecting the mountain area and nearby water area. The scope of sedimentation will depend on the scope of eroded soil from slope origin.	Turbidity of waters	Visual
3	Surface and ground water quality	Negative impacts related to the use of lubricants for heavy equipment and diesel fuel for power generation. Also related to storage of the fuel and lubricating oil.	Spilled oil and fuel could leach into the ground water or being washed away by runoff. Since the area has karst type of aquifer, which has a high permeability, there is a risk for ground water contamination.	Evidence of spilled oil on the ground	Visual
4	Loss of flora and fauna	Negative impacts related to changes in land use to industrial (rock crushing) site.	Localized to the facility area. Since location of facility does not fall into sensitive habitat or ecologically important areas, this impact is considered limited.	Loss of vegetation and habitat	Field assessment
5	Noise and vibration	Negative impacts related to equipment operation.	Localized to workers as well as visitors in the facility.	Complaint of loud noise and vibration from workers	Complaint from worker and local community
6	Occupational health and safety	Negative impacts related to the operation of heavy equipment,	Localized to workers as well as visitors in the facility.	Whether a facility is considered to be running a safe operation or not is usually indicated by the number of work related accidents in a certain period of time.	Complaint from worker, worker's health and safety record

1.6. Proposed Mitigation Measures

Proposed mitigation measures are categorized into - (i) mitigation measures for mining activities and (ii) mitigation measures for stone crushing activities. Generally, the measures are similar for both types of activities although there are differences since the nature of the activities are different and therefore lead to different measures to mitigate impacts.
The mitigation measures consist of:

1) Physical measures: those measures that require the construction of physical structures such as settlement/sedimentation basin.

2) Programmatic measures: those measures that do not require construction of physical structures such as tree planting, provision of equipment such as personal protection equipment and others. All of the proposed measures are applicable to the operational phase only since the facility has been in operation for some time at the start of the environmental impact assessment preparation. The following section contains description of the mitigation measures in relation to previously described impacts. Clear and achievable targets for the mitigation measures as well as indicators for the level of mitigation to be pursued are also described.

Table 5: Summary of Impact and Mitigation Measures

No.	Impact	Mitigation Measures
	Extraction Activities	
1	Loss of flora and fauna	• Tree planting on backfilled pits • Tree planting on trenches or other holes on the ground created from the mining activities
2	Erosion	• Development of cut slopes for erosion control as well as for ease of movement to the upper part of the mined area. • Keep existing drainage trenches to prevent water from scouring top soil and other exposed surface on the hills. Water should be directed to the lower part of the facility where a sedimentation treatment pond is located. • Backfilling of pits and holes created by mining activities • Tree planting in mined areas. • Where necessary (to be determined by engineers working on the facility), develop foundation or retaining walls in proper location. • Where necessary (to be determined by engineers working on the facility), develop foundation or retaining walls in proper location.
3	Sedimentation	• Topsoil removed should be reused as backfilling material. • Any unused becomes source of sedimentation during rainy evening. • Unused topsoil should be compacted (instead of piled) and provided with drainage and vegetation such as grass or other vegetation to avoid erosion. Location of compaction should be at least 50m away from the water bodies
4	Air quality	• Operation of well-maintained construction equipment to avoid polluted exhausts. • Proper treatment of unused topsoil (see discussion on mitigating sedimentation above) • Spraying of water in the working area and unsealed road areas often passed by project vehicles.

5	Noise and vibration	• All noise-generating equipment should be insulated and well maintained to ensure that they operate within the noise limits they were designed to operate. • Operation of noise generating equipment should only be during the day. • Vibration sources at the operation are blasting equipment used to breakdown large rocks. Mitigation measures for vibration should include: • Use of newer equipment to reduce vibration • Operation of vibration-generating equipment should only be during the day
6	Preservation of cultural and archaeological resources	Should any potential for physical cultural or archaeological resources be identified, the following steps should be followed: • All works on the location should cease immediately; • An officer should be assigned to keep watch on the archaeological or physical cultural resource; • Relevant agency (Secretary of State of Art and Culture) be contacted for further action; • All officers on the site should be aware of the potential for the discovery of archaeological artefacts during mining activities
7	Occupational health and safety	Mitigation measures for occupational health and safety should include the use of worker's protection apparatus, including: • Bright vest for easy identification of workers • Ear and eye protection especially where workers are close to excessive noise generating equipment or vehicle • Respiratory mask for workers exposed to dust. • Limitation of exposure to 8 hr per day for workers exposed to dust. • Helmet • Foot protection (safety boot), rain coat, etc. as needed • First aid kit should be made available on the site at all times • Workers should be trained in first aid response • Workers should be trained in emergency response procedures (for example for fire evacuation, etc.)
Rock Crushing Activities		
1	Air quality	Soil, dirt and other impurities from rocks should be cleaned prior to crushing and used as backfilling material as much as possible.
2	Sedimentation	The following measures are recommended to mitigate sedimentation impacts from rock crushing activities (downstream sources and downstream location): • Fine particles should be stockpiled in areas with bund to prevent getting washed by runoff to the drainage structure nearby. • Fine particle stockpile should be covered to protect it from getting blown by the wind into surrounding areas • Construction of a settlement basin to catch sediment before entering drainage lines or intermittent stream
3	Hazardous substance	Mitigation measures to protect surface and ground water quality are: • Well maintained motorized fleet where all equipment and vehicles are regularly checked for leakage of fuel and other potential operational hazard related to leakage of fuel; • Safe procedure for refueling and oil change including provision of areas lined with concrete mixers. Additionally, this type of area should be provided with drainage outlet that leads to a small oil-water separator basin that will be regularly cleaned up of oil. • Potentially hazardous materials such as fuel, lubricants and other type of chemicals should be stored in sheltered areas with ground lining to protect them from getting spilled on the ground and/or water. Any spill or accidental leakage of the substance has to be cleaned up promptly. Operator should have in place procedure, equipment as well as material suitable to clean up oil leaks either on the ground or in the water. Contaminated water or soil should be disposed-off at Tibar used oil disposal site.

4	Noise and vibration	Measures to mitigate impacts from noise and vibration should include: • All noise-generating equipment should be insulated and well maintained to ensure that they operated within the noise limits they were designed to operate. • Operation of noise generating equipment for a limited number of hours only during the day. • Worker protection equipment (ear muffle).
5	Loss of flora and fauna	Loss of flora and fauna in the rock crushing area will be compensated with some landscaping in the rock crushing area. To ensure that the trees planted will not exacerbate habitat condition following the clearance, several principles have to be followed: • Species of trees for replanting should be native species suitable for mountain area location • Species of trees for replanting can be consulted with local forestry officers. • Planting techniques such as planting distance, depth of holes, types of filling and watering needs can be consulted with local forestry officers.
6	Occupational health and safety	• Respiratory mask for workers exposed to dust. • Limitation of exposure to 8 hour per day for workers exposed to fine material. • Rotation of workers to lessen exposure for certain workers only • Bright vest for easy identification of workers • Ear and eye protection • Helmet • Foot protection (safety boot), rain coat, etc. as needed • First aid kit should be made available on the site at all times • Workers should be trained in first aid response • Workers should be trained in emergency response procedures (for example for fire evacuation, etc.)

2. LOCATION AND SCALE OF THE PROJECT

This first section of the highway road in this contract has a total length of 30.355 km. This section starts in Suai at Sta. 3 + 920.000 and ends in Zumalai at Sta. 34 + 275.000. The proposed facilities will be located at villages Suai Vila, Labarai, Holba, Beco Zumalai, all within Covalima District.

Stone crushers, washing and asphalt mixing plants together with concrete batching plants will be erected within the vicinity around our branch 2 in Holba, Labarai, and with GPS coordinates of*9°16' 27.1"S, 125°18'25.37.4"E,* and river pits located in the same village of Labarai. Other lesser capacity plants are also located in other respective locations of branches 1, 3, & 4 camps. The locations of the proposed facilities are not less than 2km meters away from the nearest settlements area.

2.1 The Project Facilities and Extraction Areas

COVEC-CRFG is proposing to quarry six (6) borrow pits locations for embankment/fill use and two (2) river pits for quarrying granular and fine aggregates. After joint confirmation together with Lease Contract with the land owners and the local chiefs, it has been established to locate the following:

1) **For Raiketan River in Branch 2** in the sub-village of HOLBA, village of LABARRAI in the sub-district of SUAI will quarry for aggregates with approximately 29 hectares in area with the GPS coordinates of 9°16'25.38"S, 125°18'25.54"E. Within the vicinity of the camp will setup Stone crusher, screening and washing plant, asphalt mixing plant, concrete batching plant and casting yard having an estimated output quantity of aggregates of 75,000 Tons/year and fine aggregates of 4,800 Tons/year. The estimated area for occupancy of the entire facilities and camp including offices and accommodation for all employees of Branch 2 is 6.5 hectares under the lease contract with the private land owners. The distance from nearby residents in the area is approximately 1 km.

2) **For Mola River in Branch 4** in the sub-village of Zulotas, village of Zulo, sub-district of Zumalai will quarry for aggregates with approximately 13 hectares in area with GPS coordinates of 9°10'22.35"S, 125°26'51.74"E. Within the vicinity of the camp will setup stone crushers, screening and washing plants, concrete batching plant and casting yard having an estimated output quantity of coarse aggregates of 40,000 Tons/year and fine aggregates of 5,600 Tons/year. The estimated area for occupancy of the entire facilities and camp including offices and accommodation for all employees of Branch 4 is 15 hectares, under the lease contract with the private land owners. The distance from nearby residents in the area is approximately 2 km.

   With the both whole river-way occupation for stone crusher plants and sand washer plants that will be built together. Other lesser capacity concrete batching plants with stockpile are also located in other respective locations of branches 1 and 3 camps. The locations of the proposed facilities are not less than 1 km away from the nearest settlements area.

3) **Borrow Pit 1** in branch 1 located in sub- village of Foho, village of Ogues, sub-district of Suai will quarry for embankment/fill with an approximate area of 54,000 sq. m. is the proposed location with GPS coordinates of Latitude 074 6710 and Longitude 897 1677.

   The facilities in Branch 1 will setup a lower capacity Concrete Batching Plant (0.75 m3 per batch) and Stockpile area. The estimated area for occupancy of the facilities including base camp for offices and accommodation of all employees under the lease contract with the private land owners of Branch 1 is 14,680 sq. m. The distance from nearby residents in the area is approximately 1 km.

4) **Borrow Pit 2** in branch 2 located in sub- village of Holba, village of Labarrai, sub-district of Suai will quarry for embankment/fill with approximately 3 Hectares in area is the proposed location with GPS coordinates of Latitude 075 3604 and Longitude 897 4720.

5) **Borrow Pit 3** in branch 2 located in sub- village of Holba, village of Labarrai, sub-district of Suai will quarry for embankment/fill with approximately 4 Hectares in area is the proposed location with GPS coordinates of Latitude 075 4677 and Longitude 897 5184.

6) **Borrow Pit 4** in branch 3 located in sub-villages of Haimanu and Aidantuik, village of Beco, sub-district of Suai will quarry for embankment/fill with approximately 3 Hectares in area is the proposed location with GPS coordinates of Latitude 075 4677 and Longitude 897 5184.

   The facilities in Branch 3 will also setup a lower capacity Concrete Batching Plant and Stockpile area. The estimated area for occupancy of the facilities including base camp for offices and accommodation of all employees under the lease contract with the private land owners of Branch 3 is 16,600 sq.m. The distance from nearby residents in the area is approximately 1 km.

7) **Borrow Pit 5** in branch 4 located in sub- village of Zoac, village of Beco, sub-district of Suai will quarry for embankment/fill with approximately 2.43 Hectares in area is the proposed location with GPS coordinates of Latitude 076 2696 and Longitude 898 0142.

8) **Borrow Pit 6** in branch 4 located in sub-village of Galitas, village of Tashilin, sub-district of Zumalai will quarry for embankment/fill with approximately 2.5 Hectares in area is the proposed location with GPS coordinates of Latitude 076 7347 and Longitude 898 3714.

FIGURE 1. GENERAL FIGURE OF RIVER AND BORROW PITS AND ITS FACILITIES

FIGURE 2. Raiketan River Pit Layout, Facilities and Borrow Pit 2&3 (Branch 2)

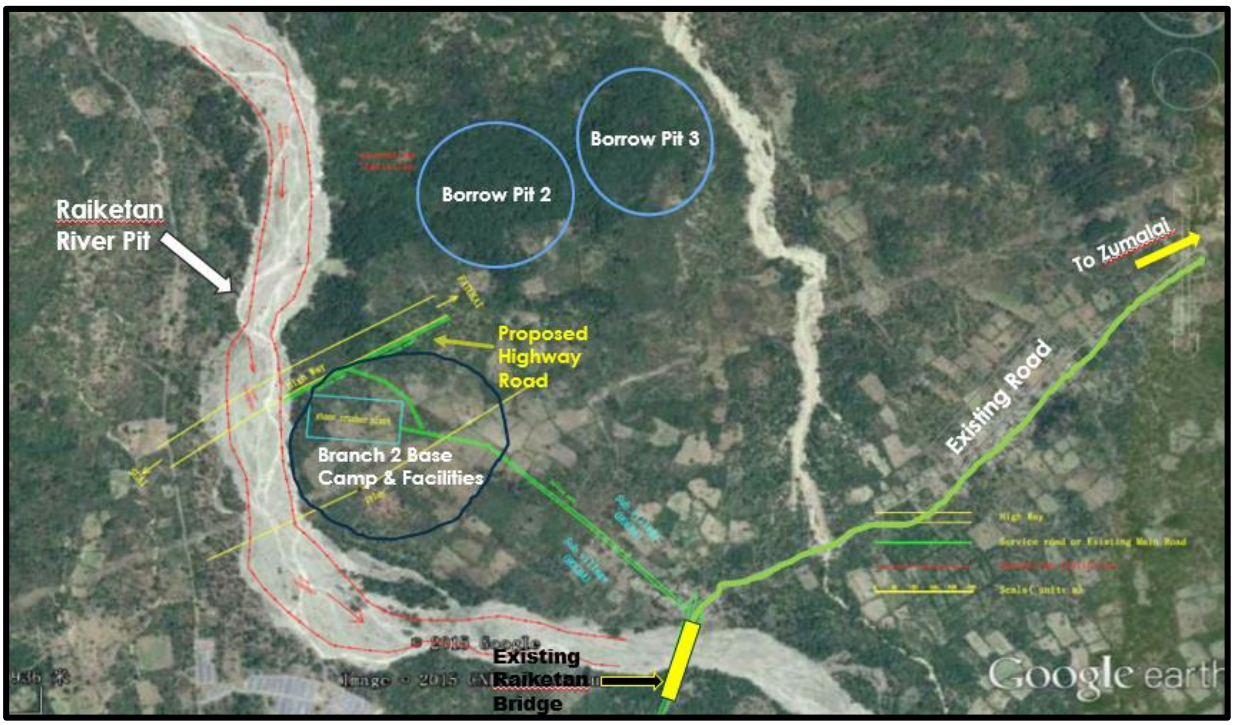


Figure 3: Layout of River Pit in Mola River and Facilities (Branch 4)

