ENVIRONMENTAL MANAGEMENT PLAN (EMP)

DRILLING ACTIVITY

PSC TL-OT-17-09

APPENDIX G - NOISE MANAGEMENT PLAN

TR-HSE-PLN-00-000-012

REVISION HISTORY

REVISION	DATE	DESCRIPTION
Rev1	04/06/21	Issued for review

MANAGEMENT APPROVAL

POSITION TITLE	NAME	SIGNATURE	DATE
Chief Executive Officer	Suellen Osborne		04/06/21
GM Exploration	Jan Hulse		04/06/21

DISTRUBUTION LIST

AUTHORITY/COMPANY'S NAME	DATE	REVISION
Autoridade Nacional do Petróleo e Minerais	04/06/21	Rev1

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ACRONYMS

EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HSE	Health Safety Environment
IFC	International Finance Corporation
TR	Timor Resources
WHO	World Health Organisation

1 INTRODUCTION

1.1 CONTEXT

The project is the construction of a wellsite and access road for the Timor Resources Rusa #1 exploration well in PSC TL-OT-17-09 on the South Coast of Timor Leste located at Suco Foho Ai-LiCo, Ainaro, Ainaro District.

1.2 PURPOSE

This project was determined to require a Category A Licence under Decree Law No. 5/2011.

The TR Noise Management Plan fulfils a requirement under the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). The EIA identified potential impacts from the project and various plans have been developed to supplement the EIS and EMP. The Plan presented here details monitoring activities and actions aimed to measure and mitigate potential noise impacts from operational activities, as well as assigning responsibilities to ensure the Plan is implemented.

This document is an appendix to the EMP – Appendix G.

1.3 SCOPE

Noise levels during construction and decommissioning phase may have a short-term effect but will be low level and transient. In contrast, the noise levels during the drilling phase may pose a problem if disturbance is caused to wildlife or human inhabitants close to the facility. A key priority will be the implementation of noise control measures at each source point (see Appendix 1). The selected methods will depend on the source type and the proximity of sensitive receptors, and can include, but not limited to, equipment selection, acoustic enclosures, cladding, traffic route selection, etc.

This document will address noise monitoring for the PSC: TL-OT-17-09 drilling programme.

1.4 LEGAL REQUIREMENTS

Timor-Leste does not have specific guidelines for the control and management of noise, therefore, this plan will refer to the International Finance Corporation (IFC) Environmental, Health and Safety General Guidelines, and in the case of noise are based on World Health Organisation (WHO) guidelines as shown in Table 1-1 .

Table 1-1 - Noise Level Guidelines

(Source: WHO Guidelines for Community Noise - Berglund et al. 1999)

NOISE LEVEL GUIDELINES		
	ONE HOUR L_{Aeq} (dBA)	
RECEPTOR	DAYTIME 07:00 - 22:00	NIGHT TIME 22:00 - 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

The typical sound levels for rig components and locations are given in Table 1-2 . The actual sound levels during the operation will be subject to the type of activity being conducted (e.g. drilling, tripping, circulating).

Table 1-2 - Typical Noise Levels Emitted by Rig Equipment

(from (Radtke, 2016[1]), (Abadi et al, 2015[2]) & (SLR Consulting, 2011[3]))

SOUND LEVEL (DBA)	TYPICAL SOURCE	SUBJECTIVE EVALUATION
130	N/A	Intolerable without PPE
100-120	Engine Generators, Desander / Desilter	Extremely Noisy
80-100	Mud Pumps, Compressors, Shakers	Very Noisy
60-80	Rig noise in camp offices	Loud
40-60	Rig Noise at site perimeter	Moderate to Loud
30-40	Rig Noise 350m from Source	Quiet
20-30	Rig Shut down, background	Almost Silent – Very Quiet

[1] Radtke. (2016). Noise Characterization of Oil and Gas Operation, MSc thesis. Colorado State University.

