

**ENVIRONMENTAL MANAGEMENT PLAN (EMP) – DRILLING
ACTIVITY
PSC TL-OT-17-08 BLOCK A**

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Contact person	Nomesia Reis / Florentino Ferreira
Further contact person/s	Jan Hulse



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MANAGEMENT APPROVAL

POSITION TITLE	NAME	SIGNATURE	DATE
CEO	Suellen Osborne		
Director	Florentino Ferreira		
General Manager of Exploration	Jan Hulse		

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Abbreviations

AAQ	Ambient Air Quality
ACGIH	American Conference for Governmental Industrial Hygiene
AKO	Adjustable Kick Off
ANPM	Autoridade Nacional do Petróleo e Minerais
API	American Petroleum Institute
ASTM	American Standard for Testing Materials
BHA	Bottom Hole Assembly
BOP	Blow Out Preventer
CO	Carbon Monoxide
CR	Critically Endangered
CSR	Corporate Social Responsibility
dBA	A-weighted decibels
DEM	Digital Elevation Model
DNAS	Direcção Nacional das Aguas e Saneamento
DNMA	Direcção Nacional de Meteorologia e Geofisica
DST	Drill Stem Test
EBC	Escola Basico Central
EBF	Escola Basico Filial
EBS	Environmental Baseline Survey
ECD	Equivalent Circulating Density
ED	Eastern Drilling
EIS	Environmental Impact Statement
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EMW	Equivalent Mud Weight
EN	Endangered
ENSO	El Nino Southern Oscillation
ERP	Emergency Response Plan
FEWD	Formation Evaluation While Drilling
GDS	Directoral General of Statistics Timor Leste
GHG	Greenhouse Gas
GRM	Grievances Redress Mechanisms
Hazid	Hazard Identification
HIRA	Hazard Identification and Risk Assessment
HAVS	Hand-Arm Vibration Syndrome
HIV/AIDS	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
HSE-MS	Health Safety Environment Management System
IADC	International Association for Drilling Contractors

IFC	International Finance Corporation
ILO	International Labour Organization
IOD	Indian Ocean Dipole
IPCC	International Panel for Climate Change
ISO	International Standard for Organization
IUCN	International Union for Conservation of Nature
KCl	Pottasium Chlorite
KPI	Key Performance Indicator
Leq	Equivalent Continuous Sound Level
Lmax	Maximum Continuous Sound Level
LOT	Leak of Test
MJO	Maden-Julian Oscillation
MoC	Management of Change
MW	Mud Weight
MWD	Measurement While Drilling
NAPA	National Adaption Plan and Action
NIHL	Noise Induce Hearing Loss
NIOSH	National Institute of Occupational Health and Safety
NOC-TL	Nacional Oil Company of Timor Leste
NORMS	Naturally Occurring Radioactive Materials
NO _x	Nitrogen Oxide
NT	Near Threatened
OECD	Organization for Economic Cooperation and Development
OSCP	Oil Spill Contingency Plan
OSHA	Occupational Safety and Health Administration
P&A	Plug and Abandonment
PACCSAP	Pacific-Australia Climate Change Science and Adaptation Planning
PDM	Positive Displacement Motor
PM	Particulate Matters
PPE	Personal Protective Equipment
PSC	Production Sharing Contract
PSL	Product Specification Level
QMS	Quality Management System
RPM	Rotation Per Minute
rr	Restricted Range
SLM	Sound Level Meter
SMC	Safety Management Consultancy
SO ₂	Sulphur Dioxide
SO _x	Sulphur Oxide
TD	Total Depth
TR	Timor Resources
UNCBD	United Nations Convention on Biological Diversity

UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nation for Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework for Climate Change Convention
URTI	Upper Respiratory Tract Infection
USGS	The United States Geological Survey
VU	Vulnerable
WB	World Bank
WHO	World Health Organization
WOC	Wait on Cement

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1. Executive Summary

This Environmental Management Plan (EMP) is for Block A drilling in Suai Municipality. It will identify the principles, approach, procedures and methods that will be used to control and reduce the environmental and social impacts of exploration drilling activities associated with the project. The project is to conduct exploration drilling of five identified well locations namely Karau, Lafaek, Kumbili, Raiketan and Laisapi. These wells are located in sub district of Suai, Maukatar and Zumalai in Covalima municipality. Within these sub districts, four villages were identified as proposed drilling area such as Matai, Kamanasa, Labarai and Tashilin. Additionally, three of five proposed wells are geographically located within the suco's boundaries between Debos and Matai, Belakasak and Labarai and Raimea and Tasilin. These sucos may be affected by the drilling campaign.

The EMP involves stakeholders which consists of Timor Resource (TR) a privately-owned Australian oil and gas corporation as the project owner and its joint venture with TIMOR GAP, E.P (TG), the national oil company of the Timor-Leste (NOC -T) Government and Contractors, Independent Consultant, the Local Authorities and the communities who live around the project area. An engage agreement was conduct on 7 April 2017 between TR and the Timor-Leste Government for Onshore PSC TL OT-17-08 permitting the company, with its partners to begin the process of exploration, development and exploitation of petroleum resources in the contract area, identified as Block A. The Ministry desires to promote Petroleum Operations in the Contract Area and the Contractor requests to join and assist the Ministry in doing so in the Contract Area

The exploration drilling is planned to be commenced in 1st quarter of 2020. The exploration drilling activities are conducted into three parts, pre - drilling, drilling and plug and abandonment phases. These phases involve activities such as build roads to access the well sites and the site construction for building the camps include welfare facilities and other related infrastructures such as mud reserve pits and cellar for the drilling rig, excavation, rig move, casing, cementing, mud pumping and circulating, pipe trip, flaring, venting, perforating, well testing and completion and well plug and abandonment. These activities may or may not potentially affect the human, plants, animals or the environmental surround the project area.

The drilling activity may have significant environmental impacts, therefore the drilling activity falls under category A according to the Decree Law No. 5/2011 of environmental Licensing. Hence, Timor Resources submits the Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) seeking for authority (ANPM) and other relevant entities approval before the drilling is commenced or spud in.

During the drilling campaign, TR will consider all the environmental aspects including the aesthetic environmental, safety and health and legal issues when upgrading or modifying the related public infrastructures which are impacted by the project activities. The potential project impacts on environmental, social-economic and cultural components for the project activities have been identified. Moreover, the mitigation measures for the proposed project activities have also been planned to be taken place at the proposed project site of five-wells within the six Sucos of Cavalima municipality. The mitigation measures identified are to be carried out at the initial stage (of pre-drilling) and through to the end of the project life cycle. The summary of environmental impacts and the proposed mitigation measures can be seen in section 7 and 8 within this document.

In addition, as part of mitigation measures, the monitoring program shall be designed to provide detail information such as specific parameters, monitoring procedures, frequency and location of sample monitoring, reporting on the assessment and monitoring the implementation and compliance. It is to ensure that the implementation program is complied with the country's legislation and standard international applicable and identified within the project EIS and EMP and its frameworks document. The monitoring program is developed with considerations to the available best practice or standards applicable for all the identified criteria. The project activities monitoring program is specified in table 10-1.

TR has also defined duties and responsibilities for TR itself and contractors during the execution of the project. Overall management of works at the site will be under the direct control of TR Operations and Country Managers. For the reporting requirements which is requested by the Environmental licensing department, report is periodically conducted on the overall work progress, changes, impacts and mitigation measures taken throughout each phase within the project life cycle. This report will be prepared and submitted in accordance with the project

environmental license reporting requirements. Other reporting requirements of the project will be undertaken in accordance with the aspect identified within the EMP and its frameworks include; daily and weekly monitoring and reporting, monthly report, and 6-monthly. In case of a major emergency, ANPM and the Environmental License department will be notified through verbal communication (message, phone calls or pager) within 24 hours, then followed by short and concise summary report within 5 working days or depending on the investigation period, progress and results; and details to be provided sequentially according to a recuperation stages. The emergency response plan is also identified to describe the plan on managing or handling an emergency or unexpected incident or accident case or situation that may occur as result of project activity within the project site. The main objective of Emergency Plan is to identify and provide appropriate means, processes, procedures that are systemized and effective in handling project emergency event or state that may or may not be able to be identified throughout the project life cycle.

For the review of the EMP purpose, the project Environmental Management Plan will also review the plan, implementation and monitoring of project activities throughout its life cycle in every phase it has. This include, all related aspects contribute to the accomplishment of first phase of project activity or pre-drilling activity; second phase activity or drilling and decommissioning phase. The review will follow the standard QA/QC document, which shall be fully and appropriately implemented.

2. Details of the Project Proponent

2.1. Contact details

Operator : TIMOR RESOURCES, PTY. LTD
Address : Suite #303, Level 3, CBD 3, Timor Plaza
Rua Presidente Nicolau Lobato, Comoro
Dili – Timor-Leste

Contact Person : Suellen Osborne
Title : Chief Executive Officer (CEO)
Mobile : +61 (0) 448 227 794
Email : Suellen.Osborne@timorresources.com.au

Contact Person : Jan Hulse
Title : General Manager of Exploration
Mobile : +670 759 42489 and +61 427 317 952
Email : Jan.Hulse@timorresources.com.au

Contact Person : Florentino Ferreira
Title : Director of Commercial and Compliance
Mobile : +670 7774 4602 or +670 74231777
Email : Florentino.Ferreira@timorresources.com.au

Contact Person : Nomesia Reis
Title : HSE Officer
Mobile : +670 73255407
Email : Nomesia.Reis@timorresources.com.au

Contact Person : Luis Pereira
Title : Operations Manager Timor Resources
Mobile : +670 7704 2531
Email : Luis.Pereira@timorresources.com.au

2.2. Company Structure



TIMOR RESOURCES ORGANISATION CHART

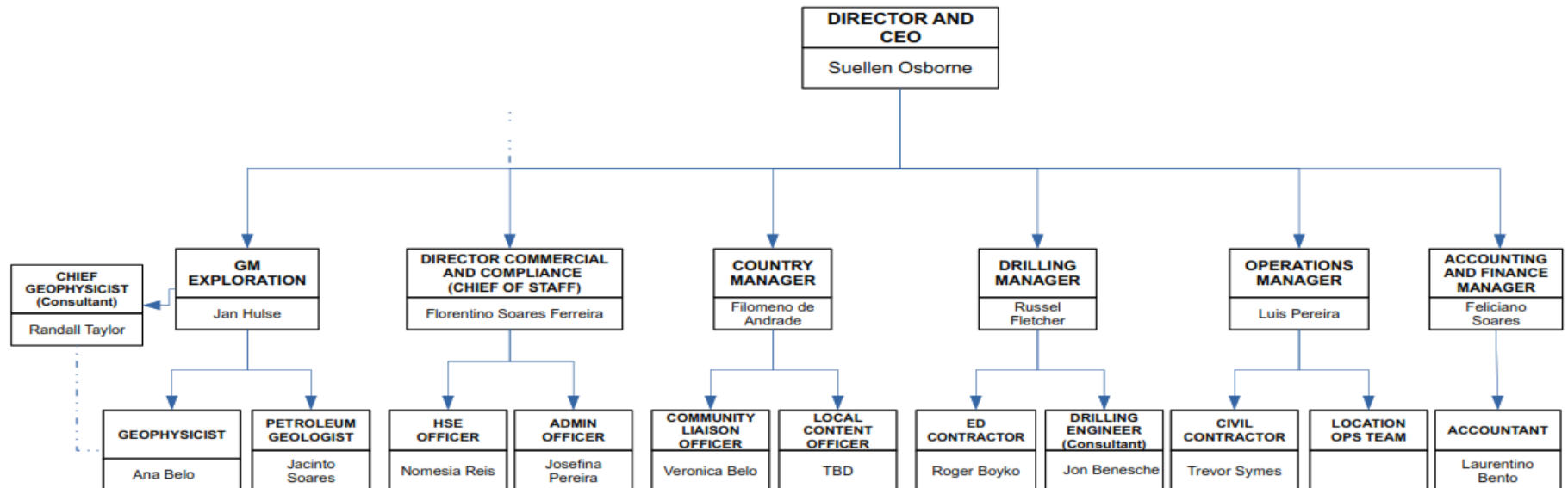


Figure 1. Timor Resources organization structure

3. Details of consultant who carried out the study and prepared the EIS

SAFETY MANAGEMENT CONSULTANCY (SMC) Lda.

Address : Rua de Catedral, Villa-Verde, Dili, Timor-Leste
Telephone : +670 7565 7185, 7740 4533, 7337 4141
Email : info@smc-tl.biz or alcino.passos@smc-tl.biz

Consultants:

1. Alcino dos Santos Passos

Has experience more than 10 years in oil and gas industry, especially in the area of production and development. Alcino hold Bachelor Degree in Electrical and Electronic Engineering and he was Manager of Production and Development at ANPM under Directorate of Development and Production (D & P) and was responsible for production, maintenance, drilling and metering.

2. Jose Azelito Soares

Has experience more than 10 years in oil and gas industry, he has Bachelor Degree in Law and Master Degree in International Energy Policy and has completed PhD coursework in International Energy Policy. Jose Soares was Legal Manager at ANPM for two years and that time he was responsible for legal and policy development as well as PSC contract arrangements.

3. Zelio Moniz

Has experience more than 16 years in oil and gas industry and was the Health and Safety Inspector of the ANPM, under directorate of the Health, Safety and Environment (HSE). He holds Diploma in Health Science and was responsible for ANPM HSE audits or inspections, incident/accident investigations, risk management and HSE performance measurements.

4. Salvador da Silva

Has experience in the oil and gas industry for than 5 years. He was Local Content and PSC Procurement Officer, who was responsible for review the contract arrangements, local content plans, PSC procurement and supply chain contracts. Salvador has Bachelor Degree Biochemistry and was also Local Content and Community Liaison Officer for Timor Resource.

5. Palmira A. Vilanova

Has 10 years of experiences of safety, environmental and social management in various disciplines, include oil and gas industry. She has a Bachelor Science degree in Natural Resources and Environmental Management and a Master of Science degree in Project Management. She has been working as an Independent Consultant for Asia Foundation and latest experiences as Country Consultant for UNCCD (United Nations Convention to Combat Degradation).

6. Adriano P. Cardoso Amaral

Fresh graduate from Victoria University of Wellington majoring in Geology and Environmental Science; with a first working experiences as an geologist and Geophysics intern with ANPM. The latest working experiences as Environmental and Geology consultant for SMC (Safety Management Consultancy).

7. Evangelita Pereira

Has 6 years of experience working as Health and Nutrition Technical Specialist. She has been working with international NGOs implementation of quality health programs according Timor Leste standards. She holds Bachelor of Health Sciences (Hons).