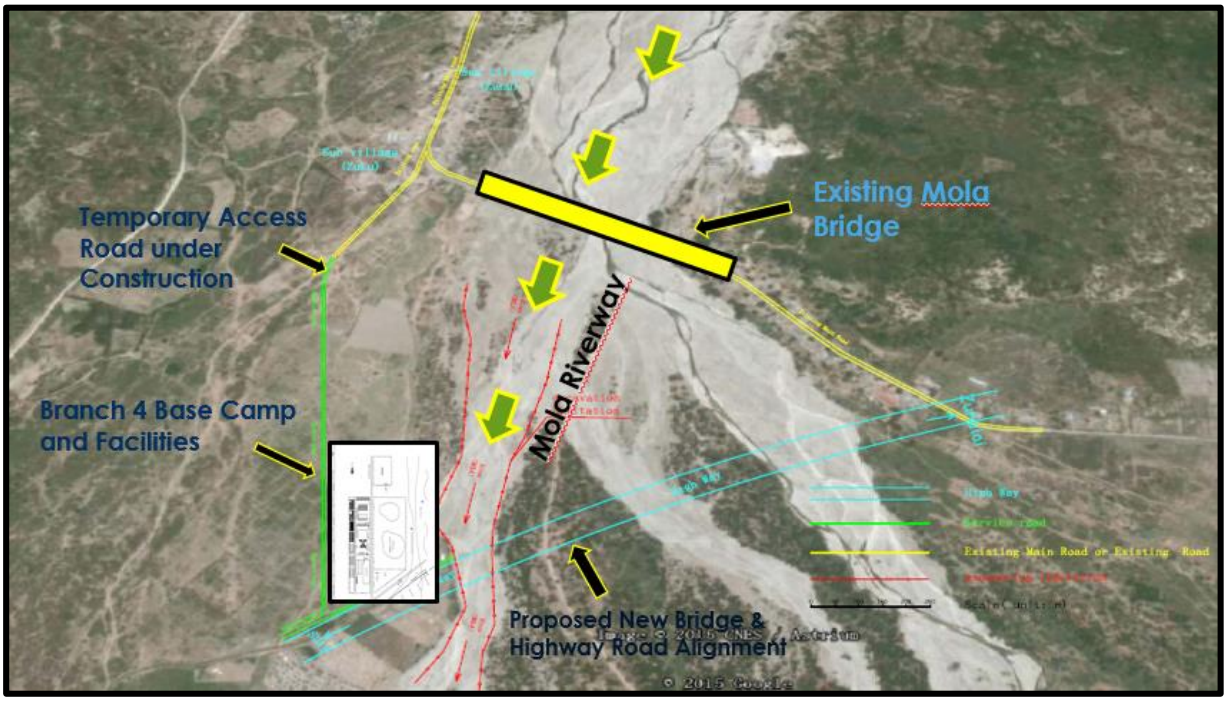


Figure 4: Layout Map of Borrow Pit 1 (Branch 1)

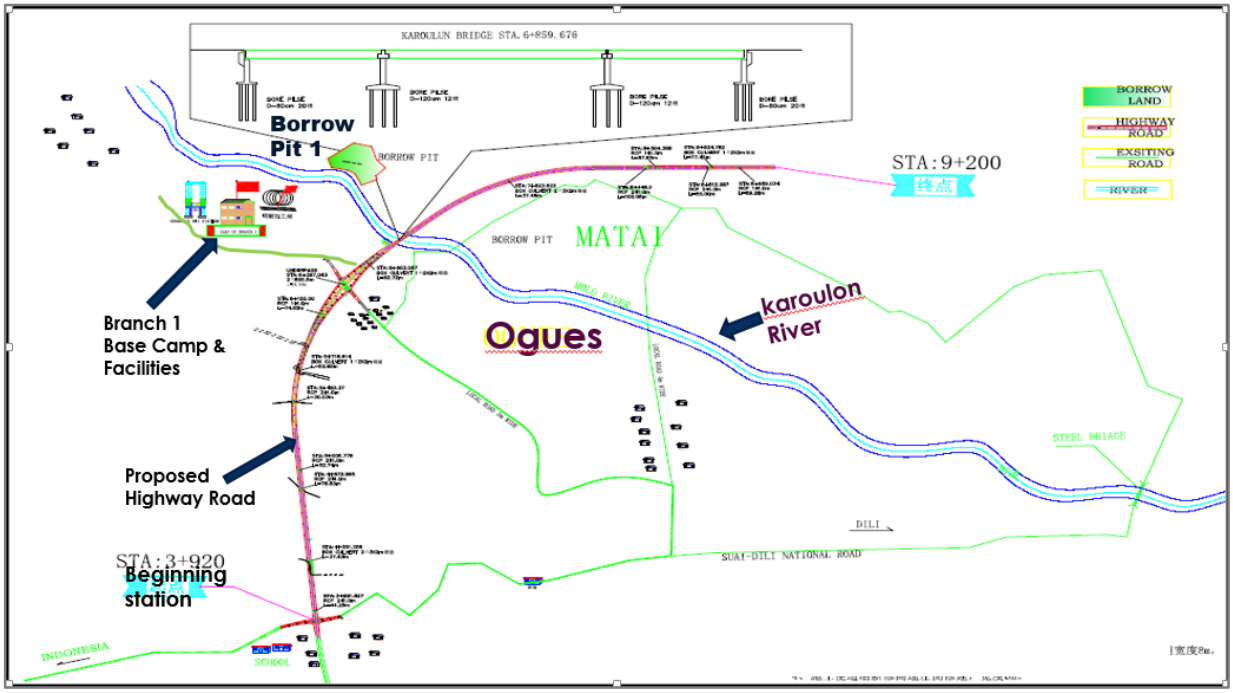


Figure 5: Layout Map of Borrow Pit 4a & b of Branch 3

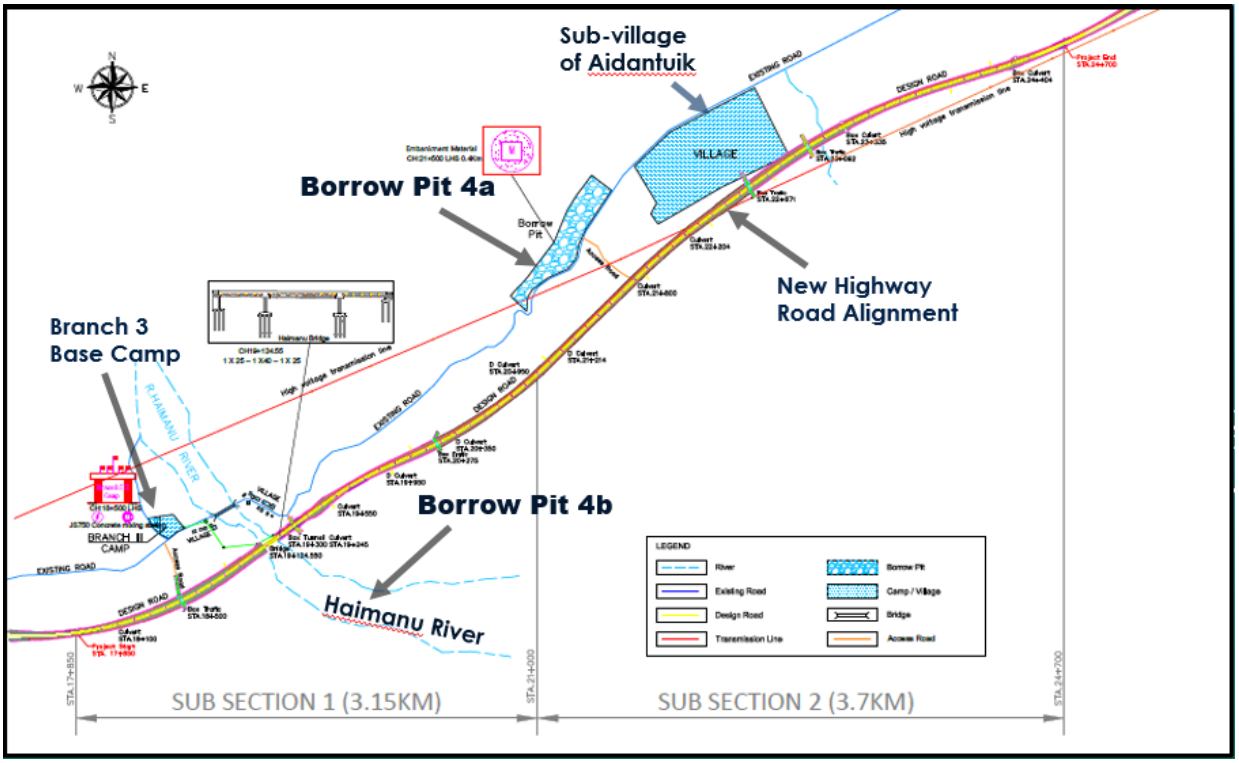
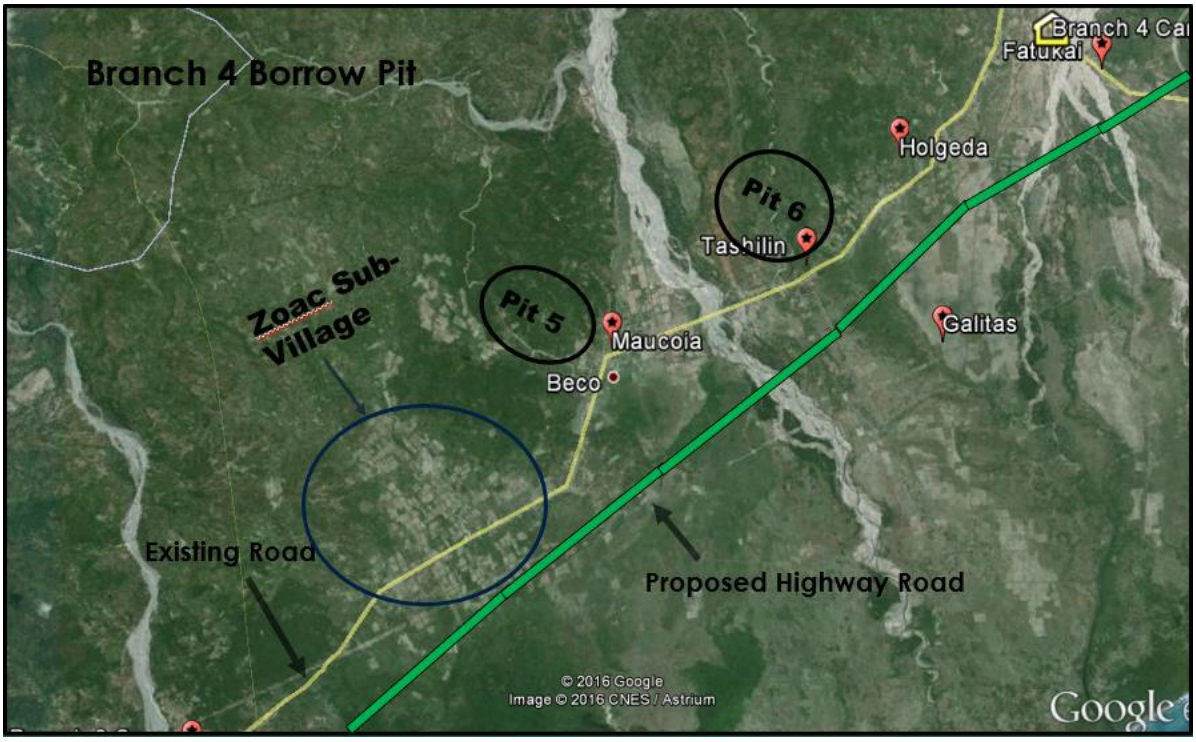


Figure 6: Layout Map of Borrow Pit 5 & 6 (Branch 4)



2.2. Districts

The proposed facilities will be located within the Covalima District. No direct adverse impacts are projected on the other districts since the activities involved in the project will be restricted within the jurisdictions of Covalima District. This project will cross the sub-Villages from Talioan of Suai to Fatucai/Mola in Zumalai. Table 6 shows the Sucos and sub-sucos affected.

TABLE 6. DISTRICT AND VILLAGE THAT MAY BE AFFECTED:

District:	Covalima
Sub-District/Suco:	Suai & Zumalai
Aldeia (Sub-village):	Talioan to Fatucai

2.3. Importance of the Project

The proposed Suai-Beaco Highway Road project is one of the South Coast Highway Improvement project of the Republic of Timor Leste. It is a south east connector across the mountainous spine/ridge and coast of Timor Leste. A highway from Suai to Beaco with a total distance of 155.68 kms, will connect the three Tasi Mane (Male Sea) clusters. It is classified as expressway. The highway is projected for speeds up to 100 km/h in flat areas and 60 km/h in mountain areas, and will reduce total travel time from Suai to Beaco to less than 2 hours. The project, section 1: Suai-Fatukai/Mola is located at villages Suai Vila, Labarai, Holba, Beco Zumalai, in Covalima District. This first section of the highway road in this contract has a total length of 30.355 kms. This section starts in Suai at Sta. 3 + 920.000 and ends in Zumalai at Sta. 34 + 275.000. The project will definitely enhance the traffic safety and promote the economic development for the surrounding areas and enhance agriculture in the southern coast of Timor Leste especially Suai will become a center for providing services, logistics, fabrications and human resource for the petroleum industry in the future.

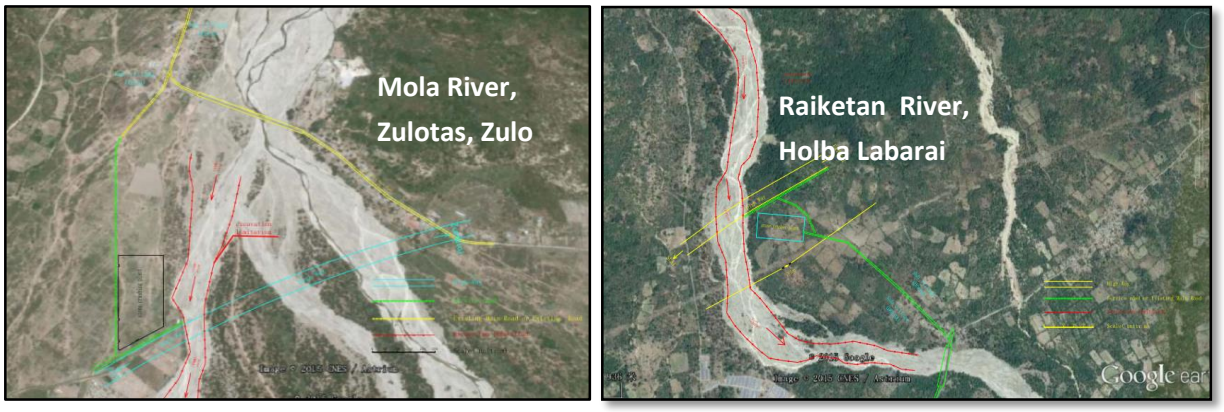
The proponent need the extraction works in order to obtain these materials to satisfy the construction requirements particularly on earthworks and aggregates courses from **River and Borrow Pits,** which will then require the **Processing/Manufacturing areas such as, Asphalt Mixing Plants, Concrete Batching Plants, Washing and Crushers** in different location within the project stretch.

