TOTAL E&P PNG LIMITED

PAPUA LNG

Upstream Environmental Impact Statement

Volume 2: Environmental and Social Baseline

Part 20
Upstream Noise Baseline Report

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Papua LNG Project

Upstream Noise Baseline Report

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Total E&P PNG Limited

Executive Summary

Papua LNG Project

Upstream Noise Baseline Report

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Executive Summary

Joint venture partners are currently planning the development of the Elk-Antelope gas field, which is located within Petroleum Retention License 15 (PRL-15) in the Gulf Province, Papua New Guinea. Total E&P PNG Limited (TEP PNG), a wholly owned subsidiary of TOTAL has the largest interest in the Elk-Antelope gas field and is the operator of the Papua LNG Project (the Project) on behalf of the other joint venture partners.

The Project will comprise upstream production well development and associated infrastructure at the gas field within PRL-15, construction of an upstream central processing facility (CPF) and delivery of gas and condensate via onshore and offshore export pipelines to a LNG Plant site at Caution Bay, Central Province, 20 km northwest of Port Moresby.

This report characterizes the baseline noise environment in the upstream Project area as quantified during a field survey which was undertaken in early November of 2016 in general accordance with IFC monitoring requirements.

The results of background noise monitoring conducted during the field survey indicate that existing noise levels in uninhabited forest areas can be very high during the night period as a result of local insect noise. In these areas the day time background noise levels were typically between 42 dBA and 46 dBA, L_{90} during the day period, increasing to an almost continuous 56 dBA, L_{90} at night.

Due to the effective clearing of land around established villages, the measured background noise levels in these locations were significantly lower relative to uninhabited regions surrounded by thick forest (i.e. insect habitation). Nonetheless, most village monitoring locations were still affected by insect noise but to a much lower extent, where the measured background noise levels were typically between 35 dBA and 42 dBA, L_{90} during the day period and 38 and 42 dBA, L_{90} for the night period.

For the village / settlement areas, the noise environment was influenced by intermittent noise associated with human habitation, such as voice / conversation noise, roosters crowing, dogs barking etc. It is noted that these generally short term activities had minimal effect on the resultant background noise levels.

For the single dwelling located near the Purari Airstrip and River, the surrounding area included noticeably more gardens and understorey growth relative to the larger settlements and villages. As a result the background noise levels at this location were somewhat higher with an average noise level of 44 dBA, L_{90} during the day period and 47 dBA, L_{90} at night.

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1 INTRODUCTION

1.1 Project Overview

The following description is focused on the upstream components of the Papua LNG Project and aims at providing minimal but appropriate context for the baseline reports.

Joint venture partners are currently planning the development of the Elk-Antelope gas field, which is located within Petroleum Retention License 15 (PRL-15) in the Gulf Province, Papua New Guinea. Total E&P PNG Limited (TEP PNG), a wholly owned subsidiary of TOTAL has the largest interest in the Elk-Antelope gas field and is the operator of the Papua LNG Project (the Project) on behalf of the other joint venture partners.

The Elk-Antelope gas field is a significant gas discovery in Papua New Guinea consisting of a gas reservoir with an estimated several trillion cubic feet of gas reserves located approximately 120 km inland from the township of Kerema, and 340 km northwest of Port Moresby (refer).

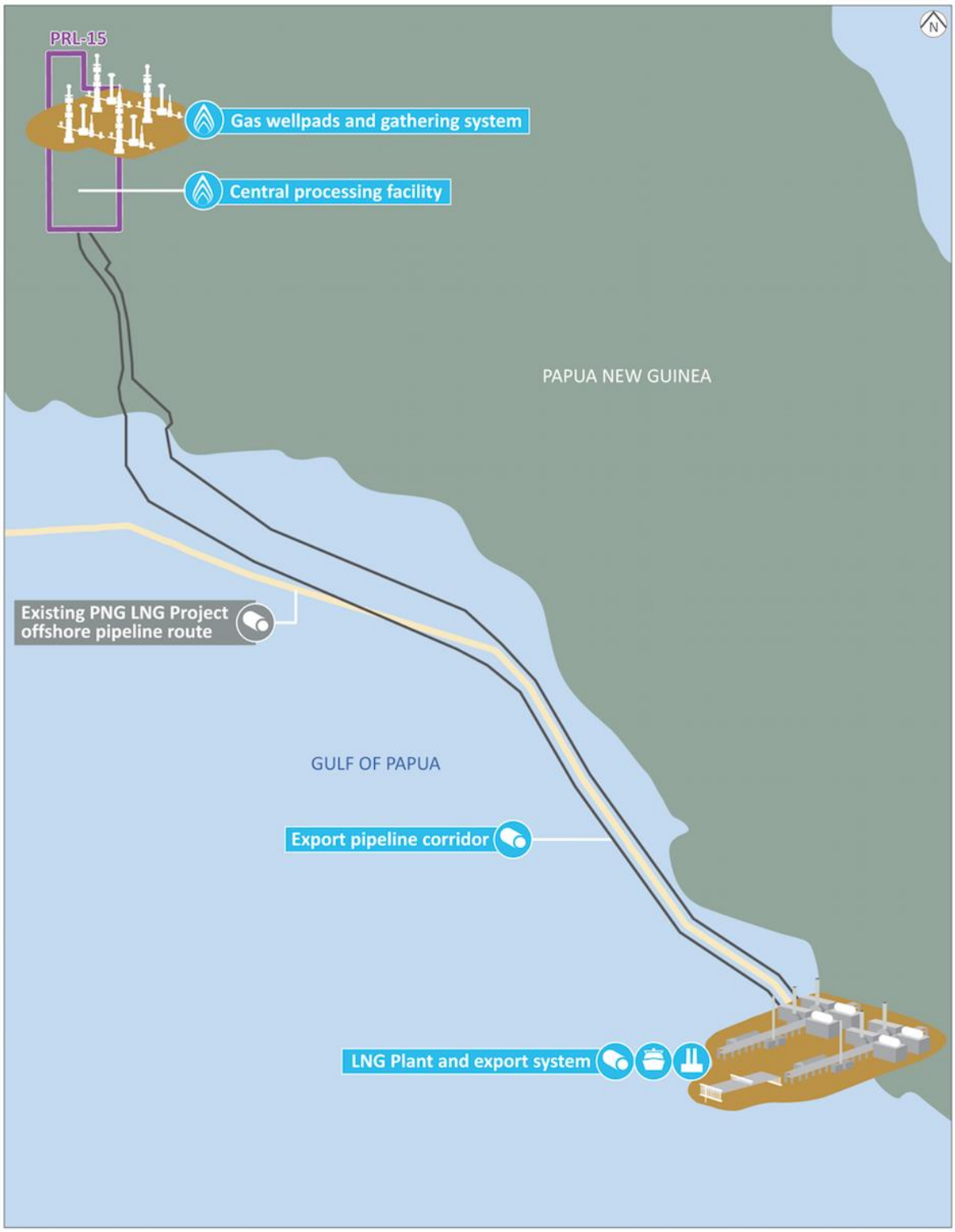
The Project will comprise upstream production well development and associated infrastructure at the gas field within PRL-15, construction of an upstream central processing facility (CPF) and delivery of gas and condensate via onshore and offshore export pipelines to a LNG Plant site at Caution Bay, Central Province, 20 km northwest of Port Moresby. The design life for the Project will be 25 years.

The Project area comprises the physical footprint of the various Project components and associated infrastructure as detailed below.

- Production, processing and related facilities (within PRL-15):
  - Wellpads and the associated gathering system (including flowlines and trunkline);
  - CPF;
  - Logistics base and river offloading facilities, accommodation camps, airstrip, roads and bridges;
  - Quarries, communications infrastructure;
  - Initial section of the onshore export pipeline.
- Onshore pipeline (outside PRL-15):
  - Remainder of the onshore export pipeline to landfall on the Gulf coast including valve stations;
  - Temporary laydown areas and camps;
  - Quarries, communications infrastructure.
- Transport (river) corridors:
  - River transport routes— the Purari, Ivo-Urika and Wame-Varoi rivers.
- Offshore pipeline:
  - Offshore section of the export pipeline to a LNG Plant site, Caution Bay.

This report characterizes the baseline noise environment in the upstream Project area.

Figure 1 Project Schematic



1.2 Study and Objectives

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by ERIAS Group on behalf of TEP PNG to undertake a baseline environmental noise study within the upstream region of the Project.

The key objectives of the noise baseline study were to:

- Define the study area for the noise and vibration baseline characterization that would also support an impact assessment. However, a vibration survey has not been conducted as there are no current regular vibration sources within the study area.
- Identify potentially sensitive receptors within the study area, such as local villages and ecosystems.
- Measure and quantify existing ambient background noise levels at sensitive receptor areas surrounding critical upstream infrastructure that may be impacted by noise from the Project.

The results of the noise baseline study will provide inputs to the formal noise assessment required as part of the Papua LNG Environmental Impact Statement (EIS) / Environmental, Social and Health Impact Assessment (ESHIA).

2 FUNDAMENTALS OF NOISE

2.1 Noise

Noise is generally described as being 'unwanted' unfavorable' sound, and to some extent this is an individual or subjective response, as what may constitute sound to one person may be noise to another.

In the context of 'environmental' noise, the term is typically used to refer to unwanted or potentially harmful outdoor sound created by human activities, typically including noise emitted by means of transport, construction and industrial activities.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over an extremely wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The relationship between decibels and pressure is shown in the following equation:

$$dB = 10\ Log_{10}\ \frac{P^2}{P^2{}_{ref}} = 20\ Log\ _{10}\frac{P}{P_{ref}}$$

With the standard reference unit for sound pressure P_{ref} = 20x10^{-6} Pa or 20 μPa.

The science of the measurement, assessment and control of unwanted noise has developed steadily over the last century. Current assessment methodologies commonly take into account human response measures such as hearing damage and other potential health effects such as stress, annoyance and sleep disturbance.

2.2 'A' Weighted Sound Pressure Level

The A-weighting is a filter which is applied to the decibel level to approximate the human ear's frequency response which is more sensitive to sounds at mid-frequencies (typically 500 Hz to 4000 Hz) and less sensitive to sounds at lower and higher frequencies.

When the overall level of a noise has had the A-weighting filter applied to it, it is represented using the A-weighted decibel, or dBA. The level of a sound in dBA is considered a good measure of the loudness of that sound. Different sources having the same dBA level generally sound equally as loud, although the perceived loudness can also be affected by the character of the sound (e.g. the loudness of human speech and a distant motorbike may be perceived differently, although they can both have the same measured dBA level).

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whereas a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness.

Table 1 presents examples of typical noise levels.

Table 1 Subjective Evaluation of Typical Noise Levels

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120 110	Heavy rock concert Grinding on steel	Extremely noisy
100 90	Loud car horn at 3 m Construction site with pneumatic hammering	Very noisy
80 70	Kerbside of busy street Loud radio or television	Loud
60 50	Department store General office	Moderate to quiet
40 30	Inside private office Inside bedroom	Quiet to very quiet
20	Unoccupied recording studio	Almost silent

Other weightings (e.g. B, C and D) are less commonly used than the A-weighting. Sound levels measured without any weighting are referred to as 'linear' and the units are expressed as dB(Lin) or dB.

2.3 Statistical Noise Levels

As noise usually varies in level over a particular period, it is common to present the results of noise testing in the form of statistical descriptors.

An explanation of noise level descriptors typically used for assessing the noise environment are illustrated in **Figure 2** and described below.

Note: The symbol (L) is commonly used to represent Sound Pressure Level and the symbol L_A represents the A-weighted Sound Pressure Level. Where statistical results are presented with the noise level as A-weighted decibels (dBA), the L_A subscript is redundant (for example 42 dBA, L_{A90} should be presented as 42 dBA, L_{90}).

L_{Amax} The maximum A-weighted noise level associated with a noise measurement interval.

