

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

Issue date	10/03/2020
Commitment category	Regulatory
Application region	TR – Asia Operations
Business code	Exploration
Type	License A
Aligned with	ANPM/Timor-Leste Regulatory
Source language	English
Supersedes	
Latest review/next scheduled review	NIL /TBD
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REVISION HISTORY

REVISION	DATE	DESCRIPTION
		Issued for the review by regulatory
		Issued for review by regulatory

MANAGEMENT APPROVAL

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DISTRUBUTION LIST

AUTHORITY/COMPANY'S NAME	DATE	Document Revision No.
Autoridade Nacional do Petróleo e Minerais		

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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 Geofísica
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
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
NOx	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
SO2	Sulphur Dioxide
SOx	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

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, as identified in the Environmental Impact Assessment, in particular the identified Residual Risks. 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 project 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 decommissioning/plug and abandonment phases. These phases involve activities such as building 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 and site decommissioning.

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.

The potential project impacts on environmental, social-economic and cultural components for the project activities have been identified and are reported in the Environmental Impact Assessment (EIA) report. Moreover, the mitigation measures for the proposed project activities have also been reported in the EIA. 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.

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.

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 EIA 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 rig 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
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2.2. Company Structure

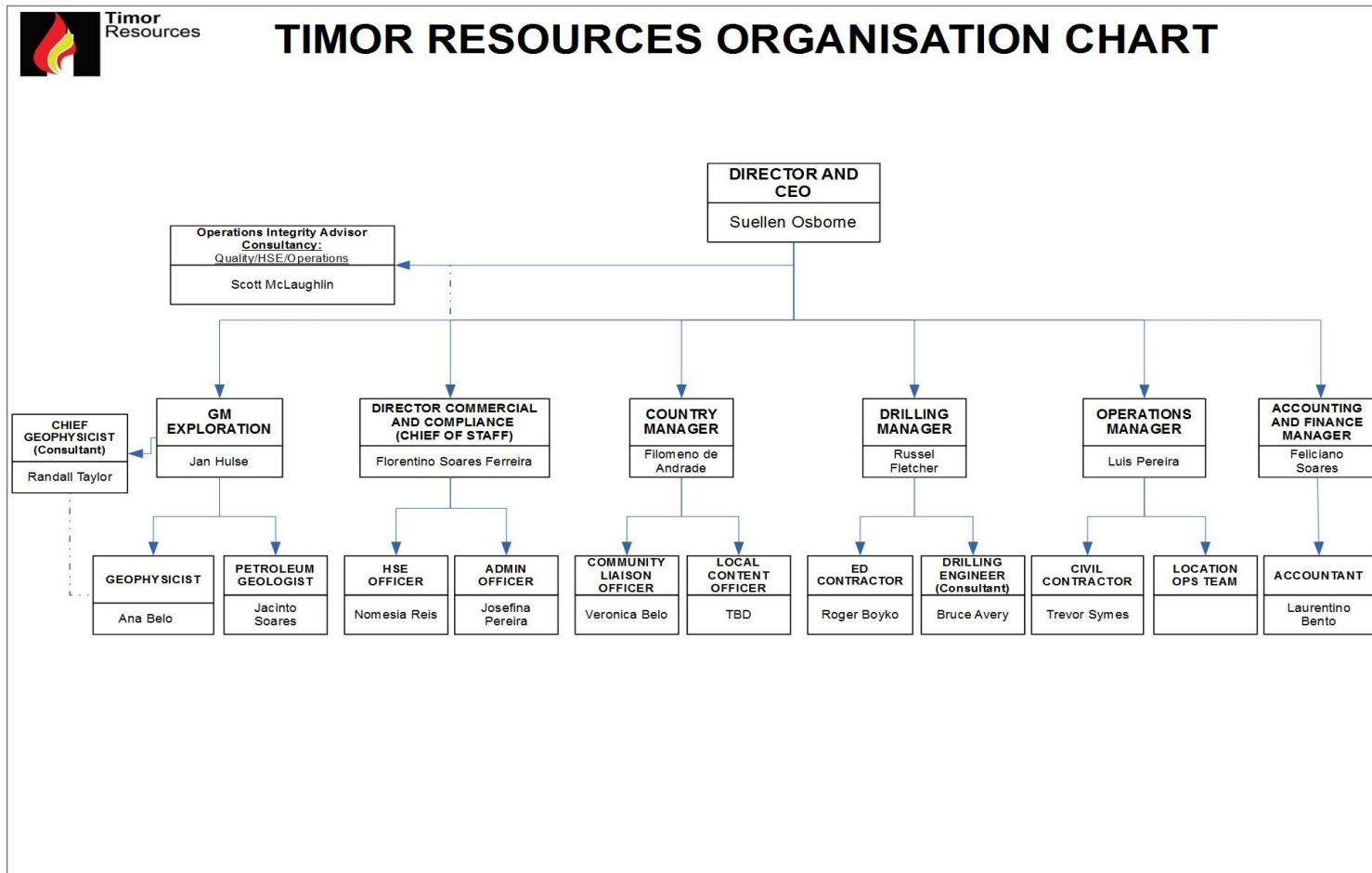


Figure 1. Timor Resources organization structure

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 Brief Overview of the drilling process

After the completion of the seismic survey five promising geological structures have been identified, the only way to confirm the presence of hydrocarbons and the thickness and internal pressure of the reservoirs is to drill exploratory boreholes.

All wells that are drilled to discover hydrocarbons are called “exploration” wells. The location of a drill site depends on the characteristics of the underlying geological formations, the well design, and location selection described in this report demonstrate a balance of environmental protection criteria with logistical needs, and the need for efficient drilling.

A well pad is constructed at each of the five sites to accommodate drilling equipment and support services, each pad occupies in the region of 1 hectare. The entire location is cleared of all vegetation and topsoil prior to the start of any civil works. The vegetation and topsoil are stockpiled in a cleared area within the drilling location but outside the drilling rig work area. A perimeter drainage ditch is constructed around the location. The well site incorporates two mud pits each with a volume of approximately 334 m³ (2,100 bbls), a freeboard of 0.5m and lined with a High Density Polyethylene (HDPE) membrane liner. Any new roads will be constructed on compacted sub-grade to form a road base 6 m wide, within a corridor of 10 m to 20 m.

The drilling rig and support equipment are split into modules and will be shipped into Suai directly where the rig will be assembled prior to the short move to the first location. Once on site, the rig and a mini camp are then assembled. Typical drilling rig modules include a derrick, drilling mud handling equipment, power generators, cementing equipment and tanks for fuel and water (see Figure). The rig mini camp provides accommodation for the senior drilling crew, canteen facilities, communications, vehicle maintenance and parking areas, fuel handling and storage areas, and provision for the collection, segregation and incineration of solid wastes, recyclable plastic bottles and tin cans and recoverable scrap materials.

A single main support camp is available in the centre of the drilling area and provides accommodation for the off-duty workforce, canteen facilities and provision for the collection and segregation of solid wastes, recyclable plastic bottles and tin cans and recoverable scrap materials.

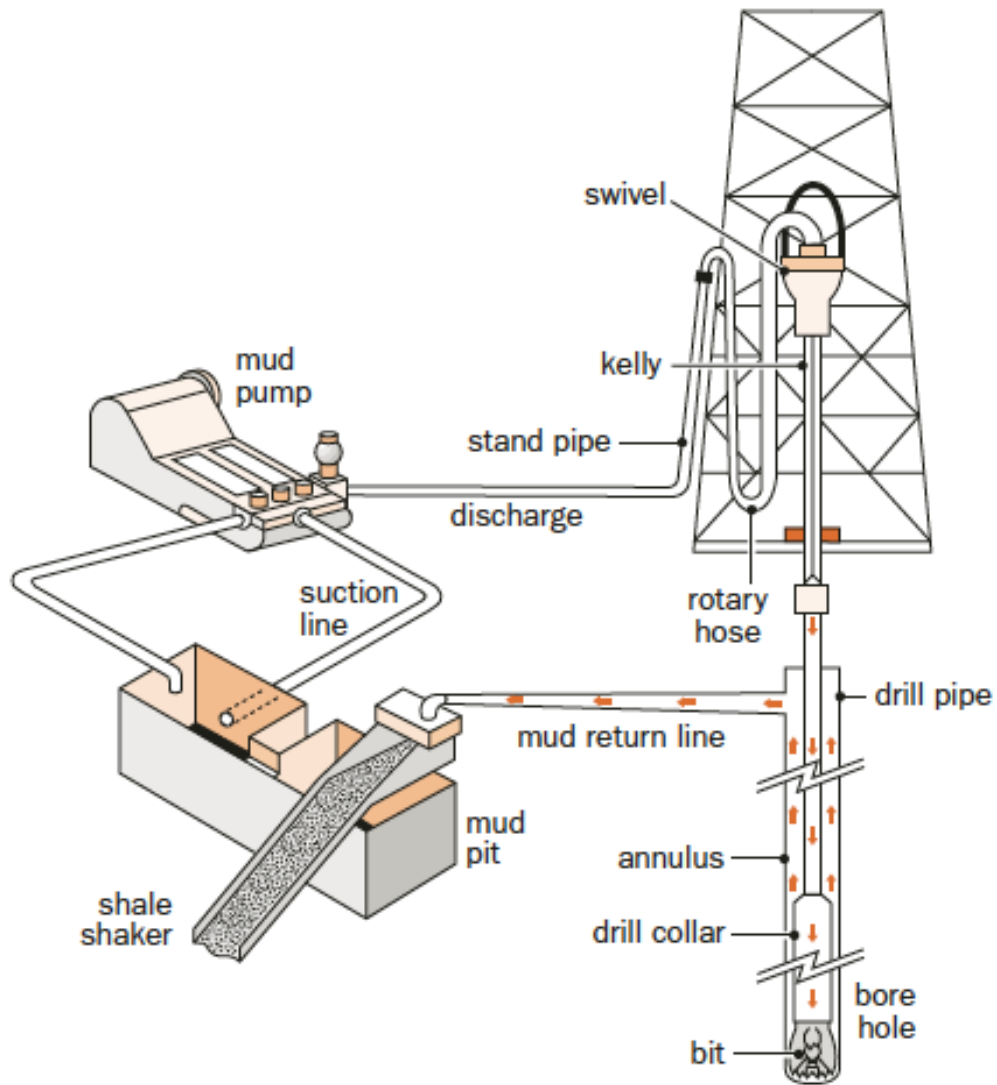


Figure 2. General Description of onshore Drilling Rig

Once drilling commences, drilling fluid or mud is continuously circulated down the drill pipe and back to the surface equipment. Its purpose is to balance underground hydrostatic

pressure, cool the bit and flush out rock cuttings. The risk of an uncontrolled flow from the reservoir to the surface is greatly reduced by using blowout preventers - a series of hydraulically actuated steel rams that can close quickly around the drill string or casing to seal off a well.