8. Pedro Pinto

Has 20 years of experience as Ornithologist. He has been working under Indonesian and Timor - Leste governments for Flora and Fauna Conservation. He holds a degree in Bachelor Science of Forestry.

4. Description of the Project

4.1. Identification of the Project Category

This project is to conduct exploration drilling of the five identified well locations, namely Karau, Lafaek, Kumbili, Raiketan and Laisapi. These wells are located in sub district of Suai, Maukatar and Zumalai in Covalima municipality. The exploration drilling is planned to be commenced around 17 April 2020.

4.2. Project Category

The drilling activity may have significant environmental impact, thus the drilling activity falls under category 'A' according to the Decree Law No. 5/2011 of Environmental Licensing. Therefore, Timor Resources submits the Environmental Impact Statement (EIS) and Environmental Management Plan (EMP) seeking for authority (ANPM) and other relevant entities approval before the drilling is commenced or spud in.

4.3. Project Nature, Size and Location

4.3.1. Nature

The exploration drilling activities are conducted into three parts pre – drilling, drilling and plug and abandonment phases.

The proposed drilling programme is designed to test three play types within the area of Block A, which are:

- a. The Pliocene-Pleistocene age Viqueque Formation, syn-orogenic Basin.
- b. Lower Allochthon (Permian-Eocene)
- c. The Triassic-Jurassic age Babulu/Aitutu and Wai-Luli Formations beneath a regional metamorphic overthrust.

The above mentioned three play are to be tested with the five wells, namely Karau, Kumbili, Laisapi, Raiketan and Lafaek. The proposed wells location are situated between Suai and Zumalai area; and with a distance of 700 and 7000 meters inland from the coastline.

In addition to proposed wells location, a drilling “Play Fairway” will be used in order to maintain a flexibility of the drilling campaign. This is to optimise the chance of success during the course of the drilling operations.

4.3.1.1. Pre Drilling

Pre-drilling operations include:

- 1) Soil boring survey.
- 2) Soil testing and analysis
- 3) Topographic survey
- 4) Soil integrity evaluation of the location and access road land for construction purposes.
- 5) Land clearance for road access and site constructions
- 6) Road Surveys with road and bridge upgrade plan, including highway and arterial and local roads.
- 7) Establish water supply (may include trucking, existing or new water wells, pumping from watercourse)
- 8) Well Site (including mini Camp) – Size requirement to be determined by rig footprint, ancillary equipment lay-out and local regulatory requirements
- 9) Cellar construction with recess for air pump.
- 10) Mud pits (sump) construction
- 11) Water storage pits
- 12) Rig Move

4.3.1.2. Drilling Operations

It is proposed to drill up to 5 wells with a cumulative depth of approximately 9,000m. The proposed well(s) designs are based on geological data supplied and interpreted predominantly by Timor Resources and the Joint Venture partner. Pore pressure and fracture pressure predictions are based on offset well drilling information.

4.3.2.1.1. Well Program, Schematic Design and Casing Program

Safe Operation Principle

Well design will be:

- Comply with regional laws, regulations, and industrial standards.
- Be designed to avoid drilling different formation pressures in same hole section.
- Be designed to have enough overbalance pressures to control well and to mitigate possible differential sticking mechanisms.
- Be designed to consider wellbore stability and/or weak/lost circulation formations.

Casing Setting Depth Principle

The first criteria of selecting casing setting depth is the overbalance pressure without fracturing shallow formations. Kick tolerance volume is also considered for determining the casing setting depth. The formation that has been cased, needs to withstand the operation of drilling, tripping in/out, and well control for the next holes section.

Economic Principle

To deliver reduced drilling time and cost, optimise hole sizes and subsequent casing sizes. General standardisation of well design and should be considered for all wells to optimize cost where applicable. Contingency plan for using a liner hanger instead of additional casing is one of the options to reduce both tangibles cost and rig operating days.

4.3.2.1.2. Well Design and Casing Selection

A 13-3/8" external/internal flush joint conductor casing should be set below the deepest aquifer at approximately 85m and will also cover the unconsolidated sand in the Suai Formation.

Drill next section with 12-1/4" Bit. Start with a MW (mud weight) from <9.0ppg and increase gradually dependent on real time hole conditions. Limit the maximum MW based on the leak-off test and control the ECD (Equivalent Circulating Density) to avoid breakdown of the 13-3/8" shoe while drilling through the lower unconsolidated sand formations.

The 9-5/8" surface casing should be set as deep as possible to cover the remaining unconsolidated sand. Casing shoe should be set in a competent shale formation to provide enough shoe strength for the next hole section. The 9-5/8" casing shoe LOT will determine the maximum EMW, with the objective of attaining an acceptable kick tolerance volume (10bbls is accepted industry minimum).

Table 1. Ratio of Condition, Criteria and Scenario for Drilling (TR & DVH, 2018)

CONDITION	CRITERIA	SCENARIO
Burst	1.1	<ul style="list-style-type: none"> • Pressure test after WOC. • Fracture at shoe with gas gradient above. • Drill ahead. • Gas over mud ratio.
Collapse	1.125	<ul style="list-style-type: none"> • Full evacuation of gas. • Loss return with mud drop. • Drill ahead.
Axial	1.6	<ul style="list-style-type: none"> • Running in hole – avg speed 1 ft/s. • Overpull force 100,000 lbf. • Post-cement static load. • Green cement pressure test 1000 psi • Service Loads.
Triaxial	1.25	N/A

The 8-1/2" hole, where possible, will be drilled to well/section TD through the target reservoir formation. Offset wells show that the target reservoir could be over pressured if below a compacted shale formation. To avoid well flow, hydrostatic overbalance will need to be maintained during drilling and tripping operations. In a trouble-free success case a Casing or Liner will be run to TD

and cemented to cover the reservoir zone. If the hole size at TD is reduced, due to additional intermediate casing strings, it may be necessary to set a temporary plug after evaluation.

4.3.2.1.3. Casing Program

The casing program will be determined by the geological interpretation at each location and be subject to the down hole conditions encountered during drilling. Two generic designs are provided in the figures below, these are expected to be similar to the final configuration.

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Typical Well Diagram

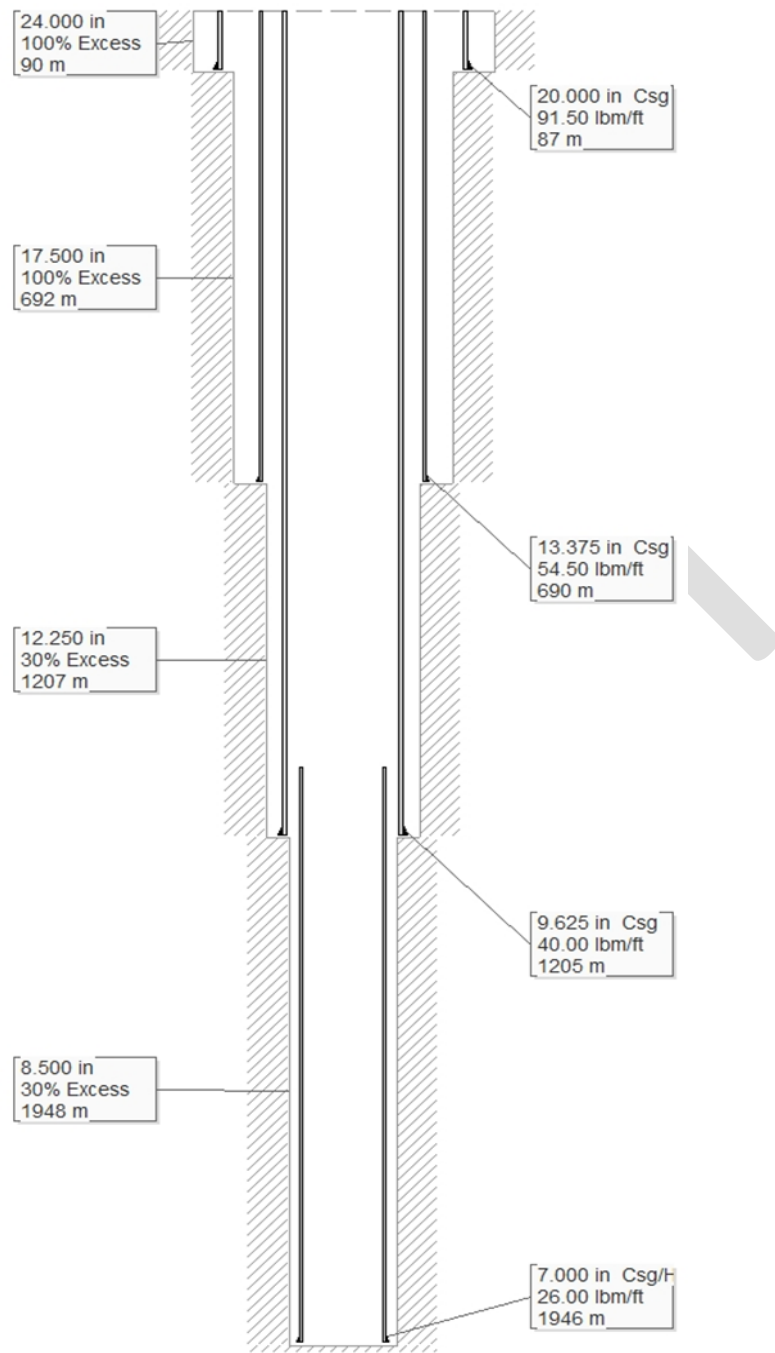


Figure 2. Typical Well Profile A (TR, 2019)

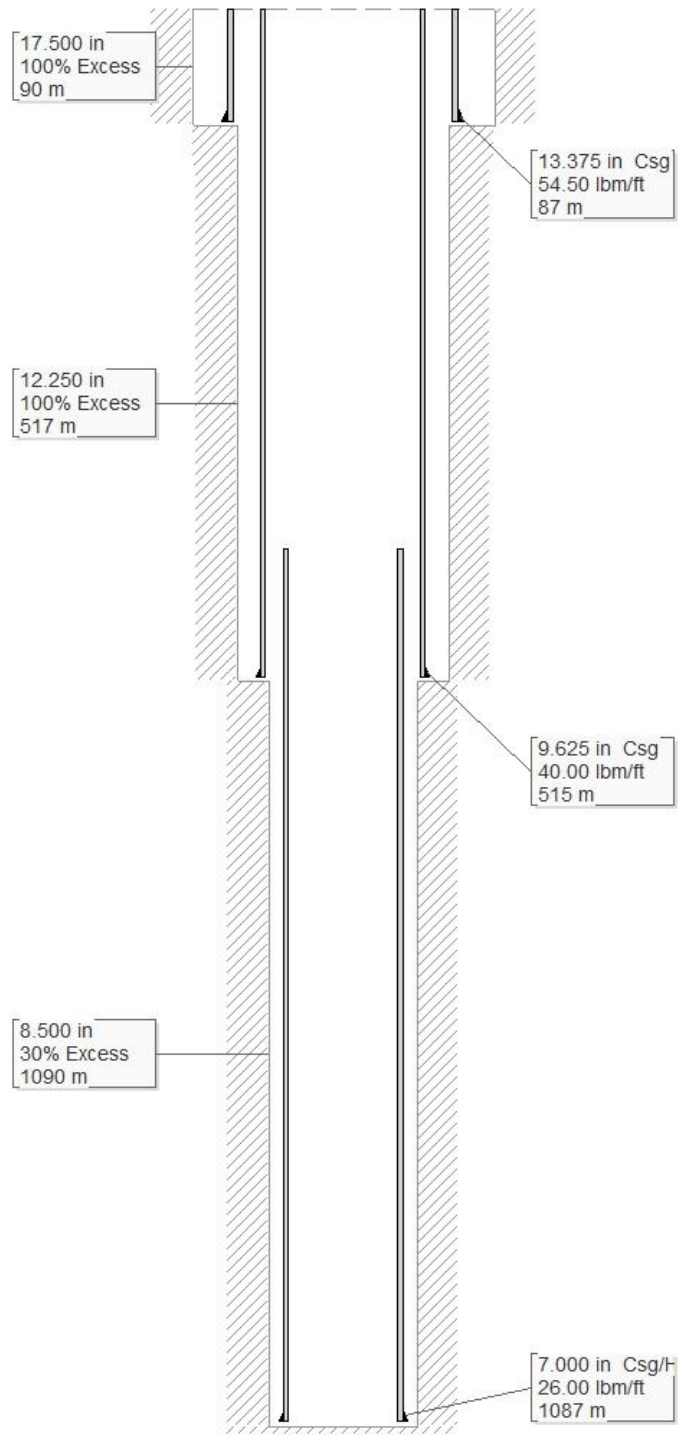


Figure 3. Typical Well Profile B (TR, 2019)

4.3.2.1.4. Drilling Operation Overview

13 3/8” Conductor Casing

The objective of the conductor casing is to case the hole through the ground water and shallow aquifer and the unconsolidated sand that is found in Suai Formation. Based on research for aquifer depth at Suai, Timor Leste, the deepest aquifer was found at 82m. Casing used for conductor driving should have external and internal flush joint and comply with API 5L, PSL-2.

To avoid loss circulation during cementing job, using light weight cement (10.5ppg tail and 12.5ppg lead) is recommended. Remedial cementing job (top job) is also required if there is no return to surface.

12 – 1/4” Intermediate Casing

The objective of intermediate casing is to isolate the shallow formations before entering the target reservoir and to provide sufficient LOT and kick tolerance to safely reach next section TD.

Offset well shows that the shallow formations contain shale and/or clay. KCl will be added to the pre-hydrated Bentonite drilling fluid to prevent bit balling.

Positive Displacement Motor (PDM) is recommended to be used in this hole section. With the same top drive rotation, BHA with Mud Motor will provide higher bit RPM, compared to conventional drilling with slick BHA. Higher ROP will result with Mud Motor BHA, which translates to reduction in drilling operational time. For Mud Motor BHA usage on the vertical wells, a 0.78o AKO bend angle setting on the motor is recommended, while for the directional wells, a 2oAKO bend angle setting on the motor is recommended.

The objectives for formation logging and directional surveys can be achieved by using electric line logging, gyro runs for directional kick-off and multi-shot surveys for direction. MWD Measurement (While Drilling) may be used to collect near bit real-time inclination and GR data.

Increasing MW to equal ECD value prior to logging operation is necessary in order to maintain the hydrostatic overbalance. Wiper trips and circulation to ensure a clean hole condition will have a significant effect on the logging data and successful logging operation.

Casing grade is chosen to withstand the worst burst and collapse load scenario. Setting the casing seat as low as possible is required to provide an acceptable kick tolerance volume for well control operations.

Cementing is the most critical operation in the 9-5/8" surface hole section. Quality cementing operations will provide good isolation of well bore to surface. Good planning on the cementing sequence and cement slurry weight is required to prevent loss circulation during the cementing operations.