[2] Abadi et al. (2015). Noise Exposure of Workers on a Land Oil Rig Floor,. Journal of Health Research.

[3] SLR Consulting. (2011). Santos Drill Rig 103, Glasserton 2,3 & 4 Drill Sites, Consideration of Noise Emission. Unpublished Report.

The percentage drop in sound level with distance from source may be calculated using Free Field Inverse Square Law. Using $dB_2=dB_1+10\ln(d_1/d_2)$ where dB_2 is the sound level at a given point at a distance of d_2 from the sound level dB_1 at a distance of d_1 from the source, see Figure 1-1 .

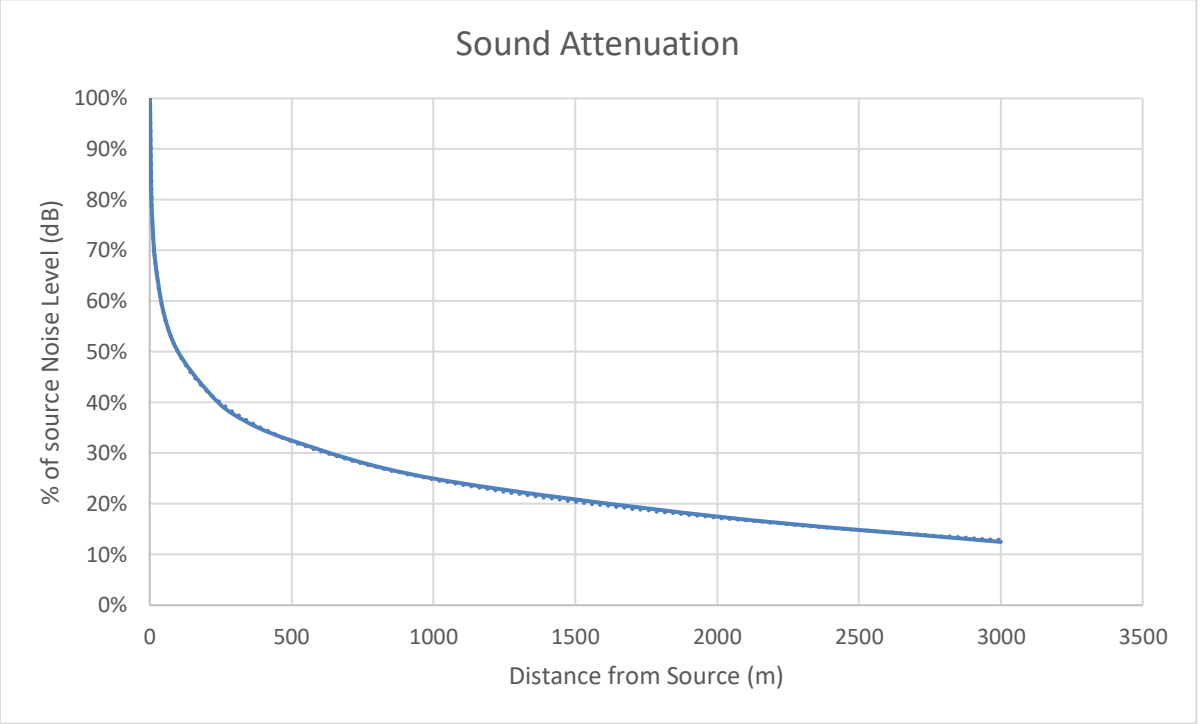

Figure 1-1 - Attenuation Rate of Sound Level in Air

The recommended noise limits for the project are based on the existing noise levels in the area and, for noise sensitive premises such as a dwelling, ranging from 55 to 62 db (A) during daylight hours to 45 to 52 db (A) during the night period (from 2200 hrs). Commercial premises (75db (A)) and industrial premises (80dB(A)) always have higher limits due to their lower sensitivity. The limit for this project is set at 80dB(A) for daytime work in non-residential areas.