Steel casing is run into completed sections of the borehole and cemented into place. The casing provides structural support to maintain the integrity of the borehole and isolates underground formations, particularly the shallow aquifer found at around 88m in the area. Drilling operations will be conducted around the clock. The time taken to drill a bore hole depends on the depth of the hydrocarbon bearing formation and the geological conditions and is expected to be in the order of 30 days for each well, slightly longer for the two deeper wells. Where a hydrocarbon formation is found, initial well tests, possibly lasting another month, are conducted to establish flow rates and formation pressure. These tests may generate oil, gas and formation water, each of which will be managed on site.

After drilling and initial testing, the rig is dismantled and moved to the next site. If the exploratory drilling has discovered commercial quantities of hydrocarbons, a wellhead valve assembly will be installed. If the well does not contain commercial quantities of hydrocarbon, the site is decommissioned to a safe and stable condition and restored to its original state or an agreed after use. Open rock formations are sealed with cement plugs to prevent upward migration of wellbore fluids. The casing wellhead and the top joint of the casings are cut below the ground level and capped with a cement plug.

4.2 Identification of the Project

This project is to conduct exploration drilling of the five identified well locations, namely Karau, Kumbili, Lafaek, 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 27th April 2020.

These five wells were identified as a result of prospect evaluation carried out by Timor Resources' exploration team which ultimately defined the targeted plays to be drilled. These targeted plays are located within the domain of five well sites.

4.3 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 Terms of Referene (ToR),

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.

4.4 Brief Description of Nature, Size and Location of the Project

4.4.1 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:

The Pliocene-Pleistocene age Viqueque Formation, syn-orogenic Basin.

Lower Allochthon (Permian-Eocene)

The Triassic-Jurassic age Babulu/Aitutu and Wai-Luli Formations beneath a regional metamorphic overthrust.

The above mentioned three plays are to be tested with the five wells, namely Karau, Kumbili, Laisapi, Raiketan and Lafaek. The proposed well locations 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 optimize the chance of success during the course of the drilling operations.

4.4.1.1.1 Pre-Drilling

Pre-drilling operations include:

1. Geotechnical and Topographic survey

These surveys aim to gain better understanding of the topography and soil characteristics of well sites and road access in order to undertake subsequent civil works.

Geotechnical surveys to obtain information on physical properties of soil which include structure and consistency.

While topographic survey is carried out to determine the configuration, relief or elevation of a portion of the earth's surface, including the location of natural and/or man-made features.

2. Land clearance for road access and site constructions

The arable top soil and vegetation will be piled up on side. This top soil will be put back once drilling is completed in the area which no longer required. There will be 20 meters wide of clearance for the construction of 6 meters wide road. River rock will be used as base course up to 30 cm in thickness.

The 1 ha well site area will be levelled after top soil removal and river rocks will be used as base course up to 50 cm in thickness.

Road access map for Karau, Kumbili and Laisapi can be seen in Figure 7 to Figure 9.

3. Road and bridge surveys plan, including highway and arterial and local roads.

TR and ED have carried out extensive survey on existing roads, bridges and highway in Suai Municipality. The new highway had been designed and constructed by using AASHTO design code. Bridges and roads have been identified and mapped during the rig move. All options have been mapped for rig transportation however truck load will be managed within the allowable road load capacity.

4. Establish water supply

Water will be sourced from local contractor to provide daily water needs for drilling with approximate volume of 60,000 liters per day.

5. Well Site

Composition of typical well site consists of:

- Mini camp and office: set of mobile units used for accommodation, kitchen, store room and support offices for engineers and meeting spaces.
- Septic field: use portable fibre glass for black water then use biotreatment method for overflow water filtration before it is channelled under ground.
- Mud pits for for drilling fluid
- Mud pump station
- Flare pit for well test
- Cellar on well bore area
- Parking space
- Power Generator
- Fence surrounding the well site

Below map provides typical layout of all well sites.

Timor Resources – Management System Document

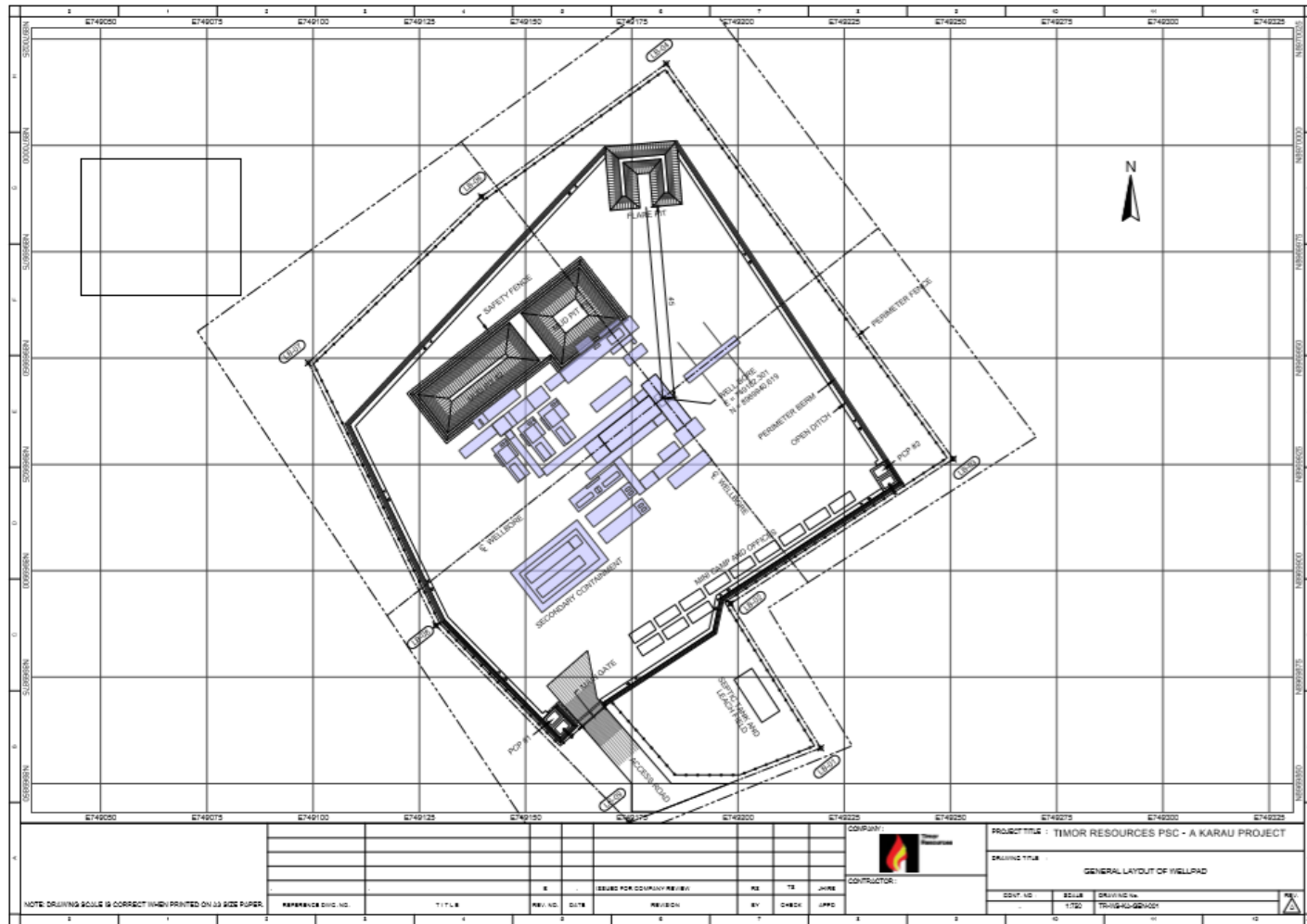


Figure 3. Map of Karau Well layout

6. Cellar construction with recess for air pump.

The objective of the cellar construction is to place BOP during the drilling operation. Groud preparation for cellar area will require 2.7 meters in depth. Precast cellar with dimation of 2.9 x 2.9 meters will then be installed.

7. Mud Pits (sump) construction

During drilling process, a consistent supply of mud is required to maintain hydrostatic pressure, lubricate, cooling the drilling bit and to transport cuttings to the surface. A 32 x 15 meters mud pit with 3 meters depth will be prepared for mud handling and circulation. Impermeable geomembrane will be used in the pit as barriers to prevent soil contamination in case of any presence of harmful substance. The pit will be fenced off within the compound for safety purposes.

8. Rig Move

Joint assessments were carried out by TR and ED for all possible routes to each well location. The assessment covered road width, intersections, bridge, community and public infrastructures. A risk assessment which includes TR, ED, transport contractors was also carried out to determine all risk associated with rig move in reference to road condition. As a result, roles and responsibilities and other activities were identified to assess and manage each rig move. The truck load height shall not exceed 4.5 meters and below 3.5 meters in width.

4.4.1.1.2 *Drilling Operations*

It is proposed to drill up to five 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.

Mud System

Water-based muds will be utilised on all wells as follows:

Spud Mud to 100m

17-1/2" Hole to 88mMDRT

Hole Interval: 88m

Mud Type	Gel based Spud Mud
Mud Weight	9.5 ppg
PV	< 20 lbs/100sq ft
YP	15-20 lbs/100sq ft
pH	9-10

Table 1. Spud Mud Type to 100m

Displace to Drilling fluid at 100m

8-1/2" Pilot Hole to 350; if poor show, drill ahead to 500m (as per well program).