8 – 1/2" Production Casing

Ideally, the objective of the 8 1/2" hole section is to drill the reservoir formation and case same with 7" casing to surface. If two formations are drilled in one hole section, there is increased risk of loss circulation on the weaker formation. Therefore, reservoir wellbore strengthening material (Liquid Casing* or similar type mud additive) should be considered as an addition to the drilling mud (pre-treated) for mitigation.

Reservoir evaluation is required with at least Neutron-Density log to confirm the hydrocarbon existence. Wireline logging will be used for preliminary evaluation. Further evaluation by open hole/cased hole Drill Stem Test (DST) will be advised dependent on the logging data.

The reservoir zone will be covered with 7" long string casing to surface or liner hanger, this is to comply with the oil and gas industry standard for well integrity.

Cementing slurry should cover all the open hole formation until surface. Option to have the TOC at least 500ft above the previous casing shoe can be considered to allow for a Sidetrack hole. With this option, Operator can cut and pull the 7" casing, set a Whipstock and drill a Sidetrack hole, if desired or required.

4.3.2.1.5. Contingency Plan

Contingency is planned for an additional 6" hole section, if the secondary target formation cannot be drilled as one-hole section. The 6" hole section can be completed with 4-1/2" or 5" flush joint liner. The objective of using a liner hanger instead of long string casing is to minimize the wellhead

sections, it's cost effective and complies with oil and gas industry standard practice. If the secondary target is proven to not be hydrocarbon bearing, the open hole can be directly plugged and permanently abandon.

4.3.2. Size

Onshore PSC TL-OT-17-08 Block A is an area that covers of approximately 1.000km², extending along the coast for approximately 55 km and up to 30 km inland was identified as an area of commencement the process exploration, development and exploitation of petroleum resources under contract between Timor Resources and TL Government officially signed on 7th April 2017.

Timor Resources (TR) commits to conduct exploration drilling campaign in Block “A” Covalima municipality, wells are located in suco Matai, Kamanasa, Labarai and Tashilin. The area size for the drilling campaign is 5 (five) hectares in total as TR requires to secure 1 (one) hectare of land per well location including safety zones. In addition, TR will also build the access roads approximately 20 meters wide to the well sites from the nearest existing highway, arterial or local roads.

4.3.3. Location

The proposed drilling operations will carry out within three sub districts, namely: Suai, Maucatar, and Zumalai. Within these Sub-Districts, four villages (Sucos) are identified as proposed drilling area such as Matai, Kamanasa, Labarai and Tashilin. In addition, three of five proposed wells are geographically situated within the Sucos' boundaries between Debos and Matai, Belekasak and Labarai and Raimea and Tashilin.

The five proposed wells in accordance with the sequence of exploration drilling campaign are Karau, Kumbili, Laisapi, Raiketan and Lafaek. Map below shows the area of the well locations and the nearby Sucos (Figure 4).

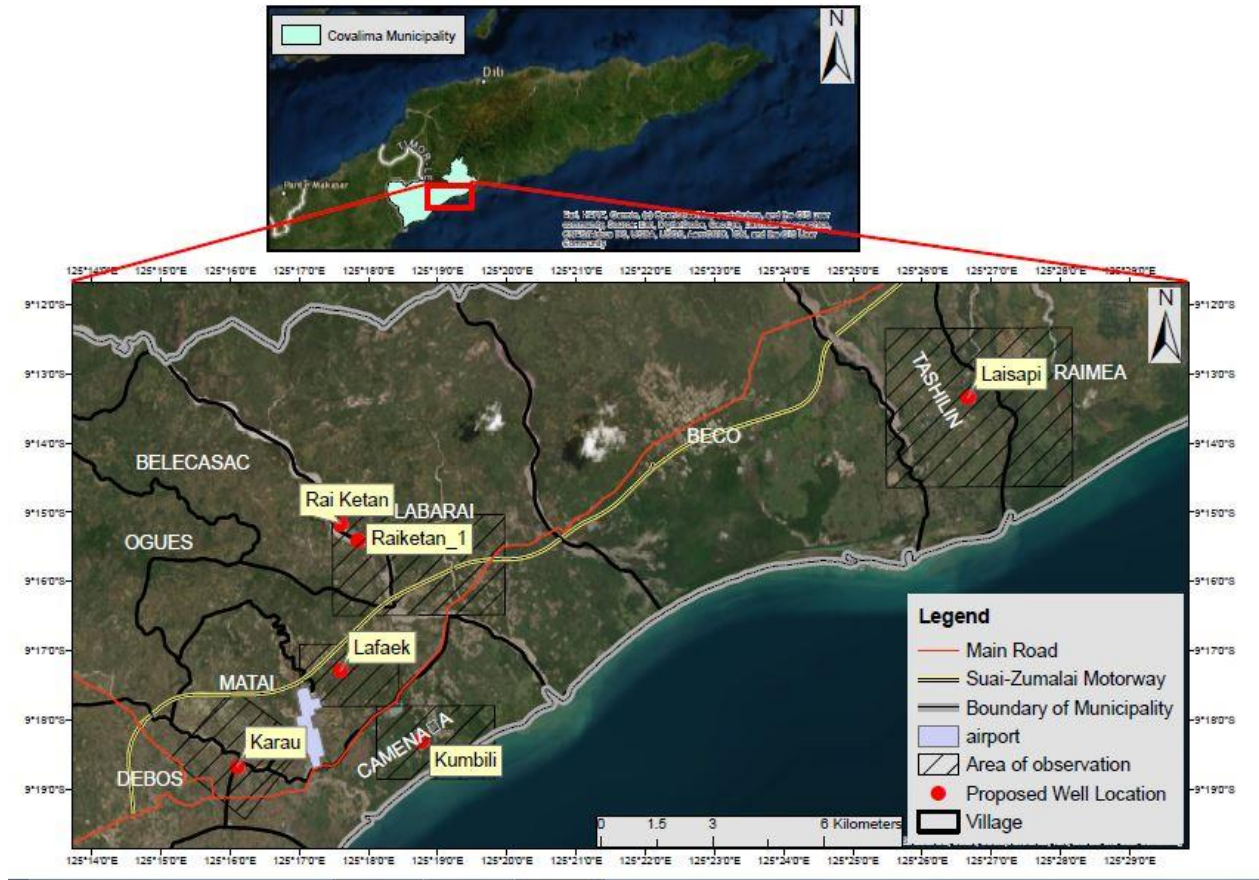


Figure 4. General Map of the Exploration Drilling Campaign Locations and nearby villages

The exploration drilling campaign requires to build roads to access the well sites and the site constructions for building the camps include welfare facilities and other related infrastructures such as Mud Reserve Pits and Cellar for the Drilling rig. Hence, existing public infrastructures such as highway, arterial and local roads, bridges and underpasses to be assessed and possibly upgraded or modified whenever necessary to accommodate the mobilization of the equipment to the project locations without damaging those facilities.

TR will consider all the environmental aspects including the aesthetic environmental, safety and health issues when upgrading or modifying the related public infrastructures which are impacted by the project activities. It will include architectural designs and their requirements are to be specified to ensure any change is comply with the local legislations and the industrial best practices.

The drilling project campaign will be limited to the five identified well's locations where each well site except Kumbili is located between the Suco's boundaries. This drilling campaign is to test the potential hydrocarbon in the Block A and potentially further testing and appraisal wells to be drilled post discovery.

Maps below show the visual site of Karau well.



Figure 5. Visual site of Karau well



Figure 6. Visual site of Kumbili Well



Figure 7. Visual site of Laisapi well

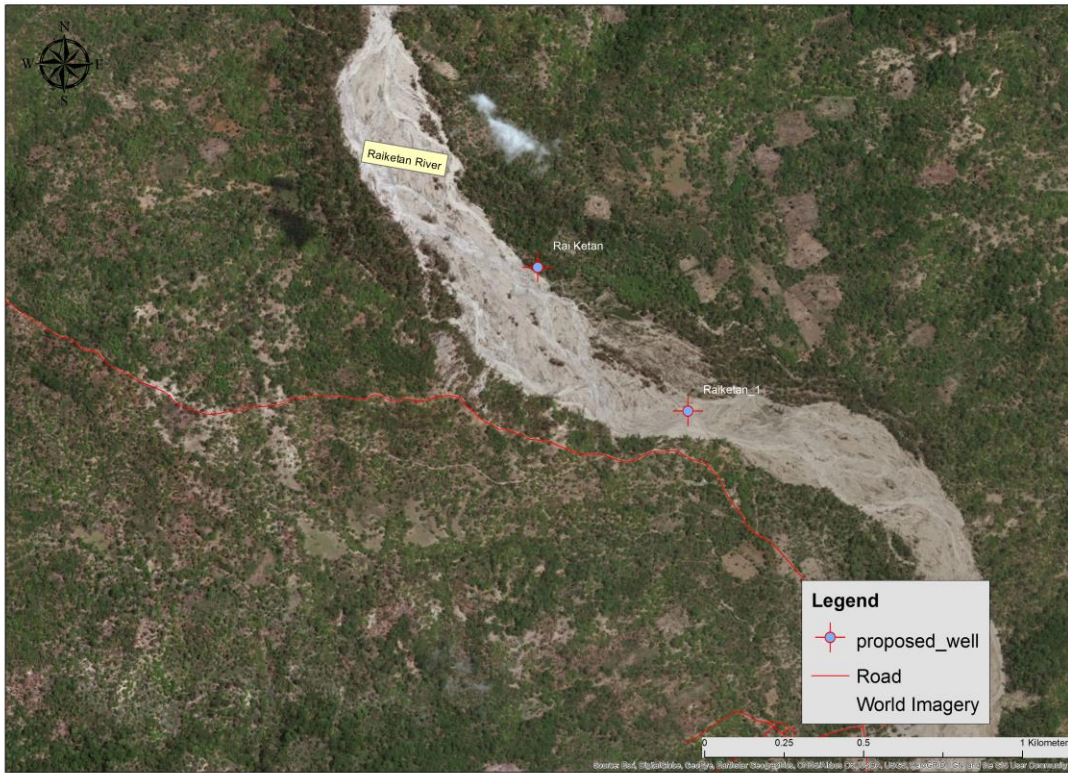


Figure 8. Visual site of Raiketan well

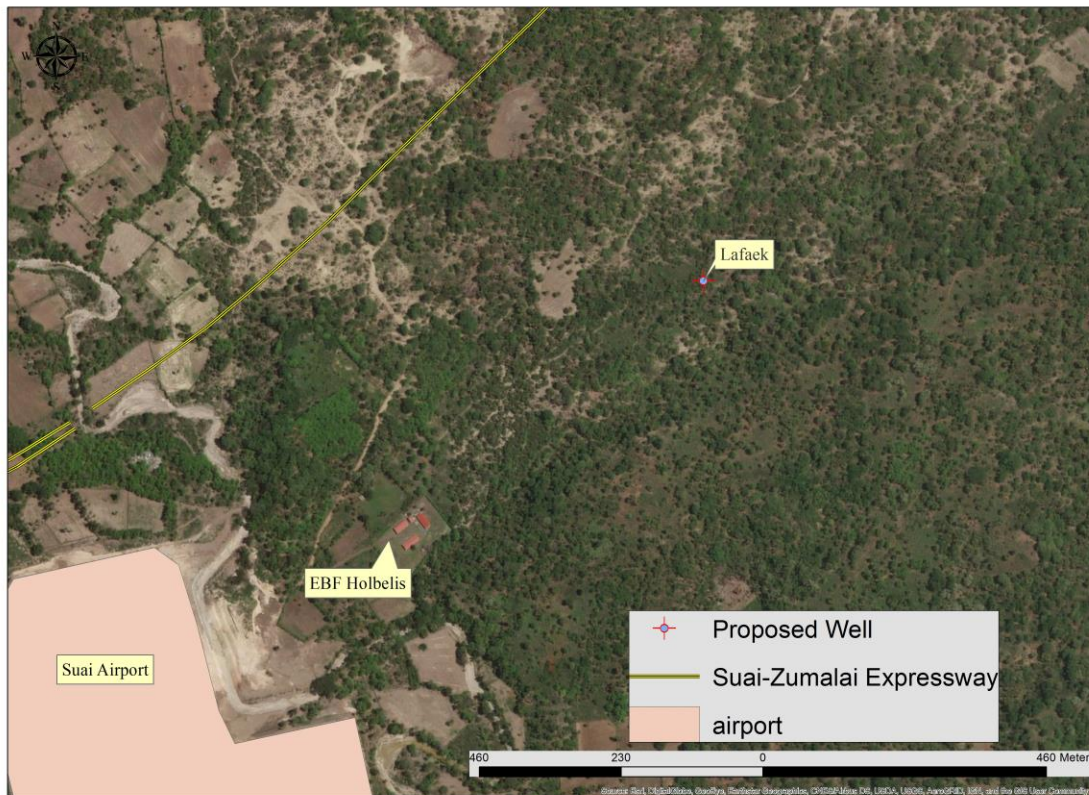


Figure 9. Visual site of Lafaek well

4.4. Justification and need for the Project

Timor Resources (TR) is a privately-owned Australian oil and gas corporation that is in joint venture with TIMOR GAP, E.P. (TG), a national oil company of the Timor-Leste (NOC - TL) Government. On 7 April 2017, TR engaged an agreement with the Timor Leste Government (Onshore PSC TL OT-17-08) permitting the company, with its partners, to begin the process of exploration, development, and exploitation of petroleum resources in the contract area, identified as Block A. The Ministry desires to promote Petroleum Operations in the Contract Area and the Contractor requests to join and assist the Ministry in doing so in the Contract Area. Exploration, development, and exploitation of petroleum resources in the contract area is encouraged and is based on data collected from 1969 to present day.