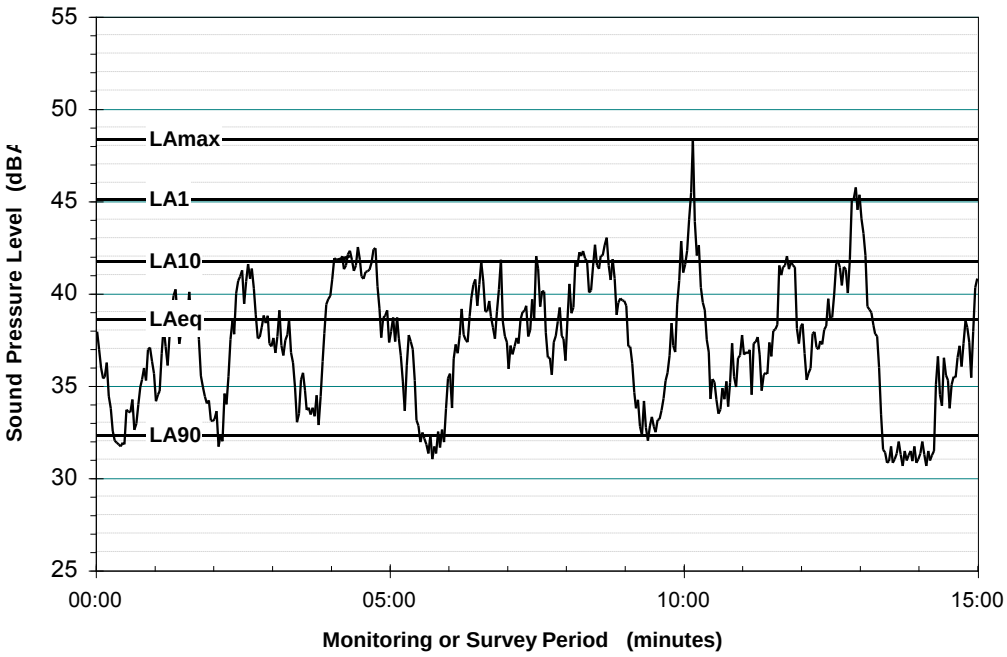
L_{A1} The A-weighted noise level exceeded for 1% of a given measurement period. This parameter is often used to represent the typical maximum noise level in a given interval.

L_{A10} The A-weighted sound pressure level exceeded for 10% of a given measurement interval and is utilized normally to characterize average maximum noise levels.

L_{Aeq} The A-weighted equivalent continuous sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound over the same measurement interval. Can be loosely thought of as the 'average'.

L_{A90} The A-weighted sound pressure level exceeded for 90% of a given measurement interval and is representative of the average minimum sound level. Often used to describe the 'background' level.

Figure 2 Graphical Display of Typical Noise Indices



When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardized method is available for determining these representative levels.

This method produces a level representing the 'repeatable minimum' L_{A90} noise level over the daytime and night-time measurement period as required by the relevant assessment criteria. In addition the method produces mean or 'average' levels representative of the other descriptors (L_{Aeq}, L_{A10}, etc.).

2.4 Character

The A-weighted noise level alone is a simplistic parameter, and may not be sufficient in providing a thorough assessment of noise. The subjective character of a sound is also a significant parameter which needs to be considered.

Some basic characteristics of sound which can make a sound more or less intrusive include:

- The frequency content of a sound – *i.e.* is the sound low frequency such as exhaust noise, or high frequency sound such as birds tweeting etc.
- The 'tonality' of a sound – *i.e.* does the sound contain one or more prominent tones such as a horn or a whistle.
- The 'impulsiveness' of a sound – *i.e.* a hammer, dog barking or an intermittently operating saw etc.).

The above parameters can usually be subjectively assessed, but more thorough assessment can be made with advanced sound measuring devices (i.e. using narrow band or one-third octave analysis etc.). Many noise policies provide an assessment method which applies penalties to sounds that exhibit particular characteristics such as those described above.

3 REGULATORY FRAMEWORK AND STANDARDS

3.1 Papua New Guinean Authorities and Legislation

3.1.1 PNG Environment Act No. 64 of 2000

In February 2014, the PNG Parliament passed an Act to set up a new Conservation and Environment Protection Authority (CEPA). CEPA has replaced the Department of Environment and Conservation (DEC) as the government agency responsible for administering the *Environment Act 2000*.

The *Environment Act 2000* (referred to as 'the Act') is the primary legislation in PNG which regulates the environmental impact of development activities and how the adverse effects of such activities should be avoided, remedied or mitigated. The Act caters for the sustainable management of the biological and physical components of the land, air and water resources of the country.

Section 133 *'Regulations'* of the Act contains general guidance regarding the enforcement of environmental noise as reproduced below:

'(1) The Head of State, acting on advice, may make Regulations not inconsistent with this Act, prescribing all matters that by this Act are required or permitted to be prescribed or that are necessary or convenient to be prescribed for carrying out or gaining effect to this Act, and in particular for prescribing penalties of fines not exceeding K100,000.00 or imprisonment for a term not exceeding two years for offences against the Regulations.…

(3) Without limiting the generality of Subsection (1), but subject to this Act, the Regulations may prescribe in relation to noise –

(a) Standards or levels for emission of various types of noise and the procedure by which they are to be tested or ascertained; and

(b) Prohibiting the use of any equipment, facility, instrument, device, vehicle or ship capable of emitting noise that does not meet a prescribed standard, and regulating the construction, installation or operation of any of them so as to prevent or minimize the emission of noise; and

(c) Providing for the delegation of power to Provincial Governments and Local-level Governments to make laws or rules consistent with this Act, to deal with noise in their respective areas; and;

(d) Making provision for officers of other governmental authorities including Provincial Governments and Local-level Governments, to enforce provisions of this Act in relation to noise; and

(e) The circumstances in which emission of noise amounts to unreasonable noise under this Act; and

(f) Issue of noise abatement notices; and

(g) Offences in relation to noise emission'

While the emission of unreasonable noise is deemed an enforceable offence in accordance with the Act, it is noted that it does not include or nominate any specific criteria or methodology outlining how environmental noise should be measured or assessed. In particular, there are no specific local requirements stated in the Act with regard to the undertaking of a baseline noise survey other than to limit the general environmental impact of a development.

3.1.2 PNG Guideline Documents for Environmental Discharges

Several guidelines have also been published by the then DEC relevant to the assessment of noise emissions from proposed developments, including:

- *Guideline for submission of an application for an environmental permit to discharge waste* (DEC 2004a).
- *Technical Guideline (Additional Information) for Noise Discharges* (DEC, 2004b).

The *Guideline for submission of an application for an environmental permit to discharge waste* requires that baseline information be provided on the bio-physical environment (i.e., geomorphology, climate, natural hazards, air quality, etc.) including noise as follows:

'…

- *noise levels,*
- *details of other pollution sources available within the locality and the additive effects of their emissions on the baseline environmental quality.'*

Specifically relating to noise the *Technical Guideline (Additional Information) for Noise Discharges* (IB-ENV/03/2004) requires the additional information presented in **Table 2** to be provided as part of the environmental permit application where noise emissions *may* be generated. Such information will be included in the noise impact assessment and EIS for the project.

Table 2 IB-ENV/03/2004 Additional Information Requirements for Noise Discharges

Heading	Requirement
Outline of the Proposal	Describe the nature and extent of activities to be carried out on the premises
Site Plan & Location	In addition to the A4 site plan (as requested in the Information Guideline), drawings should indicate the location of all external plant and equipment
Map of Surrounding Area	The map should indicate the positions of nearby residences and residentially zoned areas. An elevation contour map of 1 km radius is also required for rural developments where the land is not predominantly flat
Floor Plan of Internal Plant	Include all major items of noise producing plant and details of any existing or proposed mitigation measures such as enclosures, silencers or barriers. The plans should also include wall, roof / ceiling, window, door and vent construction details and dimensions
Sound Power Data	Sound power (or alternatively sound pressure level at a specified distance) for all significant plant and equipment
Hours of Operation of the Plant	Background noise measurements should be taken over the proposed operating period with the results presented as hourly A-weighted L90 noise levels

The above requirements provide a basis from which environmental noise from a facility can be predicted at the surrounding noise sensitive receptors and assessed. However, it is noted that IB-ENV/03/2004 does not nominate any specific noise limits or actually require noise from the facility in question to be assessed. Background noise measurement requirements are described in *'Hours of Operation of the Plant'* and are similar to (and likely based on) the international guidelines discussed in more detail in the following sections.

3.2 International Standards and Guidelines

The primary objective of any environmental noise assessment or policy is to protect people from the adverse effects of noise. Excessive noise has the ability to cause nuisance, including sleep deprivation, stress and increased blood pressure, as well as other physical, physiological and psychological effects.

In addition, any noise policy also has to allow for businesses and industries to be able to operate without having to comply with unnecessarily stringent requirements.

Many countries around the world have developed their own noise policies to protect residents and to provide some protection for industries (by, for example, nominating land use zonings or buffer zones, which allow higher noise levels in particular areas). The policies are typically based on previous studies and experience within those countries (and are often based on statistical analysis of community reaction to various levels of noise), or by reference to studies undertaken elsewhere around the world.

There are two international documents that provide indicative noise guidelines relevant to the noise study, being:

- World Health Organization (WHO) *Guidelines for Community Noise* (WHO, 1999).
- International Finance Corporation (IFC) World Bank Group *Environmental, Health and Safety (EHS) Guidelines: General EHS Guidelines: Environmental* (General EHS Guidelines). Section 1.7 *Noise* (IFC, 2007a).

3.2.1 WHO Guidelines for Community Noise

The WHO Guidelines for Community Noise (WHO Guidelines) provide the following generic guidance concerning the onset of health effects from noise:

Day Period

The WHO Guidelines recommend for a steady, continuous noise source the sound pressure level on balconies, terraces and outdoor living areas should not exceed the following levels during the day period:

- 55 dBA L_{eq} to ‘protect the majority of people from being seriously annoyed’, or;
- 50 dBA L_{eq} to ‘protect the majority of people from being moderately annoyed’

In addition, the guidelines nominate an internal noise level inside dwellings below 35 dBA, L_{eq} for the purpose of allowing for good speech communications.

Night Period

The WHO Guidelines prescribe two noise levels at residential locations to ensure that sleep is not adversely affected, these being:-

- Up to 45 dBA, L_{eq} for continuous noise;
- Up to 60 dBA, L_{max} for single events (maximums).

3.2.2 IFC / World Bank Group Noise Management Guidelines

Section 1.7 of the IFC / World Bank Group General EHS Guidelines (also referred to as the 'EHS Guidelines for Noise') prescribe noise levels for the day and night period as follows:

'Noise impacts should not exceed the levels presented in Table 1.7.1, or result in a maximum increase in background noise levels of 3 dB at the nearest receptor location off-site.

Table 3 1.7.1 Noise Level Guidelines[1]

Receptor	One Hour L_{Aeq} (dBA)	
	Daytime 07:00 – 22:00	**Night-time 22:00 – 07:00**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Highly intrusive noises, such as noise from aircraft flyovers and passing trains, should not be included when establishing background noise levels'.

The above guidelines are commonly applied as design standards for industrial facilities, and whilst this may imply they relate to threshold of noise effects in a general sense, the IFC has indicated that they are not directly applicable to transport or mobile noise sources. IFC EHS guidelines for airports (commercial airports) may be applicable to address increased aircraft movement in the future.

In addition to the numerical goals presented in **Table 3** the EHS Guidelines for noise require emissions to not exceed the existing (pre-project) background noise levels by a specified margin. To quantify the existing background noise levels a standard approach is to undertake a baseline noise monitoring campaign in the area of influence for the project as described in the *Monitoring Section* of the EHS Guidelines for Noise as reproduced below:

'Noise monitoring[2] *may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational phase noise levels.*

Noise monitoring programs should be designed and conducted by trained specialists. Typical Monitoring periods should be sufficient for statistical analysis and may last 48 hours with the use of noise monitors that should be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate (or else cover differing time periods within several days, including weekday and weekend workdays).

The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert. Monitors should be located approximately 1.5 m above ground and no closer than 3 m to any reflecting surface (e.g. wall).

In general, the noise level limit is represented by the background or ambient noise levels that would be present in the absence of the facility or noise source(s) under investigation.'

[1] Guideline values are for noise levels measured out of doors. Source: Guidelines for Community Noise (WHO, 1999).

[2] Noise monitoring should be carried out using a Type 1 or 2 sound level meter meeting all appropriate International Electrotechnical Commission (ICE) standards.