Open the Hole to 12-1/4" to Pilot Hole TD

Hole Interval: 262m

Mud Type	KCl Polymer PHPA
Mud Weight	9.5 ppg
PV	< 20 lbs/100sq ft
YP	20-30 lbs/100sq ft
API Filtrate/WL	< 6 cc/30min
API Mud cake	1 (1/32in)
pH	9-10.5
MBT	<12.5

Table 2. Type of Drilling Fluid at 100m

Displace Mud prior to drill 8-1/2” Section

8-1/2” Hole to 1037mMDRT

Hole Interval: 687m

Mud Type	KCl Polymer PHPA
Mud Weight	9.5 ppg
PV	< 20 lbs/100sq ft
YP	20-30 lbs/100sq ft
API Filtrate/WL	< 5 cc/30min
API Mud Cake	1 (1/32in)
pH	9-10.5
MBT	<10

Table 3. Mud type used to drill 8 1/2" hole

Potassium polymer muds are the most widely accepted water-based mud system for drilling water-sensitive shales, with PHPA (partially hydrolysed polyacrylamide) the polymer. The principal additives for a KCL-Polymer mud are:

- **Soda Ash** - Sodium Carbonate (Na_2CO_3) is used to treat calcium ion contamination in the mud and Sodium Bicarbonate (NaHCO_3) cement contamination.
- **Caustic Potash** - Caustic potash (KOH) is added for alkalinity control in a KCl-Polymer Mud rather than caustic soda because it provides pH control. Generally, a pH range of 9.5-10.5 is considered optimum for running KCl-Polymer muds.
- **Bentonite** - Pre-hydrated bentonite is used to viscosify KCl-Polymer Muds. Typically, concentrations of 5-15 lb/bbl of pre-hydrated bentonite are adequate for mud viscosity and filtration control.
- **Starch** - Starch is added for filtration control in KCl muds. A modified starch (starch treated with a biocide) is preferred, generally potato-based rather than corn-based.

- **PAC LV** - is a low-molecular weight polyanionic cellulose polymer, which is an extremely effective filtrate reducer.
- **XCD Polymer** - is a high molecular weight Xanthum Gum biopolymer, used to viscosify water based muds and completion fluids. It is primarily a viscosity modifier.
- **Potassium Chloride (KCl)** - Potassium chloride is used to inhibit clay hydration.
- **Barite** - barium sulphate (BaSO_4) is a commonly used to add weight to drilling mud.
- **PHPA** - Partially hydrolysed polyacrylamide (PHPA) is primarily added to encapsulate solids and provide inhibition by interacting with bentonite to improve rheology.

Drilling-fluid constituents can be grouped into several categories, depending on their function in the drilling-fluid system. The major categories are weighting (density control) agents, viscosifiers, thinners, fluid loss reducers, lost circulation material, and commercial chemicals. There are also several minor groups of additives used for special problems such as lubricants, detergents, emulsifiers, defoamers, foaming agents, bactericides and corrosion inhibitors.

Density Control

The main density control agent will be through the use of barite (BaSO_4). Commercially produced barite normally contains 95% barite (BaSO_4) along with some contaminants such as pyrite (FeS_2) and sphalerite (ZnS).

Like calcium carbonate barite is a naturally occurring, biologically inert material with an extremely low toxicity when tested in simple mud systems (Hudgins, 1991).

Viscosity Control

The additives used for controlling fluid viscosity are organophilic clays such as amine treated bentonite clay or natural organic polymers such as starch, gum, xanthan, or guar gum. Viscosifiers serve a dual purpose in providing carrying capacity to the fluid and in developing a filter cake on the borehole to reduce fluid loss to the formation. Bentonite (sodium montmorillonite) is the primary clay used for viscosity; however, several other types of clays (attapulgite, sepiolite) are used as well. In some applications, bentonite is treated with a small amount of water-soluble polymer to extend the viscosity-building

properties of the clay, however these inert clays and polymers have very low toxicity (Jones et al., 1986).

Corrosion Inhibitor and pH Control

Drill pipe corrosion and scaling are serious problems. Corrosion of the drill string and casing during drilling can be caused by entrained oxygen within the mud or by acidic gases (CO, CO₂ and H₂S) produced during drilling. Corrosion is reduced by the addition of oxygen scavenger such as sodium sulphite, ammonium bisulphite or zinc carbonate. Oxygen corrosion is also reduced by maintaining the drilling fluid at pH >11 by the addition of lime (Ca(OH)₂). This has the added advantage of stabilising the emulsions in the muds.

Fluid-loss Reducers

If properly conditioned, drilling fluids should deposit a layer or filter cake on the wall of the borehole to help prevent liquid from the mud from entering the formation. These fluid-loss reducers are primarily the clays used for viscosity control, and material such as polymers. Both natural and synthetic polymers have been utilised as fluid-loss reducers.

Starch was one of the first polymers used, followed by sodium carboxy-methylcellulose (CMC), and several varieties of polyanionic cellulosic polymers, terpolymers and polyacrylates. The earlier natural polymers were subject to bacterial decay and required a preservative. Paraformaldehyde, originally added to starch as a preservative, increased toxicity. However, the newer polymer systems are less susceptible to bacterial problems, and the need for preservatives in this regard has declined. The toxicity of the major polymers used today to control fluid loss (CMC, polyacrylates, etc.) is low-to-non-measurable (Jones et al., 1986 and Leuterman, et al., 1989).

Commercial Chemicals

Many commercial chemicals are utilised for speciality functions in drilling fluids including pH control (caustics), ion balance (potassium sources, carbonates), and corrosion control (zinc compounds). Most of the elements are naturally present in the environment and are used in limited quantities in the industry.

Lost Circulation Material

Lost circulation additives are primarily water-insoluble fibrous, filamentous, granular, or flaked material, with the most common materials used being nut shells, mica, cellophane and paper.

These naturally occurring products have not traditionally been bioassay-tested in drilling fluid systems because they are chemically inert and perceived to be non-toxic at the level

used. Any detrimental effect would be related to a mechanical, abrasive smothering action rather than chemical toxicity.

Specific-Use Additives

Lubricants are frequently utilised in water-based systems to reduce friction and prevent sticking. The traditional practice when pipe stuck was to pump a spotting fluid (50 to 100 barrels of No.2 diesel) into the stuck area to help free the drill string. The oil was later removed for separate disposal or mixed into the mud system as an added lubricant. Diesel spots have declined in use, because of regulatory constraints, and are being replaced by a variety of less toxic mineral oils. Lubricants containing oils can have relatively high toxicity levels. However, if used selectively and in moderation, regulatory compliance is still met. A number of additives (e.g. emulsifiers, defoamers, surfactants, detergents, corrosion inhibitors and bactericides) are used at low concentration to impart specific characteristics to a mud or to treat problems. The toxicity of these products vary greatly; however, such a small volume is used so that the toxicity of the overall mud system is low enough to meet regulatory compliance (Jones et al., 1986, Leuterman et al., 1989 and Hudgins, 1991).

Cement Chemicals

Portland cement is the largest component of the cement chemicals and is essentially made up of materials such as sand, alumina and bentonite clay, with calcium and sodium chloride occasionally present. These basically inert materials comprise about 97-98% of the usage and discharge.

Any other categories of chemicals used are added to impart special properties to cements and often placed deeper in the well. These other chemicals are not normally discharged except as contamination in drilling mud. Minor amounts may be discharged when mixing systems are flushed.

Well Program, Schematic Design and Casing Program

Safe Operation Principle

Well design will :

- Comply with regional laws, regulations, and best industry practice.
- 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 criterion 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, optimize hole sizes and subsequent casing sizes. General standardization 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.

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 4. 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.
Tri-axial	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.

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.

Typical Well Diagram

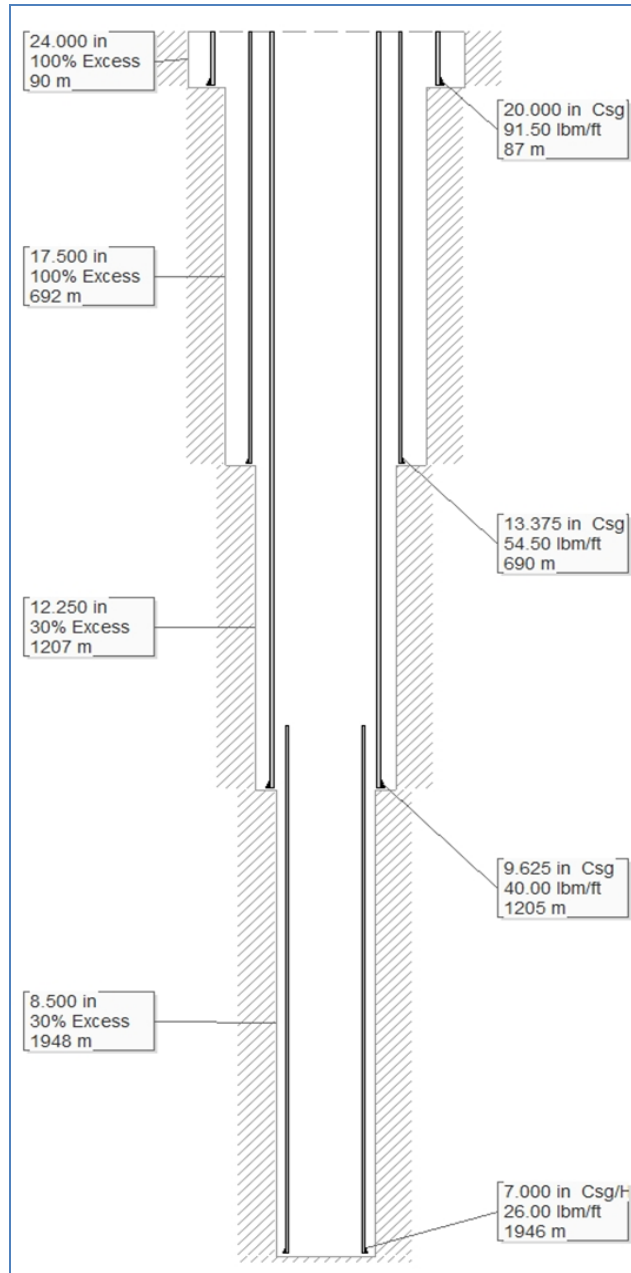


Figure 4. Typical Well Profile A (TR, 2019)