5. Legal requirements

Environmental Institutional:

- Constitutions of the Republic Democratic of Timor-Leste Article 61 (environment)
- Decree Law No. 26/2012 on Basic Environmental Law
- Environmental (Licensing) Decree Law No.5/2011
- Decree Law No. 5/2016 – National System of Protected Areas (Annex 1 – List of Timor-Leste Protected Areas)
- Diploma Ministerial No.44/2017 – Impact Benefit Agreement
- Diploma Ministerial No.45/2017 – Rules and Procedures of the Evaluation Committee for Project with Category A
- Diploma Ministerial No.46/2017 – Detail requirements of Classification, Initial Assessment and Terms of Reference, Environmental Impact Statement and Environmental Management Plan
- Diploma Ministerial No.47/2017 – Public Consultation Procedure and Requirement during Environmental Baseline Process
- International Finance Corporation Standard Performance
- United Nations Convention on Biological Diversity (UNCBD)
- United Nations Framework for Climate Change Convention (UNFCCC)
- IADC Guidelines
- Health Safety Executive Guidelines
- Western Australian Department of Mines and Petroleum “Guidelines for the Development of an Onshore Oil Spill Contingency Plan 2016”
- Ministry of Environment Decree number 48/11/1996 Indonesia

Forestry, Aquaculture and Fishing Legislation

- Law No. 14/2017 – General Regime of Forestry
- International Union for Convention of Nature (IUCN)

Cultural Heritage Legislation

- Government Resolution No.25/2011 – Protection of Cultural Heritage (Annex 4)
- UNESCO Convention on Natural and Cultural Heritage

Noise and Vibration Standards and Regulation

- WHO guideline for community noise
- Minister of Environment Decree no.48/11/1996 Indonesia

Air Quality Guidelines

- WHO Air Quality Guidelines

Climate Change

- Kyoto Protocols
- Government Resolution of National Action Plan for Climate Change
- United Nations Framework Convention on Climate Change

Water Resources

- WHO 2008 Guideline for Drinking Water Quality

Labor Legislation

- Law No. 4/2012 – Timor Leste’s Labor Code

Land legislation

- Law No. 13/2017 - Especial Regime for the Definition of Land and Property

Waste Management

- Decree Law No.33/2008 – Hygiene and Public Order
- Decree Law No. 2/2007 – Urban Residual Waste Management

Onshore Oil Spillage Management

- Western Australia Department of Mines and Petroleum “Guidelines for the Development of an Onshore Oil Spill Contingency Plan 2016”

Frameworks to be developed or provided under project EMP:

- Waste Management Plan

- Rehabilitation Plan
- Traffic Management Plan
- Oil Spill Contingency Plan
- Health Safety and Environmental Plan (HSE-EMP)
- Emergency Response Plan (ERP)
- Grievance Redress Mechanism (GRM)
- Rig Move Plan

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6. Institutional Roles & Responsibilities

The following are the roles and responsibilities for all the HSE related aspects of Timor Resources and its drilling contractor management within the project activities.

Table 2. Timor Resources and its contractor personnel roles and responsibilities

Position	Roles and Responsibilities	
	General Responsibilities	Specific Responsibilities
Timor Resources		
Chief Executive Officer	Oversees all HSE issues	<ul style="list-style-type: none"> • Lead management review and approve HSE Policies • Ensure HSE compliance and review KPI
Commercial and Compliance Director	Overall project management and Supervises all subcontractors	<ul style="list-style-type: none"> • Receives regular reports on progress, incidents, issues to be aware of • Receives updates from HSE Officer as to compliance or non-compliance with legislation, and recommendations to rectify
General Manager Exploration	Overall supervision of project	<ul style="list-style-type: none"> • Lead in seeking the resolution of HSE issues • Review and update HSE documents • Implements and updates the Project Environmental Management Plan • Observes all environmental acts, rules and regulations
Drilling Manager	Overall supervision of project	<ul style="list-style-type: none"> • Supervises drilling operations for all HSE aspects
Operations Manager	Manages all works on-site	<ul style="list-style-type: none"> • Make sure that work activities are carried out in a safe and environmentally sound manner • Ensures sediment and erosion control measures are in place and functioning • Provides advice and assistance on environmental matters to employees • Review hazard reports and ensures they are completed and corrective actions undertaken • Manages the resolution of project environmental issues

		<ul style="list-style-type: none"> • Make sure records are kept and are up to date
	Supervises all subcontractors on- site	<ul style="list-style-type: none"> • Ensures plant & equipment are weed free when entering/leaving site • Monitors that vegetation is not disturbed except where necessary for development • Ensures work is not conducted outside designated project boundary • He/she is based on the field operation and responsible for the overall compliance with project Environmental Management Plan, HSE standards and procedures, supervision of data quality and achievement of production goals. • He/she communicates HSE information with senior staff and ensures follow-up where necessary. • He/she is responsible to conduct emergency drills on the crew and ensures implementation.
Country Manager		<ul style="list-style-type: none"> • Liaise and communicate with ED Rig Manager and TR Drilling Manager in both verbal and written communication; • ensure all instructions of rig management work methods and use of equipment are communicated and carried out properly and safely, with due regard for the environment; • Manage and organize public consultation with local authorities and community for any related social and environmental issues or aspects that are mentioned or identified within the project EIS/EMP.
Health, Safety and Environment (HSE) Officer	Site HSE Compliance	<ul style="list-style-type: none"> • Monitors environmental legislative requirements. • Controls all management system documentation • Ensures that adequate HSE equipment is available for the survey; • Manages and provides HSE training and inductions for all project employees. • Audits the crew on a regular basis; • Maintains contact with Timor Resources management, participates in HSE meetings;

		<ul style="list-style-type: none"> • Sets a clear leadership example and promotes a high degree of HSE awareness, by participating in HSE activities and following all guidelines • Setting objectives and targets and communicating these to all company personnel in the country and contractor staff.
	Site HSE Compliance	<ul style="list-style-type: none"> • Actions HSE report and carries out workplace inspections • Implementation of the HSE Management System. • Draws up Emergency Response Plan, including medical contingency planning / evacuation procedures and emergency contacts etc. • Ensuring dissemination of HSE information to all crews, such as audit reports, incidents reports etc. • Ensures proper training of all staff to necessary competence level; • Coordinating the compilation and reporting of all accidents, audits and HSE statistics to Management. • Ensuring that contractors HSE standards and Timor Resources Requirements are applied equally throughout the operation. • Keeping fully apprised of ongoing HSE concerns in both the office and field environments. • Ensures that incident investigations are thoroughly carried out and actions followed up, participate in severe incident investigations. • Liaison with contractor Project management and Timor Resources HSE for HSE issues. • Follows all HSE guidelines and provides a good example for all employees to follow • Support planning, coordinating and implementing of effective HSE policies, guidelines and procedures to ensure objectives are met and implementation of EMP • Assists the Operations and Management in the implementation of all aspects of the project EMP • Assist Senior HSE officer in compiling and documenting all HSE reports and statistics • Assists in investigation of any HSE incident

		<p>and reports to relevant authorities and management providing a full report</p> <ul style="list-style-type: none"> • Assist in conducting audits and all HSE improvement initiative plans, generating the reports to be distributed internally and to relevant authorities • Ensure that all the activities are in compliance with the environmental legislative requirements. • Controls all management system documentation • Organise and participates in HSE drills and exercises • Communicates HSE requirements through the reporting line
Geologist and Geophysicist		<ul style="list-style-type: none"> • Observing and recording all hydrocarbon shows and evaluating their significant. • Describing and recording the lithological gathering from the well. • Witnessing and reporting wireline logging operation, ensuring adequate quality control. • Selecting core points based on Drilling Programme and coring criteria. • Submitting geological report (morning and afternoon) to Operations Geologist consistent with the approved procedures. • Preparing lithology from lithological description made during drilling operation. • Supervising the collection, packing and dispatch cuttings core samples and paper data from the rig. • Tie seismic to the well log.
Eastern Drilling		
Rig Superintendent		<ul style="list-style-type: none"> • Communicates with and assists onsite representative on a daily basis to implement and promote procedures and goals. • Organize and delegate responsibilities and authority to the Toolpushers, Mechanic, Electricians and Safety Supervisors. • Supervises all the daily activities on the rig
Tool Pusher – Night shift		<ul style="list-style-type: none"> • Ensures the drilling operations are being conducted at maximum efficiency in the safest manner during night time hours • Perform activities organized by the Rig

		Superintendent
Chief Mechanic		<ul style="list-style-type: none"> • Manage, direct, implement and enforce mechanical preventative programs and policies on the rig and field operations • Organize and delegate responsibilities and authority to the Mechanic and Welder
Senior Electrician		<ul style="list-style-type: none"> • Manage, direct, implement and enforce electrical preventative programs and policies on the rig and field operations • Organize and delegate responsibilities and authority to the Rig electricians
Driller		<ul style="list-style-type: none"> • Reports to the Toolpusher and/or rig superintendent • Ensures that safe method of operations and working on all operations under control • Ensures that all machineries and equipment are correctly serviced, maintained and safe to use and that all necessary guards protection devices are lifted
HSE Officer		<ul style="list-style-type: none"> • Report to Rig Manager • Responsible to promote, implement, supervise all company safety management on daily operational

7. Summary of Impacts

Section 6 of project EIS has described the various environmental aspects, such as physical components, biological or ecological components, social-economic components and cultural components of proposed project sites of the five wells. Therefore, this section will only provide short and concise summary of the projects activities and its impacts that may or may not potentially affect the human, plants, animals or the environment as whole.

The following are tables that identify the project activities and its potential impacts on environmental, social-economic and cultural components.

Table 3. Proposed project activities

	Pre-drilling	Drilling	Decommissioning
Activities	<ul style="list-style-type: none"> • Land clearance • site and road constructions • Mud Reserve Pit Excavation • Cellar Trenches Excavation • Rig move 	<ul style="list-style-type: none"> • Casing • Cementing • Mud Pumping • Mud Circulating • Pipe trip • Flaring • Venting • Perforating • Well Testing • Well Completion 	<ul style="list-style-type: none"> • Well plug and abandonment • Remediation of impacted areas around 1 ha well site

Table 4. The potential project impacts on environmental and social components within the identified phases

Impact level	Pre-drilling	Drilling	Decommissioning
Very High	N/A	N/A	N/A
High	<ul style="list-style-type: none"> Traffic disturbances Topographic change Air contamination Noise contamination Light contamination Soil contamination Waste generations Habitat's destructions Land degradation Deforestation or clear-cutting or land clearing Damage public infrastructures (rig move) 	<ul style="list-style-type: none"> Soil contamination Noise contamination Light contamination Waste generations Release of hazardous materials (HazMats) Traffic disturbances Water contamination Radioactive substances (NORMs) Air contamination Water depletion Habitat disturbances 	<ul style="list-style-type: none"> Noise contamination Light contamination Waste generation Air contamination Waste generation Topographic change Soil contamination Water contamination Traffic disturbances Habitat disturbances
Medium	<ul style="list-style-type: none"> Community health Land ownership and rights Natural resources rights Employment opportunity Terrestrial flora and fauna ecosystem 	<ul style="list-style-type: none"> Community health Institutions schools and public health facilities Use of public infrastructure facilities Employment opportunity 	<ul style="list-style-type: none"> Employment opportunity Use of public infrastructure facilities Terrestrial flora and fauna
Low	<ul style="list-style-type: none"> Cultural Heritage Family Structure Population and community's conflicts 	<ul style="list-style-type: none"> Use of forest and other natural resources Family Structure Population and community's conflicts 	<ul style="list-style-type: none"> Employment opportunity Use of forest and other natural resources Population and community's conflicts Family Structure

8. Proposed Mitigation Measures

This section describes the mitigation measures planned for the proposed project activities that would be taken place at the proposed project site of five-wells within the six Sucos of Covalima municipality. The mitigation measures identified within this documents are to be carried out at the initial stage (of pre-drilling) and through to the end of the project life cycle; these mitigation measures, however may not all be used to or applicable at the decommissioning (P&A).

8.1. Climate mitigation measures

- Fuel inventory and management system to be established
- Air quality monitoring plan
- All vehicle, equipment and/or machineries used shall follow manufacturing recommendation. This shall include a periodical vehicles, equipment and facilities inspections
- Use good quality of fuels and only use fuels which are specified based on the equipment requirements and specifications
- Engines and exhaust system shall be regularly serviced according to manufacture recommendations and maintained to meet the statutory limits/opacity tests.
- All vehicles and equipment shall be turned off when inactive

8.2. Topography and soils mitigation measures

- Cut and fill shall be properly designed and planned
- Management drainage systems include public drainages, culverts, ditch and water canal
- Provide regular maintenance of drainage systems to be included in project implementation management plan
- Regular monitor sedimentation and land use changes
- Topographic survey include drainage topographic
- Proper access road designs
- Soil Management Plan
- Soil sampling and laboratory analysis

8.3. Air quality mitigation measures

- Air Quality Monitoring Plan
- Fuel inventory and Management Plan include monitor daily fuel consumption rates

- All vehicle, equipment and/or machineries used shall follow manufacturing recommendation. This shall include a periodical vehicles, equipment and facilities inspections
- Use good quality of fuels
- Engines and exhaust system shall be regularly serviced according to manufacture recommendations and maintained to meet the statutory limits/opacity tests.
- All vehicles and equipment shall be turned off when inactive
- All onsite vehicle traffic shall be limited to an acceptable standard speed, especially on unpaved roads and community's areas or traffic speed management
- All areas with vehicles traffic shall be watered and all materials transported (if, there is) shall be covered or have dust suppressions
- Carry out air quality measurement every month,
- Carry out health screening every six-month for all workers,
- Storage areas shall be located away from sensitive receptors
- Develop and implement project Grievances Redress Mechanisms (GRM)

8.4. Noise and Vibration mitigation measures

- Monitor and measure noise and vibration frequently
- Carry out noise and vibration survey every month
- Carry out health surveillance to identify Noise Induce Hearing Loss (NIHL) and vibration related diseases i.e. Hand-Arm Vibration Syndrome (HAVS) every six-month,
- Use vehicles, machineries and equipment with lowest possible noise specifications
- Periodical vehicles and equipment maintenance services
- Develop and implement project Grievances Redress Mechanisms (GRM)
- Provide proper PPE for all personnel onsite
- Clear safety signs and marks
- Establish Safety Zone

8.5. Surface and ground water mitigations measures

- Well Drilling Program i.e. Casing Design and Cementing
- Use Water Based Mud and Mud Reserve Pit is designed to prevent any water contamination
- Prevent oil spills or any hazardous materials are released incidentally to the environment
- Develop or adopt waste management procedure for litter control
- Conduct an active cleaning of culverts and drainage sedimentation
- Use berms to control erosion, sedimentation and reduce surface runoff and diversion drains to limit flooding of the project site off to neighbours
- Well P&A Plan must be designed to prevent any water contamination in the future
- Generated waste water from facility or site has been covered in Waste Management Plan

8.6. Coastal and marine water mitigations measures

- The impacts on the coastal and marine water are not foreseen during operational phases because geographically all wells are not located around the coastal area. However, due to the gravity and location of the Karau, Raiketan and Mola Ain rivers and their estuaries, any massive oil spills or uncontained blowout or loss of containment (LOC) can reach and pollute coastal area and marine water. Therefore, the mitigation purpose to minimise the risks can only be based on:
 - Emergency Response Plan, and
 - Oil Spill Contingency Plan

8.7. Terrestrial flora, fauna and ecosystem mitigation measures

- Select site to limit on habitat with having the lowest possible clearing footprints
- Develop or adopt waste management procedure for litter control
- Measure, control and monitor dust and noise acceptable level for fauna, especially birds and other sensitive noise fauna
- Measure, control and monitor light illumination
- Develop and implement rehabilitation activities