3.2.3 IFC Environmental, Health and Safety Guidelines for Onshore Oil and Gas Development

The IFC industry sector environmental, health and safety (EHS) guideline document for onshore oil and gas development (IFC 2007b) is designed to be used together with the General EHS Guidelines document and provides general and industry-specific examples of Good International Industry Practice (GIIP). This document applies to exploration and production drilling; development and production activities; transportation activities including pipelines; other facilities including pump stations, metering stations, pigging stations, compressor stations and storage facilities; ancillary and support operations; and decommissioning.

In terms of applicable guideline noise levels, the document refers to the General EHS Guidelines for Noise (discussed in **Section 0**).

This document recognizes that oil and gas development activities can generate noise during all phases of development. To minimize potential noise impacts from these activities the documents requires:

'Noise impacts should be estimated by the use of baseline noise assessments for developments close to local human populations. For significant noise sources, such as flare stacks at permanent processing facilities, noise dispersion models should be conducted to establish the noise level guidelines can be met and to assist in the design of facility siting, stack heights, engineered sound barriers, and sound insulation on buildings.'

This process will be undertaken as part of the noise impact assessment provided in the environmental impact statement (EIS).

3.2.4 IFC Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

The IFC Performance Standards establish standards that a client[3] is required to meet throughout the life of an investment by the IFC.

In particular, IFC Performance Standard 1 (PS1) *Assessment and Management of Environmental and Social Risks and* Impacts (IFC, 2012) was developed by the IFC to establish the importance of:

(i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects;

The specific reference to baseline studies in PS1 is that the identification of risks and impacts is to be based on recent environmental and social baseline data *at an appropriate level of detail*.

In addition, when assessing the potential environmental impacts from a project, the cumulative impacts that may result from the incremental impact of the project in addition to other '*existing, planned or reasonably defined developments*' at the time the assessment is conducted are to be considered.

In Guidance Note 1 for PS1 it is noted that '*reference to secondary information on the project's area of influence is acceptable, but it may still be necessary to gather primary information from field surveys to establish baselines appropriate to the proposed project's potential impacts and risks.'* Primary information has been collected during a baseline noise field survey within the study area.

[3] The term 'client' is used throughout the Performance Standards broadly to refer to the party responsible for implementing and operating the project that is being financed, or the recipient of the financing, depending on the project structure and type of financing.

The Performance Standards refer to the EHS Guidelines (see Section 3.2.2) for performance levels and measures that are normally acceptable to the IFC, and are generally considered to be achievable in new facilities at reasonable costs by existing technology.

3.2.5 IFC Performance Standard 2: Labor and Working Conditions

IFC Performance Standard 2 (IFC, 2012) recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.

The relevant objective of the standard with respect to noise is '*to promote safe and healthy working conditions and the health of workers'*. Furthermore, the standard requires that:

'Where accommodation services are provided to workers covered by the scope of this Performance Standard, the client will put in place and implement policies on the quality and management of the accommodation and provision of basic services'. Basic services include the protection against noise amongst other requirements.

3.2.6 IFC Performance Standard 3: Resource Efficiency and Pollution Prevention

IFC Performance Standard 3 (IFC, 2012) outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices.

Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. The standard recognises that noise is pollution.

In regard to pollution prevention the IFC Performance Standard 3 states:

'To address potential adverse project impacts on existing ambient conditions, the client will consider relevant factors, including, for example:

(i) existing ambient conditions;

(ii) the finite assimilative capacity of the environment (i.e., the capacity of the environment for absorbing an incremental load of pollutants while remaining below a threshold of unacceptable risk to human health and the environment);

(iii) existing and future land use;

(iv) the project's proximity to areas of importance to biodiversity; and

(v) the potential for cumulative impacts with uncertain and/or irreversible consequences'.

Guidance Note 3 (IFC, 2012) for Performance Standard 3 states that when developing a new project' Considerations should include background ambient conditions (that may occur due to natural and/or anthropogenic causes not related to the project), the presence of local communities, environmentally sensitive receptors (such as potable water supplies or protected areas), the expected project demand for water, and the availability of waste disposal facilities. Potential for cumulative impacts should also be reviewed'.

3.3 TOTAL Company Standards and Commitments

Relevant baseline assessment requirements set out in TOTAL'S policy documents and General Specification documents have been reviewed. The findings of this review are outlined below.

3.3.1 Environmental Baseline and Monitoring Studies: Onshore Sites

TOTAL General Specification, GS EP ENV 111, *Environmental Baseline and Monitoring Studies: Onshore Sites* (TOTAL, 2012) sets out technical instructions for the establishment of the baseline environmental status and for carrying out environmental monitoring of an onshore site.

Section 8.7 *'Noise Measurements'* provides the following:

'When necessary, measurements of background noise level (daytime and night) shall be performed on the surveyed site, and recorded, during a representative period of activity, according to the method required by GS EP ENV 001'

The background noise monitoring for this baseline study has, therefore, been conducted at representative sites in accordance with GS EP ENV 001 (discussed below). It is also noted that **Appendix 8** of the specification requires the collection of detailed data including measured background noise levels and notes on any existing noise sources.

3.3.2 Environmental Requirements for Project Design and E&P Activities

The TOTAL General Specification document GS EP ENV 001 *Environmental requirements for project design and E&P activities,* Section 5.9 *'Noise level'*, (TOTAL, 2011) requires the following to be taken into account:

'1. Equipment noise emissions:

All the noise abatement measures shall be taken to ensure an adequate acoustical insulation of the engines, compressors, turbines (enclose engines) and gas flow lines and valves (lagging, in-line silencers, etc.).

2. Noise emissions on the worksite, offices and living quarters (refer to GS EP SAF 221).

3. Noise emissions at the facility's boundary limit and in residential areas close to the installations'

GS EP ENV 001 sets out noise level guidelines for off-site receptors based on the International Finance Corporation (IFC) World Bank Group *Environmental, Health and Safety Guidelines: General Guidelines.* Section 1.7 Noise (IFC, 2007) (see Section 3.2.2).

3.4 Noise Assessment Criteria

The noise assessment criteria against which the Project will be assessed will be defined in the relevant noise impact assessment report.

4 STUDY AREA

4.1 Project Location

The general study area is based on the expected upstream Project area of influence as described in the Upstream ESBS Report and is collectively comprised of the following areas where Project components may be located:

- Production, processing and related facilities. Gasfield area within PRL-15 (wellpads, upstream gathering system, CPF and associated infrastructure and support facilities, i.e., construction camp, laydown area, wharf, airstrip, access roads).
- Onshore pipeline. Export gas and condensate pipeline system from the CPF to the coast at Orokolo Bay, together with associated infrastructure and construction support facilities.
- Transport (river) corridors. West of the onshore export pipeline corridor and downstream of proposed Project facilities within PRL-15. The Project area of influence includes potential barge transport routes along each of the Purari River's three main delta distributaries—the Purari, Ivo-Urika and Varoi-Warne rivers.
- Offshore pipeline. Offshore section of the export pipeline to a LNG Plant site, Caution Bay[4].

The study area for the baseline noise study is defined as an area where noise impacts may be experienced as a result of Project activities, including the construction and operation of facilities and infrastructure for the Project. The upstream noise survey focussed on gathering baseline noise information at key locations such as existing villages, potential in-migration and fauna sensitive areas that will potentially be impacted by noise from the Project during both construction and operations.

The potential area of impact of construction and operational phase noise emissions from upstream Project components will be assessed as part of the noise impact assessment.

4.2 Climate

Weather conditions can have a significant effect on the propagation of noise outdoors. Where background noise levels are measured in the absence of any mechanical plant noise, the effects of weather are limited to either sustained periods of:

- Heavy rainfall (i.e. noise from the impact of rain on the ground, building structures etc.), or;
- Strong winds (which can cause either wind induced microphone noise or disturb nearby foliage i.e. the rustling of leaves in trees).

A brief overview on the general climate of the Project area is provided below for reference purposes.

Papua New Guinea has a tropical, monsoonal climate. The coastal and islands regions tend to be hot and humid, with temperature averages ranging between 20°C to 32°C, relative humidity levels ranging from 70% to 90% and high rainfall year-round.

Seasonal climate changes in the study area are controlled by two mass air movements. Typically the easterly trade wind season occurs from April / May to October / November and the northwest monsoon occurs from November / December to March / April. There are transitions at the cross over of each season.

[4] An underwater noise and vibration assessment, including baseline characterization, will be undertaken for the downstream component of the Project, once Project definition has been finalized and requirements for underwater construction activities such as piling are known.

Papua New Guinea's climate varies considerably from year to year due to the El Niño-Southern Oscillation (ENSO). This is a natural climate pattern that affects weather across the world. El Niño is a warming of the Pacific Ocean resulting in longer and cooler dry seasons (i.e., periods of drought), and a delay to the start of monsoon season. La Niña, the cold phase of ENSO, typically results in higher than average rainfall and warmer temperatures during the wet season, often leading to flooding events and landslides (PACCSAPP, 2015). Papua New Guinea also experiences neutral phases.

A dominant climatic factor in the upland areas is cloud and fog; and for most of the year, they are important sources of moisture. Western and northern parts of Papua New Guinea experience the most precipitation, since the north- and westward-moving monsoon clouds are heavy with moisture by the time they reach these more distant regions. However, on rare occasions, vegetation of the uplands can become dry enough to burn, as happened during a severe drought in 2015 when fires spread from the Highlands to West New Britain across to Milne Bay Province in the latter half of the year. Towards the coast, rainfall is lower and more evenly spread throughout the year (averaging around 300 mm / month) (Evesson, 1983).

Temperatures in the study area are mild and remain relatively consistent throughout the year.

Temperature is altitude dependent, with hot and humid conditions associated with lower altitudes and cooler conditions at higher altitudes.

Tropical cyclones affect southern Papua New Guinea between November and April. In the 41-year period between 1969 and 2010, 23 tropical cyclones passed within 400 km of Port Moresby, an average of less than one cyclone per season. From 1969–2010, cyclones occurred more frequently in neutral phases of the El Niño-Southern Oscillation (PACCSAPP, 2015).

4.3 Topography and Land Form

The surrounding landform and topography can have a significant effect on the propagation of noise due to the natural shielding provided by hills and mountain ranges. If sound is propagating over ground, attenuation will occur due to acoustic energy losses on reflection depending on the surface; for example, smooth, hard surfaces (such as cement or water) will provide little absorption, whereas thick grass may result in sound levels being reduced significantly at higher frequencies.

Mountains, hills and levee plains characterize PRL-15. The northern two-thirds of PRL-15 comprises southeast to northwest trending ridges and folded terrain up to approximately 450 m above sea level (asl) in places, while terrain in the southwestern section lowers to the plains of the Purari River catchment that are is subject to flooding during the wet season.

The existing wellpads from previous appraisal drilling are primarily located on steep ridges, some up to 250 m asl. The proposed CPF site is located on the flood plain of the Purari River bounded to the south by the Purari River main tributary and to the east by the tributary Kuku Creek. The generally flat swampy terrain of the site has a maximum elevation of about 50 m asl, but is more generally below this elevation. From the north, the export pipeline corridor traverses extensive ranges of asymmetrical mountains and hills, which descend into alluvial plains and composite levee plains, coastal mangroves and finally beach ridges and beach plains.

In general, the typically dense tropical forests and agricultural cover across most of the Project area will provide increased ground absorption (relative to hard stand areas, roads, water surfaces etc.) and help attenuate the propagation of noise from the various works. Similarly, the surrounding natural landform can have a significant effect on the propagation of noise depending on the location of any noise sources and receptors relative to the presence of ridges, hills or valleys.

4.4 Anthropogenic Setting

PRL-15 is largely unsettled but used by the Pawaian people, who reside in villages along the Purari River. Most of these villages are outside of but near to PRL-15 except for two small villages (Poroi 1 and Mapaio Fish Camp) that are located on the Purari River within the southern part of the license area. Aside from subsistence livelihood activities from the Pawaian people, the main anthropogenic activities in PRL-15 relate to the recent and ongoing gas exploration activities, including the main operations camp at Herd Base, temporary camps at Antelope-3 Operations Camp and Hou Creek Base (both now demobilized), and activities and disturbances relating to wellpads, access roads, and helipads.

The inland section of the export pipeline corridor is largely unpopulated however has been modified by large-scale industrial logging. Near to and along the coast, the number and size of villages, and hence population density, increases. Anthropogenic activities include clearing of forest for settlements, subsistence agriculture (food gardens, sago planting, hunting and fishing) and historical clearing for coconut plantations.

