CHT QUARRY (MOTA ULUN)

ENVIRONMENTAL MANAGEMENT PLAN

(DRAFT)

13 Mar 2019

CONTENTS

ABBREVATIONS / ACRONYMS

ANPM:	National Authority for Petroleum and Minerals
CHEC:	China Harbour Engineering Company
CHT:	China Harbour Timor Lda
CLO:	Community Liaison Officer
CNEFP:	National Centre of Employment and Professional Training
EIA:	Environmental Impact Assessment
EIS:	Environmental Impact Statement
EMP:	Environmental Management Plan
ERT:	Emergency Response Team
GoTL:	Government of Timor-Leste
ha:	hectares
HSE:	Health, Safety and Environment
ISO:	International Standards Organisation
MPa:	Megapascals
NDPCEI:	National Directorate of Pollution Control and Environmental Impact
PD:	Project Document
PMU:	Project Management Unit (representing the GoTL for the Tibar Port Project)
PPE:	Personal Protection Equipment
Project:	Proposed CHT Quarry at Mota Ulun
SWP:	Safe Work Practices
TOR:	Terms of Reference

1.0 EXECUTIVE SUMMARY

1.1 The construction of the Tibar Bay Port, with a 630 m long quay wall and a container terminal measuring about 27 ha, requires about 1,030,000 m3 of rocks and gravel for making concrete and for ground improvement work, i.e. to strengthen the ground to lessen the effects of earthquakes, so as to protect the structures on it.

1.2 2 hills at Mota Ulun are identified as meeting the rock-related requirements of quality and quantity, and the other requirements of favourable terrain (i.e. ease of transportation), and minimal disruption to the local community, i.e. no eviction, no resettlement, dispossession of land or assets, no destruction of dwellings or other structures, and no economic deprivation. There are already quarry-related enterprises operating in the Mota Ulun area.

1.3 The quarry is not in or near wetlands or nature reserves. There are also no religious, historical, cultural, archeological, or sacred sites, or protected or endangered species, or unique vegetation, in or near the quarry area of operation.

1.4 The CHT quarry has no unusual environment impacts. There is no tunneling, or open-cast, i.e. pit, type of mining. There is no requirement for chemical treatment, i.e. no creation of hazardous sludge. It is a relatively simple quarry to construct and operate.

1.5 Mota Ulun is a small village with about 457 people in about 162 families, living in scattered dwellings, usually of the timber, zinc and thatched roof types. Water obtained from the few wells are salty, for the village is near the sea, and not near rivers or streams.

1.6 There are no plantations or live-stock industry or fishing using boats. Some families have small crops and keep a few animals for home consumption. Commercial activity is very low, with 2 family owned and operated small provision shops.

1.7 The only and little number of employment opportunities are at the low intensity bulk fuel station, and the few small-scale companies operating stone works, i.e. making gravel and casting concrete parts.

1.8 The CHT quarry, by employing 50 local workers out of the 162 families in Mota Ulun, in addition to providing wages, supports commercial activities, e.g. food, housing and recreational, resulting in economic gain for the whole local community without damage to the social fabric, usually caused by an undesirable influx of workers from other regions.

1.9 Mota Ulun has a primary school, Ensino Basico Filial Caitehu, the Church of Capela da Sagrada Familia, and at the rear of the Church, the convent Irmas Franciscanas de Nosa Senhra das Victorias. There is no Clinic. The nearest clinic is at Ulmera, about 11 km to the east. There are no social or recreational facilities, except for 2 billiard tables at open air sheds at 2 locations.

1.10 The Quarry Community Liaison Officer (CLO) frequently meets local residents; explaining the rationale for the quarry, the associated economic and social benefits, and the precautions taken to lessen environmental impacts to the community. A Grievance Management Scheme is in-place.

1.11 The CLO also conducts a census at the start of operations, and again about 3 to 6 months after, to determine the status and changes to the economic and social conditions of the Mota Ulun villagers

1.12 Communications with the Mota Ulun residents signal the welcoming of the quarry. Desires include employment opportunities, skills and vocational upgrading, purchase of local produce and products, and the provision of well water, for the existing wells have a salty taste due to proximity to the sea. The CLO has the responsibility of ensuring that the requests are met.

1.13 The EIS is complemented by the Environmental Management Plan (EMP); aiming to avoid, minimize and control environment related concerns. It comprehensively documents the probable causes of concern, and the mitigation methods to counter air, land and water pollution, with the aim of continual improvement.

1.14 Regarding decommissioning, the probability is that the quarry will operate for many years to come, for the hills are full of good quality rocks. Also, as industrial and commercial growth increases in the Tibar, Ulmera and Mota Ulun areas, and the country as a whole, the demand for rocks also increases, for such a material is essential for constructing modern structures. However, in the unlikely event that the quarry is to be

decommissioned, the first step is for the Village Chief and the Land Authority to decide on the future use of the land. Then it will be clearer as to what to remain behind, what to remove, and what to restore. After removal of structures, equipment and material, bare ground is returfed with earth from the reserve topsoil stockpile. It is noteworthy to mention that the place can be rezoned for housing, for roads and utilities are in place, and the higher elevation provides a wonderful view of the sea; enhancing the value of the land.

1.15 In conclusion, the setting-up and operating of the quarry are not expected to encounter difficulties because general sentiment welcomes the quarry in support for constructing the Tibar Bay Port, it is in an industrial area, no endangered or protected flora and fauna is harmed, there are no cultural or sacred elements in the site, access is good, no persons live on or off the quarry land, employment prospects for the local Mota Ulun residents are excellent, and there are many opportunities for sharing in economic growth and social improvements.

1.16 Work by CHT, i.e. employing about 1,000 persons for constructing the Tibar Bay Port, and the supporting activities of the quarry and the associate jetty, bring economic growth to the regions of Tibar, Ulmera (where the 400-person Camp is sited) and Mota Ulun. This growth acts as a stimulant for other industrial and commercial enterprises, for people, machinery and transportation factors are in place. The country has peace; now followed by progress and prosperity.

2.0 DETAILS OF THE PROJECT PROPONENT

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3.0 DETAILS OF THE EMP CONSULTANTS

3.1 The names of the persons preparing the EMP are stated at Table 3-1.

Table 3.1. Names of Persons Preparing the EMP

SN	Area	Name / Academic and Professional Qualifications / Experience
1	EIS / EMP Preparation Lead	Koh Chee Thong, Aircraft Maintenance Engineer (Qantas Airways), Dip in Electronics (Sydney Technical College), Dip in Law (University of London). CHEC HSE Adviser. Prepared and implemented more than 5 Construction Environmental Management Plans (in which EIS / EMP are components) for CHEC projects in Angola, Qatar, Gabon, Ghana and Guinea. Also prepared and implemented HSE Management Plans for Seagate sites in Singapore, Malaysia, China and India.
2	Biodiversity	Kate Barker, BSc Hons Marine and Freshwater Biology, University of Wales. Marine life researcher in various country, e.g. Mexico, Thailand and Timor-Leste. Diving instructor.
3	Biodiversity	Kayla Noble, BSc Hons Zoology. Developed and implemented programs in improved farming techniques (US Peace Corp in Timor-Leste) and caring for animals (including preparation of diets and feeding) at VHS Wildlife Rehabilitation Center, Asheboro, North Carolina (USA). Diving Instructor.
4	Dust Management	Li ShunQuan, BSc, South China Agricultural University. Director of an Analysis Laboratory. More than 10 years of experience in field monitoring of water and air samples for water and power plants.
5	Noise Management	Koh Chee Thong, ex-HSE Officer for Seagate factories in Singapore, Malaysia, India and China, and Sony factory in Singapore. Prepared and implemented Noise Control / Monitoring procedures for these factories.

6	Vibration Management	Hu SiJie, BEng, Ocean University of China. CHEC Quarry Engineer, for supply of rocks for revetment for Fujian Ningde Nuclear Power Marine Engineering Project (China)
7	Quarry Management	Pedro Nelson dos Santos Moreira, a geotechnical engineer, has extensive experience in quarry works. He is employed by CHEC, with the previous project at a CHEC quarry in Tema, Ghana, supplying about 3 million m3 of rocks for the construction of a breakwater approximately 3.5 km long.

4.0 PROJECT DESCRIPTION

4.1 Bollore leads the Public-Private Concessionaire provided by the GoTL, for an enterprise to undertake the financing, design, construction, operations and transfer of Tibar Bay Port, 10 km west of Dili, for a 30-year timeframe. China Harbour Timor Lda (CHT), a subsidiary of China Harbour Engineering Company (CHEC), is the main contractor for Design and Construction.

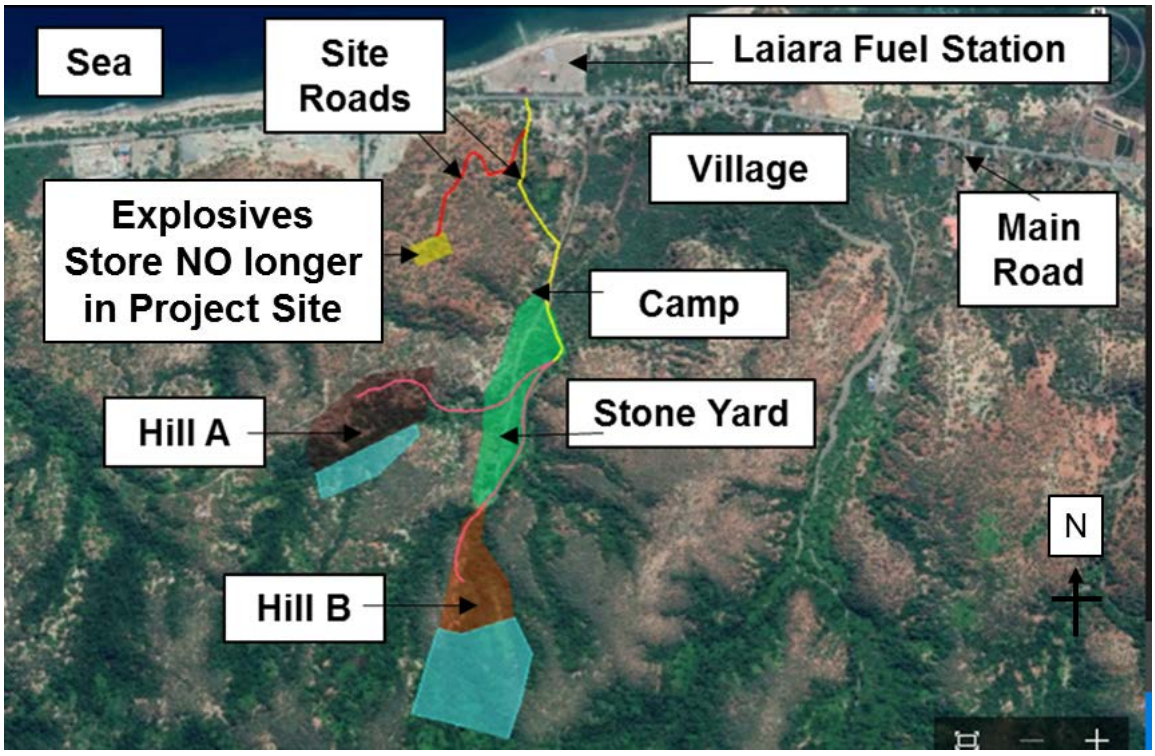
4.2 The quarry is to provide rocks for construction purposes, e.g. for making concrete structures, and for ground improvement to strengthen against earthquakes. About 1,030,000 m3 of rocks is required, over a 2-year timeframe, starting from May 2019. The majority of the rocks will be used for strengthening the quay and the grounds of Tibar Bay Port, in the form of “loose” stone columns in the ground. This is an engineering design to enable the structures on top of the ground to survive an earthquake. In the unlikely event of an earthquake, the Port must be able to remain operational, so that supplies, materials and machinery can be shipped into the country for humanitarian reasons, and for rebuilding work.

4.3 After surveys of at least 15 locations, and with assistance from the Institution of Petroleum and Geology (under the Ministry of Petroleum and Ministry of Mineral Resources), the quarry at Mota Ulun, about 20 km west of Dili, was chosen. The stone processing yard, and the hills where blasting takes place, are about 1 km and 1.5 km respectively from the main road. The nearest local residences, located at the east of the main entrance, next to the main Dili-Liquica road, is about 1.5 m away from the stone processing yard. The site location and layout plans are shown at Figures 4-1 and 4-2.

4.4 The quarry is not in or near wetlands or nature reserves. There are also no religious, historical, cultural, archeological, or sacred sites, or protected or endangered species, or unique vegetation, in or near the quarry area of operation.

Figure 4-1. Locations of Main Places

Figure 4-2. Location and Site Plan of CHT Quarry at Mota Ulun



4.5 The conventional method for obtaining rocks is used, i.e. using controlled explosions for breaking up a rock wall, and followed by transporting rocks to a crushing machine for processing into the required smaller sizes.

The rock / gravel processing and storage area is about 70,000 m2. The rock crushing machine has a capacity of about 300 tons per hour.

4.6 Initial work starts with making an internal haul road of the dirt type, about 1 km long, from the main road to the laydown area. Lamp posts, powered by solar panels, are installed along this road. As work progresses, the haul roads are lengthened to reach further work places, e.g. excavations in the hills.

4.7 The type and number of equipment are shown at Table 4-1. Electricity supply is from public mains. There is no plan to install a generator. 3 bore holes will be bored to provide domestic water for the quarry, as well as supplying to the local community.

4.8 A workforce of 80 persons is planned. A single-storey camp quarter for 35 persons is constructed. The majority of workers is from the local Mota Ulun community.

Table 4-1. Type and Quantity of Machinery

Heavy Machine	Initial setup (first 4 months)	Production
Excavator	4	4
Bulldozer	2	1
Front Loader	2	2
Dump Truck	5	21
Water Tanker	1	2
Fuel Tanker	1	1
Rock Crusher	1	1

4.9 An explosives store, that was previously planned to in the quarry area, is now sited elsewhere, i.e. no longer as part of the quarry. For illustration, Attachment A has a summary of the procedure for safe use of explosives There are separate applications for an Explosives Permit and a Mining Permit.

4.10 For ease of reference, the Quarry Manager has the following main staff reporting to him; Quarry Deputy Manager (in charge of operations), Quarry Engineer, Blasting Engineer, HSE Manager (also responsible for

Security matters), Equipment Manager, and HR Manager (assisted by a Community Liaison Officer, and a Housing officer).

4.11 The capital cost of setting-up the quarry is about US $ 3 million. Operating cost is not included.

5.0 LEGAL REQUIREMENTS

5.1 The preparation of the EIS and the EMP is mainly governed by environment-related regulations. In addition, other regulations, standards, and guidelines that are associated with environmental protection, e.g. covering demarcated sensitive areas, protected and endangered species, culturally important sites, and the welfare of communities, are also referenced. A "Compliance with Legislation Requirements" Section is in the EIS, and is shown here at Attachment B for easy reference. The relevant legislation are as follows.

5.1 The Constitution of the Democratic Republic of Timor-Leste (RDTL)

5.1.1 The Constitution of RDTL has Articles relating to the environment, natural resources and culture, with examples as follows:

5.1.1.1 Section 61 (Environment) directs that the State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

5.1.1.2 Section 139 (Natural Resources) states that the exploitation of the natural resources shall preserve the ecological balance and prevent destruction of ecosystems.

5..1.1.3 Section 41.5, though relating to freedom of the press and mass media, mentions the protection and dissemination of culture and traditional values. Section 59 (Education and Culture), recognises and guarantees that every citizen has the right to education and culture.

5.2 Environmental Legislation

5.2.1 Decree Law 26/2012, Environmental Basic Law; Sets out the framework for environmental policy and the guiding principles for the conservation and protection of the environment and for the preservation and sustainable use of natural resources in order to promote the quality of life of the citizens. Article 13 states that the State, before consenting to any rule, plan or project that could potentially impact the environment, shall conduct a strategic environmental assessment identifying, describing and

assessing any significant effects on the environment and ensuring the integration of environmental concerns into the decision-making procedure.

5.2.2 Decree Law 5/2011, Environmental Licensing Law; Creates a system of environmental licensing for public and private projects likely to produce environmental and social impacts on the environment. The system of licensing is based on assessing the size of the potential environmental impact of projects taking into account their nature, size, technical characteristics and location. Article 3 states the environmental licensing procedure.

5.2.3 Decree Law 14/2018,Government Structure; Article 33, paragraph 1, sub-paragraph O, empowers the Minister of Petroleum and Minerals to carry out the environmental licensing process, including the approval of environmental licenses, in the petroleum and mining sector.

5.2.4 Ministerial Directive 44/2017, Regulation on Impact and Benefit; Covering the process for agreement between the project Proponent and the local community regarding the advantages and disadvantages of the project.

5.2.5 Ministerial Directive 45/2017; Regulation on the management of and the rules for the Committee assessing Category A projects.

5.2.6 Ministerial Directive 46/2017; Defining the details for Project Documents (PD), Terms of Reference (TOR), Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) documents, as stated in Annexes 1, 3, 4 and 5 respectively.

5.2.7 Ministerial Directive 47/2017; Regulation on public consultation procedures and requirements during an environmental assessment process.

5.2.8 Government Resolution 32/2016; Establishing an investment strategy for waste management covering waste collection, destruction, and recovery. A new landfill is to be setup in Tibar, to be operated by private entities.

5.2.9 Decree Law 2/2017, Urban Waste Management; Stating the rules on recyclable waste, duties of Municipalities, waste collection, transportation and disposal, and urban waste management contracts.

5.3 Biodiversity and Protected Areas Legislation

5.3.1 Decree Law 5/2016, National System of Protected Areas; Defines the legal framework for the creation and management of protected areas, including waters. These areas could be classified as national parks, wildlife sanctuaries, natural monuments, protected landscapes and natural reserves. Permitted activities include subsistence hunting and fishing of unprotected species. Prohibited activities include cutting, burning, stripping and harvesting of protected flora.

5.3.2 Government Resolution 41/2015, Sandalwood Classified as Iconic Plant; Classifies sandalwood as an iconic plant of national value, and prescribes the protection measures for this species, e.g. the cutting, extraction, and sale of sandalwood is prohibited.

5.3.3 Joint Ministerial Diploma No. 18/MAP/MCIA/II/2017 of 12 April 2017; Annex 1 has the List of Protected Species.

5.3.4 UNTAET Regulation 2000/19 on Protected Places.

5.3.5 UNTAET Regulation 2000/17 on the Prohibition of Logging Operations and the Export of Wood from East Timor.

5.3.6 Draft Decree Law on Forest Management, draft 7 August 2013.

5.3.7 Draft Decree Law on Biodiversity March 2012.

5.3.8 Timor-Leste Biodiversity Strategy and Action Plan 2016.

5.4 Mining Legislation

5.4.1 Decree Law 64/2016, Licensing of Mining Activities; Sets the licensing procedures for different types of mining licenses, for mining activities relating to construction materials, certain process materials and ornamental stones. Article 40 requires the submission of monthly reports covering HSE concerns and other matters.

5.4.2 Joint Ministerial Resolution 1/2017; This directive states the importance of rocks for the Tibar Bay Port Project, in that without rocks of a certain quality and quantity, the Project is in jeopardy.

The use of explosives permit is to be issued, subject to certain conditions.

5.4.3 Government Resolution 36/2016; Determining that licenses for the extraction of construction materials shall be awarded to companies incorporated in Timor-Leste, and in which Timorese citizens hold the majority of the share capital. However, the Government may provide an exemption to international companies engaged in major public construction projects.

5.5 Land Acquisition Legislation

5.5.1 Decree Law 15/2017, Private Investment Law; Article 14, on Land Ownership and Land Use, states that the State guarantees the right to private ownership and use of land for development of investment or reinvestment projects, subject to the limits provided under the Constitution and land legislation.

5.5.2 Decree Law 10/2011, Civil Code; Comprehensively covers the management, e.g. rights, purchase, lease, and contractual interpretations, of land and immovable property.

5.5.3 Decree Law 6/2017, Basis of Spatial Planning; Provides the mechanism for planning, promotion and development of sectors and regions.

5.5.4 Decree Law 8/2017, Expropriations Law; Defining "expropriation" as any legally admissible restriction to private property or related rights or interests, irrespective of the persons or entities to which they belong. Expropriation is only admissible in cases of "public interest" in the use of the asset. The exploitation of petroleum, gas, minerals, and geothermal energy facilities is included in the "public interest" category.

5.6 Agriculture and Fishing Legislation

5.6.1 Decree Law 6/2004, Legal Regime for Regulation and Management of Fisheries and Aquaculture; Regulates fishing activities including aquaculture. Article 81 prohibits the introduction into waters of substances likely to harm aquatic life. Article 82 states that authorisation is required, amongst other activities, for any work or installation intended to be carried out in

national maritime waters, or in the seafront up until 100 meters from the coastline.

5.7 Labour Legislation

5.7.1 Decree Law 4/2012, Labour Law; This law establishes the legal regime applicable to individual and collective labour relations. Article 20 requires an employer, to provide to employees, in addition to other items, good working conditions, with regard to health, hygiene and safety at work. An employer is also required to provide vocational training opportunities. Other health, safety and environmental (HSE) matters are covered in Section IV.

5.8 Other Legislation

5.8.1 Decree Law 33/2008, Hygiene and Public Order; Article 2 states that this law is applicable to urban areas. However, in a social responsibility sense, it is prudent to note Article 5 stating the following prohibitions, in addition to others, of releasing polluted water into ditches, depositing refuse on rights of ways, blocking drains, directing drainage onto rights of ways, and making noises that prejudice communication or disturb the peace.

5.8.2 Decree Law 9/2016, Sucos Law; Explaining the concept of Sucos, establishing the authorities of Sucos, and the rules for appointments of members of associated bodies.

5.8.3 Decree Law 7/2009, Community Leaderships and their Election; Defines community leadership, and sets the rules for the action limits of the community leadership structures, and the organization and implementation of the process for elections.

5.8.4 Decree Law 43/2015, Tibar Port Public-Private Partnership; Sets the legal framework for Tibar Port, e.g. granting the legal power to the Government to execute the contract for the financing, design, construction and operation of the Port.

5.8.5 National Cultural Policy (2016).

5.9 Other Standards and Guidelines

5.9.1 Timor-Leste regulations, e.g. covering health, safety and environmental (HSE), and social matters, will be followed. If local standards do not cover an item of concern, then WHO (World Health Organisation) specifications are referenced. If still not available, then British Codes are used. These Codes are expected to be able to cover all aspects of quarry operations, without the need for referring to material from other countries. This approach also has the advantage of consistency.

5.9.2 In addition to the "Compliance with Local Legislation Analysis" at Attachment B, the Quarry HSE Manager has the responsibility of preparing a "Compliance with Other Standards Analysis", based on the following documents (with further information at Attachment C):

5.9.2.1 World Bank, International Finance Corporation (IFC), and Asian Development Bank (ADB) environmental, health and safety standards.

5.9.2.2 The Equator Principles; a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in project financing.

5.9.2.3 The Extractive Industries Transparency Initiative (EITI); a global standard for the good governance of oil, gas and mineral resources.

5.9.2.4 The Global Reporting Initiative (GRI); an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change, human rights and corruption.

5.9.2.5 Internal Standards Organisation (ISO) standard ISO14001 (Environmental Management System), and the OHSAS 18001standard on Occupational Safety and Health.

6.0 INSTITUTIONAL ROLES AND RESPONSIBILITIES

6.1 The Quarry Community Liaison Officer (CLO) has responsibility for the process of community consultations and notifications from start to closure of project, and 6 months thereafter (assisted by a Quarry Closure Manager). The roles and responsibilities of other entities involved in the environment and social related matters in the different phases of development of the Project are shown at Table 6-1. The Employer / Engineer reviews all CHT reports before submission to ANPM, the Environmental Authority.

Table 6-1. Roles and Responsibilities of Project-related Entities (all activities by CHT)

SN	Project Phase	Activity	Approving Authority (reviewed by Employer / Engineer before submission to authority)
1	Mobilisation	Preparations of PD, TOR, EIS and EMP documents (process for obtaining Environmental License). One-off.	ANPM
2	Mobilisation	Obtaining Environmental License, and other Permits for the quarry. One-off.	ANPM, National Directorate of Land, Property and Cadastral Services, and Ministry of Public Works
3	Construction	Environmental baseline monitoring (part of EMP). One-off	ANPM
4	Construction	Quarry HSE Plan (Part of Mining Plan)	ANPM
5	Construction	Blasting Plans (one for each blast). Summary in Quarry Monthly Report.	ANPM
6	Operations	Quarry Monthly HSE Report	ANPM
7	Operations	Monthly environmental sampling	Item in Quarry Monthly HSE Report
8	Operations	Implementation of mitigation measures (stated in EMP)	Item in Quarry Monthly HSE Report
9	Operations	Daily site general inspections	Item in Quarry Monthly HSE Report
10	Operations	Review of EMP and Quarry HSE Plan	Item in Quarry Monthly HSE Report
11	Closure	Site Closure Report	Item in Quarry Monthly HSE Report
12	Closure	Site Handing / Taking-Over document	Item in Quarry Monthly HSE Report
13	Closure	Site Closure Monthly Report	Item in Quarry Monthly HSE Report

7.0 SUMMARY OF IMPACTS

7.1 As at the date of this draft EMP, the Project Document (PD) has been approved by the ANPM without conditions. The subsequent Terms of Reference (TOR) is under review by the ANPM. The draft Environmental Impact Statement (EIS) is with the ANPM for comments. These activities are part of the process for obtaining an Environmental License. Therefore, the controls for the proposed CHT quarry are yet to be finalized, for there could be conditions issued by the Environmental Authority, i.e. the ANPM.

7.2 A summary of the negative impacts identified from the EIS study for each phase of the Project, i.e. drawing, pre-construction, construction, operation, and decommissioning, are listed at Tables 7-1 to 7-3. Social and economic impacts are shown together at Table 7-4. The evaluation of impacts generally starts by identifying the type, the generating activity, and the stages during which controls are required. These are stated at Table 7-1. The serial number (SN) of each impact is kept consistent throughout Tables 7-1 to 7-3 for ease of reference.

7.3 For completeness, balance, and ease of reference, the benefits of the Project are stated, including revenue (in the form of royalties for the rocks) for the government, earnings for the local community (in the form of rental of land for access routes and general areas of work), excellent employment prospects with learning of new trades and skills, and growth of local enterprises through the purchase of locally produced goods and other items.

7.4 The land is even enhanced, because the mining method is such that the original height of the hills and the vegetation on it, are retained, i.e. the tops are untouched and are not cut. What remains after end of excavation work is a stepped pyramid structure, similar to rice terraces, with a circular trekking route from bottom to top. Depending on specific hills, the bottom 20 to 70 m of a hill remains, providing excellent views of the sea.

Table 7-1. Identification of Impacts

SN	Impact	Generator	Drawing	Pre-Construction	Construction	Operation	Decommissioning
1	Dust	Use of machinery and explosives	Yes	Yes	Yes	Yes	Yes
2	Noise	Use of machinery and explosives	Yes	Yes	Yes	Yes	Yes
3	Vibration	Use of explosives	Yes	No	No	Yes	No
4	Polluted Water	General Waste	No	Yes	Yes	Yes	Yes
5	Silt	Land Clearance	Yes	Yes	Yes	Yes	Yes
6	Traffic Congestion and Accidents	Truck Movements	Yes	Yes	Yes	Yes	Yes
7	Destruction of flora and fauna	Land clearance and machinery movement	Yes	Yes	Yes	Yes	Yes
8	Visual Amenity	Alteration of landscape	Yes	Yes	Yes	Yes	Yes

7.5 The effects of the impacts are evaluated, and details are shown at Table 7-2.

Table 7-2. Evaluation of Impacts

SN	Impact	Importance	Direct / Indirect	Cumulation	Temporary / Permanent	Negative / Positive
1	Dust	High	Direct	Yes	Permanent	Negative
2	Noise	High	Direct	No	Permanent	Negative
3	Vibration	High	Direct	No	Temporary	Negative
4	Polluted Water	High	Direct	Yes	Permanent	Negative
5	Silt	High	Direct	Yes	Permanent	Negative
6	Traffic Congestion and Accidents	High	Direct	No	Temporary	Negative
7	Destruction of flora and fauna	High	Direct	Yes	Permanent	Negative
8	Visual Amenity	High	Direct	Yes	Permanent	Positive

7.6 The required studies, followed by evaluation and mitigation of impacts are summarised at Table 7-3.

Table 7-3. Evaluation of Impacts and Mitigation

SN	Impact	Study	Evaluation	Mitigation	Residual Impact (if all goes well)
1	Dust	Dust Assessment Study	WHO Standard, or equivalent	1. Design and location. 2. Buffers. 3. Equipment and Vehicles.	Yes
2	Noise	Noise Monitoring Survey	WHO Standard, or equivalent	1. Design and location. 2. Buffers. 3. Equipment and Vehicles.	Yes
3	Vibration	Vibration Calculation	WHO Standard, or equivalent	Design and location	Yes
4	Polluted Water	Water Courses and Pollutant Survey	No foreign objects	Storage, collection and disposal	No
5	Silt	Water Courses and Pollutant Survey	No foreign objects	1. Design and location. 2. Buffers. 3. Equipment and Vehicles.	No
6	Traffic Congestion and Accidents	Road Traffic Survey	Unsafe driving	1. Design and location. 2. Training.	No
7	Destruction of flora and fauna	Flora and Fauna Survey	1. Classification of species against the International Union for the Conservation of Nature (IUCN) Red List. 2. Unnecessary destruction	1. Design and location. 2. Training.	No
8	Visual Amenity	Visual Amenity Survey	Unnecessary destruction	Design and location.	No

7.7 Social (including cultural) and economic-related impacts are evaluated differently from environment-related impacts. Table 7-4 shows the evaluation for social and economic advantages and disadvantages created by the quarry.

Table 7-4. Evaluation of Impacts and Mitigation (Social and Economics)

SN	Impact	Study	Mitigation	Residual Impact (if all goes well)
1	Historical items	Public Consultations	There are no cultural or historical items or sites within or in the vicinity of the quarry	Nil
2	Employment	Community Profile Survey	Preference is for employing locals	No
3	Influx of workers (Timorese)	Community Profile Survey	Preference is for employing locals	No
4	Influx of workers (Expatriates)		Expatriates stay in a purpose-built housing quarter in the quarry. Training on “Good Social Behaviour”.	No
5	Local enterprises	Community Profile Survey	Buy local policy	No
6	Skills	Community Profile Survey	Skills Upgrading Program	No
7	Water	Community Profile Survey	Provision of domestic water from quarry wells	No

8.0 DESCRIPTIONS OF PROPOSED MITIGATION MEASURES

8.1 Evaluation of impacts generally starts by identifying the type, the time-line of generation (e.g. during different phases of the Project), the mitigation measures and the targets. These are stated at Tables 8-1 and 8.2. The serial numbers (SN) in both these 2 Tables are kept consistent for ease of reference.

8.2 Further information on controls on the impacts are described in the following Attachments:

8.2.1 Attachment D on the Quarry Dust Management Plan, including a report on baseline measurements conducted in late Jan 2019.

8.2.2 Attachment E for the Quarry Noise Management Plan.

8.2.3 Attachment F for the Quarry Vibration Management Plan.

8.2.4 Attachment G for the Quarry Water Management Plan.

8.2.5 Attachment H for the Environmental Protection Training Program for Employees.

8.3 The “Design and Location” mitigation measure has the following components:

8.3.1 Siting as far away as practical from sensitive locations, and dwellings.

8.3.2 Using terrain and vegetation as shields against propagation of noise and dust.

8.3.3 Machinery and equipment have provisions for dust and noise reduction items.

8.4 Green buffers, i.e. strips of vegetation, preferably original, provide visual attractiveness, act as a natural absorbent of dust and noise, and promote the message of protection of the environment.

8.5 The activities of people destroy, protect, and enhance the surrounds. The best laid plans will come to nought if people are ignorant of the consequences of their actions, and what they can do to preserve conditions. Operators and drivers are in the focus group, for their undesired actions can create environmental nuisance, and unnecessarily destroy tracts of vegetation, leading to degradation of social life. Details of the training program for operators and operators are at Attachments D and H.

8.6 A poorly maintained piece of equipment or machinery creates excessive noise and exhaust fumes. The Quarry Equipment Manager has the responsibility of preparing an Equipment Log, in which particulars of equipment in the quarry are recoded, including scheduled maintenance periods, and the subsequent work carried out.

8.7 Procedures guide personnel in the correct steps to take, and act as reminders of necessary actions. The Land Clearance Permit ensures that during the removal of undergrowth, shrubs and trees, and the profiling of the land, green buffers are retained, that there is no unnecessary destruction, that water courses are not obstructed or interfered with, that designated protected vegetation remains untouched, and that there is no excessive clearance of land.

8.8 A Blasting Plan, required for each blast, is essentially a feature for structural safety. It also has items to ensure that noise and vibration levels are kept below permissible limits. Blasting is not carried out on Sundays.

8.9 Inspections and monitoring activities are conducted to provide feedback on whether the required conditions remain present, or even change for the better. Undesired situations, if caught early, can immediately help to stop unwanted circumstances, and prompt rectification action will achieve faster, cheaper and more effective results.

Table 8-1. Evaluation of Environmental Impacts and Mitigation (Targets)

SN	Impact	Construction / Operation / Closure	Target
1	Dust	Construction / Operation / Closure	WHO Standard: PM2.5: 10 µg/m3 for annual mean, and 25 µg/m3 for 24-hour mean. PM10: 20 µg/m3 for annual mean, and 50 µg/m3 for 24-hour mean.
2	Noise	Construction / Operation	The generally accepted noise level is not more than 85 dBA for 8 hour exposure. BS 5228 Part 1 Noise Control on Construction and Open Sites, at Page 61, Table C.9, shows the noise generated by various equipment and machinery in a rock quarry. Details are in paragraph 9.5 and at Table 9-2.
3	Vibration	Construction / Operation	The Action Trigger Level stated in BS 5228 Part 2: Vibration Control on Construction and Open Sites, is, “3 mm/s; Stop and review works and methodology; reduce work periods before recommencement.” Details are in Attachment F
4	Polluted Water	Construction / Operation / Closure	No foreign objects and substances
5	Silt	Construction / Operation / Closure	No foreign objects and substances
6	Traffic Congestion and Accidents	Operation	No unsafe driving and parking
7	Destruction of flora and fauna	Construction / Operation / Closure	1. Protection of species classified in the International Union for the Conservation of Nature (IUCN) Red List. 2. No unnecessary destruction
8	Visual Amenity	Construction / Operation / Closure	1. Original hill tops and vegetation to be retained. 2. Retention of routes from bottom to top of hills. 3. Retention of haul routes and street lights.

Table 8-2. Mitigation Measures for Each Environmental Impact

SN	Impact	Design and location	Green buffers	Training of operators/ drivers	Maintenance of equipment / vehicles	Inspection and monitoring	Procedure
1	Dust	Yes	Yes	Yes	Yes	Baseline and monthly monitoring	
2	Noise	Yes	Yes	Yes	Yes	Baseline and monthly monitoring	
3	Vibration	Yes				Daily measurements	Blasting Plan. Informing Residents about blasting schedules
4	Polluted Water	Yes		Yes		Daily (on-site) and weekly (off-site) checks	Storage, collection and disposal sites
5	Silt	Yes	Yes	Yes		Daily (on-site) and weekly (off-site) checks	Land Clearance Permit. Storage, collection and disposal sites
6	Traffic Congestion and Accidents	Yes		Yes		Daily inspections of roads	Vehicle Entry / Exit Form.
7	Destruction of flora and fauna	Yes	Yes	Yes		Daily on-site checks	Land Clearance Permit. Identification of places and vegetation to be preserved
8	Visual Amenity	Yes	Yes	Yes		Daily on-site checks. Weekly main road side checks	Land Clearance Permit. Identification of places and vegetation to be preserved

9.0 REGULATORY PARAMETERS

9.1 In addition to Timor-Leste legislation on protection of the environment, stated at Chapter 5, the following standards are used when setting emission limits and control targets for various impacts.

9.2 Regarding dust, WHO publication, WHO/SDE/PHE/OEH/06.02, WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, sets the limits as shown at Table 9-1.

Table 9-1. WHO Guidelines for Particulate Matter

SN	Size	Guideline
1	PM2.5 (i.e. particle size of 2.5 micro-meter)	10 µg/m3, annual mean. 25 µg/m3, 24-hour mean
2	PM10 (i.e. particle size of 10 micro-meter)	20 µg/m3, annual mean 50 µg/m3, 24-hour mean

9.3 Regarding noise, document BS 5228 Part 1 Noise Control on Construction and Open Sites, at page 26, paragraph A.3.2 Control of Noise at Work Regulations 2005, states the criteria of, quote, *"The main requirements are triggered by four "action levels": daily personal noise exposures of 80 dB(A) and 85 dB(A) (the lower and upper exposure action levels respectively). There are also daily exposure and peak exposure limits of 87 dB(A) and 140 dB(C) respectively, which take into account the effect of wearing hearing protection and which the regulations do not allow to be exceeded".*

9.4 From the said BS 5228, at pages 6 to 7, paragraph 6.3 Issues associated with noise effects and community reaction, states, quote, "*Hours of work. For dwellings, times of site activity outside normal weekday and Saturday morning working hours will need special consideration. Noise control targets for the evening period in such cases will need to be stricter than those for the daytime and, when noise limits are set, the evening limit might have to be as much as 10 dB(A) below the daytime limit. Very strict noise control targets might need be applied to any site which is to operate at night; this will depend on existing ambient noise levels."*

9.5 From the said BS 5228, at Page 61, Table C.9, Sound level data on hard rock quarries, shows the noise generated by various typical equipment and machinery in a rock quarry, from which certain information is extracted, and listed at Table 9-2, for easy reference.

Table 9-2. Sound Produced by Typical Rock Quarry Equipment (extracted from Table C.9 of BS 5228-1)

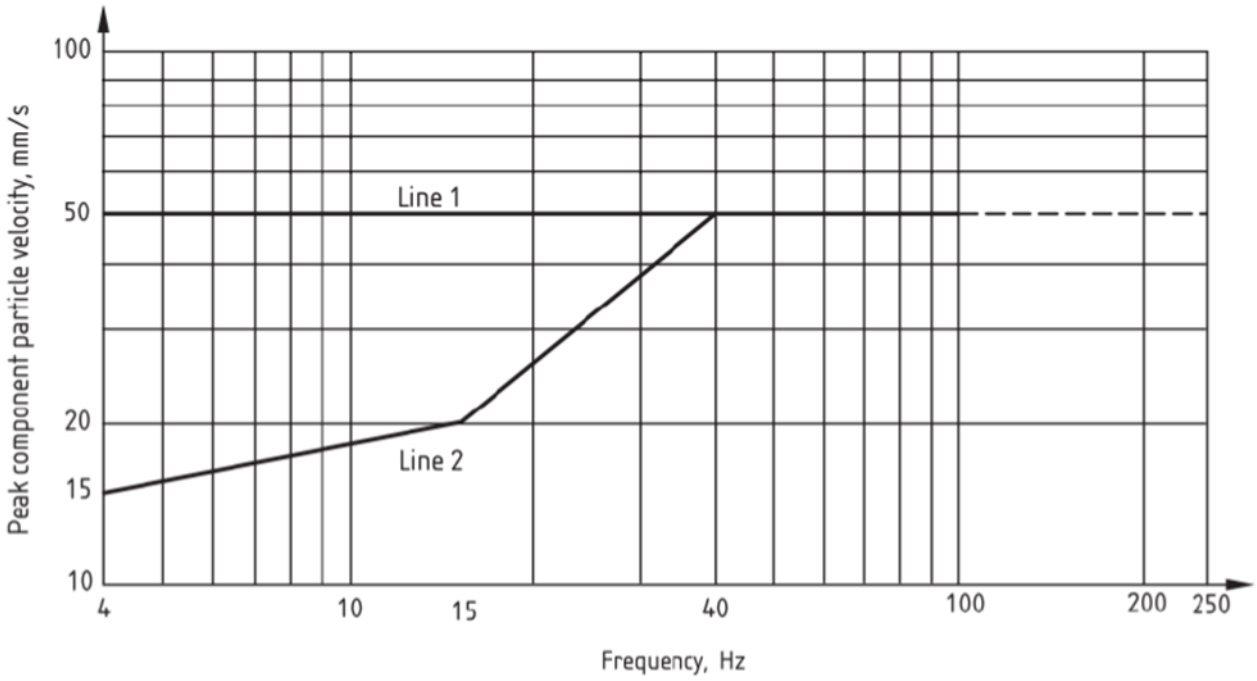
Ref No	Equipment	Power rating, kW	Equipment size, weight (mass), capacity	A-weighted sound pressure level, LAeq, dB at 10 m
2	Tracked mobile drilling rig	270	23 t / 110 mm dia.	92
6	Tracked hydraulic excavator	235	47 t	91
9	Wheeled loader	364	56 t	91
11	Excavator mounted rock breaker	125	29 t	93
18	Rigid dump truck (on haul road)	544	60 t	90
23	Rigid dump truck discharging into hopper	544	60 t	85
26	Wheeled loader loading chippings into dump trucks	320	45 t	87

9.6 At page 36, Table B.1 of Annex B of document BS 5228 Part 2 Vibration Control on Construction and Open Sites, provides guidance on the effects of vibration levels on human beings and these are reproduced in Table 9-3. Figure B.1 of the said document, i.e. BS 5228 Part 2, at page 38, shows the vibration levels, at different frequencies, that could create an onset of cosmetic damage to buildings. This figure is reproduced at Figure 9-1 at below.