2 POTENTIAL NOISE IMPACTS

Noise can become an environmental nuisance when it negatively affects environmental values, including human health and wellbeing. A negative impact can include disturbance to sleep or recreational activities, impacts on the health and biodiversity of ecosystems, and reduced community amenity. Factors leading to potential noise emissions associated with this project are:

- The use of heavy vehicles during camp construction and vegetation clearing.
- Accommodation camp (e.g. vehicle use to and from the camp at peak times, personnel activity, use of generators, construction and decommissioning).
- Increase in light vehicle movements to and from site/camp, particularly at the start and end of daily shift

Excessive noise may lead to the following impacts:

- Disturbance to sensitive receptors (e.g. residential areas, breeding/nesting fauna).
- Degradation of public utilities.

During the construction phase of the proposed project, there is expected to be an increase in the noise levels within the area due to machinery and equipment including generators, vehicular traffic, and other construction activities. These may contribute to noise levels above the background within the site and along the road to the site.

Drilling operations produce limited noise from drilling machinery and vehicular movement.

The sensitive locators identified around the Rusa-1 well site are shown in Table 2-1 with the closest, Aldeia Raimerlau, 470m distant. As can be seen in Figure 2-1 , noise from the operations will be below the WHO standard at this distance. The other receptors are considerably further distant so are unlikely to be affected.

Table 2-1 - Sensitive Receptors in the Vicinity of Rusa-1 well site

Sample Site	Location	Sensitive Receptor	Distance (km)	Centroid Coordinates	
				Latitude	Longitude
01 - b	Aldeia Fatukabelak	Resident Settlement	0.93	09º 07’ 05” S	125º 41’ 33.8 “E
02 - a	Aldeia Sessurai	School area	1.06	09º 06’31.1” S	125º 41’44.8” E
03 - c	Aldeia Raimerlau	Resident Settlement	0.47	09º 06 ’52.5” S	125º 41” 00” E

Noise levels at Betano camp will be low (see Figure 2-2 below), the main contributions being from heavy vehicle movement (daylight hours only) and a small generator to provide camp power if the EDTL supply is interrupted.