Along the Purari riverways, villages are predominately located on or in the vicinity of the upper reaches of the tidal influence where there is likely to be a greater availability of resources. In addition to subsistence agriculture activities, logging and Project commissioned barges transporting supplies and equipment to the base, regularly travel along the Purari channels.

5 EXISTING INFORMATION

5.1 Prior Studies within the Study Area

In 2008 an environmental impact statement (EIS) [5] was prepared by Douglas Environmental Services (DES) for the Elk Antelope Gas Field Project (DES, 2008). This EIS was prepared for the:

- Installation of production wells connected by a network of pipelines in the Elk Antelope Gas Field,
- Construction of a delivery pipeline to take the raw gas to a gas processing facility on the bank of the Purari River, and
- Transport of the dehydrated gas stream via a pipeline to a LNG plant located at Napa Napa near Port Moresby for further processing and export.

As part of this EIS, a background noise level of 46 dBA was documented for existing gas field sites; however, no detailed measurement information is provided in the report (i.e. measurement equipment, calibration details, local conditions, measurement time and duration, statistical results).

Consequently, these results have not been used in this report.

5.2 Studies in Neighboring Regions

A baseline noise monitoring campaign[6] (Heggies, 2010) was prepared by SLR Consulting (formerly Heggies) for upstream facilities of the ExxonMobil PNG Limited (EMPNG) PNG LNG Project in the Hides region of the Southern Highlands, approximately 250 km northwest of the Project area.

It should be recognized that this region has a much higher population density (relative to that surrounding the Papua LNG Project) with a large number of existing villages and settlements located around the various project facilities.

Unattended noise monitoring results indicate high background noise levels (typically 40 dBA - 45 dBA) at night which is dominated by insect noise. However, due to the various site differences (i.e. elevation, climate, population density), these results have not been used or referenced in this report.

5.3 Summary

A literature review was conducted in October 2016 which indicated that minimal information regarding the existing ambient baseline noise environment was available in the upstream Project area and particularly at potential noise sensitive receptor sites in the vicinity of Project components. Nonetheless, based on available information, the background noise environment is likely to be affected by high levels of insect noise and other natural ambient noise sources such as, birds, periods of heavy rainfall, and (for existing village locations) domesticated noise from animals and typical village activities (music, construction, human voices noise).The information gained from the literature review has been used to identify gaps in the baseline information and thus plan the noise field baseline survey (Section 5).

[5] Elk/Antelope Gasfield Project: Environmental Impact Statement, Douglas Environmental Services, 20 December 2008

[6] Heggies Report 40-1530-R6 PNG LNG Semi-Permanent Facility Baseline Noise Monitoring, 4 November 2010

6 METHODS

6.1 General Approach

This section describes the field survey in detail with **Section 7** detailing the resultant baseline noise characterization

Table 4 outlines that, considering the existing information on noise in the upstream Project area, background noise could not be accurately quantified without visiting the site. Consequently, to sufficiently characterize the existing baseline (pre-Project) noise environment, a field survey was required in accordance with the requirements discussed in **Section 3**.

Table 4 Summary of Information Requirements Relevant to Noise Study

Study Element	Description of Gap	Field Study/Data Collection
Baseline noise data	♦ Background noise levels in critical areas surrounding the Project infrastructure are not known. As noise impacts during the construction works will predominantly occur during the day period and be of generally short duration, the upstream noise study will primarily focus on areas exposed to both construction and operational noise from the Project. Other areas where particular sensitivities have been highlighted (i.e. the Oxbow wetlands area and high density coastal region – see below) will also be considered in the study. It is noted that these receptors correlate with those examples provided in the Section 1.7 of the EHS Guidelines which include 'permanent or seasonal residences… and parks and campgrounds' ♦ As background noise levels can have an impact on applicable noise criteria used to assess noise from the Project, the results can have implications on mitigation/noise control requirements for plant and equipment on the Project	♦ Collection of background noise data from representative measurement locations. Measurement locations include existing villages and areas where future community in-migration / faunal impacts may occur ♦ As the dominant construction and operational noise impacts will be within PRL-15 (pipeline construction will also be a temporary source of noise during construction), the field study was based from Herd Base near the CPF ♦ Baseline noise monitoring was conducted near the wellpads as well as along the export pipeline right of way (ROW) (near the highly populated coastal area) and at a representative location further inland.
Fauna impact	♦ Page xi of the Executive Summary for the Elk / Antelope Gasfield Project EIS (DES, 2008) lists the current Project area to be an occasional hunting ground for the local community and highlighted in their previous assessment that once construction would begin, animal species in the area would likely move away due to high noise levels from machinery ♦ The local Community Group and Leader Consultations in the Uraru Village area (page 241 of the Elk / Antelope Gasfield Project EIS) suggests that noise from exploration activities has already had an impact on local animals in the Purari Mangrove Forest 'Conservation Needs Assessment' (CNA) area as locals 'now hunt in pairs of 2-3 men because animals had gone further because of noise from exploration activities'	♦ Quantify and measure existing (pre-Project) ambient background noise levels in the sensitive oxbow wetland area west of the CPF. Due to the flooded nature of this area access was not possible during the survey period. Consequently, representative measurements were taken from alternate locations which were used to gain an understanding of the local acoustic environment ♦ The measurement results allow for future comparison to assist in assessing potential noise impacts to these areas

Study Element	Description of Gap	Field Study/Data Collection
Noise modeling assessment	♦ While most of the critical information to facilitate the noise modeling of the operational CPF is currently available, additional site data (such as local terrain / tree coverage, shielding / absorption parameters, and existing noise sources) can assist with the preparation of the noise model that will be used to assess noise from the facility	♦ During the noise study, a site investigation was also undertaken near the CPF to identify parameters that can have an impact on modeling results

Noise monitoring sites were selected in conjunction with ERIAS Group and TEP PNG on the basis of a site's potentially sensitive nature (i.e. existing villages and settlements, and / or the site's location relative to potential future noise impacts associated with the Project, see **Table 4**).

The approach to the baseline noise survey was executed as per the methodology provided in the Papua LNG Project Noise Study Scope and Methods document (ERIAS Group, 2016).

Essentially, two levels of survey activity (including unattended noise monitoring / noise logging, and attended noise measurements) were undertaken at all identified locations with the exception of the ANT-7 wellpad where works were limited to an attended noise survey (for the purpose of gathering reference data) of the operational drilling rig.

Attended noise surveys conducted at Herd Base and ANT-7 collected data that will be used in the noise impact assessment that will be undertaken at a later stage for the Project. As such, this data from the two attended noise surveys at these locations is not discussed in this baseline report but is included in **Appendix C** for completeness.

The two survey methods adopted are discussed in more detail below, with details regarding the analysis, exclusion and validation of data provided in **Section 6.5**.

6.1.1 Unattended Noise Monitoring

Unattended noise monitoring equipment (a noise logger) was deployed in a secure location at each identified survey area. The noise logger was set to continuously measure the ambient background noise levels over a minimum two day (48 hr)[7] monitoring period to quantify the day and night time ambient noise levels for the area.

Data from the unattended noise monitoring is particularly useful as the bulk of the monitoring locations were not easily accessible during the night period.

As the noise logging process allows for the capture and review of data over long periods of time, it can be useful for identifying diurnal noise patterns and localized noise sources which may not be able to be captured during the relatively short time period over which an attended noise survey is conducted.

[7] The minimum 48 hour monitoring period was selected in accordance with the *Monitoring* requirements of the EHS Guidelines for Noise.

6.1.2 Attended Noise Survey

At each survey location attended noise measurements were taken using a hand held sound level meter (SLM). During the measurements, ambient noise sources were quantified and surrounding noise sources with potential to affect the noise impact assessment identified.

The attended noise measurements allow for direct noise source identification as well as the capture of other pertinent site data, which is not always that obvious when reviewing noise logging results (i.e., distance from noise sources to measurement location, local weather conditions, frequency content of noise, and any acoustic characteristics such as tonality and impulsiveness).

During the attended noise survey, site personnel took the opportunity to review the surrounding area (particularly around the proposed CPF area) and any surrounding localized shielding (such as that provided by terrain) that can have an impact on future noise emissions across the site.

6.2 Data Sources

Data sources used to help with the site selection, data collection, processing, analysis and reporting for the noise baseline survey include:

- 2016 AAM LIDAR & Imagery Survey Data, Rev01.
- Village locations provided by ERIAS Group.
- Attended noise measurement results as recorded using the Brüel&Kjær 2260 1/3 Octave Band Type-1 Sound Level Meter.
- Raw data from the Acoustic Research Laboratories (ARL) Ngara Type-1 Noise Monitoring System saved as:
  - Hourly .wav audio files sampled at 12 kHz and 192 kbps.
  - Hourly .csv files storing the A-weighted and C-weighted SPL and L_{eq} values recorded at 10 Hz.

  Note: The noise monitoring data was post-processed using the ARL NGARA Remote Host (v4.00-1-g673eb69) software package to extract hourly statistical indices and the short term 20 second L_{Aeq} data for reporting purposes (see **Section 6.5**).
- Historical weather data recorded at Wabo and Kerema.

6.3 Field Survey

The upstream baseline noise field survey was conducted between the 7 and 14 November 2016 during the typically dry period when weather conditions are less likely to adversely affect noise measurement results. Sites were accessed via boat or helicopter.

A description of each unattended noise monitoring location, which explains why monitoring was undertaken at the location is provided in **Table 5** and a summary of the daytime attended noise locations (relevant to the baseline noise survey) provided in **Table 6.** **Table 7** provides a brief description of the general catchment area with corresponding photographs showing the noise monitoring equipment deployed at each monitoring location.

All noise monitoring locations used during the survey (including those solely for the purpose of collecting reference data to assist with the future impact assessment) are shown in **Figure 3.** The general location of the CPF, logistics base, and other ancillary facilities as indicated in **Figure 3** is preliminary only and subject to change.