Table 9-3. Vibration Level Effects on Humans

SN	Vibration Level	Effect
1	0.14 mm per second	Vibration might be just perceptible in the most sensitive situations
2	0.3 mm per second	Vibration might be just perceptible in residential environments
3	1.0 mm·per second	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
4	10 mm per second	Vibration is likely to be intolerable for any more than a very brief exposure to this level

Figure 9-1. Vibration Levels Creating Cosmetic Damage to Buildings (reproduced from Figure B.1 of BS 5228 Part 2)
Key: Line 1 - Industrial and heavy commercial buildings.
Key: Line 2 - Residential and light commercial buildings.



9.7 For the protection of flora and fauna, the International Union for the Conservation of Nature (IUCN) Red List for classification of species is used. A biodiversity survey (including flora and fauna) of the Project site was conducted from 2 to 8 Jan 2019. The full report is at Attachment I. Following this report, the next steps are that of engaging competent persons, e.g. a zoologist and a biologist, to conduct initial training for CHT quarry management and supervisory staff on the following topics:

9.7.1 Field identification of critical trees. After training, the Project site is re-surveyed to identify and mark out trees that are to be protected and their preservation methods.

9.7.2 Identification of endangered and near-threatened species.

9.7.3 Care for wounded / trapped creatures.

9.7.4 "Catch and Release" techniques; should any creature be accidently trapped or caught. Equipment that are required for the safe handling of wild creatures will be obtained and persons are taught on the use of such equipment.

9.8 Regarding road traffic and congestion, local legislation, e.g. covering driver and vehicle licensing and annual inspections, and safe driving rules (the Highway Code), will be followed.

9.9 For the protection of water courses, e.g. silt and water pollution, and visual amenity, "best practices" are followed, and these include:

9.9.1 Preserving the original landscape. The hill tops and original vegetation are retained and remain in original condition, leaving a stepped pyramid shape, at the end of excavation work.

9.9.2 Keeping green buffers. A wide strip of greenery, i.e. a green belt, is kept at the boundary of work areas, and at water courses. This has the benefits of preventing silt from running from laydown areas into water courses, shielding surroundings from noise and dust, preventing excessive land clearance, and providing a pleasant view from the roadside. It helps that the quarry is more than 1.5 km from the main road, and surrounded by hills and vegetation, and these features remain untouched.

9.9.3 Designated Work and Storage Places. The washing and maintenance of vehicles are at purpose-built locations, with concrete floors, and channeling of water to proper receptacles. Similarly, the sewage system is of the closed-loop type with enclosed tanks, with contents removed by government authorized waste removals, and with subsequent dumping at authorized disposal sites. The few hydraulic oil drums are stored in a designated oil storage shed with hard standing and spill control features.

9.9.4 Inspections. There are daily site-wide inspections, so as to spot discrepancies early, and to stop and correct unsafe behavior before situations further degrade. For the surrounding community, inspections are conducted once a week, focusing on the water courses, and the small vegetable plots at the sides.

9.10 The Quarry HSE Management Plan comprehensive covers occupational health matters, usually referring to the identification, evaluation, and control of industrial health hazards caused by chemical, physical, or biological agents. A review of the construction method for the quarry shows that there are no unusual industrial hygiene hazards, in that the risks are the usual types associated with normal “construction” activities, e.g. no requirement for chemical processing to achieve finished material.

9.11 There is no work involving radiation-type devises. The quarry does not have a test laboratory, i.e. no hazards involved with usage of small amounts of chemicals. It is unlikely that there is work in stagnant water-logged ground, i.e. hazard of waterborne diseases. If required, the methods to protect the health of employees working in brackish water include the wearing of water boots, the provision of clean water for washing hands and feet at the work place, and weekly checks by the in-house medical staff for signs of skin problems.

9.10 The Medic in charge of the Medical Centre has the responsibility of implementing a system in which personnel are assessed medically fit for work. It is anticipated that the following work will require some form of respiratory protection; handling of packages of cement powder, clearing of kitchen refuse, material stockpile work, rock crusher work, and blasting work. Essentially, the workers are provided with disposable masks, of at least EN 149: 2001 standard, with FFP2 or FFP3 markings.

9.11 Depending on the work, rubber and cotton gloves are provided for hand protection for workers, janitorial workers, vehicle mechanics, and diesel refuelling operators.

9.12 The Quarry HSE Manager is responsible for training for persons exposed to the hazards of noise and dust, including the proper usage of personal protection equipment.

9.13 To prevent vector-borne diseases, e.g. caused by rats, cockroaches and flies, the consumption of food is prohibited at the site work fronts. Food is taken only at designated meal centres, and in the meal rooms at accommodation blocks.

9.13 Project work is not expected to have an industrial hygiene impact on the community. The Community Liaison Officer is responsibility for carrying out regular visits to the local community to establish cooperation, and to increase communications to gather feedback on areas of concern within the project areas of influence.

10.0 MONITORING PROGRAM

10.1 What is not monitored might not get reported, and unsafe conditions and rectification actions will be missed. The converse is true. The monitoring program is comprehensive, and is divided into the various types of impacts and details are shown in Tables 10.1 to 10.9.

10.2 For vibration monitoring, seismometers, i.e. instruments for measuring ground vibrations, are placed at each of the 2 electrical towers at Hill A of the quarry. The readings are then used for calculating the effects at 2 other locations, as shown at Figure 10.1, i.e. 100 m east of the entrance to the quarry at the main road, and opposite an existing quarry (Star Concrete) 750 m west. Figure 10.1 also shows the similar 2 points for dust and noise monitoring.

Figure 10-1. The 2 Points for Dust and Noise Monitoring

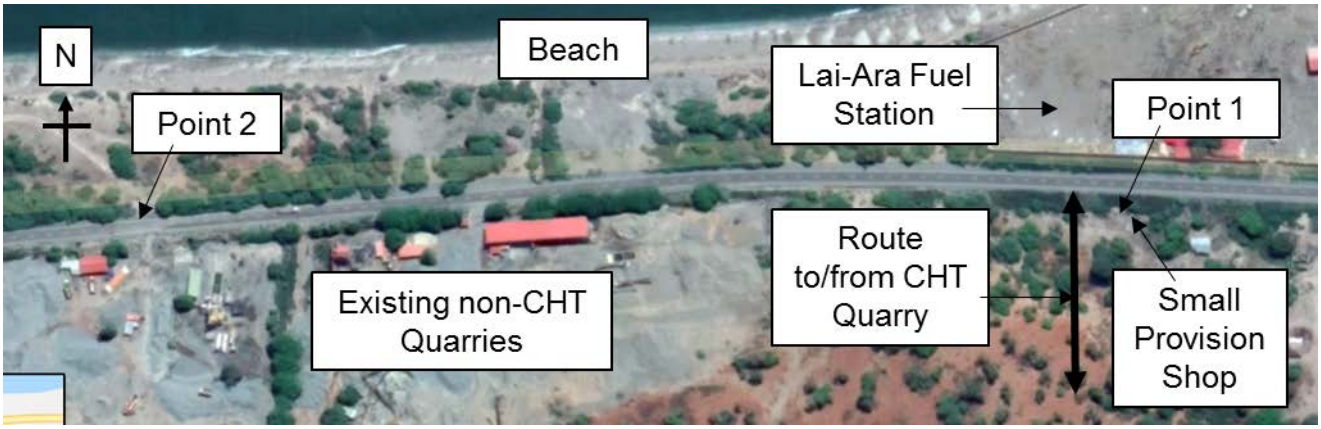


Table 10-1. Dust Monitoring Program (Phases of Construction, Operation and Closure

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Storage at approved locations. Covering stockpiles, and topsoil	Daily	Quarry Deputy Manager
2	Green buffers retained	Daily	Quarry Deputy Manager
3	Tanker watering report	Daily	Quarry Deputy Manager
4	Monthly maintenance of equipment	Monthly	Quarry Equipment Manager
5	Security at exit gate reports, i.e. Truck Entry /Exit Form	Daily	Quarry HSE Manager
6	Dust monitoring reports	Baseline. Monthly	Quarry HSE Manager.

Table 10-2. Noise Monitoring Program (Phases of Construction, Operation and Closure

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Operations at approved locations, i.e. no work at unauthorised locations	Daily	Quarry Deputy Manager
2	Green buffers are retained	Daily	Quarry Deputy Manager
3	Monthly maintenance of equipment	Monthly	Quarry Equipment Manager
4	Noise monitoring reports	Baseline. Monthly	Quarry HSE Manager

Table 10-3. Vibration Monitoring Program (Phases of Construction and Operation

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Operations at approved locations, i.e. based on Blasting Plans	Daily (except Sundays)	Blasting Engineer
2	Blasting Calculations	Daily (except Sundays)	Blasting Engineer
3	Vibration monitoring	Baseline calculations. Daily (except Sundays	Blasting Engineer

Table 10-4. Water Monitoring Program (Phases of Construction, Operation and Closure)

Note 1. There is a purpose built storage for four 44-gallon (about 220 litres) drums of hydraulic oil. This facility has a hard standing with spill containment features.

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Waste management, e.g. site hygiene conditions	Daily	Quarry HSE Manager
2	Storage of hydraulic oil, e.g. spillages. See Note 1.	Daily	Quarry HSE Manager
3	Inspections of site and water courses	Daily	Quarry HSE Manager
4	Inspections of nearby village areas	Weekly	Quarry HSE Manager

Table 10-5. Silt Monitoring Program (Phases of Construction, Operation and Closure)

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Inspections of site and water courses	Daily	Quarry HSE Manager
2	Maintenance of water courses (on site), e.g. not silted-up	Daily	Quarry Deputy Manager
3	Maintenance of water courses (off site), e.g. not silted-up	Weekly	Quarry HSE Manager
4	Land Clearance Permit, e.g. no interference with water courses, and green buffers are retained	Before application, and after work	Quarry Deputy Manager

Table 10-6. Traffic Congestion Monitoring Program (Phases of Construction and Operation)

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Review of road conditions	Daily	Quarry HSE Manager
2	Training of drivers	As and when	Quarry HSE Manager
3	Disciplinary records	As and when	Quarry HSE Manager

Table 10-7. Flora and Fauna Monitoring Program (Phases of Construction, Operation and Closure)

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Land Clearance Permit, e.g. no interference with water courses, and green buffers are retained	Before application, and after work	Quarry Deputy Manager
2	Green buffers are retained	Daily	Quarry Deputy Manager
3	Training of quarry staff	As and when	Quarry HSE Manager
4	Site inspections for general condition, e.g. no unnecessary destruction	Daily	Quarry HSE Manager

Table 10-8. Visual Amenity Monitoring Program (Phases of Construction, Operation and Closure)

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Land Clearance Permit, e.g. no interference with water courses, and green buffers are retained	Before application, and after work	Quarry Deputy Manager
2	Green buffers are retained	Daily	Quarry Deputy Manager
3	Training of quarry staff	As and when	Quarry HSE Manager
4	Site inspections for general condition, e.g. no unnecessary destruction	Daily	Quarry HSE Manager

Table 10-9. Social and Economics Monitoring Program (Phases of Construction, Operation and Closure)

Note 1. The Quarry Community Liaison Officer visits the local community on a weekly basis, and all households are covered at least once a month.

SN	Monitoring Item	Frequency	Responsibility (and to propose and implement corrective measures)
1	Historical items, e.g. locations (even far away), and checks on condition	Baseline. Monthly	Quarry Community Liaison Officer
2	Employment, e.g. percentage of locals employed	Monthly	Quarry HR Manager
3	Influx of workers (Timorese), e.g. locations and behaviour of workers from other regions	Monthly	Quarry HR Manager
4	Influx of workers (expatriates), e.g. interviews on interactions and relationships	Monthly	Quarry HR Manager
5	Local enterprises, e.g. amount and type of purchases from local shops	Monthly	Quarry HR Manager
6	Skills, e.g. type of training courses and number of persons trained	Monthly	Quarry HR Manager
7	Water, e.g. amount and the number of homes receiving domestic water	Monthly	Quarry HR Manager

11.0 REPORTING REQUIREMENTS

11.1 As at the date of this draft EMP, the Environmental License is yet to be issued. Therefore, the reporting requirements in this Chapter will incorporate stipulations in the Environmental License when received. Each month, the following 2 reports are prepared and after review by the Employer / Engineer, are submitted to ANPM (the Environmental Authority). The contents of the reports include items summarized from the activities stated in Tables 11.1 to 11.3.

11.1.1 Quarry Monthly Mining Report. Prepared by the Quarry Manager, and focusing on areas of work, production rates, types of materials, delivery quantity, time periods for assorted activities, and personnel and equipment factors.

11.1.2 Quarry Monthly HSE Report. Prepared by the Quarry HSE Manager, and focusing on monitoring results, feedbacks from inspections, trends, corrective actions, summaries from the Employment and Local Development Report prepared by the Quarry HR Manager, and summaries from the Community Survey Report prepared by the Quarry Community Liaison Officer.

11.2 In case of emergencies, the Quarry Manager immediately notifies the Employer / Engineer and the ANPM representative assigned to the quarry. A written report is then submitted within 24 hours. The Quarry HSE Manager has the responsibility of setting-up the emergency response teams (further information in Chapter 13 and Attachment P), and investigating incidents, accidents and other types of emergencies, and preparing associated reports.

Table 11.1 Internal Monitoring and Inspection Reporting

SN	Item	Frequency	Type of Report	Responsibility (includes Interpretation and Action on Indicators
1	General site condition, covering storage areas, water courses, waste disposal areas and green buffers	Daily	General Site Inspection report	Quarry HSE Manager
2	Off site: Water courses and sides of water courses	Weekly	Off-site Water Courses Report	Quarry HSE Manager
3	Land Clearance Permit, e.g. for laydown areas and haul roads)	Ad-hoc	Permit Closure	Quarry Deputy Manager
4	Blasting Plan (for each blast)	Daily (except Sundays)	Blasting Plan Closure	Blasting Engineer
5	Site Closure Plan, e.g. handing / taking-over items, and restoration.	Daily	Closure Daily Report	Quarry Closure Manager

Table 11.2 Measurement of Performance(Environmental) Reporting

SN	Item	Frequency	Type of Report	Responsibility (includes Interpretation and Action on Indicators
1	Dust	Baseline and monthly	Dust Measurement Report	Quarry HSE Manager
2	Noise	Baseline and monthly	Noise Measurement Report	Quarry HSE Manager
3	Vibration	Daily (when there is blasting)	Vibration Measurement Report	Blasting Engineer
4	HSE Training	Ad-hoc (in Monthly HSE Report)	HSE Training Report	Quarry HSE Manager

Table 11.3 Measurement of Performance(Social) Reporting

SN	Item	Frequency	Type of Report	Responsibility (includes Interpretation and Action on Indicators
1	Grievances	Monthly	Community Survey Report	Quarry Community Liaison Officer
2	Historical and cultural sites	Monthly	Community Survey Report	Quarry Community Liaison Officer
3	General Community Survey	Monthly	Community Survey Report	Quarry Community Liaison Officer
4	Employment figures	Monthly	Employment and Local Development Report	Quarry HR Manager
5	Influx of workers (Timorese) figures	Monthly	Employment and Local Development Report	Quarry HR Manager
6	Influx of workers (expatriates) figures	Monthly	Employment and Local Development Report	Quarry HR Manager
7	Local enterprise support	Monthly	Community Survey Report	Quarry HR Manager
8	Improvement of skills (Upgrading Training Program)	Monthly	Employment and Local Development Report	Quarry HR Manager
9	Supply of domestic water	Monthly	Community Survey Report	Quarry HR Manager

12.0 RESPONSIBILITIES FOR MITIGATION AND MONITORING

12.1 The Quarry Manager has overall responsibility for proper construction, operations and closure of the quarry. He is assisted by a Quarry Deputy Manager (who also oversees production), and various staff. Appointments and responsibilities are shown at Tables 12.1 to 12.3.

12.2 The modes of information flow and coordination between the various parties are as follows:

12.2.1 Daily Quarry Operations Meeting. All departments are represented, to discuss the daily work and the one-week look-ahead plan, and occasionally other longer-term plans. Observations from the previous inspections are also discussed. The Quarry HSE Manager presents a summary of the environment conditions.

12.2.2 Weekly Tibar Bay Port Project Operations Meeting. This meeting has representatives from the 3 main entities involved in the Tibar Port Project, e.g. the PMU (representing the GoTL), Bollore (representing the Concession Holder), and CHT (the main contractor). The Quarry Manager provides information, including environment-related matters, for the "Quarry Support" item in the Meeting Agenda.

12.2.3 Monthly Reports to ANPM (Environmental Authority). The ANPM is kept aware of quarry activities through the following 2 reports; the Quarry Monthly Mining Report, and the Quarry Monthly HSE Report.

12.2.4 Incidents. These are ad-hoc events. Meetings are called amongst affected and interested parties, and reports are submitted on an "as and when basis".

Table 12.1 Responsibilities for Mitigation and Monitoring (General Site Condition)

SN	Item	Responsible Person (Monitoring)	Responsible Person (Mitigation)
1	General site condition, covering storage areas and waste disposal areas	Quarry HSE Manager	Quarry Equipment Manager
2	General site condition, covering, water courses and green buffers	Quarry HSE Manager	Quarry Deputy Manager
3	General site condition, covering haul routes	Quarry HSE Manager	Quarry Deputy Manager
4	General site condition, covering living quarters	Quarry HR Manager	Quarry HR Manager
5	Off site: Water courses and sides of water courses	Quarry HSE Manager	Quarry Deputy Manager
6	Land Clearance Permit, e.g. for laydown areas and haul roads)	Quarry Deputy Manager	Quarry Deputy Manager
7	Blasting Plan (for each blast)	Blasting Engineer	Blasting Engineer
8	Emergency preparedness setup	Quarry HSE Manager	Quarry HSE Manager
9	Site Closure Plan, e.g. handing / taking-over items, and restoration.	Quarry Closure Manager	Quarry Closure Manager

Table 12.2 Responsibilities for Mitigation and Monitoring (Specific Environmental Impacts

SN	Item	Responsible Person (Monitoring)	Responsible Person (Mitigation)
1	Dust	Quarry HSE Manager	Quarry Deputy Manager
2	Noise	Quarry HSE Manager	Quarry Deputy Manager
3	Vibration	Quarry Blasting Engineer	Quarry Blasting Engineer
4	HSE Training	Quarry HSE Manager	Quarry HSE Manager

Table 12.3 Responsibilities for Mitigation and Monitoring (Social Factors)

SN	Item	Responsible Person (Monitoring)	Responsible Person (Mitigation)
1	Grievances	Quarry Community Liaison Officer	Quarry Manager
2	Historical and cultural sites	Quarry Community Liaison Officer	Quarry Manager
3	General Community	Quarry Community Liaison Officer	Quarry Manager
4	Employment	Quarry HR Manager	Quarry HR Manager
5	Influx of workers (Timorese)	Quarry HR Manager	Quarry HR Manager
6	Influx of workers (expatriates)	Quarry HR Manager	Quarry HR Manager
7	Local enterprise	Quarry HR Manager	Quarry HR Manager
8	Improvement of skills	Quarry HR Manager	Quarry HR Manager
9	Supply of domestic water	Quarry HR Manager	Quarry HR Manager

13.0 EMERGENCY PLAN

13.1 The CHT quarry has no unusual environment impacts, i.e. it is a conventional type of quarry operation, using explosives to break-up rock surfaces. There is no tunnelling, or open-cast, i.e. pit, type of mining. There is also no requirement for chemical treatment, i.e. no creation of hazardous sludge. The type of work does not create significant environmental hazards, e.g. relating to sludge holding embankments collapsing, or spillage of large quantities of chemicals into water courses or other types of water bodies, or release of harmful fumes from processes.

13.2 Quarry operations do not require any chemical processing to process the finished material of rocks and gravel. Therefore, the risks associated with hazardous chemicals or waste are low. There is a purpose built storage for four 44-gallon (about 220 litres) drums of hydraulic oil. This facility has a hard standing with spill containment features.

13.3 When the quarry is in operation, the quarry medical centre remains open with medical staff. A vehicle is designated as the standby vehicle for emergencies. The quarry medical centre, and the CHT medical centres at the CHT housing quarters at Ulmera, and at Tibar Bay (about 10 minutes drive away), are in close communications for providing mutual support. The nearest clinics are at Ulmera and Liquica, both locations are about 10 minutes away by vehicle.

13.4 The Quarry HSE Manager Plan has a Chapter on emergency preparedness. This is summarized at Attachment P. The minimum emergency-related provisions are as follows:

13.4.1 Fire Fighting. Fire extinguishers placed at housing quarters, offices, stores, and electrical rooms. At every main workplace, at least 2 persons are trained on fire-fighting techniques.

13.4.2 Spills. At the hydraulic store, chemical sill kits are available. The store keepers and equipment maintenance mechanics are trained on spill prevention and recovery techniques by the Quarry HSE Manager.

13.4.3 Medical. There is a Medical Centre with a duty medic. It remains open when the site is operating. There are also first aiders and first aid boxes at the various work places. In addition, arrangements are made with the other 2 CHT

medical centres at Ulmera and at Tibar Bay for local medical service providers for improved handling of emergency cases.

13.4.4 Awareness. The names and contact numbers of first aiders and the locations of first aid boxes are posted at area notice boards.

13.4.5 Remote Locations. There could be work at remote locations. A first aider, with a first aid kit is located within 15 minutes by foot of such work places. In addition, communication equipment for contacting the quarry office is available.

13.4.6 Training. The Quarry HSE Induction training package, for new arrivals to the quarry, has an Emergency Response item. At the main work places, notices relating to fire safety, assembly areas, etc., are posted, to inform and remind personnel of the need for preventing and responding to emergencies.

13.5 The Quarry HSE Manager has the responsibility of ensuring that the emergency preparedness setup is adequate, e.g. covering procedures, equipment, facilities and training.

14.0 DEACTIVATION PLAN

14.1 Decommissioning can be economically beneficial. The steps to achieve a closure plan favourable to the local community and district in general, and the country as a whole, include the following step by step approach.

14.2 The Land Authority, in consultation with the local authorities, e.g. the Suco (village) Chief, decides on the future use of the land. Options include continue mining, keeping the land "empty", converting to plantations or livestock rearing, and rezoning to housing usage.

14.3 These decisions should be taken by Jan 2010, for usage by CHT is planned to end in Feb 2021. At least a year of lead-time is required for interested operators and developers to plan, take over and obtain the necessary licenses for renewed or new use of the land.

14.4 The start-up cost of a quarry is about a few million US $. Therefore, this lead time is also required by CHT to plan whether to keep people and machinery at the site, to sell lock, stock and barrel, to re-mobilize to another location in-country or overseas, or to decommission completely.

14.5 CHT might decide to continue quarry operations, either to support other construction activities in Timor-Leste, or even exporting material for work in other countries. If this is the case, then a Closure Plan is not required for the time being.

14.6 Once the supplying of rocks and gravel for the Tibar Port project is completed, the main and only reason for CHT to operate the quarry is over. CHT might hand-over the quarry to another operator. It is presumed that such a sale would be on an "as is" basis, for this provides signification savings both for the new operator, and for CHT. It follows that decommissioning work by CHT is minimal, with usually a Site Closure and Handing / Taking-over Report. The in-coming operator warrants to the government, and takes responsibility for continued operations.

14.7 CHT has built roads and installed water and electricity supplies, and constructed habitable buildings and supporting infrastructure. CHT has also levelled large tracts of the hilly terrain to a stepped pyramid structure, with flat ground at the base, and with a stockpile of topsoil. There is a now a reservoir holding about 400,000 m3 of fresh rain water.

14.8 The local community, or an external commercial entity, might want to convert the land to vegetable growing, or other similar agricultural and livestock pursuits. The stockpile of topsoil is especially suitable for laying on and preparing the earth for vegetation. The supply of fresh water from the reservoir is also an essential factor, to ensure the viability of the crop growing industry.

14.9 Contrary to other types of mining, granite quarrying does not irreversibly scar the land. The activity might even be a plus factor in developing a previously hilly region. CHT leaves large tracts of flat land about 20 m above ground, and with access roads. Property developers might want to use the land for housing. Houses on this elevated land have scenic views of the sea. The road to Dili is now upgraded to meet the transport requirements of the new Tibar Port. Start-up cost for a developer is greatly reduced, for roads and utilities are already in place, and there is available accommodation for workers building the homes. The ex-quarry is readily transformed to a location with a premiere residential address.

14.10 At closure stage, facilities at the quarry area include 2 unpaved access roads wide enough for 2-way traffic, and with a total length of about 3,400 m, 3 boreholes for well water, a rain water reservoir measuring 200 m by 100 m and with a depth of 20 m, 3 domestic water tanks (2 with 10 m3 capacity, and a third with 50 m3 capacity), an electrical room connected to government supplied electrical mains, street lights from the main road powered by solar cells, and a single-storey housing unit for 35 residents with a fence.

14.11 A hill by itself, without any outstanding features, has no economic value. In conclusion, contrary to conventional thinking, the closure of a granite quarry can enhance the attractiveness of the location, with further and greater economic returns, in monetary terms. At the end of CHT quarrying work, the hill tops remain untouched. There is now a stepped pyramid structure with trekking routes all the way to the top where original vegetation is retained. The location now is easily accessible and provides scenic views of the sea. Further details about the Quarry Closure Plan is at Attachment J.

14.12 If closure is required, a Quarry Closure Manager is appointment with the responsibilities of:

14.12.1 Preparing and submitting a detailed closure, post-closure and rehabilitation plan to the Environmental Authority for approval.

14.12.2 Removing spare stocks of material, equipment, etc. The first preference is to give to the local community items that are unwanted by CHT.

14.12.3 Coordinating with the local community for both internal and external to site facilities and conditions to be retained, converted or restored.

14.12.4 Returfing bare land, except probably haul routes used by vehicles. The reserve stock of topsoil is kept for the purpose.

14.12.5 Conducting inspections for a period of at least 3 months after site handover, to verify that “all is well”.

15.0 CAPACITY BUILDING AND TRAINING

15.1 For employment of staff, preference is given to persons from the local community. An advantage of this action is that employees need not travel far to/from work, and for training. Training helps to sustain the about 50 local employees, i.e. improving morale, better prospects for promotion, and lowering the turn-over rate. The training needs of local staff are analyzed, with follow-on programs tailored for designated groups. Generally, training courses range from basic to advanced, with examples as follows in increasing degree of difficulty:

15.1.1 Languages (English and others). The syllabus starts with basic vocabulary covering words used day-to-day and words used in the construction industry.

15.1.2 Elementary mathematics; starting with arithmetic (plus, minus, addition and multiplication), then progressing to geometry, and so on.

15.1.3 Elementary science; covering living and non-living things, life cycles, the human system, etc.

15.1.4 Office skills, e.g. use of Microsoft Office.

15.1.5 Engineering (technician) fundamentals.

15.1.6 Technical trade skills (i.e. vocational training).

15.2 Generally, the academic levels of the different types of classes can only be set once volunteers for training come forward, and their abilities are evaluated. A separate Capacity Building procedure will be prepared once there are enough workers to gauge foundation levels, followed by determination of the type, level and frequency of courses, and class size, and the required infrastructure.

15.3 Courses are voluntary, and free-of-charge (including training material, classroom stationery and pens). Sessions are conducted in the mornings, i.e. 15 minutes before work starts, and in the evenings, i.e. 15 minutes after work hours. The scheme is similar to “Adult Education”. Food and drinks are not provided, because of the short durations of each session of the academic and computer classes. Elementary knowledge can easily be broken-down into specific items that can be taught in 15 minutes, with examples including:

15.3.1 Languages. Basic day-to-day words.

15.3.2 Mathematics. Multiplication tables, “long” addition, division, and multiplication, areas, and volumes.

15.3.3 Science. Living and non-living things (characteristics and classifications), cycles (e.g. water cycle), plant system, and human system.

15.3.4 Microsoft Office. Using Word as an example; fonts, repagination, numbering, spacing, and alignment.

15.3.5 Engineering (technician). Fastening devices (e.g. types of screws, washers, gaskets, and nails), and different types of tools.

15.3.6 Trade Skills. This depends on the type of trade, e.g. welder, and electrician.

15.4 An exception is made for “technical trade skills”, in that such training might be conducted during work hours, because equipment and machinery are at worksites, and it is more beneficial and safer to work on during daylight hours. The trainees are already employed, and the training is for improvement of skills. Activities are covered by site safety rules.

15.5 Technical trade skills include training on taking of environmental samples and measurements of noise, dust and vibration. The training covers basics of these matters, types of instruments, sampling techniques, Codes for exposure levels, etc.

15.6 Depending on subject matter, the Quarry HR Manager, the HSE Manager and the Equipment Manager are responsible for preparing course syllabus, training material, and conducting classes. The HR Manager is responsible for overall organization, scheduling, training facilities and use of language translators.

16.0 PUBLIC CONSULTATION AND DISSEMINATION OF INFORMATION

16.1 For a Project to be successful, a clear understanding of the stakeholders and an engagement strategy is essential for building better relationships with the societies in which a company operates, and also for improving business planning and performance. Conversely, if not managed properly, there will be considerable risks to the Project.

16.2 The stakeholders can generally be categorized into the following 4 main groups:

16.2.1 Partnership. These stakeholders have the highest interest and the greatest influence on the Project. There is usually a contractual relationship with shared accountability with two-way joint learning, decision making and actions. Communications are regular and with designated participants.

16.2.2 Regulatory. Government agencies with regulatory oversight on particular activities, and with authoritative influence. There are ad-hoc site visits.

16.2.3 In-directly Affected Parties. These consist of non-government organizations (NGO) and the media, e.g. newspapers, that has no responsibility for the company's activities, or duty to correct any activity. The NGO and the media, even if not affected by the project, can effectively voice the grievances of locals.

16.2.4 Directly Affected Parties. These are the communities around the worksites, i.e. directly affected by activities.

16.3 As stated at above, the first group is bound by contract. The second group is regulatory. These 2 groups are legally unavoidable. The third group is a pressure group, and might be avoidable. The fourth group, i.e. the local community is crucial, and public consultation is essential towards ensuring harmony, for without peace, there cannot be progress.

16.4 Public consultation has the following guidelines:

16.4.1 Involve the local community early, i.e. as soon as possible. Rumours and subsequent denials or confirmation show a lack of planning.

16.4.2 Be forthright. A development can be detrimental in the short-term, but bring greater rewards in the medium to long-terms. The slightest evidence of a hidden agenda can snowball to disastrous consequences.

16.4.3 Present both the good and the bad.

16.4.4 Accurately take notes. One-sided notes are not worth reading for there are only skewed views, and other opinions are not presented.

16.5 Public consultations are fundamental because:

16.5.1 The buy-in of the local community is essential in building trust.

16.5.2 Involving the public in preparation of the EIS increases understanding and acceptance.

16.5.3 Opportunities are available to raise concerns, some of which might not be obvious to the team from the Proponent.

16.5.4 A sense of "togetherness' is created.

16.6 There are 2 types of public consultations for a local community, that usually does not have newspapers, or television or radio sets. The first is that of formal town-hall gatherings, with official invitations to community leaders, with an Agenda, with attendance sheets and note-taking, and where seats, and refreshments are provided. Questionnaires are prepared, handed out and collected at the end of the meeting. A formal report is prepared by the Quarry Community Liaison Officer (CLO) and submitted to the team preparing the EIS and the EMP, for inclusion in these 2 latter documents.

16.7 The second type of public consultations is that of the Quarry Community Liaison Officer (CLO) regularly visiting as many households as practicable; to provide information about activities, gather feedback, as part of the Grievance Management process, and also to give a personal touch. These visits continue throughout the life of the quarry, and for a short period after decommissioning.

16.8 The public consultation process is guided by Ministerial Directive 47/2017; Regulation on public consultation procedures and requirements during an environmental assessment process. The Quarry Community Liaison Officer (CLO) has the responsibility of ensuring that

engagement methods are prepared, and that public consultations are properly and adequately carried out, covering, e.g.:

16.8.1 Preparing the List of Stakeholders (shown at Attachment K1).

16.8.2 Creating a table that identifies directly affected parties and indirectly affected parties.

16.8.3 Details around actual stakeholders identified, e.g. Suco chief, names of community members, government officials and representatives of NGO groups.

16.8.4 Consultations for the EIS and the EMP, e.g. publicity, access, comments to documents, meetings and records.

16.8.5 Evidence of consultations undertaken, with photographs and notes/minutes of meetings covering key issues raised in each forum.

16.9 As part of the due diligence process in gathering information about the local population profile, a survey is conducted, covering type of dwellings, water supply, domestic animals, household size, make-up of persons in each household, education level, and type of employment. About 6 months after the quarry starts operations, and at yearly intervals, surveys will be conducted to find-out the effects on the community, especially on indicators of growing prosperity, e.g. employment rate, ownership of motorcycles, and better types of dwellings.

16.10 2 formal public consultations were held on 20 April 2018 and 8 Jul 2018. The first consultation included the local authorities of Liquica Municipality; during which the activities of CHT in the Tibar Bay Port, and the quarry site, were presented, and benefits explained, e.g. creating many job opportunities for the local people, and boosting the economy. The Attendance List is at Attachment K2.

6.11 In the second consultation, seven respondents were interviewed on their concerns regarding environmental impacts due to the proposed project activity. Most of the correspondents focused on the effects of the activities such as dust, noise and water conditions. However, they expected that the activities can enhance their earnings through job opportunities that are prioritize for the local people. A sample of a questionnaire is at Attachment K2.

16.12 In addition, a Community Profile Survey was carried out in Dec 2018 (with the report at Attachment L). A copy of the “no objection letter’ from Mr. Francisco Soares, the Chief of Suco Mota Ulun, is at Attachment M.

16.13 A further public consultation with the Mota Ulun community leaders was conducted on 18 Jan 2019. The notes of this meeting is at Attachment N.

17.0 COMPLAINTS AND COMPLIANTS MECHANISM

17.1 All grievances from the local community are directed to the Quarry Community Liaison Officer (CLO). Grievances from workers are directed to respective Supervisors. If the CLO or the Supervisor and the person with the grievance do not come to an amicable solution, the escalation steps within CHT to resolve the matter are shown at Table 17-1.

Table 17-1. Escalation Steps if Community / Employee Grievance is Not Resolved

Step	Item	Deadline to Resolve Matter
1	Affected person informs the CLO / Supervisor about the grievance. A Grievance Reporting Form is used. A sample of the form is at Attachment O.	Not applicable
2	The CLO / Supervisor informs the HR Manager. Initial response to the affected person by the CLO / Supervisor.	2 days
3	CLO/ Supervisor escalates to the immediate Manager.	1 day
4	The Manager makes a decision. Any Manager can make the decision if the designated Manager is absent.	2 days
5	The Manager escalates to the Quarry Manager.	1 day
6	The Quarry Manager directs a non-interested Manager to investigate and prepare a written report with recommendations. See Note 1.	1 day
7	The non-interested Manager presents the report to the Quarry Manager	3 days
8	The Quarry Manager makes a written decision, giving reasons for the decision. The Quarry Manager might make the decision without asking a non-interested Manager to investigate and make a report.	2 days
9	The Quarry Manager might decide to bring in external parties to resolve the matter	5 days
10	If the case is not settled, persons from the community, workers and employer have rights to approach environmental authorities or others, or to introduce proceedings before judicial courts as per general law.	Not applicable

Note 1. A non-interested Manager is a person in charge of a department that has no direct interest in the grievance.

Note 2. For items from s/n 5 to 10, the Project Manager must keep the Employer / Engineer and the Environmental Authority informed about developments.

17.2 Each grievance, whether from an employee, or from the local community, are recorded on a Grievance Reporting Form (sample at Attachment O). The HR Manager keeps records of these forms, information from which is summarized in the “Grievances” section of the Quarry Monthly HR Report.

18.0 WORKPLAN AND IMPLEMENTATION SCHEDULE

18.1 The Project Documents part of the process for obtaining an Environmental License for the proposed quarry has been approved. The key milestones of the Project are described at Table 18-1.

Table 18-1. Project Key Milestones (as at 28 Jan 2019)

		Month (2019)					
SN	**Step**	Jan	Feb	Mar	Apr	May	Jun
1	TOR was submitted in Dec 2018						
2	Draft EIS was submitted in Jan 2019						
3	Draft EMP submission	Jan					
4	Approval of TOR		Feb				
5	Review by Authority on EIS / EMP		Feb				
6	Approval of EIS / EMP			Mar			
7	Issuing of Environmental License				Apr		
8	Site laydown construction work		Feb	Mar	Apr		
9	Site operations (rock excavation)					May	

18.2 During site laydown construction work , e.g. land clearance, building of facilities, installation of equipment, and making of haul roads from the main road to the laydown area, the following environment activities must keep pace:

18.2.1 Baseline samplings for dust and noise, followed by monthly monitoring.

18.2.2 Survey of water courses, both in the site, and off-site.

18.2.3 Community Profile Survey.

18.2.4 Biodiversity Survey.

18.3 All the above-mentioned activities are completed before work starts at the foot of Hill B for constructing the haul roads for going up this Hill. February 2019 is the starting month for the first Quarry Monthly HSE Report.

19.0 COST ESTIMATES

19.1 The total planned expenditure, for environmental monitoring of dust, noise and vibration, is US $191,000 over 2.5 years. Details are in Table 19.1. This cost does not include the cost of employing a Community Liaison Officer, and site closure cost.

Table 19.1. Cost of Dust, Noise and Vibration Monitoring

SN	Parameter	One off cost of Instrument (US $). Excludes yearly calibration	Monthly Personnel Cost (US $)
1	Air (Dust)	10,000	2,000
2	Noise	2,000	2,000
3	Vibration	8,000 (2 sets)	2,000
4	Sub-Total	11,000	6,000 per month, i.e. 180,000 for 30 months (i.e. 2.5 years)
5	Total (for 2.5 years)		US $ 191,000 (11,000 plus 180,000)

20.0 REVIEW OF THE EMP

20.1 The EMP is subject to review under any one of the following conditions:

20.1.1 Before start of quarry operations, 3 months after start of quarry operations, and every 6 months thereafter.

20.1.2 Stipulations stated in the original Environmental License, and other conditions upon renewal of the Environmental License. File Note: As at the date of this draft EMP, the Environment License is yet to be issued.

20.1.3 An environmental monitoring result exceeds prescribed threshold levels.

20.1.5 Significant changes in operating mode, e.g. covering mining method, output, and type of machinery.

20.1.6 Significant changes in weather conditions, and societal factors.

20.1.7 Significant changes in terrain, whether occurring naturally, or as a result of quarry work.

20.1.8 Significant changes in land use in the neighbourhood.

20.1.9 Changes in relevant legislation.

20.1.11 After an environmental incident, or other safety and occupational health incident.

20.2 The Quarry HSE Manager has the responsibility of ensuring that the EMP is fully and properly implemented, and remains suitable. Activities for proper and adequate reviews of the EMP include:

20.2.1 Keeping track of changes to legislation.

20.2.2 Coordinating with the other departments, especially the operations group on changes to production rates and the means of production.

20.2.3 Communicating with the Community Liaison Officer on feedback from the neighbourhood.

20.3.4 Evaluations of the regular environmental sampling reports.

20.3.5 Views raised at the regular meetings with the Employer / Engineer and community leaders.

20.3.6 Comments from Authorities on submitted reports, and site visits.

21.0 NON-TECHNICAL SUMMARY

21.1 For the purpose of the EMP, discussions on the proposed CHT rock extraction quarry at Mota Ulun is non-technical in nature. The "Non-Technical Summary" of this chapter, for convenience and ease of reference, is a copy of the contents of Chapter 1, Executive Summary".

21.2 The construction of the Tibar Bay Port, with a 630 m long quay wall and a container terminal measuring about 27 ha, requires about 1,030,000 m3 of rocks and gravel for making concrete and for ground improvement work, i.e. to strengthen the ground to lessen the effects of earthquakes, so as to protect the structures on it.

21.3 2 hills at Mota Ulun are identified as meeting the rock-related requirements of quality and quantity, and the other requirements of favourable terrain (i.e. ease of transportation), and minimal disruption to the local community, i.e. no eviction, no resettlement, dispossession of land or assets, no destruction of dwellings or other structures, and no economic deprivation. There are already quarry-related enterprises operating in the Mota Ulun area.

21.4 The quarry is not in or near wetlands or nature reserves. There are also no religious, historical, cultural, archeological, or sacred sites, or protected or endangered species, or unique vegetation, in or near the quarry area of operation.