2.4. Scale

Based on the proposed Contractor's Schedule of Activities which is in reference with the Bill of Quantities (BOQ) of the Bidding documents for the Suai-Fatucai/Mola stretch the following scale has been derived:

- Stone Crushers, has a capacity of 30m3/hr of 3/4 inches and 3/8 inches for aggregates, and sand.
- Asphalt Mixing Plant (AMP) with a capacity of 320 tonne/hr. Production of Asphalt is scheduled to commence on the month tenth of the Project duration, The AMP can produce 2,560 Tons per day for an eight hour operation depending on the length of the prepared base to be paved. See Figure 2

FIGURE 7. Layout Map of River Pits and Facilities Location.

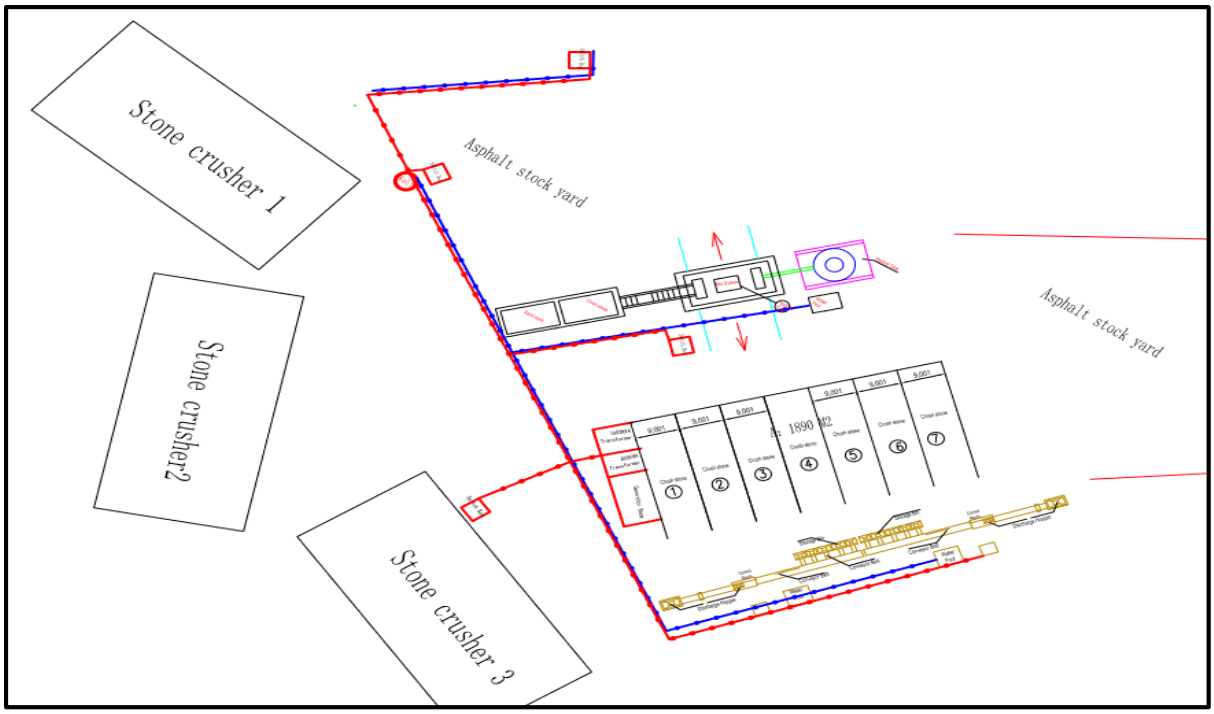


2.5. Machinery and Equipment Layout

The preliminary design and layout for the mobile stone crusher and asphalt mixing plant for the project is presented in Figure 3 - Crusher and Asphalt Mixing Plant Layout. The requisite equipment will be installed by:

(i) Securing the proposed location of the plants and constructing the perimeter fence
(ii) Staking out the foundations required for each individual plant item;
(iii) Clearing of shrubs and trees avoiding cutting down of large trees;
(iv) Implementing the appropriate environmental, health and safety procedures, appropriate traffic management and control and other measures that may be necessary.

FIGURE 8. CRUSHER AND ASPHALT MIXING PLANT LAYOUT



The project is located at a safe distance to the nearest public structure. The project machinery is an open area, unused and as agreed with the local authorities. The sub-office and accommodation for all facilities involve in the figures is in a dedicated purpose built structures.

The proposed works will not involve any relocation and resettlement since there is no adjacent or any directly affected houses within the area. There is limited removal of trees required although clearing and grubbing is required all across the site. Commissioning of the stone crusher and asphalt mixing plant will require minimal construction limited mainly to foundation works for the mobile stone crusher and asphalt mixing plant. Works to provide temporary drainage will not be required to avoid inundation or flooding or increased precipitation due to climate change since the plants to be erected do not affect inundation. The drawing for the foundation of crusher and concrete batching plant are shown in Figure 4 – Drawing and Foundation Plan of Stone Crusher, and Figure 5 – Drawing and Foundation Plan of asphalt Mixing Plant.

FIGURE 9. DRAWING AND FOUNDATION PLAN OF STONE CRUSHER

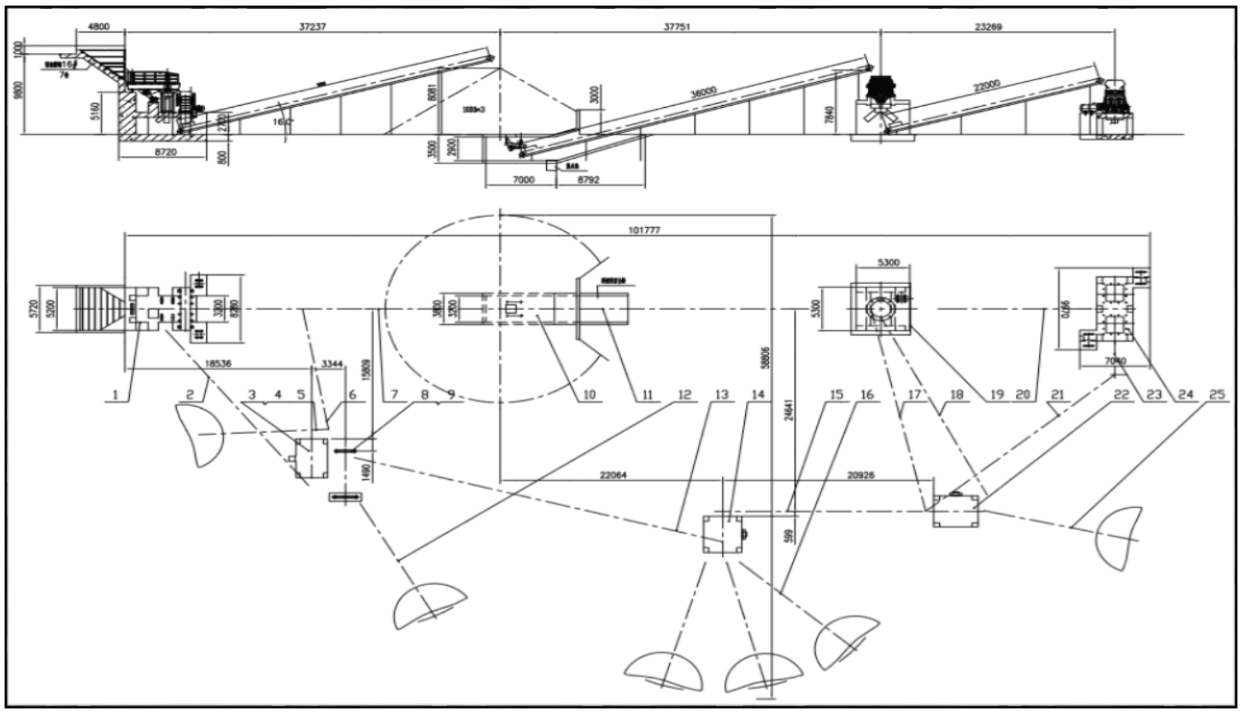
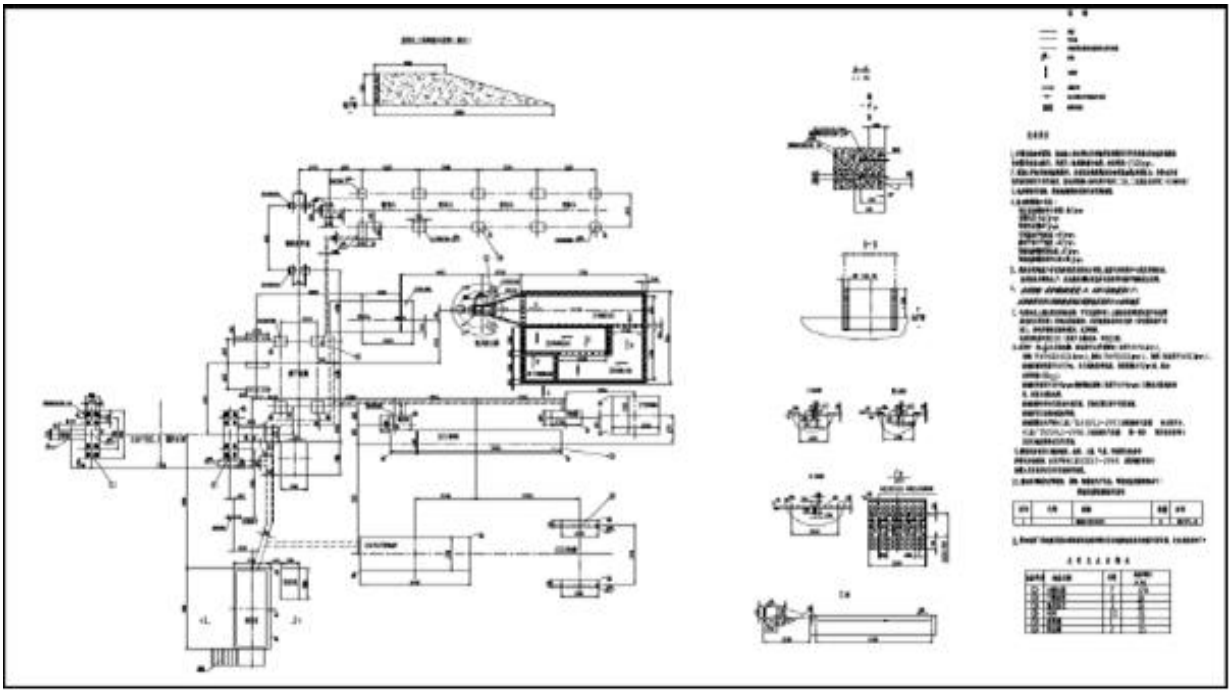


FIGURE 10. DRAWING AND FOUNDATION PLAN OF ASPHALT MIXING PLANT



3. LEGAL REQUIREMENTS

The proponent acknowledges and will require the selected Sub-contractor to uphold the laws and regulations of Timor-Leste particularly those pertaining to environmental protection, specifically with regards to compliance with environmental laws, regulations by national or local guidelines.

3.1 Environmental Law in Timor-Leste

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 Environmental Basic Law (Decree-Law no. 26/2012) sets the framework for other environmental legislation such as the Environmental Licensing Law (ELL - Decree Law 05/2011) and pending laws and regulations including the draft forest and biodiversity laws. 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.

Environmental Licensing Law. (ELL) of Decree-Law no. 05/2011. Under the ELL, the environmental assessment for the project was approved by the Minister after review by the National Directorate for Pollution Control and Environmental Impact (NDPCEI). Under the ELL the Project is Category B because it involves construction, reconstruction, and extension of roads and bridges. This project may cause environment impact but not significant (See Table 4). To comply with the ELL, an environmental assessment and EMP was prepared and approved by NDPCEI. The conditions of the environmental license are attached as Annex 1. COVEC-CRFG recognizes and accepts that the conditions of the environmental license are to be followed in the implementation of the project by following this EMP.

Figure 11: Environmental Licensing Process

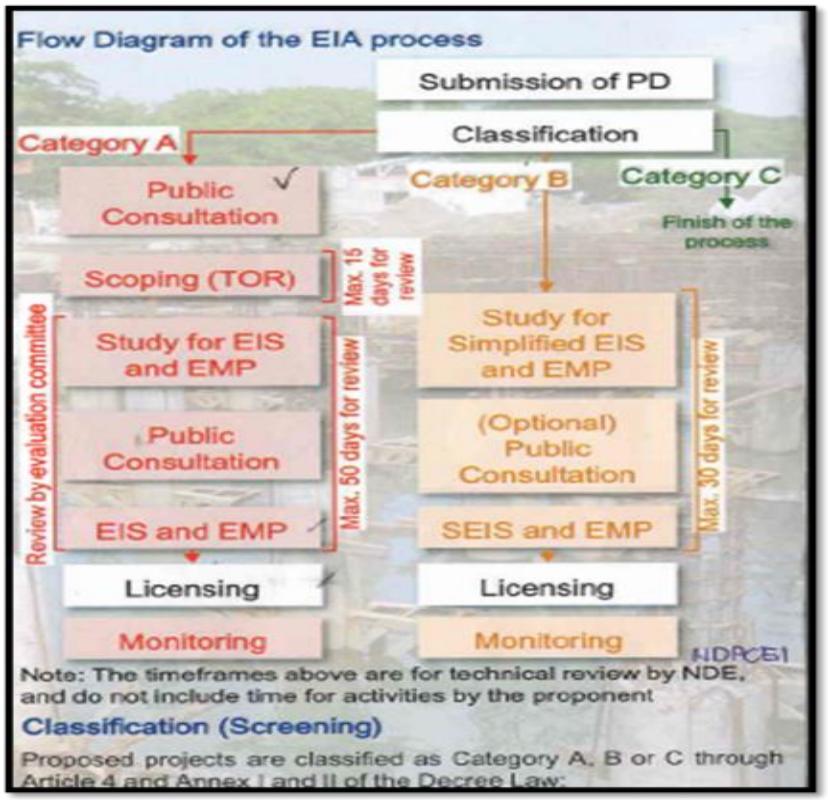


Figure 12. ENVIRONMENTAL REGULATORY COMPLIANCE

Project Component Description				
Transportation	V 1	Rehabilitation of an existing road, excluding community road (including toll roads, bridge crossing, each with two lanes	All	SEIS and EMP
Transportation	V 2	Construction of Bridges	<300m	SEIS and EMP
Quarries				
Mining	I 1	Exploitation of minerals (sand and gravel)	<30,000 m^3/year &>5,000 m^3	SEIS and EMP
Mining	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

Environmental Guidelines. In addition to the legal requirements NDPCEI also issues guidelines from time to time and refers to best international practice. COVEC-CRFG will implement this EMP by reference to NDPCEI guidelines and the Environmental, Health, and Safety General.

Occupational Health and Safety. Timor-Leste has not enacted laws or implemented regulations for working conditions, health and safety. UNTAET Regulation 2002/05, the Labor Code for Timor-Leste, is broadly relevant creates a National Labor Board to provide independent advice on occupational safety and health matters as well as training and skills development, minimum wages and other

related functions. The Occupational Health and Safety Law was drafted in 2004, but has not yet been enacted. Therefore during construction, the Subproject will conform to the Environmental, Health, and Safety General Guidelines.

4. INSTITUTIONAL ROLES AND RESPONSIBILITIES

4.1. Role of the Ministry of Public Works, Transport and Communication

As implementing agency (IA) for this project 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 of the project. Consulting firms were hired in different stages by the GOTDL to provide services for detailed engineering design, construction supervision, and other assignments, as needed.