8.8. Traffic and transport mitigation measures

- Transport infrastructure to access the well locations shall be upgraded to support container trucks travelling to the well sites.
- Minimize vehicle movement with appropriate schedule to limit the number of vehicle movements required in order to reduce the likely impacts on public road condition, safety and environment
- Implement one-way systems within the well site area and ensure that all vehicles and mobile equipment or machineries and signage are equipped reversing alarm in all reversing areas
- Install and/or display clearly and permanently all significant and necessary traffic signage. Signage shall be posted to indicate speed limits, restricted access, visitor parking, headroom, and other route hazards
- Control and enforce vehicles speed limits within and outside project area (include all public access areas and roads)
- Access roads widening may be required for heavy vehicles
- Assess the road conditions and maximum load designs before any heavy equipment is moved or rig move
- Establish and follow Rig Move Plan

8.9. Employment mitigation measures

- Develop and/or adopt appropriate system for locals hiring or firing processes or procedures
- Employment opportunity shall possible prioritize locals with qualify skills, knowledge and experiences
- Shall prioritize local affected community for an employment opportunity at the project site
- Develop and implement project Grievances Redress Mechanisms (GRM)
- Ensure to provide necessary and applicable training based on the nature of work for all local employees as a way for local capacity development
- Adopt the National Labour Code and SEPFOPE regulation and ensure that these employment code and regulation are well-distributed and informed to the local communities.
- Provide equal opportunity for everyone include consider gender balance for all employees

8.10. Infrastructure mitigation measures

- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities
- Prevent any damage to the public infrastructures, avoid as much as possible any disturbance to the public infrastructures

8.11. Use of forest and other natural resources mitigation measures

- Develop and implement rehabilitation activities to ensure that any loss of forest ecosystem are restore and redress to the possible baseline conditions
- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities

8.12. Fishing mitigation measures

- Minimize water pollution through appropriate means and equipment for control and managing waste disposal, especially for any type of hazardous waste, such as oil, fuel and other chemical waste

- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities

8.13. Agriculture mitigation measures

- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities
- Measure, Monitor and control dust, noise, sediments at the project site to minimize or limit the impacts
- Use proper means and equipment for monitoring and control of all type of any form of solid or liquid waste either non-hazardous or hazardous waste produced by the project activities to not affect the nearby community private or public areas
- Prevent any contamination to any agricultural infrastructure

8.14. Tourism mitigation measures

- The Project location does not have or is located nearby any popular destination for tourism. Therefore, it is not considered that the Project will affect any of the seven Sucos' tourism site or popularity.

8.15. Community and population mitigation measures

- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities.

8.16. Community health mitigation measures

- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities
- Establish access control to site activities that posing health and safety risks to the community

8.17. Institution, Schools and health facilities mitigation measures

- Install safety signs for any nearby public facility

- Conduct socialization on safety awareness on the public road or public areas that in a close distance with the project site areas
- Provide support for education and awareness campaign throughout the project lifecycle
- Conduct regular cleaning and water sprinkling on the roads that impacted by the drilling campaign
- Ensure that all trucks with materials shall be watered and covered before travelling on any public road or within public areas.
- Conduct regular air quality monitoring and application of dust suppressants to sections of roads used routinely by vehicles that pass through the public road, and close to habitation and facilities including conducting routine air quality monitoring
- Use lowest possible noise specifications equipment or machineries
- Implement Grievances Redress Mechanisms (GRM)

8.18. Community and family structure mitigation measures

- Conduct a continuous or ongoing consultation with stakeholders throughout the project lifecycle
- Implement Grievances Redress Mechanisms (GRM)
- Provide and ensure equal job opportunity to community

8.19. Land ownership and rights mitigation measures

- If there is a resettlement for project affected community, a resettlement plan shall include provision for loss of income for those who lost their economic activity as result of the project development activities (within land or water), such as loss of commercial or fishing subsistence activities, distraction of agricultural or plantation farm activities, etc.
- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIS document, which they believe affected as result of project development activities
- Government together with Timor Resources shall conduct public consultation with and for any community resettlement and restoration of livelihoods, which these shall be incorporated into a developed resettlement or restoration of livelihoods plan for affected community
- TR has developed a leasing contract plan that covered any related resettlement issues with the project affected communities or households

8.20. Natural resources rights mitigation measures

- If there is a resettlement for project affected community, a resettlement plan shall include provision for loss of income for those who lost their economic activity as result of the project development activities (within land or water), such as loss of commercial or fishing subsistence activities, distraction of agricultural or plantation farm activities, etc.

8.21. Cultural heritage, archaeological and sacred sites mitigation measures

- Record and document the number of cultural heritage, archaeological and sacred sites identified within the proposed project site
- Minimise direct impacts (if, there is) on the Cultural heritage, archaeological and sacred sites
- Ensure the rehabilitation plan include provision of relocation of the cultural heritage, archaeological and sacred sites in accordance with an acceptable standards, e.g. UNSECO
- Conduct a transparency communication or consultation in relation to any impacted cultural heritage, archaeological and sacred sites with all relevance stakeholders or government institutions
- Conduct community consultation for if there is to be a restricted access by the project activities; and ensure that there shall be access restriction or control measures or protocol developed for the restriction sites, which the control measure or protocol shall be in accordance with the local community requirements

8.22. Unique landscapes mitigation measures

- There are no unique or specific aesthetic landscapes identified within the project site or footprints.

8.23. Contamination, Safety and other general mitigation measures

- Training and awareness of safety campaign
- All personnel shall be equipped with all applicable PPE for all types of work carry out during the phase or based on the nature of the work
- Control access to the site, including creating safe perimeter zone, gate and traffic control
- Use proper method and equipment for oils spill to follow oil spills standards management
- Good housekeeping practices
- Provision of solid waste removal services to the project site

- Education of employees about safety and environment impacts from litters and contaminations
- If, there is noise and/or dust complaint is recorded through the grievance redress framework and monitoring confirms, it is beyond the guideline level a retrofit mitigation measure shall be implemented
- Establish and implement environmental monitoring for assessing the site in accordance with the project duration

8.24. Waste management and mitigation measures

- Develop waste management plan as a framework under project Environmental Management Plan for all related type of project generated waste (i.e. liquid, solid, hazardous and/or non-hazardous). The plan shall include oil, fuel and chemical substance spills procedure and shall identify a responsible entity
- Designate a specific area for refuelling of heavy equipment onsite
- Use of spill kits for every refuelling activity, and no manual or bottle refuelling on any equipment or heavy machineries
- Develop regular waste collection schedule
- All generated waste onsite shall be identified and labelled i.e. recyclable, non-recyclable, plastic, paper, bottles, etc.
- For hazardous type of waste, such as fuel, unused oil, and other chemical dispersant or substances shall be stored in a separate location or storage from normal waste
- Shall there be a third party for waste handling and collection and/or refuelling, it then shall follow Timor Resources approved EMP-Health Safety, Security and Environmental Management Plan in place, Safety Policy and other related environmental management plan frameworks
- All vehicles, equipment and heavy machineries shall be inspect daily and conduct regular maintenance, especially for oil or fuel leakages issue
- All waste management handling and plan shall be developed in accordance with Timor-Leste national policy and regulation as well as all related standard procedures or best practices applicable in the country

9. Regulating Parameters

For the purpose of the project to mitigate and ensure that the environmental impacts are within control or manageable, the following environmental standards limits are used accordingly throughout the proposed project activities.

9.1. Air quality standard limit

Table 5. WHO acceptable limits value for particles PM_{2.5} and PM₁₀

Parameter	Limit value	International standard	Source
Particles PM _{2.5}	24 hour = 25 µg/m ³	WHO air quality guideline global update 2005	https://apps.who.int/iris/bitstream/handle/10665/69477/WHO_SDE_PHE_OEH_06.02_eng.pdf;jsessionid=A0CC9067B75A79868D805680E0BD8D62?sequence=1
	Annual = 10 µg/m ³		
Particles PM ₁₀	24 hour = 150 µg/m ³		
	Annual = 20 µg/m ³		

The following Table shows the other particles of ambient air quality standard of US-EPA

Table 6. US-EPA standard limit value for ambient air quality (TR-ToR, 2019)

Parameter	Type	Limit value	Average time	International standard
Sulfur dioxide (SO ₂)	Primary	1 ppb	1 hour	40.C.F.R.50.17a
	Secondary	1,300 µg/m ³ (0.5 ppm)	3 hour	40.C.F.R.50.5a
Carbon monoxide (CO)	Primary	40 mg/m ³ (35 ppm)	1 hour	40.C.F.R.50.8a (2)
	Secondary	10 mg/m ³ (9 ppm)	8 hour	40.C.F.R.50.8a (1)
Ozone (O ₂)	Primary	235 µg/m ³ (0.12 ppm)	1 hour	40.C.F.R.50.9a
	Secondary	140 µg/m ³ (0.070 ppm)	8 hour	40.C.F.R.50.19a
Nitrogen Dioxide (NO ₂)	Primary	100 µg/m ³ (0.053 ppm)	Annual	40.C.F.R.50.12ab
	Secondary			
Lead (Pb)	Primary	0.15 µg/m ³	rolling 3 months	40.C.F.R.50.12a
	Secondary			

9.2. Water quality standard for potable and surface water

Table 7. WHO water quality parameters guidelines

Parameter	Limit value	Source
E. Coli or thermo tolerant coliform bacteria	0 mg/L in 100 ml sample water	WHO drinking water standards (2000)
Nitrate	50 mg/L	
Nitrite	3 mg/L	
Chlorine	5 mg/L	
Copper	2 mg/L	
Lead	0.01 mg/L	
Nickel	0.07 mg/L	
Manganese	0.4 mg/L	

Figure 10. Water Quality Test Parameters (TR-ToR, 2019)

Parameters	Unit	WHO/Timor-Leste Guideline
Physical Test		
pH value	pH meter	6.5 - 8.5
E. Conductivity	us/cm	100 us - 1 ms
TSS	mg/L	
TDS	mg/L	1,000
Salinity	%	
Temperature	°C	
Turbidity	NTU	5 (NTU)
Chemical Test		
NH ₃ -N	mg/L	1.5
NO ₃ -N	mg/L	50
NO ₂ -N	mg/L	3
Iron (Fe)	mg/L	0.3
Manganese (Mn)	mg/L	0.5
Fluoride	mg/L	1.5
Chloride (Cl ⁻)	mg/L	250
Free Chlorine	mg/L	0.5
Ca Hardness	mg/L	2.5
Hardness	mg/L	
Total Hardness	mg/L	200
Total Alkalinity	mg/L	
Sulphate (SO ₄ ²⁻)	mg/L	250
Arsenic		0.1
Bacterial Test		
Total Coliform	CFU/100ml	0
E.Coli	CFU/100ml	0

9.3. Noise and Vibration standard limit

Table 8. WHO Guideline values for community noise in specific environments

Specific environment	Critical health effect(s)	L _{Aeq} [dB(A)]	Time base [hours]	L _{Amax} fast [dB]	Sources
Outdoor living area	Serious annoyance, daytime and evening	55	16	-	https://www.who.int/docstore/peh/noise/ComnoiseExec.htm
	Moderate annoyance, daytime and evening	50	16	-	
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	16	45	
Inside bedrooms	Sleep disturbance, night-time	30	8		
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60	
School class rooms & pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	-	
Pre-school bedrooms, indoor	Sleep disturbance	30	sleeping-time	45	
School, playground outdoor	Annoyance (external source)	55	during play	-	
Hospital, ward rooms, indoors	Sleep disturbance, night-time	30	8	40	
	Sleep disturbance, daytime and evenings	30	16	-	
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1			
Industrial, commercial shopping and traffic areas, indoors and outdoors	Hearing impairment	70	24	110	
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110	
Public addresses, indoors and outdoors	Hearing impairment	85	1	110	

Music and other sounds through headphones/earphones	Hearing impairment (free-field value)	85 #4	1	110	
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults)	-	-	140 #2	
	Hearing impairment (children)	-	-	120 #2	
Outdoors in parkland and conservations areas	Disruption of tranquility	#3			

Note:

#1: As low as possible.

#2: Peak sound pressure (not LAF, max) measured 100 mm from the ear.

#3: Existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low.

#4: Under headphones, adapted to free-field values.

9.4. Water and Soil Sampling

Water and soil sampling were taken according to the WHO and ASTM standards. The samples were taken mostly around the community areas and the well locations and its surroundings. The water physical tests were done onsite such as pH, Conductivity, Salinity, Total Dissolved Solid (TDS) and Total Suspended Solid (TSS). Water chemical and bacteriological tests were conducted on the laboratory and all tests were based on the WHO drinking water quality guidelines as referred by the Ministry of Health.

"The soil laboratory tests were performed on the selected samples, recovered during the field investigation phase of this study, to verify field classifications and to estimate the index and engineering properties of the subsurface materials. All tests were conducted in general accordance with current applicable ASTM procedures or equivalent (Geo-technical Investigation Testing)" – to be attached within the EIS!

9.5. Safety Management

The management of the project activities will be implemented in accordance with project Environmental Management Plan framework for Health Safety and Environmental Plan and the local labour laws and regulations. In addition, the Timor Resource (TR) and Eastern Drilling (ED)

Health, Safety and Environmental Management System (HSE-MS) will mainly be used to regulate project implementation activities. Any contradictions between TR and ED's HSE-MS will be bridged through HSE Bridging Documents, which may be included Project Implementation Plan, Emergency Management System, Risk Management, HSE Audits and Accident Investigations.

9.6. Communicable diseases

Under Section 6 of project EIS document has described and listed prevalence diseases occur within the country and municipality of Covalima level.

The Communicable diseases in this Section will be identified confidentially through screening from health providers within the country to determine of whether or not the workplace health and safety standard needs adjustment.

General practice for personal hygiene to manage or to control infection are:

Wash hand

- Cover cuts or scratch with waterproof dressing
- Use gloves when cleaning or washing facilities

For food-borne diseases control every individual is encourage to wash their hand before and after handling food, seal food in a proper food container and food or drink shall be covered at all time, especially outdoor.

Further, for workplace common illnesses, such as cold and flu are frequent among workers, it is thus encouraged for every individual to use a mask when interacting with each other in the workplace environment.

10. Monitoring Program

As part of mitigation measures the monitoring program shall be designed to provide details information, such as specific parameters; monitoring procedures; frequency and location of sample monitoring; report on the assessment of monitoring implementation compliance, it is to ensure that the implementation program is complied with the country legislation and international standard applicable and identified within the project EIS and EMP and its frameworks document.