21.5 The CHT quarry has no unusual environment impacts. There is no tunneling, or open-cast, i.e. pit, type of mining. There is no requirement for chemical treatment, i.e. no creation of hazardous sludge. It is a relatively simple quarry to construct and operate.

21.6 Mota Ulun is a small village with about 457 people in about 162 families, living in scattered dwellings, usually of the timber, zinc and thatched roof types. Water obtained from the few wells are salty, for the village is near the sea, and not near rivers or streams.

21.7 There are no plantations or live-stock industry or fishing using boats. Families grow crops and keep a few animals for home consumption. Commercial activity is very low, with 2 family owned and operated small provision shops.

21.8 The only and little number of employment opportunities are at the low intensity bulk fuel station, and the few small-scale companies operating stone works, i.e. making gravel and casting concrete parts.

21.9 The quarry, by employing 50 local workers out of the 162 families in Mota Ulun, in addition to providing wages, supports commercial activities, e.g. food, housing and recreational, resulting in economic gain for the whole local community without damage to the social fabric, usually caused by an undesirable influx of workers from other regions.

21.10 Mota Ulun has a primary school, Ensino Basico Filial Caitehu, the Church of Capela da Sagrada Familia, and at the rear of the Church, the convent Irmas Franciscanas de Nosa Senhra das Victorias. There is no Clinic. The nearest clinic is at Ulmera, about 11 km to the east. There are no social or recreational facilities, except for 2 billiard tables at open air sheds at 2 locations.

21.11 The Quarry Community Liaison Officer (CLO) frequently meets local residents; explaining the rationale for the quarry, the associated economic and social benefits, and the precautions taken to lessen environmental impacts to the community. A Grievance Management Scheme is in-place.

21.12 The CLO also conducts a census at the start of operations, and again about 3 to 6 months after, to determine the status and changes to the economic and social conditions of the Mota Ulun villagers

21.13 Communications with the Mota Ulun residents signal the welcoming of the quarry. Desires include employment opportunities, skills and vocational upgrading, purchase of local produce and products, and the provision of well water, for the existing wells have a salty taste due to proximity to the sea. The CHT CLO has the responsibility of ensuring that the requests are met.

21.14 The EIS is complemented by the Environmental Management Plan (EMP); aiming to avoid, minimize and control environment related concerns. It comprehensively documents the probable causes of concern, and the mitigation methods to counter air, land and water pollution, with the aim of continual improvement.

21.15 Regarding decommissioning, the probability is that the quarry will operate for many years to come, for the hills are full of good quality rocks.

Also, as industrial and commercial growth increases in the Tibar, Ulmera and Mota Ulun areas, and the country as a whole, the demand for rocks also increases, for such a material is essential for constructing modern structures. However, in the unlikely event that the quarry is to be decommissioned, the first step is for the Village Chief and the Land Authority to decide on the future use of the land. Then it will be clearer as to what to remain behind, what to remove, and what to restore. After removal of structures, equipment and material, bare ground is returfed with earth from the topsoil stockpile. It is noteworthy to mention that the place can be rezoned for housing, for roads and utilities are in place, and the higher elevation provides a wonderful view of the sea; enhancing the value of the land.

21.16 In conclusion, the setting-up and operating of the quarry are not expected to encounter difficulties because general sentiment welcomes the quarry in support for constructing the Tibar Bay Port, it is in an industrial area, no endangered or protected flora and fauna is harmed, there are no cultural or sacred elements in the site, access is good, no persons live on or off the quarry land, employment prospects for the local Mota Ulun residents are excellent, and there are many opportunities for sharing in economic growth and social improvements.

21.17 Work by CHT, i.e. employing about 1,000 persons for constructing the Tibar Bay Port, and the supporting activities of the quarry and the jetty, bring economic growth to the regions of Tibar, Ulmera (where the 400-person Camp is sited) and Mota Ulun. This growth acts as a stimulant for other industrial and commercial enterprises, for people, machinery and transportation factors are in place. The country has peace; now followed by progress and prosperity.

22.0 ATTACHMENTS

Attachment A: Safe Use of Explosives.
Attachment B: Compliance with Legislation.
Attachment C: Other Relevant Standards.
Attachment D: Quarry Dust Management Plan.
Attachment D1: Environmental Dust Sampling Report.
Attachment E: Quarry Noise Management Plan.
Attachment F: Quarry Vibration Management Plan.
Attachment G: Water Management Plan.
Attachment G1: Survey of Water Course East of Laydown Area.
Attachment G2: Well Test Report.
Attachment H: Environmental Protection Training for Employees.
Attachment I: Biodiversity Survey Report.
Attachment J: Quarry Closure Plan.
Attachment K1: List of Stakeholders.
Attachment K2: Public Consultation (Apr and Jul 2018)
Attachment L: Community Profile Survey Report (Dec 2018).
Attachment M: Support Letter from Mr. Francisco Soares, Chief Suco Mota Ulun.
Attachment N: Public Consultation Meeting (18 Jan 2019).
Attachment O: Grievance Reporting Form.
Attachment P: Emergency Plans.

Attachment A. Safe Use of Explosives

1. This summary of safe use of explosives is organized in a narrative manner, in the form of responsibilities of the main participants of the Blasting Team.

Organisation

2. The Blasting team has the following main persons; Blasting Engineer, Shot Firer, Blasting Foreman, the Blasting Safety Officer, and the Explosives Truck Driver. Main equipment and facilities are the purpose-built explosives store, the purpose-outfitted explosives truck and assorted wood-type containers for explosives.

The Blasting Engineer

3. Act as the Shot Firer, only for actual triggering of the explosives, if required.

4. Manage the handling and transporting of explosives and accessories from external places to the quarry explosives store.

5. Prepare the list of items to be removed from the explosives store, i.e. the “Stock Out” Permit.

6. Surveys the place for the purpose of blasting work.

7. Select the explosives, detonators, fuses for the purpose.

8. Calculate and prepare the layout of the explosives, and the charging and tamping of shots.

9. Check the connections of lines and circuits.

10. Co-ordinate with the Blasting Safety Officer before giving the warning and all-clear signals.

11. Give warning signals (30 mins and 5 mins) before the blast, and the all-clear signal after the blast.

12. Manage misfires.

13. Return all unused items to the explosives store.

The Blasting Safety Officer

14. The Blasting Safety Officer is assisted by a Blasting Safety Supervisor.

15. Issue certificates of competency to the Blasting Team.

16. Train quarry personnel on “Blasting Safety”.

17. Post the weekly forecast schedule for blasting, and the actual daily timings.

18. Setup the 50 m restricted zone, and the 300 m safety zone.

19. At the 300 m safety zone, organise the road blocks, the guards at the road blocks, and the safety car that travels at the perimeter of the 300 m zone.

20. Check that only authorized persons and equipment are within the 50 m, and the 200 m.

21. Check that the blasting shed is position at a relatively safe place.

22. Co-ordinate with the Blasting Engineer before the blasting and all-clear signals.

The Blasting Foreman

23. Ensure that only persons holding certificates of competency are in his work team.

24. Check that persons in the work team are in fit condition, e.g. not under the influence of alcohol or drugs.

25. Check that unauthorized items are not brought into the workplace. Examples of unauthorized items include cellphones and lighters, and non-certified tools.

26. Organise the work in a safe manner, e.g. explosives, detonators and containers are under proper care, and handled with caution.

27. Lay the explosives and circuitry in the manner prescribed by the Blasting Engineer.

28. Check that scatter protection items, e.g. blasting mats are properly placed.

29. Perform confidence checks before informing the Blasting Engineer that the shot can be safely triggered.

30. Assist the Blasting Engineer in handling misfires.

31. Check inventory, and return all unused items to the explosives store.

32. Manage the explosives store, e.g. ensuring security, proper containers, separation of incompatibles, and keeping inventory control.

The Shot Firer

33. The Shot Firer assists the Blasting Foreman.

34. Prior to firing, the explosives stock register is reconciled against the number of holes loaded to ensure all explosives are accounted for.

35. Perform confidence checks before informing the Blasting Engineer that the shot can be safely triggered.

36. Trigger the blast only after positive confirmation from the Blasting Engineer.

37. Collect all unused items in proper containers and check inventory.

Blasting Crew

38. Work in a safe manner, i.e. no distracting activities or conversations, and not bringing-in unauthorized items into the workplace.

39. Handle all explosives related items, including containers with care and caution.

40. Work in accordance with instructions given by Supervisory staff.

The Explosives Truck Driver

41. Use the vehicle only for transporting explosives. Do not use the vehicle for any other purpose.

42. Maintain the vehicle.

43. When carrying explosives, there must be a Vehicle Assistant, who has a certificate of competency issued by the Blasting Safety Officer.

44. Before driving off, check that all items are in designated containers, and properly placed in the vehicle.

45. No explosives related items are to be placed in the driver's cabin.

46. Take instructions only from the Blasting Engineer, the Blasting Safety Officer, and the Blasting Foreman.

47. No unauthorized stops. The trip is only to/from designated places.

Attachment B. Compliance with Legislation

1. The preparation of the EIS and the EMP is governed by environment-related regulations. In addition, other regulations, standards, and guidelines that affect environmental and social matters, e.g. covering demarcated sensitive areas, protected and endangered species, culturally important sites, and the welfare of communities, are also referenced. Information on "Compliance with Legislation Requirements" are shown at Tables B-1 to B-7.

Table B-1. Legal Compliance (Environment Legislation)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	26/2012. Environmental Basic Law	Article 13	Conduct a strategic environmental assessment before consenting to any project	EIS and EMP	CHT HSE Manager
2	Decree Law 5/2011, Environmental Licensing Law	Article 3	Describes the environmental licensing procedure	Project Documents, TOR, EIS, EMP and Environmental License	CHT HSE Manager
3	Decree Law 14/2018,Government Structure	Article 33, paragraph 1, sub-paragraph O	Empowers the Minister of Petroleum and Minerals to approve environmental licenses, in the petroleum and mining sector	Environmental License	CHT HSE Manager
4	Directive 44/2017, Regulation on Impact and Benefit		Process for agreement between the Proponent and the local community regarding the project	Impact and Benefits Agreement	CHT Community Liaison Officer
5	Directive 45/2017		Rules for the Committee assessing Category A projects	Project Documents, TOR, EIS, EMP and Environmental License	CHT HSE Manager

6	Directive 46/2017		Details of Project Documents (PD), TOR, EIS and EMP documents, as stated in Annexes 1, 3, 4 and 5 respectively	Project Documents, TOR, EIS, EMP and Environmental License	CHT HSE Manager
7	Directive 47/2017		Public consultation procedures and requirements during an environmental assessment process	EIS and EMP	CHT HSE Manager
8	Resolution 32/2016		Strategy for waste management covering waste collection, destruction, and recovery. A new landfill is to be setup in Tibar; operated by private entities	Quarry Waste Management procedure	Quarry HSE Manager
9	Decree Law 2/2017, Urban Waste Management		Rules on recyclable waste, duties of Municipalities, waste collection, transportation and disposal, and urban waste management contracts	Quarry Waste Management procedure	Quarry HSE Manager

Table B-2. Legal Compliance (Biodiversity and Protected Areas)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 5/2016, National System of Protected Areas		Defines areas classified as national parks, wildlife sanctuaries, natural monuments, protected landscapes and natural reserves. Permitted and non-permitted activities	PD, EIS and EMP	CHT HSE Manager
2	Government Resolution 41/2015, Sandalwood Classified as Iconic Plan		States the protection measures for this species, e.g. the cutting, extraction, and sale of sandalwood is prohibited	PD, EIS and EMP. Quarry HSE Plan.	CHT HSE Manager. Quarry HSE Manager
3	Joint Ministerial Diploma No. 18/MAP/MCIA/ II/2017 of 12 April 2017	Annex 1	List of Protected Species	PD, EIS and EMP. Quarry HSE Plan.	CHT HSE Manager. Quarry HSE Manager

Table B-3. Legal Compliance (Mining)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 64/2016, Licensing of Mining Activities		Describes the licensing procedures for different types of mining licenses, for construction and other types of materials. Article 40 - monthly HSE reports	PD, EIS and EMP. Quarry HSE Plan.	CHT HSE Manager. Quarry HSE Manager
2	Joint Ministerial Resolution 1/2017		States the importance of rocks for the Tibar Bay Port Project, in that without rocks of a certain quality and quantity, the Project is in jeopardy. The use of explosives permit is to be issued, subject to certain conditions.	Noted	CHT Permits Officer
3	Resolution 36/2016		Government provides exemption to international companies engaged in major public construction projects without Timorese having majority share	Noted	CHT Permits Officer

Table B-4. Legal Compliance (Land)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 15/2017, Private Investment Law	Article 14	Right to private ownership and use of land	Noted	CHT Permits Officer
2	Decree Law 10/2011, Civil Code		Covers the management, e.g. rights, purchase, lease, and contractual interpretations, of land and immovable property	Noted	CHT Permits Officer
3	Decree Law 6/2017, Basis of Spatial Planning		Provides the mechanism for planning, promotion and development of sectors and regions	Noted	CHT Permits Officer
4	Decree Law 8/2017, Expropriations Law		Expropriation is only admissible in cases of “public interest” in the use of the asset	Noted	CHT Permits Officer

Table B-5. Legal Compliance (Agriculture and Fishing)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 6/2004, Legal Regime for Regulation and Management of Fisheries and Aquaculture	Article 81. Article 82	Prohibits the introduction into waters of substances likely to harm aquatic life. Authorisation is required, amongst other activities, for any work or installation intended to be carried out in national maritime waters, or in the seafront up until 100 meters from the coastline.	Quarry HSE Plan. Quarry Waste Management procedure	CHT Quarry Manager.

Table B-6. Legal Compliance (Labour Legislation)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 4/2012, Labour Law	Article 20	Requires an employer, to provide good working conditions, with regard to health, hygiene and safety at work. An employer is also required to provide vocational training opportunities	Quarry HSE Plan	Quarry HSE Manager

Table B-7. Legal Compliance (Other Legislation)

SN	Legislation	Article / Annex	Requirement	Compliance	CHT Responsible Person
1	Decree Law 33/2008, Hygiene and Public Order	Article 2. Article 5	Applicable to urban areas. Prohibitions; releasing polluted water into ditches, depositing refuse on rights of ways, blocking drains, directing drainage onto rights of ways, and making noises that prejudice communication or disturb the peace	Quarry Waste Management Procedure. Quarry HSE Plan	Quarry HSE Manager
2	Decree Law 9/2016, Sucos Law		Explaining the concept of Sucos. Establishing the authorities of Sucos, and the rules for appointments of members of associated bodies	Noted	CHT Community Liaison Officer
3	Decree Law 7/2009, Community Leaderships and their Election		Defines community leadership, sets the rules for the action limits of the community leadership structures, and the organization and implementation of the process for elections	Noted	CHT Community Liaison Officer
4	Decree Law 43/2015, Tibar Port Public-Private Partnership		Sets the legal framework for Tibar Port, e.g. granting the legal power to the Government to execute the contract for the financing, design, construction and operation of the Port	Noted	CHT Permits Officer

Attachment C. Other Relevant Standards

1. The Equator Principles is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risks in project financing. It has the following items:

   Principle 1: Review and Categorisation

   Principle 2: Environmental and Social Assessment

   Principle 3: Applicable Environmental and Social Standards

   Principle 4: Environmental and Social Management System and Equator Principles Action Plan

   Principle 5: Stakeholder Engagement

   Principle 6: Grievance Mechanism

   Principle 7: Independent Review

   Principle 8: Covenants

   Principle 9: Independent Monitoring and Reporting

   Principle 10: Reporting and Transparency

2 The Extractive Industries Transparency Initiative is a global standard for the good governance of oil, gas and mineral resources. It seeks to address the key governance issues in the extractive sectors. The EITI Standard requires information along the extractive industry value chain from the point of extraction, to how the revenue makes its way through the government, to how it contributes to the economy

3. The Global Reporting Initiative(GRI) is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such

as climate change, human rights and corruption. The 100 series of the GRI Standards includes three universal Standards applicable for every organization preparing a sustainability report. They guide reporters in using the Standards, reporting an organization's relevant contextual information, and reporting how its material topics are managed:

GRI 101: Foundation 2016 (containing Standard Interpretation 1) Effective date: 01 Jul 2018.

GRI 102: General Disclosures 2016 Effective date: 01 Jul 2018.

GRI 103: Management Approach 2016.

4. The International Finance Corporation (IFC), part of the World Bank, has the following Performance Standards (PS):

4.1. IFC PS 1 Assessment and Management of Environmental and Social Risks and Impacts.

4.2. IFC PS 2 Labor and Working Conditions.

4.3. IFC PS 3 Resource Efficiency and Pollution Prevention.

4.4. IFC PS 4 Community Health, Safety, and Security.

4.5. IFC PS 5 Land Acquisition and Involuntary Resettlement.

4.6. IFC PS 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources.

4.7. IFC PS 7 Indigenous Peoples.

4.8. IFC PS 8 Cultural Heritage.

4.9 IFC Environmental Health, Safety (EHS) Guidelines April 2007.

5. The Asian Development Bank (ADB) has environmental safeguards, i.e. referring to environmental, assessments and measures to identify potential environmental impacts and risks of a project and prescribe the environmental management plans to be implemented. These are composed of the following documents:

5.1 Initial Environmental Examination (IEE). Describes the environmental condition of a project, including potential impacts, the formulation of mitigation measures, and the preparation of institutional requirements and environmental monitoring for the project.

5.2 Environmental Assessment Review Framework (EARF). Outlines procedures for the preparation of environmental assessment documents for a project to ensure environmental impacts are appropriately addressed and mitigated.

5.3 Environmental Impact Assessments (EIA). Examines the social and environmental consequences of the project prior to execution and provides information to decision makers and the public about the environmental implications of proposed actions before decisions are made.

5.4 Social and Environmental Compliance Audit Reports. Describe project compliance to social or environmental safeguards requirements based on ADB Safeguards Policy Statement (2009) and includes conclusions and recommendations.

5.5 Environment and Social Management System Frameworks (ESMS). Provide guidelines and frameworks for establishing the environmental and social management system for a project that is consistent with the safeguard policy principles and requirements of ADB.

6. The Internal Standards Organisation (ISO) standard ISO14001 refers to Environmental Management Systems.

7. The OHSAS 18001 is a standard on Occupational Safety and Health. Note: OHSAS refers to Occupational Health and Safety Assessment Series.

Attachment D. Quarry Dust Management Plan

Locations of CHT Quarry and Neighbours

1. The China Harbour Timor Lda (CHT) quarry is at Mota Ulun, about 25 km west of Dili. A drawing showing the quarry and the surroundings is at Figure 1. The layout plan of the quarry is at Figure 2.

2. The stone processing yard, and the hills where blasting takes place, are about 1 km and 1.5 km respectively from the main road. The nearest local residences, located at the east of the main entrance, is about 1.5 m away from the stone processing yard.

3. There are 3 existing quarries, with excavation of rocks, making gravel and casting concrete parts, located 100 m west of the CHT quarry entrance at the main road. The name plates of these quarries are at Figure 3. The impacts of these dust generating sources are to be considered when conducting evaluations during CHT quarry operations. Evaluations for cumulative impacts might be difficult for these are quarries belong to the competition.

Method

4. According to the International Standardization Organization (ISO 4225 - ISO, 1994), "Dust: small solid particles, conventionally taken as those particles below 75 μm in diameter, which settle out under their own weight but which may remain suspended for some time". Smaller dust particles can remain airborne longer, potentially increasing local ambient concentrations of suspended particulate matter. Therefore, in addition to “total dust level”, environmental dust monitoring concentrates on PM10 and PM2.5 particles. File note: PM refers to “particulate matter, 10 refers to “10 micro-meter, and 2.5 refers to “2.5 micro-meter”. In other words, PM10 is airborne particulate matter with a diameter less than 10 microns (μm), and PM2.5 is less than 2.5 μm.

5. The quarry dust management plan has a focus on only dust prevention, suppression, and monitoring. Other environmental aspects of quarry operations, including dust generated by vehicle exhausts, are not included. The method for the said plan consists of the following steps:

    5.1 Establish baseline conditions of the existing dust climate around the site of the proposed operations.

5.2 Identify site activities that could lead to dust emission without mitigation.

5.3 Identify site parameters which may increase potential impacts from dust.

5.4 Recommend mitigation measures, including site design and layout.

5.5 Make proposals to monitor and report dust emissions to ensure compliance with appropriate environmental standards and to enable an effective response to complaints.

Figure 1. Location of the Quarry

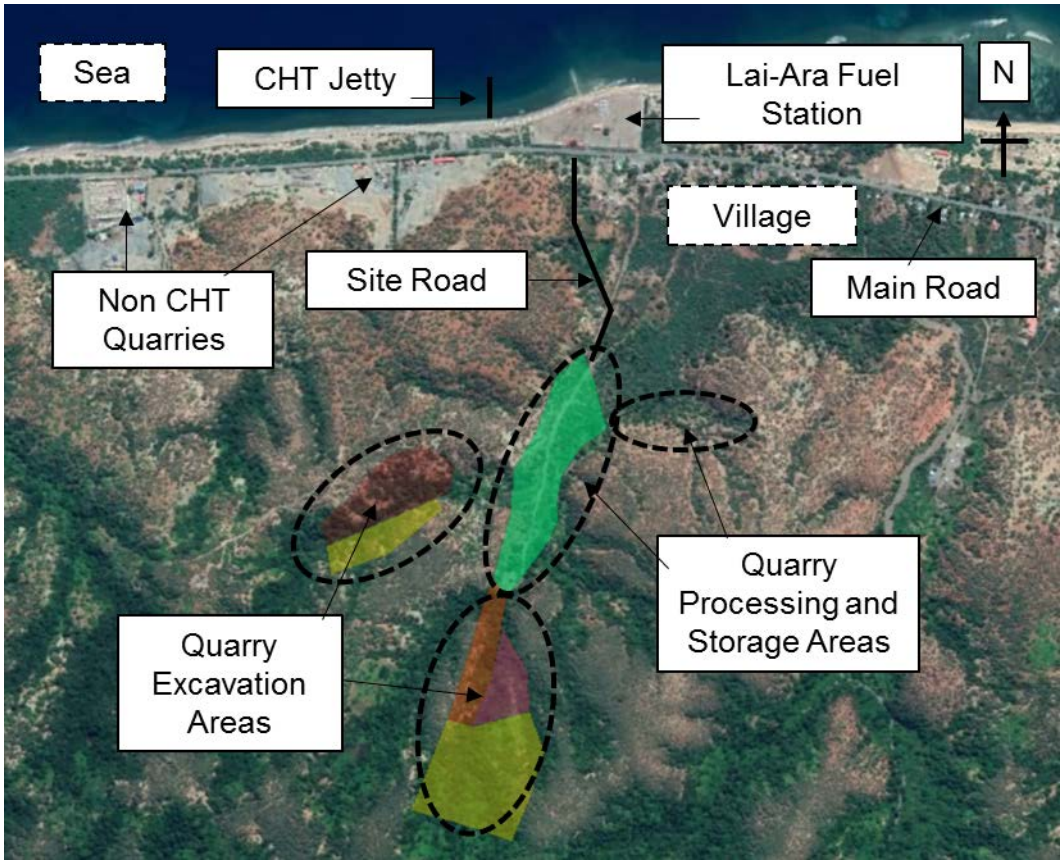


Figure 2. Quarry Site Layout

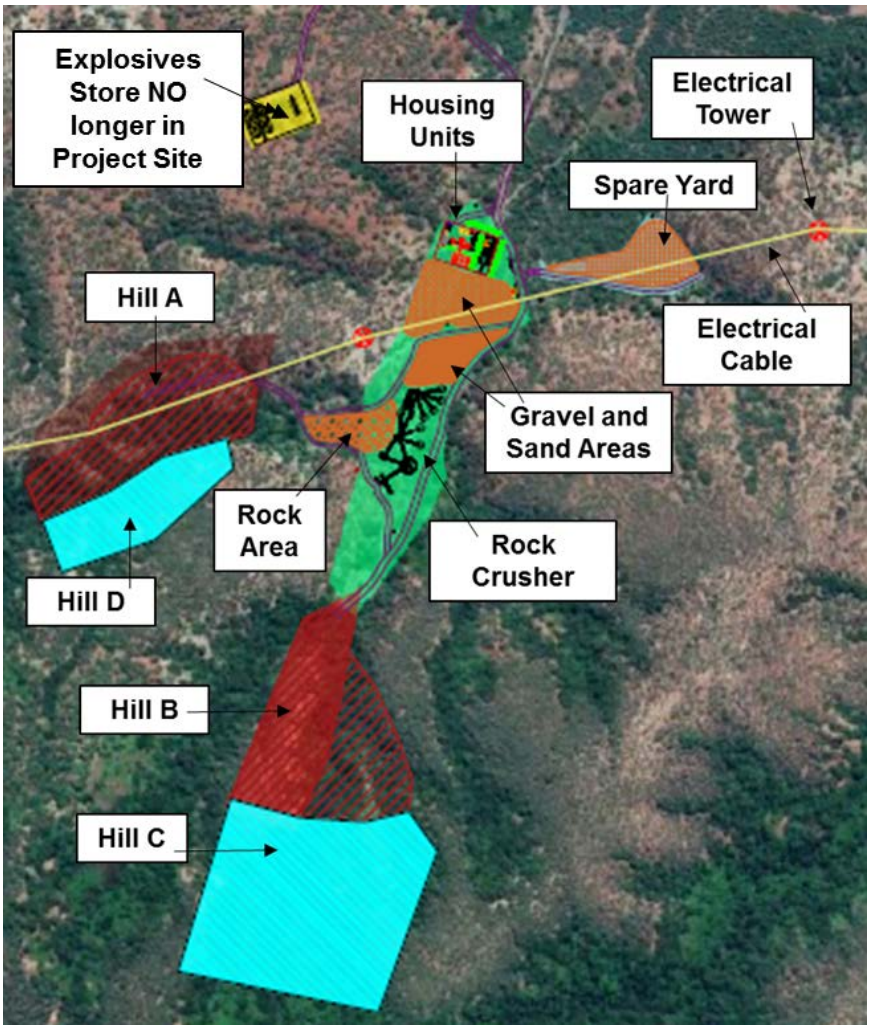


Figure 3. Neighbouring Quarries

The Quarry Works

6. The conventional method for obtaining rocks is used, i.e. using controlled explosions for breaking up a rock wall, and followed by transporting rocks to a crushing machine for processing into the required smaller sizes. There is no tunnelling, or open-cast, i.e. pit, type of mining. The rock / gravel processing and storage area is about 70,000 m2. The rock crushing machine has a capacity of about 300 tons per hour. Recycled water, stored in an enclosed tank, to prevent evaporation loss, is used to water the rocks in the crusher to mitigate against dust pollution.

7. About 1,030,000 m3 of rocks is produced, over an approximate 3-year timeframe, starting from May 2019. The estimated volumes of material to be extracted each year in 2019, 2020 and 2021 are 300,000, 700,000 and 30,000 m3 respectively.

8. The main steps for producing rocks and gravel are as follows:

    8.1 Surface earthworks and preparation.

    8.2 Drilling and blasting.

    8.3 Loading to crusher plant.

    8.4 Crushing, screening and classification.

    8.5 Stockpiling.

    8.6 Hauling to end user site, i.e. at Tibar Bay.

9. Preparation work for starting the quarry consists of:

    9.1 Making an internal haul road from the main road to the laydown area.

    9.2 Clearing of land for the camp quarters (for 35 persons).

    9.3 Clearing of land for the rock / gravel processing and storage areas.

    9.4 Installing machinery and facilities.

Topography

10. For a quarry, dust is invariably carried by wind to receptors further away. The terrain at the CHT quarry is favourable for containing dust, e.g. quicker settlement and capture, as against blown further away. The reasons are high hill formations and a thick line of tall trees and shrubs surrounding the rock and gravel processing and storage areas, as shown at Figures 4 to 8. The vegetation continues until the nearest residential properties about 1.5 km away. These features have the effect of reducing the strength of the wind, and containing dust.

Figure 4. Looking north from laydown area towards haul road to main road

Figure 5. Hills at north-west side of laydown area

Figure 6. Hills at west side of laydown area

Figure 7. Another view of hills and vegetation at west side of laydown area

Figure 8. Hills at east side of laydown area

Climate

11. Timor-Leste has distinctive wet and dry seasons, with the wet season generally from November to May. Naturally, dust levels will be lower after rain conditions, for rainfall acts as a natural dust suppressant.

12. Wind speed and wind direction obtained from sources are usually for a specific place, e.g. Dili airport, or for the country as a whole, and does not represent local conditions . Such information are generally not useful for the quarry; a location that has different and unique features, especially relating to topography and vegetation. CHT will be setting up a full-fledge weather station at Tibar Bay, about 12 km to the east of the quarry. Information from this nearby weather station will help to provide better analysis for making improvements to the Quarry Dust Management Plan; a document that will be reviewed within 3 months after start of quarry operations.

Baseline Conditions

13. In the quarry areas, and in the vicinity, there are no dwellings, no plantations or animal rearing industries. Therefore, there is no need to conduct baseline monitoring at the quarry areas.

14. The receptors of the housing type, are at least 1.5 km away, along the main road, and consist of village dwellings and the existing non-CHT quarries, as shown at Figure 1. There are no sensitive receptors, e.g. hospitals or homes for elderly persons, or industrial entities especially susceptible to dust.

15. In respect of the housing receptors, baseline environmental dust sampling was conducted from 20 to 22 Jan 2019, at 3 locations (Figure 9), with details at Table 1. The readings are stated at Table 2. The full report is at Attachment D1.

Figure 9. The 3 Dust Sampling Points (20 to 22 Jan 2019)

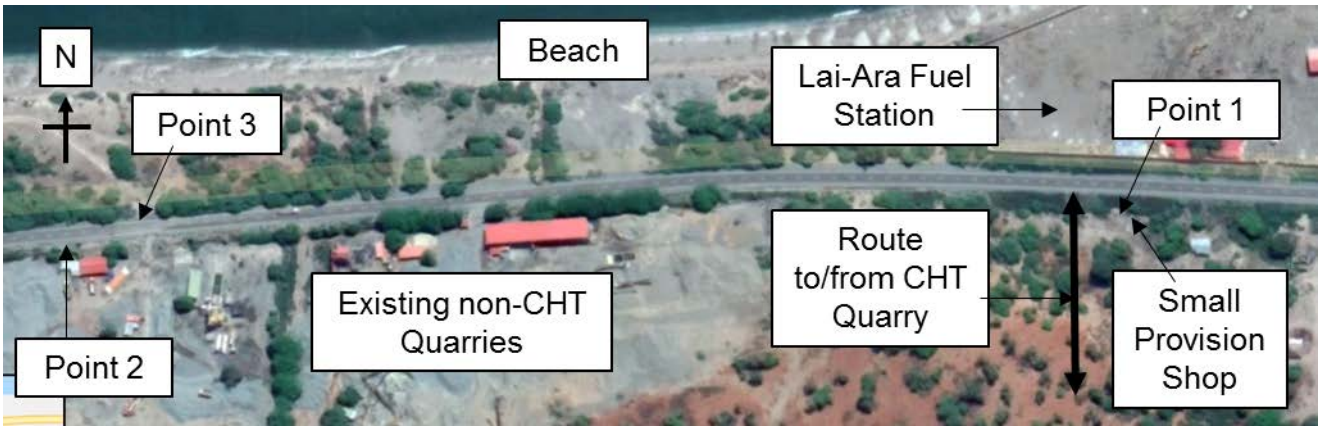


Table 1. Dust Sampling Location and Timeframes

SN	Location	Sampling Date and Time	Wind Speed and Direction
1	100 m east of quarry entrance road. In front of provision shop. 2 m from road.	20 Jan 2019. 08:00 to 16:00 hr.	3.2 m/s, Southwest
2	800 m west of quarry entrance. In from of Star Concrete. 2 m from road.	21 Jan 2019. 10:00 to 18:00 hr.	3.6 m/s, Southwest
3	750 m west of quarry entrance. Opposite Star Concrete. 2 m from road.	22 Jan 2019. 08:00 to 16:00 hr.	3.0 m/s, Northwest

Table 2. Dust Sampling Results

		ug/m3		
SN	**Location**	**PM2.5**	**PM10**	**TSP (Total suspended Particles)**
1	100 m east of quarry entrance road. In front of provision shop. 2 m from road.	ND (Not Detectable)	12	31
2	800 m west of quarry entrance. In from of Star Concrete. 2 m from road.	ND (Not Detectable)	10	23
3	750 m west of quarry entrance. Opposite Star Concrete. 2 m from road.	ND (Not Detectable)	44	94

16. The World Health Organisation (WHO) guidelines for exposure to dust is shown at Table 3.

Table 3. WHO Guidelines for Particulate Matter

SN	Size	Guideline
1	PM2.5 (i.e. particle size of 2.5 micro-meter)	10 µg/m3 annual mean. 25 µg/m3 24-hour mean
2	PM10 (i.e. particle size of 10 micro-meter)	20 µg/m3 annual mean 50 µg/m3 24-hour mean

Dust Emitting Activities

17. The dust emitting activities, i.e. sources, without mitigation measures, are shown at Table 4.

Table 4. Dust Sources

SN	Category	Activity	Location	Frequency
1	Site Preparation	Removal of vegetation, overburden, and land profiling	Site-wide	Daily at construction stage. Weekly at operations
2	Mineral extraction	Blasting	Extraction areas	Once a day for a few seconds (except Sundays)
3	Material handling and preparation	Tipping rocks and gravel onto trucks from blasting area to crusher area	Extraction areas	Daily
4		Rock crushing and screening	Rock crusher area	Daily
5	Stockpiling (exposed material)	Tipping rocks and gravel onto stockpile	Stockpile area	Daily
6		Fugitive dust	Stockpile area	Daily
7	Material movement (on-site)	Tipping rocks and gravel onto trucks for transport out of site	Stockpile area	Daily
8		Trucks travelling on haul routes (unpaved)	Internal haul routes	Daily
9	Material movement (off-site)	Trucks travelling on bitumen roads	External public roads	Daily. Affects general public

Pathways

18. A pathway is the route from which dust from a source reach the receptor. The factors to consider when evaluating pathways include distance, wind, terrain and vegetation. The receptors are more than 1.5 km away from the quarry. Terrain and site vegetation, e.g. trees and tall shrubs, are

essential in stopping dust from being propagated further by the wind, whether prevailing or temporary. There are hills, tall trees and high-type shrubs surrounding the rock processing areas, where most dust is emitted.

19. The mining method is such that the original height of the hills are retained, i.e. the tops are not cut. What remains after end of excavation work, is a stepped pyramid structure, similar to rice terraces, with a circular trekking route from bottom to top. Depending on specific hills, the bottom 20 to 70 m of a hill remain untouched, i.e. there is high ground surrounding the laydown location. Therefore, there is no need to build wind shields, or similar structures.

20. In summary, the quarry is boxed-in by terrain and vegetation, and this natural perimeter border effectively reduces the pathway for dust reaching the already far away receptors.

Receptors

21. The health effects on human receptors can be classified into 3 broad categories, i.e.:

    21.1 High Sensitivity. This includes hospitals, homes for the elderly, and schools, in which a relatively large group of similar type of occupants are exposed, and who are more susceptible to dust. Industrial enterprises that are especially at risk to dust are also included in this category.

    21.2 Medium Sensitivity. The village dwellings, and the industrial enterprises (existing quarries), located at the far north side of the CHT quarry (next to the main road), are placed in this category, for the inhabitants are exposed over a full day.

    21.3 Low sensitivity. Exposure is transient, e.g. persons passing by, and stopping only for shopping.

22. The CHT quarry is not within or near protected natural reserves, or sites with special scientific interest. Therefore, the susceptibility of flora and fauna to dust need not be further discussed. File Note: The level of dust deposition likely to lead to a change in vegetation is very high (over 1 g/m2/day; Farmer, A M, 1993. The effects of dust on vegetation – a review. Environmental Pollution 79, 63-75).

Mitigation Measures

23. Human activities that increase potential impacts from dust include indiscriminate removal of vegetation, tracked vehicles churning-up ground, non-maintenance of haul routes, making sharp turns on unpaved routes, and discharge of material at unauthorised locations. During dust prevention training for operators and drivers, the need for appropriate techniques for reducing dust emissions, are mentioned. Further details on training are at paragraph 25.

24. The areas where mitigation measures are implemented can be classified into the following 3 main groups, as shown at Table 5.

Table 5. Grouping of Mitigation Measures

SN	Group	Mitigation Measures (details at …)
1	Site Design and Planning	Table 6
2	Operational Control	Table 7
3	Training	Paragraph 25

Table 6. Dust Control Measures (Site Design and Planning)

SN	Activity	Control	Responsibility
1	Layout	Keep green buffers	Quarry Engineer
2		Site routes away from villages	Quarry Engineer
3		Retain high ground and vegetation	Quarry Engineer
4		Pave area where haul route meets main road	Quarry Engineer
5		Pave area for off-site vehicles (e.g. staff cars)	Quarry Engineer
6		Balance between the number of stockpiles and height of each stockpile.	Quarry Engineer
7	Equipment and Machinery	Using electric instead of diesel machines, e.g. for the rock crusher	Equipment Manager
8		Rock crusher with internal water spray and water containment for recycled water	Equipment Manager
9		Hopper inlet appropriate for type of trucks, e.g. no side spillages	Equipment Manager
10		Closed system in conveyors, i.e. fitted with covers	Equipment Manager
11		Trucks with fittings for covers	Equipment Manager

Table 7. Dust Control Measures (Operational Control)

SN	Activity	Control	Responsibility
1	Rock crushing	1. Installation and maintenance of shields. 2. Water sprays in crusher head. 3. Daily inspections of condition. 4. Maintenance of equipment.	1 to 4. Equipment Manager
2	Tipping rocks and gravel onto stockpile	1. Designated locations. 2. Designated heights of stockpiles.	1 and 2. Quarry Deputy Manager
3	Tipping rocks and gravel into trucks	1. No overloading. 2. No protrusion of load above the height of the bed.	1 and 2. Quarry Deputy Manager
3	Trucks travelling on internal haul routes (unpaved)	1. Speed control. 2. Watering of routes. 3. Maintenance of haul routes	1. HSE Manager. 2. HSE Manager. 3. Quarry Deputy Manager.
4	Trucks travelling on external bitumen roads	1. Speed control. 2. Tarpaulin cover. 3. Cleanliness condition of trucks	1 to 3. HSE Manager.
5	Land clearance	1. Land Clearance Permit	1. Quarry Deputy Manager
6	Blasting	1. Blasting Permit	1. Blasting Engineer
7	Accumulation of fugitive dust on ground	1. Housekeeping, e.g. gathering-up of spill material, mobile machinery do not run over and crush material	1. Quarry Deputy Manager

Training

25. Machine operators and truck drivers have a very important role in dust management, for their work usually generates dust, especially when travelling on unpaved ground. The Quarry HSE Manager is responsible for training these groups of employees. In the “Dust Control Methods for

Machine Operators and Truck Drivers" training package, the topics include:

25.1 Load and Weight. Load to be least 20 cm below the top height of the bed of a truck. Material is not to be left in a "triangle" type heap over the bed. For a bucket, material from excessive scooping-up will spill over the sides when the bucket swings. Scooping and putting back material creates dust more than necessary. Tyres of overloaded trucks dig deeper into unpaved routes; creating more dust.

25.2 Covers. Use the tarpaulin cover when travelling off-site. This reduces windblown dust, and prevents material from dropping onto the public roads.

25.3 Speed. The faster the speed, the greater the amount of dust churned-up by the tyres, and for the cargo, the greater the wind-blown dust. Stay within the speed limits. Turning a vehicle, or a bucket at too fast a speed causes material to spill out. A moving bucket with trailing gravel droppings creates unnecessary dust. Avoid abrupt changes in direction, stopping, and starting. Slow down when approaching road humps. Do not charge through, for the bounces, and sudden braking, cause spillages of material.

25.4 Tyres. Maintain the correct tyre pressure. Too low a pressure causes the tyres to dig deeper into unpaved routes; creating more dust.

25.5 Height. Rock and gravel dropped at height creates a "striking against" effect amongst the material, and generates dust. The bucket should not be positioned too high above the truck bed, or too high above a stockpile for releasing the load, i.e. the higher the release, the greater the production of dust.

25.6 Distances and Frequency. More dust is created with further distance travelled, and greater number of trips. Work and trip planning are necessary. Examples of what should be avoided include returning with the load (i.e. not able to deliver), delivering with a half-full load (i.e. double the trips), and travelling a long distance to do short work, then returning, and then going out again to a place near the first location to perform another short-time work.

25.7 Vegetation. Keep to the designated haul routes. A tracked vehicle churns-up large tracts of ground, leaving behind bare

earth, and increasing wind-blow dust. When clearing ground, keep to the construction plans, i.e. do not clear more than is necessary, and leave a "green buffer" whenever possible. Do not remove a tree, if work can go around it. Report haul routes that need repair, e.g. a puddle that does not dry up. Going around a puddle by driving on the sides of the route destroys vegetation at the sides, and creates a wider than required haul route, and associated increases in dust.