Figure 3 Aerial Overview showing all Noise Survey Locations

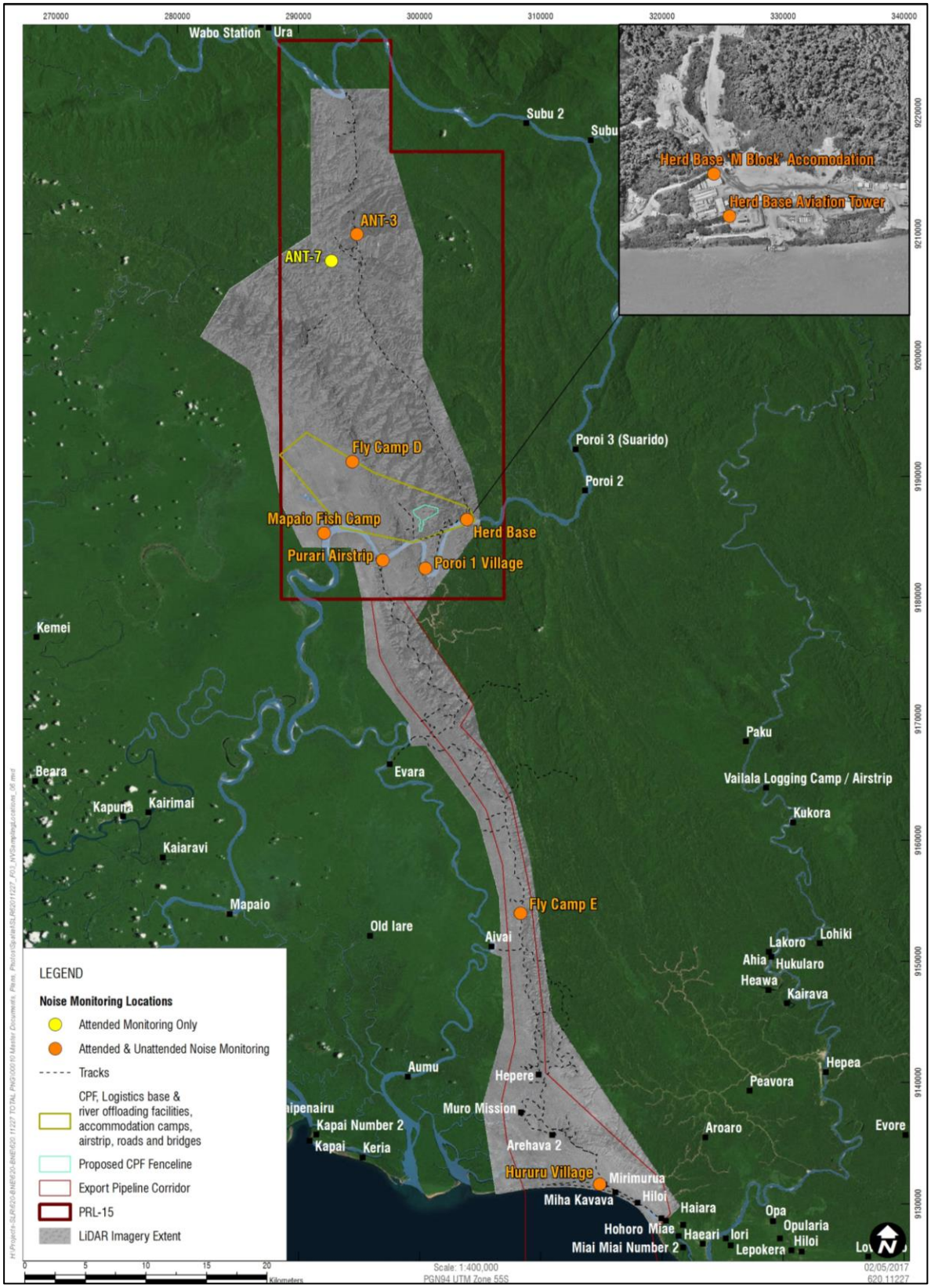


Table 5 Coordinates of Unattended Noise Monitoring Locations

Location	Description	PNG94 / PNGMG94 Zone 55 Coordinates (m)		
		Easting	Northing	Elevation (asl)*
ANT-3 Wellpad	Location representative of acoustic environment within the gas wellpads	294826	9209994	95
Fly Camp D	Location representative of acoustic environment in bushland closest to the proposed CPF (that is an area of natural forest similar to the proposed CPF location)[8]	294442	9191246	32
Poroi 1 Village	Closest existing cluster of sensitive receptors to proposed CPF. Village is located on north bank of the Purari River	300456	9182430	31
Purari Airstrip#	Location representative of existing sensitive receptor near existing airstrip as well as possible future community in-migration area at future logistics base	296942	9183120	23
Mapaio Fish Camp	Monitoring location at second closest established village to CPF	292084	9185342	21
Herd Base 'M Block' Accommodation*	Reference monitoring at operational facility near sleeping area	303842	9186587	32
Herd Base Aviation Tower*	Reference monitoring at operational facility near aviation tower	303885	9186467	33
Fly Camp E	Location representative of acoustic environment along the pipeline alignment at uninhabited forest	308327	9153987	9
Hururu Village	Indicative coastal village (e.g. Marea, Iuki, Herekera, Hururu etc.) within the export pipeline corridor disturbance area close to landfall	314854	9131624	3

Note * The unattended noise monitoring conducted at Herd Base was for reference purposes only
Note # There is only one garden / fishing hut at this location
asl Above sea level. Due to geometrical considerations, altitude error is generally considerably worse than the horizontal (position) error. For most GPS measurements the reported positional error was typically ±5 m

[8] Monitoring representative of the proposed CPF location was originally planned at Fly Camp C; however, due to localized tree clearance works during the survey the monitoring was instead conducted from Fly Camp D. As a result of the relatively close proximity and similar nature of the site (e.g. thick forest, high density of insects, nil human habitation), the ambient noise environment measured at Fly Camp D would likely be comparable to Fly Camp C and the pre-Project CPF area.

Table 6 Coordinates of Attended Noise Monitoring Locations

Location	Attended Measurement	PNG94 / PNGMG94 Zone 55 Coordinates (m)		
		Easting	Northing	Elevation (asl)*
ANT-3 Wellpad	WP12	294814	9209993	95
	WP13	294781	9210004	94
	WP14	294844	9208975	69
Fly Camp D	WP5	294431	9191297	32
Poroi 1 Village	WP10	300462	9182431	30
	WP11	300444	9182425	31
Purari Airstrip#	WP8	296926	9183126	24
	WP9	296948	9183102	26
Mapaio Fish Camp	WP6	292040	9185351	24
	WP7	292013	9185361	25
Fly Camp E	WP4	308302	9153987	5
Hururu Village	WP1	314855	9131617	4
	WP2	314835	9131670	3
	WP3	315160	9131152	1

Note # There is only one garden / fishing hut at this location

asl Above sea level. Due to geometrical considerations altitude error is generally considerably worse than the horizontal (position) error. For most GPS measurements the reported positional error was typically ±5 m

Table 7 Description of General Noise Monitoring Areas

Photograph	General Description of Area	Noise Logging Locations
Photo 1 to Photo 3	Wellpad gathering system – area is extremely remote and currently uninhabited	ANT-3 Wellpad
Photo 4 to Photo 15	Along Purari River near where the upstream CPF and logistics base are proposed to be constructed. Area has a few scattered settlements and villages along the river up and downstream of the proposed site.	Fly Camp D, Poroi 1 village, Purari Airstrip#, Mapaio Fish Camp, Herd Base
Photo 16 to Photo 21	Pipeline alignment – High density of village / sensitive receptors located where export pipeline corridor makes landfall in this area	Fly Camp E, Hururu village

Note # There is only one garden / fishing hut at this location

In accordance with the International Finance Corporation (IFC) Performance Standards (PS) on Environmental and Social Sustainability, TEP PNG undertook pre-awareness consultation with potentially affected communities in the upstream Project area. The process satisfies requirements relating to PS1 Assessment and Management of Environmental and Social Risks and Impacts[9] and PS7 Indigenous Peoples.

[9] Relating to S31 Informed Consultation and Participation, S32 Indigenous People

Photo 1 ANT-3 Wellpad: North View towards Noise Logger and Capped Wellpad in Background

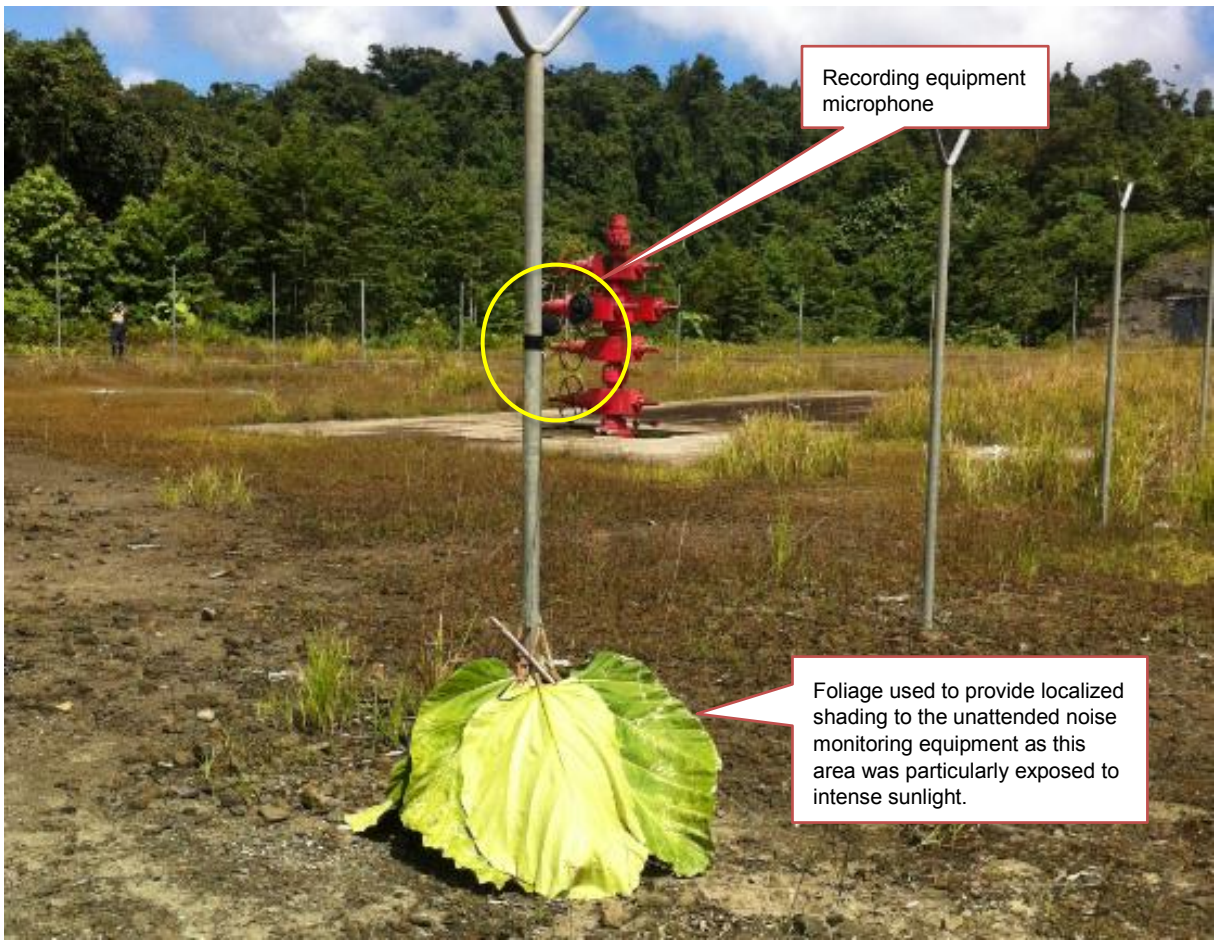


Photo 2 ANT-3 Wellpad: Aerial Photograph of Unattended Noise Monitoring Location

Photo 3 ANT-3 Wellpad: Aerial View looking West towards Operations Camp & Capped Wellpad

Photo 4 Fly Camp D: Unattended Noise Monitoring Equipment at Site

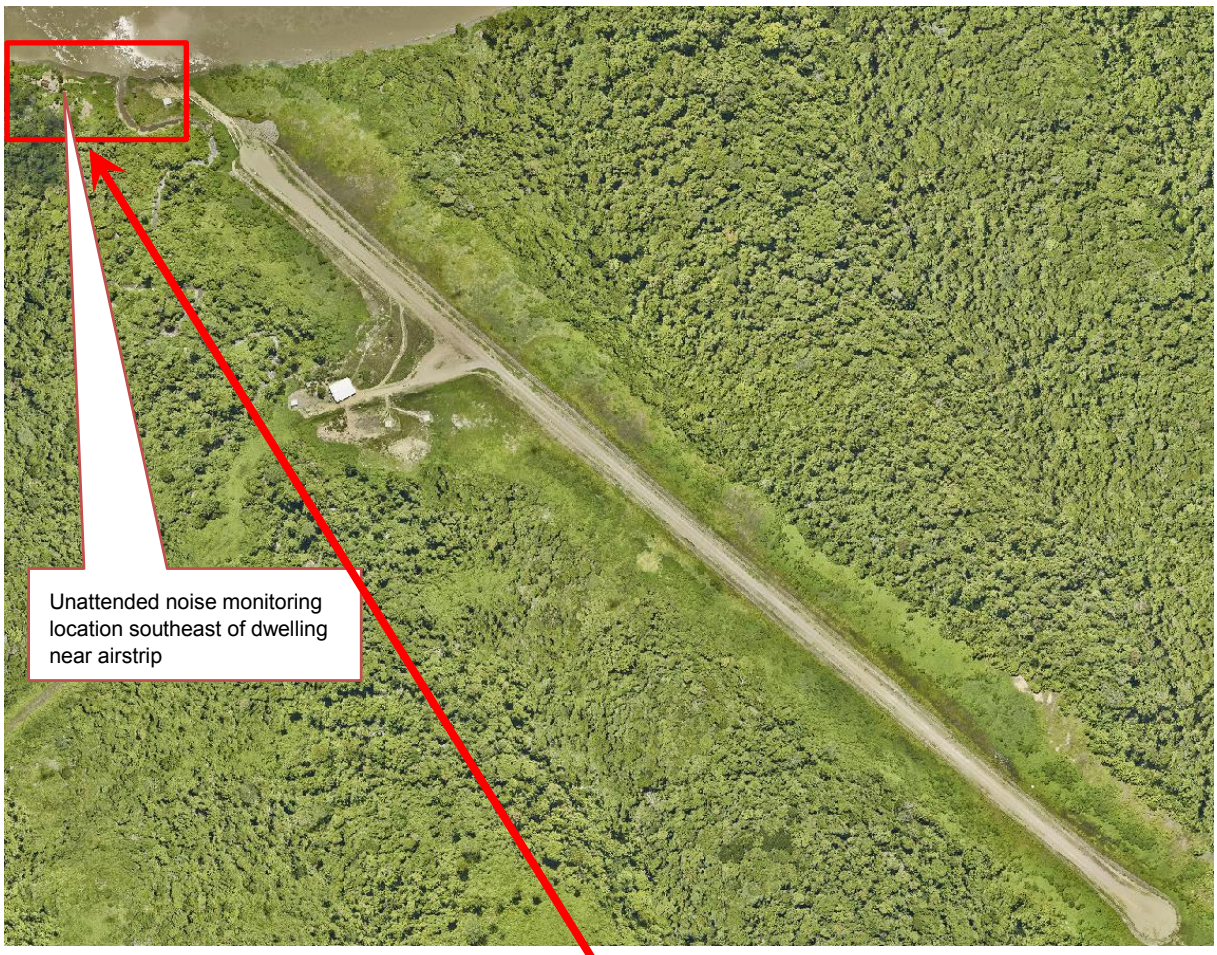
Photo 5 Fly Camp D: Aerial Photograph of Unattended Noise Monitoring Location