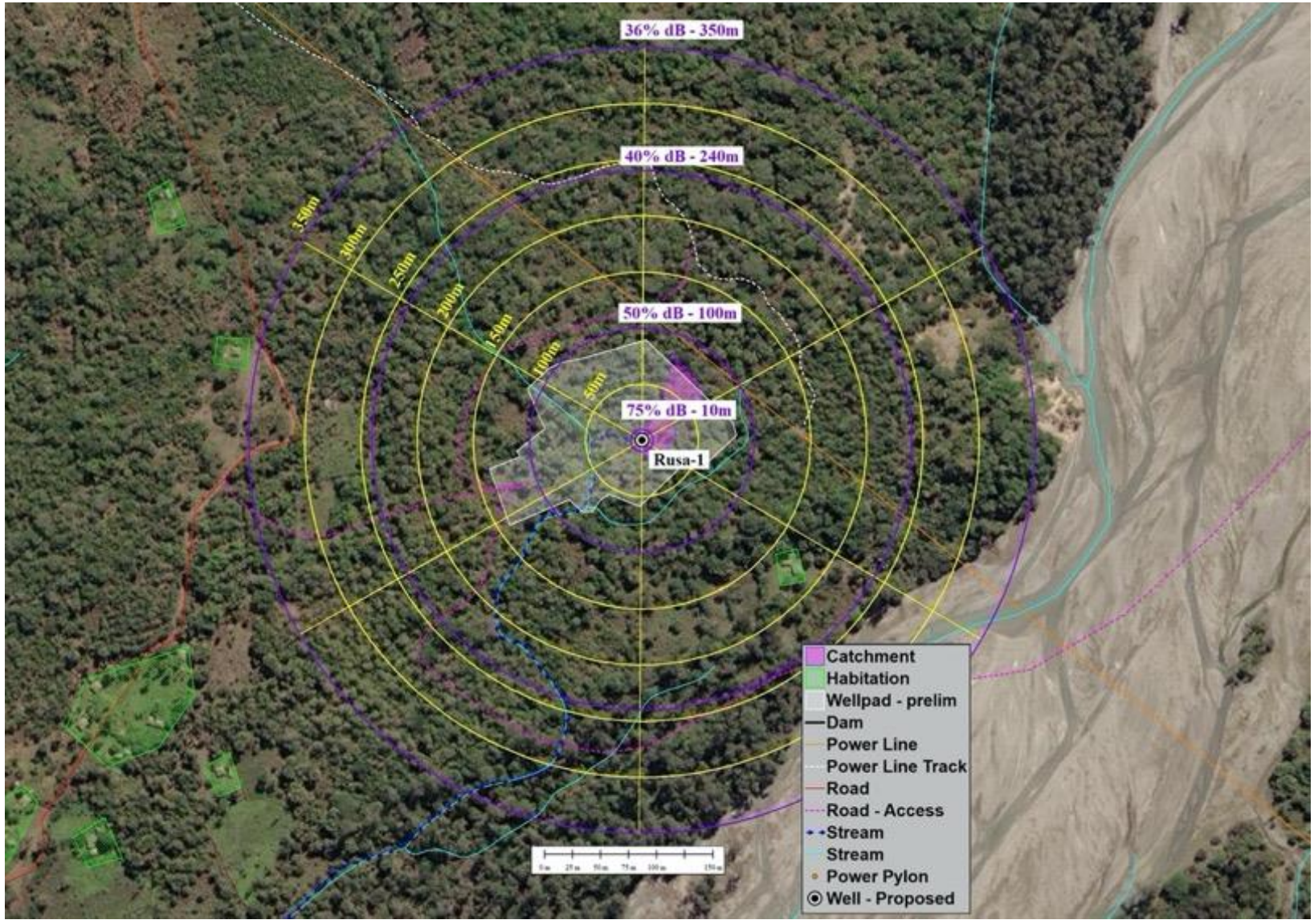

Figure 2-1 - Sound Attenuation at the Rusa-1 Well Site Location

Figure 2-2 - Sound Attenuation at the Betano Base Camp Location

3 MANAGEMENT OF IMPACT

The noise impacts will be mitigated throughout the project phases by implementing the following mitigation strategies:

Construction

- Restrict construction activities to normal working hours 0800hrs to1700hrs
- Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of demolition works.
- Machinery should be maintained regularly to reduce noise resulting from friction during operations.
- Drivers to adhere to speed limits within the project site access road and vicinity
- A grievance procedure will be established whereby noise complaints by neighbours are recorded and responded to.
- Restrict hooting of vehicular horns.
- Locate all stationary construction equipment (i.e., compressors and generators) as far as practicable from any nearby sensitive receptors.

Operations

- Machinery should be maintained regularly to reduce noise resulting from friction during operations.
- A grievance procedure will be established whereby noise complaints by neighbours are recorded and responded to.
- Muffle and maintain all equipment used.
- Using modern machinery equipment with noise suppressing technologies in order to reduce the noise-rating as much as possible.

Decommissioning

- Restrict decommissioning activities to normal working hours 0800hrs to1700hrs
- Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of demolition works.
- Machinery should be maintained regularly to reduce noise resulting from friction during operations.
- Drivers to adhere to speed limits within the project site access road and vicinity
- A grievance procedure will be established whereby noise complaints by neighbours are recorded and responded to.
- Restrict hooting of vehicular horns.
- Locate all stationary equipment (i.e., compressors and generators) as far as practicable from any nearby sensitive receptors.
- Limit pick-up trucks and other small equipment to an idling time, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.