25.8 Unwanted Material. The disposal of unwanted material at unauthorised places destroys vegetation and creates more places with fugitive dust. Rework, i.e. removal and restoring work, generates yet even more dust.

25.9 Spillages. Keep a spade in the truck to clear gravel spilled on public roads. If there is no tyre wash point, the spade can be used to scrap earth from tyres and other parts of the vehicle under the chassis.

Monitoring and Reporting

26. The types and frequencies of monitoring and reporting of dust control measures and responsibilities, to ensure compliance with appropriate environmental standards, to maintain the dust management plan, and to enable an effective response to complaints are described at Table 8.

27. The HSE Manager has the responsibility of ensuring that monthly dust monitoring is conducted at 2 points, each located about 100 m east and 800 m west of the quarry entrance at the main Dili-Liquica main road. The monitoring results are tabulated against World Health Organisation (WHO) standards for environmental dust level standards.

28. The HSE Manager also conducts daily site inspections, and the work environment, to ensure that conditions do not degrade, and that operators and drivers are adhering to the operations rules for protection of the environment.

Table 8. Monitoring and Reporting

SN	Activity	Report Format	Frequency of Reporting	Responsibility
1	Daily Inspections of Machinery and Equipment	1. Checklist for Rock Crusher. 2. Checklist for tarpaulin sheets on trucks.	1. Daily Summary Report of Condition	1 and 2. Equipment Manager
2	Tipping rocks and gravel onto stockpile	1. Daily inspections of site conditions, including stockpile conditions	1. Daily inspections of site conditions	1. HSE Manager
3	Tipping rocks and gravel into trucks	1. Daily inspections of site work environment	1. Daily inspections of site conditions	1. HSE Manager
3	Trucks travelling on internal haul routes (unpaved)	1. Daily inspections of site work environment. 2. Regular clearing, grading and maintenance of haul routes	1. Daily inspections of site conditions. 2. Weekly report on conditions of haul routes	1. HSE Manager
4	Trucks travelling on external bitumen roads	1. Truck Leaving / Entering Site Form (speed control, and inventory control).	1. Daily Summary Report (part of daily total trips)	1. Quarry Deputy Manager
5	Preservation of site vegetation	1. Daily inspections of site work environment. 2. Land Clearance Permit.	1. Daily inspections of site conditions (part of Land Clearance Permit conditions)	1. HSE Manager
6	Training	1. Training records (operators and drivers)	1. Monthly training report	1. HSE Manager
7	Dust monitoring	1. Monthly dust sampling results at 2 locations (100 m east and 800 m west of quarry entrance at main road)	1. Monthly Dust Sampling Report	1. HSE Manager
8	Complaints	Complaints Log, e.g. based on Grievance Reporting Form	Summary included in Quarry Monthly HSE Report	1. Community Liaison Officer

Dust Impact Risk

29. The Institute of Air Quality Management (IAQM), based in London (UK), has a document titled, "Guidance on the Assessment of Mineral Dust Impacts for Planning, dated May 2016 (v1.1). An estimation of dust impact risk can be based on the 3 factors of "Source", "Pathway" and "Receptor". Page 15 of the said IAQM document, has the following quote:

"The Source-Pathway-Receptor (S-P-R) concept presents the hypothetical relationship between the source (S) of the pollutant, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected. The dust impact at relevant receptors should be predicted using this concept. This approach is applicable to both the disamenity and the ecological effects of deposited dust."

30. An illustration of the Source-Pathway Matrix, after mitigation measures, is at Figure 10. File Note: Figures 10 and 11 are direct copies from similar figures at pages 16 and 17 of the said IAQM document.

Figure 10. Source-Pathway Risk Level (after mitigation measures)

		Residual Source Emission		
		Small	**Medium**	**Large**
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

31. From Figure 10, the risk levels are tabulated against the sensitivity of receptors to obtain the magnitude of effects, as shown at Figure 11.

Figure 11. Magnitude of Dust Effects

	Receptor Sensitivity		
	Low	**Medium**	**High**
High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

32. From Figure 10, the pathway for the CHT quarry is in the “ineffective pathway” category, because it consists of tall vegetation and hills, and the receptors are more than 1.5 km away, i.e. dust is dissipated or blocked before reaching the target. Therefore, even if the residual source emission is high, the risk level is classified as “low risk”.

33. The receptor sensitivity is not in the high category, because it is not in the sensitive class, e.g. not a hospital or a home for elderly people. The dwellings 1.5 km away from the quarry can be placed in either the “medium” or “low” receptor sensitivity category. Therefore, it can be concluded from Figure 11, that the magnitude of the effects of dust on these dwellings is “negligible effect”.

Attachment D1. Environmental Dust Sampling Report (Jan 2019)

CMA 20161917770

ENVIRONMENTAL MONITORING REPORT

Report No: （JY）EM 2019 NO. 01145

Project: Environmental Air Monitoring of China Harbour Timor Lda (CHT) Quarry for the New Container Terminal Project in Tiba Bay, Timor-Leste

Type: Ambient air

Monitoring Category: Baseline Environmental Monitoring

Date of Report: 28 January, 2019

Guangdong Jianyan Environmental Monitoring Co., Ltd

Page 1 of 10 pages

Statement on Monitoring and Report

1. The organization ensures the scientific, impartiality and accuracy of the monitoring and results. The organization is responsible for the monitoring data, and keeps the sample and technical information provided by the entrusted party.

2. The verification report will be invalid under the following situations: no signature of the issuer, alteration, no official stamp of the organization, or no seal on the perforation.

3. Partial copy of this verification report is prohibited without written approval by the organization (complete copy is allowable).

4. The organization accepts no responsibilities for the veracity of samples not taken by the organization.

5. If there is any objection to the results in this report, please forward your checking application within fiftheen days from the day receiving this report.

Guangdong Jianyan Environmental Monitoring Co., Ltd

Address: No.19,6 Second Street, Huangwu, Kemulang, Guangshan Road, Tianhe district, Guangzhou, China
Post Code：510520
Tel：020-37250207
Fax：020-37250211
E-mail：jianyan_em@163.com

Guangdong Jianyan Environmental Monitoring Co., Ltd

2016191777U

Environmental Monitoring Report

Unit code: ---

(JY) EM (Ambient air) 2019 NO. 01145

Project: Environmental Air Monitoring of CHT Quarry for the New Container Terminal Project in Tiba Bay, Timor-Leste

Location: Mota Ulun, Liquica, Timor-Leste | Monitoring category: Environmental baseline monitoring

Samples Taken by: Gaojie Xie and Zhanyang Chen | Type: Ambient air | Sample status: Normal

Date of Monitoring: 20, 21, 22 January 2019 | Date of Analysis: 24 January, 2019. | Date of report: 25 January, 2019

Location	Monitoring point	Monitoring Time	Analytic Result Unit: mg/m^3			Meteorological Information			
			PM2.5	PM10	TSP	Temperature (℃)	Atmos (kPa)	Wind speed (m/s)	Wind direction
1	Monitoring Site 1# (S:8°33′51″;E:125°24′43″)	From 08:00 to 16:00 January 20, 2019	ND	0.012	0.031	25.0	100.95	3.2	Southwest
2	Monitoring Site 2# (S:8°33′51″;E:125°24′22″)	From 10:00 to 18:00 January 21, 2019	ND	0.010	0.023	26.0	100.85	3.6	Southwest
3	Monitoring Site 3# (S:8°33′52″;E:125°24′21″)	From 08:00 to 16:00 January 22, 2019	ND	0.044	0.094	24.0	100.80	3.0	Northwest
	(Following blank)								

Remarks: 1. For monitoring points, see attached Figure 1.
2. "ND" indicates Not Detectable.
3. List of monitoring factors and criterion are at Table 1.
4. Particulars of field instruments used are at Table 2.

Prepared by: Lyu Ping Mo Inspected by: Qingya Zhuang Approved by: Zecheng Chen Title of Approver: Chief of Dept., Engineer Issued date: 28 January, 2019

Page 3 of 10 pages

Figure 1. Locations of Monitoring Points at Mota Ulun, Barzetete, Liquica, Timor-Leste

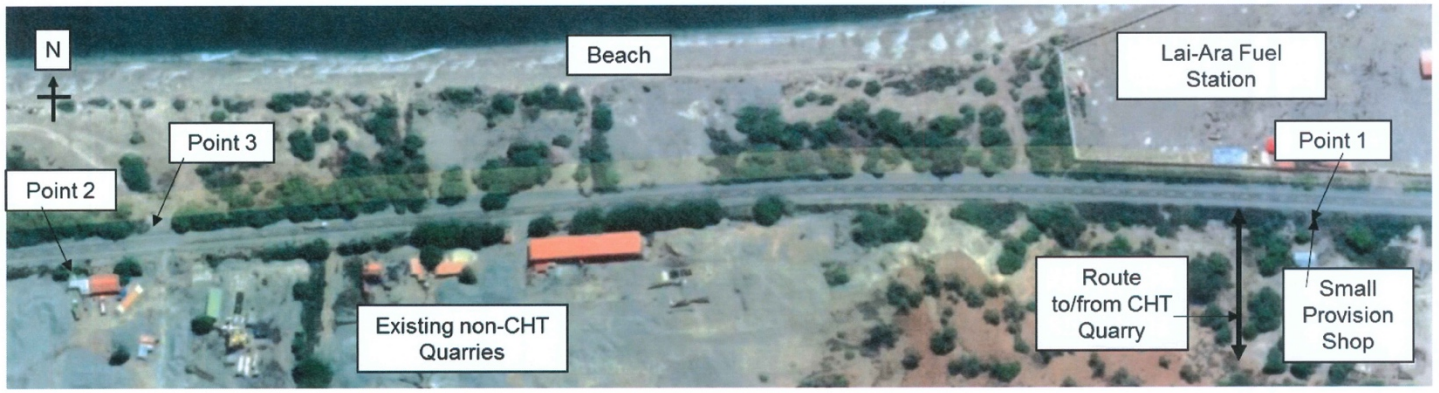


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Table 1. List of Monitoring Factors and Criterion

SN	Monitoring Type	Monitoring Factor	Criterion
1	Ambient air	TSP	Ambient air-determination of total suspended particulates. Gravimetric method. GB/T15432-1995
2		PM10	Determination of atmospheric articles PM10 and PM2.5 in ambient air by gravimetric method. HJ 618-2011
3		PM2.5	
		(End)	

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Table 2-1. Particulars of Field Sampling Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Sampling TSP
2	Make	Qingdao Laoshan Applied Technology Research Institute
3	Model	Laoying 2030
4	Serial Number	M03230950
5	Date of Calibration	14 May 2018

Table 2-2. Particulars of Field Sampling Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Sampling PM10
2	Make	Qingdao Laoshan Applied Technology Research Institute
3	Model	Laoying 2030
4	Serial Number	M03350136
5	Date of Calibration	4 July 2018

Table 2-3. Particulars of Field Sampling Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Sampling PM2.5
2	Make	Qingdao Laoshan Applied Technology Research Institute
3	Model	Laoying 2030
4	Serial Number	M03344990
5	Date of Calibration	4 July 2018

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Table 2-4. Particulars of Field Sampling Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Monitoring wind direction and wind speed
2	Make	Shanghai Fengyun Meteorological instrument Co., Ltd.
3	Model	FYF-1
4	Serial Number	06G6818
5	Date of Calibration	6 July 2018

Table 2-5. Particulars of Field Sampling Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Monitoring atmospheric pressure
2	Make	Ningbo Yinzhou Jiang Shan Glass instrument Factory
3	Model	DYM3
4	Serial Number	16072220
5	Date of Calibration	4 December 2018

Table 2-6. Particulars of Laboratory Analyzing Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Analyzing TSP and PM10
2	Make	Sedorius Scientific Instruments (Beijing) Co., Ltd.
3	Model	BS224S
4	Serial Number	23691487
5	Date of Calibration	7 May 2018

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Table 2-7. Particulars of Laboratory Analyzing Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Analyzing TSP and PM10
2	Make	Shanghai Jinghong Experimental equipment Co., Ltd.
3	Model	HWS-80
4	Serial Number	H1309413
5	Date of Calibration	30 March 2018

Table 2-8. Particulars of Laboratory Analyzing Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Analyzing PM2.5
2	Make	Mettler Toledo International Trade (Shanghai) Co., Ltd.
3	Model	MS105DU
4	Serial Number	B828107864
5	Date of Calibration	22 August 2018

Table 2-9. Particulars of Laboratory Analyzing Equipment

SN	Item	Particulars
1	Purpose of Equipment	For Analyzing PM2.5
2	Make	Qingdao Rongguang Electronic Technology Co., Ltd.
3	Model	RG-AWS9
4	Serial Number	RGAWS9028
5	Date of Calibration	28 March 2018

List of Photographs

Figure 2:

20 January, 2019

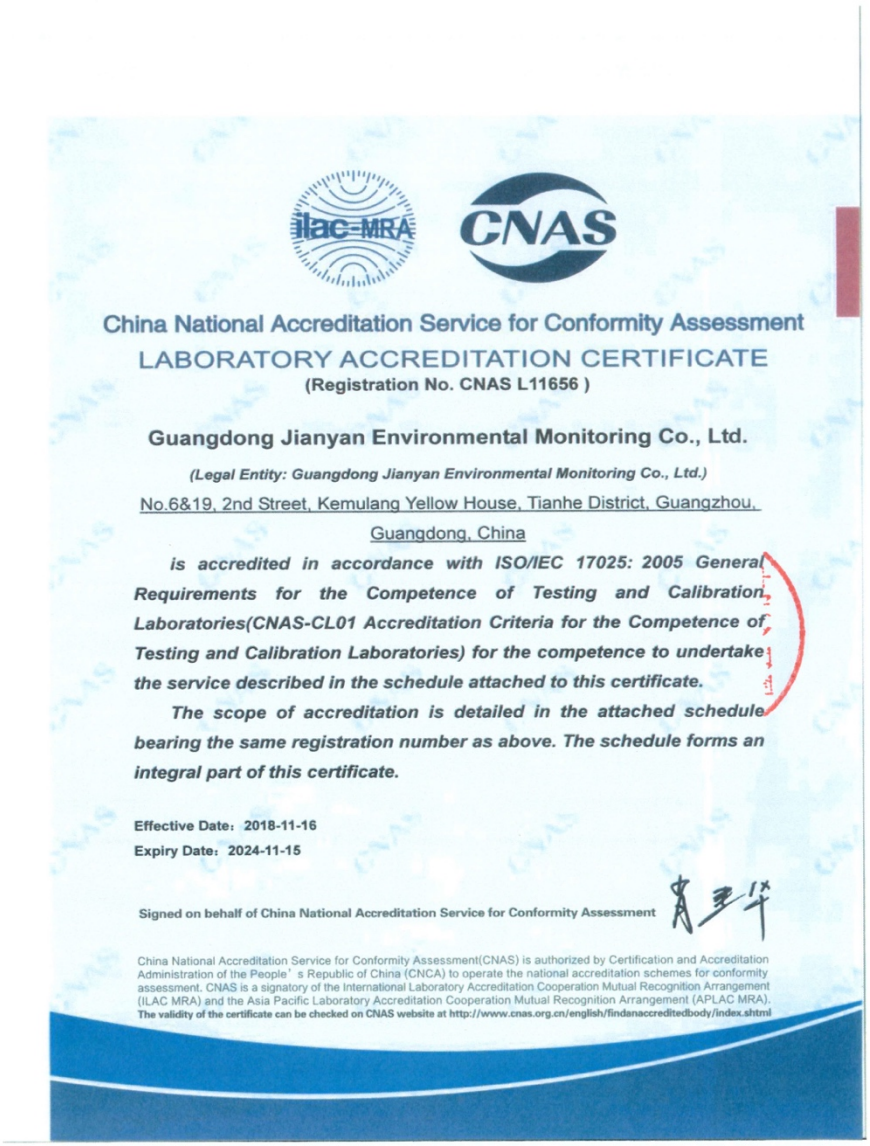
Figure 3:

21 January, 2019

Figure 4:

22 January, 2019

Annex 1：



China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L11656)

Guangdong Jianyan Environmental Monitoring Co., Ltd.

(Legal Entity: Guangdong Jianyan Environmental Monitoring Co., Ltd.)

No.6&19, 2nd Street, Kemulang Yellow House, Tianhe District, Guangzhou, Guangdong, China

is accredited in accordance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date：2018-11-16

Expiry Date：2024-11-15

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment(CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Laboratory Accreditation Cooperation Mutual Recognition Arrangement (APLAC MRA).
The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml

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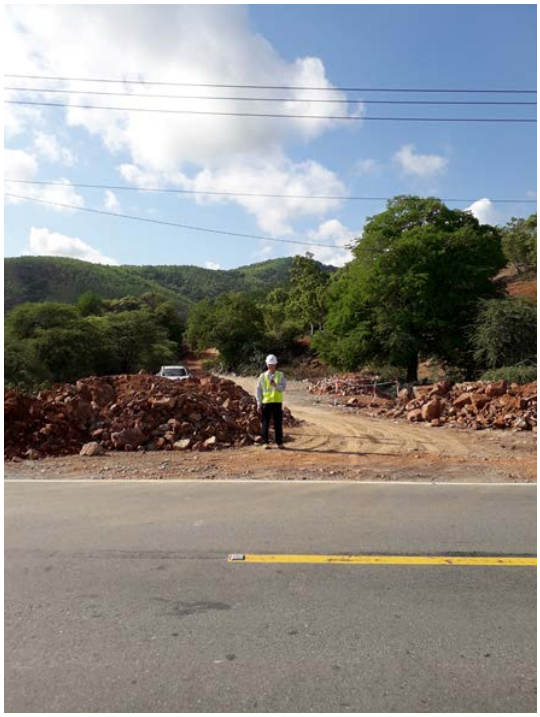
Attachment E. Quarry Noise Management Plan

1. Table E-1 shows the readings taken during an initial baseline noise sampling conducted on 9 Jan 2019, at the turn-off from the main road to the quarry road. The instrument used was a 3M made, model SD-200, and serial number SD20017508. It was held at a height of 1.5 m, and facing the main road, and 2 m away from it. Figure E-1 shows the location (represented by the person taking the sampling).

Table E-1. Noise Readings

SN	Vehicle	Reading (dBA)
1	Ambient	62
2	Motorcycles / Sedans	72 to 78
3	Trucks	83

Figure E-1. Location of Noise Sampling



2. Sound level is measured in dBA (i.e. a range within the human ear). For every doubling of distance, the sound decreases by 6 dBA. Table E-2 illustrates the sound produced by various activities. Table E-3 shows the sound level decreasing when a person is further away from noise produced by a working jack hammer. The conclusion is that noise produced by quarry activities does not affect the nearest dwellings for these are more than 1.5 km away. The

generally accepted noise exposure level is not more than 85 dBA over an 8-hour time period.

Table E-2. Noise Level Chart
(from website: https://www.noisehelp.com/noise-level-chart.html)

dBA	Example	Home & Yard Appliances	Workshop & Construction
0	healthy hearing threshold		
10	a pin dropping		
20	rustling leaves		
30	whisper		
40	babbling brook	computer	
50	light traffic	refrigerator	
60	conversational speech	air conditioner	
70	shower	dishwasher	
75	toilet flushing	vacuum cleaner	
80	alarm clock	garbage disposal	
85	passing diesel truck	snow blower	
90	squeeze toy	lawn mower	arc welder
95	inside subway car	food processor	belt sander
100	motorcycle (riding)		handheld drill
105	sporting event		table saw
110	rock band		jackhammer
115	emergency vehicle siren		riveter
120	thunderclap		oxygen torch
125	balloon popping		
130	peak stadium crowd noise		
135	air raid siren		
140	jet engine at takeoff		
145	firecracker		
150	fighter jet launch		
155	cap gun		

Table E-3. Sound Level at Different Distances from Source

SN	Distance from Noise Source (m)	Sound Level (dBA)	Sound Produced by
1	1	110	Jack hammer / rock band
2	2	104	
3	4	98	
4	8	92	
5	16	86	Passing diesel truck
6	32	80	Alarm clock
7	64	74	
8	128	68	
9	256	62	
10	512	56	
11	1,024	50	Light traffic / refrigerator
12	2,048	44	
13	4,096	38	
14	8,192	32	whisper

3. However, noise monitoring will still be carried out during the first week of blasting work, and monthly thereafter, to “make assurance doubly sure”. The following activities are planned for reducing noise pollution:

4. Heavy machinery, especially the rock crusher, generate noise. The methods to reduce the noise nuisance include:

   4.1 Night work is not planned or minimised.

   4.2 The rock crusher is as fully enclosed as practicable. This feature also reduces the emission of dust.

   4.3 Machinery is maintained, with at least a monthly cycle.

   4.4 Machinery operators use a Daily Pre-Start Equipment Checklist to ascertain the conditions of assigned equipment before starting work.

5. Other activities to reduce the noise level include:

   5.1 No speeding, no blasting of the horn except as a warning sound, and to avoid unnecessary revving of engines.

5.2 Starting machinery one by one, rather than all together at once.

5.3 Not operating machinery at maximum engine capacity.

5.4 Switching-off machinery when not required.

5.5 Drivers keep to the designated routes, e.g. not parking near homes.

5.6 Drivers refrain from travelling in a convey, i.e. increasing the build-up of noise.

5.7 Not making steep gradients for haul roads.

5.8 Regular maintenance of machinery and the haul roads.

5.9 Installing rubber linings at inlets of chutes to reduce impact noise.

5.10 Excavators and wheeled loaders minimise drop height of materials to reduce impact noise.

5.11 Operating equipment with covers in place.

5.12 Not carrying noisy work during the night.

5.13 Retaining green buffers, i.e. tall trees and shrubs, as noise barriers.

6. Depending on the specific noise control method, the Quarry Deputy Manager (in charge of operations), Equipment Manager, and the HSE Manager, have the responsibilities of ensuring that noise pollution is reduced to as low as reasonably practicable.

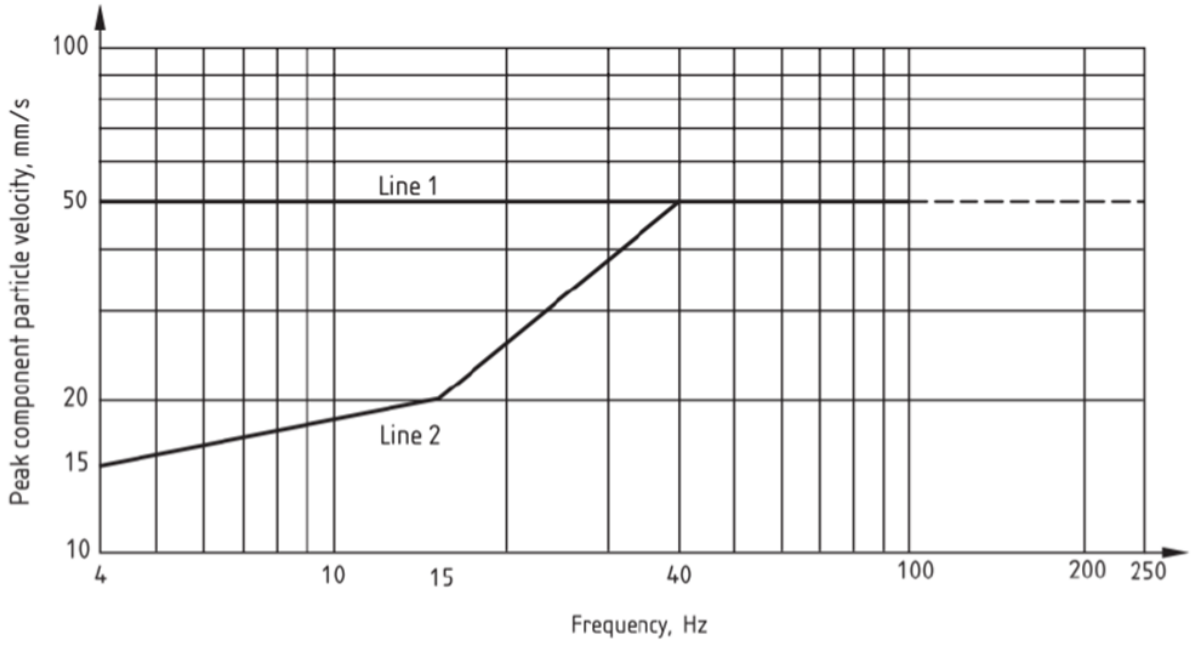
Attachment F. Quarry Vibration Management Plan

1. Blasting work creates vibrations. At page 36, Table B.1 of Annex B of document BS 5228 Part 2 Vibration Control on Construction and Open Sites, provides guidance on the effects of vibration levels on human beings and these are reproduced in Table F-1. Figure B.1 of the said document, i.e. BS 5228 Part 2, at page 38, shows the vibration levels, at different frequencies, that could create an onset of cosmetic damage to buildings. This figure is reproduced at Figure F-1 at below.

Table F-1. Vibration Level Effects on Humans

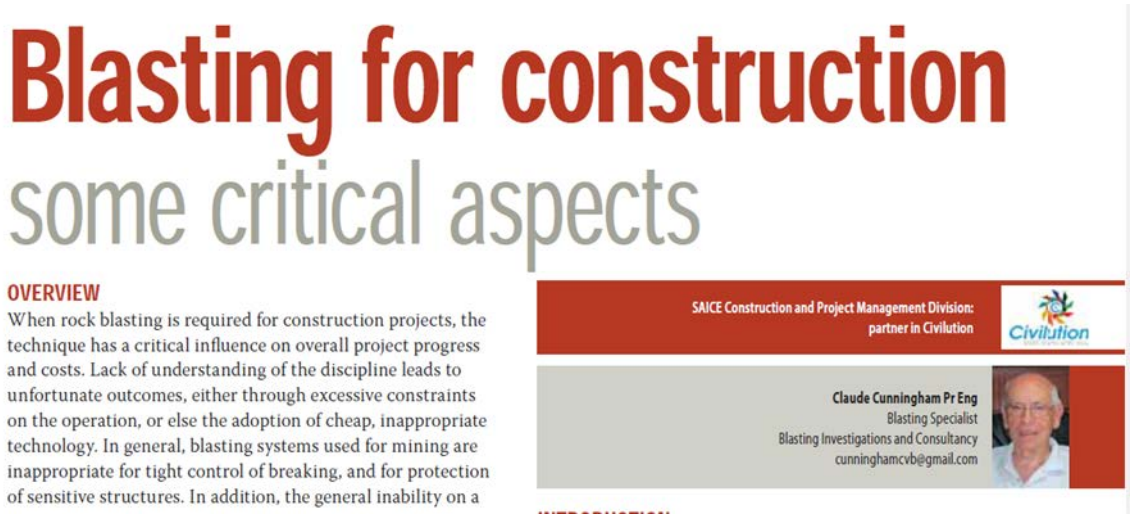
SN	Vibration Level	Effect
1	0.14 mm per second	Vibration might be just perceptible in the most sensitive situations
2	0.3 mm per second	Vibration might be just perceptible in residential environments
3	1.0 mm·per second	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents
4	10 mm per second	Vibration is likely to be intolerable for any more than a very brief exposure to this level

Figure F-1. Vibration Levels Creating Cosmetic Damage to Buildings (reproduced from Figure B.1 of BS 5228 Part 2)
Key: Line 1 - Industrial and heavy commercial buildings.
Key: Line 2 - Residential and light commercial buildings.



2. An equation for predicting the vibrations produced by blasting can be obtained from document “Blasting for Construction: some critical aspects”, with the front cover shown at Figure F-2, and published in the July 2013 edition of Civil Engineering. From this stated document, the equation is shown at page 14 and presented at Figure F-3.

Figure F-2. Document from which Blasting Equation is Obtained



Blasting for construction

some critical aspects

OVERVIEW

When rock blasting is required for construction projects, the technique has a critical influence on overall project progress and costs. Lack of understanding of the discipline leads to unfortunate outcomes, either through excessive constraints on the operation, or else the adoption of cheap, inappropriate technology. In general, blasting systems used for mining are inappropriate for tight control of breaking, and for protection of sensitive structures. In addition, the general inability on a

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Civilution

Claude Cunningham Pr Eng
Blasting Specialist
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Figure F-3. The Blasting Equation

There are various equations used to predict the maximum amplitude of vibration, and the one most commonly invoked in South Africa is derived from the old Dupont Blasters Handbook in the USA. Converted to metric units, it takes the form of Equation 1:

$$V' = 1143 \times \left(\frac{D}{\sqrt{E}} \right)^{-1.65} \qquad (1)$$

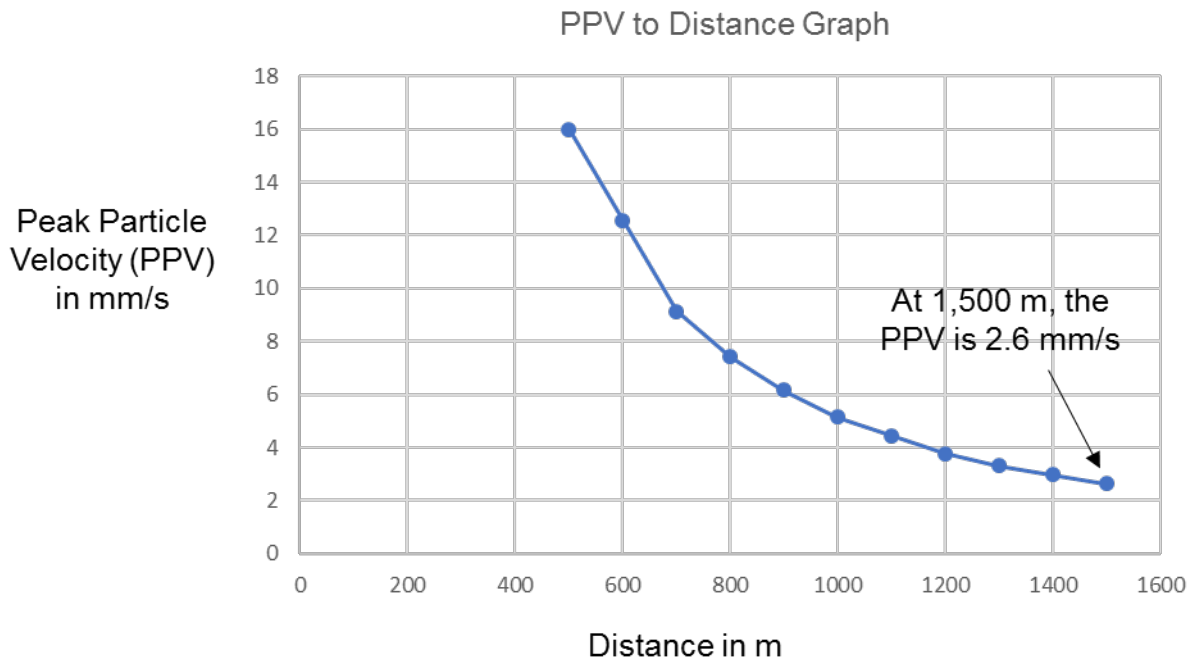
Where V' = predicted PPV, mm/s

D = distance from blast hole to point of interest, m

E = mass explosive per 8 ms interval, kg

3. Using the said blasting equation, and using 1,440 tons as the amount of explosives, the graph at Figure F-4 is obtained.

Figure F-4. Velocity to Distance Graph



4. From the graph at Figure F-4, the velocity at 1,500 m is 2.6 mm/s, a level that is considered as tolerable, if prior warning and explanation has been given to residents (as shown at Table F-1 at above). Moreover, the vibration occurs only once a day, and lasts for only between 1 to 2 seconds.

5. The level of 2.6 mm/s is also below the threshold level of 6 mm/s as stated at Figure F-5, extracted from page 79 of BS 5228 Part 2 Vibration Control on Construction and Open Sites.

Figure F-5. Vibration Limits

Annex A of Minerals Planning Guidance Note MPG 9 [12] and Scottish Government Circular 26/1992 [58] give illustrative guides to the planning conditions on vibration limits. These state that:

> "ground vibration as a result of blasting operations shall not exceed a peak particle velocity of [6 mm/sec] [10 mm/sec] in 95% of all blasts measured over any period of [six months] and no individual blast shall exceed a peak particle velocity of [12 mm/sec] as measured at vibration sensitive buildings. The measurement to be the maximum of three mutually perpendicular directions taken at the ground surface."

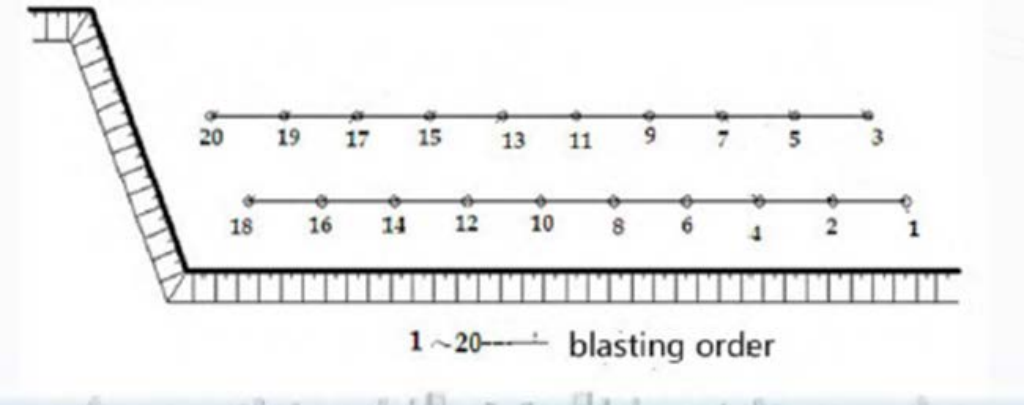
This indicates that the statistical limit should be chosen, for example, between 6 $mm \cdot s^{-1}$ and 10 $mm \cdot s^{-1}$ and that the maximum value should not normally exceed 12 $mm \cdot s^{-1}$.

6. For completeness and ease of reference, the blasting layout is shown at Table F-2 and the blasting sequence for the 20 holes is at Figure F-6.

Table F-2. Blasting Layout

SN	Item	Dimension / Quantity
1	Number of rows	2
2	Distance between rows	4 m
3	Total number of holes	20
4	Hole diameter	140 mm
5	Hole distance	4.5 m
6	Hole depth	10 m
7	Amount of explosives in each hole	72 kg
8	Total amount of explosives in all 20 holes	1,440 kg

Figure F-6. Blasting Sequence



7. To reduce vibration, and for safe vibrations, the following measures are implemented:

7.1 Safe blasting procedure; with a Blasting Plan for each blast.

7.2 Calculations on amount of explosives used to ensure no excessive noise and vibration, and that the levels stated at Table F-1 and Figure F-1, for discomfort to people, and cosmetic damage to buildings, respectively, are not exceeded.

7.3 Millisecond delays for each set of explosion to reduce overall impact.

7.4 No night blasting, no blasting on Sundays, and blasting is planned for regular times of either 11.30 am or 5.00 pm each day.

Attachment G. Quarry Water Management Plan

1. There are no rivers in or bordering the Project site, a location that is at least 1.5 km away from the sea. There is no need for chemicals to process the finished rocks / gravel; i.e. no waste sludge. A recycled water tank is used for watering of the stones in the rock crushing machine. CHT does not rear animals or grow crops. Sanitary waste water is channel in closed pipes into closed tanks. The contents are removed by a collector licensed by the authorities. Therefore, quarry operations have no impact on surface, coastal, and marine water.

2. The few small surface streams in the area are dried-up during the dry season Pictures of these streams, mainly at road crossings are taken for baseline evidence of conditions, shapes and sizes. During quarry operations, the streams, whether dried-up or otherwise, are checked each day to ensure that "all is well". A survey of the natural drainage east of the laydown area was conducted on 19 Jan 2019, and the report is at Attachment G1.

3. During ground investigations for the locations and types of rocks, boreholes were dug to within 20 m above ground level without any sign of ground water. The results show that the water table is below the foot of the hills, as shown at Figures G-1 and G-2. During quarry operations, excavation for rocks stops at 20 m and 100 m above ground level respectively for Hills A and B, i.e. there will be no interference with ground water. However, the water in the wells of the village will still be tested at least once every 6 months. The results of a well water test conducted on Aug 2018, is at Attachment G2.

Figure G-1. Hill A Boreholes (north-south cross-section)

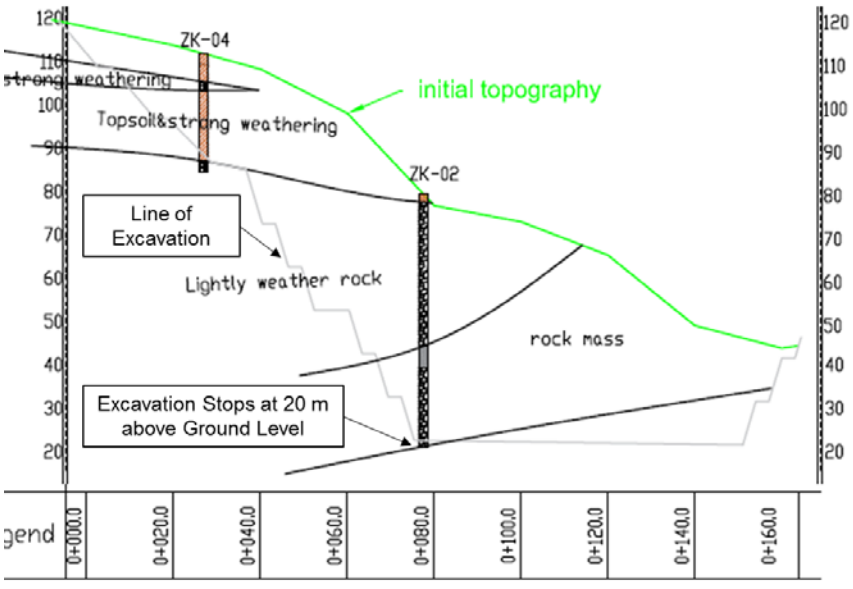
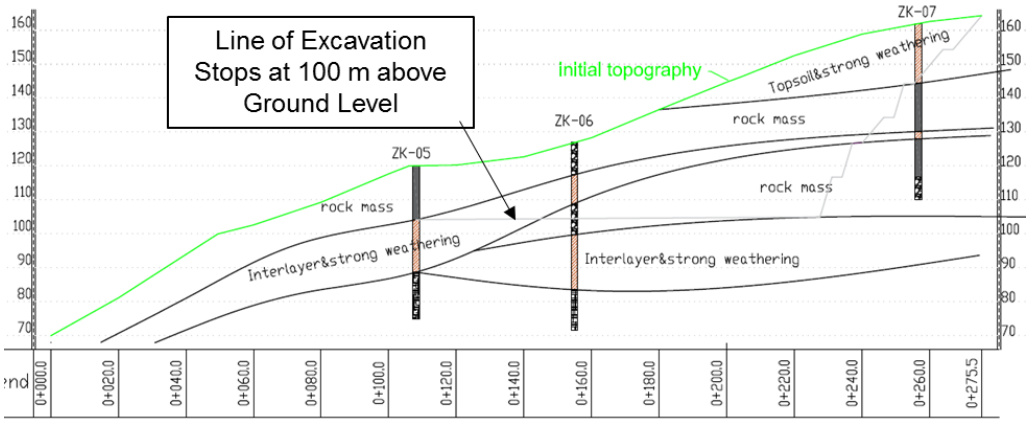


Figure G-2. Hill B Boreholes (north-south cross-section)



4. Further measures to protect ground water include:

4.1 A purpose built storage for four 44-gallon (about 220 litres) drums of hydraulic oil. This facility has a hard standing with spill containment features.

4.2 Closed loop for sewage waste from the housing quarters for 35 persons. The contents of the sewage tank are pumped out by a government approved contractor and disposed at an approved disposal location.

4.3 Use of green barriers, i.e. original vegetation is retained, to prevent silt run-off into water courses.

4.4 A Land Clearance Permit is used to ensure that there is no unnecessary destruction of vegetation.

4.5 Baseline surveys of water courses with photographs to show the state of original conditions.

4.6 Daily and weekly inspections of in-site and off-site conditions, respectively.

4.7 Weekly household visits at the neighbourhood to enquire about the state of the water courses flowing pass their dwellings.

4.8 It is against site rules to divert water courses, or to dig the ground to obtain water without first obtaining permission from the Quarry HSE Manager.

Attachment G1. Survey of Water Course East of Laydown Area

Site Survey of Natural Drainage East of Laydown Area Flowing South to the Village and Under the Dili-Liquica Road to the Sea

Date of Survey: Sat 19 Jan 2019.

Surveyed By: Koh Chee Thong (CHEC HSE Adviser), and 2 residents, both sisters, from the house at the location where the culvert goes under the main Dili-Liquica road, i.e. Ms Anabela da Silva and Ms Angelina da Silva.