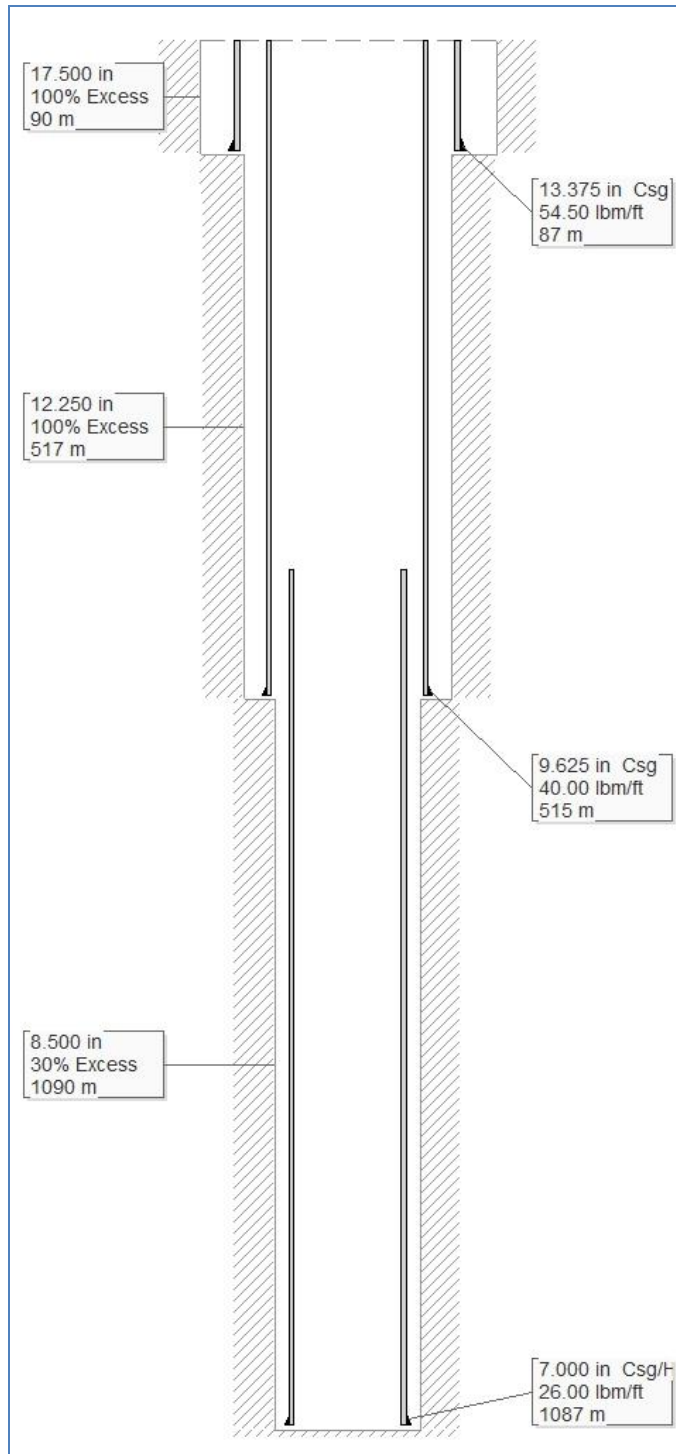


Figure 5. Typical Well Profile B (TR, 2019)

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 0.780 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 – ½” Production Casing

Ideally, the objective of the 8 ½” 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.

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.

4.4.2 Size

Onshore PSC TL-OT-17-08 Block A is an area that covers of approximately 1,000 km², 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 7 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 hectares in total as TR requires to secure 1 (one) hectare of land per well location. 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.

4.4.3 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.

Timor Resources – Management System Document

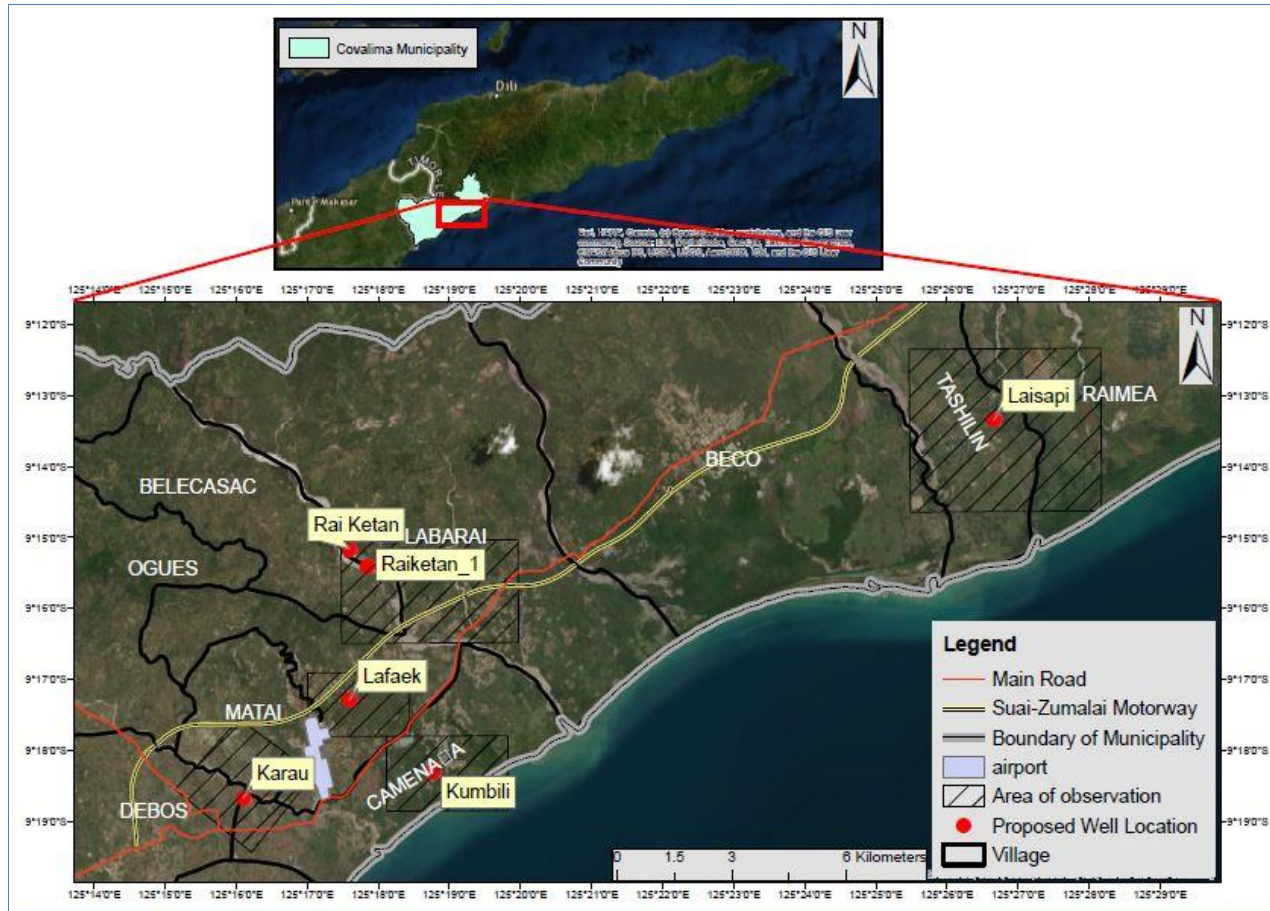


Figure 6. General Map of the Exploration Drilling Campaign Locations

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 from Figure 7 to Figure 9 below show the visual site of each well location:



Figure 7. Visual site map of Karau Well

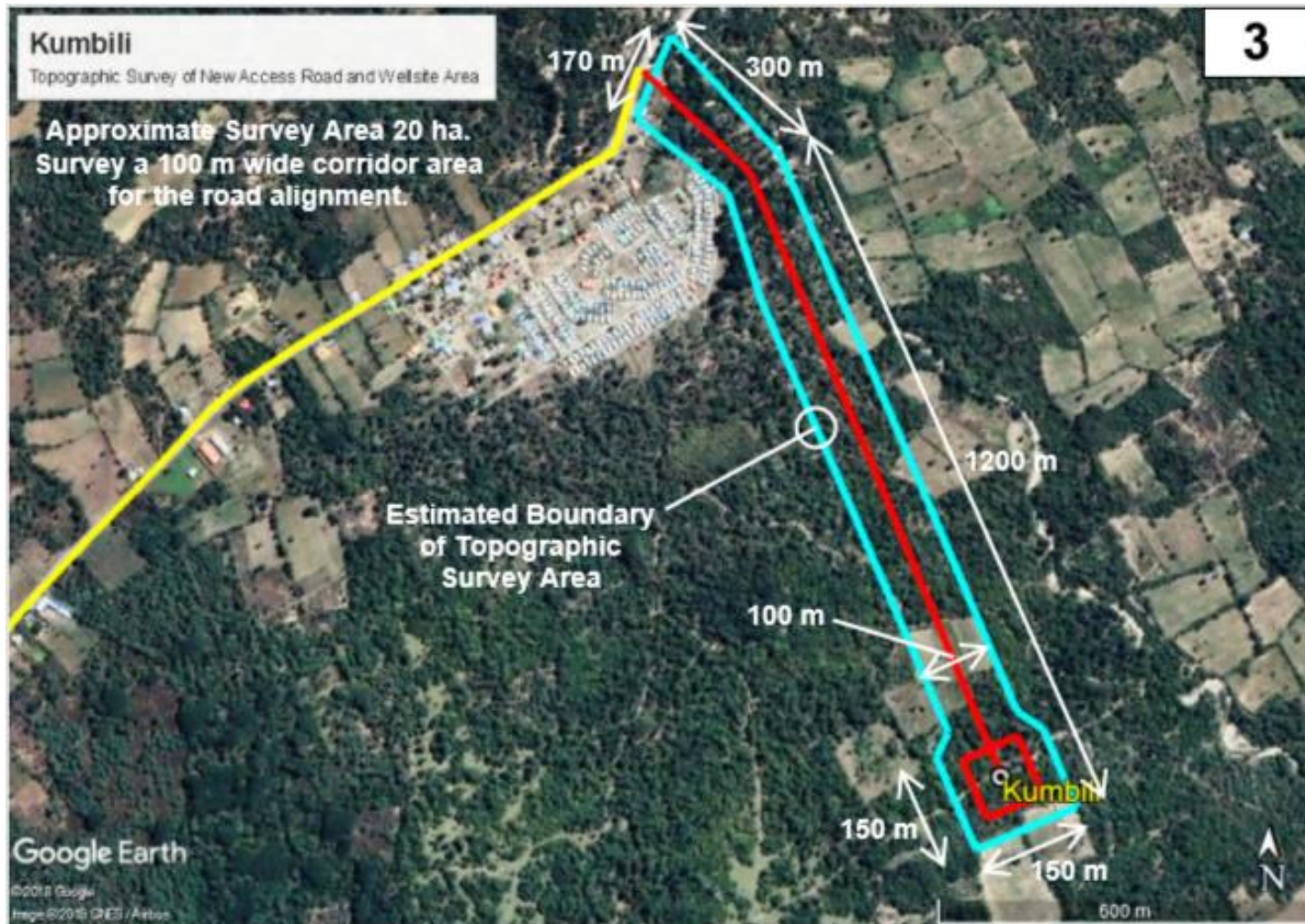


Figure 8. Visual site map of Kumbili Well

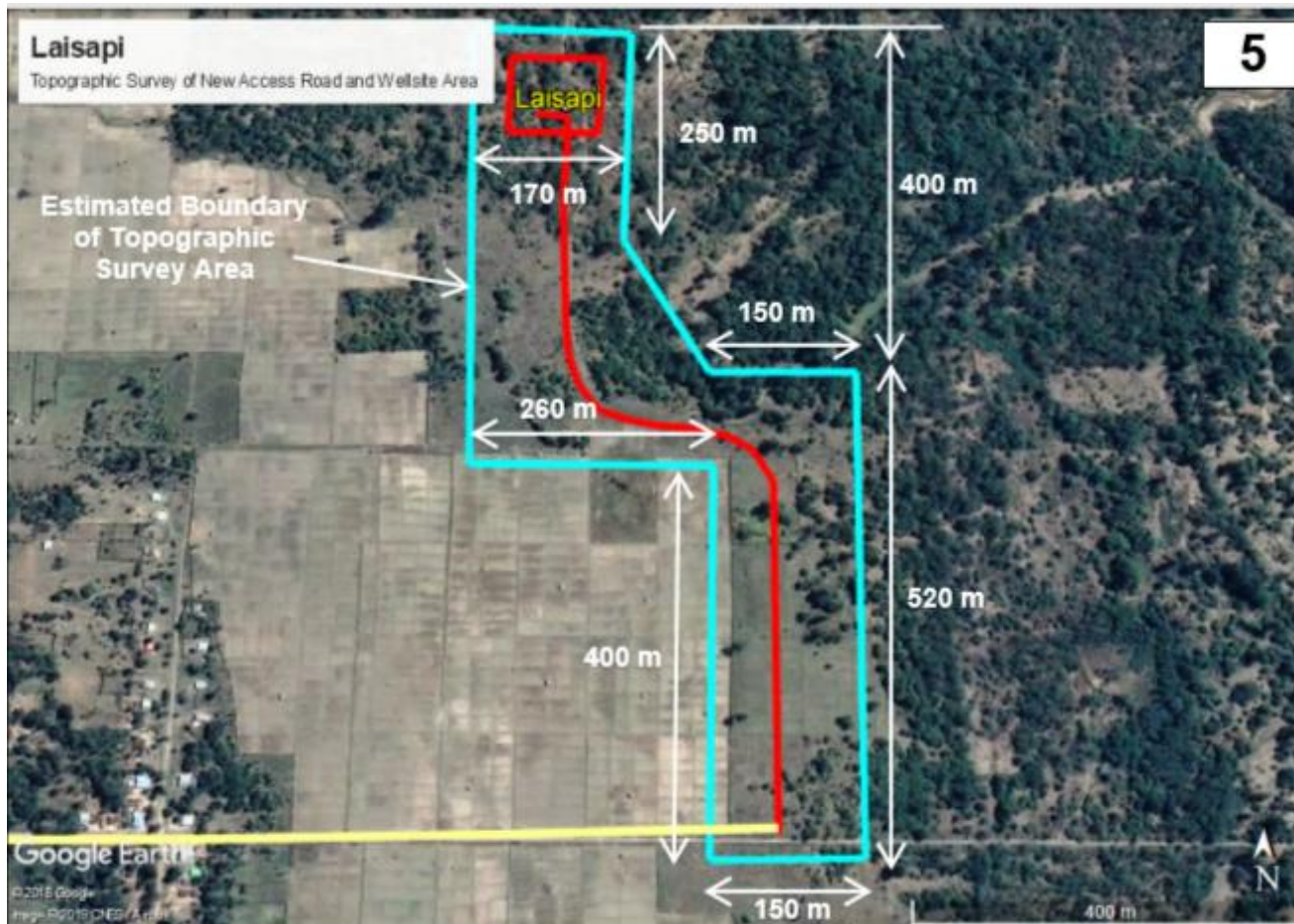


Figure 9. Visual site map of Laisapi Well

4.5 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:

TITLE	DESCRIPTION	RELEVANCY TO THE PROJECT
Timor-Leste National Legislation and Regulation		
Constitutions of the Republic Democratic of Timor-Leste Article 61 (Environment)	The article specifies provisions for state including the proponent shall undertake to defend, and safeguard the environment recognizes the right of all citizens to a humane, health and ecologically balances environment while also specifying the duty of everyone to preserve and protect the environment for the benefit of future generation	Provide the basis for environmental protection and safeguarding in the Country
Environmental (Licensing) Decree Law No.5/2011	The procedure for directing the environmental assessment, the review of application for environmental license, issuance and renewal of license. • Categorization of the project category according to severity of the environmental impacts. • Procedures and information requirement for Category A project • Organization and composition of the review committee and its duties and responsibilities. • Specific provisions for public consultation and the protection of the traditional customs and cultural practices. • The issuance of the decision by the Environment Authority on the review of the application and the rights of the project owner to appeal the decision.	Provides the Environmental Licensing procedure to regulate actions to encourage and protect the nature as an important instrument for sustainable development of economy of Timor-Leste
Decree Law No. 5/2016 – National System of Protected Areas (Annex 1 – List of Timor-Leste Protected Areas)	This Decree Law defines the norms and principles for the creation of the national system of terrestrial and marine protected areas, for the classification of protected areas and for the approval of the applicable management instruments, according to the international best	Provide the basis for the protection of the terrestrial and marine protected areas without putting aside the

	practices, in the matter, duly adapted the national reality, without forgetting the important role of community authorities and existing customs.	important role communities authorities and existing customs.
Decree Law No. 26/2012 on Basic Environmental Law	The Decree Law identifies the protection of the environmental life and wildlife protection, including the basic principles for the conservation, preservation and sustainable use of natural resources in order to improve the quality of life of the local populations.	Communicate to the communities by providing information on the basis for the protection of environment and wildlife protection and sustainable use of natural resources through public consultation
Diploma Ministerial No.44/2017 – Impact Benefit Agreement	The article specifies the process for the agreement between the project proponent and the local community regarding the advantages and disadvantages of the project	As this is a category A project, the IBA will be implemented if it proposed by a member of community to ensure local or community’s interest is considered and agreed proposal shall be implemented
Diploma Ministerial No.45/2017 – Rules and Procedures of the Evaluation Committee for Project with Category A	The article specifies the importance of establishing rules and procedures for the evaluation committee for the management of the environmental evaluation process for projects in category A	Establishment of a committee in order to review the project that categorise into category A.
Diploma Ministerial No.46/2017 – Detail requirements of Classification,	The article specifies the necessary of establishing a regulation to regulate projects that may have significant impacts on the environment, while aslo specifying the procedures and requirements to	Provides the environmental licensing and classification of

Initial Assessment and Terms of Reference, Environmental Impact Statement and Environmental Management Plan	select projects that classified into category A, B and C.	the project into category A.
Diploma Ministerial No.47/2017 – Public Consultation Procedure and Requirement during Environmental Baseline Process	This Diploma Ministerial specifies the procedures and requirement of involvement of public and communities into different stages of the environmental assessment process through public consultation.	Provides information and communicate to the communities by providing information on the basis for the protection of environment and wildlife protection and sustainable use of natural resources through public consultation
Forestry, Aquaculture and Fishing Legislation: Law No. 14/2017 – General Regime of Forestry	The article outlines the basic principles and standards for the management, protection, conservation and sustainable use of forestry and river basin resources. Moreover, it describes the important of communities that utilise the forests to their need and prosperity and promoting sustainable development	Provide legal framework of the fundamental norm of the environmental protection and preserving the natural resources existence in the forests for sustainability of the economic development
Cultural Heritage Legislation: Government Resolution No.25/2011 – Protection of	This Government Resolution is used to protect and preserve Timor Leste’s cultural heritage until the Cultural Heritage National Law is made available. The resolution defines the type of the cultural heritages; archaeological heritage, architectural heritage, ethnographic	The resolution provides scope or boundary of the cultural heritage which has to be considered by project

Cultural Heritage (Annex 4)	and traditional heritage and intangible heritage	proponent.
Other countries Legislation		
Western Australian Department of Mines and Petroleum “Guidelines for the Development of an Onshore Oil Spill Contingency Plan 2016”	Provide Guidelines for the development onshore OSCP Provide mitigation measures to oil impacts sourced from the drilling activity.	Provide Guidelines for the development onshore OSCP Provide mitigation measures to oil impacts sourced from the drilling activity.
International Legislation		
International Finance Corporation Environmental, Health and Safety Guidelines for Onshore Oil and Gas Development; April 30 th , 2007	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice. The guidelines are industry specific for onshore oil and gas and are designed to be used together with the General EHS Guidelines document (see below), which provides guidance to users on common EHS issues potentially applicable to all industry sectors.	Provide guidance on the application of good environmental practice.
International Finance Corporation Environmental, Health and Safety General Guidelines; April 30 th , 2007	The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice.	Provide guidance on the application of good environmental practice.
United Nations Convention on Biological Diversity (UNCBD)	The Convention on Biological Diversity (CBD) entered into force on 29 December 1993. It has 3 main objectives: <ol style="list-style-type: none"> 1. The conservation of biological diversity 2. The sustainable use of the components of 	Timor Leste is rich of the biodiversity with significant ecosystem and endemic species. The country signed the convention in 2001. As the project could have impacts on the flora and fauna or risk to the loss of