Project Management Unit. The PMU is already established in MPWTC and has been augmented sometime in the year 2011 to implement the project and manage detailed engineering design and to this stage of construction supervision. 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 (PSC) and contractor; (iii) as required liaising and coordinating with the DRBFC; and (iv) managing the contractor, and liaising with other stakeholders, on the day to day implementation of Project activities. The PMU, through the PSC, will retain experienced consultants to monitor and report on contractor compliance with the approved CEMP.

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 by the government. 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). 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. 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.

PMU will prepare and submit to MPWTC Monthly 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

4.2 Role of National Directorate for Pollution Control and Environmental Impact

The NDPCEI, the agency responsible for environmental management, was consulted at the onset of the SEIS process and again at the confirmation of the categorization of the project. The SEIS is submitted to NDPCEI for review and issuance of environmental clearance. Ongoing consultations with NDPCEI will be required during the operation of the project facilities and NDPCEI will have authority to monitor implementation of the SEMP and ensure that environmental management and mitigation of the project is undertaken to an acceptable standard. Periodic inspections will take place with NDPCEI, PMU, PSC and the Contractor.

4.3. Role of the Contractor

The Contractor will be responsible for responding fully the contract conditions including those covering environmental mitigation, social mobilization and awareness and monitoring. The Contractor will then be responsible for implementing all environmental, health and safety actions included in the SEMP and relevant clauses in the bidding documents and contract during the pre-construction and construction period.

The contractor will prepare the SEMP based on the site-specific construction methodologies they proposed in this SEIS. The SEMP 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 SEMP before the commencement of construction.

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

- Submit the SEIS and SEMP to NDPCEI for approval and obtain the site specific Environmental License.
- Participate in induction on environmental awareness and mitigation measures to be delivered by PMU prior to preparation of the SEMP;
- Participate in induction on environmental awareness and mitigation measures to be delivered by PMU prior to preparation of the SEMP;
- Appointing an ESO , sending letter to PMU confirming that this position 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 SEMP 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.

Project Supervision Consultant (PSC). The PMU is supported by a PSC (Katahira Engineers International). The PSC will comprise international specialists as required to supplement existing PMU resources and assist PMU to deliver a capacity building program. In respect of safeguards the PSC will include an environment consultant (EC intermittent) full time to monitor contractor's mitigation measures. The inputs of specialist to maximize capacity building efforts across a number of activities required in first phases of implementation of this project as well as for more general awareness raising and training needs.

The environment consultant will assist in capacity building for the contractors who will receive training and capacity support from the EC and NEC to ensure learning and development, as well as smooth and effective implementation of the SEMP. Environment consultant will also monitor contractor's mitigation measure and implement this SEMP in all activities at stage pre-construction, operational and deactivation.

5. SUMMARY OF IMPACTS

5.1 Activities Required in the Project

Activities involved in the project can be categorized into (i) mining activities and (ii) stone crushing activities. The facility will produce approximately 300 tons crushed rocks per day (Normally Eight hours).

The specification and uses of the products are provided in the table below.

Table 7: Types of Products from the Facility

No	Size, mm	Type	Application
1	0.5-1.0	Sand/Fine material	Concrete and asphalt
2	2.0-4.0	Quarry dust/waste	Blinding, Bedding course -road work
3	5.0-10.0	Aggregates chips	concrete, plastering and asphalt
4	10.0-20.0	Aggregates	Concrete, pre-casting, gravel, and asphalt
5	50.0-100.0	Aggregates	Road work's base course, gravel packing

Timor Leste Constitution provides a strong foundation for the protection of the environment as stipulated in Article 6(f); 61 and 139. Decree law 5/2011- Environmental Licensing contains procedures and other requirements related to securing environmental permit to start development activities. As of lately, guidelines for the formulation of required documents to prepare for environmental license have been developed through the Expert101 system that contains checklist and other necessary documents for the preparation of Project Document, Environmental Impact Statement (EIS) for category A projects and Simplified EIS and EMP for category B projects.
There are several standards that are relevant to the project's activities. They are:
Drinking water quality - Timor Leste's Drinking Water Guidelines
Air quality - Indonesian Government's Regulation No. 35/MENLH/10/1993 on Upper Limit for

Vehicle Emission

Noise - Indonesian Environmental Ministerial Diploma No. 48/MENLH/11/1996 on Noise Level standards

Vibration - Indonesian Environmental Ministerial Diploma No. 49/MENLH/11/1996 on vibration Level Standards

Liquid waste quality for mining activities (Mining Type: Loose in-Land) - Indonesian Ministerial Diploma No.43/MENLH/10/1996 on Liquid Waste Standards for Mining Activities Group C Type Loose in-Land.

Guidelines applicable for project's activities include several guidelines on the preparation of Environmental Impact Statement.

5.2. Impacts

Likely environmental impacts for the stone crushing plants are related to operational activities that involve stone mining and crushing of the rocks. As previously explained, stone mining is done mechanically through the use of heavy extraction equipment. Stone crushing is similarly done, mechanically through feeding of the raw stones into the hopper where the stones are being shaken to clean them from impurities. From the hopper, stones are then fed into the primary, secondary and tertiary crusher where the size of the stones being reduced until they reach desirably specifications. No chemical or other physical treatments (e.g. heating) are involved in the operation.

The following table presents all potential impacts from the development, major or otherwise grouped based on mining or crushing activities.

Table 8. Impacts from Quarrying and Rock Crushing Activities

		Mining Activities		Rock Crushing Activities	
No	**Impact**	**Nature of Impact**	**No**	**Impact**	**Nature of Impact**
1	Loss of flora and fauna.	Negative, direct, long term impacts related to top soil removal during excavation of rocks.	1	Air quality from particulate matter	Negative impacts related to the handling of raw rocks and crushing of rocks. Most likely become a problem during dry season from June to November.
2	Erosion	Negative, direct, could be long term impacts related to the mining activities that leave open areas in the mining sites. Erosion is especially a high risk during the rainy season (impacts are likely to happen during rainy season from December through May).	2	Sedimentation	Negative impacts similar to the above impact, related to the movement of earth that is settled by the rain, therefore will become a problem especially during the rainy season.
3	Sedimentation	Negative, direct, could be long term impacts related to the movement of soil settled by the rain, therefore will become a problem especially during the rainy season.	3	Surface and ground water quality	Negative impacts related to the use of lubricants for heavy equipment and diesel fuel for power generation. Also related to storage of the fuel and lubricating oil.
4	Air quality	Negative, direct dust, could be long term related to the movement of earth during excavation, vibration etc. Most likely become a problem during dry season from April to November.	4	Loss of flora and fauna	Negative impacts related to changes in land use to industrial (rock crushing).
5	Noise and vibration	Negative, direct, short term, related to operation of equipment.	5	Noise and vibration	Negative impacts related to equipment operation.
6	Preservation of cultural or archaeological resources	Negative, direct, could be long term related to excavation for rock mining activities.	6	Occupational health and safety	Negative impacts related to the operation of heavy equipment,
7	Occupational health and safety	Negative, direct, could be long term to workers' health. Related to the day to day mining activities.			

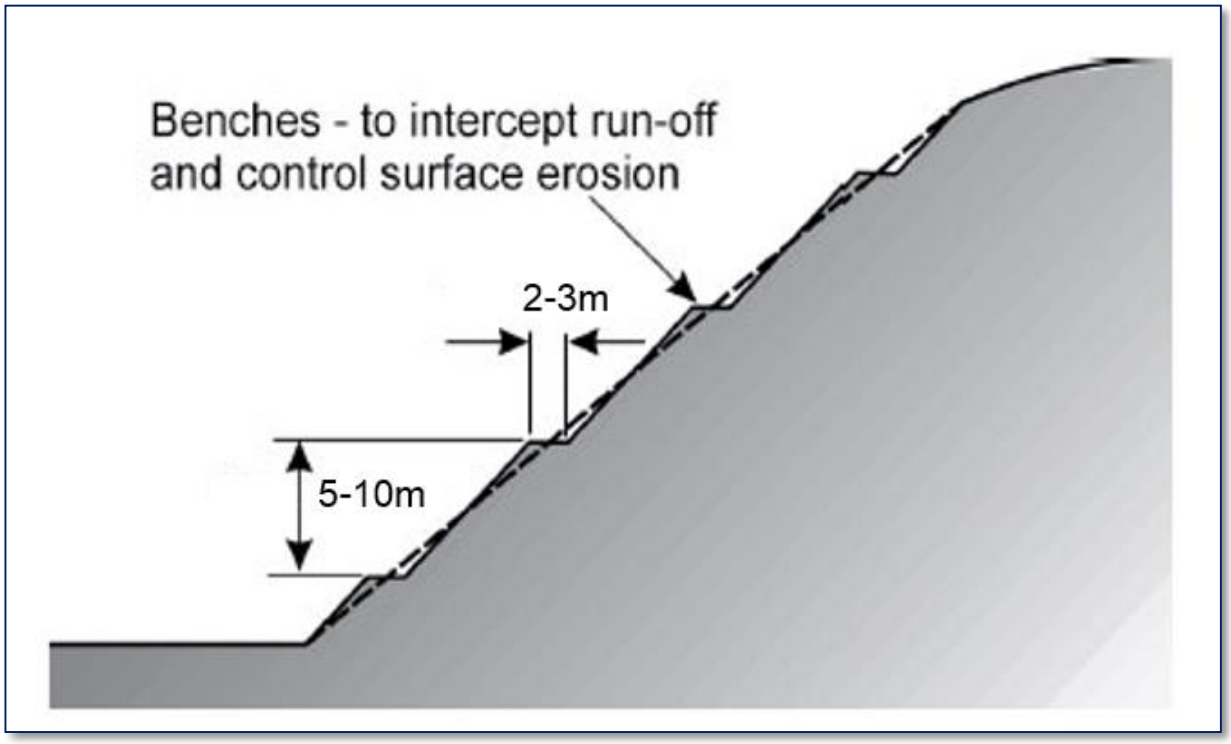
5.3 Targets and indicator for level of erosion protection

Targets to Indicate Level of Protection from Erosion:

1. Walls and benches are developed in higher slope areas.
2. Construction of drainage trencher drainage trenches should be directed to the sedimentation treatment pond
3. No sign of erosion are observed such as rockslides, debris and slumps/earth flow
4. Limited sign of sedimentation in the drainage network in the area.

Monitoring for land instability and evidence of the start of erosion in areas with relatively steep slope. Evidence could include cracks and early sign of water scouring in certain area although it should be noted that many incidence of erosion or major landslides are without apparent early signs. Therefore, a proactive approach should be taken and development of wall and benches as well as drainage trenches should be a priority once one new area start to be mined. Any sign of erosion should be closely monitored and swiftly attended with proper measures.

Figure 13: Typical Borrow Pit Quarrying Walls and Benches



The anticipated environmental and social impacts and mitigation measures are identified in the environmental assessment and covered by the Environmental License, summarized in section 6.

5.4 Sedimentation

Quarrying activities generate sedimentation from topsoil removal and improper piling or disposal of the removed material. Mitigation measures for sedimentation should be designed to control the source of sedimentation first before controlling sedimentation at the downstream location. Implementation of measures described under the “Erosion” section will significantly reduce

sedimentation at source. In addition to the above measures though, additional measures that will further reduce the rate of sedimentation from quarrying activities are:

- Topsoil removed should be reused as backfilling material.
- Any unused topsoil should not be piled anywhere in the facility and becomes source of sedimentation during rainy event.
- Unused topsoil should be compacted (instead of piled) and provided with drainage and vegetation such as grass sodding or other vegetation to avoid erosion
- Location of compaction should be at least 50m away from the water bodies including intermittent stream in the south of facility and drainage lines nearby.
- Tracking on compacted topsoil can be done do provide grooves that will catch seed and rainfall to assist in the re-vegetation of the soil
- Location of the compaction should drain well

Figure 14: Benching to Minimize Surface Sedimentation

6. PROPOSED MITIGATION MEASURES

Proposed mitigation measures are categorized into - (i) Pre-construction activities, (ii) Construction and Commissioning, and (iii) Operations. Secondly: (i) Mitigation measures for mining activities and (ii) Mitigation measures for stone crushing activities. Generally, the measures are similar for all types of activities although there are differences since the nature of the activities are different and therefore lead to different measures to mitigate impacts.
The mitigation measures consist of:

3) Physical measures: those measures that require the construction of physical structures such as settlement/sedimentation basin.
4) Programmatic measures: those measures that do not require construction of physical structures such as tree planting, provision of equipment such as personal protection equipment and others.

All of the proposed measures are applicable to the operational phase only since the facility has been in operation for some time at the start of the environmental impact assessment preparation. The following section contains description of the mitigation measures in relation to previously described

impacts. Clear and achievable targets for the mitigation measures as well as indicators for the level of mitigation to be pursued are also described.

The matrix of mitigation measures presents all the required measures and monitoring responsibilities corresponding to the impacts as assessed to be necessary through the environmental assessment and licensing process (Monitoring is also included for ease of reference). The mitigation measures required cover all stages of the contract and are separated into pre-construction, construction and operation phases and are presented as in the SEIS; that has thoroughly assessed all potential impacts that seem likely at the project planning stage and the SEMP will be updated if necessary in the pre-construction stage.

This SEMP is based on the type, extent and duration of the environmental impacts identified at the design stage. In the event that unexpected impacts occur during implementation or if COVEC-CRFG fails to implement the mitigation measure, the SEMP will be amended to take account of the unexpected impacts and mitigation measures will be amended as necessary.