Summary

1. Other than 2 small ponds with brackish water, the drainage channels are is completely dried-up, even during the wet season. The channels are flat and wide, with some parts about 50 m wide, i.e. the rain water flows over a large area. There are no gullies, except for a location where the flow of water cuts a grove in the ground about 30 cm deep, 1 m wide and 20 m long. There is no crop growing either side of the drainage channels, other than a single small enclosure, measuring about 20 m by 10m, with corn plants in it. There are scattered dwellings of the wood and grass type on the west side of the drainage system, about 250 m from the main road. Domestic goats, chickens and pigs were encountered all along the route.

Location of Survey

2. At the immediate east of the CHT laydown area for the Quarry at Mota Ulun, there is a natural drainage channel flowing north towards the sea. The start point for the survey is the location where the drainage goes into a culvert under the Dili-Liquica road, and then to the sea. The turn back location is where the drainage meets the quarry laydown area. Figure G1-1 shows the layout of the mentioned places.

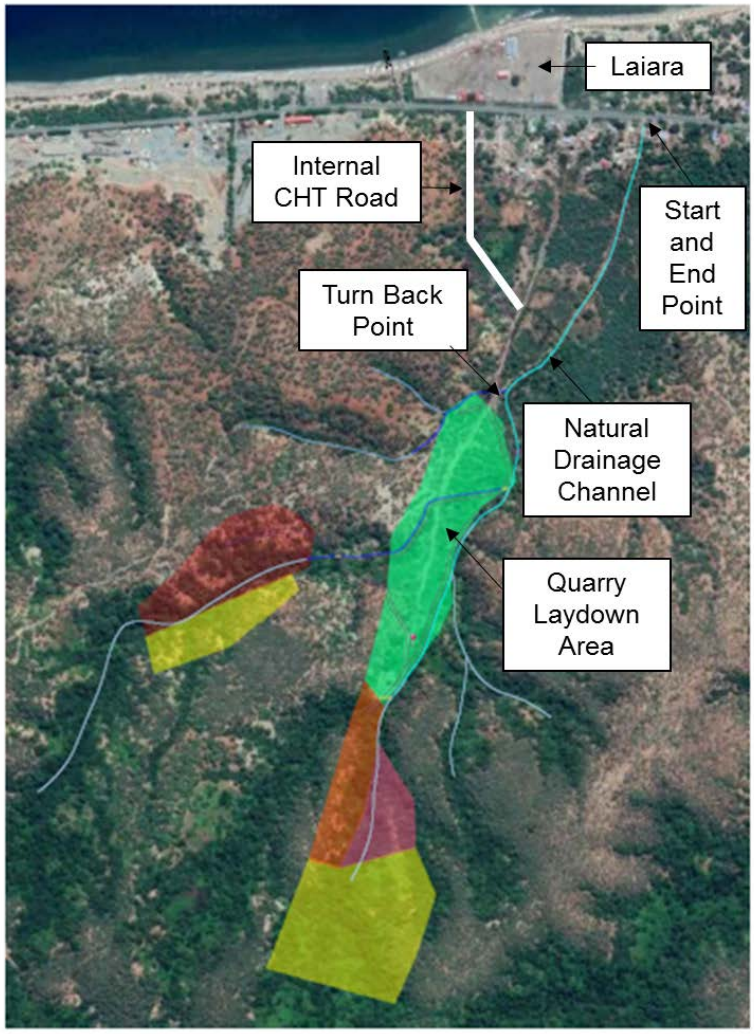
Method

3. After enquiries, it was gathered from the villagers that the water channels are not flooded, that there are no steep slopes or dangerous wild animals, or snakes, and that it is safe to walk on the water channels, or at the sides.

4. The survey method consists of travelling on foot, with the assistance of 2 local persons staying at the house next to the water channel and near the main road. The hike was easy, and 4 children with ages ranging from about 5 to 8 years accompanied the Team, for they are familiar with and are comfortable with the neighbourhood. The Team walked up to the laydown area, and made a turn back, and return by another trail, running approximately parallel to the first route, and on the east side.

5. Photographs were taken at places of interest, and these are shown as figures in Attachment A. The distances stated in the figures are a continuation of distance for the Team, as it starts out from the under-the-road culvert point. The distances are not distances from any other point.

Figure G1-1. Layout Drawing and Route Taken by the Survey Team



Terrain

6. The ground is generally flat, and the slow rise from the main road to the foot of the hills is not noticeable as a person walks on it. Along several parts, the rain channel is general wide, about 50 m. It narrows to about 3 m at certain areas. There is no gully, except for a small section where the rain water flow cuts a grove in the ground measuring about 1 m wide, 30 m long and 30 cm deep. The reason could be because the ground is very firm, for there are stones just about 20 cm deep from the surface. Some parts of the ground are sandy with small stones, and other parts are slightly muddy. The mud is only about 1 cm thick, and easily walked on. At the village area where the culvert under the road was constructed, the ground is full of small stones, carried down by the flow of water.

7. There are only 2 shallow ponds with brackish water, one of which is only 1 m wide and 3 m long. The other pond is about 20 m by 6 m. The water is dirty and muddy, because pigs wallow in it.

Vegetation

8. Vegetation is sparse. There is no thick undergrowth. The ground is usually bare. The trees are not more than 6 m high. Palm trees are prominent; many of which are dead, with only trunks remaining. There is no evidence of oil palm cultivation. The branches on the other types of trees are not thick with leaves.

Fauna

9. There was hardly any sound made by birds. Only one small bird was observed flying. A butterfly was seen, and the children were stopped from trying to beat it with sticks.

10. No wild animals were seen. Domestic goats, pigs and chickens, and animal droppings are encountered all along the path. The animals move away when the Team approaches, indicating that they are not familiar with humans in the area. This is expected, for there is no reason for the villagers or other persons to be in the location. There are several spots where pigs, whether wild or domesticated, have dug up the ground next to trees in search of roots to eat.

Homes, Crops and Husbandry

11. About 250 m from the main road, there are several small buildings of the wood and grass type on the west side of the rain water channel. There are free ranging

and domestic chickens, goats and pigs. There are also a few cows. Grass and shrubs are sparse, probably due to foraging by the domestic animals.

12. There is no growing of vegetables, other than a small enclosure measuring about 20 m by 10 m, and with rows of corn plants less than 1 m in height. This enclosure is about 200 m from the main road, and on the west side of the water channel. Further up the path, there were 2 similar enclosures, but they are abandoned, without any crops, and with only weeds and wild vegetation.

Pictorial Observations

13. Observations along the route are shown at below. The distances stated in the figures are a continuation of distance for the Team, as it moves along, i.e. starting from the under-the-road culvert point. The distances are not distances from any other point.

Figure G1-2. Start Point. Inlet of culvert under crossing (of Dili-Liquica road)

Figure G1-3. 150 m. Small pond with brackish water

Figure G1-4. 200 m. Corn growing enclosure (about 20 m by 10 m) on the right

Figure G1-5. 200 m. Dried-up shallow bed of stream

Figure G1-6. 250 m. Pond (about 20 m by 6 m) with brackish water

Figure G1-7. 250 m. Mother pig and a piglet using the pond
(Note: a few piglets ran away when the Team approached the pond)

Figure G1-8. 350 m. Enclosure on the left without crops
(only weeds and wild growth)

Figure G1-9. 500 m. Dried-up drainage. Typical of terrain

Figure G1-10. 600 m. Continuation of dried-up drainage

Figure G1-11. 800 m. Further continuation of dried-up drainage. Note the wide ground span covered by water when it rains

Figure G1-12. 1,000 m. Enclosure without crop growing. Only weeds and wild vegetation in it

Figure G1-13. 1,150 m. Rain water flow cutting a grove in the bed. (about 1 m wide, 30 m long and 30 cm deep)

Figure G1-14. 1,200 m. Fork in the rain water flow path. Team continued onto the fork on the right

Figure G1-15. 1,250 m. Dried-up bed continues

Figure G1-16. 1,300 m. Turn-back point. CHT rest shed in the far background. Return to main road by the previously encountered fork on the left (now on the right)

Figure G1-17. 1,400 m. Dried-up bed continues

Figure G1-18. 1,500 m. Dried-up bed continues

Figure G1-19. 1,500 m. Earth dug up by pigs

Figure G1-20. 1,600 m. Wide area covered by rain water flow

Figure G1-21. 1,700 m. Depression (1 m wide by 3 m long by 20 cm deep), created by rain water flow

Figure G1-22. 1,800 m. Wide area flooded by rain water

Figure G1-23. 1,850 m. Continuation of wide area flooded by rain water (Note the stones on the ground)

Figure G1-24. 1,900 m. Decayed tree trunk eaten by pigs

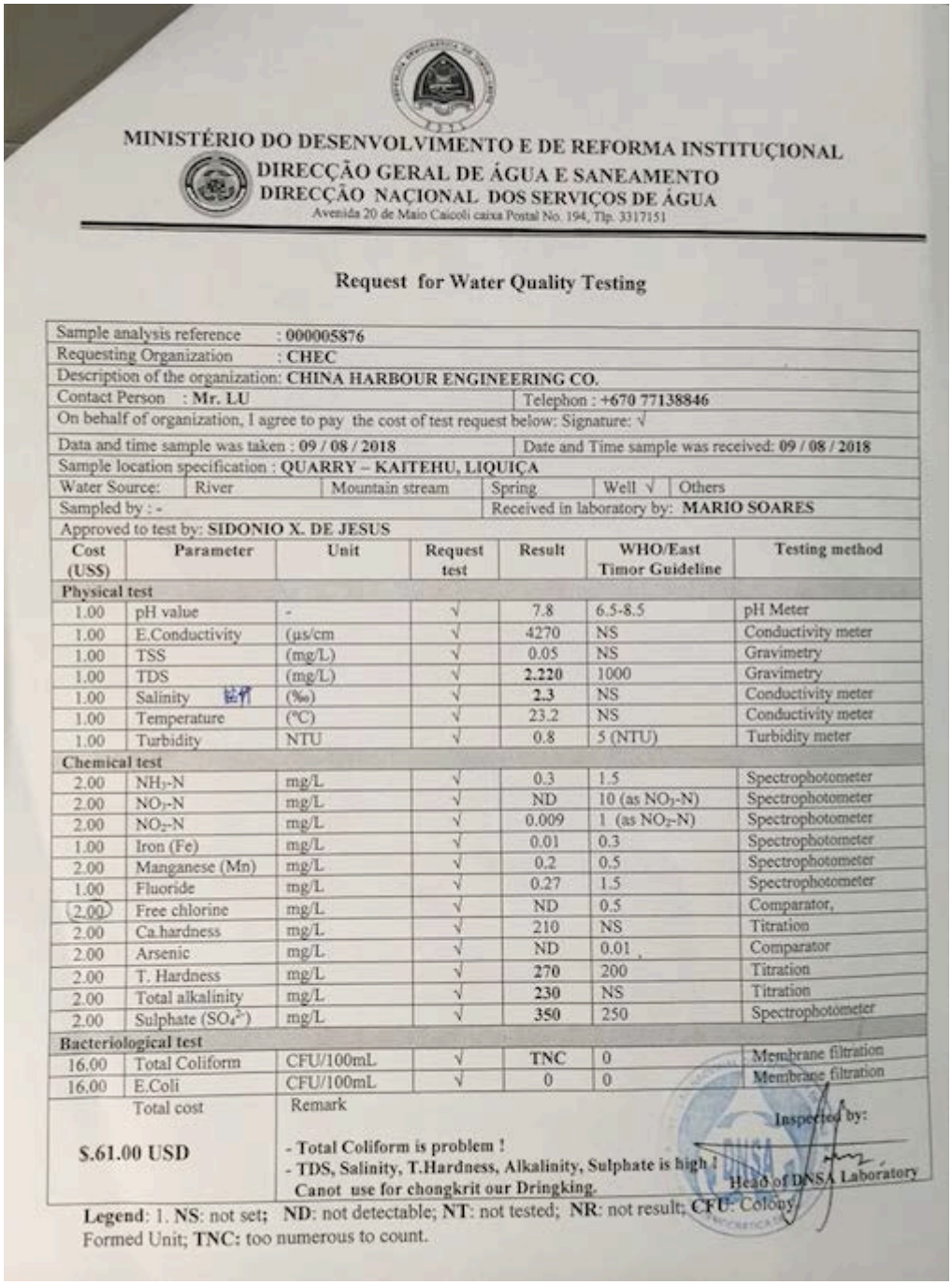
Figure G1-25. 1,900 m. Wide area flooded by rain water

Figure G1-26. 2,000 m. Another view of wide area flooded by rain water. Note thin white deposit on surface, and tree cut by villagers (truck stump remaining)

Figure G1-27. 2,200 m. Return to village houses at location where culvert runs under the main road (Note the small stones on the ground carried down by the rain water)

Attachment G2. Well Water Test

Figure G2-1. Water Test Report for Main Well at Mota Ulun



MINISTÉRIO DO DESENVOLVIMENTO E DE REFORMA INSTITUÇIONAL
DIRECÇÃO GERAL DE ÁGUA E SANEAMENTO
DIRECÇÃO NACIONAL DOS SERVIÇOS DE ÁGUA
Avenida 20 de Maio Caicoli caixa Postal No. 194, Tlp. 3317151

Request for Water Quality Testing

Sample analysis reference : 000005876						
Requesting Organization : CHEC						
Description of the organization: CHINA HARBOUR ENGINEERING CO.						
Contact Person : Mr. LU				Telephon : +670 77138846		
On behalf of organization, I agree to pay the cost of test request below: Signature: √						
Data and time sample was taken : 09 / 08 / 2018				Date and Time sample was received: 09 / 08 / 2018		
Sample location specification : QUARRY – KAITEHU, LIQUIÇA						
Water Source:	River	Mountain stream	Spring	Well √	Others	
Sampled by : -			Received in laboratory by: MARIO SOARES			
Approved to test by: SIDONIO X. DE JESUS						
Cost (US$)	**Parameter**	**Unit**	**Request test**	**Result**	**WHO/East Timor Guideline**	**Testing method**
Physical test						
1.00	pH value	-	√	7.8	6.5-8.5	pH Meter
1.00	E.Conductivity	(µs/cm	√	4270	NS	Conductivity meter
1.00	TSS	(mg/L)	√	0.05	NS	Gravimetry
1.00	TDS	(mg/L)	√	2.220	1000	Gravimetry
1.00	Salinity	(‰)	√	2.3	NS	Conductivity meter
1.00	Temperature	(°C)	√	23.2	NS	Conductivity meter
1.00	Turbidity	NTU	√	0.8	5 (NTU)	Turbidity meter
Chemical test						
2.00	NH_3-N	mg/L	√	0.3	1.5	Spectrophotometer
2.00	NO_3-N	mg/L	√	ND	10 (as NO_3-N)	Spectrophotometer
2.00	NO_2-N	mg/L	√	0.009	1 (as NO_2-N)	Spectrophotometer
1.00	Iron (Fe)	mg/L	√	0.01	0.3	Spectrophotometer
2.00	Manganese (Mn)	mg/L	√	0.2	0.5	Spectrophotometer
1.00	Fluoride	mg/L	√	0.27	1.5	Spectrophotometer
2.00	Free chlorine	mg/L	√	ND	0.5	Comparator,
2.00	Ca.hardness	mg/L	√	210	NS	Titration
2.00	Arsenic	mg/L	√	ND	0.01	Comparator
2.00	T. Hardness	mg/L	√	270	200	Titration
2.00	Total alkalinity	mg/L	√	230	NS	Titration
2.00	Sulphate (SO_4^{2-})	mg/L	√	350	250	Spectrophotometer
Bacteriological test						
16.00	Total Coliform	CFU/100mL	√	TNC	0	Membrane filtration
16.00	E.Coli	CFU/100mL	√	0	0	Membrane filtration

Total cost
$.61.00 USD

Remark
- Total Coliform is problem !
- TDS, Salinity, T.Hardness, Alkalinity, Sulphate is high !
Canot use for chongkrit our Dringking.

Inspected by:
Head of DNSA Laboratory

Legend: 1. **NS**: not set; **ND**: not detectable; **NT**: not tested; **NR**: not result; **CFU**: Colony Formed Unit; **TNC**: too numerous to count.

Figure G2-2. Main Well at Mota Ulun

Attachment H. Environmental Protection Training for Employees

1. Training for drivers and machine operators are stated at Attachment D "Quarry Dust Management Plan".

2. The Quarry HSE Induction training package has a module on environment protection and items in it include:

   2.1 The use of open fires is not allowed, e.g. to dispose waste, or to clear land and structures. The exception is when open fires are used for the purpose of fire-fighting practices authorized by the Quarry HSE Manager.

   2.2 No indiscriminate dumping of soil, i.e. culverts are not to be blocked.

   2.3 The need for green borders to prevent erosion and silt run-off, and also to preserve a visually pleasant environment.

   2.4 Check work areas after each bout of heavy rain for condition.

   2.5 Drivers and mobile machinery operators are reminded not to stray out of designated areas of work, so as not to destroy the protective layer of vegetation.

   2.6 Practice good housekeeping, place wanted items in proper places and receptacles, and as far as practicable, reduce, reuse, and recycle unwanted items.

   2.7 There is a "No Hunting, No Capturing, No Fishing, No Gathering, No Feeding, No Collecting of Eggs, No Souvenirs" rule. However, the buying of arts and craft items made locally is encouraged.

   2.8 The keeping of pets is also not allowed, for dogs and cats will kill small mammals and other small native creatures.

   2.9 The extraction of water, the digging of wells, and the diversion of water courses must be approved by the Quarry HSE Manager.

Attachment I. Biodiversity Survey Report

Prepared By:

Kayla Noble, BSc Hons Zoology.

Kate Barker, BSc Hons Marine and Freshwater Biology.

Ivan Samra Loria Shelley, Field Guide.

Date of Report: 15 January 2019.

Report on Biodiversity Study for China Harbour Timor Lda (CHT), a subsidiary of China Harbour Engineering Company (CHEC)

Quarry at Mota Ulun, Liquica, Timor-Leste.

Abstract

Considering both small size of the study area, in addition to the timeframe of the fieldwork the recorded biodiversity is reasonably high: 16 plant species, 22 bird species; the presence of bats, a macaque monkey, Asian common toad, gecko species and a colorful array of insects. The majority of bird species are listed as IUCN least concern with a few data deficient. The Timor imperial pigeon (*Ducula cineracea*) is listed **endangered** whilst the White bellied bushchat *Saxicola gutturalis* is **Near Threatened**.

There is little information on the vegetation, but the cedar and sandalwood trees are IUCN **vulnerable** but from our research we know they are rare in Timor-Leste. The Burmese redwood is listed as **endangered.** Despite recording the presence of bats, we were unable to identify the species, yet the numbers are few in the area (5 or 6 individuals).

Limitations included the time frame, access to published scientific articles from Timor, identification aids and to some extent a lack of local people's knowledge. However, ample time was spent on observations during the designated 6 day period. Using a group of six people split into three teams greatly increased the overall accuracy of sightings, especially during sunrise/sunset studies where individuals observed both sites thus allowing for varying perspectives and knowledge. Further study by persons specialized in these fields would be needed to truly identify bat and insect species and could act to confirm the data shown here.

Overview

1. This short report follows on from a request from CHT for a biodiversity study of an area for their proposed quarry. The framework for the study was based on the following requests.

    1. Vegetation clearance, habitat destruction, transit corridor changes, migration routes, caves, roosting areas, wetlands and groundwater dependent ecosystems.

    2. Literature review of existing studies and NGO records for the area.

    3. Consultation with the community to obtain their understanding of habitats in the area.

    4. Bat and bird survey at dawn and sunset to identify and count the presence of fauna.

    5. Classification of species against the IUCN Red List, and other information, e.g. migratory, breed at ground level or in trees, preference for specific trees, (e.g. eucalyptus), and other habitats that could be used instead.

    6. Aerial photography interpretation to identify vegetation zones. (footage provided by CHT drone)

    7. Mapping of vegetation types, distribution and health.

    8. Mapping of significant fauna habitats and key trees and nesting areas.

Background

2.1 The following background information was provided by CHT.

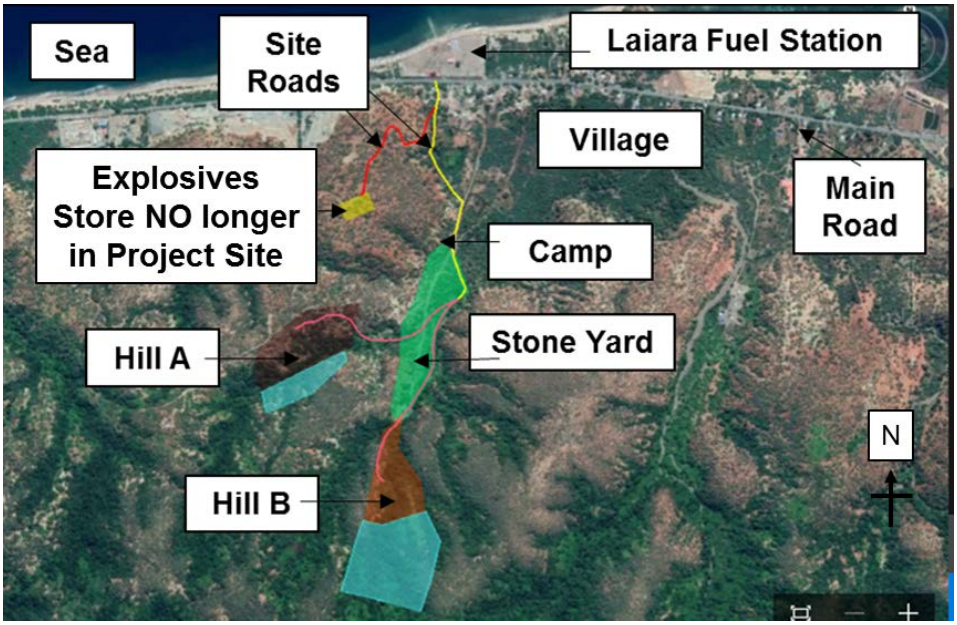


Figure 2-1. Site Map (provided by CHT)

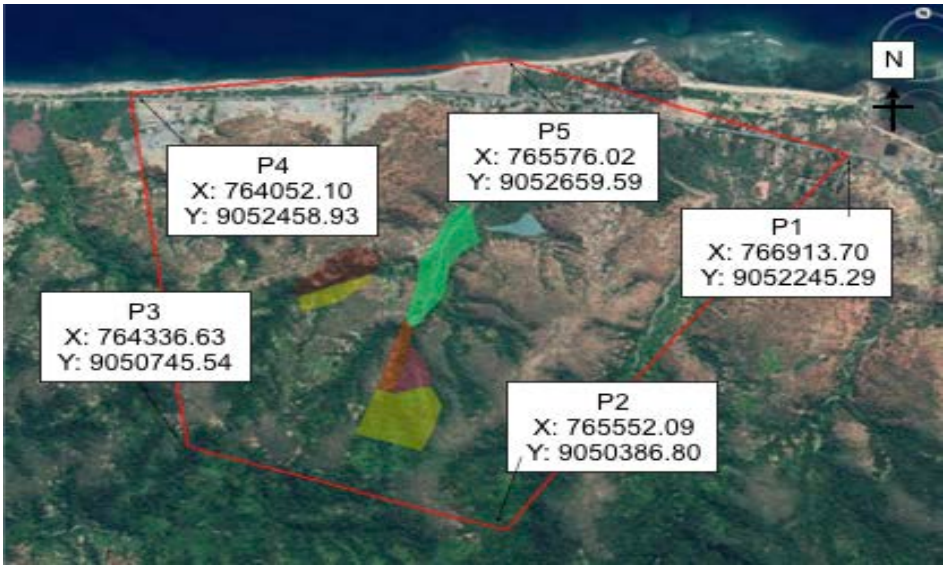


Figure 2-2. Site Map by CHT with GPS coordinates of the Quarry Area

2.2 Mota Ulun is a small village with about 457 people in about 162 families, living in scattered dwellings, usually of the timber, zinc and thatched roof types. Water obtained from the few wells are salty, for the village is near the sea, and not near rivers or streams. There are no plantations or live-stock industry or fishing using boats. Families grow crops and keep a few animals for home consumption.

2.3 Commercial activity is very low, with 2 family-owned and operated small provision shops. The only and small number of employment opportunities are at the low intensity bulk fuel station, and the few small-scale companies operating stone works, i.e. making gravel and casting concrete parts. Mota Ulun has a primary school with a football field, the Church of Capela da Sagrada Familia, and at the rear of the Church, the convent Irmas Franciscanas de Nosa Senhra das Victorias. There is no Clinic. There are no social or recreational facilities, other than 2 billiard tables at 2 locations

2.4 Figure 2-1 shows the location and layout of the quarry at Mota Ulun. Also shown at the top of Figure 2-1 is the Quarry Jetty, sited about 60 m west of the brick wall of the Lai-Ara Bulk Fuel Station. The identified 2 hills (A and B) at Mota Ulun are the main focus of the biodiversity study. Figure 2-2 shows the full area with GPS coordinates.

Local Testimonials

3.1 During our survey we asked some of the local people and people working around the area about the wildlife and to some extent the vegetation in the study area. Not many of them were knowledgeable about the bird life, although the blue quail was mentioned, presumably due to the eggs, but we had lots of assistance with the plant life. The names of the plants were evidently given in Tetum and we later had to re-identify the common and scientific names

3.2 Some of the people we spoke to include the security guards working in the parking area - both day and night teams. We also met the security persons watching over the radio tower at the top of Hill A. Additionally, almost every day we met a local bringing firewood down to the village from one or both of the hills. As each team had at least one Tetum speaker, we were able to ask them a series of questions to aid in our research. Mainly we asked what animals are common to see in the area and asked about the plant life around us.

3.3 Everyone we asked confirmed the presence of monkeys, the only species in Timor is the crab-eating macaque monkey (*Macaca fascicularis)*. Occasionally, both the common palm civet (*Paradoxurus hermaphrodites*) and common spotted cuscus (*Phalanger orientalis*) are witnessed in the area and very rarely Rusa deer (*Cervus timorensis*); obviously local livestock such as cattle, chickens and goats also graze there. In regard to the vegetation the locals were able to help us identify mainly fruiting plants they eat plus a few of the local bushes; the custard apple tree (*Annona squamosa*), elephant foot yam (*Amorphophallus paeoniifolius*), the tamarind tree *(Tamarindus indica)* and the cinnamon tree (*Cinnamomum verum*). The main fuel wood they use comes from the white and black eucalyptus.

Introduction

General Overview

4.1 Timor is part of the Walleacean biogeographic region (Braby & Pierce 2007). This biogeographic region is recognized globally for its unique and overall high biodiversity (Myers 2000); including a large number of endemic species. At least 1,500 plants, 262 birds, 127 mammals, 33 frogs, 99 reptiles and 50 freshwater fish species are found specifically in this region (Wikramanayake *et al*. 2002a; Wikramanayake *et al.* 2002b). Unfortunately, though and despite a global significance, there is a low level of biological research on many islands in Wallacea, with Timor island being one of the least studied of all the main islands. Obstacles for the further research have included and continue to include limited access during the occupation by Indonesia, a lack of indigenous researchers or visiting international ones, little knowledge of threatened species and restricted areas of forest and woodland. (Trainor 2010). Studies from Timor island have

shown fauna is usually characterized by low species richness but high levels on endemism, which considering its proximity to Australia and being an island environment is evolutionary consistent (Grantham et al. 2010).

4.2 Birds and vegetation are by far the most studied group, whilst the other main fauna is generally poorly known. Regrettably, much of Indochina's biodiversity is still unknown although the more common groups, such as mammals, have been better described since the 1990s.(Conservation International, 2011). A minimum of 262 bird species is known from Timor (Trainor 2005) whilst vegetation of Timor-Leste can be grouped by savannah formations comprised primarily of Eucalyptus (*Eucalyptus alba*) and Tamarind trees (*Tamarindus indicus*), open or moderately dense forest; containing a dominant species of black Eucalyptus (*Eucalyptus urophylla*) and several fern species and tropical monsoon forest; made up from a larger variety of species including *Santalum album, Canarium reidentalia, Toona sureni, Pterocarpus indicus* and *Tectonia grandis* (Henriques et al. 2011).

4.3 Bats have 34 representative species, 12 of which are fruit bat species There are seven species of rats and mice, five shrews (2 endemic). Other mammals include the common spotted cuscus (*Phalanger orientalis*) which is the only marsupial on Timor and long-tailed macaque (*Macaca fascicularis*) the only primate. Additional mentions include 1 common palm civet (*Paradoxurus hermaphroditus*), the Eurasian wild pig (*Sus scrofa*) and Rusa deer (*Cervus timorensis*) (Trainor *et al* 2007). There are 15–20 amphibian species and 40 or more reptiles on Timor (Kuchling et al. 2007).

Vegetation

4.4 Although Botanical surveys in Timor-Leste have recorded more than 1,000 plant species, the predictions, based upon parallels with many other Malesian islands, are that up to 2,500 species might be present on Timor Island (Cowie 2006).

4.5 Timor-Leste is internationally recognized for naturally occurring forest species including *Santalum album, Eucalyptus urophylla, Pterocarpus indicus, Casuarina junghuhniana* and *Tamarindus indica* (Old et al 2003). Along the north coast, from sea level to low-mid altitudes; such as where this survey is to be carried out, is dominated by woodlands and savannas. The savanna woodlands are usually made up of *Eucalyptus alba*, palm and/ or acacia. At higher altitudes there may be open forests comprising mainly of *Eucalyptus urophylla* (Grantham et al. 2010).

Birds

4.6 Whilst Trainer (2005, 2007b) showed a minimum of 262 bird species from Timor; 169 of which are considered resident, 76 regular migrants and 17 vagrants, the website avibase.bsc-eoc.org (updated to present date) reports 280 known species in the country seven of which are on the red list, with four being

introduced species. Birdlife International (2008) recognizes four globally threatened and 14 near threatened birds in Timor-Leste; of which all depend on the tropical forest habitats (Trainor et al. 2008). As a side note - the Christmas Frigate bird, *Fregata andrewsi* has been recorded as a critically endangered vagrant.

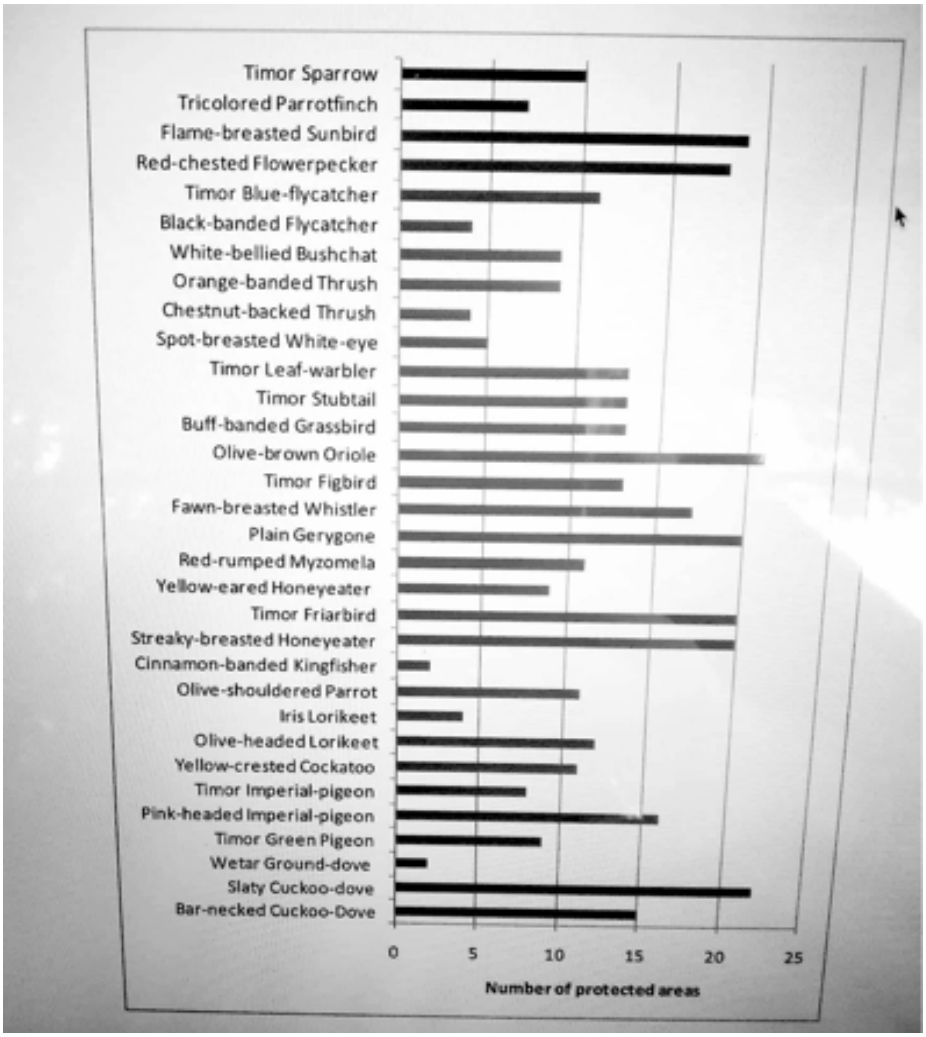


Figure 4-1. List of threatened and endemic bird species. Source: Timor-Leste Gap Analysis 2011

Mammals

Bats

4.7 As previously mentioned, there are 34 bat species, 12 fruit bat species, on Timor (Birdlife 2007). Regrettably, there have been few studies to expand on all these species, www.inaturalist.org indicates only 12 of 34 species have been sighted, plus bat identification can be difficult. The species *Pteropus vampyrus* of the flying-fox family has been recorded (Breed *et al*., 2010). Another noted species is *Pipistrellus javanicus* (Cranbrook, 1991). The Timorese horseshoe bat

Rhinolophus montanus is listed as endangered on the IUCN red list but little other information is available (Armstrong, K. & Csorba, G. 2016). Indonesian Short-nosed Fruit Bat, *Cynopterus titthaecheilus* has also been sighted (www.inaturalist.org).

Other Species

4.8 The Shrew (*Crocidura tenuis)* and Timor Rat (*Rattus timoriensis)* are the only endemic mammal species aside from the bats, with all others being introduced by human activity (Glover 1986). Species introduced include the house mouse (*Mus musculus*), house rat (*Rattus tanezumi*), brown rat (*R. norvegicus*) and field rat *(R. exulans*). Additionally, the common spotted cuscus (Phalanger orientalis), long-tailed macaque (*Macaca fascicularis*), common palm civet (*Paradoxurus hermaphroditus*), Eurasian wild pig (*Sus scrofa)* and Rusa deer (*Cervus timorensis*).

Reptiles and Amphibians

4.9 During September 2004 and July 2009 fieldwork in Timor-Leste recorded 263 herpetological specimens (100 amphibians, 163 reptiles) of which at least seven species are frogs and toads (most commonly *Duttaphrynus melanostictus*, rice paddy frogs (genus *Fejervarya*), and treefrogs (*Polypedates cf. leucomystax)*). Reptiles comprised 20 species of lizards inclusive of six geckos, two monitor lizards, about 10 skinks (Kuchling et al. 2007), seven species of snakes; at least one blind snake, three pythons, one viper snake, approximately eight colubrid snakes, one file snake, at least four primitive sea snakes (Kuchling et al. 2007), two species of turtles, and one species of crocodile (Kaiser et al 2011).

Insects

4.10 Data regarding insecta is scarce, however www.inaturalist.org indicates 110 species present in Timor-Leste. Although limited, most of these species are photographed. With over 670,000 species of insect worldwide and limited information available for representative in Timor-Leste it is fair to say any sightings will be noted and/or identifications made as possible. Though insect information was not directly requested for this survey we wish to provide at least a brief overview.

Threatened Species

4.11 According to the IUCN (2010), species **threatened with extinction** include three tree species, four birds, three mammals and one butterfly on Timor (**Figure 3)**, mostly due to habitat loss. It is likely that this IUCN's assessment is now outdated as well as a gross underestimation, as little is known of the status of many amphibians and flora across the island of Timor (Grantham *et al,* 2010). This also does not consider species that are vulnerable or near threatened, plus many species will fall under the data deficient category.

Common name	Scientific name	IUCN status	Threatening process
TREES			
Sandalwood	*Santalum album*	VU	Habitat loss, fires, agriculture, extraction
Borneo Teak	*Intsia bijuga*	VU	Habitat loss, selective logging
Burmese Rosewood	*Pterocarpus indicus*	VU	Habitat loss, agriculture, selective logging
BIRDS			
Timor Green Pigeon	*Treron psittaceus*	EN	Habitat loss, hunting, agriculture
Timor Imperial Pigeon	*Ducula cineracea*	EN	Habitat loss, hunting, agriculture
Wetar Ground-dove	*Gallicolumba hoedtii*	EN	Habitat loss, hunting, agriculture
Yellow-crested Cockatoo	*Cacatua sulphurea*	CR	Habitat loss, harvest for pet trade, agriculture
MAMMALS			
Thin Shrew	*Crocidura tenuis*	VU	Habitat loss, degradation, restricted range
Western Naked-backed Bat	*Dobsonia peronii*	VU	Habitat loss, extraction, restricted range
INSECTS			
Timor Yellow Tiger	*Parantia timorica*	EN	Severely fragmented population with ongoing decline

Figure 4-2. The IUCN List of Threatened Plants and Animals of Timor-Leste. Source: Timor-Leste Gap Analysis 2011

Methodology

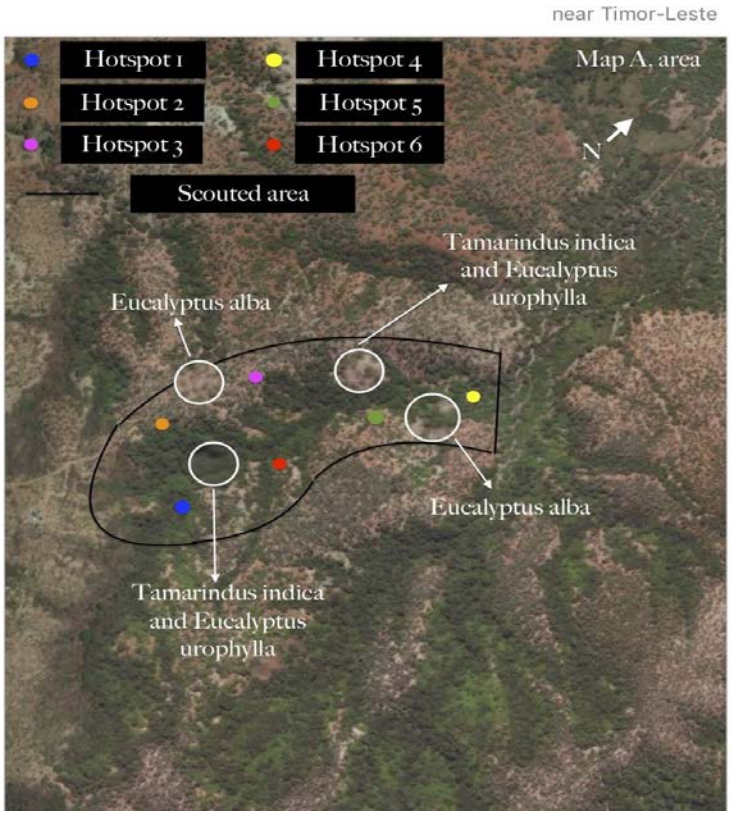
5.1 Flora and Fauna species, particularly birds, insects, bats and other mammals, were recorded in Liquica, Timor-Leste during eight field visits over a total six day period spanning from 2nd January to 5th January and 7th and 8th January. A full breakdown of the field work schedule can be found in Appendix 1. The research site was dictated by that of a proposed quarry; located in the province of Mota Ulun (-8.573 and 125.614 (Lat./Lng.); S -8° 34' 22" and E 125° 36' 51", Liquica district where this survey was conducted. Photographs of flora and fauna are at Appendix 2.

5.2 Various areas were investigated over 6 days however the main focus was on the 2 hills to be used for terracing (Figure 2-1). We have provided maps of Hills A and B indicating the hotspot areas we surveyed (Maps 1 and 2). Most sites were identified during the first day as flora or fauna hotspots and thus became the focus for observations. The team was then split into 3 groups; one team scouting hill A and two teams scouting hill B due to the topological differences. Each hill had a total of 6 hotspots. Fauna was observed using the naked eye as well as with binoculars, camera equipment was available within each team and where possible photo documentation was taken to assist with identifications.