Photo 6 Poroi 1 Village: View looking North towards Monitoring Equipment and Closest Dwelling

Photo 7 Poroi 1 Village: Aerial Photograph of Unattended Noise Monitoring Location

Photo 8 Purari Airstrip: View looking Northwest towards Logger and Single Dwelling in Background

Photo 9 Purari Airstrip: Aerial Photograph of Unattended Noise Monitoring Location at Dwelling



INSET SHOWING DWELLING NEAR AIRSTRIP

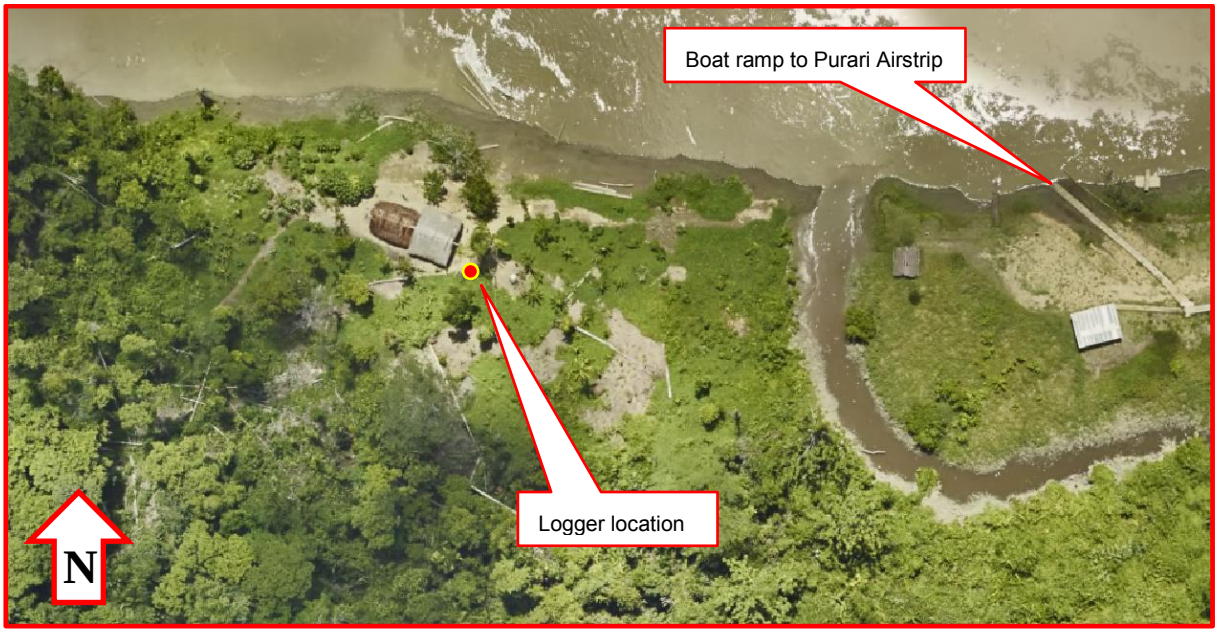


Photo 10 Mapaio Fish Camp: View looking Southwest towards Noise Monitoring Equipment and Hut

Photo 11 Mapaio Fish Camp: Aerial Photograph of Unattended Noise Monitoring Location

Photo 12 Herd Base 'M Block' Accommodation: View looking Southwest towards Noise Logger

Photo 13 Herd Base 'M Block' Accommodation: View overlooking Main Camp Area and Logger Location

Photo 14 Herd Base Aviation Tower: East View of Unattended Noise Logger with Helipad in Background

Photo 15 Herd Base Aviation Tower: Aerial Photograph of Unattended Noise Monitoring Location

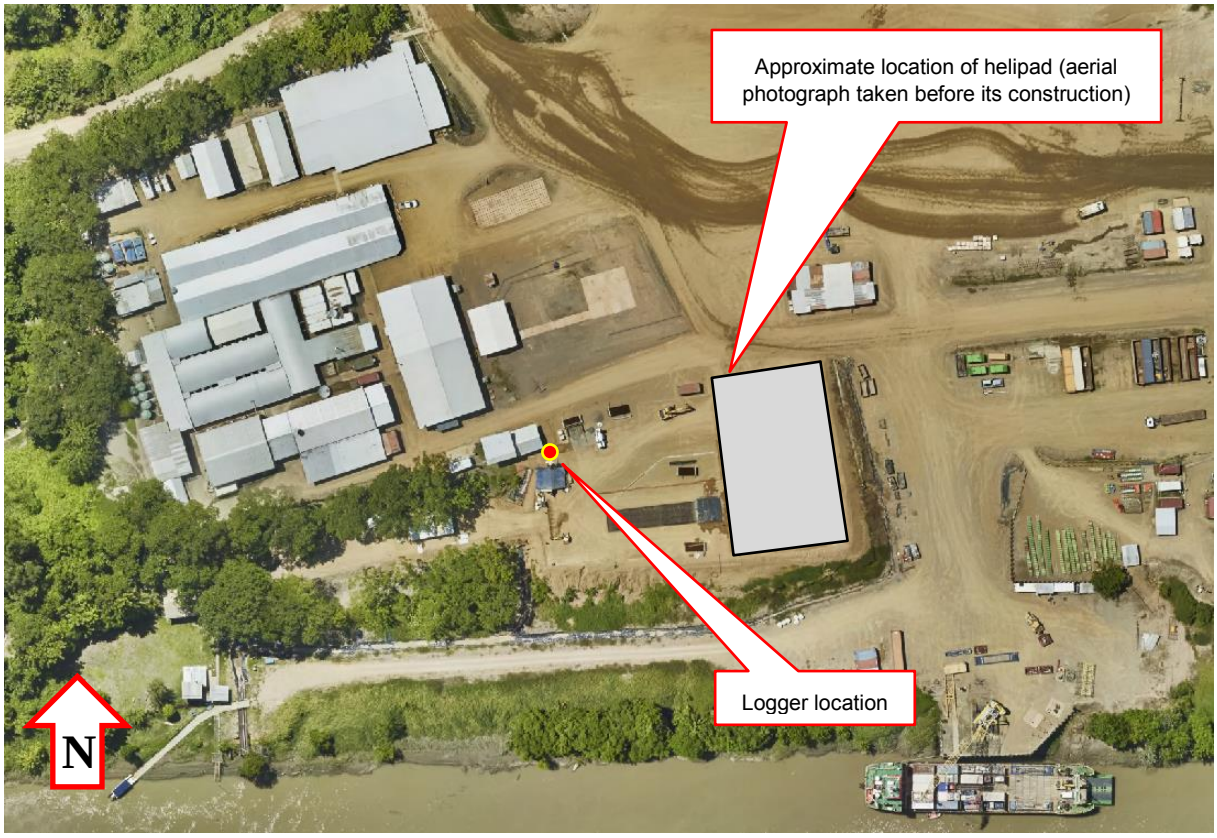


Photo 16 Fly Camp E: View along Logging Road looking North towards Helicopter Landing Zone and Bank to Unattended Noise Monitoring Location (to right of photo)

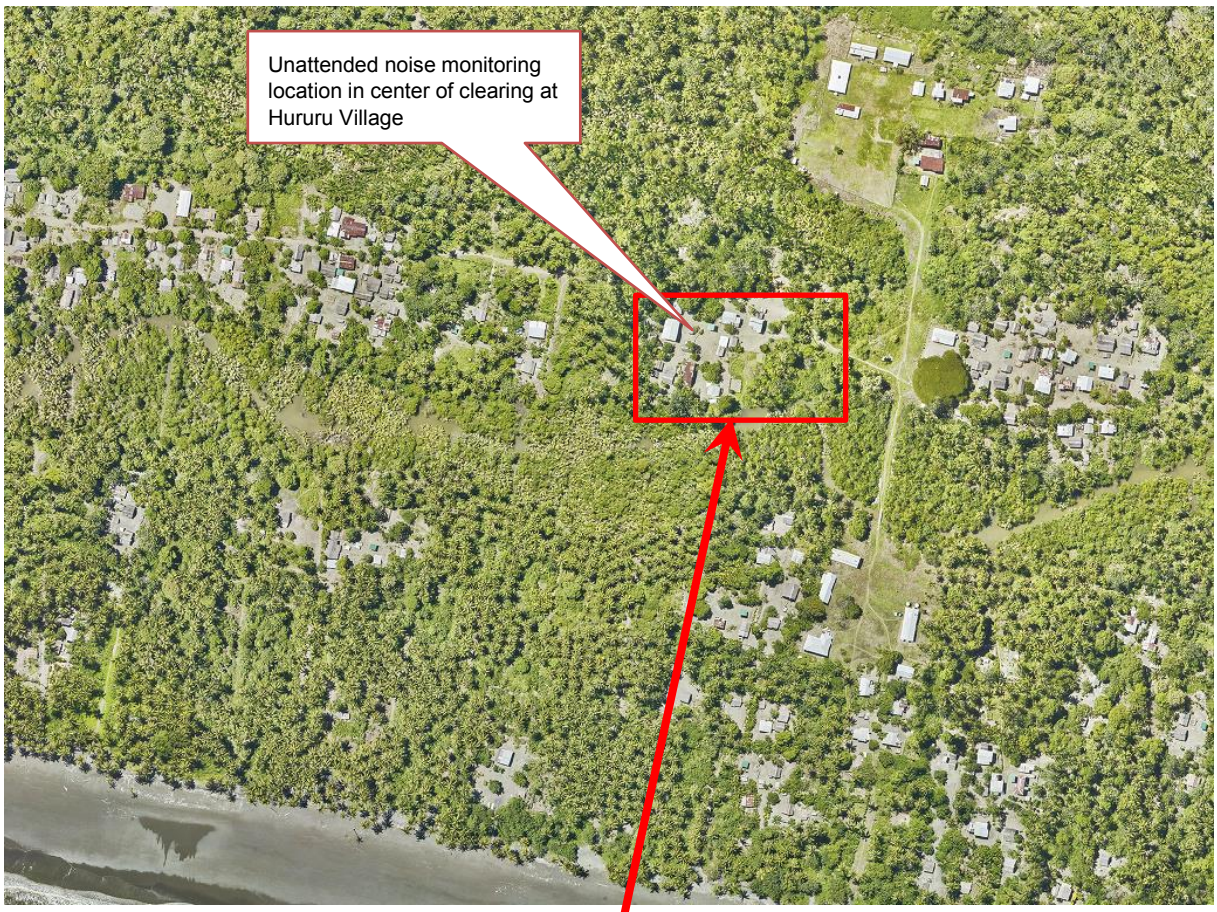
Photo 17 Fly Camp E: Aerial Photograph of Unattended Noise Monitoring Location

Photo 18 Fly Camp E: View looking East towards Unattended Noise Monitoring Equipment on Bund

Photo 19 Hururu Village: West View of Monitoring Equipment at Edge of Clearing in Center Village

Photo 20 Hururu Village: View from Noise Logger looking Northeast towards Main Gathering Area

Photo 21 Coastal Village Region: Aerial Photograph of Noise Monitoring Location at Hururu Village



INSET SHOWING HURURU VILLAGE

6.4 Protocols Used

The measurement approach was guided by the following assessment and study criteria / standards:

- World Health Organization *'Guidelines for Community Noise'* (WHO, 1999).
- International Finance Corporation (IFC) World Bank Group *'Environmental, Health and Safety (EHS) Guidelines: General Guidelines'*, Section 1.7 Noise (IFC, 2007a).
- TOTAL General Specification GS EP ENV 001 *'Environmental requirements for project design and E&P activities*'. Section 5.9. Noise level[10] (TOTAL, 2015).
- TOTAL General Specification GS EP ENV 111: '*Environmental Baseline and Monitoring Studies: Onshore Sites'*(TOTAL, 2012).