Table 9.1 Impacts and Mitigation Measures Covered by the ELL

PROJECT ACTIVITIES GIVING RISE TO IMPACTS	MITIGATION MEASURES TO CONTROL ENVIRONMENTAL IMPACT FROM:	IMPACT AFTER MITIGATION	METHOD	MONITORING RESPONSIBILITY
PRE–CONSTRUCTION				
Use of public and private land.	Identifying suitable land with sufficient supplies of rock based material & testing rock quality	Neutral	Consultation	Contractor, PMU
	Establishing acceptable agreements with land owners for land use and tree felling.	Neutral	After negotiation with land owner	Contractor, PMU
	Planning and developing a sustainable design of the Project excavation, mechanical structures and control of operational impacts	Positive	Observation & consultation	Contractor, PMU
Surveying and demarcation of manufacturing area boundary.	Loss of vegetation during demarcation	Negative	Visual inspection	Contractor; PMU
Site clearance, digging, excavations	Discovery of cultural historical property	Positive	Stop worker order	Contractor; PMU
	Removal of trees	Negative	After negotiation w/ landowner	PMU
Mobilization of contractor	Social disruption	Negative	Consultation	Contractor
	Health and safety risks and management	Positive	Observation & consultation	Contractor
	Spread of communicable deceases	Negative	Preconstruction check record	Contractor
CONSTRUCTION AND COMMISIONING				

PROJECT ACTIVITIES GIVING RISE TO IMPACTS	MITIGATION MEASURES TO CONTROL ENVIRONMENTAL IMPACT FROM:	IMPACT AFTER MITIGATION	METHOD	MONITORING RESPONSIBILITY
Clearing, cut & fill activities for manufacturing working areas, stockpile and tagging areas lead to loss of land	Soil erosion & sediment contamination of rivers & turbidity.	Negative	Visual inspection	Contractor; PMU
Operation of construction equipment	Emission and dust from plant and materials	Negative	Visual inspection	Contractor
Works adjacent to water bodies or drainage channels	Erosion & physical changes to drainage channels	Negative	Check design, visual observation on consultation with users	Contractor; PMU
Spoil overburden discarded un-useable rock base material	Impacts to habitats & water courses	Negative	Visual inspection	Contractor; PMU
Run-off, discharges, generation of liquid wastes	Impacts on water quality	Negative	Visual inspection	Contractor; PMU
General activities solid& liquid waste arising	Uncontrolled unmanaged waste disposal	Negative	Visual inspection	Contractor; PMU
Use of hazardous materials	Spillage, leakage, accidents	Negative	Inspection of storage &review emergency response plan	Contractor; PMU
Accidental damage to existing services	Interference with existing infra-structure; water supply, power, telecommunications	Negative	Plan with utility providers and avoid reprovision	Contractor; PMU
Presence of construction workers	Disruption, or antagonism, communicable diseases & community health	Negative	Inspection, review contractor staff management As required;	Contractor; PMU
Site office, water use & electricity supplies	Stress on existing resources and infrastructure	Negative	Consult with villages along road	Contractor; PMU
OPERATIONS				
Sourcing of materials (quarry aggregates)	Extraction gravel, altering contours and runoff patterns & erosion; quarries & borrow pits	Negative	Visual inspection; review of extraction plan and rehabilitation	Contractor;
Operation of construction equipment	Emissions & dust from plant & materials Negative	Negative	Visual inspection, complaints	Contractor
Operation of rushers, conveyors, batching & asphalt mixing equipment	Emissions & dust from plant & materials Negative	Negative	Visual inspection, complaints Consultation, GRM register	Contractor
Spoil overburden discarded un-useable	Impacts to habitats & water courses	Negative	Visual inspection	Contractor; PMU

PROJECT ACTIVITIES GIVING RISE TO IMPACTS	MITIGATION MEASURES TO CONTROL ENVIRONMENTAL IMPACT FROM:	IMPACT AFTER MITIGATION	METHOD	MONITORING RESPONSIBILITY
rock base material				
Run-off, discharges, generation of liquid wastes	Impacts on water quality	Negative	Visual inspection	Contractor; PMU
General activities - solid & liquid waste arising	Uncontrolled unmanaged waste disposal	Negative	Visual inspection	Contractor; PMU
Use of hazardous materials	Spillage, leakage, accidents	Negative	Inspection of storage & review emergency response plan	Contractor; PMU
Activities outside manufacturing areas encroaches habitats	Workers poach animals, eggs feathers gather fuel wood &impact habitats.	Negative	Inspections, camp & work sites check food supply, re-vegetation	Contractor; PMU
Accidental impacts historical / cultural sites	Impacts on PCR or cultural property sites	Negative	Stop work & dealt appropriately	Contractor; PMU
Noisy construction plant and equipment	Impacts community & workers	Negative	Consultation, review work schedule, GRM register	Contractor; PMU
Vehicle parking and traffic safety issues	Traffic disruption & safety affected	Negative	Inspection, review traffic management	Contractor; PMU
General work activities	Worker health and safety risks	Positive	Inspection, review H&S Plan	Contractor; PMU
Operation of vehicles creating emissions	Emissions increase locally	Negative	Visual inspection and complaints	PMU-DRBFC
Routine and ongoing maintenance	Blocked drains; gravel repair materials	Positive	Routine maintenance records	Contractor
Run-off from manufacturing area	Loss of soils and water quality in rivers and near shore areas	Negative	Routine maintenance	Contractor; PMU

Table 9.2 Summary of Environment Impact and Mitigation Measures

No.	Impact	Mitigation Measures
Quarrying Activities		
1	Loss of flora and fauna	• Tree planting on backfilled pits • Tree planting on trenches or other holes on the ground created from the mining activities.
2	Erosion	• Development of cut slopes for erosion control as well as for ease of movement to the upper part of the mined area. • Keep existing drainage trenches to prevent water from scouring top soil and other exposed surface on the hills. Water should be directed to the lower part of the facility where a sedimentation treatment pond is located. • Backfilling of pits and holes created by mining activities • Tree planting in mined areas. • Where necessary (to be determined by engineers working on the facility), develop foundation or retaining walls in proper location.

3	Sedimentation	• Topsoil removed should be reused as backfilling material. • Any unused unsuitable materials and other source of Unused topsoil should be compacted (instead of piled) and provide with drainage and vegetation such as sodding grass or other vegetation to avoid erosion. • Location of compaction should be at least 50m away from the water bodies, sedimentation during rainy days.
4	Air quality	• Operation of well-maintained construction equipment to avoid polluted exhausts. • Proper treatment of unused topsoil (see discussion on mitigating sedimentation above) • Spraying of water in the working area and unsealed road areas often passed by project vehicles.
5	Noise and vibration	• All noise-generating equipment should be insulated and well maintained to ensure that they operate within the noise limits they were designed to operate. • Operation of noise generating equipment should only be during the day. • Vibration sources at the operation are blasting equipment used to breakdown large rocks. Mitigation measures for vibration should include: • Use of newer equipment to reduce vibration • Operation of vibration-generating equipment should only be during the day
6	Preservation of cultural and archaeological resources	• Should any potential for physical cultural or archaeological resources be identified, the following steps should be followed: • All works on the location should cease immediately; • An officer should be assigned to keep watch on the archaeological or physical cultural • resource; • Relevant agency (Secretary of State of Art and Culture) be contacted for further action; • All officers on the site should be aware of the potential for the discovery of archaeological artefacts during mining activities;
7	Occupational health and safety	Mitigation measures for occupational health and safety should include the use of worker's protection apparatus, including: • Reflective vest for easy identification of workers • Ear and eye protection especially where workers are close to excessive noise generating equipment or vehicle • Respiratory mask for workers exposed to dust. • Limitation of exposure to 8 hr per day for workers exposed to dust. • Helmet • Foot protection (safety boot), rain coat, etc. as needed • First aid kit should be made available on the site at all times • Workers should be trained in first aid response • Workers should be trained in emergency response
Rock Crushing Activities		
1	Air quality	• Soil, dirt and other impurities from rocks should be cleaned prior to crushing and used as backfilling material as much as possible. • Minimization of dust from crushing and material handling sources such as conveyors by using covers and/or control equipment • Spraying of water in the working area and road areas often passed by project vehicles. • Spraying of water and provision of cover on the stockpile of fine material. • Operation of well-maintained construction equipment to avoid polluted exhausts.
2	Sedimentation	The following measures are recommended to mitigate sedimentation impacts from rock crushing activities (downstream sources and downstream location): • Fine particles should be stockpiled in areas with bund to prevent getting washed by runoff to the drainage structure nearby. • Fine particle stockpile should be covered to protect it from getting blown by the wind into surrounding areas • Construction of a settlement basin to catch sediment before entering drainage lines or intermittent stream

3	Hazardous substance	Mitigation measures to protect surface and ground water quality are: • Well maintained motorized fleet where all equipment and vehicles are regularly checked for leakage of fuel and other potential operational hazard related to leakage of fuel • Safe procedure for re-fueling and oil change including provision of areas lined with concrete, additionally, this type of area should be provided with drainage outlet that leads to a small oil-water separator basin preventing the leakage of fuel and other potential operational hazard related to leak will be regularly cleaned up. • Potentially hazardous materials such as fuel, lubricants and other type of chemicals should be stored in sheltered areas with ground lining to protect them from getting spilled on the ground and/or water. • Any spill or accidental leakage of the substance has to be cleaned up promptly. Operator should have in place procedure, equipment as well as material suitable to clean up oil leaks either on the ground or in the water. Contaminated water or soil should be disposed off at any approved used oil disposal site.
4	Noise and vibration	Measures to mitigate impacts from noise and vibration should include: • All noise-generating equipment should be insulated and well maintained to ensure that they operated within the noise limits they were designed to operate. • Operation of noise generating equipment for a limited number of hours only during the day. • Worker protection equipment (ear muffle).
5	Loss of flora and fauna	• Loss of flora and fauna in the rock crushing area will be compensated with some landscaping in the rock crushing area. To ensure that the trees planted will not exacerbate habitat condition following the clearance, several principles have to be followed: • Species of trees for replanting should be native species suitable for mountain area location • Species of trees for replanting can be consulted with local forestry officers. • Planting techniques such as planting distance, depth of holes, types of filling and watering needs can be consulted with local forestry officers.
6	Occupational health and safety	• Respiratory mask for workers exposed to dust. • Limitation of exposure to 8 hour per day for workers exposed to fine material. • Rotation of workers to lessen exposure for certain workers only • Bright vest for easy identification of workers • Ear and eye protection • Helmet • Foot protection (safety boot), rain coat, etc. as needed • First aid kit should be made available on the site at all times • Workers should be trained in first aid response • Workers should be trained in emergency response procedures (for example for fire evacuation, etc.)

7. GOVERNING PARAMETERS

7.1. Environmental Health and Safety

Parameters for air quality, noise, water quality and waste disposal standards have yet to be declared in Timor-Leste therefore until such time as GOTL declares standards the Environmental, Health, and Safety (EHS) General Guidelines will apply to the implementation of the Project.

Mitigation measures for noise should include:

- All noise-generating equipment should be insulated and well maintained to ensure that they operate within the noise limits they were designed to operate.
- Operation of noise generating equipment should only be during the day
- Provision of personal protection measures from noise (see section on Occupational Health and Safety)

Vibration sources at the operation are heavy equipment used to breakdown large rocks. No blasting is currently employed at the facility and it is not anticipated to be employed in the future as well. Mitigation measures for vibration should include:

- Use of newer equipment to reduce vibration
- Operation of vibration-generating equipment should only be during the day Targets for Noise and Vibration:
  - No record of complaint from workers on excessive noise and vibration
  - No record of complaint from nearby communities on excessive noise and vibration

Monitoring measures for noise and vibration are:

- Record of complaint about noise/vibration from workers and communities living near the project.

The GoTL standard for ambient noise has adopted the IFC noise guideline which is presented in the following table.

TABLE 10. IFC NOISE GUIDELINES (IFC, 2007)

Receptor	One Hour L_{Aeq} dBA)	
	Day time 07:00 – 22:00	Night time 22:00 – 07:00
Residential; Institutional; Educational	55	45
Industrial; Commercial	70	70

7.2. Occupational Health and Safety

Based on the impact assessment, several types of potential threat to Occupational Health and Safety (OHS) of the workers are relevant to the facility. These risks are listed in the following table.

Table 11: Risk to Occupational Health and Safety from Mining Activities

No	Occupational Health and Safety Risk	Impact Source	Activity Source
1	Risk of pulmonary disease	Degraded air quality	Vehicle/heavy equipment Exhaust Particulate matter/dust
2	Risk of disability from exposure to excessive noise	Noise pollution	Working near heavy equipment generating excessive noise
3	Risk of disability from exposure to excessive vibration	Vibration pollution	Working near heavy equipment generating excessive vibration
4	Risk of disability from equipment handling	Manual handling of equipment	Working with heavy Equipment
5	Risk of falling from high platform/benches	Working in high areas	Inadequate safety measure around high areas
6	Risk of heat stroke/heat related accidents or disease	Working under the heat	Working in open areas

The main principle for Occupational Health and Safety (OHS) implementation is that COVEC-CRFG's facility management and/or supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. The health and safety of workers is important in ensuring good level of productivity and high morale among workers. The benefits of productive workers will be re-aped by business owners because higher productivity leads to higher margin of profit. Business owner also do not have to spend much energy in retraining new workers because of high turn-over.

OHS measures shall be implemented according to the following order of priority:

- Eliminating hazard: remove high risk activity from the work process.
- Controlling hazard: control implemented at the source through the use of engineering equipment or
- Other types of physical control.
- Minimizing hazard: implementation of safe work systems and administrative or institutional control measures such as job rotation, limiting exposure of work duration, etc.
- Provision of appropriate Personal Protective Equipment (PPE) in conjunction with training, use and maintenance of the PPE.

Table 12. Occupational Health and Safety Measures

No.	OHS Risk	Proposed Measures			
		Priority 1: Eliminating Hazard	**Priority 2: Controlling Hazard**	**Priority 3: Minimizing Hazard**	**Priority 4: Provision of PPE**
1	Risk of pulmonary disease from degraded air quality	N/A	Control dust and vehicle emission Generation through implementation of measures identified under "Air Quality" section	Minimize exposure to degraded air quality through workers rotation and limitation to working hours (max. 8 hrs)	Provision of facemasks with appropriate filters for dust removal.
2	Risk of disability from exposure to excessive noise	N/A	Control noise generation through implementation of measures identified under "Noise and Vibration"	Minimize exposure to excessive vibration through workers rotation and limitation to working hours (max. 8 hrs)	Provision of ear protection such as ear plugs or ear muffs
3	Risk of disability from exposure to excessive vibration	N/A	Control exposure to excessive vibration through implementation of measures identified under "Noise and Vibration" section	Minimize exposure to excessive vibration through workers rotation and limitation to working hours (max. 8 hrs)	N/A
4	Risk of disability from equipment handling	N/A	N/A	• Provision of training for proper equipment handling and safety precautions for equipment handling. • Adequate supervision for handling of heavy machinery	• Provision of helmet, boots or safety shoes for protection against moving and falling object. • When hands protection is needed, gloves made of rubber or synthetic material and leathers can be provided.

5	Risk of falling from high platform/benches	N/A	Fall prevention measures should be provided whenever a worker is exposed to a hazard of falling for more than 2m. Fall prevention can come in the form of wider benches to allow for safer movement or guardrail as necessary	Training for proper use of ladder or other equipment in higher areas. Adequate supervision for workers performing jobs in fall hazard areas	When deemed necessary, fall prevention equipment can be provided to workers. Use of bright vest for easy identification of workers
6	Risk of heat stroke/heat related accidents or disease from working in open areas	N/A	Provision of temporary shelters in open working areas so workers can rest after a few hours of work.	• Adjustment of work and rest period for workers when days are specially hot (there have been several hotter than usual days in Timor Leste in 2014. • Provision of adequate and easy access to drinking water.	Use of heat-protected clothing

In addition to the above measures, other general OHS measures such as provision of first aid kits, worker's training on first aid response, provision of clean and sanitary eating and food preparation areas are important. These measures are discussed under the mitigation measures recommended for stone crushing activities.

Monitoring measures for OHS should involve the establishment of procedures and systems for reporting and recording of:

- Occupational accidents and disease and
- Dangerous (near miss) occurrences and incidents.

This system should enable workers to report immediately to their immediate supervisor of any situation they believe presents a serious threat to life of health.

Frequency of monitoring should be daily and a regular reporting system should be established to record accidents, near misses and diseases related to OHS. Reporting can be conducted weekly that can then be compiled to a quarterly, semi-annual and annual reports. For the purpose of reporting, incidence should be classified into:

- Fatalities
- Non-fatal injuries/disease

Causes of steps taken to attend to the incident and measures taken to prevent the same incident from happening again should be recorded.

8. MONITORING PROGRAM

The matrix of monitoring measures is linked to the relevant mitigation in Table 6 presents the required monitoring responsibilities corresponding to the impacts as assessed to be necessary through the environmental assessment process in the SEIS.