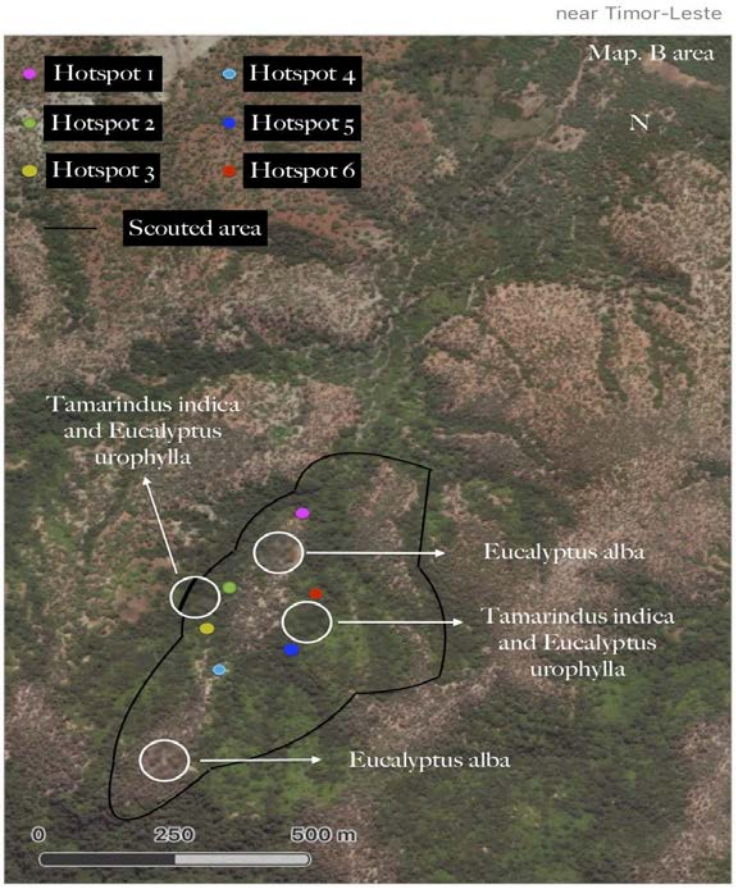
5.3 All species of flora witnessed was photographed and recorded. Identifications were made with the assistance of websites, papers and books (see our references). Observations of number of sightings and locations were recorded as well as any important notes on habitat or nesting behaviors or locations. With the aid of google maps and GPS, hotspot locations were also noted. All data was recorded in a notebook, if photos were taken this was recorded too, for later cross referencing. Location names are recorded as the common English and local Tetum (where available).

5.4 Sunrise and sunset observations were made on January 4th and 8th in a clear area at the base of both hill A and B. Focusing mainly on birds but also recording bat sightings. Sunrise is defined as approximately 30 minutes before sunlight and 1 hour after sunlight. Sunset is defined as 1 hour before sundown and 1 hour after initial darkness. Sunrise observations focused primarily on bird sightings with any bat sightings noted as well. Sunset observations focused on bird sightings during the early hour and move to focus on bat sightings at sunset and after sunset. The numbers of bats and birds were recorded, different types of bird calls were recorded, and sightings of different bird and bat species were recorded. Notes were added for identification purposes regarding the color and size of birds and bats.

5.5 Additionally, to aid in bat sightings, a white sheet was set up, hanging from a tree, with artificial white lights shining onto it, aiming to attract insects which in turn attracted any bats to hunt near the sheet. This was studied for around 1 hour after there was no light. Additional equipment used included GPS location devices and torches for spotting animals at night and in small holes.



Map 1: Hill A Area



Map 2: Hill B Area

6.1 Bird sightings are shown at Table 6-1.

Table 6-1. Bird Sightings

Key: LC – Least Concern (IUCN Classification)

Common Name	Scientific Name	IUCN Listing (where available)	Notes
Timor Oriole	*Oriolus Melanotis.*	Unknown	Endemic to this island
Zitting Cisticola	*Cisticola Juncidis.*	LC and increasing	Resident. Low lands and
Brush Cuckoo	*Cacomantis Variolosus.*	LC and stable	Resident. Low lands.
Rainbow Bee-eater	*Merops Ornatus.*	LC and stable	Resident. Low lands. Abundant in area B.
Sunda Thrush	*Zoothera Andromedae.*	LC but decreasing	Resident. Low lands.
Thick-billed Flowerpecker	*Dicaeum Agile.*	LC and stable	Resident.
Northern Fantail	*Rhipidura Rufiventris.*	LC and stable	Resident. , Low lands. Have photo. Sighted in both A and B areas.
Lesser Coucal	*Centropus Bengalensis.*	LC and increasing population	Resident.
Oriental Reed-Warbler	*Acrocephalus orientalis.*	LC and decreasing	Resident.
Timor Leaf-warbler	*Phylloscopus Presbytes.*	LC and stable	Endemic to the region.

Barred Dove	*Geopelia Maugeus.*	LC and stable	Resident. Area A and lowlands.
Long-tailed Shrike	*Lanius Schach.*	Unknown	Resident. Low lands and area A.
Timor Blue-flycatcher	*Cyornis hyacinthinus*	LC but decreasing	Area A
Timor imperial pigeon	*Ducula cineracea*	Endangered	Area B
White bellied bushchat	*Saxicola gutturalis*	Near Threatened	Area B
Spectacled Monarch	*Symposiachrus Trivirgatus.*	LC and stable.	Resident. Low lands and area A.
Red-chested Flowerpecker	*Dicaeum Maugei.*	LC and stable	Endemic to the region. Area A.
Streaky-breasted Honeyeater	*Microptiloptis Reticulatus*	Unknown	Endemic to this island.
Slender-billed Cicadabird	*Edolisoma Tenuirostre.*	LC and stable.	Resident. Area A.
Flame-breasted Sunbird	*Cyaniris Solaris.*	LC and stable	Resident.
Japanese sparrowhawk	*Accipiter gularis*	LC	Area A
Black kite	*Milvus migrans*	LC	Area A

Vegetation

6.2 Vegetation sightings are shown at Table 6-2.

Table 6-2. Vegetation Sightings

Common Name	Scientific Name	IUCN List (where available)	Notes
Sandalwood	*Santalum album*	Vulnerable	Area A, young
Spanish Cedar	*Cedrela odorata*	Vulnerable	Area A, young
White Gum Tree	*Eucalyptus alba*	Unknown	Area A and B
Tamarind Tree	*Tamarindus indica*	LC	Area A and B
Yellow Oleander	*Thevetia peruviana*	Unknown	Area A
Bellyache Bush	*Jatropha gossypifolia*	Unknown	Area A and B
Siam Weed	*Chromolaena sp.*	Unknown	Area A and B
Custard Apple Tree	*Annona squamosa*	Unknown	Area B
Big-Sage	*Lantana camara*	unknown	Area A and B
Rubber Bush	*Calotropis procera*	Unknown	Area B
Elephant Foot Yam	*Amorphophallus paeoniifolius*	Unknown	Area B
Cinnamon Tree	*Cinnamomum verum*	Unknown	Area B
Cabbage Tree	*Andira inermis*	LC	Area B
Hairy Brown Uvaria	*Uvaria hirsuta*	Unknown	Area B
Bignonia species	*Bignonia sp.*	Unknown	Area A and B
Burmese Rosewood	*Pterocarpus indicus*	Endangered and decreasing	Area A and B

Bat Sightings

6.3 On the 4th January around 5 bats were spotted during the sunset/evening investigations. None of these were attracted to the white sheet but were flying around the base area. On the 8th January again 4-5 bats were sighted; giving the impression of one family living in the area. During sunrises the bats were seen moving from Hill A to Hill B (NW) Identification proved impossible as bats were only seen flying and a specimen could not be obtained. Further investigation is required for full identification of species. No roost was found nor were bats sighted in the trees during day time. However, presence of bats at night strongly indicates an unlocated roosting area somewhere in or close to Hill A.

Insect Sightings

6.4 These sightings were not specifically requested but they have been included for reference. Despite insect sightings, recordings, and photos being substantial, especially with use of the white sheet during night surveys, identifications were difficult due to a lack of information. As mentioned in the introduction there have been few studies into the insects of Timor island or Timor-Leste. Table 6-3 lists the positive identifications we did manage; none of which are listed as endangered.

Table 6-3. Insect Sightings

Common Name	Scientific Name	Type of Insect
Common Mormon	*Papilio Polytes*	Butterfly
Malay cruiser	*Vindula dejone*	Butterfly
Lemon migrant	*Catopsilia pomona*	Butterfly
Plain tiger	*Dariaus chrysippus*	Butterfly
---	*Papilio Pericles*	Butterfly
The common crow	*Euploea core*,	Butterfly
---	*Xylocopa perforator*	Beetle
---	*Tropidothorax fimbriatus*	Beetle
Crusader Bug	*Mictis profana*	Beetle
Common house fly catcher	*Plexippus petersi*	Spider
Australian Golden Orb-Weaver	*Nephila edulis*	Spider
Giant Honey Bee	*Apis dorsata*	Bee
Blue flower wasp	*Austroscolia soror*	Wasp

Other Sightings

6.5 **Livestock:** Cows, goats and chickens from the surrounding village.

6.6 **Monkeys:** A long-tail macaque monkey (*Macaca fascicularis)* was sighted and heard on multiple days of the study. A small group was seen traveling through the lower levels of the forest on Hill A.

6.7 **Amphibians:** The Asian common toad (*Duttaphrynus melanostictus)* was sighted during evening surveys for bats and birds.

6.8 **Geckos and lizards**: Tokay gecko (*Gekko gecko*) and the *House gekko (Hemidactylus frenatus)* were heard and/or seen around the area.

6.9 Considering both small size study area in addition to the timeframe of the fieldwork the recorded biodiversity is reasonably high: 16 plant species, 22 bird species; the presence of bats, the macaque monkey, Asian common toad, geckos species and a colourful array of insects.

Discussion

7.1 Vegetation clearance is historically known from during the Portuguese colonisation period, when the Portuguese were interested in the ample sandalwood timber; following this the Indonesian occupation resulted in significant deforestation with little reforestation; growing of crops was more of a focus (*Gusmão 2003*). Between 1972 and 1999, forest cover in East Timor decreased by almost 30%; (*Sandlund et al. 2001).* Traditionally, many communities used slash and burn agriculture (Trainer et al 2008). *Eucalyptus alba i*s an indigenous species which is a common coloniser after clearing or fire *(*Old *et al 2003).* Small sections of the area here indicate clearance of vegetation in the past. From our observations these areas show a lower variety of species, although many insects were noted.

7.2 Evaluation of aerial footage for the survey areas confirmed the presence of two main forest types present on both Hills A and B; the top and flatter areas of each hill dominated by reasonably sparse Eucalyptus forest (*Eucalyptus alba*) whilst the valley sections of each hill consist of Tamarind trees (*Tamarindus indica*) and low shrubs (See map 1 and 2). Confirming the observations from the field study, aerial footage shows that the Eucalyptus forest area is comprised of younger trees with less vegetation present in the canopy understory; whereas the valley areas consist of a more dense forest canopy plus larger, older trees. These older trees offer effective foliage and space for a variety of bird species. Thick, lower level bush provides roosting and foraging areas for species occupying lower parts of the forest. Areas suitable for roosting were identified in Hills A and B.

7.3 Between 1972 and 1999, forest cover in East Timor decreased by almost 30%; perhaps only 6% of that remaining is primary forest (endemic forest) (Sandlund et al. 2001). More recently it has been shown to be between 50-70% of its forest remaining which is also heavily fragmented (Grantham et al. 2010). Around half the land has a slope of 40% or more (Mota 2002) thus deforestation likely began at the base and peak of hills which could explain the distributions of *E. alba* found here.

7.4 The clearance of vegetation leads to the destruction of a wide array of habitats as well as fragmentation or modification of said habitats which in turn can lead to localized extinctions via increased predation (less cover for the prey), reduced breeding or feeding areas, and soil erosion and nutrient loss which can affect the type of plants that may recolonize an area. Limited seed dispersal and/or pollination due to fewer animals will also affect plant colonization (Heywood et al 1992). Most species occupy small niches thus increasing the probability of chance extinctions (Gaston 1994), within those small areas there will be limited numbers of individuals (Brown 1984) and these areas are threatened by human activity (Cincotta et al. 2000).

7.5 Observations showed particularly birds and reptiles (gecko species) were roosting in and around trees and bushes. Butterflies and an array of insects were found near the ground level of the forest either flying or on a variety of plants or perched on rocks. It has been shown that invertebrates, such as butterflies, and small vertebrates like lizards require less habitat to continue to thrive in an area (Brooks et al 1999*)* but many mammals and birds need full coverage forest areas (*Peters, 1983*).

7.6 A majority of the bird species identified prefer nesting and general habitats in thick bush cover and low level trees. Several exceptions include the barred dove (*Geopelia maugeus*) commonly found in agricultural areas and *Cisticola spp*. which tend to be found in grasslands (Trainor et al 2008). The Timor Imperial Pigeon (*Ducula cineracea*) was found to prefer habitat dominated by Eucalyptus trees (*Eucalyptus alba*) and the Red-chested Flowerpecker (*Dicaeum maugei*) was identified as having preference for Tamarind trees (*Tamarindus indica*) as a food source (https://www.hbw.com).

7.7 Species with preference for certain forest types include the White-bellied Bushchat (*Saxicola gutturalis*) commonly found in *Eucalyptus alba* woodlands and the Flame-breasted Sunbird (*Nectarinia solaris*) often sighted in tropical dry forests (Trainor *et al.,* 2008). The majority of birds identified feed primarily on insects. Fruit, pollen or nectar eating birds include the Timor imperial pigeon (*Ducula cineracea*), red-chested flowerpecker (*Dicaeum maugei*), streaky-breasted honeyeater (*Microptiloptis Reticulatus*), and thick-billed flowerpecker *(Dicaeum agile)*. Identified birds which feed on small animals or carrion include Long-tailed shrike *(Lanius schach)*, Japanese sparrowhawk (*Accipiter gularis)*, and Black kite (*Milvus migrans) (*https://www.hbw.com*)*.

7.8 Several species are restricted-range species, found specifically in montane areas including the Timor Imperial Pigeon (*D. cineracea)*, however other species are unexpectedly sighted in the lowlands, including the Timor Blue Flycatcher (*Cyornis hyacinthinus*), which can also be spotted on coffee plantations (*Trainor et al 2008*). Nesting preferences are generally for thick bush covered vegetation or roostings within trees with one exception, the rainbow bee-eater (*Merops ornatus*), a ground dwelling species which creates a burrow nest (http://www.environment.gov.au).

7.9 There is limited data about bird migration patterns in Timor-Leste, thus it is unclear if there are any direct migration routes within the survey area however as the area is relatively small, it is not likely any development will disrupt major migration paths for birds (Trainor *et al.,* 2008). Migration of other animals is also unclear but tracks present do indicate movement throughout the survey area.

7.10 The long-tailed Macaque monkeys (*Macaca fascicularis*) were observed moving across the mountain side and vocalizations were heard on different sides of the survey area during different days, indicating movement throughout the area, particularly on Hill B. Troops are reported to have a home-range area which can vary from 12.5 ha (hectares) to over 300 ha. Many Southeast Asian islands attribute prehistoric human introduction for the presence of *M. fascicularis*. The natural range for this species stretches from Bangladesh and Southern Burma down to the Lesser Sunda islands, including the island of Timor. Consistent with our findings, *M. fascicularis* tend to favor lower and middle levels within the forest canopy (Fooden, 1995).

7.11 Despite bat sightings, no caves were found during this survey, and owing to the limited number of bats observed this seems consistent. Sighting most likely indicate one family roosting in a small area. In forested areas bats can be characterized by those that roost in foliage of trees or those roosting in cavities or crevices of trees (Christy and West, 1993). Foliage-roosting bats typically roost by hanging from limbs, leaf petioles, or small branches in tree canopies (Constantine, 1966). Cavity and crevice-roosting bats roost in cracks, spaces under exfoliating bark, holes in decaying limbs, and hollow trunks of live trees (Christy and West, 1993). Some bat species may prefer to roost in more open areas and thus may not be so adversely affected by deforestation (McMahon et al., 1998)

7.12 Additionally, no wetlands were identified as the majority of the area is mountainous. Due to the presence of mountains all water sources flow directly downhill; as no springs or other groundwater sources were noted in the top areas, further investigation by a specialist would be needed to confirm. There are indications of streambeds which likely fill with water during large rainfall. According to an assessment by World Bank Group (2018), the monsoon climate found in Timor-Leste leads to variations in the flow of rivers from changing consistency and flash floods during the wet season to dry riverbeds during the dry season. However, only those larger primary rivers will have a consistent water

flow throughout the year. The existence of multiple dry streambeds indicates the potential presence of water dependent species. One species, the Asian common toad (*Duttaphrynus melanostictus)* was documented during field research.

7.13 As wetlands are extremely limited in Timor-Leste and due to the mountainous geography of the survey area, none of the varying wetland types which include freshwater or saline lakes, swamps, marshes as well as wet grasslands, intertidal sand and mudflats, and also sandy or rocky beaches, mangrove habitats and exposed coral reefs were noted in the survey area (Trainor 2008).

7.14 Limitations in time frame for observations, the low volume of published scientific articles relating to previous studies in Timor, restricted identification aids available and to some extent a lack of local people's knowledge about wildlife may have affected results. However ample time was spent on observations during the designated 6-day period. Using a group of six people split into three teams greatly increased the overall accuracy of sightings, especially during sunrise/sunset studies where individuals observed both sites, thus allowing for varying perspectives and knowledge. Further study by persons specialised in these individual fields would be needed to truly identify bat and insect species and could act to confirm the data shown here.

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Appendix 1.

Methodology

Schedule

Day 1 January 2nd: Overall site investigation to find hotspots and map each hill in more detail.

Day 2 January 3rd: Initial survey of the 6 hotspots chosen on both hills 6.30am to 10.30am.

Day 3 January 4th: Sunrise and sunset surveys for bats and birds 6am - 8am and 6pm to 9pm.

Day 4 January 5th: Second survey of hotspots 6.30am to 10.30am.

Day 5 January 7th: Third and final survey of hotspots 6.30am to 10.30am.

Day 6 January 8th: Sunrise and sunset surveys for bats and birds 6am - 8am and 6pm to 9pm.

Day 1 02/01/2019. Finding hotspots summary;

Hill A: Team 1: Kate and Mario;

Starting from the base of the hill, we trekked up the road which is already carved. Along the way we found one wet spot with some fresh tracks - bird and goat or deer. For future reference this will be used as hotspot 3.

Continuing up we reached a plateau where the pylon is - leading up to the radio tower. This area is mostly eucalyptus trees and not very dense. We chose one point up here for hotspot 2.

After the radio tower is a small path which allowed us to access some clearings at the top of the hill. Giving us an overview of the main valley between the hills. One of these clearing was fairly noisy with bird songs and bug noises. We marked a tree there for hotspot 1.

We trekked down from these clearings by following a small river bed, although it was do-able we would prefer not to use that route in the future due to the steepness and large

rocks we encountered. We chose not to mark any areas along this route as later access may pose hazardous.

Eventually as you get closer to the bottom you reach a track which is already made that leads down to the base of the hill again. Along this track we chose 2 points as hotspot 5 and 6. 5 is a clearing nearer the base where you can see the top of the hill; namely the radio tower. Whereas 6 is better accessed from the base area; it is part of the river bed with lots of vegetation coverage yet a small opening in the trees where you can see the electric cables.

Hotspot 4 is right at the base of the hill where the small river bed is broken by the road building.

No rain was recorded this day

Hill B: Team 2: Ivan and Melky observed areas beginning at the base of hill B and moving halfway up the mountain, noting and marking hotspots along their way. Team 2 identified four hotspots.

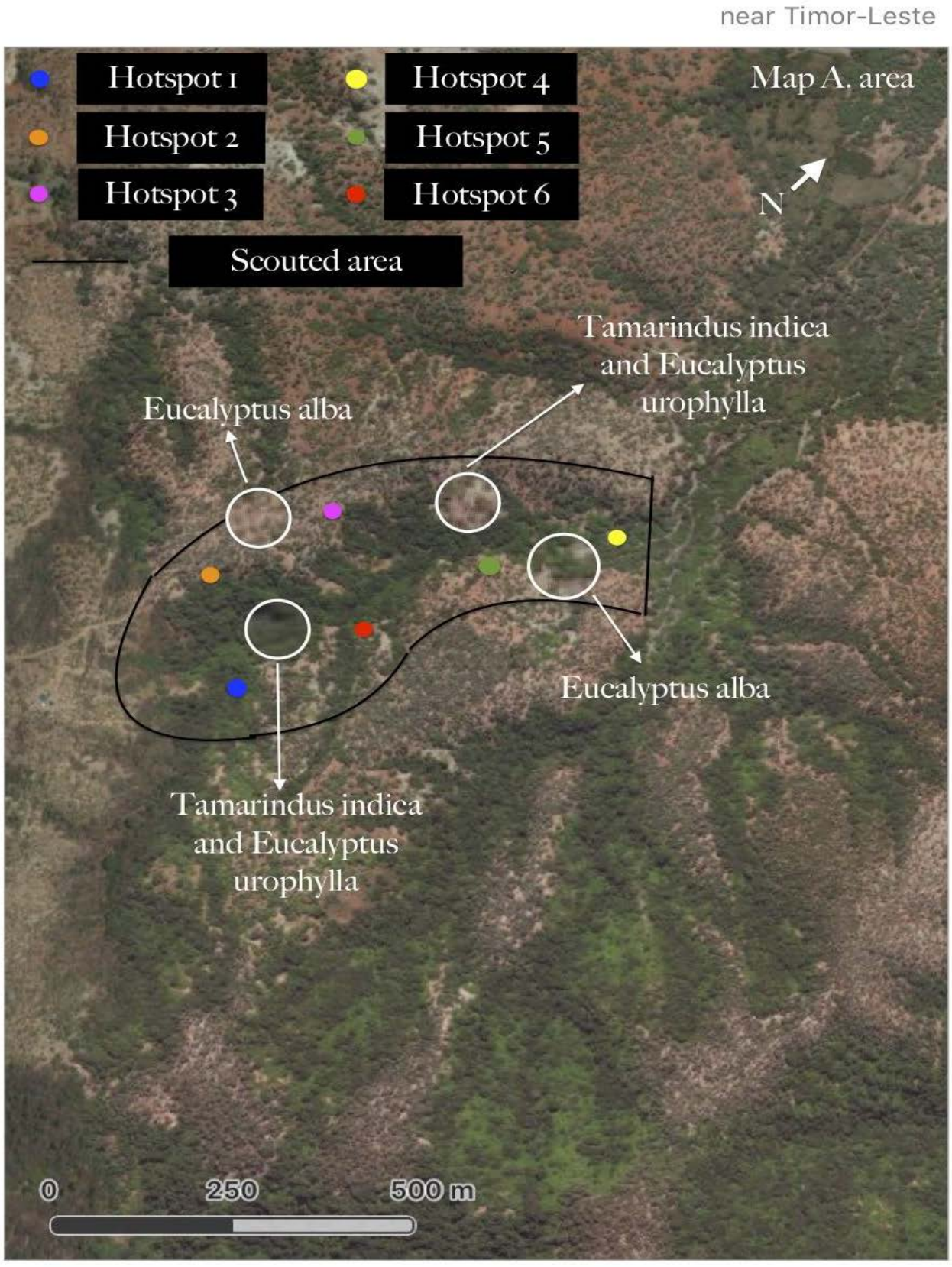
Upon further review, both teams agreed that the hotspots identified at the top of Hill B ranging to halfway down the hill were outside the target area. These spots were chosen due to difficult access to other areas by Team 3. Further observations were made along the southeastern side of Hill B by Team 2 and three new hotspots were identified. Team 3 subsequently observed the three lower hotspots identified by Team 2 and Team 2 observed the new hotspots identified further to the east on Hill B.

Hill B: Team 3: Kayla and Atinu observed Hill B beginning a general assessment walking from the hill base to the peak along the main road and following a footpath to the hill peak. Heading Northwest from the hill peak, Team 3 assessed the surround areas, noting and marking hotspots* along the descent. Four hotspots were identified ranging from the hill peak to halfway down the hill.

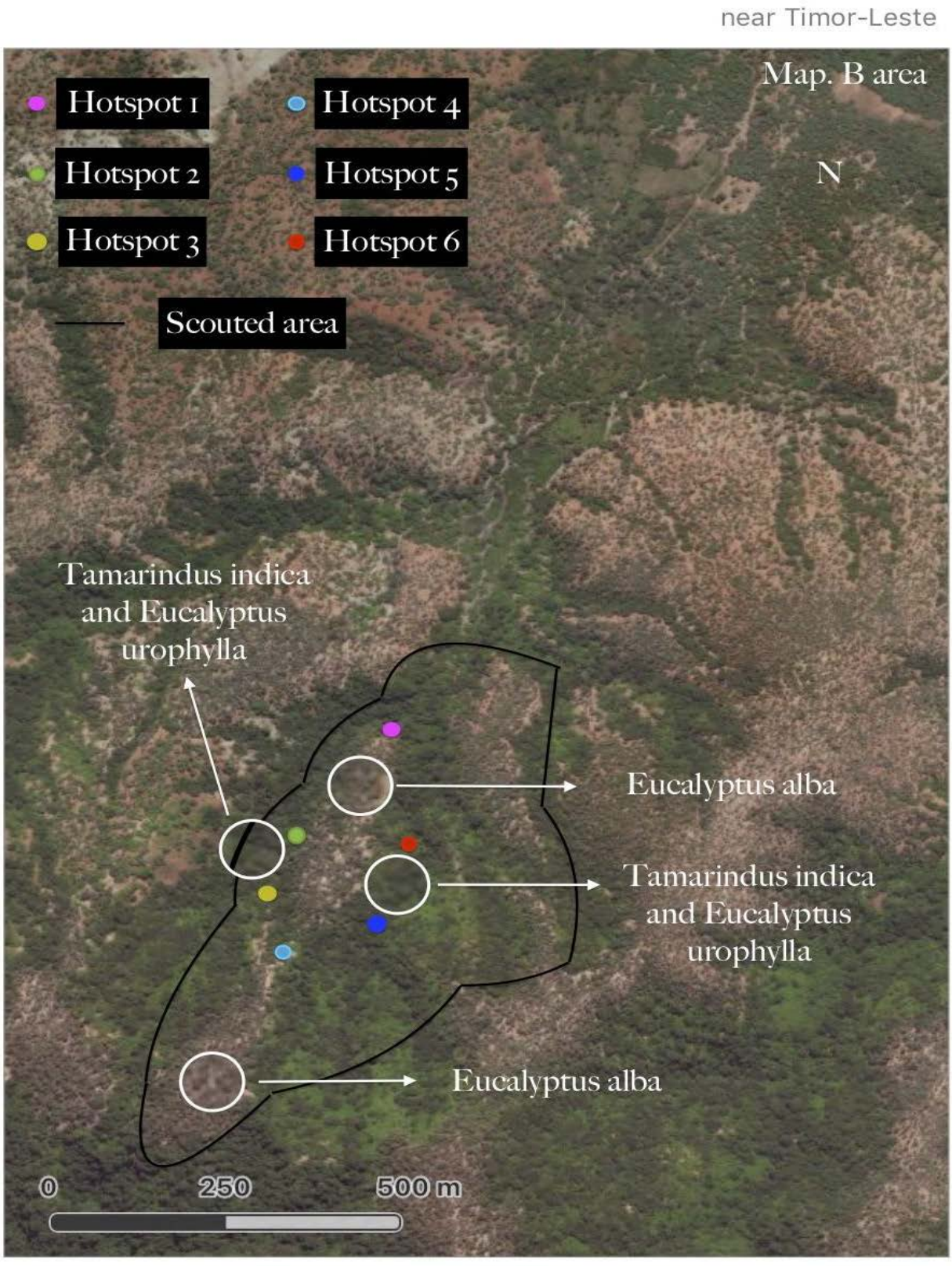
Day 2, 4 and 5 - 03/01/19, 05/01/19 and 07/01/19 respectively - each team visited their designated hot spots, Team 1 visited all 6 zones of Hill A whilst Teams 2 and 3 had 3 spots to survey (this was due to the topography, vegetation coverage and steepness difference between hills). Each hotspot was surveyed for 20 minutes, in which time teams made notes of all flora in the hotspot plus any sightings of animals or indications of animals being present (bird calls, scats, tracks, etc.).

Day 3 and 7 - 04/01/19 and 08/01/19 were devoted to sunrise and sunset bird and bat studies. Sunrise surveys were conducted between 5.30am and 8.30 am whilst sunset/night surveys took place from 6pm to 9pm.

Hill A Map Area Enlarged



Hill B Map Area Enlarged



Appendix 2

Photographs of flora and fauna taken at the site are shown as follows

Key: LC – Least Concern (IUCN classification).

Figures A2-1A and A2-1B. Rainbow bee-eater; *Merops ornatus*

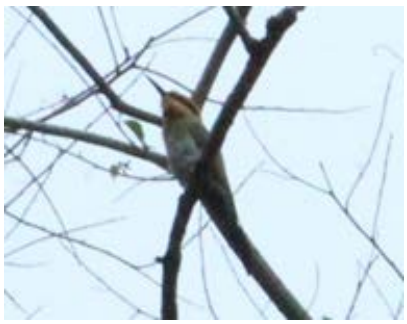


Figure A2-2. Northern fantail; *Rhinopidura rufiventris*. Resident. Low lands. LC and stable. Sighted in both B and A areas.

Figure A2-3. Barred dove; *Geopelia maugeus*, Resident. LC and stable. Area A and low lands

Figure A2-4. Long-tailed Shrike; *Lanius schach*. Resident. IUCN status unknown. Lowlands and Area A

Figure A2-5. Timor imperial pigeon; *Ducula cineracea*.
IUCN status: near threatened. Area B

Figure A2-6. Japanese sparrowhawk; *Accipiter gularis*.
IUCN status: LC. Area A

Figure A2-7. White gum tree; *Eucalyptus alba*

Figure A2-8. Timor White Gum; *Eucalyptus urophylla*

Figure A2-9. Tamarind tree; *Tamarindus indica.* Scattered along both river beds and particularly abundant on the hill east from B area

Figures A2-10A and A2-10B. Yellow Oleander; *Thevitia peruviana*

Figure A2-11. Bellyache bush; *Jatropha gossypiifolia*

Figure A2-12. Siam weed; *Chromolaena sp*.

Figure A2-13. Custard apple tree; *Annona squamosa*

Figure A2-14. Big Sage (Malaysia-term); *Lantana camara*

Figure A2-15. Sodom's apple, milkweed; *Calotropis procera*

Figure A2-16. Elephant foot yam; *Amorphophallus paeoniifolius*

Figure A2-17. Cinnamon tree; *Cinnamomum verum*

Figure A2-18. Cabbage bark tree; *Andira inermis*

Figure A2-19. Hairy brown uvaria; *Uvaria hirsuta*

Figure A2-20. Yet to be identified Bignonia sp.

Figure A2-21. Burmese rosewood; *Pterocarpus indictus*

Figure A2-22. Carpenter bee; *Xylocopa perforator*

Figure A2-23. Genus of ground bugs; *Tropidothorax fimbriatus*

Figure A2-24. Blue flower wasp; (*Austroscolia soror*)

Figure A2-25. Crusader bug; *Mictis profana*

Figure A2-26. Giant Honey Bee; *Apis dorsata*

Figure A2-27. Yet to be Identified Butterfly

Figure A2-28. Common crow; *Euploea core*

Figure A2-29. Common house fly catcher (*Plexippus petersi*)

Figure A2-30. Yet to be Identified Insect

Figure A2-31. Yet to be Identified Insect (on white cloth)

Figure A2-32. Yet to be Identified Insect (on white cloth)

Figure A2-33. House Gekko; *Hemidactylus frenatus*

Attachment J. Quarry Closure Plan

1. The purpose of this attachment to present the closure plan for the quarry, covering the choices of continuation, transformation, and final closure, and the activities required for each choice.

2 The matter of China Harbour Timor Lda (CHT) monetary contributions to the Mining Rehabilitation Fund is not discussed in this document.

Closure Plan Guiding Principles

3. The steps to achieve a closure plan beneficial to the local community and district in general, and the country as a whole, include the following step by step approach.

4. The Land Authority, in consultation with the local authorities, e.g. the Suco (village) Chief, decides on the future use of the land. Options include continue mining, keeping the land "empty", converting to plantations or livestock rearing, and rezoning to housing usage.

5. These decisions should be taken by Jan 2010, for usage by CHT is planned to end in Feb 2021. At least a year of lead-time is required for interested operators and developers to plan, take over and obtain the necessary licenses for new or renewed use of the land.

6. The start-up cost of a quarry is about a few million US $. Therefore, this lead time is also required by CHT to plan whether to keep people and machinery at the site, to sell lock, stock and barrel, to remobilize to another location in-country or overseas, or to decommission completely.

Quarry Continuation by CHT or Another Operator

7. CHT might decide to continue quarry operations, either to support other construction activities in Timor-Leste, or even exporting material for work in other countries. If this is the case, then a Closure Plan is not required for the time being

8. Once the supplying of rocks and gravel for the Tibar Port project is completed, the main and only reason for CHT to operate the quarry is over. CHT might hand-over the quarry to another operator. It is presumed that such a sale would be on an "as is" basis, for this provides signification savings both for the new operator, and for CHT. It follows that decommissioning work by CHT is minimal, with usually a Site Closure and Handing / Taking-over Report. The in-coming operator warrants to the government, and takes responsibility for continued operations.

Conversion to Other Uses (Agriculture)

9. CHT has built roads and installed water and electricity supplies, and constructed habitable buildings and supporting infrastructure. CHT has also levelled large tracts of the hilly terrain to flat ground, and with a stockpile of topsoil. There is a now a reservoir holding about 400,000 m3 of fresh rain water.

10. The local community, or an external commercial entity, might want to convert the land to vegetable growing, or other similar agricultural and livestock pursuits. The stockpile of topsoil is especially suitable for laying on and preparing the earth for vegetation. The supply of fresh water from the reservoir is also an essential factor, to ensure the viability of the crop growing industry.

Conversion to Other Uses (Housing)

11. Contrary to other types of mining, granite quarrying does not irreversibly scar the land. The activity might even be a plus factor in developing a previously hilly region. CHT leaves large tracts of flat land about 20 m above ground, and with access roads. Property developers might want to use the land for housing.

12. Houses on this elevated land have scenic views of the sea. The road to Dili is now upgraded to meet the transport requirements of the new Tibar Port. Start-up cost for a developer is greatly reduced, for roads and utilities are already in place, and there is available accommodation for workers building the homes. The ex-quarry is readily transformed to the location with the premiere residential address in Dili.

13. In Singapore, there is a wonderful example where a disused granite quarry was transformed into a nature park, as shown at Figure 1; greatly enhancing property prices in the vicinity. This place in Singapore is called Singapore Little Guilin, after another well-known scenic spot in China.

14. For conversion to other types of use, whether agricultural or housing, CHT will negotiate with the incoming owner on what to remove and what to leave behind. A fuller discussion on full removal and complete rehabilitation is at paragraphs 15 to 22 of this Attachment.

Figure1. Views of Singapore Little Guilin

Complete Clearing Out

15. It might be that CHT is required to leave the land in an “empty” state. This process entails the following work.

16. Remaining stock of material is sold-off, for the rocks and gravel has commercial value. Similarly, for the machinery, equipment and the crusher.

17. Signs are removed. Structures, if not left behind for the local community, are demolished. Concrete floors should be left intact, for the villagers as staging areas. Any protrusions will be levelled, so as not to create tripping hazards.

18. Material of no further use to CHT, will be given to the local community, if wanted by them. This will be arranged by the CHT Community Liaison Officer, in close consultation with the Suco Chief, and other community leaders.

19. All waste material are completely taken out of site, and disposed at government approved locations.

20. Items that should preferably be left intact include:

    20.1 Electrical poles for the mains supply are left standing.

    20.2 The site access roads, and haul roads remain, for these are required for future surveys of the land.

    20.3 The wells in the quarry; for these are long-term viable assets.

    20.4 The reservoir with fresh water. This item is especially important for the water in the village wells have a high salt content due to close proximity to the sea.

21. Remaining bare land are covered by earth from the topsoil stockpile. In consultation with the villagers, vegetation will be planted to restore greenery.

22. A CHT Quarry Closure Manager remains available for preparing the final Site Closure Report, and the Site Handing / Taking-Over document. Drawings, with co-ordinates of positions of remaining structures, e.g. wells, are also provided.

Cost of Closure

23. The monetary cost of complete closure is not significant, and need not be expressed in quantitative figures for the following reasons:

    23.1 The sale of stock material is recognised as a profit.

    23.2 Machinery after 3 years of usage are written-off.

    23.3 The high value crusher, if not sold, is kept in storage.

    23.4 The top soil is “free of charge.”

24. The major part of the cost is towards replanting vegetation. However, with close collaboration with the villagers, cash crops could instead be grown, and instead of expenses, profits are made.

Conclusion

25. The quarry, if not continued as is, has potential for conversion to plantations or housing. The land was hilly. It now has large tracts of level ground. Roads, utilities, housing structures, and even a fresh water reservoir is available, all enhancing the value of the land. The ex-quarry has scenic views of the sea, and with a good road to Dili. It can readily be transformed to premiere housing.