The measurement and analysis of existing ambient baseline noise levels was conducted in general accordance with the following standards:

- International Standard ISO 1996-1: 2016 *'Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures'* (ISO, 2016).
- International Standard ISO 1996-2: 2007 *'Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels'* (ISO, 2007).
- Australian Standard AS 1055.1: 1997 *'Acoustics – Description and measurement of environmental noise – Part 1: General procedures'* (Standards Australia, 1997a).
- Australian Standard AS 1055.2: 1997 *'Acoustics – Description and measurement of environmental noise – Part 2: Application to specific situations'* (Standards Australia, 1997b).

All noise measurement equipment was calibration checked before and after each survey, with the variation in calibrated noise levels not exceeding the acceptable variation of ±0.5 dBA (AS 1055.1).

All noise measurement equipment used complied with the requirements of AS IEC 61672.1:2004 *'Electroacoustics - Sound level meters – Specifications'* (Standards Australia, 2004a) as a Type 1 precision sound level meter and had an accuracy suitable for both field and laboratory use.

Similarly, the acoustic calibrator used to conduct all field calibration checks complied with AS IEC 60942:2004 *'Electroacoustics – Sound calibrators'* (Standards Australia, 2004b).

Calibration details for all noise measurement and field calibration equipment used are provided in **Table 8**.

[10] The nominated project noise goals are based on the IFC guidelines. In addition to the day and night time noise goals for residential and commercial/industrial areas, the guidelines also allow for background based noise limits.

Table 8 Noise Measurement Equipment and Calibration Details

Instrument	Model	Serial No.	Calibration Certificate	Calibration Date
Acoustic Calibrator	Brüel&Kjær Type 4231	2205467	CAU1601031	2016-09-19
Sound Level Meter	Brüel&Kjær Type 2260	2350039	CAU1601030	2016-09-19
- SLM Microphone	Brüel&Kjær Type 4189	2345513	CAU1601030	2016-09-19
Noise Logger	ARL Ngara	87801E	C16329	2016-06-30
- Logger Microphone	Rion NH-17	317143	C16329	2016-06-30
Noise Logger	ARL Ngara	878048	C16003	2016-01-15
- Logger Microphone	Rion NH-17	315126	C16003	2016-01-15
Noise Logger	ARL Ngara	878049	C16539	2016-10-10
- Logger Microphone	Rion NH-17	315118	C16539	2016-10-10
Noise Logger	ARL Ngara	878086	C15201	2015-04-27
- Logger Microphone	Rion NH-17	318216	C15201	2015-04-27
Noise Logger	ARL Ngara	878053	C16540	2016-10-10
- Logger Microphone	Rion NH-17	316738	C16540	2016-10-10
Noise Logger	ARL Ngara	878037	C15133	2015-04-16
- Logger Microphone	Rion NH-17	315809	C15133	2015-04-16

It should be noted that all sound level meters and field calibrators have an annual calibration requirement, whereas noise loggers are required to be calibrated once every two years. The calibrations were all undertaken at a National Association of Testing Authorities (NATA) accredited laboratory in accordance with ISO / IEC 17025 *'General requirements for the competence of testing and calibration laboratories*' (NATA Australia, 2013).

6.5 Summary of Data Collected

A noise survey was conducted at each site in accordance with the methodology and procedures as outlined in the Scope and Methods planning document.

As previously outlined in **Section 6.1**, the measurement results from the unattended and attended noise surveys provide slightly different data sets, the analysis of which is briefly discussed below.

6.5.1 Unattended Noise Monitoring

The ARL Ngara noise monitoring system used for the bulk of the noise monitoring campaign continuously logs data (including the instantaneous SPL and L_{eq} at 10 samples / second and recorded audio at 12 kHz) over the monitoring period.

Unattended noise monitoring results were then processed and analyzed to allow for data review / exclusions to calculate the ambient background noise levels for each survey location. Noise logging results are provided in **Appendix A**, which includes a graph of the time history (as a short-term 20 second A-weighted L_{eq}) and a table that includes all relevant hourly statistical indices.

A summary of the equipment details and start / finish times for each unattended noise monitoring location is provided in **Table 9**.

Table 9 Unattended Noise Monitoring Details

Location	Serial No.:	Start Time	Stop Time	Duration
ANT-3	87801E^	10-11-2016 9:46	12-11-2016 11:54	50 hours
Fly Camp D	878053	8-11-2016 14:11	11-11-2016 12:10	70 hours
Poroi 1 Village	878086	9-11-2016 11:11	12-11-2016 16:31	77 hours
Purari Airstrip	878037^	9-11-2016 10:17	11-11-2016 12:26	50 hours
Mapaio Fish Camp	878048	9-11-2016 8:34	12-11-2016 15:39	79 hours
Fly Camp E	87801E	8-11-2016 12:21	11-11-2016 9:32	69 hours
Hururu Village	878049	8-11-2016 9:45	11-11-2016 9:46	72 hours
Herd Base 'M Block' Accommodation*	87801E	11-11-2016 16:14	13-11-2016 16:20	48 hours
Herd Base Aviation Tower*	848049	11-11-2016 16:30	13-11-2016 16:30	48 hours

Note * The unattended noise monitoring conducted at Herd Base was for reference purposes only

Note ^ Calibrated audio recordings taken at the Purari Airstrip dwelling and ANT-3 wellpad were post analyzed

The unattended monitoring equipment also included audio recording capability to assist with the identification of extraneous noise (such as periods during adverse weather). After periods of extraneous noise[11] were excluded from the analysis the resultant 'day' and 'night' time background noise levels for each survey location were determined.

As previously discussed, the results will be further reviewed in the noise impact assessment for the EIS (to be conducted at a later date) to determine applicable noise criteria for the various receptor locations to allow for the assessment of Project noise emissions.

6.5.2 Attended Noise Survey

Short term (typically 5 to 15 minute) attended noise measurements were taken using a Brüel&Kjær 2260 SLM when the unattended noise monitoring equipment was deployed / collected at each receptor location.

A summary of the attended noise measurement results for the various sensitive receptor areas is provided in **Table 10**. All attended noise measurement results taken during the field survey are provided in detail in **Appendix B**.

Table 10 Attended Noise Measurement Results at Sensitive Receptor Locations

Location	Measurement Details		Comments	Noise Level, dBA	
				Leq	L90
ANT-3	WP12	Cleared area around capped wellpad	Insect and water noise ~33 to 36 dBA. Intermittent birdsong up to 45 dBA.	38	36
	WP13	Open area near cliff edge above creek	Noise levels dominated by insects in nearby scrub ~41 to 43 dBA	43	41
	WP14	Above bridge which crosses river ~600 m south of camp	Ambient noise environment dominated by noise from flowing river	52	51
Fly Camp D	WP5	Semi-cleared area at edge of bushland	Continuous noise from insects ~41 BA Birds whistling ~47 to 48 dBA	47	41

[11] Periods of heavy rainfall were observed on the night of Wednesday 10 November and from the evening of Friday 11 through early morning of Saturday 12 November. These periods have been identified in the noise monitoring graphs (see **Appendix A**) and excluded from the analysis.

Location	Measurement Details		Comments	Noise Level, dBA	
				Leq	L90
Poroi 1 Village	WP10	Near logger at east end of village	General village noise with roosters up to 57 dBA. Continuous insect noise ~38 dBA	46	39
	WP11	Next to hut ~15 m southwest of grave	Noise from nearby insects ~36 dBA. Nearby conversation from villagers up to 60 dBA.	51	36
Purari Airstrip	WP8	~15 m from riverbank on west side of family dwelling	Continuous noise from insects ~46 dBA with noise from turbulent water	48	46
	WP9	Southeast side of hut near clothesline	Noise from insects in scrub ~46 to 53 dBA. Nearby rooster crowing up to 57 dBA	51	48
Mapaio Fish Camp	Logger	At logger ~2 m from closest hut	General village noise (crowing rooster up to 50 dBA). Distant insect noise ~30 to 34 dBA	43	31
	WP6	Approximately 60 m west of Purari River near inlet	Nearby crowing rooster up to 64 dBA. Continuous insect noise ~ 34 dBA	47	34
	WP7	Approximately 80 m west of Purari River near gardens	Ambient noise levels dominated by insects in scrub ~42 to 54 dBA	45	42
Fly Camp E	WP4	Thick scrub on hill near helipad	Continuous mid/high frequency noise from insects	48	46
Hururu Village	WP1	Near logger location at centre of village	Noise from roosters ~59 to 64 dBA. Continuous insect noise ~44 dBA	46	44
	WP2	Track at northwest corner of village	Intermittent rooster crowing up to 64 dBA. Continuous insect noise ~46 dBA	53	46
	WP3	On beach ~500 m from monitoring location	Continuous noise from rolling waves / ocean swell ~55 dBA w/ nearby loud insects up to 76 dBA	64	56

The attended noise measurement results presented in detail in **Appendix B** will be used to identify any relevant existing noise sources (i.e., noise from the operational wellpad or other relevant noise sources such as those at Herd Base) and will also help inform the noise impact assessment in the EIS.

6.6 Permits Obtained

No permits were required as part of the baseline study.

6.7 Limitations

The noise monitoring was undertaken in accordance with the procedures nominated in the IFC and WHO guidelines (see **Section 6.4**). It should be noted that there is potential for seasonal effects to influence background noise levels depending on weather conditions and local fauna (such as frogs and insects). While the field survey was conducted during the typically dry season, with periods affected by heavy rainfall excluded from the analysis, it is understood that the species of insects which dominate the background noise environment are a constant feature of the area and prevalent throughout the year. Therefore, it is likely that the results are typical of conditions experienced over the seasons.

A decision was made to also deploy a portable weather station at Herd Base (as it is closest to the majority of monitoring locations). The weather station deployed at Herd Base was functioning correctly when it was deployed, however, due to an unforeseen equipment failure the logging data become corrupted with only a small amount retrievable.

While data could not be recovered from the weather station, it was noted during the survey that weather conditions were perfect for noise monitoring (i.e., predominantly calm and dry).

As previously noted in **Section 4.2**, in order for weather conditions to affect the measured background noise levels there has to be either consistently strong winds or heavy rainfall. With the exception of brief periods of rain on the afternoon of Wednesday 9 November and Friday night / Saturday morning of the 10 and 11 November, these conditions did not occur during the survey. This was further verified by:

- Reviewing recorded audio at each monitoring location, and;
- A brief review of historic weather data sourced from Kerema (to the southeast of Hururu Village) and Wabo (north of the capped wellpad at ANT-3).

As the baseline noise measurements presented in this report were taken in the absence of any existing mechanical plant or construction noise sources, the effects of wind direction had no bearing on the measured background noise levels.

Noise from insects located throughout the nearby habitat was found to be the dominant noise source at all monitoring locations and therefore unaffected by wind propagation effects. As such, the resultant noise levels are likely to be similar from all wind directions.

7 BASELINE CHARACTERIZATION

The measured day and night time baseline background noise levels for each noise monitoring location are presented in **Table 11**. The results have been conditionally formatted to easily identify the range of background noise levels whereby the quieter areas are highlighted using a green fill, with the louder areas highlighted using a yellow, orange, and pink fill.