4 MONITORING

The Operations Manager will implement noise monitoring on a monthly basis at the rig and camp fence and at sensitive receptors as per Table 4-1 below, and recording the following (see Appendix 2 - Noise Survey Form):

- Date and time.
- Location.
- Equipment to be monitored as applicable.
- Proximity to the rig site, buildings, officer and nearby community.

Table 4-1 - Monitoring Schedule as determined under the EIA and EMP

Monitoring	Monitoring/ Performance Indicator	Responsible Person / Function	Timing and Frequency	Performance Standard
Noise Construction	Noise monitoring at fence and sensitive receptors	Operations Manager	Monthly	TR Noise Management Plan TR Grievance mechanism World Health Organisation (2015). WHO noise quality standard – WHO, 2015. International Best Practice: - Environmental Health and Safety (EHS) Guidelines for Onshore Oil and Gas Development (IFC 2007a) - EHS General Guidelines (IFC 2007b)
Noise Operations	Noise monitoring at fence and sensitive receptors	Operations Manager	Monthly	TR Noise Management Plan TR Grievance mechanism World Health Organisation (2015). WHO noise quality standard – WHO, 2015. International Best Practice: - Environmental Health and Safety (EHS) Guidelines for Onshore Oil and Gas Development (IFC 2007a) - EHS General Guidelines (IFC 2007b)
Noise Decommissioning	Noise monitoring at fence and sensitive receptors	Operations Manager	Monthly	TR Noise Management Plan TR Grievance Mechanism World Health Organisation (2015). WHO noise quality standard – WHO, 2015. International Best Practice: - Environmental Health and Safety (EHS) Guidelines for Onshore Oil and Gas Development (IFC 2007a) - EHS General Guidelines (IFC 2007b)

5 RESPONSIBILITIES

5.1 TIMOR RESOURCES

Timor Resources is to guarantee the availability of the economic, human and technical resources needed to manage the mitigation measures as described in this document. It is Timor Resources' responsibility to:

- Operations Manager to ensure that the requirements of this Air Quality Management Plan are satisfied.
- Operations Manager to ensure that all contractors and sub-contractors are aware of their responsibilities to undertake their activities in accordance with this Plan.
- Operations Manager to supervise contractors monitoring in accordance with the Inspection and Monitoring Plan (see TR-HSE-PLN-011)
- Operations Manager shall cease operations if there is any non-compliance regarding noise monitoring (see Table 4-1) against WHO standards (see Table 1-1).

5.2 CONTRACTORS

- Understand their responsibilities as per this Plan, and ensure they have the capacity to carry out those responsibilities and that all personnel under their care are made aware of responsibilities and requirements.
- Recommend changes to this Plan if appropriate and in discussion with TR personnel.
- Ensure appropriate records are kept and maintained on-site.
- Verifying any specific training/awareness sessions to employees involved in operations that may impact on the noise environment

APPENDIX 1 - Noise Survey Form

NOISE SURVEY FORM

Location:

Rig No.: ______________________

Weather Condition: Rain Dry Windy No Wind Low Cloud

Person Conducting the Test:

Noise Meter Type/model: ______________________

Rig No.:

Calibration Date: ______________________

Item No:	Date & Time of Noise Level Test	Specific Location of equipment to be tested	Equipment to be Tested	Proximity in Meters to nearest Rig work areas/ Workshop/ Store/ Building/ Office/ sleeper etc	1st test: Noise Level Reading - to be taken at the source of noise	2nd test: Noise Level Reading - taken 10 meter from source of noise	3rd test: Noise Level Reading - to be taken 20 meter from source of noise	Are any personnel continuously exposed to a 12 hour dose >83.2dB	Are any personnel exposed to a peak level dose > 140dB for >15 minutes continuously	Is hearing protection required - what type - single or double & at what distance from the source	Are hearing protection warning signs displayed in the area of the noise source	Additional Precautions i.e. consider job rotation to reduce exposure time to the noise source