Attachment K1. List of Stakeholders

1. The List of Stakeholders for public consultations are shown at Tables 1 to 4.

Table 1. Consultations and Dialogue with Local Community Leaders and Local Community Meet-the-People Sessions (as at 7 Mar 2019)

SN	Stakeholder	Dates of Past Meetings
1	Various leaders and representatives of Liquica, Barzetete and Tibar	23 Apr and 8 Jul 2018
2	Mr. Francisco Soares, Chief of Suco Mota Ulun and 3 other village leaders	31 Oct 2018 and 18 Jan 2019
3	Mr. Bento Correia da Conceicao, Chief of Suco Tibar	6 Feb 2019
4	Mr. Domingos da Conceicao Dossantos, Administrator of Liquica Municipality, and Mr. Joao Nascimento Braz, Administrator of Barzetete Sub-District	27 Feb 2019
5	Dialogue with general community (Mota Ulun)	31 Oct 2018
6	Dialogue with general community (Mau Meta)	28 Feb 2019

Table 2. Stake Holders (Central Government) Engagement Plan (as at 7 Mar 2019)

SN	Stakeholder	Interest
1	Ministry of Petroleum and Mineral Resources (National Directorate of Mines and Minerals)	Environmental license and quarrying activities
2	Ministry of Justice (National Directorate of Land, Property and Cadastral Services)	Land lease
3	Ministry of Finance	Royalties, duties and taxes
4	Ministry of Public Works, Transport and Communications (Directorate of Roads, Bridges, and Flood Control)	Access road
5	Servico de Registo e Verificacao Empresarial (SERVE)-Registration	Quarry registration

Table 3. Stake Holders (Local Government) Engagement Plan (as at 13 Mar 2019)

SN	Stakeholder	Dates of Previous Dialogue
1	Liquica District Municipality Representatives	20 April 2018, 8 Jul 2018 and 27 Feb 2019
2	Barzetete Sub-district Representatives	20 April 2018, 8 Jul 2018 and 27 Feb 2019
3	Suco Council Mota-Ulun	31 Oct 2018, and 18 Jan 2019
4	Local Police (PNTL) – Tibar Police Station	13 Mar 2019

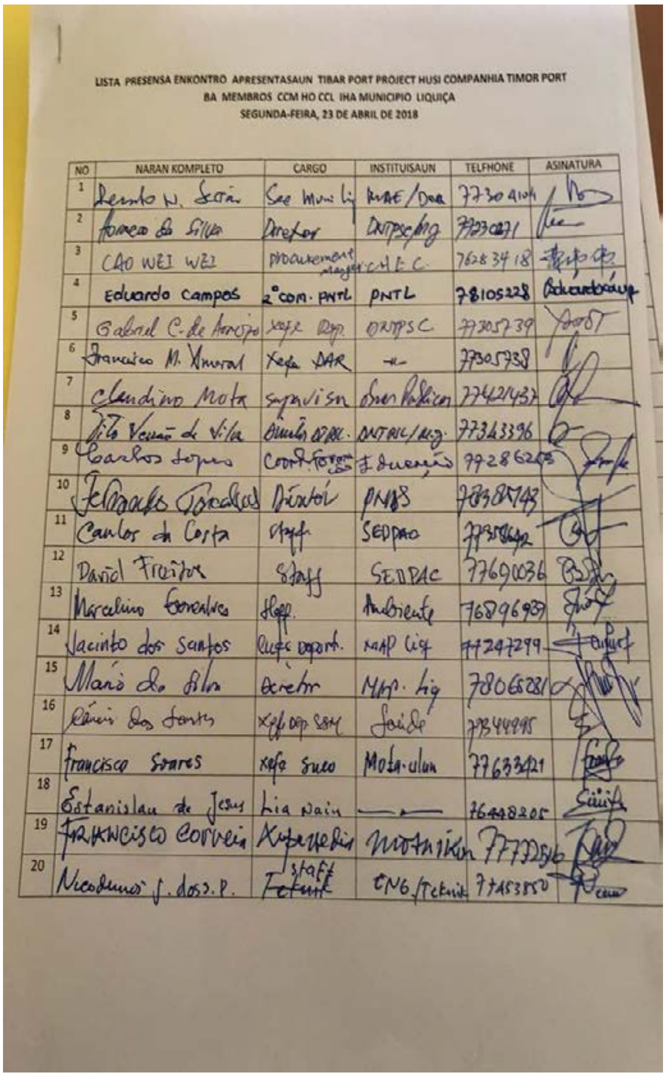
Table 4. Stake Holders (Civil Communities) Engagement Plan (as at 7 Mar 2019)

SN	Stakeholder	Dates of Previous Dialogue
1	Local Youth Organizations	20 to 26 Dec 2018 (Mota Ulun Community Profile Survey)
2	Local Women's Organizations	
3	Academic (Mr. Helio Casemiro Gutteres, President IPG – Institute of Petroleum and Geology -	On-going dialogue (e.g. on suitable rocks)
4	Trade Association (Senhor Oscar Lima, President CCI-TL, Camara do Comercio e Industria de Timor-Leste)	On-going dialogue (e.g. on quarry and other operations)
5	FONGTIL, umbrella body for NGO (Lourenco Tito Ximenes Lopes, Chefe Sebisu Membrus and Publiku)	13 Mar 2019
6	NGO - Lao Hamutuk	31 Jan 2019 and 8 Feb 2019
7	NGO – Luta Hamutuk	

Attachment K2. Public Consultation (Apr and Jul 2018) and Household Visits

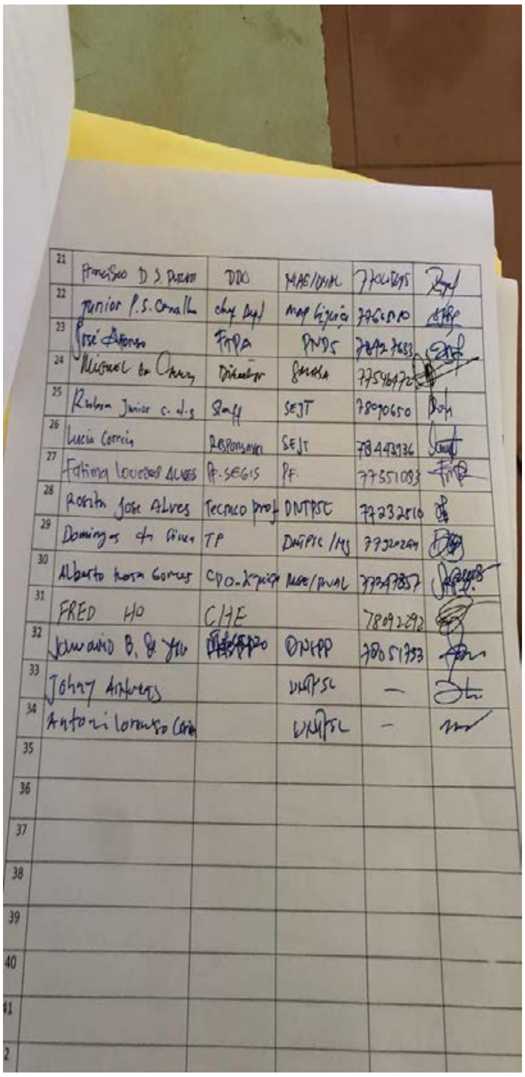
Photographs 1 and 2. Formal Public Consultations

Photograph 3. Attendance List (23 Apr 2018)



LISTA PRESENSA ENKONTRO APRESENTASAUN TIBAR PORT PROJECT HUSI COMPANHIA TIMOR PORT
BA MEMBROS CCM HO CCL IHA MUNICIPIO LIQUIÇA
SEGUNDA-FEIRA, 23 DE ABRIL DE 2018

NO	NARAN KOMPLETO	CARGO	INSTITUISAUN	TELFHONE	ASINATURA
1	Lenito W. Serrão	Sec Mun Liq	MAE/DAA	77304104	[illegible]
2	Fonseca da Silva	Diretor	DNPSC/Liq	77230271	[illegible]
3	CAO WEI WEI	procurement manager	CHEC	76283418	[illegible]
4	Eduardo Campos	2° com. PNTL	PNTL	78105328	[illegible]
5	Gabriel C. de Araujo	Xefe Dep.	DNPSC	77305739	[illegible]
6	Francisco M. Amaral	Xefe DAR	-u-	77305738	[illegible]
7	Claudino Mota	Supervisor	Serv Publica	77421437	[illegible]
8	Tito Venancio de Vila	Autoridade	DNTAL/Liq	77343396	[illegible]
9	Carlos Lopes	Coord. Forum	I. Sueragio	77286265	[illegible]
10	[illegible]	Diretor	PNBS	77385743	[illegible]
11	Carlos da Costa	Staff	SEDPAC	[illegible]	[illegible]
12	David Freitas	Staff	SEDPAC	77690036	[illegible]
13	Marcelino Gonçalves	[illegible]	Ambiente	76896989	[illegible]
14	Jacinto dos Santos	Xefe depart.	MAP Liq	77247299	[illegible]
15	Mario da Silva	Diretor	MAP. Liq	78066281	[illegible]
16	[illegible] dos Santos	Xefe Dep SSM	Saude	77344995	[illegible]
17	Francisco Soares	Xefe Suco	Mota-ulun	77633421	[illegible]
18	Estanislau de Jesus	Lia Nain	—	76448205	[illegible]
19	Francisco Correia	Xefe Aldeia	Motaikin	7772[illegible]	[illegible]
20	Nicodemus J. dos S. P.	Staff	CNG/Teknik	77453850	[illegible]



NO	NARAN KOMPLETO	CARGO	INSTITUISAUN	TELFHONE	ASINATURA
21	Francisco D. S. [illegible]	DDO	MAE/DNAL	77[illegible]	[illegible]
22	Junior P. S. Carvalho	Chefe Dep	MAP Liquiça	776[illegible]	[illegible]
23	José Afonso	FAPA	PNDS	[illegible]	[illegible]
24	Miguel da Costa	Diretor	[illegible]	77546472	[illegible]
25	Ruben Junior C. d. S.	Staff	SEJT	78090650	[illegible]
26	Lucia Correia	[illegible]	SEJT	78447936	[illegible]
27	Fatima Lourdes Alves	P. SEGIS	PF.	77351083	[illegible]
28	Rosita José Alves	Tecnico prof	DNTPSC	77232510	[illegible]
29	Domingos da Silva	TP	DNTPSC/Liq	7732[illegible]	[illegible]
30	Alberto Rosa Gomes	Cpo. [illegible]	MAE/DNAL	7734[illegible]	[illegible]
31	FRED HO		CHE	7809[illegible]	[illegible]
32	Juvenario B. da Silva	[illegible]	DNFPP	78051393	[illegible]
33	Johny Antunes		DNTPSC	—	[illegible]
34	Antonio Lorenço Cor[illegible]		DNTPSC	—	[illegible]
35					
36					
37					
38					
39					
40					
41					
42					

Photograph 4. Sample of Feedback Form

Notice of Public Consultation for the Environment Impact Assessment

Location: Kaitehu, Mota ikun, Mota ulun
Date and Time of the Public Meeting: 8 /07 /2018
Type of the Public Meeting: public consultation
Type of the Proposed Project: Quarry
Project Proponent: China harbour Timor. LDA

I. Details of Respondent

Name	Manuel Pereira
Sex	M
Age	64
Aldeia	Mota ikun
Suco	Mota ulun
Designation	

II. Baseline Environmental Condition

Climate and Weather: Udan ho Bailoron
Community Livelihood Condtion: Agricultura, pescador e Pequaria
Access to the Public Facilities: Drinking Water: poso, Ajuda husi stor King Electricity: EDTL Health Service: CEDE ALDEIA, MOTA ULUN Education: TK & SD Market: MOTA ULUN, LIQUICA & DILI Road and Transportation: microlet, Anguna Others:
Surrounding Economic Development: HCI AI, projeito Quarry, peskas, Agricultura
Heritage and Cultural Site: Diributi
Natural Hazard: Baajir

… continue next page

III. Environmental Concerns on the Proposed Project

- Baarur "BE SAE"
- Barulho
- Rai Rahun
- Tesi Ai (Oho ai horis)

IV. Suggestion and Recommendation

- Hadia drainase (tankak rasa kon etc)
- Rega be dala 3 ba loron 1
- Ajuda dada bemar

V. Consultant's Surveyors

No	Name	Signature
1	Sergio Valdano	[signature]
2	Udranud H.S. Pinto	[signature]
3	Francisco da costa Araujo	[signature]
4		
5		
6		

The following photographs show CHT staff with Mota Ulun villagers, during social visits by CHT HSE Advisor Koh Chee Thong, and CHT Community Liaison Officer Adelina do Rego Soares. Ms Adelina is not in most of the photographs, because she was taking the photographs.

<u>Photograph 5. With Mr. Francisco Soares (Chief of Mota Ulun Village), and Ms. Adelina do Rego Soares (CHT Community Liaison Officer)</u>

Photograph 6. With Occupants of House Near the Junction of Access Route and Main Road

Photograph 7. With Mr. Zery Correia and Friend

Photograph 8. With Ms. Joana Ribeiro (with green T-shirt) and Friends

Photograph 9. With Mr. Paul Ribeiro and Family

Photograph 10. With Mr. Bartolomeu Mesquita (purple T-shirt) and Friends

Photograph 11. With Mr. Jose Silvestre (red/black T-shirt) and Friends, at recreation centre

Photograph 12. With Ms. Anna Clara dos Santos (white top) and Friends

Photograph 13. With Ms. Anna Clara dos Santos at her shop

Photograph 14. With Mr. Venancio dos Santos (yellow T-shirt) and Friends at his motor workshop

Photograph 15. With Ms Maria Soares (carrying baby) and Friends

Photograph 16. With Mr. Manuel dos Reis (white T-shirt) and his 2 young children and CHT driver (Mr. Ano)

Attachment L. Community Profile Survey Report (Dec 2018)

CHT Quarry and Jetty (Mota Ulun)
Community Profile Survey Report (

Summary

1. The community profile survey from 20 to 26 Dec 2018, covered 68 households with a total of 498 persons, and with a distribution of 271 males and 227 females. The population is young, for 74 % are below 31 years. There are 82 wage earners, with about half earning between US $ 100 to 200 a month. These 82 persons make up 41 % of the 201 persons in the 21 to 50 years age group. CHT by providing employment for another 50 persons increases the employment rate to more than 65 %. A 100 % employment rate is not feasible, for it is not practical for both parents to be working.

2. It is pleasing to observe that for women, the 21 to 30 age group has 3 times more persons attending secondary and university education compared with the 31 to 50 age group.

3. Health-wise, there are improvements, for there are about 70 children in the 1 to 5 age group, compared to the about 50 and 60 children in the 6 to 10 and 11 to 15 age groups respectively.

4. Opportunity-wise, CHT can contribute to the community by:

    4.1 Employing as many locals as practicable, especially the large number of unemployed women.

    4.2 Helping to concrete the floors of 12 homes that have dirt floors.

    4.3 Providing better quality water from the bore holes higher up in the hill slopes. The water from the wells located lower, and nearer to the sea, has an undesired high salt content.

    4.4 Purchasing groceries from the local shops; focusing on locally grown products.

Method

5. The quarry is at Suco Mota Ulun, approximately 23.4 km west of Dili, and in Liquica Municipality, with Barzetete as the sub-district. A community profile survey questionnaire was prepared; of which a sample shown at Figure 1. It has

items covering the main groups of type of dwellings, household composition, personal information, employment, education, utilities, and animal husbandry.

6. Madam Anna Clara do Santos has the main grocery shop out of 3 in the village. With her kind heartedness and consent, the wide foyer of her shop was used for interviews as persons arrive to make purchases. Conveniently, next to the shop is a billiards table, where the villagers come for recreation, and subsequently agreeing to be interviewed. Feedback questionnaires about positive and negative opinions about the quarry were handed out, and returned to the store at responders' convenience. A sample of this questionnaire is at Figure 2.

Figure 1A. Community Profile Survey Questionnaire (Left Half)

Mota-Ulun Community Profile Questionnaire					
House/Shop Number:			General Location:		
1	Nuclear	Extended	No Persons	Head of Household:	
2	Land Owner	Electricity	Toilet: F/L/O	House - Roof:	Wall:
3	Chicken:	Pig:	Goat:	Cow:	Duck:
4	Vegetables	Home / Retail		Fruit Trees (Qty)	Home/Retail
5	Person 1	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr
6	Person 2	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr
7	Person 3	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr
8	Person 4	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr
9	Person 5	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr
10	Person 6	Male / Female	Age:	Edu: IL / L / N / P / S / V / U:	S/M/Sp/D/W/Wr. H/W/S/D/GM/GF/GS /GD/Rel/Ptr

Figure 1B. Community Profile Survey Questionnaire (Right Half)

	Date:	Person Collecting Info:	
	Single/Mother/Father	Language:	Religion: C/Pt/Ism/O
Floor:		Water: Mains/Well/Sp	
Dog:	Cat:		
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):
Nationality	Income per month	Livelihood (Main):	Livelihood (Others):

Figure 2. Public Consultation Questionnaire

CHT Quarry/Pedreira no Ponte Kais (Mota Ulun)
CHT Quarry and Jetty (Mota Ulun)
Questionário Konsulta Públika. Public Consultation Questionnaire

Naran no asinatura husi ema/pesoal:
Name and Signature of Person:

Idade / Generu. Age / Gender:
Occupasaun. Occupation:
Hela Fatin. Address:

Numeru telemovel (opsional). Cellphone number (optional):
Residente husi Mota Ulun. Resident of Mota Ulun. Yes / No. Sim / Não:
Data. Date:

Representa an rasik. Representing ownself: Sim / Não. Yes / No:
Representa Organizasaun ruma (Organizasaun nia naran):
Representing an organisation (Name of Organisation):
Nomeasaun iha Organizasaun. Appointment in the organisation:

Saida mak diak kona ba quarry (pedreira)/ ponte kais?
What is good about the quarry / jetty?

(Eskala husi 1 to 10, ho 10 hanesan mais preferidas / gosta liu).
(Scale of 1 to 10, with 10 as most preferred).

SN	Bom/Diak (Preferência). Good (Preference)	Eskala. Scale	Komentários. Comments
1	Empregu. Employment.		
2	Sosa produtu lokal. Buy local products.		
3	Be'e uza ba domestiku. Water for home use.		
4	Hasae hablidades/skills. Improvement in skills.		
5	Servisu médiku. Medical service.		
6	Krescimentu ekonômiku. Economic growth.		
7	Seluk. Others.		
8	Seluk. Others.		
9	Seluk. Others.		

Saida mak ladiak kona ba Quarry (Pedreira)/ Ponte Kais?
What is bad about the quarry / jetty?

(Eskala husi 1 to 10, ho 10 hanesan la gosta mais / liu).
(Scale of 1 to 10, with 10 as most disliked).

SN	At (la Gosta). Bad (Dislike)	Eskala. Scale	Komentários. Comments

1			
2			
3			
4			
5			

Komentárius. Other Comments:

7. A courtesy call on Mr. Francisco Soares, Chief Suco Mota Ulun, was carried out, with the purpose of providing information about the community profile survey. Francisco Soares mentioned that there are about 162 households in the Suco.

8. The survey was conducted by Adelina do Rego Soares (CHT Community Liaison Officer), and Koh Chee Thong (CHT HSE Adviser), over 7 days from 20 to 26 Dec 2018. There were house-to-house visits, with some photographs shown at Figures 3 to 7. The List of Persons Surveyed is at Figure 8.

Figure 3. With Mr. Francisco Soares, Chief of Suco Mota Ulun

Figure 4. With Mdm Anna Clara dos Santos (in the background , in her shop)

Figure 5. With Mdm Marta De Araujo (red T-shirt) and Neighbours, at household compound

Figure 6. With Mr. Manuel dos Reis (wearing a singlet, at his house), and his children and friends

Figure 7. With Mr. Venancio dos Santos (blue T-shirt, with wide red decorations, at his motor shop) and Friends/Customers

Figure 8. List of Persons Surveyed

Form No	Date of Interview	Location of Interview	Name of Interviewer	Name of Person Interviewed
1	20 Dec 2018	Ana Clara Shop	Ade and Koh	Ana Clara do Santos
2	20 Dec 2018	Ana Clara Shop	Ade and Koh	Santiago Dias Gomes
3	20 Dec 2018	Mechanic Shop	Ade and Koh	Venancio do Santos
4	20 Dec 2018	Mechanic Shop	Ade and Koh	Adao Soares Lima
5	21 Dec 2018	Ana Clara Shop	Ade and Koh	Isabel Mesquita
6	21 Dec 2018	Ana Clara Shop	Ade and Koh	Custodio Babo
7	21 Dec 2018	Ana Clara Shop	Ade and Koh	Elizario da Conceicao
8	21 Dec 2018	Ana Clara Shop	Ade and Koh	Leonel Correia
9	21 Dec 2018	Ana Clara Shop	Ade and Koh	Jeronimo Alves

10	21 Dec 2018	Ana Clara Shop	Ade and Koh	Ana Rosa do Santos Gomes
11	22 Dec 2018	Ana Clara Shop	Ade and Koh	Sergio Soares
12	22 Dec 2018	Ana Clara Shop	Ade and Koh	Gabriel Correia
13	22 Dec 2018	Ana Clara Shop	Ade and Koh	Rogino do Santos
14	22 Dec 2018	Ana Clara Shop	Ade and Koh	Romaldo de Jesus Alyes
15	22 Dec 2018	Ana Clara Shop	Ade and Koh	Avelino da Cruz
16	22 Dec 2018	Ana Clara Shop	Ade and Koh	Zacarias Correia
17	22 Dec 2018	Ana Clara Shop	Ade and Koh	Marta da Conceicao
18	22 Dec 2018	Ana Clara Shop	Ade and Koh	Christina Correia
19	22 Dec 2018	Ana Clara Shop	Ade and Koh	Silveiro da Conceicao Castro
20	22 Dec 2018	Ana Clara Shop	Ade and Koh	Marcal Brito
21	22 Dec 2018	Ana Clara Shop	Ade and Koh	Cerilio da Silva
22	22 Dec 2018	Ana Clara Shop	Ade and Koh	Francisco Correia
23	22 Dec 2018	At Operator's house	Koh and Janu	Manuel dos Reis
24	22 Dec 2018	Mechanic Shop	Koh and Janu	Rosalino Dosantos
25	22 Dec 2018	At Operator's house	Koh and Janu	Jermano Augusto
26	22 Dec 2018	Small Shop near CHT	Koh and Janu	Elidio Coreia
27	22 Dec 2018	Other Billard Place	Koh and Janu	Pedro Soares
28	22 Dec 2018	Other Billard Place	Koh and Janu	Florindo da Concincao
29	22 Dec 2018	Other Billard Place	Koh and Janu	Joaqim da Concincao
30	22 Dec 2018	Other Billard Place	Koh and Janu	Carlito Pinto

31	22 Dec 2018	Other Billard Place	Koh and Janu	Mudo Mesquita
32	23 Dec 2018	CHT Quarry	Koh and Janu	Simao da Costa
33	23 Dec 2018	Clothes Shop	Koh and Janu	Zito DeJesus Ribeiro
34	23 Dec 2018	Clothes Shop	Koh and Janu	Albino Soares
35	23 Dec 2018	Clothes Shop	Koh and Janu	Joaquina deJesus
36	23 Dec 2018	Ana Clara Shop	Koh and Janu	Adeino Coreia
37	23 Dec 2018	Veg stall next to Clara	Koh and Janu	Natalino Ribeiro
38	23 Dec 2018	Veg stall next to Clara	Koh and Janu	Imaculada Fatima
39	23 Dec 2018	Church	Koh and Janu	Joanico Coreia
40	23 Dec 2018	Ana Clara Shop	Koh and Janu	Mario Fatima Vaseo Amaral
41	23 Dec 2018	Ana Clara Shop	Koh and Janu	Amelia de Fatima
42	23 Dec 2018	Ana Clara Shop	Koh and Janu	Salvador Coreia
43	23 Dec 2018	Ana Clara Shop	Koh and Janu	Tobias Coreia
44	23 Dec 2018	Ana Clara Shop	Koh and Janu	Elias Coreia Soares
45	23 Dec 2018	Ana Clara Shop	Koh and Janu	Arsenio Bossa Coreia
46	23 Dec 2018	Ana Clara Shop	Koh and Janu	Oscar da Silva
47	23 Dec 2018	Ana Clara Shop	Koh and Janu	Marcelina Coreia
48	24 Dec 2018	Ana Clara Shop	Koh and Nache	Benita Ramos
49	24 Dec 2018	Ana Clara Shop	Koh and Nache	Silvestre Corea
50	24 Dec 2018	Ana Clara Shop	Koh and Nache	Sabina Castro
51	24 Dec 2018	Ana Clara Shop	Koh and Nache	Jeremias da Conceicao
52	24 Dec 2018	Ana Clara Shop	Koh and Nache	Ana Correia Soares

53	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Faustino Brito
54	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Sebastiao Varela
55	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Maria dos Santos Soares
56	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Alexandre Correia
57	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Dircio de Fatima
58	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Marman
59	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Domingos Fatima
60	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Jose Pedro Perreira
61	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Martina Ribeiro
62	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Agida Pereira
63	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Domingas dos Santos
64	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Madalena Destry da Silva
65	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Joaminha de Aranyo
66	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Paulina Correia
67	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Jeronimo G Leite
68	26 Dec 2018	Ana Clara Shop	Koh and Inacio	Fridus Ramos da Silva

Demographics

9. Demographics - statistical data relating to the population and particular groups within it. There are 498 persons from the interviewed 68 households. The 271 males and 227 females make-up a population distribution of 54 to 46 % in favour of males, as illustrated at Figure 9. This ratio is close to 50-50, except for an anomaly at the 11-15 age group, where the boys outnumber the girls by 43 to 16, i.e. nearly 70 %, as shown at Figure 10. The population is young, for 74 % are below 31 years. There are only 2 persons, one from either sex, aged above 70 years.

Figure 9. Total Population by Gender

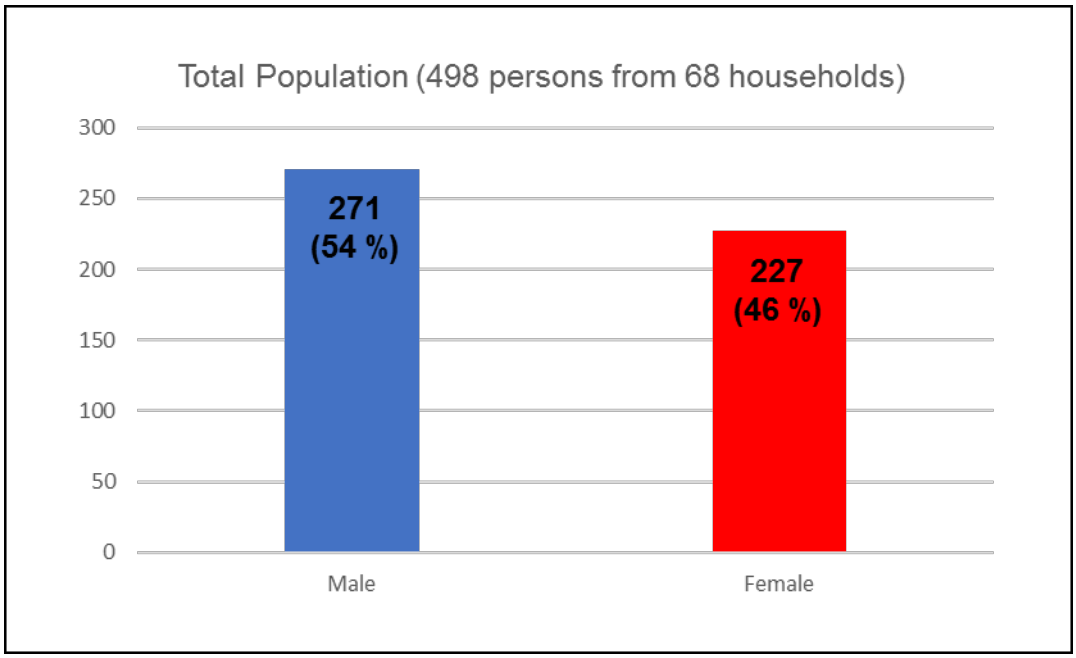
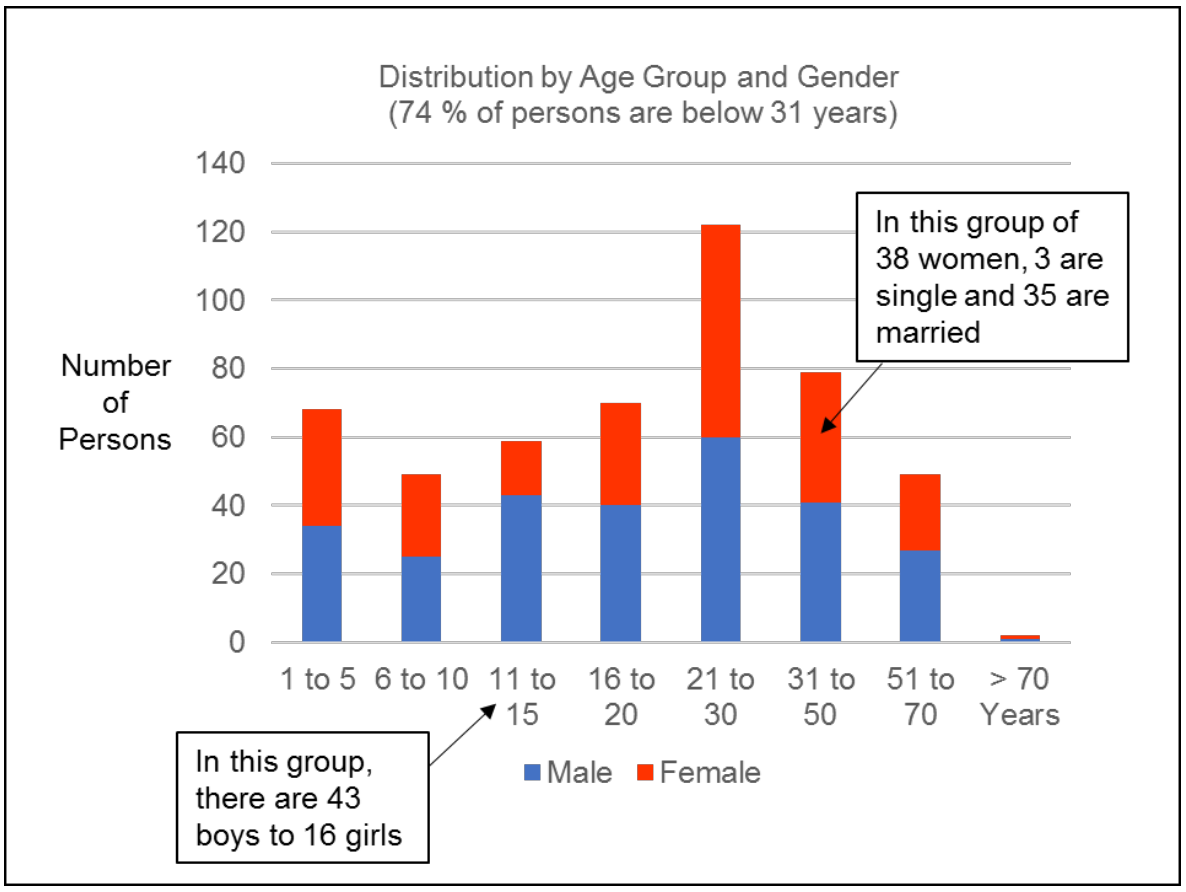
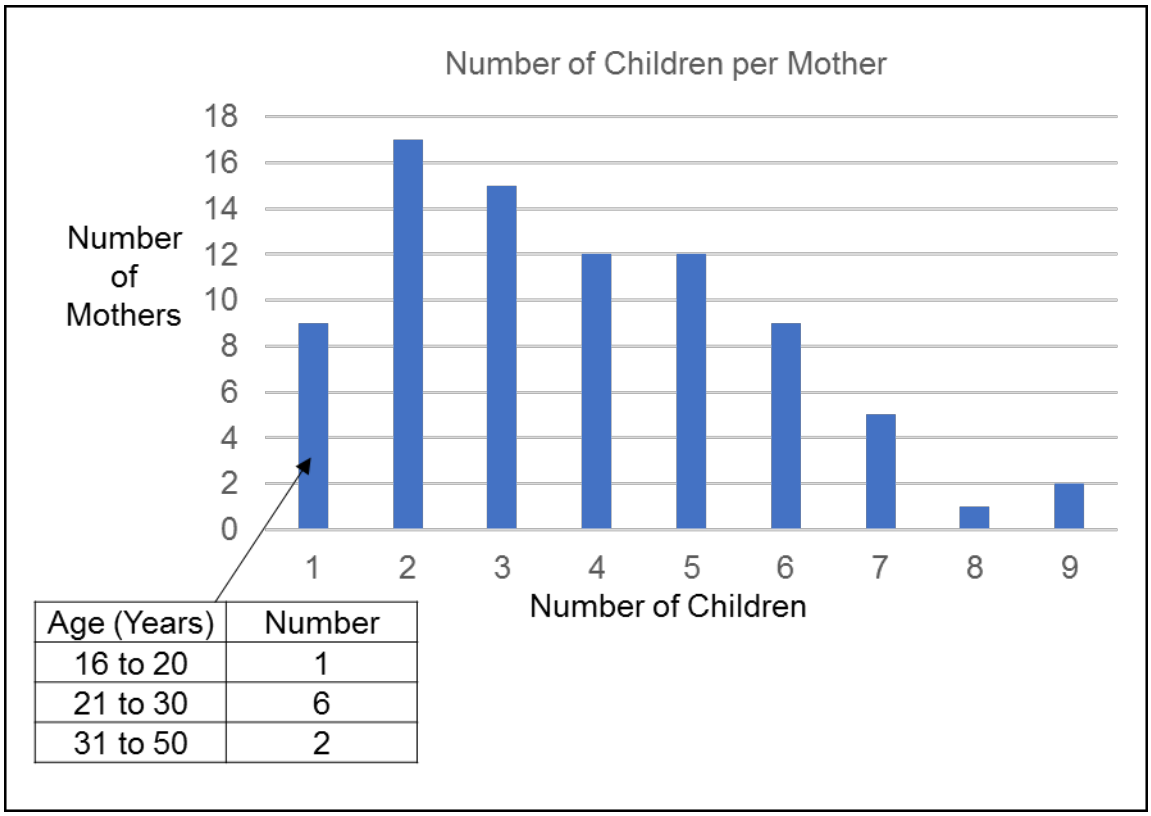


Figure 10. Distribution by Age Group and Gender



10. Women have little difficulty getting married. In the 31 to 50 year age-group, only 3 women are single, as shown at Figure 10. The birth-rate is excellent. Family size is large. The great majority of mothers have more than 2 children. Of the 9 mothers with only one child each, 7 are still below 31 years, as shown at Figure 11.

Figure 11. Number of Children per Mother



Age (Years)	Number
16 to 20	1
21 to 30	6
31 to 50	2

Education

11. All children reaching school age go to school. The younger generation is better educated, as illustrated by Figures 12 and 13. For both sexes, the great majority of people more than 51 years do not go to school at all. There is significant improvement for women, with 16 persons in the 21 to 30 age group with university education, compared with only 4 in the 31 to 50 age group. Similarly, for these 2 age groups, there is a 3-fold increase in secondary education for women.

Figure 12. Males – Education Level by Age Group

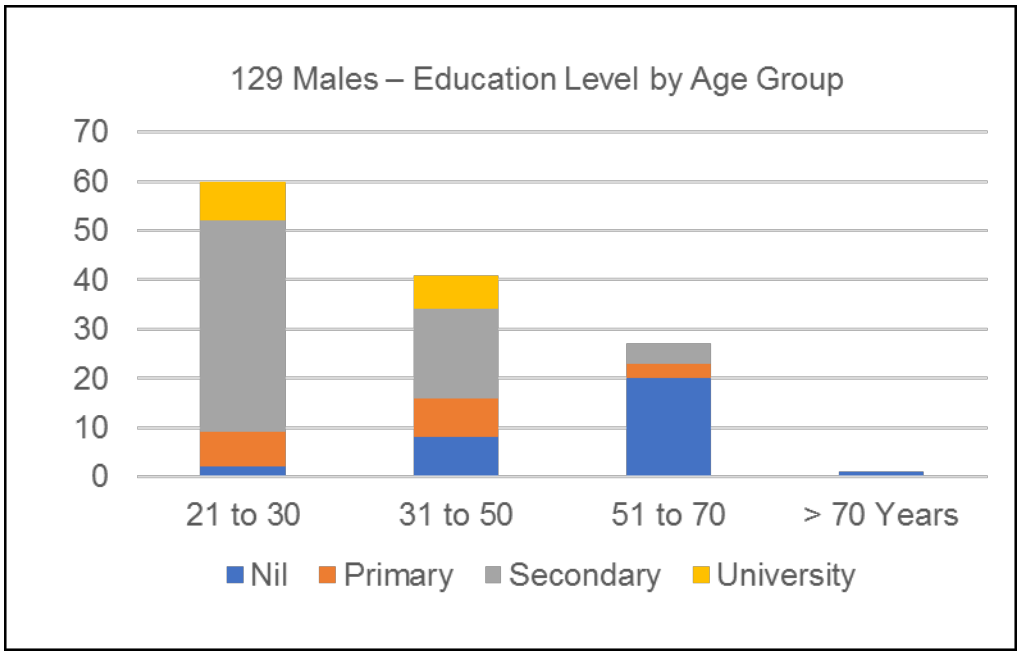
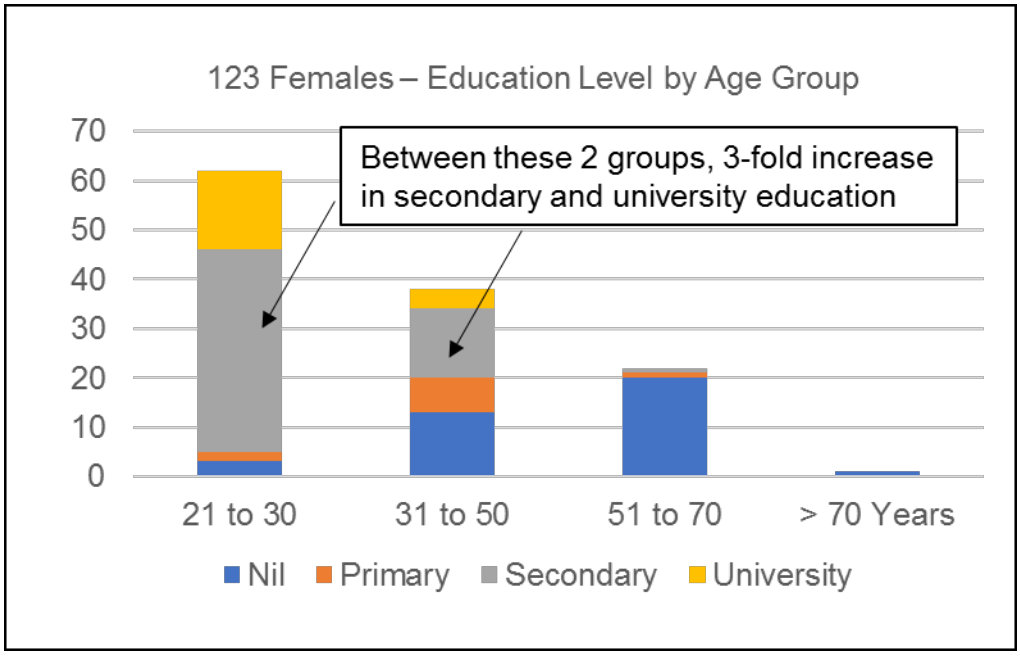


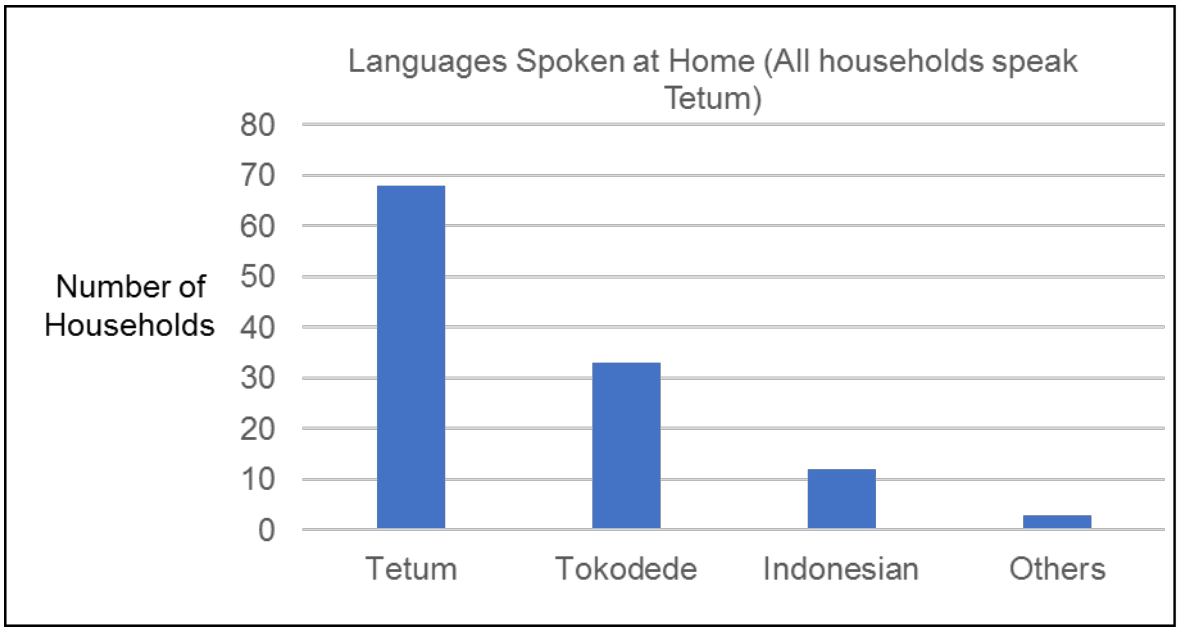
Figure 13. Females – Education Level by Age Group



Language and Religion

12. All but 1 of the 68 families are Catholics. Islam is the religion of the one family. All families speak Tetum. In addition, 33 families speak Tokodede, the dialect of the area. Figure 14 shows the different languages spoken by households.

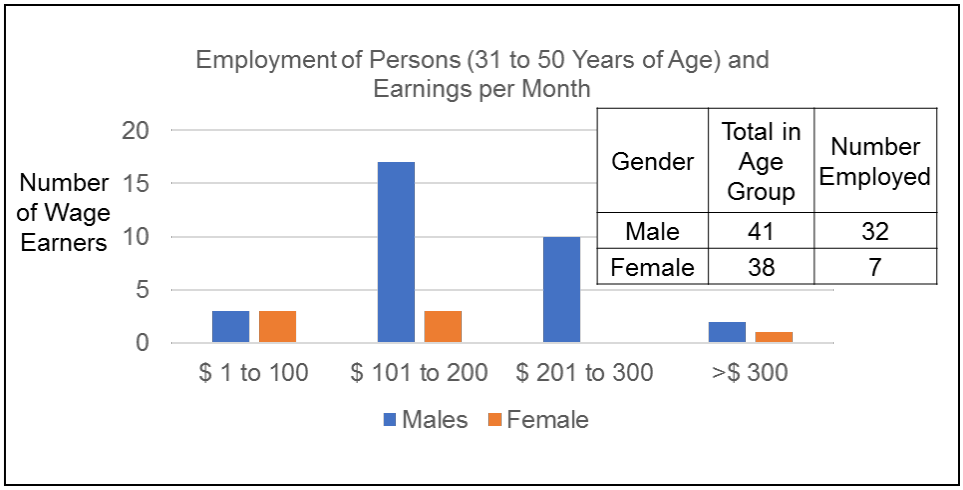
Figure 14. Languages Spoken at Home



Employment

13. In the prime working age group of 31 to 50, 32 out of 41 men are earning a living. However, only 7 women out of 38 are working, as illustrated at Figure 15. Over all age groups, 82 persons are employed, with the types of work classified in the groups of “unskilled”, “semi-skill” and “academic skills”; shown at Figure 16. From this figure, and also from Figure 17, it is deduced that earnings are less than $300 per month, because the large majority of workers are not in the highly desired “academic skills” and therefore better paying group. There are only households with dual income, i.e. one with 2 teachers, and the other with a security guard and a driver.