The monitoring program is developed with considerations to the available best practice or standards applicable for all the identified criteria as specified in Section 9 – Regulating Parameters within this document.

Table below lists out the project activities monitoring program for all project phases with exception to decommissioning (P&A) stage, which will be identified within the Table 9.

Table 9. Project monitoring activities

Environmental aspects	Monitoring activities/programs	Sampling location	Frequency	Project Phase
Climate	- Estimation of carbon emission	Project site	Daily	Pre-drilling and Drilling
Topography; Geology; and Soils	- Regular Management of culverts and maintenance of drainage system		Weekly or Fortnightly	
Air quality	- Periodical air quality measurement	Project site	monthly	Pre-drilling; drilling; decommissioning
	- Regular vehicles, equipment and/or machineries inspection		As per manufactured recommendation	
	- Estimation of fuel consumption		Daily	
	- Periodical monitoring of Green Houses Gases (GHG) and Climate change		Monthly	
	- Regular maintenance or service of vehicles, equipment and/or machineries		As per manufactured recommendation	
	- Periodical health screening for dust exposure effects		6-monthly	
	- Regular monitoring of bathymetry for sedimentation and land used changes		Monthly	
Noise and Vibration	- Periodical measurement of noise and vibration	Project site	monthly	Pre-drilling; drilling; decommissioning
	- Periodical health screening for hearing effects		6-monthly	
	- Regular maintenance or service of vehicles, equipment and/or machineries		As per manufactured recommendation	
	- Regular vehicles, equipment and/or machineries inspection		As per	

			manufactured recommendation	
Surface and Ground water	- Regular checking and cleaning of oil, fuel and waste spills	Project site	Daily	Pre-drilling; drilling; decommissioning
	- Regular inspection and maintenance of water treatment unit		Monthly	
	- Regular cleaning of culvert and drainage for sedimentation or trash		Weekly	
Coastal and marine water	- Regular checking and cleaning of oil, fuel and waste spills, if there is	Project site	Daily	Pre-drilling; drilling; decommissioning
	- Develop and implement Rehabilitation activities		Daily	Pre-drilling; drilling; decommissioning
	- Regular monitoring and control of light pollution at night work		Daily	
Traffic and transport	- Develop schedule for transport movement activity on public road and rig move plan - Implement of one-way systems and ensure that all vehicles and mobile equipment or machineries and signage are equipped reversing alarm in all reversing areas - Install and/or display clearly and permanently all significant and necessary traffic signage	Project site	Throughout project life cycle	Pre-drilling; drilling; decommissioning
	- Regular check and control of vehicles speed limit		Daily	
Employment	- Develop and/or adopt appropriate system for locals hiring or firing processes or procedures - Employment opportunity shall possible prioritize locals with qualify skills, knowledge and experiences - Timor Resources shall adopt the National Labor Code and SEPFOPE regulation and ensure that these employment code and regulation are well-distributed and informed to the local workers community	Project site	Monthly	Pre-drilling and Drilling

	<ul style="list-style-type: none"> - . Develop and implement project Grievances Redress Mechanisms (GRM) 		Through GRM	
	<ul style="list-style-type: none"> - . Timor Resources shall ensure to provide necessary and applicable training based on the nature of work for all local employees as a way for local capacity development 		As needed	
Infrastructure	<ul style="list-style-type: none"> - . Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document 	Project site	Throughout project life cycle	Pre-drilling and Drilling
Use of forest and other natural resources	<ul style="list-style-type: none"> - . Develop and implement Rehabilitation activities to ensure that any loss of forest ecosystem are restored and redressed to the possible baseline conditions 	Project site	Throughout project life cycle	Pre-drilling and Drilling
	<ul style="list-style-type: none"> - . Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document 		Through GRM	
Fishing	<ul style="list-style-type: none"> - . Prevent water pollution through appropriate means and equipment for control and managing waste disposal, especially for any type of hazardous waste, such as oil, fuel and other chemical waste 	Project site	Throughout project life cycle	Pre-drilling and Drilling
	<ul style="list-style-type: none"> - . Establish and implement environmental monitoring for assessing project site 		Monthly and subject to well site location	
	<ul style="list-style-type: none"> - . Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document 		Through GRM	
Agriculture	<ul style="list-style-type: none"> - . . Implement and maintain developed Grievances Redress 	Project site	Through GRM	Pre-drilling and Drilling

	<p>Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document</p> <p>-. Use proper means and equipment for monitoring and control of all type of any form of solid or liquid waste either non-hazardous or hazardous waste produced by the project activities to not affect the nearby community private or public areas</p> <p>-. Monitor and control dust, noise, sediments at the project site to minimize or limit the impacts</p>		<p>Weekly</p> <p>Daily</p>	
Tourism	The Project location does not have or is located nearby any popular destination for tourism. Therefore, it is considered that the Project will not have impacts on tourism site or its popularity.			
Community and Population	-. Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document	Project site	Through GRM	Pre-drilling and Drilling
Community health	-. Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document	Project site Project site	Through GRM	Pre-drilling and Drilling
	-. Establish access control to site activities that posing health and safety risks to the community		Daily	
	-. Provide support for education and awareness campaign throughout the project lifecycle		As needed	
Institution, Schools and health facilities	<p>-. Install safety signs for any nearby public facility</p> <p>-. Provide support for education and awareness campaign</p> <p>-. Ensure that all trucks with materials shall be watered and</p>	Project site	throughout the project lifecycle	Pre-drilling and Drilling

	<p>covered before travelling on any public road or within public areas</p> <ul style="list-style-type: none"> - Use lowest possible noise specifications equipment or machineries. 			
	<ul style="list-style-type: none"> - Conduct regular dust monitoring and application of dust suppressants to unpaved roads used routinely by vehicles as well as public road, which are close to habitation 		Monthly and daily	
	<ul style="list-style-type: none"> - Conduct regular cleaning and water sprinkling on the roads 		Daily	
	<ul style="list-style-type: none"> - Implement Grievances Redress Mechanisms (GRM) 		Through GRM	
	<ul style="list-style-type: none"> - Conduct socialization on safety awareness on public areas that in a close distance with the project site areas 		As needed	
	<ul style="list-style-type: none"> - Conduct a continuous or ongoing consultation with stakeholders 		throughout the project lifecycle	
	<ul style="list-style-type: none"> - Implement Grievances Redress Mechanisms (GRM) 		Through GRM	
Land ownership and rights	<ul style="list-style-type: none"> - Develop and implement Rehabilitation activities to ensure that any loss of forest ecosystem are restored and redressed to the possible baseline conditions 	Project site	At initial stage and subject to commercial discovery	Pre-drilling and Drilling
	<ul style="list-style-type: none"> - Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document 		Through GRM	
Natural Resources rights	<ul style="list-style-type: none"> - If there is a resettlement for project affected community, the resettlement plan shall include provision for loss of income of those who lost their economic activity as result of the project development activities (within land or water), such as loss of commercial or distraction of agricultural or plantation farm activities. 			
Cultural heritage, archaeological and scared sites	<ul style="list-style-type: none"> - Record and document the number of cultural heritage, archaeological and sacred sites identified within the proposed project site - Minimize direct impacts (if, 	Project site	At initial stage only	Prior to pre-drilling (during EIS studies)

	<p>there is) on the Cultural heritage, archaeological and sacred sites</p> <ul style="list-style-type: none"> - Ensure the resettlement or restoration (if, there is) plan include provision of relocation of the cultural heritage, archaeological and sacred sites in accordance with an acceptable standards, e.g. UNSECO - Conduct community consultation for if there is to be a restricted access by the project activities; and ensure that there shall be access restriction or control measures or protocol developed for the restriction sites, which the control measure or protocol shall be in accordance with the local community requirements. - Conduct a transparency communication or consultation in relation to any impacted cultural heritage, archaeological and sacred sites with all relevance stakeholders or government institutions. 			
Unique Landscape	- There are no unique landscape within or at the vicinity of project site			
Waste management	- Regular trashes and waste cleaning and collecting from project site	Project site	Weekly	Pre-drilling; drilling; decommissioning
	- Develop waste management plan for all waste type generated by the project		Throughout project life cycle	

11. Reporting Requirements

A major report require of this project is the report request by the National Authority of Petroleum and Minerals (ANPM) periodically to report on the overall work progress, changes, impacts and mitigation measures taken throughout each phase within the project life cycle. This report will be prepared and submitted in accordance with the project environmental license reporting requirements.

Other reporting requirements of the project will be undertaken in accordance with the aspect identified within the EMP and its frameworks, as follows:

- Daily and Weekly monitoring and reporting – an internal day-to-day monitoring and assessment report that review and share internally within TR
- Monthly report – external shared report on environmental aspects identified that shall need to be shared with ANPM and other necessary government institution or stakeholders. The monthly report shall already cover daily or weekly summary or details.
- 6-monthly – external shared report on 6-monthly EMP report - to be submitted to ANPM. The report shall also cover certain environmental monitoring and/or study carried out at the project site, such as noise, vibration and dust report, workers hearing screen test results.

In case of a major emergency the reporting requirement refers Bridging Emergency Response Plan.

The following Table lists the type and distribution of reports to be shared with the ANPM and other relevance entities, if necessary.

Table 10. Project report type and distribution list

Report type	Frequency	Distribution	Responsibility entity
Internal Inspection and monitoring			
Day-to-day inspection or reporting on general site condition	Daily	Internal only	HSE department
Day-to-weekly of environmental monitoring program	Weekly	Internal only	HSE department
Environmental Reporting			
Noise/Dust/Vibration measurement	6-monthly	External - ANPM	HSE department
Health screening	6-monthly	External - ANPM	HSE department
Accident/incident (reportable only)	As soon as practicable	External - ANPM	HSE department
HSE training and awareness	Monthly	External - ANPM	HSE department
Social Reporting			
Grievances (GRM)	As needed	External - ANPM	Social Department
Employment figures	Monthly	External - ANPM	HR and Commercial
Influx of local workers	Monthly	External - ANPM	HR and Commercial
Influx of Expatriates workers	Monthly	External - ANPM	HR and Commercial
Local or international enterprise support	Monthly	External - ANPM	HR and Commercial
Capacity building	Monthly	External - ANPM	HR and Commercial
Local and international suppliers	Monthly	External - ANPM	HR and Commercial

12. Responsibilities for Mitigation and Monitoring activities

Table 11. Environmental monitoring and mitigation measures for onshore oil exploration project

Project Parameters						
No	Phase	Activities	Aspects	Potential Impacts	Mitigation measures	Responsible Party
1	Pre-drilling	Site clearance	<ul style="list-style-type: none"> Emission of dust particles GHG emission Energy used Removal of vegetation Soil disturbance Traffic demand (density) Vibration Light emission Waste generation 	<ul style="list-style-type: none"> Sleep disruption NIHL & HAVS Air Pollution caused by dust particles and GHG Traffic disturbance and incident light glare or over illumination Health illness i.e. respiratory infection, Soil erosion, Surface run – off 	Noise and Vibration Management, Traffic Management, Energy Efficiency Management Training and Competency, Light Pollution Control, Wear Proper PPE and Health Surveillance Programs, Waste Management Plan, Risk Assessment, Hazid Card Report, ERP, HSE Plan	TR Operations & Sub Contractors
2	Pre-drilling	Road Construction	<ul style="list-style-type: none"> Noise and Vibration Light emission 	<ul style="list-style-type: none"> Sleep disruption NIHL, HAVS Air Pollution caused by dust 	Noise and Vibration Management; Water or Dust Suppression,	TR Operations & Sub Contractors

			<ul style="list-style-type: none"> • Traffic demand (density) • Emission of dust particles • Energy used • Water used • Cut and fill • Soil compaction • Soil excavation • Soil removal • Waste generation 	<ul style="list-style-type: none"> • particles and GHG • Traffic disturbance and incident, light glare or over illumination • Health illness i.e. respiratory infection • Soil erosion • Soil degradation • Surface run – off 	<p>Traffic Management System, Energy Efficiency Management, Training and Competency, Light Pollution Control, Wear Proper PPE, Health Surveillance Programs Soil Management Plan, Waste Management Plan, Topographic Survey, ERP, HSE Plan, Hazid Card Report, Risk Assessment</p>	
3	Pre-drilling	Mud Reserve Pit Excavation	<ul style="list-style-type: none"> • Noise and vibration • Light emission • Emission of dust particles • GHG emission 	<ul style="list-style-type: none"> • Sleep disruption • NIHL & HAVS • Pollution caused by dust particles and GHG • Traffic disturbance and incident 	<p>Noise and Vibration Management; Water or Dust Suppression, Traffic Management System,</p>	TR Operations & Sub Contractors

			<ul style="list-style-type: none"> • Energy used • Removal of vegetation • Soil removal and excavation • Traffic demand (density) • Waste generation 	<ul style="list-style-type: none"> • Light glare or over illumination • Health illness i.e. respiratory infection • Soil erosion • Surface run – off 	<p>Energy Efficiency Management, Training and Competency, Light Pollution Control, Wear Proper PPE, Health Surveillance Programs</p> <p>Soil Management Plan, Waste Management Plan, ERP, HSE Plan, Hazid Card Report, Risk Assessment</p>	
4	Pre-drilling	Cellar Trenches Excavation	<ul style="list-style-type: none"> • Noise and vibration • Light emission • Emission of dust particles • GHG emission • Energy used • Removal of vegetation • Soil removal 	<ul style="list-style-type: none"> • Sleep disruption • NIHL & HAVS • Pollution caused by dust particles and GHG • Traffic disturbance and incident • Light glare or over illumination • Health illness i.e. respiratory 	<p>Noise and Vibration Management; Water or Dust Suppression, Traffic Management System, Energy Efficiency Management, Training and</p>	TR Operations & Sub Contractors

			<p>and excavation</p> <ul style="list-style-type: none"> • Traffic demand (density) • Waste generation 	<p>infection</p> <ul style="list-style-type: none"> • Soil erosion • Surface run – off 	<p>Competency, Light Pollution Control, Wear Proper PPE, Health Surveillance Programs Soil Management Plan, Waste Management Plan, ERP, HSE Plan, Hazid Card Report, Risk Assessment</p>	
5	Pre-drilling	Rig Move	<ul style="list-style-type: none"> • Noise and vibration • Light emission • Emission of dust particles • GHG emission • Energy used • Traffic demand (density) • Waste generation 	<ul style="list-style-type: none"> • Sleep disruption • NIHL, HAVS • Air Pollution caused by dust particles and GHG • Traffic congestion and incident • Light glare or over illumination • Health illness i.e. respiratory infection • Soil compaction • Soil degradation • Road and bridges destructions due to overload and 	<p>Noise and Vibration Management; Water or Dust Suppression, Traffic Management System, Energy Efficiency Management, Training and Competency, Light Pollution Control, Wear Proper PPE,</p>	

			dimension	Health Surveillance Programs, Rig Move Procedure, Waste Management Plan, Communication and Coordination with relevant authorities and PNTL, ERP, HSE Plan, Hazid Card Report, Risk Assessment
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6	Drilling	<p>Casing; Cementing operations Mud Pumping; Mud Circulating; Pipe Trip Flaring Venting; Perforating; Well Testing and Completion</p>	<ul style="list-style-type: none"> • Use energy • Use water • Use drilling fluid (mud) • Use cement slurry • Noise and vibration • Air emission • Light emission • Heat emission • Produce NORMs • Waste generation • Use explosive materials • Use chemicals (hazardous and none hazardous materials) • Traffic demand (density) 	<ul style="list-style-type: none"> • Sleep disruption • NIHL and HAVS • Dust pollution • Traffic congestion and incident • Air pollution • Water pollution • Soil pollution • Light glare or over illumination • Climate Change • Loss Of Containment • Well Blowout • Ecological Damage • People Injuries and Fatalities • Economical and Reputational Damage • Communicable and none communicable diseases • Respiratory infections • Heat stroke • Loss Circulation • Traffic disruption, congestion and incident 	<p>Energy Efficiency Management, Noise and Vibration Management, Water Use Management, Pollution Control System, Aspect and Impact Registers, Onshore Drilling Safety Case, HSE Audit and Inspection, 3rd Party Validation and Verification, Maintenance Management System, Well Control Systems (Primary, Secondary and Tertiary Well Controls) ERP and OSCP Quality Management</p>	<p>TR Operations, HSE and ED</p>
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System (QMS)
Fatigue and
Stress
Management
Risk
Assessment
(HIRA),
Management of
Change (MoC),
Safety Zone,
Comply HSE –
MS, Maximum
Equivalent
Mud Wight
(EMW),
Logging While
Drilling,
Formation
Evaluation
While Drilling
(FEWD),
Measurement
While Drilling,
BOP – testing
and installation,
Hazid Card
Report.