8.1. Monitoring Objectives

The objectives of the monitoring program are to:

(i) Measure the impacts occurring during the pre-construction, construction and operational phases of the project
(ii) Ensure compliance with legal and corporate requirements
(iii) Determine the effectiveness of the mitigation and enhancement measures and
(iv) Facilitate management of unanticipated impacts.

8.2. Monitoring Parameters

The parameters for monitoring in the pre-construction, construction and operational phases of the project are presented in Table 7 in line with the proposals presented in the SEIS.

The monitoring of the mitigation measures and responsibilities will be a more or less continuous and daily process for COVEC-CRFG staff responsible for their implementation. The PSC will make at least weekly checks on the implementation of monitoring of the mitigation measures for all sections of the Project road and the off-site installations. The PMU will make regular spot checks on all sections of the Project road. There will be regular joint inspections of the mitigation measures along the Project road and the off-site installations by the PMU, PSC and COVEC-CRFG environmental representatives.

TABLE 13. 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 BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
PRE-CONSTRUCTION PHASE							
PMU Check on legitimacy ofmaterial sources	Project complies with donor bank requirements, best practice and are fit for purpose	PSC checks legitimacy of land for use in quarry and manufacturing area as proposed by Contractor	PSC and Contractor	Project - Included in the Contract (IIC)	CEMP prepared and endorsed	Review inspection of CEMP	PMU
Contractor EMP prepared Awareness and orientation of Contractor	All foreseeable impacts captured in CEMP.	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 pre-,,,construction stage for approval by PSC and endorsement by PMU and implementation by the Contractor: Quarries, borrow areas and construction materials management; Blasting and vibration; Asphalt, hot mix plant, rock crushers and bitumen supply; Dust and noise minimization; Tree cutting and replanting; Enhancement planting; Construction camp operations, sanitation and diseases; Safety precautions - workers and public; Temporary traffic management; and Accidental discovery of archaeological assets at sites.	PSC – and Contractor compile CEMP based on the EMP in the SEIS and the CEMP shall be prepared by the Contractor assisted by PSC as necessary.	IIC	CEMP prepared and endorsed	Review inspection of CEMP	PMU
Surveying and demarcation of centre-line	Minor loss of vegetation during demarcation	Vegetation clearance during surveying and demarcation activities, especially of trees along the river banks and road- side, will be minimized. Major trees 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	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 BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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.					
Siteclearance, digging, excavations	Accidental discovery of PCR or cultural property sites	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 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.	Contractor	IIC	Sites and/or resources discovered and protected	During activities - stop work order issued; - site/resources dealt with appropriately	Contractor; Sec. of State for Art and Culture/ PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
	Removal of trees	Based on the schedule of trees that are unavoidably to be cut made by PSC make a plan to remove trees and include this in the CEMP. Consultation with owner and compensation as per Resettlement Plan (RP).	Contractor	In Resettlement Plan (RP)	No residual effect of loss; owner satisfaction with compensation	Following provision ofc ompensation	EC;PSC
Mobilization of contractor, presence of construction workers, establishment of camp, associations with local people	Social disruption	Tali Oan to Fatucai (villages) 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 code sand rules of conduct are observed at all times; The contractor will identify one member of their staff to be the liaison between 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 Tali Oan to Fatucai/Mola.	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
	Health & safety	Provide adequate housing for all workers at the construction camps and establish clean canteen/eating and cooking areas; Potable water,	Contractor	IIC	Camp, yard, streams/rivers	Monthly observation, consultation	Contractor

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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 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 in Tibar in line with the agreed waste management section of the EMP and the Environmental License; Predictable wastewater effluent discharges from construction works shall have the necessary permits from NDPCEI 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 (see 5.4.1); Entry to the					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		protected areas, IBAs and/or sensitive areas (beaches and 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 if required by villagers, and signage or marking of the work areas; Provision of safe access across the works site to people of Sucos and access are temporarily affected or disconnected during construction works (especially across drainage works in Suai);					
	Spread of communicable diseases	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; 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, discussions with NGO	PMU
CONSTRUCTION PHASE							
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	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.	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	PSC; EC

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
	stockpiles	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) during transportation. This is especially important as there are a number of villages along the road; Dumping down the road, especially within 100m from the villages along the road and any roads being used for haulage of materials, during the dry season shall take place four times per day; and Periodic qualitative air quality monitoring.					
General activities - solid and liquid waste generation	Uncontrolled and un-managed waste disposal impact soil, ground and surface water quality	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 observed. 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.	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	PSC, EC, PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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; Topsoil will be stockpiled for use in rehabilitation. 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, 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 the local authority designated waste disposal sites; and Waste disposal areas approved by local authorities shall be rehabilitated, monitored, catalogued, and marked.					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
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	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 NDPCEI 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- fuelling 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	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

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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 oil disposal facility as required by NDPCEI; 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 oil disposal facility as required by NDPCEI; 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 waste will be collected and put in drums and taken to disposal site as approved by NDPCEI; Spillage, if any, will not be washed away but will be immediately cleaned up using absorbant 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					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		materials will be quarantined and provided with adequate facilities to combat emergency situations complying with all the applicable statutory stipulation; 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.					
Encroachment into precious ecology, disturbance of marine and terrestrial habitats, effects on flora and fauna	Impacts on terrestrial habitats; Workers poach animals for food or feathers etc; Protected or sensitive areas affected	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 any ecologically important sites or areas valuable for conservation; Vegetation clearance during construction activities, especially of trees around the quarry will be avoided and 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 firewood or timber; 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; Contractors will be responsible for re-	Contractor	Including in Contract (IIC)	Check for poaching and unnecessary vegetation clearance; 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.	Spot inspections; monthly - visual inspection of camp and work sites; Re-vegetation activities as per EMP; Consultations with villagers and workers	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		vegetation and rehabilitation in cleared areas and before closure of the project and before the contractor is discharged; 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 prohibited from cutting trees and mangroves for firewood; 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 approved by PMU.					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
Accidental encroachment into historical / cultural sites	Impacts on PCR or cultural property sites	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 MPWTC 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	During activities - stop work order issued; - site/resources dealt with appropriately	Contractor; Sec. of State for Culture/, PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
Operation of construction plant and equipment creating noise	Noise in community; Impacts on construction workers	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 activity and identify the types of equipment to be used; 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	Contractor	IIC	Adherence to agreed schedule; Complaints (no. logged with resolution); Workers safety equipment	Monthly or after complaint - review schedule Consultation (ensure schedule being adhered to) GRM register	Contractor; PMU
Presence of vehicles and equipment in villages, use of people's land for access to	Traffic and access disrupted during construction; Traffic safety affected	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	Contractor, Sucos	IIC	No. of accidents or events; Maintenance of access; Signage; Road free of materials and debris; Haulage	During activities - Visual inspection; Consultations; Review of traffic management plan	Contractor; PMU

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
construction site, traffic and safety issues		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; 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.			routes rehabilitated		

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
General activities, handling equipment and plant; construction vehicles	Worker health and safety risks	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; Workers shall be provided with appropriate personnel protection equipment (PPE) such as safety boots, helmets, reflector vest,	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

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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.					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
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	The contractor will appoint an ESO to address health and safety concerns and liaise with the PMU and TaliOan, Suai-Fatucai, Zumalai 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 ofsucos 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	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;

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
		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; 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 Covalima-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 labor will be used.					

IMPACT MITIGATION					IMPACT MONITORING		
PROJECT ACTIVITIES	**ENVIRONMENTAL IMPACT**	**MITIGATION MEASURES TO BE INCLUDED IN EMP**	**MITIGATION RESPONSIBILITY**	**MITIGATION COST (US$)**	**PARAMETER TO BEMONITORED**	**FREQ/MEANS OFVERIFICATION**	**MONITORINGRESPONSIBILITY**
Site office and works yard and use of water and electricity supplies	Stress on resources and existing infrastructure	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, telecom, 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

9. REPORTING REQUIREMENTS AND COMMUNICATIONS

9.1 Work Plan

The work plan for monitoring and reporting responsibility is in the hand of project proponent. Prior to data collection, all activities should be coordinated with relevant government agency to ensure that indicator and parameters being collected meet regulatory requirement in place.
At a minimum, the reporting should cover:

- Internal monitoring and inspection
- Incident, accident and emergency reporting
- Performance indicators and any follow up actions needed and planned to be conducted
- Training programs

Different agencies require different reporting package that include different formatting and reporting frequency. Per NDPCEI's rules, the environmental license has to be updated every year by submission of an updated EMP.

Work plan will involve regular spot checks and site inspections by the proponent and monthly joint site inspections by Proponent and Contractor. Schedules will be developed at implementation stage based on the progress of COVEC-CRFG support required and available PMU staff resources.

Upon execution of the Contract, COVEC-CRFG immediately organized a dedicated Management Team, who is responsible for the operation and management of the extraction works divided into 4 branch teams. Activities in the start includes mobilization of resources for the required manpower, construction equipment, tools, consumables, material and temporary site facilities. Will coordinate with the EMPLOYER through the PSC representatives, and submit all required deliverables in accordance with the Contract.

The Project Team composed of discipline personnel to commence the preparation of all requirements before site mobilization. Mobilization activities will include preparation of identification card for the CONTRACTOR'S personnel involved in the Work, qualification certificates for welders, riggers, excavators, other heavy equipment operators, drivers, certification of equipment, gate pass & vehicle stickers for site access, licenses, permits and other requirements necessary to be able to start the Work.

A Detailed Mobilization Plan for resources, such as the site mobilization of site facilities, manpower, construction equipment, materials were presented in each specific Mobilization Schedule plan (Manpower Mobilization Schedule, Construction Equipment Schedule and Detailed Construction Schedule) as specified above, that will be submitted to the PSC for approval prior to actual site mobilization.

9.2 Quality Plan

A specific Quality Assurance & Control Program addressing all quality requirements of the Work will be submitted to the PSC Engineer for prior approval subsequent to Conditions of Contract. This is to ensure full compliance with the project quality assurance and control program requirements and specifications.

The Quality Assurance Plan contains the methodology of all kinds of works, testing frequency, works inspections & test plan, checklist, laboratory form, quality assurance system.

Normal Clearing & Grubbing will be carried out on borrow pit sites using earth moving equipment such as; excavator, grader, loader and trucks. Waste materials will be dumped in selected sites throughout the construction area. Clearing around bridges will generally be done by manual.

To arrange method of extraction according to the general plan and in order to ensure the progress accomplishment to meet the requirement, at first step will concentrate on cutting of trees and clearing, second is the other activities section under certain condition which do not influence the earth arrangement with respect to the existing site condition. The construction modification of any activity should be done not to influence the access route.

According to the geological condition, it is necessary to excavate and remove top soil about 1meter thick during clearing before obtaining to excavate the suitable materials for road embankment.

Access Road Furniture: Signs, marker posts and milestones will all be placed particularly at intersections of existing roads to and from borrow pits areas utilizing standard and acceptable construction methods.

There will be construction team that will overall perform extraction woks. For asphalt concrete batching process, there will be 2 stations for aggregate storage at the same station of gravel mixing bulk funnels, and 1 bitumen mixing station for asphalt plant graded stone batching plant. The construction of pavement will be done at section by section depending on the preparation works. Program planning, and close coordination between plant teams and the field workers should be enhance during peak demand in the construction process in order to ensure product quality and construction progress.

For mix graded gravel for sub-base products processed by machines for pavement use, transport it with loader, pave it with dozer, leveling it with grader, and compact it with roller.

For graded gravel , mix it with the mix machine, for the asphalt concrete, we adopt for the batch mix machine to mix, paving it with pave machine, or use two pave machine which has the same type and same function to pave it by the way of ladder-shaped (according to the road width).

Stone Pitching and Rock walling: These operations will be carried out in conjunction with cut or drainage construction. Stone pitching will be constructed by compacting a base and placing mortar on top of it the stones then being hand placed into the mortar, additional mortar being placed if required to ensure correct depths. Rock walling will either be constructed to retain a slope or to provide a retaining wall needing backfilling. In the first case the wall will be shuttered on one side only and in case two shuttered both sides until concrete has set. The relatively large amount of rock walling will require at least 5 separate teams working concurrently to allow completion within the required time.

Laboratory Testing: According to the bidding documents, technical specifications and other relevant provisions, for laboratory to carry out all raw materials for earthworks, aggregate mixture for subbase and base course for cement concrete and asphalt, intermediate concrete, bituminous mixtures slurry and finished products like intended for bridge, roadbed, road surface engineering routine test are mainly part of its provision in accordance with specification. Routine test mainly has: Grain size distribution, specific gravity, moisture content, cube crushing, bearing capacity, swell increment, CBR, compactness and DCP, abrasion, etc., at the same time in the engineering process of doing will be added according to the actual condition whether to increase or decrease.

9.3 Contractor Reporting

COVEC-CRFG will prepare monthly reports reflecting the regular monitoring and results and findings. Checklists and other monitoring forms and supporting documents will be completed and submitted to the PSC as requested. Minutes of consultation with the communities and project-affected community, and the evaluation of performance of the programs/mitigating measures employed will be summarized. All the above will be in compliance with the endorsed SEIS, SEMP and Environmental License requirements. These will be used as bases in the preparation of Compliance Monitoring Reports. Checklists may be amended from time to time.

COVEC-CRFG's monthly progress report to the PSC shall contain the checklists and a summary of the implementation of mitigation measures for all sections of the Project road and the off-site installations as well and any complaints received during the relevant period.

COVEC-CRFG shall check the implementation of environmental mitigation measures on a weekly basis and shall report the weekly checks on implementation of environmental mitigation measures to the PISC on a monthly basis. The monthly report by COVEC-CRFG to the PSC shall include the status of the implementation of mitigation measures required in the Environmental License and the SEMP. The monthly report shall include reference to all environmental mitigation activities carried out by COVEC-CRFG (what, where, when, how & why) with any complaints made in the relevant month and reference to complaints resolution; or complaints referred into the GRM.

9.4 Project Supervision Consultant (PSC) Reporting

The PSC (as part of the PMU) shall assist the PMU and check the implementation of environmental mitigation measures by COVEC-CRFG in a weekly basis on the checks listed in the forms and submit to the PSC on a monthly basis. The PSC monthly progress report to PMU shall contain a summary of the implementation of environmental mitigation measures for all sections of the project road and the off-site installations. The PSC will also report every three months on the environmental monitoring to the PMU containing the details of environmental monitoring and the implementation of mitigation measures for all sections of the Project road and the off-site installations.

9.5 PMU Reporting

The PMU will report every three months on the environmental monitoring to the Ministry of Public Works with a summary of environmental monitoring and the implementation of mitigation measures for all sections of the Project road and the off-site installations.

9.6 Inclusive Reporting

The reports mentioned above will contain sufficient detail on

(i) Internal monitoring and inspections
(ii) Incidents, accidents and emergency reporting
(iii) Performance in the implementation of mitigation measures
(iv) Training given and received by the supervising staff and workers and
(v) Any complaints made in the relevant month and reference to complaints resolution; or complaints referred into the GRM.

9.7 Reporting to the Authorities

The reports mentioned above will be circulated to the NDPCEI if required. Reports shall be prepared reflecting the monitoring results/findings. Filled up checklist/monitoring forms, supporting

documents, minutes of consultation with the communities and project-affected villages, and the evaluation of performance of the programs/mitigating measures employed based on SEIS, Environmental License and EMP requirements are compiled. These will be used as bases in the preparation of Compliance Monitoring Reports. Table 8 describes the types of reports that shall be produced.