Figure 15. Employment of Persons (31 to 50 years age group)



Gender	Total in Age Group	Number Employed
Male	41	32
Female	38	7

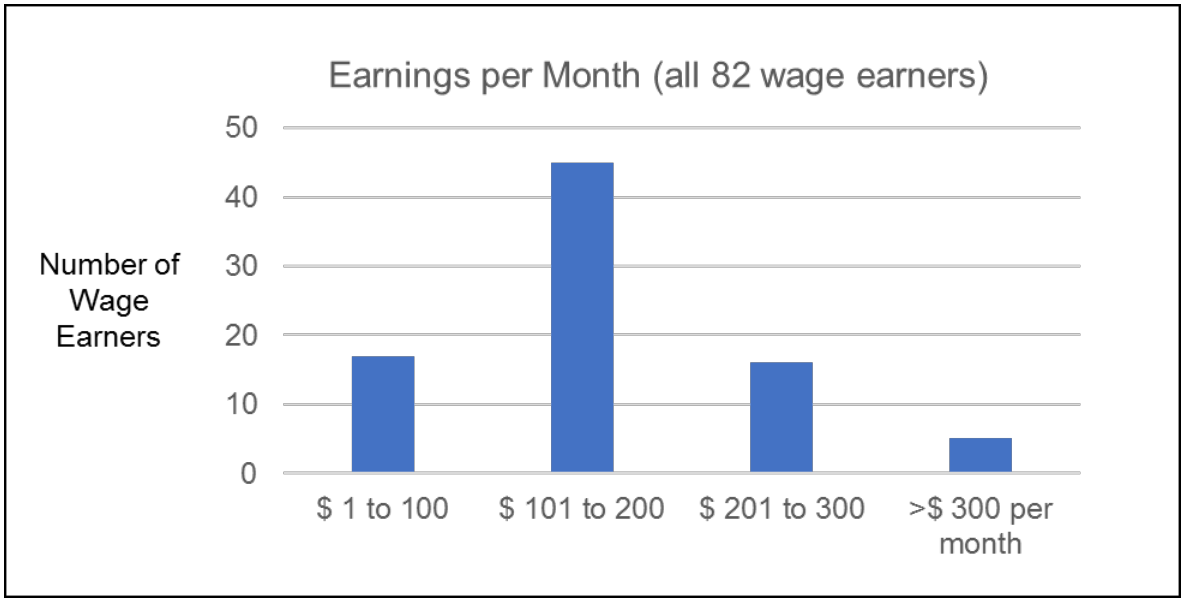
Figure 16. Type of Occupation (all age groups)

SN	Unskilled	Qty
1	Construction Worker	15
2	Wood Seller	11
3	Security Guard	8
4	Driver	8
5	Cement worker	3
6	Vegetable seller	3
7	Fruit Seller	1
8	Marine worker	1
9	Waitress	1
10	Pensioner	1
11	Total	52

SN	Skilled	Qty
1	Mobile Machine Operator	7
2	Mechanic	3
3	Construction Supervisor	2
4	Soldier	2
5	Shopkeeper	2
6	Farmer	2
7	Retail Sales	1
8	Cook	1
9	Fisherman	1
10	Total	21

SN	Academic Skills	Qty
1	Teacher	6
2	Engineer	2
3	Bank Employee	1
4	Total	9

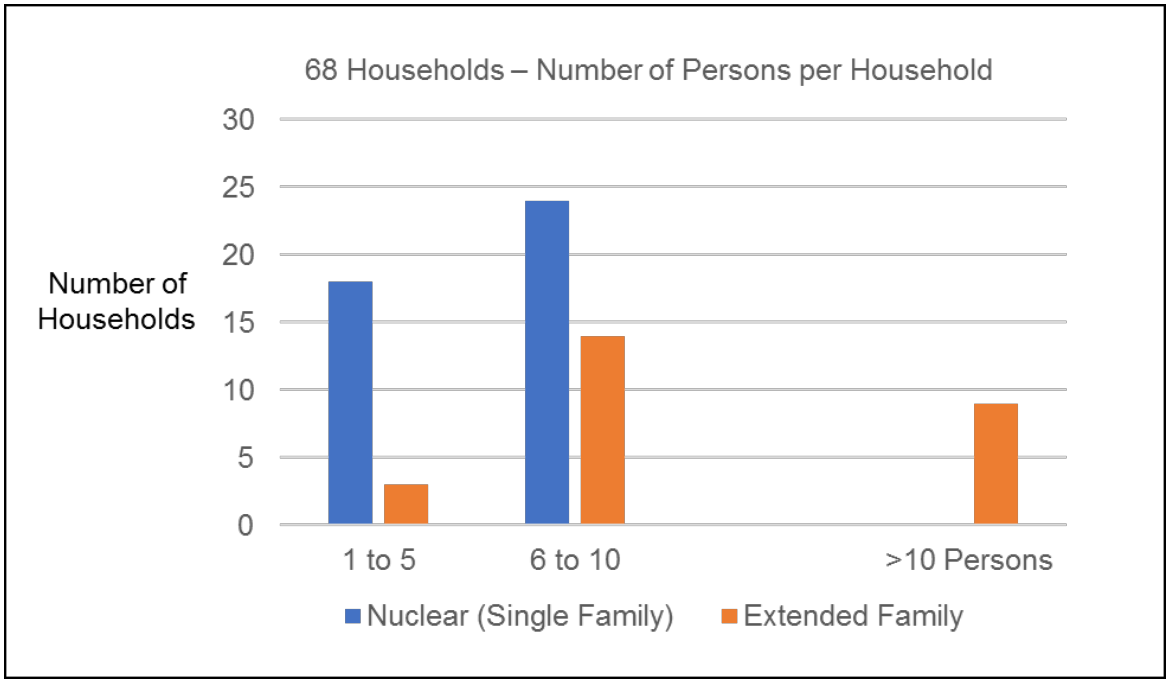
Figure 17. Earnings per Month (all 82 wage earners)



Households

14. 21 families are comfortably housed, with up to 5 persons per home. However, as shown at Figure 18, there are 9 extended families, with each having more than 10 persons.

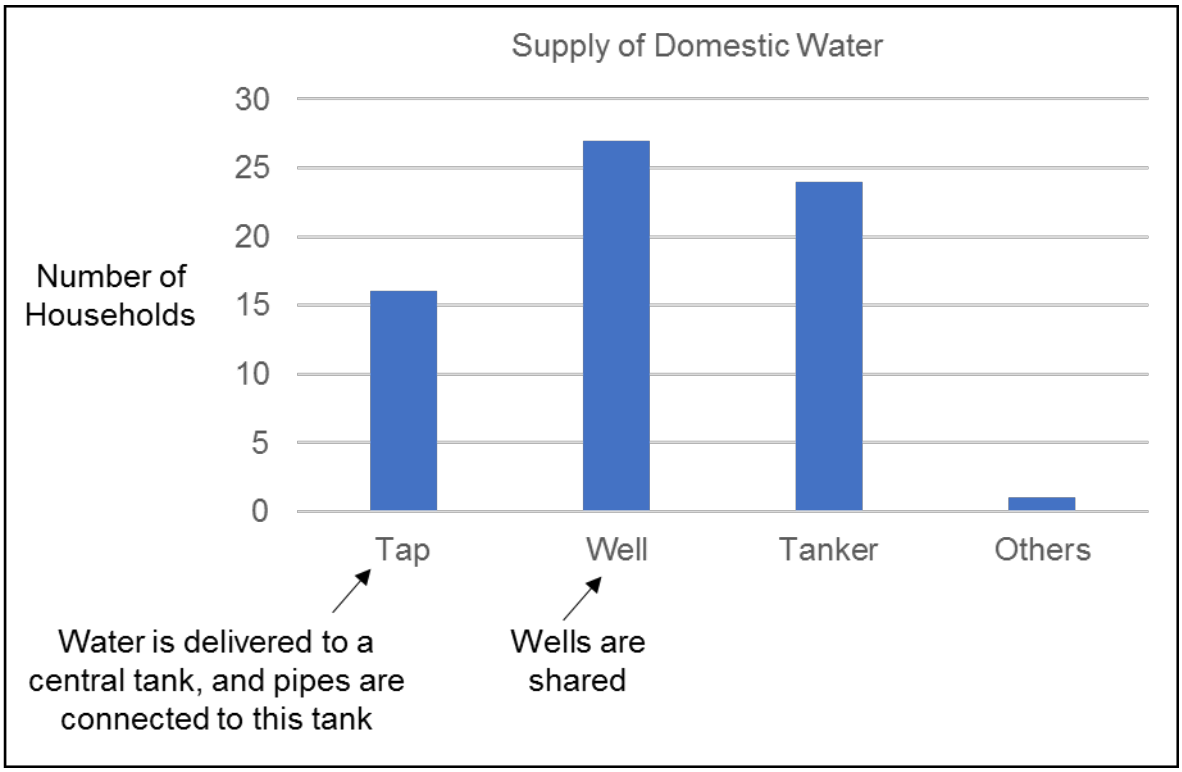
Figure 18. Number of Persons per Household



Utilities

15. All homes are connected to the government provided mains electrical supply. Domestic water is generally obtained from wells. This water has a high salt content that is not desirable. Some families, especially those living near the coast, i.e. north of the main road, have their water delivered by tankers. Figure 19 shows the different supply types of domestic water.

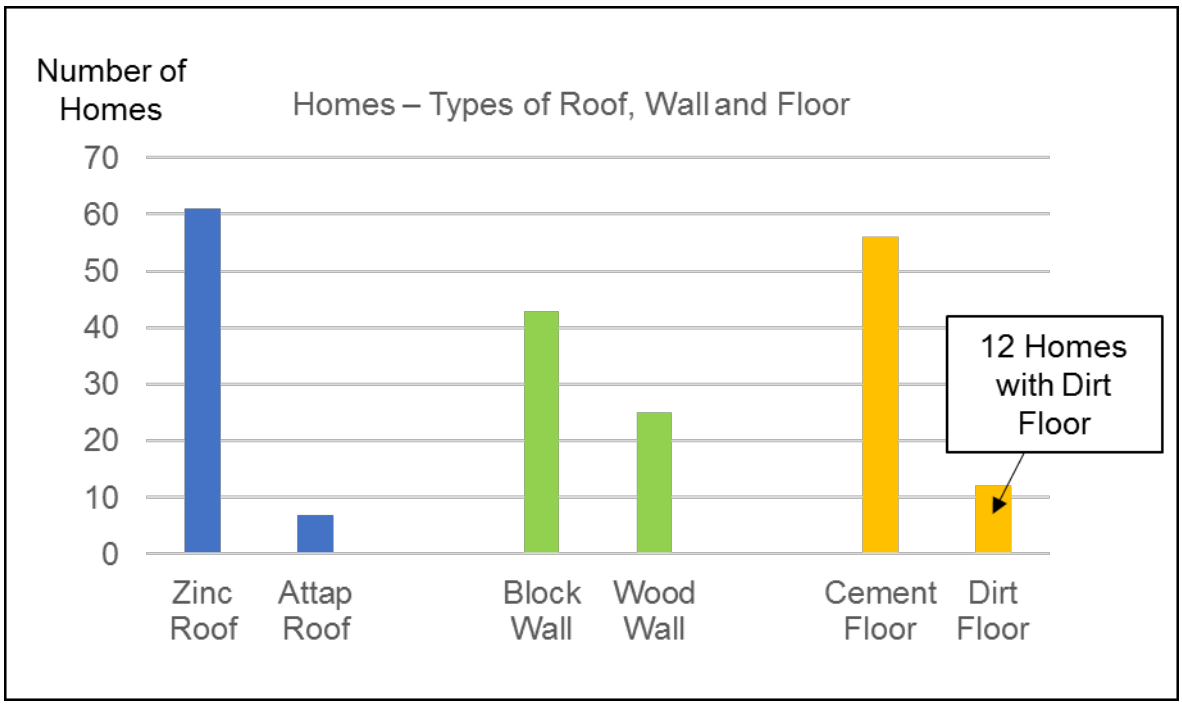
Figure 19. Supply of Domestic Water



Buildings

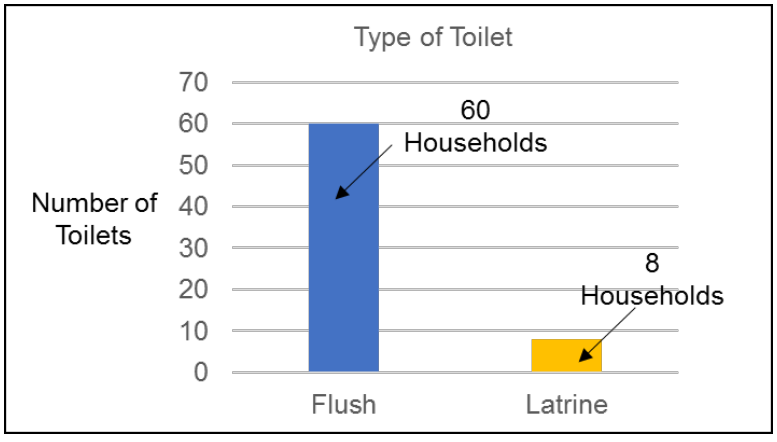
16. All persons interviewed said that they own the homes that they live in. Whether made of bricks, wood, zinc or leaves (i.e. usually coconut leaves), there is adequate shelter. There are 12 homes with dirt floor, with the rest of the 56 with concrete floors, as shown at Figure 20.

Figure 20. Types of Roof, Wall and Floor



17. 60 households have water flush toilets. The remaining 8 households use pit latrines. Figure 21 illustrates the figures.

Figure 21. Type of Toilet



Husbandry

18. Husbandry - the care, cultivation, and breeding of crops and animals. The community is resourceful with the keeping of chickens, pigs, and goats for home consumption. The distributions of animals and households are shown in Figures 22 and 23. Only one family has ducks. There is no animal husbandry for commercial purposes.

Figure 22. Distribution of Chickens and Pigs

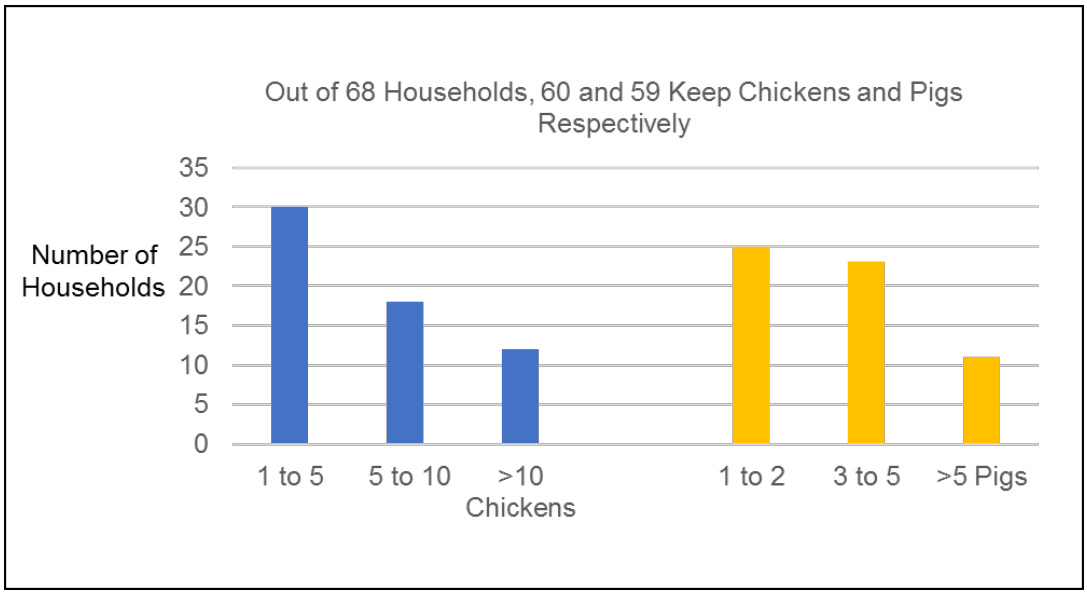
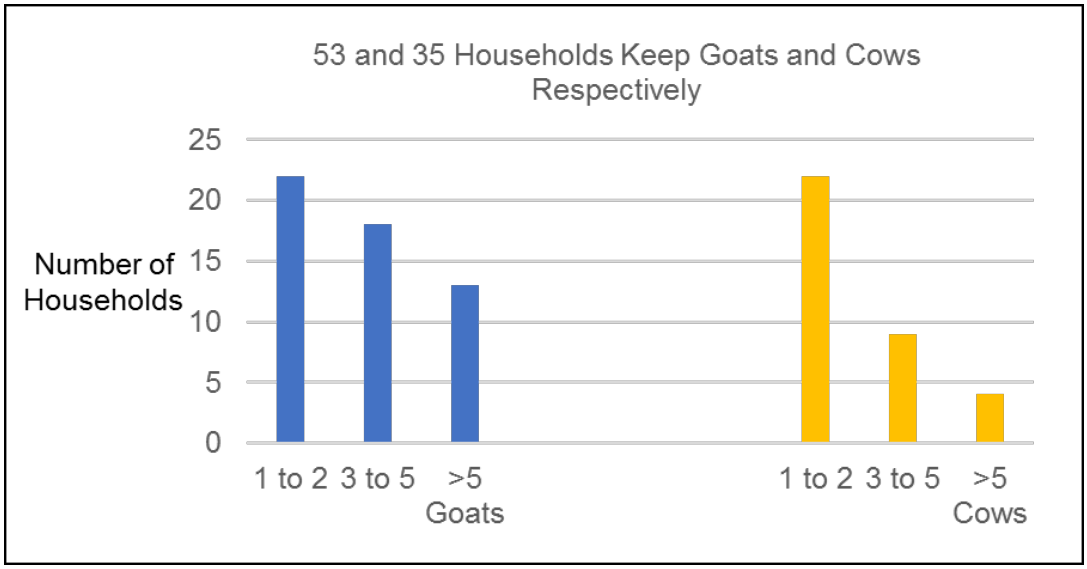
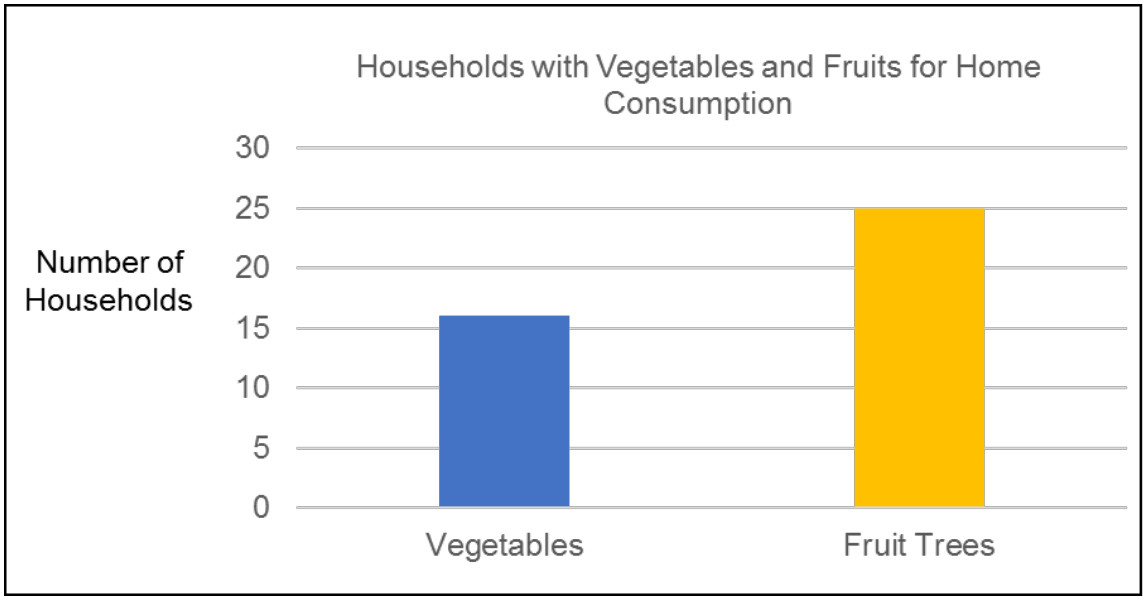


Figure 23. Distribution of Goats and Cows



19. Only 16 families grow vegetables for domestic consumption. 25 families have fruit trees, usually of the coconut type, as illustrated at Figure 24. There is no cultivation for commercial purposes.

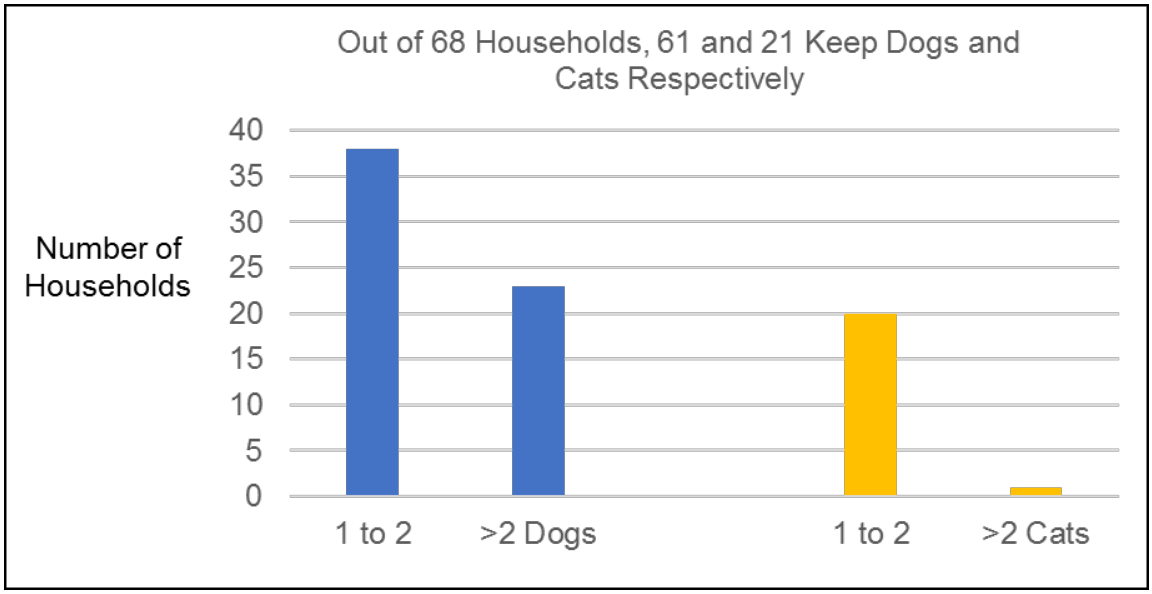
Figure 24. Families with Vegetables and Fruits



Pets

20. Dogs are the favourite domestic pet, with 61 households keeping them. A distant second are cats in only 21 households, as shown at Figure 25.

Figure 25. Families with Pets



Other Facilities and Activities

21. Except for a primary school, i.e. Ensino Basico Filial Caitehu (Figure 26), there are no other education centres in Mota Ulun. There is one Church, the Capela da Sagrada Familia (Figure 27).

Figure 26. Ensino Basico Filial Caitehu Primary School

Figure 27. Church (Capela da Sagrada Familia

22. There are no medical centres in Mota Ulun. The 2 nearest clinics are at Ulmera, and at Liquica.

23. The only and small number of employment opportunities are at the low intensity bulk fuel station, and the few small-scale companies operating stone works, i.e. making gravel and casting concrete parts. There are no plantations or raising of animals on a commercial basis.

24. Whether common or individual, there are no informal property or customary rights to land or natural resources. The nearby seashore has no mangroves. Families go to the nearby hills to collect wood, followed by preparation and bundling at home, and placed by the road side to sell to passing motorists, as shown at Figure 28.

Figure 28. Bundles of Wood for Sale at the Roadside

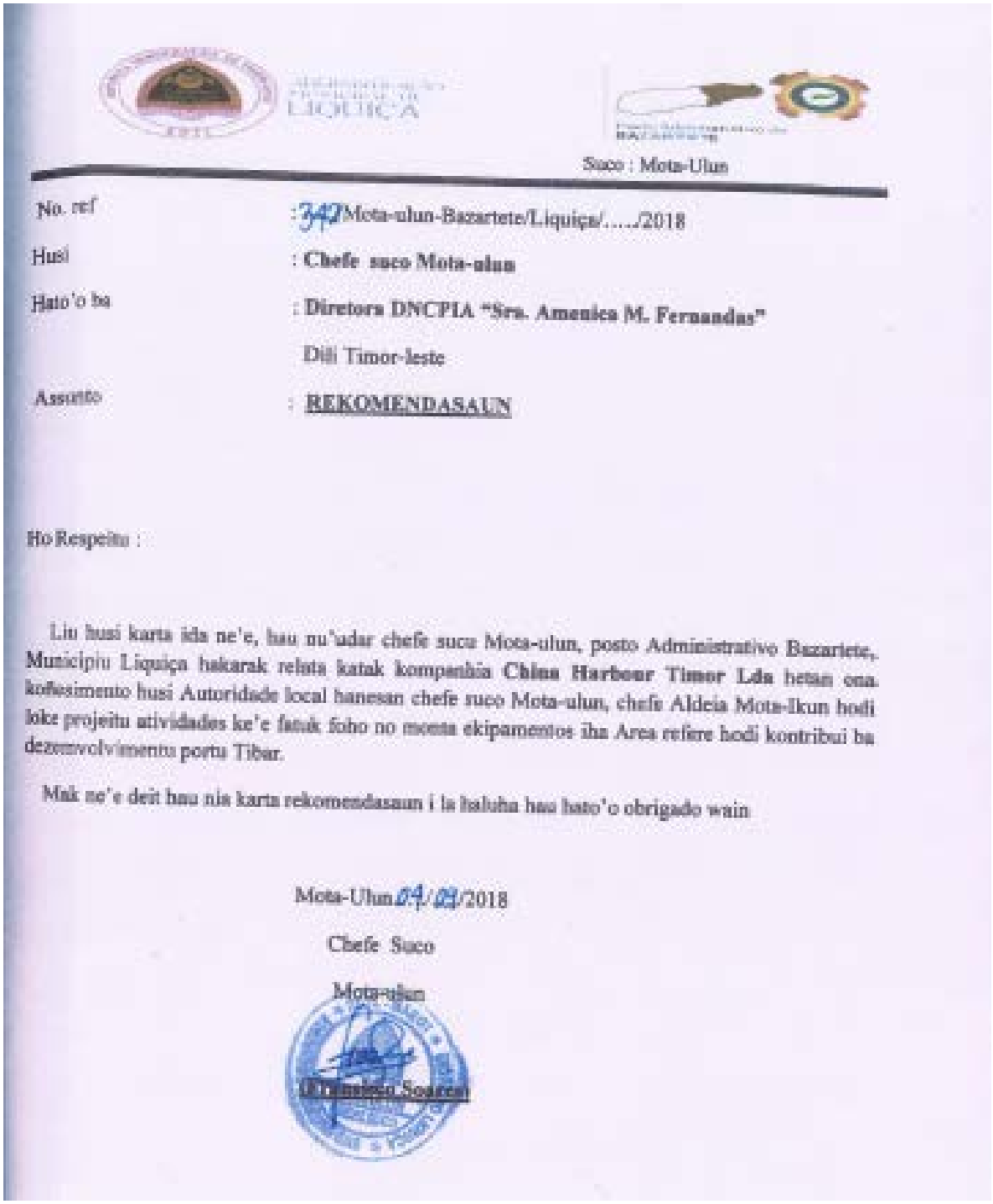
25. Only one person states employment as a fisherman. At the beach behind the primary school, there are 2 small one-person wood type fishing boats. There is no fish for sale by the roadsides, or at the few grocery shops.

26. The primary school has a dirt type football field, and a basketball court with a broken-up surface. There are no other social or recreation areas, other than 2 places with one billiard table each, as shown at Figures 29 and 30.

Figure 29. Billiard Station next to Mdm Anna Clara Shop (with Mr. Jose Silvestre (red/black T-shirt), and Friends)

Figure 30. Billiard Station (about 100 m west of Mdm Anna Clara Shop, and on the opposite side of the road), with Mr. Bartolomeu Mesquita (purple T-shirt) and Friends

Attachment M. Support Letter from Mr. Francisco Soares, Chief Suco Mota Ulun



Suco : Mota-Ulun

No. ref : 347/Mota-ulun-Bazartete/Liquiça/...../2018

Husi : **Chefe suco Mota-ulun**

Hato'o ba : **Diretora DNCPIA "Sra. Amenica M. Fernandas"**

Dili Timor-leste

Assunto : **REKOMENDASAUN**

Ho Respeitu :

Liu husi karta ida ne'e, hau nu'udar chefe suco Mota-ulun, posto Administrativo Bazartete, Municipiu Liquiça hakarak relata katak kompanhia **China Harbour Timor Lda** hetan ona. konfesimento husi Autoridade local hanesan chefe suco Mota-ulun, chefe Aldeia Mota-Ikun hodi loke projetu atividades ke'e fatak foho no moenta ekipamentos iha Area refere hodi kontribui ba dezenvolvimentu portu Tibar.

Mak ne'e deit hau nia karta rekomendasaun i la laluha hau hato'o obrigado wain

Mota-Ulun 04/09/2018

Chefe Suco

Mota-ulun

(Francisco Soares)

Attachment N. Public Consultation Meeting (18 Jan 2019)

Notes of Public Consultations with Mota Ulun Community Leaders

Date: Fri 18 Jan 2019, at 10.00 am.
Place: Café below CHEC Office at Palm Office Bldg.

Attendance: Francisco Soares, Chief of Suco Mota Ulun.
Germano Augusto, Mota Ulun Council Representative.
Jorge da Conceicao, Mota Ulun Council Representative.
Francisco Correia, Mota Ulun Council Representative.
Noel Bernardo de Carvalho, CHT Public Relations Officer.
Koh Chee Thong, CHT HSE Advisor (Note taker for the meeting).

A photograph of the Attendees, and the Attendance Register, are at Appendix A of this Attachment.

Background

1. China Harbour Timor Lda (CHT), a subsidiary of China Harbour Engineering Company (CHEC), is operating a quarry at Mota Ulun, as well as a rock type jetty, sited about 60 m west of the Laiara Bulk Fuel Station at Mota Ulun (in Barzetete, Liquica).

2. There have been several other consultations with the local community about the jetty and the quarry (sited directly across the road, about 1.5 km away, and up in the hills) projects. This meeting is a continuation of public consultation activities until site closure.

Purpose

3. The purpose of the meeting is to further inform the community leaders about the status of implementation of the quarry and jetty projects, and to obtain information that probably only persons with knowledge of the local environment can provide. All are encouraged to bring-up any subject matter for discussion.

Layout

4. Koh presented the revised layout plans of the quarry and the jetty. The explosives store is no longer sited within the area. The reasons for choosing the location of the jetty, i.e. near the CHT and other quarries, present non-usage by other parties of the site, and not near any historical or cultural spots, were

explained. The location is also not a nature reserve, or a place with special scientific interest, or with protected or endangered flora and fauna. Jetty activities are also of the non-environmental polluting type. There is no housing quarter in the jetty compound. The beach area remains open to the public, and the existing paths from the main road to the beach are not obstructed.

Benefits

5. Koh re-emphasized the benefits of the quarry. He also described the advantages of the jetty, including serving as transport hub for CHT and for the other quarries. In the future, it could be used as a transit hub for cargo ships from Dili, Oe-cussi, and other parts of Timor-Leste, and even from Indonesia. These activities point towards improvement for the economy of the local community. The aim of CHT is to be a beneficial part of the local community, and also society in general.

6. Transport of rocks and gravel by the jetty means that there will be less heavy trucks using the road to / from Tibar Bay where the new port is being constructed, i.e. greatly reducing road traffic pollution, and other safety concerns.

Implementation Status

7. Noel informed the meeting about the process for obtaining environmental licenses for the quarry and the jetty. For the quarry, the project documents (PD) had been approved, and the Terms of Reference (TOR) document is being reviewed by ANPM, the Environmental Authority. As for the jetty, the PD has already been submitted to the Environmental Authority, i.e. the National Directorate of Pollution Control and Environmental Impact (NDPCEI), for obtaining Project Classification. Further environmental studies of the land and sea conditions will be conducted. It is planned to start jetty construction in Apr 2019.

Discussions

8. Mr. Francisco Soares expressed his appreciation to CHT for providing updated information, and for staging projects in the community, with the advantages of economic growth, employment and the learning of new trades and skills.

9. Mr. Francisco Soares also mentioned that items for support of quarry and for jetty construction and operations can also be obtained from the community, so as to allow local enterprises to grow.

10. Mr. Noel said that for jetty work, a 7 m width of vegetation alongside the road will not be removed, i.e. preserved to keep a “green buffer” between the road and the fence of the jetty compound. This retains the pleasant visual image of a country road and the surroundings, i.e. industrial development need not degrade the environment.

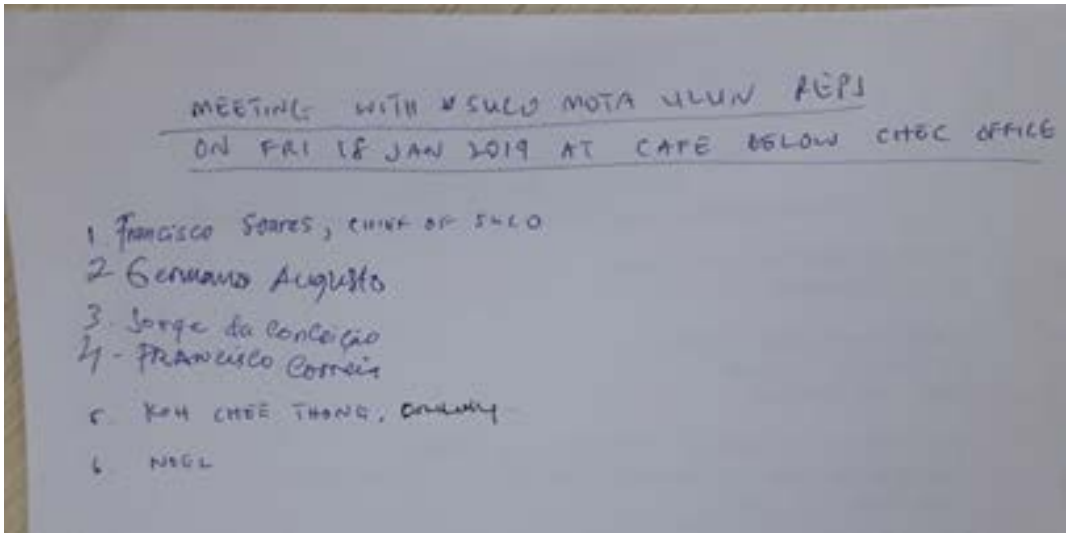
11. Mr. Germano Augusto added that such a “green” feature is welcomed. He cautioned against jetty users littering the beach. CHT replied that employees are trained on environmental awareness, and that there is daily housekeeping.

12. Mr. Germano Augusto also said that meetings, such as the one being held, are useful for all sorts of dialogue, e.g. notifications, discussions, and feedback.

Appendix A

Figure 1. List of Participants. Mr. Francisco Soares is the 3rd person from the left (wearing a brown shirt)

Figure 2. Attendance Register



Attachment O. Grievance Reporting Form

Grievance Reporting Form (for both employee and community grievances)

Grievance Report Number (filled-in by HR Manager):
Location:
Date / Time:
Names of Persons Reporting the Grievance:

Grievance Received by:

Grievance Closed by HR Manager:
Date of Closure:
Brief Description of Grievance:

SN	Grievance Area	Comments
1	Employee contract	
2	Welfare	
3	Transport	
4	Accommodation	
5	Food and drinks	
6	Vehicle parking	
7	Supervisor-related matters	
8	Relationship with co-workers	
9	Relationship with security staff	
10	Animals	
11	Crops	
12	Social disturbance	
13	Noise	
14	Dust	
15	Flooding	
16	Access	
17	Claims	
18	Others	

Attachment P. Emergency Plans

1. The CHT quarry has no unusual environment impacts, i.e. it is a conventional type of quarry operation, using explosives to break-up rock surfaces. There is no tunnelling, or open-cast, i.e. pit, type of mining. There is also no requirement for chemical treatment, i.e. no creation of hazardous sludge. The type of work does not create significant environmental hazards, e.g. relating to sludge holding embankments collapsing, or spillage of large quantities of chemicals into water courses or other types of water bodies, or release of harmful fumes from processes.

2. The probable emergency scenarios include:

   2.1 Trucks toppling of the haul roads.

   2.2 Fires, e.g. at the housing quarters and the oil store.

   2.3 Explosions, e.g. explosives truck in the quarry.

   2.4 Landslides and floods at the explosives store.

   2.5 Civil disturbances.

3. The first rule of emergency preparedness is that of ensuring that emergencies do not occur, and the precautions are described as follows.

Trucks Toppling

4. Speed limits are strictly enforced. Depending on the type and severity of the offence, wilfulness, and past records, the penalty for offences range from lower scale verbal warnings to the highest level of instant dismissal, with the company reserving the right to claim for damages. Criminal offences are reported to the police.

5. The haul roads are winding and steep. Berms, i.e. raised banks at the drop-off sides of roads, of at least 1 m in height, are constructed to prevent vehicles from driven off the road. Drivers attend “Safe Haul Road Driving” training conducted by the Quarry HSE Manager. Defensive driving is a module in the training material.

6. The Equipment Department make sure that the trucks, especially mechanical components, are in good condition. A driver has the duty to use the Daily Pre-Task Checklist, to verify that the vehicle is fit for purpose, before starting work for the shift.

Fires

7. The first step in preventing fires is the “No Smoking” rule. Smoking is allowed at only designated places. The rule of “No Smoking in Rooms” is especially important in the accommodation units. Notices to this effect are posted at prominent places.

8. Wood is not used in making the housing units of only one-storey high, and such buildings are inherently safer in the fire sense. The cooking areas are separated from other areas by 1-hr fire rated walls.

9. Domestic electrical appliances are approved by the Quarry HSE Manager. The Quarry Chief Mechanic (reporting to the Quarry Equipment Manager) approves all other types of equipment and machinery. A List of Machinery” is drawn-up to enable tracking and maintenance of these items.

10. The storage of flammables is allowed only at the designated oil / fuel store. The Quarry HSE Manager and the Quarry HR Manager on a daily and weekly basis, conduct checks on the oil store and the accommodation rooms respectively.

Landslides and Floods

11. The Land Clearance Permit has an item relating to prevention of landlsides and floods.

12. Structures are not built near slopes or on ground lower than the surroundings, or near shallow gulleys with the potential of overflowing during heavy rain.

13. After each occurrence of blasting, and after rain, site conditions, especially where there are steep sides, are checked for stability. In cases of instability, and where the potential for landslides is high, rectification measures include warnings to quarry personnel, barricading-off the area, making benches on the slope, reducing the steepness of the slope, and placing mats and other types of soil stabilising methods.

14. After rain, the site is checked for areas where pooling of water occurs. Such signs are indication of floods, made worse in case the embankments of large pools of water are broken through by the sheer volume and weight of the

contained water. Rectification measures in making drainages, or moving structures away from the flood line are implemented.

Safety of Explosives

15. Separate applications are made to appropriate Authorities for licenses for the storage of explosives (off site) and the usage of explosives. Attachment A of this EMP describes procedures for safe use of explosives. A separate document, Safe Rock Quarry Blasting Operations, fully describes the safety precautions to take when using explosives for quarrying purposes.

Civil Disturbances

16. The Quarry Community Liaison Officer (CLO) has the responsibility of fostering goodwill, by ensuring that the opportunities for employment, commerce, and social improvement are available in a fair manner, and that negative impacts from the quarry, are well managed. In the unlikely event of civil disturbances, the responses include:

16.1 The police is immediately called at the first sign of social disorder.

16.2 Non-aggravation of the situation. All are not to engage in shouting disputes, confront demonstrators, especially with weapons, throwing of objects, removal of barricades, etc. Fighting is allowed only in self-defence.

16.3 The gates are locked. Non-essential staff for ensuring security at the gate are to retreat and stay at the housing quarters. Isolated and caught out in the open is a serious hazard. Keeping together is necessary.

16.4 A location in the housing quarters is designated as a place of refuge. It has a strong main door, and objects to barricade it. Dried food and water for emergency supplies, and weapons for self-defence, are placed in it.

16.5 Serious unrest do not suddenly occur. There is usually a “brewing” time. Upon receiving information, the Quarry Manager might decide to initiate the first step of an evacuation plan, i.e. each person to pack essential documents and light change of clothing in a small backpack; ready to leave the site at short notice.

Other Emergency Support Setup

17. An Emergency Response Team (ERT) is organised, with members mainly from the Equipment Department. Whenever the site is operating, the ERT is available. The ERT duty roster is placed at the main security post. Names and contact numbers are available. Each day, the Security Supervisor checks to verify that all members of the ERT Team are present.

18. Equipment for the ERT is placed at the Equipment Yard. The equipment consists of at least an adequate quantity of torch lights, barrier tapes, spill absorbents, spill trays, spades, drums, crowbars, and jacks. The Chief Mechanic checks the items on a weekly basis.

19. The Chief Mechanic is also responsible for the availability of the standby vehicle, i.e. for medical support, recovering broken-down trucks, and for other emergency purposes.

20. Fire extinguishers are placed at work and rest locations, e.g. at the housing units, the oil store, the security posts, and the maintenance workshops. These items are at prominent and easily accessible places, e.g. near exit doors, and along corridors.

21. A medical centre is situated at the accommodation unit. It is a basic facility, with a patient room with 2 beds, an observation room, a reception area, and sanitary facilities. Medical supplies are usually of the first aid type. A medic is on duty when the site is operating, and on standby during non-operating hours. The nearest medical clinic, operated by the Ministry of Health, is about 10 km away at Ulmera, i.e. Servico Distrital de Saude Liquica, Centro de Saude Barzartete, Posto de Saude Ulmera. At Liquica, also about 10 km away, there is another Clinic, i.e. the Hospital de Liquica. At nearby Ulmera, and at Tibar Bay, CHT has separate medical centres for mutual support.