7	Decommissioning (Plug and Abandonment)	<ul style="list-style-type: none"> • Casing • Cementing operations • Well Integrity Test • Well site restoration and remediation 	<ul style="list-style-type: none"> • Use energy • Noise and vibration • Emission of dust particles • Light emission • Traffic demand (density) 	<ul style="list-style-type: none"> • Sleep disruption • NIHL & HAVS • Produce dust particles • Traffic disturbance and incident • Light glare and over illumination • Health illness i.e. respiratory infection 	<p>Noise and Vibration Management, Traffic Management, Energy Efficiency Management, Training and Competency, Light Pollution Control, Wear Proper PPE, Health Surveillance, Well Plug and Abandonment Plan</p>	<p>TR Operations, HSE and ED</p>
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13. Emergency Plan

13.1. Objective

The emergency response plan describes the plan on managing or handling an emergency or unexpected incident or accident case or situation that may occur as result of project activity within the project site.

The main objective of Emergency Plan is to identify and provide appropriate means, processes, procedures that are systemized and effective in handling project emergency event or state that may or may not be able to be identified throughout the project life cycle. The Emergency Plan is established to ensure that:

- Any identified or unidentified risk can be reduced, minimized or remediated. For instance, oil and/other hazardous substances spill and leaks, gas explosion, gas leaked, fire, tsunami, earthquake and floods
- It provides an effective and immediate response system with proper guidelines and instructions
- It identifies all responsible entities within the project organization structure, especially HSE and Emergency Response team

13.2. Responsibilities

The HSE department and/or Emergency Response team will be held responsible for the following event, such as:

- Conduct regular review and update the Emergency Plan
- Ensure that the Emergency Plan is effective and practical
- Notify regulatory authority and other relevance stakeholders or government institution of any major related oil exploration wells emergency events
- Ensure that each and every employee is trained and provided with necessary equipment for managing or handling oil exploration and other related emergency events
- Create, maintain and update safety data sheet for all identified hazardous or chemical substance used and stored at the project site

- Carry out emergency drills, such as fire, drill, earthquake and tsunami drills, and site evacuation drills

13.3. Incident classification

The HSE department shall identify, register and classify any emergency state or event, such for oil leaks or spills event or other uncontrollable release of hazardous materials or substances as follows; hydrocarbon, chemical substances, oily waste water, powder chemicals, sewage, concrete washed out and bitumen. The following Table shows the hazard classification level for the project.

Table 12. Classification of incident level – to be adjusted with ERP and with the tier

Description	
Level 1	Insignificant leaks or spills of oil or other hazardous materials on an area that might disturb a land surface without affecting other aspects, such as groundwater aquifers, surface water, vegetation, flora and fauna or the environment as whole. The spills can be easily cleaned-up.
Level 2	Moderate leaks or spills of oil or other hazardous materials on the ground of an area that may reach ground water or surface water; has minor impact on soil, plants or animals. Can be cleaned-up over short period of time.
Level 3	Uncontained leaks or spills of oil or release of hazardous materials on the ground of an area that may have reached sea water and affected the sea environment; affected vegetation and terrestrial ecosystem, impacted soils that require soil treatment; and reached ground water aquifers and any nearest surface water. The spills cannot be easily cleaned-up over short period of time or require a couple of recuperation stages or processes.
Level 4	Significant or major leaks or spills of oil or other hazardous materials on the ground that may have impacted marine and terrestrial ecosystems; impacted major terrestrial or marine flora and fauna, impacted vegetation; impacted soil that require long treatment processes; reached and impacted ground and surface waters; and impacted human and environmental as whole. The impacts can be permanent and require long period of time for recuperation and irreversible of environmental state or condition.

13.4. Leaks or Spills response

In the event of leaks or spills, Timor Resources adopt the following procedures, which is based on its contractor (Eastern Drilling) Spill Contingency Plan.

Accordingly, the site shall have sufficient emergency equipment located at the site to respond to a spill of hazardous substances.

The type and quantity of equipment shall vary depending on levels of risk, and the type of operation and client requirements. A suggested list is shown below:

- 2 x long handle shovels.
- 2 x pairs of chemically resistant rubber boots.
- 2 x pairs of chemically resistant gloves.
- 2 x pairs of chemically resistant safety goggles.
- Quantity of dust masks.
- Quantity of heavy-duty plastic garbage bags with ties.
- Quantity of chemical absorbent.

Emergency procedures for environmental incidents are shown at Eastern Drilling Environmental Management Document. All employees shall be trained to effectively respond to any environmental incident as part of the induction process.

13.5. Spills or Leaks response equipment

The following are equipment used for clean-up activity, this include:

- Spill kits
- Absorbent pad
- Shovels
- All necessary PPE
- Details refers to applicable OSCP

13.6. Training

The HSE department shall identify and ensure that each and every employee is given safety training and mandatory induction; in which this should be provided and monitored in the training matrix. Below is the Training Program and Matrix are shall be complied by all personnel working for the TR projects.

14. Decommissioning Plan (P&A)

Timor Resource will restore the project locations as part of its project remediation plan to ensure the project will not create significant environmental damage in the future. The restorations may cover reforestation and remediation of the well sites. Hence, Timor Resource will follow and comply with its Plug and Abandonment Plan while ensuring the health, safety and aesthetic environment on the well locations.

Below is the general P&A plan for all wells:

- In the event of discovery, land size below 1ha will be fenced off around Wellhead. That area may be purchased or rented for the duration of the production life. The well will be made safe for suspension and re-entry in the future.
- In the event of Plug and Abandonment (P&A), the surface soil will be restored in the well site area for reforestation or future agricultural purposes. The well will be cemented as per Abandonment plan based on JPDA Interim Regulations Rev 0, June 2003.
- Topsoil on access road will also be restored for reforestation unless requested by population to be left in situ for community use.

Detail Plug and Abandonment Plan to be submitted in stages.

15. Capacity Building and Training

Ongoing capacity building and training is an essential requirement for project to be successful and prevent and mitigate any residual health, safety and environmental related risks. Therefore, Timor Resource will provide ongoing training to its workers and ensure all contractors workers shall fulfil their training requirements as listed on their Training Matrixes.

The training is considered mandatory to the safe operations of the project shall be conducted and implemented before and during the drilling campaign. Hazard Identification (HaZid) Workshop, Risk Assessment and Emergency Management and Drills must be conducted to all personnel involved in the drilling campaign. Weekly Drills shall be implemented during the project activities to ensure workers familiar with the emergency management systems. All new comers must complete facility's safety induction before they are assigned to their jobs. The facility inductions must be also conducted to workers that have been away from the facility for minimum six months.

16. Public Consultation and Dissemination of Information

Public Consultation for drilling activity of Timor Resource in Suai is very crucial not only been part of the normal standard to obtain the environmental license but more importantly is to gather inputs, opinion, ideas from communities affected by the said activity and at the same time serves as a means of spreading the technical and no technical information. Facilitated by Safety Management Consultancy (SMC), Timor Resource together with SMC itself has presented to the communities information such as location of the drilling sites (Five drilling sites in total), the well depth, equipment use, infrastructure involved, legal bases, local content, the effect of activity to communities and surrounding environment and so on.

The participants include Local Community leaders such as Chefe Suco, Chefe Aldeia and Local Youth Groups. There were also Representative of Local Authorities such as District Administrator, Sub District Administrator and Vice Commander of Police.

The Public Consultation was carried out each day for each separate drilling location and Participation at those five drilling sites was positive. Exchanging information, question and answer as well as civility during the consultation have been positively displayed.

Methodology and Approach

The Public Consultation has been conducted by means of direct meeting between the project owner and the participant. The facilitator and the project owner directly presenting the material to the participants with a specific section dedicated to question and answer.

Before the actual consultation, the facilitator has directly engaged with the participant informing the rundown of the public consultation itself. Apart from direct engagement there was also invitation formally issued to the participant.

Detail of Public Participation Activity

1. Date: Monday, 21 October 2019, Location: Camenasa Community Hall

Attendance:

ANPM - HSE team, TR team, Local community leaders of Camenasa: Chefe Suco, Chefe Aldeia, Oficiais Policia Comunitaria (OPS) and Cultural leaders of Holbelis; Local Authorities: Representatives of Municipio Administração Estatal (MAE), Segundo Commandante PNTL, other members of PNTL.

Total Participants: 97 participants

Consultation Commenced at 9:00 am to 12:30 pm

2. Date: Tuesday 22 October 2019 Location: Belecasac Community Hall

Attendance

SMC team, Local Community leaders of Belecasac-Chefe de Suco and Chefe villages
Representative of Local Authorities- Representative of the District Administrator Sub District
Administrator of Maucatar, Representative of Local Youth Group, Vice Command of Police, Local
Community – Total 89 participants

Consultation Commenced at 9:00 am to 12:30 pm

3. Date: Wednesday, 23 October 2019 Location: Matai Community Hall

Attendance

ANPM – HSE team and 9 other members, TR team, SMC team, Local Community leaders of
Matai-Chefe de Suco and Chefe villages Traditional leaders.

Representative of the Local Authorities- Agriculture, Environment Representative of the District
Administrator, Sub District Administrator of Maucatar, Representative of Local Youth Group

Local Police Commander, Local Community – Total 135 participants

Consultation Commenced at 9:00 am to 12:30 pm

4. Date: Thursday, 24 October 2019 Location: Labarai Community Hall (Detail attached)

Attendance:

ANPM – HSE team and 9 other members, TR team, SMC team. Local Community leaders of
Labarai: Chefe de Suco and Chefe villages Traditional Leaders

Representative of the Local Authorities- Agriculture Representative of the District Administrator,
Sub District Administrator of Suai, Representative of Local Youth Group

Local Veterans, Local Police Commander, Local Community – Total 132 participants

Consultation Commenced at 9:00 am to 12:30 pm

5. Date: Friday 25 October 2019 Location: Community Hall of Tashilin

Attendance:

Representative of the Local Authorities - The District Administrator, Sub District Administrator of Suai, Representative of Local Youth Group.

Local Veterans, Local Police Commander, OPS and Local Community – Total 89 participants.

Consultation Commenced at 9:00 am to 12:30 pm

Question (Preoccupation) Raised During Public Consultation

Following is the questions raised during the public consultation at those five well by the participant;

- Local participation
The preoccupation of the locals were focusing on how their participation in terms of workforce and direct contribution such as providing goods and services to the project owner. It is advised by the project owner (Timor Resource) that preference will be given to locals. However, the readiness of locals to participate is the key. TR will provide the means to enhance local participation for example providing training to workforce and if available with preferable standards, goods and service will be acquired from locals.
- Cultural and traditional respect and ceremonies
Before, during and after the drilling activities, respecting the cultural and traditional sites and ceremonies has to be prioritized by the project owner. Indeed there are some traditional ceremonies has been taken place during the initial engagement and TR pledges its promise to pay respect always the culture and traditions of the surrounding drilling sites.
- Avoided damaging the environment
It is hoped that the project owner will pay much attention to the environment specially the flora and fauna. Livestock and their feeding ground has to be preserved.
- Compensation to land and other valuable Trees

Compensation for the community's land has become one of the central issues raised during the Public Consultation. Project owner pledges to pay attention to it and work hand in hand with the related authority to identify and taking care of the issue properly.

- Providing infrastructure to communities

Providing clean water, road accesses, schools, gathering places for communities, sports facilities have also been asked to the project owner. The pledges has been given to communities by the project owner that as much as they can, the project owner will in coordination with other related government institution as well as communities leader realize their queries.

Conclusion and Recommendation

Overall, the Public Consultation has been conducted successfully in terms of participation and enthusiasm of communities. All preoccupation of communities have been addressed properly by the project owner. However, strong coordination between the project owner, communities and related government institution is advised.

17. Grievance Redress Mechanisms (GRM)

Timor Resources shall develop a Grievance Redress Mechanism (GRM) procedure to accommodate project environmental and social related complaints from project affected communities or households. The GRM shall be designed to provide appropriate procedures on how the project affected communities or households can pass on their concerns and/or conflicts that may arise during the phases of the project. The GRM shall provide resolutions that are mutually beneficial and acceptable to all parties. The GRM shall also identify parties involve in the resolution stage process, which include their roles and responsibilities.

The purpose of establishing GRM procedure is to ensure that concerns, conflicts and/or complaints raised by the project affected communities or households are accommodated, communicated and resolved amicably; this is in turn to create or establish and maintain a harmony relationship between the project and the communities living surrounding the project location.

Additionally, it shall also describe the structure on how a complaint is solved, and if there is no mutual agreement reached, the GRM shall provide the next level inline to be approached in order to obtain or reach an acceptable resolution between parties.

As specified in the GRM framework below, the GRM procedure shall have a complainant form and a register log, which has a monitoring and a performance indicator. Within the GRM procedure, an individual or group of community who submit their concerns through GRM complaint's form refers to as Complainants.