9.8 Emergency Plans for Landslides

Landslide is major land movement with significant impacts to the surrounding area or facility. For mining operation such as the CNI22's facility, emergency preparedness plans is related especially to landslide. The plans should be prepared by project proponent and be consulted with Mining authority. Landslide is triggered by land instability usually a product of steep slope, insufficient drainage and inadequate foundation. Mitigation measures have been proposed to address these factors, however, there are other factors outside of human control that might trigger landslide such as higher than usual rainfall that is concentrated in short period of time.
Emergency preparedness plans for landslide should involve awareness building on early signs of landslide that includes:

- The emergence of springs, seeps or saturated ground in areas that are not typically wet before.
- New cracks in the ground
- Soil moving away from foundations
- Leaning or cracking of retaining walls at the base of the slope.

Areas that are most prone to landslides are:

- At the base of slopes
- At the base of minor drainage hollow
- At the base or top of old cut slope

As noted in the mitigation and monitoring measures, a regular inspection should be carried out for early signs of landslide in the area. This should be emphasized over and over again as Contractor could sustain significant loss should landslide happen in the area.

TABLE 14. REPORTING SCHEDULE

RESPONSIBILITY	TYPE OF REPORT	PURPOSEOF REPORTING	FREQUENCY OF SUBMISSION	SUBMIT TO:
Contractor & Workplace Safety and Environmental Officer	Daily Compliance Checklist	Checklist of environmental and social compliance during construction	Weekly	PSC
	Accidents/Incident Report	Filing/notification of accidents or events	Within 24 hours of the incident	PSC &MPWTC-PMU
	Non-compliance report	Detail the cause, nature and effect of any environmental and/or socio-economic non-compliant act performed	Within one week of the event	PSC
	Monthly compliance report	Detailed account of mitigation measures implemented during the month reported to the Project Supervision Consultants	Report of compliance and non-compliance measures on a monthly basis	PSC

RESPONSIBILITY	TYPE OF REPORT	PURPOSEOF REPORTING	FREQUENCY OF SUBMISSION	SUBMIT TO:
Project Supervision Consultants with the assigned Environmental Specialist (on intermittent basis)	Daily / Weekly Compliance Checklist	Checklist of environmental and social compliance during construction	Daily / Weekly	Internal
	Monthly Compliance Report	Monthly report of compliance within 10 days from receipt of report from Contractor	Monthly	MPWTC-PMU
	EMP updates, including any changes in management or monitoring procedures	For approval prior to Implementation	As required, prior to implementation	MPWTC-PMU
	Key changes in project activities that may trigger Conditions in the Environmental License	Ensure compliance with the EMP updates	As required, prior to implementation	MPWTC-
	Environmental monitoring reports	Notification of non-compliance with standard environmental guidelines and parameters	Dependent on environmental parameters: weekly, monthly, quarterly or annually	MPWTC

9.8. Communications Process

Communication and reporting mechanisms to be observed and implemented by COVEC-CRFG as part of the EMP with resident construction workers and other project-related individuals with respect to reporting of incidents and concerns throughout the construction phase are presented in Table 9.

COVEC-CRFG will respond initially to complaints and concerns of locally affected persons and report to the PSC who will inform MPWTC/PMU.

COVEC-CRFG will consult with local Sucos Chiefs along the project corridor as the project construction proceeds and will seek to secure the services of local workers and train them as necessary for unskilled and semi-skilled work.

COVEC-CRFG will ensure their workers observe an acceptable code of conduct when interacting with local affected persons and will avoid social conflict or exploitation of any local water or mineral resources unless agreed with the Sucos Chief and PSC.

TABLE 15. COMMUNICATION PATHWAY (AS ENDORSED UNDER ENVIRONMENTAL LICENSE)

STAKEHOLDER	POTENTIAL INTEREST/CONCERN	MEANS OF CONTACT	CONTACT
Residents	Adequate compensation package for affected property; Disturbance from construction camp and associated activities; (drugs, alcohol,prostitution, disease, etc.)	Complaints/concerns shall be communicated to community leaders and authorities;	MPW TC– PMU PSC Contractors

STAKEHOLDER	POTENTIAL INTEREST/CONCERN	MEANS OF CONTACT	CONTACT
	Loss of productive lands/vegetation; Access to road, community services; (medical, education, communication, market, etc.) Safety and security of local people; Project updates; Information dissemination on potential hazards (road closures etc.).	Information dissemination and project updates shall be provided by COVEC-CRFG to community leaders.	
Project Personnel/workers	Employment opportunities, Adequate resources (food, water, etc.) and shelter; Competitive wages	Recruitment of locals through word of mouth Issues shall be conveyed to site foremen	Suco Chief, Contractor
Construction workers	Workers code of conduct Social conflicts between the locals and workers Behavior issues (gambling, drugs, etc.) Environmental issues (exploitation of natural resources, etc.)	Weekly meetings with construction workers	Contractor
Government agencies, other concerned parties	Environmental and socio-economic impacts	Conduct of meetings	MPWTC

10. RESPONSIBILITIES FOR MITIGATION AND MONITORING

10.1. Environmental Monitoring and Reporting

The monitoring plan is incorporated into the SEMP as per Table 7. The 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 this Environmental Safeguards Implementation Plan has been developed and the matrix of mitigation measures and monitoring is presented in Table 7. The contract documents have been prepared to contain the list of all required mitigation measures as the EMP matrix (which will be included in the Contract) and a time-frame for the compliance monitoring of these activities as per Table 7. The monitoring will comprise surveillance checks that COVEC-CRFG as contractor and all subcontractors are meeting the provisions of 7 matrix and all other contractual obligations during construction and maintenance.

The environmental specialists of PMU will supervise the monitoring of implementation of mitigation measures during the construction stage and compliance with the EMP. During project implementation COVEC-CRFG will:

- Develop an environmental monitoring protocol for the construction period and the period of regular maintenance and formulate a detailed plan as per Section 10 above;
- In consultation with the PSC, conduct regular environmental monitoring, including daily and weekly site inspections undertaken by COVEC-CRFG and subcontractor and items recorded in the site officer's site diary; and
- Prepare environmental monitoring reports to accompany monthly progress reports covering the above and prepare and submit inputs for the Quarterly Progress Reports.

Responsibilities for the implementation of the monitoring requirements of this EMP are shown in Tables 10 and the SEMP matrix. Implementation of mitigation measures during the construction stage will be the responsibility of COVEC-CRFG in compliance with the bid documents, contract clauses and technical specifications.

10.2. Health and Safety Plan

COVEC-CRFG aims to make it as easy as we can to make the construction site safe, healthy and legal. Health and safety is relevant to all businesses. So, as an employer shall be responsible for the health, safety and welfare of his employees and any others who may be affected in every task to do. This includes employees, casual or part time workers, trainees, customers, neighbours, sales people and members of the public. COVEC-CRFG aims to *zero (0) casualties* and *zero (0) serious physical injuries* for all employees and workers during the entire duration of the construction.

COVEC-CRFG will provide full time Health, Safety Supervisor and Safety Officers experienced and familiar with the project specific work safety requirements, safety procedures and regulations will be assigned at the project site to take the responsibility for the implementation of the approved Safety Program. Health, Safety & Security Program will be submitted to Client representative for approval prior to implementation.

COVEC-CRFG assigned Safety Officers will be at the work site during the entire project duration to implement and enforce the approved Health and Safety Program.

- All workers on site will be provided by COVEC-CRFG a Personal Protective Equipment (PPE) at least every six (6) months or earlier as needed, such as; hardhat, reflective vest, protective eyeglasses, gloves, safety steel toed boots, and fire retardant coveralls/vests for welders and electricians.
- A physician and a group of First Aide or Medical Aide teams will be available at all time for any untoward physical injuries to all workers on site and in office which will be stationed at the Contractor's main base camp.

The Contractor's team headed by the Project Manager will however verify with the Employer and the Engineer about more health and safety plan requirements particularly addressing to the local hired construction workers in their instruction during the execution of the contract.

TABLE 16. RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT & MONITORING

AGENCY	RESPONSIBILITIES
The Ministry of Public Works, Transport and Communication of the Democratic Republic of Timor-Leste (MPWTC).	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 environmental and other policies. 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.
Project Management Unit (PMU)	Ensure that SEMP and CEMP provisions are implemented to mitigate environmental impacts to acceptable levels Ensure that Project complies with GOTL laws and regulations Engage and retain two full time staff within PMU as environment specialist (ES) and social safeguards specialist (SSS) Ensure that environmental protection and mitigation measures in the SEIS and SEMP are incorporated into the detailed design including climate change adaptation measures. Ensure that requisite measures from the SEIS and SEMP are incorporated into the bid and contract documents.
Project Management Unit (PMU)	Ensure that measures from the SEIS and SEMP are incorporated into COVEC-CRFG's SEMP document. Undertake environmental management capacity building activities for MPW and orientation and awareness training for contractors. Ensure that MPW has obtained necessary environmental license(s) from NDPCEI prior to award of civil works contracts. Ensure that contractors obtain necessary environmental license(s) from NDPCEI prior to commencement of civil works contracts. During detailed design phase carry out baseline data collection on air quality and noise (as specified in the SEMP) Assist MPW to establish an environmental grievance redress mechanism, as described in the SEIS, to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the Project's environmental performance. Undertake monitoring of the implementation of the SEMP (mitigation and monitoring measures) Prepare quarterly or semi-annual environmental monitoring reports to submit co-financiers as necessary. Based on the results of CEMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to co-financiers as necessary. Implement all mitigation and monitoring measures for various project phases specified as PMU's tasks in the SEMP & CEMP Work with DRBFC to undertake any additional environmental assessment for sub-projects prior and submit to NDPCEI for review and clearance.
(PSC-included in PMU;EC)	Provide training and capacity building to MPW and PMU staff (including management) and provide training to engineers and contractors prior to the submission of contractor's CEMP. Incorporate into the project design the environmental protection and mitigation measures identified in the SEMP for the design stage including climate change adaptation measures included in the SEIS. During detailed design phase provide all necessary information to the MPW to facilitate obtaining environmental licenses from NDPCEI 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 SEMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that

AGENCY	RESPONSIBILITIES
	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 SEMPs and other environmental protection and management measures to be incorporated in bid and contract documents. Assist PMU to undertake monitoring of the implementation of the SEMP & CEMP (mitigation & monitoring measures) including incorporating reports from COVEC-CRFG. Assist PMU to prepare quarterly progress reports and semi-annual safeguards monitoring reports for submission to MPW as necessary including incorporation of reports from COVEC-CRFG and corrective action requests to contractor. Based on the results of SEMP &CEMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to other co-financiers as necessary.
COVEC-CRFG (Contractor)	Participate in induction training on SEMP provisions and requirements delivered by the PMU and incorporate in the CEMP. Prepare the CEMP and submit to PSC for approval and PMU for endorsement. Provide sufficient funding and human resources for proper and timely implementation of mitigation measures required in the SEMP. Obtain necessary environmental license(s) from NDPCEI for associated facilities for subproject 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 PSC. Maintain a record of training and conduct of awareness sessions for staff to ensure compliance with environmental and safety statutory and contractual obligations including the approved SEMP. Ensure compliance with environmental statutory and contractual obligations and proper implementation of the project including approved SEMP & CEMP. Based on the results of CEMP 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 and PSC for environmental corrective actions and corrective actions and implement additional environmental mitigation measures, as necessary.
National Directorate for Pollution Control and Environmental Impact (NDPCEI)	Review and approve environmental assessment reports required by the GOTL. Issue & 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.

11. EMERGENCY RESPONSE PLAN

The environmental personnel of COVEC-CRFG will supervise the inclusion of the emergency response plan for implementation of emergency mitigation measures during the construction stage for compliance with the EMP. During project implementation COVEC-CRFG will:

Develop an emergency response plan protocol for the construction period and the period of regular maintenance and formulate a detailed plan based on the template provided in Annex 1.

In consultation with the PSC, conduct monitoring of emergency responses, including updates by COVEC-CRFG to respond to any unforeseeable circumstances.

12. DECOMMISSIONING PLAN

A decommissioning plan will be included in the CEMP at the pre-construction stage covering rehabilitation, re-vegetation and re-contouring of quarries, borrow areas and construction materials processing areas.

The de-commissioning of off-site activities such as the constructors camp is covered in the Section on Sourcing of Materials (river gravels, aggregates etc). These requirements are included in both the SEMP and SEIS EMP matrices. COVEC-CRFG's updated ESIP includes provisions for:

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. Commissioning plan will be included in the CEMP covering rehabilitation, re-vegetation and re-contouring of quarries, borrow areas and construction materials processing areas.

13. CAPACITY DEVELOPMENT AND TRAINING

The capacity development and training will include elements from both the proponent and COVEC-CRFG. Awareness training on environmental safeguards will be conducted by the PSC for the selected contractor immediately after mobilization. This element of the capacity development and training for contractors will include:

a) Statutory and contractual responsibilities for Contractors
b) The content of the statutory EMP
c) The requirements for COVEC-CRFG to update the statutory EMP and include all site specific information
d) The requirements to acquire and environmental license for any associated facilities (quarry, mineral processing etc.)
e) Obligations under GOTL regulations (for gravel extraction and fuel storage etc.),
f) Environmental and health and safety monitoring and reporting
g) Monitoring methods, checklists and priorities for the pre-construction stage.

Capacity development and training will be developed by the selected Contractor (with assistance from the PSC and EC) as part of the contract and included in the CEMP at the pre-construction stage. The precise requirements will be dependent on the personnel and capabilities of COVEC-CRFG staff. It will cover roles and responsibilities as per the monitoring plan and the methods to ensure the implementation of all the health safety and environmental safeguards and mitigation measures and how they are to be incorporated into the CEMP with commitments for management, site agents, foremen and workers from the working level upwards.

These requirements are included in EMP matrix. COVEC-CRFG's updated CEMP will include provisions for:

- Waste spoil disposal, general waste and hazardous waste disposal;

- Quarries, borrow areas and construction materials management;
- Concrete Batching Plants;
- Asphalt, hot mix plant, rock crushers and bitumen supply;
- Erosion control and runoff; bridge repairs and river protection;
- Water contamination prevention; (vii) Dust and noise minimization;
- Tree cutting and replanting;
- Slope stability, bio-engineering and enhancement planting;
- Construction camp operations, sanitation and diseases;
- Power and utilities protection;
- Drainage system, irrigation and water resources;
- Workers and public safety precautions;
- Temporary traffic management;
- Accidental discovery of archaeological assets, sites or resources; and
- Decommissioning, rehabilitation, re-vegetation and re-contouring of quarries, borrow areas and construction materials processing areas.

There are several trainings that are necessary for HSE, they are listed in the following table.

Table 17: HSE Training Needs

No.	Training	Who Should Join
1	Health and Safety trainings for operation of heavy equipment for mining and crushing	Operator of Plants and Heavy Equipment
2	Fire drill	All workers with several trained as fire marshals
3	First aid training	All workers
4	Facility manager training	Training on HSE from accredited training providers covering all aspects related to HSE

A transparent process for the development of the Environmental Management Plan (EMP) is a requirement of the law. To ensure that transparency principle has been followed in this process, several steps have been taken by the consultant as follows:

1. Active consultation with local authority
2. Consultation with potentially affected community, those living close to the project location
3. Consultation with workers in the facility, especially those that come from local communities

In addition to the above steps, the transparency requirement is also being followed by making the Project Document and Draft EMP accessible through NDPCEI. Information sources for the formulation of the EMP has also been thoroughly reported so the public could see that the information comes from reliable institutions.

14. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

In the project preparation phase the stakeholder consultation process disseminated information on the Project and its expected impact, long-term as well as short-term to gather information on relevant issues, determine the extent of the concerns amongst the community and address these

issues at early stages of Project design. At the implementation stage the objective will be to address these concerns and ensure the appropriate mitigation measures are implemented included.

Consultations will continue throughout preconstruction and construction phase to keep local affected persons, local village head persons, local authorities, Suco leaders, national authorities, educational institutions, and other groups with an interest in the Project corridor informed about the Project.

Information disclosure will be undertaken as per the requirements of JGESC policy 2010. In disclosing the environmental documents to the public, the MPW through the PMU is responsible for (i) Providing the SEIS &SEMP to NDPCEI 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.

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.

FIGURE 15. PHOTOS OF DURING NATIONAL AUTHORITIES AND PUBLIC CONSULTATION

Suco Villagers in Ogues (Branch 1)

Suco Villagers in Beco (Branch 3)

Meeting with Land Property Officers in Dili

Meeting with NDPCEI Officers in Dili

The following safeguard documents to be prepared and submitted by the PMU shall be publicly disclosed by GOTL including posting on WB's website:

- Draft and final SEIS & EMP 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 SEMP provisions; and Quarterly safeguards monitoring reports and other reports submitted by the PMU during project implementation (PSC will report monthly to PMU).

15. GRIEVANCE REDRESS MECHANISM

MPWTC assisted by PMU will establish a Grievance Redress Mechanism (GRM) to facilitate resolution of complaints by affected people and grievances about the project's environmental performance, in line with the requirement of JGESC. The GRM will be facilitated by the PMU and be applicable to all contractors who will be required to maintain a grievance registry as a record.

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 COVEC-CRFG and PMU have an open door policy and that the complainant can remain anonymous if requested.
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 GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

First tier of GRM. COVEC-CRFG as contractor (through PSC and EC) are the first tier offering the fastest and most accessible mechanism for resolution of grievances and a designated officer in the COVEC-CRFG shall be the key officers for grievance redress. Resolution of complaints will be done within fifteen working (15) days. The PSC and EC will provide the support and guidance in grievance redress matters, investigation of grievances 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.

Second Tier of GRM. COVEC-CRFG (through PSC) 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 will meet as necessary when there are grievances that cannot be solved at the first tier. The GRC shall be established by MPWTC before commencement of site works. The GRC will consist of the following persons: (i) Project D irector; (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 for Pollution Control and Environmental Impact (NDPCEI) (for environmental related grievances). A hearing will be called where the affected person can present his/her concern. The process will facilitate resolution through mediation.

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. COVEC-CRFG 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.

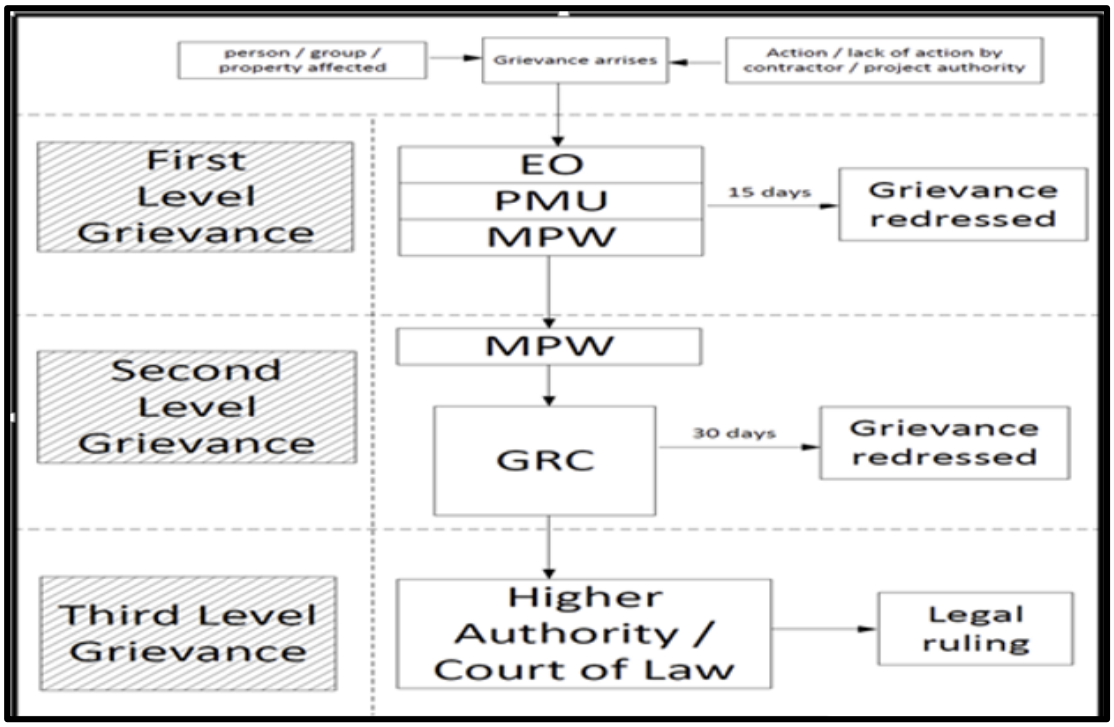
Third tier of GRM. In the event that a grievance cannot be resolved directly by COVEC-CRFG or PMU officers (first tier) or GRC (second tier), the affected person can seek alternative redress through the Suco or District committees under the existing arrangements for redress of grievances for affected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

Monitoring reports shall include information about the GRM including:

a) The cases registered, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and

b) 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 6.

FIGURE 16. GRIEVANCE REDRESS MECHANISM



16. ESTIMATED COST OF ENVIRONMENTAL MONITORING

The major expense in the implementation of the EMP including environmental monitoring, public consultation and capability building is a remuneration of the international and national environmental specialists. The estimated cost for the EMP implementation is presented in the following table.

Table 18.1 ESTIMATED COST OF IMPLEMENTING THE EMP

Unit Remuneration	Unit	No of Unit	Cost/Unit USD	Total (USD)
Environment Specialist	Man month	2	10,000.00	20,000.00
National Environment Sp.	Man month	5	2,000.00	10,000.00
Total				**30,000.00**

TABLE 18.2 NON-TECHNICAL SUMMARY

	PARTICULAR
1	The Project is Ministry of Public Works, Transport and Communication of the Democratic Republic of Timor-Leste (MPWTC) and day to day management will be the Project management Unit. The project proponent is COVEC-CRFG
3	Location and scale of the project: This project, Section 1, will start from Suai to Fatukai/Mola, the first section of the highway road in this contract having a total length of 30.355km. This section starts in Suai at Sta. 3+920 and ends in Zumalai at Sta. 34+275.
4	Legal requirements: 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.
5	Contractual and corporate obligations: The Project will comply with Timor-Leste safeguard regulations. COVEC-CRFG will also comply with policies and principles for protecting the environment and people by wherever possible avoiding impacts and mitigating and/or Compensating for impacts that cannot be voided.
6	Summary of impacts: The key impacts are summarized in table format
7	Proposed Mitigation Measures: The proposed mitigation measures are summarized in a table matrix format. The environmental impacts from the Project will be controlled and minimized to acceptable levels. Controls on operation construction impacts such as dust and noise, waste disposal, water quality impacts, health and safety concerns, tree falling, traffic interruption, preservation of water and electricity supplies will be monitored on a regular basis by the PSC-EC. Training will be provided as necessary to ensure these impacts are mitigated to the greatest extent feasible.
8	Governing Parameters: The parameters for air quality, noise, water quality and waste disposal standards have yet to be declared in Timor-Leste therefore to standard international practices will be used.
9	Monitoring Program: The objectives of monitoring, parameters and monitoring program are described.
10	Reporting Requirements and Communications: The responsible parties for monitoring and reporting are described as is the communications process
11	Responsibilities for mitigation and monitoring: The requirements for environmental monitoring, reporting, emergency response planning, decommissioning of associated facilities, and training, consulting with public and how to deal with complaints are all described. Requirements for ongoing consultations with the public to give information on the progress of the Project to interested parties and the proposed mitigation measures. Project documentation will be disclosed in a place and language accessible to stakeholders. A grievance redress mechanism (GRM) will be established to help resolve issues associated with the Project. The GRM will receive concerns and facilitate resolution of affected people's complaints and grievances about the environmental and social performance of the Project. The GRM will provide a mechanism for affected persons to voice and resolve social and environmental concerns linked to the Project.

ANNEXES

ANNEX 1
DRAFT EMERGENCY RESPONSE PLAN MATRIX

SITE SPECIFIC EMERGENCY RESPONSE PLAN			
PROJECT NAME	SUAI-BEACO HIGHWAY ROAD PROJECT, SECTION 1		
PROJECT LOCATION/ADDRESS	SUAI, COVALIMA, TIMOR LESTE		
SITE MUSTER POINT LOCATION	SUAI, COVALIMA, TIMOR LESTE		
SITE PHONE NUMBER	N/A		
EMERGENCY CONTACTS	NAME: REN RUI	+670 7303 7378	
HEALTH & SAFETY OFFICER			
GEN.SITE SUPERVISOR			
NEAREST HOSPITAL/ADDRESS	REFERRAL SUAI	+670 7823 9847	
HOSPITAL IN SUAI	VOLLADARES HOSPITAL	3311008	
AMBULANCE IN DILI	AMBULANCE DILI		
AMBULANCE	ESTANIS LAU CARVALLO	+670 7561 6220	
AIR AMBULANCE (STARS)	AGAPITO, LIQUICA	+670 77971200	
POLICE	SUAI	122	
FIRE DEPARTMENT	SUAI	+670 223 0348	
POISON CONTROL			
REGULATORY- LABOUR (OCCUPATION HEALTH & SAFETY, WCB)			
REGULATORY- ENVIROMENT (REPORTABLE SPILL)			
GAS UTILITIES	N/A		
WATER UTILITIES			
ELECTRICAL UTILITIES	EDTL SUAI	+670 7618 8783	
ELECTRICAL CONTRACTOR			
MECHANICAL CONTRACTOR			
LINE LOCATORS			
First Aid/ Emergency Response Attendant(s)		Contact #	Training
			DHS
			MINISTRY OF HEALTH
Emergency Response Training	Type of Training	Frequency	
Emergency Response Training	Level 2 First Aid	Every 3 Years	
Emergency Response Training	Site and Safety Orientation	On-going	
Emergency Response Training	Fire Extinguisher Training	At Orientation	
Emergency Response Training			
Emergency Response Training			
First Aid Kit and Equipment Location (s)	Level 3 First Aid Kit and Medical Supplies CONTRACTOR Trailer		
First Aid Kit and Equipment Location (s)	Fire Extinguishers: 2 ABC 20 lb. Extinguishers in CONTRACTOR Trailer		
First Aid Kit and Equipment Location (s)	Fire Sprinklers and Hoses		
Material Safety Data Sheet Location	CONTRACTOR Mobile		
Alarm and Emergency Communication Requirements	All designated first aid and rescue attendants to have cell phones. Number listed above 3 horn blasts = Medical Aid 6 horn blasts = Evacuation		
Fire Protection Requirements	Fire Extinguishers kept in Trailer and on-site. All sub-contractors should have readily available fire extinguishers.		
Potential Emergencies (based on Pre-Task	Fire	Gas/ Water Leak	
Potential Emergencies (based on Pre-Task Hazard Assessment)	Confined Space/ restricted access for rescue	Excavation rescue	
Potential Emergencies (based on Pre-Task	Power-line/ Utility line hit	Hazardous spill	
Potential Emergencies (based on Pre-Task Hazard Assessment)	Fall from heights	Powered Mobile Equipment / Vehicle Accident	
Potential Emergencies (based on Pre-Task	Electrical		
SITE SPECIFIC EMERGENCY RESPONSE PLAN			

SITE SPECIFIC EMERGENCY RESPONSE PLAN	
SITE SPECIFIC EMERGENCY RESPONSE PLAN EMERGENCY RESPONSE PROCEDURE	As soon as the incident is noticed, STOP the work isolates the area and inform to officer in charge. Sound alarm or initiate evacuation order. (Medical Aid- Three short horn blasts, Evacuation- six long horn blasts on first aid horn) Notify appropriate emergency services if required and the Superintendent. Evacuate the work site. If it is safe to do so remove injured from danger if necessary and attend to them, otherwise wait for Emergency workers. Take all possible safety precautions including the use of protective equipment as required. All employees will assemble in the designated area and will remainthere until ordered to move by site Manager/Supervisor or the emergency services. Foreman of each trade to count employees and immediately notify appropriate authorities of any missing personnel. Some employee may elect to use emergency equipment to control and/ or extinguish flames, spill, etc. but at no time is any employee to remain in the building or work site if further exposure shall increase the risk hazard to the employees. No employee shall enter the workplace until a return to the building or work site has been authorized by the superintendent and the emergency services. Cordon of the incident area. Advise governmental agencies as per regulation (by the Engineer). Ensure site is safe prior to examination before resuming work.Perform a thorough incident investigation as soon as possible.Produce incident report and forward to required parties (Engineer) etc. Review incident findings with workers during next safety meeting.
EMERGENCY RESPONSE FOR GAS/POWER UTILITY LINE HIT	Walk away from hole/area. Turn of all ignition sources. Evacuate immediate area and meet at the designated Mustering point. Notify site Manager and appropriate utility company. Turn off/ remove all potential ignition sources in next closest areas building heaters, thermostats, best to hit main breaker for building if applicable. Proceed with Emergency Response Plan.
EMERGENCY RESPONSE PROCEDURES FOR CONFINED SPACE / RESTRICTED ACCESS RESCUE Required emergency rescue equipment: Man-lift, Access Tools, Fire Extinguisher, Stretcher, Restraints, PPE as required according to the safe work procedure, Entry Permit and/or pre-job hazard assessment	In the event the attendant cannot make contact with entrant or suspects an incident has occurred, the attendant shall immediately notify site Manager/ Supervisors if injuries are suspected to be life threatening. Notify the site Superintendent. If adequately trained and it is safe to do so remove injured from danger by using required rescue equipment and attend to them, otherwise wait for emergency workers. Take all possible safety precautions includingthe use of protective equipment as required. Proceed with Emergency Response Plan.
EMERGENCY RESPONSE FOR ROOF/WORK AT HEIGHTS EVACUATION Required Emergency Rescue Equipment: PPE, Fall Protection, Scaffolding, Man-lifts, Stretcher, Restrains as required according to the safe work Procedure and pre- job hazard assessment.	Notify Site Manager/Supervisors if incident is life Threatening and site Superintendent immediately. If adequately trained and it is safe to do so remove injured from danger by using required rescue equipment and attend to them, otherwise wait for emergency workers. Take all possible safety precautions including the use of protective equipment as required. Prep injured worker for transport by stretcher or backer board by qualified first attendant. Lower injured worker by ropes attached to stretcher as directed by First Aid attendant following all appropriate safety procedures for tie off. Ensure the safety of both the injured and non-injured workers. Proceed with the Emergency Response Plan.