	<p>biological diversity</p> <p>3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources</p>	<p>the biodiversity, it is fundamental principle for the project proponent to prevent or minimise the risk of biodiversity loss during the project implementation</p>
<p>United Nations Framework for Climate Change Convention (UNFCCC)</p>	<p>The United Nations Framework Convention on Climate Change (UNFCCC) provides a framework for intergovernmental efforts to reduce greenhouse gas emissions and adapt to the expected impacts of climate change. It also provides guidance to member states on developing and implementing national climate change strategies, incorporating both adaptation and mitigation actions. Timor-Leste became a signatory to the UNFCCC in October 2006.</p>	<p>The project activities release GHG emissions which could be one of the contributing factors to the country's climate change issue. Minimisation climate change risks by reducing the GHG emissions are an essential part of the project environmental objective and target. This convention is the principle guidance for the project proponent to prevent the air pollutions and reduce the GHG emissions as much as possible.</p>
<p>IOGP Guidelines</p>	<p>The International Association of Oil & Gas Producers (IOGP) is the voice of the global upstream industry. Oil and gas continue to provide a significant proportion of the world's energy to meet growing demands for heat, light and transport. IOGP Members produce 40% of the world's oil and gas. They operate in all producing regions: the Americas, Africa, Europe, the Middle East, the Caspian, Asia and Australia. IOGP serve industry regulators as a global partner for improving safety, environmental and social performance and act as a uniquely</p>	<p>Provide oil and gas industry specific guidance on the application of good environmental practice.</p>

	<p>upstream forum in which Members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security and social responsibility.</p>	
IPIECA Guideline	<p>IPIECA is a not for profit association that provides a forum for encouraging continuous improvement in industry performance. IPIECA is the only global association involving both the upstream and downstream oil and gas industry. It is also the industry’s principal channel of communication with the United Nations. IPIECA develops, shares and promotes good practice and knowledge to help the industry and improve its environmental and social performance. We do this with the understanding that the issues that dominate the sustainable development agenda – climate and energy, environmental and social issues – are too big for individual companies to tackle alone. The industry must work together to achieve improvements that have real impact. IPIECA helps to achieve this goal.</p>	<p>Provide oil and gas industry specific guidance on the application of good environmental practice.</p>
<p>Forestry, Aquaculture and Fishing Legislation:</p> <p>International Union for Convention of Nature (IUCN)</p>	<p>This international convention is and interantional organisation focus on the nature conservation and sustanable of utilising the natural resources. The IUCN works in the field to promote ecological conservation in order to ensure the sustainable development concepts.</p>	<p>Timor Leste is a signatory member of the IUCN convention which has responsibility to protect its ecological components to ensure the economic sustainable development. Therefore, baseline survey is used to identify all species categories listed under the IUCN red list which can be impacted by the project activities</p>

<p>Cultural Heritage Legislation: UNESCO Convention on Natural and Cultural Heritage</p>	<p>The convention mandates each signatory party to identify, protect, conserve, transmit and present to the future generations of the cultural and natural heritage</p>	<p>As the Timor Leste is a signatory member of this convention therefore this project activities ensure the protection and conservation of any cultural and natural heritage around the project locations</p>
<p>Noise and Vibration Standards and Regulation: WHO guideline for community noise</p>	<p>This WHO guideline is used to measure the noise level around the community areas and ensure the protection of people from discomfort environment and potential noise induce hearing loss</p>	<p>This guidance is used to ensure the noise levels arising from the project activities are contained or maintained between the WHO set values to protect everyone at or near the project locations are effected by unwanted sound caused by the project activities.</p>
<p>Air Quality Guidelines: WHO Air Quality Guidelines</p>	<p>WHO Air Quality Guidelines (AQG) offer guidance on threshold limits for key air pollutants that pose health risks and provide a reference for setting air pollution targets at regional and national levels to improve air quality.</p> <p>Air quality guidelines have been published by WHO in 1987 and they were revised in 1997. The 2005 update represents the most current assessment of air pollution health effects, based on an expert evaluation of the scientific evidence. The guidelines offer recommended exposure levels for particulate matter (PM10 and PM2.5), ozone, nitrogen dioxide and sulphur dioxide, as well as a set of interim targets to encourage a progressive improvement in air quality.</p>	<p>The air quality benchmark is used as reference by the project proponent is the WHO air quality guidelines.</p>
<p>Climate Change</p> <ul style="list-style-type: none"> • Kyoto Protocols 	<p>Kyoto Protocol is an international treaty which extends the UNFCCC parties commitment to reduce the green house gas according to the scientific consensus. The protocol implement</p>	<p>Timor Leste is the signatory party of the Kyoto Protocol which shall ensure the implementation of the protocol in</p>

<ul style="list-style-type: none"> Government Resolution of National Action Plan for Climate Change 	<p>the objective of reducing the global warming potential gas in the atmospheres.</p> <p>The government resolution of national action plan for climate change (NAPA) is the first national document that identifies urgent and immediate climate change adaptation needs of the most vulnerable groups. It provides a starting point from which climate change adaptation can be mainstreamed into development plans as a key strategy for attaining sustainable development and poverty reduction (MDG, 2010).</p>	<p>order to reduce the GHG emissions.</p>
<p>Water Resources</p> <ul style="list-style-type: none"> WHO 2008 Guideline for Drinking Water Quality 	<p>This guidelines is used as the reference for the Timor Leste to ensure drinking water quality according to the WHO drinking water quality standard</p>	<p>As the guidance for the project proponent to test and ensure water quality around the proposed project locations before any drilling activities are taken place</p>
<p>Labor Legislation</p> <ul style="list-style-type: none"> Law No. 4/2012 – Timor Leste’s Labor Code 	<p>This law describes the rights between employers and workers in regards to the working hours, leaves, remunerations, compensations and health and safety welfares</p>	<p>Provide basis for the project proponent to set up a working condition and contracts between employer and employee</p>
<p>Land legislation</p> <ul style="list-style-type: none"> Law No. 13/2017 - Especial Regime for the Definition of Land and Property 	<p>This law provides legal jurisdiction of the owners of lands and the individual rights of their private properties according to the Article 54 (1) of the RDTL Constitution</p>	<p>As the legal basis for the project proponent to identify, access and compensate for any land used during the project activities</p>

<p>Waste Management</p> <ul style="list-style-type: none"> • Decree Law No.33/2008 – Hygiene and Public Order • Decree Law No. 2/2007 – Urban Residual Waste Management 	<p>This law provides legal framework to manage the the urban solid waste and ensure promoting the hygiene in the workplace</p>	<p>As the legal basis for the project proponent to manage solid waste are produced during any project phase. This to be set as the minimum criteria for the TR to establish its own waste management system</p>
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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 5. 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

		<p>undertaken</p> <ul style="list-style-type: none"> • Manages the resolution of project environmental issues • 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.

		<ul style="list-style-type: none"> • Audits the crew on a regular basis; • Maintains contact with Timor Resources management, participates in HSE meetings; • 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

		<ul style="list-style-type: none"> • Assist Senior HSE officer in compiling and documenting all HSE reports and statistics • Assists in investigation of any HSE incident and reports to relevant authorities and management providing a full report • 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

		<p>safest manner during nigh time hours</p> <ul style="list-style-type: none"> • 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 rig 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 6. 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 7. The potential project impacts on environmental and social components within the identified phases

ACTIVITY	RESIDUAL IMPACT	RECOMMENDATION
FACILITY AND ROAD CONSTRUCTION	1. Land Disturbance / Land Occupation: Highly localised effects from construction phase. Low severity. Long term loss of land use due to presence of roads and well sites. Low severity. After strict application of controls minimal residual impact will result.	
	2. Air Quality: Short term, highly localised effects from construction phase. Low severity.	Particulate Matter monitoring
	3. Liquid Effluents: Short term, highly localised effects. Low severity.	
	4. Solid Waste: Generation of solid wastes will continue throughout project, thus a short term adverse impact, however, quantities generated during construction are small compared to national waste generation, and will be managed under the Waste Management Plan.	A detailed Waste Management Plan (WMP) shall be prepared
	5. Noise: impacts short term, highly localised effects. Low severity.	Noise levels will be routinely monitored in surrounding locations outside the well site.
	6. Leaks and Spills: Small scale spillages, leaks from construction equipment.	Containment and clean up kits to be on site.
DRILLING	7. Liquid Effluents: Short term, highly localised effects from drilling phase. Low severity.	
	8. Air Quality: Short term, highly localised effects from drilling phase. Low severity. GHG emissions extremely low compared to National and global levels.	Particulate Matter monitoring
	9. Water Usage: Short term, transient, highly localised effects. Low severity	
	10. Drilling Fluids and Cuttings: De-watered cuttings buried in closed pit	
	11. Liquid Effluents: Short term, transient, highly localised effects from drilling phase. Low severity	
	12. Solid Waste: Generation of solid wastes will continue throughout project, thus a long term adverse impact, however, quantities generated are small compared to national waste generation.	A detailed Waste Management Plan (WMP) shall be prepared.
	13. Noise: impacts short term, highly localised effects. Low severity.	Noise levels will be routinely monitored in surrounding locations outside the well site.
	14. Chemicals: no residual impact	A Chemicals Management Plan shall be prepared.
DECOMMISSIONING	15. Leaks and Spills: Potential exists for both minor and major spillages, the former constitutes minor impact potential because of preventative measures and facilities design. The latter, similarly, poses low risk through preventative measures and contingency planning, however, with a potential for a major localised impact.	Full Oil Spill Contingency Plan should be prepared.
	16. Land Disturbance / Land Occupation: Decommissioning activities will have minimal impact on the environment. Effects are short term.	
	17. Air Quality: Emissions during decommissioning mainly related to dust - Particulate Matter. Some emissions from heavy equipment burning diesel, but short term and transient.	Particulate Matter monitoring
	18. Liquid Effluents: Short term, highly localised effects. Low severity.	
	19. Solid Waste: Generation of solid wastes will continue throughout project, thus a short term adverse impact, however, quantities generated during decommissioning are small compared to national waste generation, and will be managed under the Waste Management Plan.	A detailed Waste Management Plan (WMP) shall be prepared
	20. Noise: impacts short term, highly localised effects. Low severity.	Noise levels will be routinely monitored in surrounding locations outside the well site.
	21. Leaks and Spills: Small scale spillages, leaks from heavy equipment.	Containment and clean up kits to be on site.