Further, it shall be noted that after the GRM is established within the project, it then needs to be socialized with the project affected communities or households. For their awareness and accessibility of procedure; and it shall be practical and transparent for all parties.

The following is structure of GRM procedure shown in Figure 11. The GRM shall be developed in accordance with the IFC performance standard for grievance mechanism.

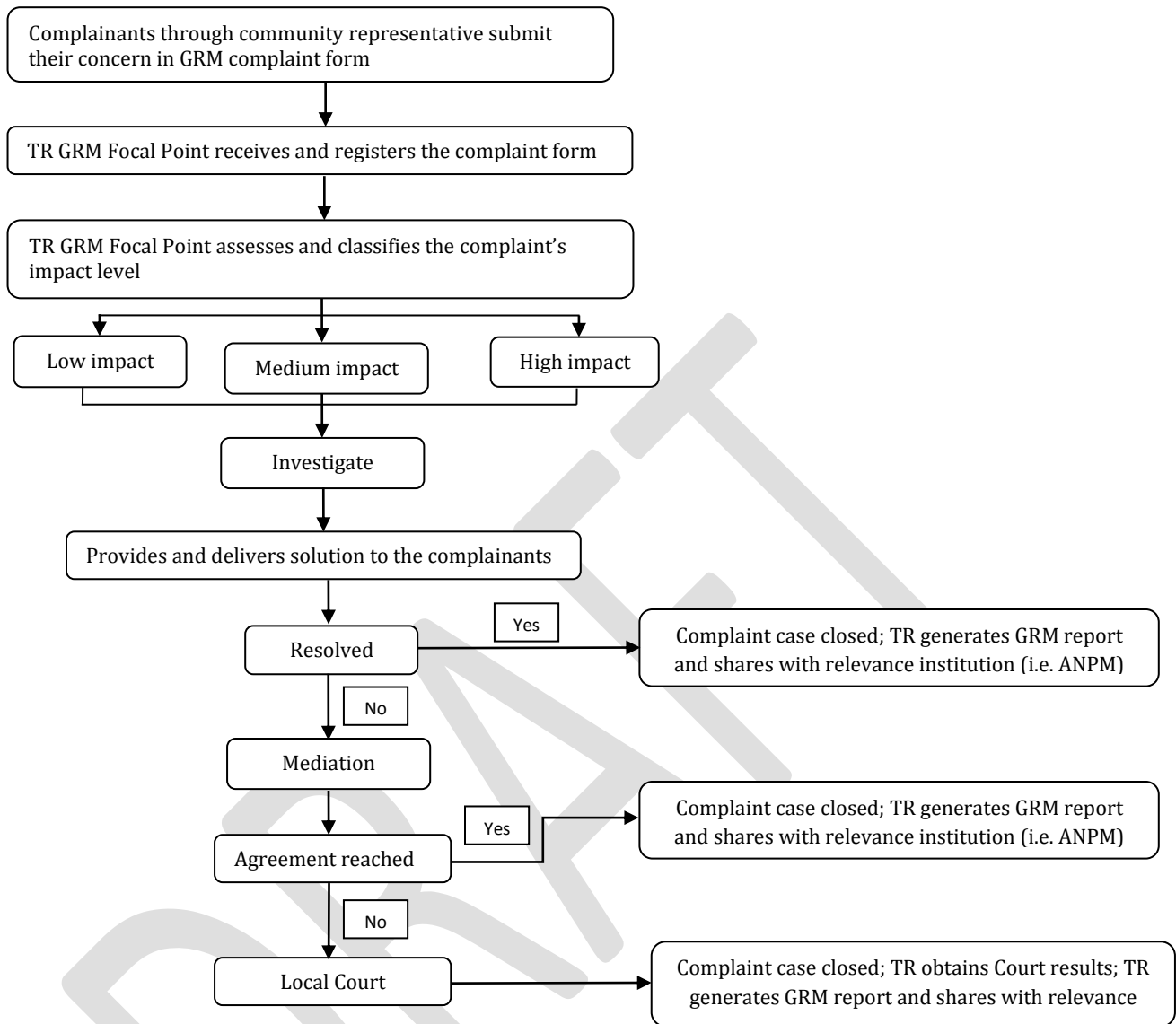


Figure 11. GRM procedure structure

18. Work Plan and Implementations Schedule

Project Schedule for Drilling 2020				
Code	Description of Tasks	Start Date	Completion Date	Duration (days)
1	Environmental Licence	12/09/2019	13/05/2020	295
1.1	Terms of Reference (ToR)	12/09/2019	4/12/2019	83
1.2	Safety Case	9/12/2019	10/04/2020	123
1.3	EMPEIS	3/02/2020	20/04/2020	77
1.4	Environmental Licence	21/04/2020	30/04/2020	9
1.5	Approval to Test	12/05/2020	13/05/2020	1
1.6	Approval to Flare	12/05/2020	13/05/2020	1
1.7	Approval to Abandon	12/05/2020	13/05/2020	1
2	Programme Submission	27/03/2020	20/08/2020	0
2.1	Karau Well Programme	27/03/2020	27/03/2020	0
2.2	Kumbili Well Programme	24/04/2020	24/04/2020	0
2.3	Lafaek-1 Well Programme	29/05/2020	29/05/2020	0
2.4	Laisapi -1 Well Programme	17/07/2020	17/07/2020	0
2.5	Raiketari- 1 Well Programme	21/08/2020	21/08/2020	0
3	Civil Works	21/01/2020	11/09/2020	174
3.1	Karau Site Preparation	21/01/2020	24/01/2020	3
3.2	Kumbili Site Preparation	2/03/2020	15/04/2020	44
3.3	Lafaek Site Preparation	22/04/2020	5/06/2020	44
3.4	Laisapi Site Preparation	12/06/2020	26/07/2020	44
3.5	Raiketari-1 Site Preparation	3/08/2020	11/09/2020	39
4	Rig Schedule	31/01/2020	19/11/2020	247
4.1	Rig Mobilisation	31/01/2020	25/03/2020	54
4.2	Move to Karau-1	26/03/2020	1/04/2020	6
4.3	Commission Rig	2/04/2020	26/04/2020	24
4.4	Drill Karau-1	27/04/2020	13/05/2020	16
4.5	Complete Karau-1	14/05/2020	23/05/2020	9
4.6	Move to Kumbili-1	24/05/2020	30/05/2020	6
4.7	Drill Kumbili-1	31/05/2020	16/06/2020	16
4.8	Test Kumbili-1	17/06/2020	20/06/2020	3
4.9	Move to Lafaek-1	21/06/2020	27/06/2020	6
4.10	Drill Lafaek-1	28/06/2020	6/08/2020	39
4.11	Test Lafaek-1	7/08/2020	10/08/2020	3
4.12	Move to Laisapi-1	11/08/2020	17/08/2020	6
4.13	Drill Laisapi	18/08/2020	9/09/2020	22
4.14	Test Laisapi-1	10/09/2020	13/09/2020	3
4.15	Move to Well#5	14/09/2020	20/09/2020	6
4.16	Drill Well#5	21/09/2020	15/10/2020	24
4.17	Complete Well#5	16/10/2020	20/10/2020	4
5	Move to Block C	21/10/2020	19/11/2020	29

19. Cost Estimate

The economic values for the following project activities or programs are estimated and available at the current stage and will be throughout the project cycle. This is to ensure that all the mitigations measures are fully evaluated for all its cost.

Table 14. Project cost estimation for environmental aspects identified within EIS and EMP

Inclusivity	Pre-Drilling	Drilling	Decommissioning
BOP's, Koomey, Diverter, ESD, Flare Lines	\$ 3,400,000	\$ -	\$ -
Pumps, Chokes, Lines, Pressure & Flow Monitoring, equipment redundancy.	\$ 1,500,000	\$ 400,000	\$ -
Mud Weighting, Lost Circulation	\$ 300,000	\$ 100,000	\$ -
Certification, training, maintenance, HSE	\$ 500,000	\$ 400,000	\$ 50,000
Air, Noise, Light, Pollution, Habitat	\$ 200,000	\$ 200,000	\$ 100,000
Community, Cultural	\$ 200,000	\$ 300,000	\$ 140,000
Planning, Survey, Equipment, Transport	\$ 50,000	\$ 250,000	\$ 100,000
Restoration, Removal, Reforestation, Monitoring	\$ -	\$ -	\$ 420,000
TOTAL	\$ 6,150,000	\$ 1,650,000	\$ 810,000
		TOTAL	\$ 8,610,000

20. Review of the EMP

The project Environmental Management Plan will also review the plan, implementation and monitoring of project activities throughout its life cycle in every phase it has. This include, all related aspects contribute to the accomplishment of first phase of project activity or pre-drilling activity; second phase activity or drilling and decommissioning phase. The review will follow the standard QA/QC document, which shall be fully and appropriately implemented and valid.

The EMP and its frameworks are subject to review for the following purposes:

- Changes of a plan or activity process or procedure that consider to pose any detrimental effect to project, human or environmental as whole; it also applicable for any positive changes that consider to add value into the project, social or environment as whole;
- Changes of responsibility towards any social and environmental aspects identified within the project EIS or EMP and its frameworks;
- Changes of any project related country legislation that may require to update the EMP and its frameworks; and
- Changes of monitoring results that may require to update any threshold or environmental limit value identified within project EIS or EMP and its frameworks.

21. Non-Technical Summary

Atividade perfurasaun ba mina matan lima ho naran Karau, Lafaek, Kumbili, Raiketan no Laisapi iha Municipio Covalima sei hala'o iha tinan ida ne'e nia laran. Mina matan lima nebe mak sei fura lokaliza iha suco hat hanesan Kamnasa, Matai, Labarai no Tasilin. Suku seluk mak bele mos hetan impaktu maka Belekasak no Debos tanba mina matan balun ne'ebe mak lokaliza iha kedas bareira entre suku rua ne'e nian.

Prosesu perfurasaun ida ne'e sei hala'o husi Kompania Timor Resource ho nia parseiru TIMOR GAP, E.P. Timor Resources hanesan kompania privadu ba Mina no gas husi Australia e TIMOR GAP, E.P. maka sai hanesan kompania nasional ba Mina no gas Timor-Leste. Timor-Resources halo ona akordu ho Governu Timor-Leste no permite sira atu halo esplorasun ba area Bloku A (PSC TL OT-17-08). Objetivo husi perfurasaun ida ne'e atu hodi koko dadus sira ne'ebe hetan ona husi estudu geologico no geofisico ne'ebe kolekta ona husi tinan 1969 to ohin loron no perfurasaun ida ne'e rasik atu hodi koko estrutura sira iha rai okos ne'e iha mina ou lae. Atu halo prosesu perfurasaun ida ne'e, Timor Resource halo ona kontratu ho kompania Eastern Drilling atu halo prosesu perfurasaun ida ne'e.

Prosesu perfurasaun ida ne'e sei kompostu husi fase rua mak hanesan:

- Fase molok perfurasaun nebe mak sei kompostu husi aktividade mak hanesan Estudu ba rai no teste laboratorio, survey ba topografia, loke dalan atu ba iha mina matan, no aktividade seluk tan nebe relevante molok hahu perfurasaun.
- Fase segundu maka hanaran fase perfurasaun. Fase ida ne'e kompostu husi aktividade maka hanesan perfurasaun ba mina matan lima baseia ba dadus geological nebe mak kolekta ona durante ne'e husi Timor Resources ho nia parseiro. Fase ida ne sei implementa tuir lei no regulasaun no standarte industrial nian.

Implementasaun ba projeto ida ne'e sei halao tuir Dekreto Lei Numero 5/2011 konaba Licenciamento Ambiental no lei sira seluk nebe mak vigora iha Timor-Leste. Tanba ida ne'e Timor Resources hatama ona Estudu impaktu ambiental no plano managementu ambiental atu nune'e Autoridade Nacional do Petroleo e Minerais bele fo Lisensa Ambiental molok projeto ne'e hahu.

Atu bele hetan lisensa ambiental, Timor Resources serbisu hamutuk ona ho kompania Safety Management Consultancy (SMC) atu halo estudu ambiental iha area lima nia laran. Objetivo husi estudu ida ne atu hodi hatene tuir kondisaun ambiente iha area lima nebe mak sei hetan impaktu husi prosesu ne rasik.

SMC mos serbisu hamutuk ho Timor Resource atu halo Sistema Managementu Ambiental ne'ebe mak sei koalia konaba mekanismu oinsa atu protégé ambiente iha durasaun de projeto ida ne'e rasik. Dokumentus EMP ou Planu Jestaun Ambiental ida ne'e sei sai hanesan mata dalan ida atu nune'e bele prevene impaktu ne'ebe la aseitavel. Em geral, planu ida ne'e sei hare konaba oinsa maneja impaktu sira hanesan rai rahun, barulhu, qualidade be, problema social no kultural ne'ebe bele mosu durante prosesu perfurasaun ida ne'e to'o remata.

Konsultasaun publiku ho objetivo atu fahe informasaun ba comunidade sira konaba aktividade perfurasaun ne rasik halao ona iha fulan Outubro tinan 2019 iha suku lima hanesan Kamnasa, Matai, Belekasak, Labarai no mos Tashilin. Iha konsultasaun publiku, SMC hamutuk ho Timor Resource fahe ona informasaun hanesan fatin perfurasaun, ekipamentu ne'ebe mak sei uja, konteudu local nomos informasaun seluk hanesan ambiente no seluk seluk tan. Participante husi konsultasaun publiku ida ne'e kompostu husi lideres comunidade, Chefe Suku, Chefe Aldeia, representante husi administrador municipal no Sub Distrito nomos kumunidade sira. Em geral, preokupasaun husi comunidade suku lima ne'e nian maka hanesan oportunidade serbisu no kultura. Ikus liu, aktividade perfurasaun ida ne'e sei bele iha impaktu ba ambiente hanesan rai rahun no barulhu. Maibe, Kompania mos iha ona plano atu maneja ida ne'ebe mak sei uja hodi hamenus ipaktu negativo husi prosesu perfurasaun ne rasik.

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APPENDICES

DRAFT

APPENDIX A: WASTE MANAGEMENT PLAN

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APPENDIX B: REHABILITATION PLAN

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APPENDIX C: REDRESS AND GRIEVANCES PROCEDURES

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APPENDIX D: SPILL REPOSE MANAGEMENT PLAN

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APPENDIX E: TRANFIC MANAGEMENT PLAN

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APPENDIX F: INSPECTION SCHEDULES

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APPENDIX G: NOISE MANAGEMENT PLAN

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APPENDIX H: INCIDENT REPORTING PROCEDURE

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APPENDIX I: COMMUNITY CONSULTATION

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APPENDIX J: AIR QUALITY PLAN

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