8 Proposed Mitigation Measures

This section describes the mitigation measures planned for the proposed project activities that would be taken place at the proposed rig site of five-wells within the six Sucos of Covalima municipality. The mitigation measures identified within this document 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 to include daily fuel consumption rates
- Air quality plan (see Appendix A)
- All vehicle, equipment and/or machineries used shall follow manufacturing recommendation. This shall include a periodical vehicles, equipment and facilities inspections
- 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 design and planning completed
- Provide regular maintenance of rig drainage systems
- Topographic survey completed
- Access road designs completed
- Soil sampling and laboratory analysis

8.3 Air quality mitigation measures

- Air Quality Monitoring Plan (see Appendix A)
- Fuel inventory to include 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

- 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 - See Appendix E Traffic Management Plan.
- All areas with vehicles traffic shall be watered and all materials transported (if, there is) shall be covered or have dust suppressions
- Carry out Particulate Matter (PM2.5 and PM10) air quality measurement as per Appendix V - Air Quality Plan
- Storage areas shall be located away from sensitive receptors
- Develop and implement project Grievances Redress Mechanisms (GRM) see Appendix C - Redress and Grievance Procedures

8.4 Noise and Vibration mitigation measures

- Carry out noise monitoring as per Appendix G - Noise Management Plan
- Periodical vehicles and equipment maintenance services
- Develop and implement project Grievances Redress Mechanisms (GRM) see Appendix C - Redress and Grievance Procedures
- 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 completed
- Use Water Based Mud and Mud Reserve Pit is designed to prevent any water contamination
- Prevent oil spills or any hazardous materials are released accidentally to the environment
- Conduct an active cleaning of rig/road drainage culverts
- Well site drainage system design completed
- Well P&A Plan must be designed to prevent any water contamination
- Contaminated discharges from facility or site covered in Waste Management Plan - See Appendix A - Waste Management Plan (WMP)

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 See Attachment D- Spill Response Management Plan
-

8.7 Terrestrial flora, fauna and ecosystem mitigation measures

- Site design and location selection completed to limit on impact on habitat with having the lowest possible clearing footprints
- Measure, control and monitor dust and noise acceptable level for fauna, especially birds and other sensitive noise fauna see Appendix J - Air Quality Plan and Attachment G - Noise Management Plan
- Develop and implement rehabilitation activities See Appendix B Rehabilitation Plan

8.8 Traffic and transport mitigation measures

- 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 See Appendix E - Traffic Management Plan
- 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) See Appendix E - Traffic Management Plan
- 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
- Prioritize local affected community for an employment opportunity at the rig site
- Develop and implement project Grievances Redress Mechanisms (GRM) see Appendix C - Redress and Grievance Procedures
- 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 SEPFPOPE 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 EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures

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 See Appendix B - Rehabilitation Plan
- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures
-
- Minimize water pollution through appropriate waste management and waste disposal, especially for any type of hazardous waste, such as oil, fuel and other chemical waste See Attachment VII - Waste Management Plan (WMP)
- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures

8.12 Fishing mitigation measures

- Minimize water pollution through appropriate waste management and waste disposal, especially for any type of hazardous waste, such as oil, fuel and other chemical waste See Appendix A - Waste Management Plan (WMP)
- Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this

EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures

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 EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures
- Measure, Monitor and control dust and noise at the rig site to minimize or limit the impacts see Appendix J - Air Quality Plan and Appendix G - Noise Management Plan
- Use proper means for monitoring and control of solid or liquid waste either non-hazardous or hazardous waste arising from project activities to not affect the nearby community private or public areas - See Appendix A - Waste Management Plan (WMP)

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 EIA document, which they believe affected as result of project development activities. see Appendix C - Redress and Grievance Procedures

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 EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures

8.17 Institution, Schools and health facilities mitigation measures

- Install safety signs for any nearby public facility
- Conduct socialisation on safety awareness on the public road or public areas that in a close distance with the rig site areas
- Provide support for education and awareness campaign throughout the project lifecycle
- 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 see Appendix J - Air Quality Plan and Appendix G - Noise Management Plan
- Implement Grievances Redress Mechanisms (GRM) see Appendix C - Redress and Grievance Procedures

8.18 Community and family structure mitigation measures

- Conduct an ongoing consultation with stakeholders throughout the project lifecycle
- Implement Grievances Redress Mechanisms (GRM) see Appendix C - Redress and Grievance Procedures
- 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 be prepared
- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures
- 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
-

8.20 Natural resources rights mitigation measures

- If there is a resettlement for project affected community, a resettlement plan shall be prepared

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 rig site See EIA Report
- Minimise direct impacts (if, there is) on the Cultural heritage, archaeological and sacred sites See EIA Report
- Ensure the rehabilitation plan include provision of relocation of the cultural heritage, archaeological and sacred sites in accordance with acceptable standards, e.g. UNSECO See Appendix B - Rehabilitation Plan
- Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures

8.22 Unique landscapes mitigation measures

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

8.23 Contamination, Safety and other general mitigation measures

- Conduct induction training and raise awareness of safety campaign
- All personnel shall be equipped with all applicable PPE for all types of work carried out during the phase or based on the nature of the work
- Use proper method and equipment for oils spill to follow oil spills standards management See Appendix D - Spill Response Management Plan
- Follow good housekeeping practices
- Provision of solid waste removal services to the rig site - See Appendix A - Waste Management Plan (WMP)
- Education of employees about safety and environment impacts from litters and contaminations See Appendix I - Community Consultation
- 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 see Appendix C - Redress and Grievance Procedures
- 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 See Appendix A - Waste Management Plan (WMP)
- Designate a specific area for refueling of heavy equipment onsite
- Use of spill kits for refueling activity, and no manual or bottle refueling on any equipment or heavy machineries See Appendix D - Spill Response Management Plan
- Develop regular waste collection schedule See Appendix A - Waste Management Plan (WMP)
- All generated waste onsite shall be identified and labelled i.e. recyclable, non-recyclable, plastic, paper, bottles, etc. See Appendix A - Waste Management Plan (WMP)
- 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 See Appendix A - Waste Management Plan (WMP)

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 8. WHO acceptable limits value for particles PM2.5 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		

9.2 Water quality standard for potable and surface water

Table 9. 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 10. 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	
	Sleep disturbance, night-time				

Inside bedrooms		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 samples were taken according to the WHO 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)".

9.5 Safety Management

The management of the project activities will be implemented in accordance with project 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 be used to regulate project implementation activities. Any contradictions between TR and ED's HSE-MS will be bridged through HSE Bridging Documents.

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.

Table 11. Project monitoring activities

Environmental aspects	Monitoring activities/programs	Sampling location	Frequency	Project Phase
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Topography; Geology; and Soils	- Regular Inspection of road culverts and rig drainage system	Rig site	Weekly	
Air quality	- PM _{2.5} and PM ₁₀ measurement	Rig site	monthly	Pre-drilling; drilling; decommissioning
	- Estimation of fuel consumption		Fuel data collected Daily	
	- Periodical monitoring of Green Houses Gases (GHG) and Climate change from fuel consumption data		Monthly	
	- Regular maintenance or service of vehicles, equipment and/or machineries		As per manufactured recommendation	
Noise and Vibration	- Periodical measurement of noise at rig fence	Rig site	monthly	Pre-drilling; drilling; decommissioning
Surface and Ground water	- Regular checking and cleaning of oil, fuel and waste spills	Rig site	Daily inspection	Pre-drilling; drilling; decommissioning
	- Regular inspection of sewage system		Monthly	
	- Regular inspection of road culvert and rig drainage system		Weekly	
Coastal and marine water	- Regular checking and cleaning of oil, fuel and waste spills, if there is	Rig site	Daily	Pre-drilling; drilling; decommissioning
Traffic and transport	- Develop schedule for transport movement activity on public road and rig move plan - Install and/or display clearly and permanently all significant and necessary traffic signage	Rig site	Throughout project life cycle	Pre-drilling; drilling; decommissioning
	- Regular check and control of vehicles speed limit		Daily	
Employment	- Employment opportunity shall possible prioritize locals with qualify skills, knowledge and experiences - Timor Resources shall adopt the National Labor Code and SEPFPOPE regulation and ensure that these employment	Rig site	Monthly	Pre-drilling and Drilling

	code and regulation are well-distributed and informed to the local workers community			
	- . Develop and implement project Grievances Redress Mechanisms (GRM)		Through GRM	
	- . 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	- . Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document	Rig site	Throughout project life cycle	Pre-drilling and Drilling
Use of forest and other natural resources	- . Develop and implement Rehabilitation Plan to ensure that any impact is restored to its original condition or agreed after use	Rig site	Throughout project life cycle	Pre-drilling and Drilling
	- . Implement and maintain developed Grievances Redress Mechanisms (GRM)		Through GRM	
	- . 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	- . . Implement and maintain developed Grievances Redress Mechanisms (GRM) to address the local community official reported grievances in any aspects mentioned within the EIS document	Rig site	Through GRM	Pre-drilling and Drilling
	- Measure, Monitor and control dust and noise at the project site to minimize or limit the impacts see Appendix J - Air Quality Plan and Appendix G - Noise Management Plan		Weekly	
	- . Monitor and control dust,		Daily	

	noise at the rig site to minimize or limit the impacts			
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	Rig 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	Rig site Rig site	Through GRM	Pre-drilling and Drilling
Institution, Schools and health facilities	- Install safety signs for any nearby public facility - Provide support for education and awareness campaign	Rig site	throughout the project lifecycle	Pre-drilling and Drilling
	- 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 see Appendix J - Air Quality Plan and Appendix G - Noise Management Plan		Monthly and daily	
	- Implement Grievances Redress Mechanisms (GRM)		Through GRM	
Community and family structure mitigation measures	- Conduct socialization on safety awareness on public areas that in a close distance with the rig site areas - Conduct a continuous or ongoing consultation with stakeholders		As needed	Pre-drilling and Drilling
	- Implement Grievances Redress Mechanisms		throughout the project lifecycle	

	(GRM) see Appendix C - Redress and Grievance Procedures			
Land ownership and rights	- . If there is a resettlement for project affected community, a resettlement plan shall be prepared	Rig site	At initial stage and subject to commercial discovery	Pre-drilling and Drilling
	- . 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	- .If there is a resettlement for project affected community, a resettlement plan shall be prepared.			
Cultural heritage, archaeological and scared sites	<p>- . Record and document the number of cultural heritage, archaeological and sacred sites identified at the proposed rig site</p> <p>- . Minimize direct impacts (if, there is) on the Cultural heritage, archaeological and sacred sites</p> <p>- . 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</p> <p>- .Develop and implement project Grievances Redress Mechanisms (GRM) to address the local community officially reported grievances in any aspects mentioned within this EIA document, which they believe affected as result of project development activities see Appendix C - Redress and Grievance Procedures.</p>	Rig site	At initial stage only	Prior to pre-drilling (during EIS studies)
Unique Landscape	- . There are no unique landscape within or at the vicinity of rig site			

Waste management	<p>- . 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 See Appendix A - Waste Management Plan (WMP)</p>	Rig site	Throughout project life cycle	Pre-drilling; drilling; decommissioning
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Timor Resources – Management System Document

Table 12. Monitoring of Environmental Objectives and Target KPIs

LAGGING INDICATORS	Target Per well	Well 1	Well 2	Well 3	Well 4	Well 5
CO ₂ Emissions (tonnes per well)	200 tonnes					
Oil and Chemical Spills (Number of spills > 15 bbls)	Zero					
Oil and Chemical Spills – Total Spilt (tonnes)	Zero					
Oil and Chemical Spills – released to the environment (tonnes)	Zero					
LEADING INDICATORS						
<p>Extent of compliance with EIA mitigation measures (per Quarter - percentage)</p> <p>The extent to which mitigation measures identified in the EIA have been set and achieved. Expressed as a percentage:</p> <p style="text-align: center;">$\frac{\text{Total number of mitigation measures satisfactorily completed}}{\text{Total number of mitigation measures identified}} \times 100$</p>	60%					
<p>Recycled waste (per well - tonnes)</p> <p>Segregated waste for recycling - plastic bottles and tin cans. Expressed as a weight tonnes.</p>	2 tonnes					
<p>Complaints made and redress agreed (per well - percentage)</p> <p>Ratio of complaints received vs number redressed</p> <p style="text-align: center;">$\frac{\text{Total number complaints redressed}}{\text{Total number of complaints made}} \times 100$</p>	80%					
<p>Employment</p> <p>Number of local people working in the campaign (rig and camp)</p>	20					
<p>Environmental Inspections and audits Conducted (per well)</p> <p>Area inspections are primarily operational (e.g. weekly rig and camp inspections), and also weekly inspections for Logistics operations (e.g. road transport/Journey Management System).</p>	5					

<p>Regular inspection and maintenance of road culverts and rig drainage system The extent to which inspections are have been set in the EMP and the number achieved. Expressed as a percentage:</p> <p style="text-align: center;"><u>Total number of inspections completed</u> x 100</p>	80%					
<p>Regular maintenance or service of vehicles, equipment and/or machinery The extent to which vehicle/plant/equipment servicing is set in the EMP and the number achieved. Expressed as a percentage:</p> <p style="text-align: center;"><u>Total number of services completed</u> x 100 Total number of services required</p>	80%					

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 rig 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 13. 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
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

Timor Resources will be responsible for all Environmental Monitoring as identified in the Environmental Impact Assessment (EIA).

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 rig 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

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

13.2 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 14. 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.

13.3 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.

13.4 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

13.5 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 (see Appendix B: Rehabilitation Plan).

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

16.1 Public Consultation during Baseline Survey

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

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.

- **Avoiding 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 raises 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.

Minutes and Attendance list are in the Appendix I.

16.2 Public Consultation after draft EIA/EMP submission to ANPM

Timor Resources carried out one day Public Consultation in Suai Municipality on 21st of Februry 2020. It was mostly attended by local authorities, community leaders, community representative and other interest parties. The objective of this consultation was to disseminate information on the result of baseline study, current environmental condition, social impacts, further update on drilling preparation and also to obtain further public queries.

Afet the submission of draft EIA/EMP to ANPM, Timor Resources made a public notification through printed media and websites on this Public Consutantion and also delivered direct invitations to local authorities, community leaders and interest parties. The open invitation is to invite any community members who may be interested or may be affected by this drilling activity to attend

and carry forward any concern to the attention of Timor Resources and relevant authorities. The Public Notice was also to invite community members or any interest parties to obtain a copy of draft EIA/EMP for their review and comment.

Most of the concerns or questions from the participants are on the drilling impacts to communities land and farms, mitigation on drilling issues environmental impacts, job opportunities and local supplies.

Details of this Public Consultation, pictures, attendance list and Public Announcement are on Appendix I.

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.

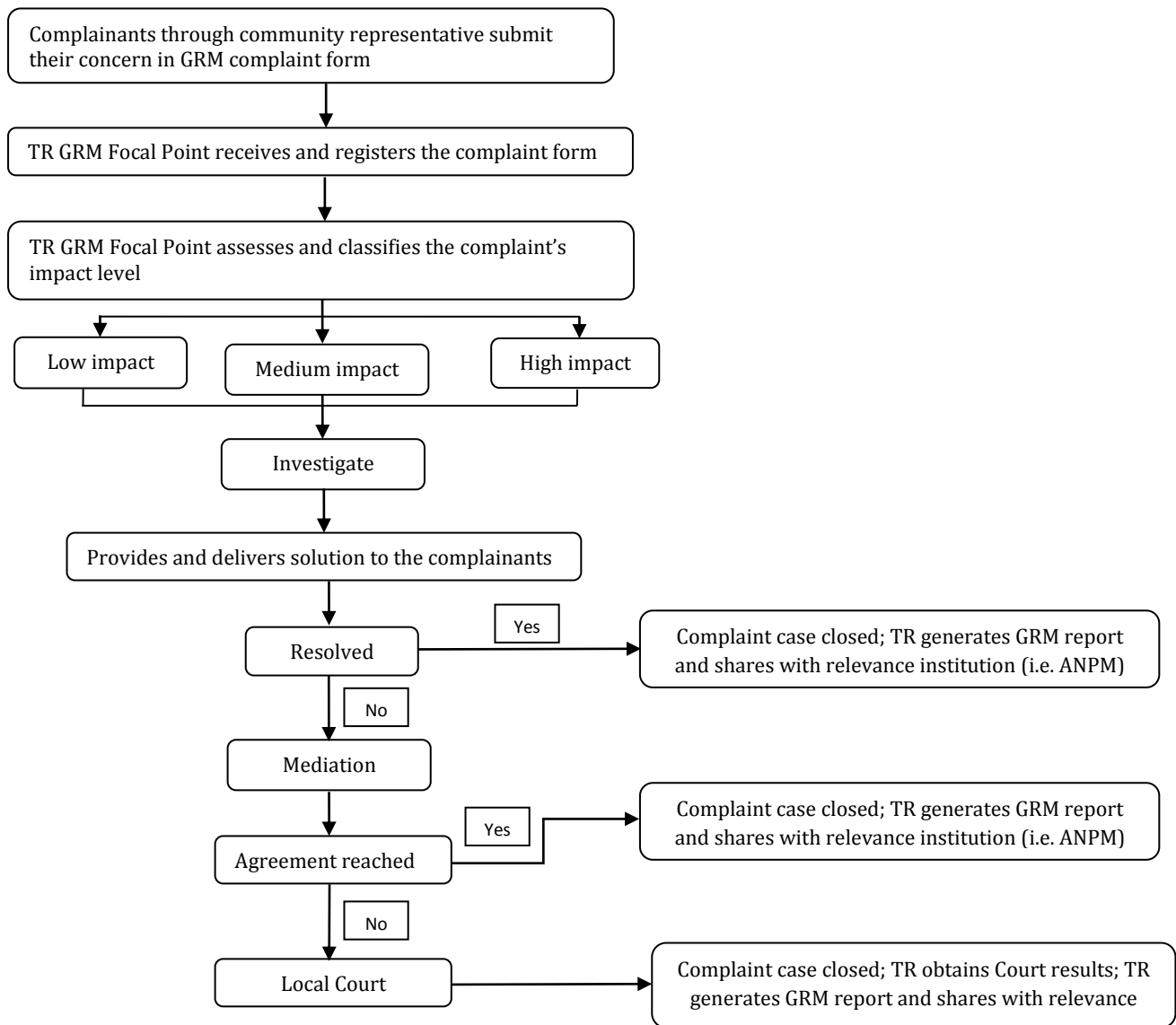


Figure 11. GRM procedure structure

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	Raiketan- 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	Raiketan-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	Commision 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
4.1	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 16. 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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APPENDIX A: WASTE MANAGEMENT PLAN

APPENDIX B: REHABILITATION PLAN

APPENDIX C: REDRESS AND GRIEVANCES PROCEDURES

APPENDIX D: SPILL REPOSE MANAGEMENT PLAN

APPENDIX E: TRAFFIC MANAGEMENT PLAN

APPENDIX F: INSPECTION SCHEDULES

APPENDIX G: NOISE MANAGEMENT PLAN

APPENDIX H: INCIDENT REPORTING PROCEDURE

APPENDIX I: COMMUNITY CONSULTATION

APPENDIX J: AIR QUALITY PLAN