Table 11 Unattended Noise Monitoring Results (November 2016)

		Tue 8	Wed 9	Thu 10	Fri 11	Sat 12	Sun 13	Average
ANT-3 Wellpad - Logger S/N: M10 & 87801E								
Day	$L_{90(15h)}$, 7-22h			38	39	45		38
Night	$L_{90(9h)}$, 22-7h			45	47			46
Fly Camp D - Logger S/N: 878053								
Day	$L_{90(15h)}$, 7-22h	48	41	43	38			42
Night	$L_{90(9h)}$, 22-7h	56	55	56				56
Poroi 1 Village - Logger S/N: 878086								
Day	$L_{90(15h)}$, 7-22h		40	40	39	39		40
Night	$L_{90(9h)}$, 22-7h		43	42	42			42
Purari Airstrip[#] - Logger S/N: M10 & 878037								
Day	$L_{90(15h)}$, 7-22h		45	43	44			44
Night	$L_{90(9h)}$, 22-7h		47	47				47
Mapaio Fish Camp - Logger S/N: 878048								
Day	$L_{90(15h)}$, 7-22h		35	35	35	32		35
Night	$L_{90(9h)}$, 22-7h		41	41	40			41
Fly Camp E - Logger S/N: 87801E								
Day	$L_{90(15h)}$, 7-22h	47	46	45	46			46
Night	$L_{90(9h)}$, 22-7h	56	55	55				55
Hururu Village - Logger S/N: 878049								
Day	$L_{90(15h)}$, 7-22h	42	42	43	41			42
Night	$L_{90(9h)}$, 22-7h	40	37	37				38
Herd Base 'M' Block Accommodation * - Logger S/N: 87801E								
Day	$L_{90(15h)}$, 7-22h				52	53	51	52
Night	$L_{90(9h)}$, 22-7h				50	50		50
Herd Base Aviation Tower* - Logger S/N: 878049								
Day	$L_{90(15h)}$, 7-22h				51	52	51	51
Night	$L_{90(9h)}$, 22-7h				51	51		51

Note * The unattended noise monitoring conducted at Herd Base was for reference purposes only
Note # There is only one garden / fishing hut at this location

Legend

<45 dBA
45 to 50 dBA
51 to 55 dBA
>55 dBA

Observations taken during the noise survey and analysis process are presented below:

- Background noise levels at all locations are generally dominated by insect noise with clear noticeable tones between 4 kHz and 8 kHz.
- There is a distinct increase in background noise levels during the night period at many locations owing to increased insect activity typical of PNG.
- The background noise levels around the fly camps were consistently high during the night period with levels typically around 55 dBA L_{90}. This is attributed to the thick forest surrounding (and in close proximity of) the monitoring location which provides habitat for insects and fauna (frogs, bats).
- The measured background noise levels during the day period at Fly Camp E were observed to typically be 2 to 5 dBA louder than those at Fly Camp D. It is assumed that this is due to the thicker undergrowth surrounding the monitoring location at Fly Camp E resulting in higher levels of insect activity.
- The small dwelling at Purari Airstrip and the clearing at ANT-3 were observed to both have elevated levels of insect noise during the night period (compared to the village monitoring locations) with levels typically between 45 and 47 dBA, L_{90}. It was noted that both locations were surrounded by undergrowth as compared to the cleared villages.
- For the villages and larger settlement areas where most of the surrounding insect and fauna habitation had been cleared, the night time background noise levels were much lower (relative to the fly camp areas) with the measured noise levels ranging from 38 to 42 dBA, L_{90}.
- The villages were also affected by intermittent noise associated with normal habitation such as voice / conversation noise, roosters crowing, dogs barking etc. For the larger Hururu Village located near the coastline, review of the recorded audio indicated use of a chainsaw and a diesel power generator (which was at times used to power a radio). However, it is noted that these activities occurred mostly for short periods of time and were excluded from the analysis in accordance with standard procedure.
- For some villages located along the Purari River the background noise levels were at times also affected by noise from nearby turbulent regions in the river. Although, it is noted that the relative contribution from any river noise was minimal compared to the continuous noise from the insects.
- The unattended noise monitoring at Herd Base was conducted for reference purposes only. A brief summary of these results is provided below:
    - The monitoring results were dominated by noise from the diesel power generation units, air-conditioning plant, and refrigerated cooling units.
    - The noise logger near the aviation tower was also affected by high noise levels associated with helicopter activity (typically around 90 dBA, L_{max}).
    - Inside the accommodation blocks the background noise levels were dominated by air-conditioning noise (typically around 46 dBA, L_{90}), which provides effective masking from other noise sources.

The average background noise levels presented in **Table 12** are organized by general study area and monitoring location. The results have been provided alongside ambient noise level guidelines for residential receptors provided in the IFC Guidelines and Total General Specification documents (see Section 3.3.2).

Table 12 Measured Background and Residential Guideline Noise Levels

Study Area	General Description of Receptor Location	Receptor	Period	Average Background Noise Level dBA, L_{90}	IFC Noise Level Guidelines dBA, $L_{eq(1h)}$*
Production, processing and related facilities	Remote uninhabited historic wellpad	ANT-3 Wellpad	Day, 7-22h	38	55
			Night, 22-7h	46	45
	Uninhabited forest	Fly Camp D	Day, 7-22h	42	55
			Night, 22-7h	56	45
	Established villages	Poroi 1 Village	Day, 7-22h	40	55
			Night, 22-7h	42	45
		Mapaio Fish Camp	Day, 7-22h	35	55
			Night, 22-7h	41	45
	Single dwelling near operational airstrip	Purari Airstrip	Day, 7-22h	44	55
			Night, 22-7h	47	45
	Existing operational logistics base	Herd Base 'M Block' Accommodation	Day, 7-22h	52	N/A#
			Night, 22-7h	50	N/A#
		Herd Base Aviation Tower	Day, 7-22h	51	N/A#
			Night, 22-7h	51	N/A#
Onshore Pipeline	Uninhabited forest	Fly Camp E	Day, 7-22h	46	55
			Night, 22-7h	56	45
	Established coastal village	Hururu Village	Day, 7-22h	42	55
			Night, 22-7h	38	45

Note * In accordance with EHS Guidelines, Section 1.7 for off-site residential receptors

Note # The monitoring conducted at Herd Base was for reference purposes only. Project related noise sensitive receptors will be considered in detail in the noise impact assessment in the EIS. As such, noise level guidelines have not been provided for these locations

The noise monitoring results summarized above will be further reviewed during the impact assessment phase to determine noise assessment criteria against which the Project will be assessed in the EIS.

8 CONCLUSIONS

The objectives of the noise baseline study were to:

- Define the study area for the noise baseline characterization that would also support an impact assessment.
- Identify potentially sensitive receptors within the study area, such as local villages and ecosystems.
- Measure and quantify existing ambient background noise levels at sensitive receptor areas surrounding critical upstream infrastructure that may be impacted by noise from the Project.

These objectives have been met by the planning and execution of the field survey (including post analysis of data) that was conducted in the upstream Project area between 7 and 14 November 2016.

During the field survey, baseline unattended noise monitoring was conducted at a total of nine (9) separate monitoring locations (two of which were conducted at Herd Base for reference purposes only) within the upstream Project area.

The results of the noise monitoring indicate that while some areas may be affected by natural sources (such as fast flowing water or ocean swell); the ambient noise environment is generally dominated by local insect noise, with levels generally increasing during the night period. It is noted that the upstream field survey noise monitoring results provide a sufficient baseline dataset to complete the impact assessment to follow.

At the established villages, where the surrounding undergrowth and forest had been cleared to make way for housing and gardens, the resultant night time background noise levels were significantly quieter than the remote locations where project infrastructure is proposed.

Despite the limited existing baseline data available, the noise measurement results in the village areas were typical of those previously taken in PNG by SLR Consulting. For the remote fly camp monitoring locations (which were surrounded by forest with dense understorey), the measured noise levels during the night period were significantly higher than at other monitoring locations due to the high prevalence and close proximity of surrounding insects.

9 STUDY TEAM

The study team consisted of the following SLR personnel:

Gustaf Reutersward – Technical Director: Acoustics, Noise & Vibration Team Lead

- Provide technical oversight for all acoustics, noise, and vibration works undertaken by SLR Consulting on the Project.

Ima Fricker – Senior Project Consultant: Acoustics, Noise & Vibration Specialist

- Assist with preparation of all pre-planning documentation and logistics required to undertake upstream field survey for baseline noise report.
- Field team lead during baseline noise survey from 7 through 14 November 2016.
- Analysis and reporting of field survey results.
- Preparation of upstream baseline noise report.

David Woodcock – Project Consultant: Acoustics, Noise & Vibration Specialist

- Assist with preparation of all pre-planning documentation and logistics required to undertake upstream field survey for baseline noise report.
- Field assistant during baseline noise survey from 7 through 14 November 2016.
- Assist with analysis and reporting of all field survey results.

10 REFERENCES

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Appendix A Unattended Noise Monitoring Results

SLR Consulting Australia Pty Ltd

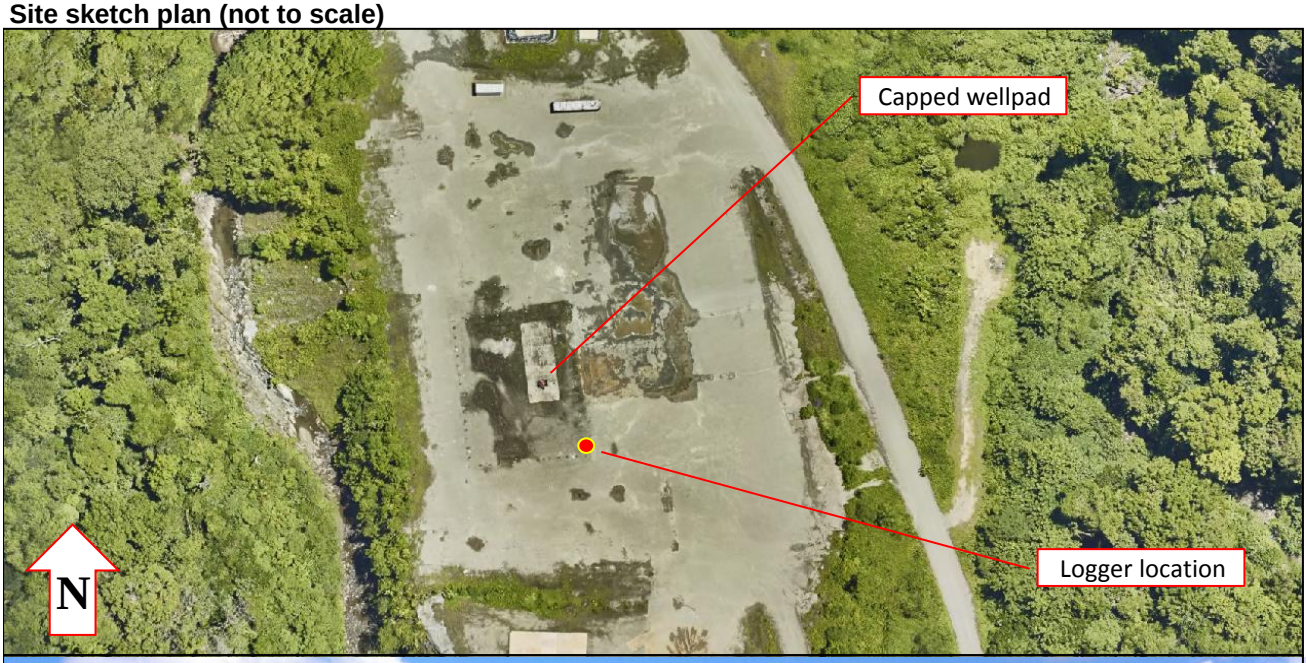
Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: ANT-3 Capped (Historical) Wellpad
Measurement period: Thursday 10 to Saturday 12 November 2016
GPS Coordinates (UTM Zone 55): 294826m E, 9209993m S
Microphone position: 1.3m AGL in clearing 18m SSE of capped wellpad
Prevailing ambient noise environment: Continuous insect noise
Prevailing weather conditions: Calm winds with heavy rains on Wed afternoon 4pm to 6pm and Sat morning from 1am to 7am
Measured noise level, dBA L90, Day: 38, 39, 45
Measured noise level, dBA L90, Night: 45, 47

Site sketch plan (not to scale)



SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 620.11227 **Location:** ANT-3 Wellpad
Microphone position: 1.3m AGL in clearing near capped well
Initial calibration: 94 dBA **Final calibration:** 94 dBA

Hour	Sound Pressure Level, dB(A)																				
	Thu, 10-11-2016			Fri, 11-11-2016			Sat, 12-11-2016														
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				48.1	47.1	47.7	55.1	47.8	51.9												
01:00 to 02:00				48.5	47.3	48.0	53.4*	48.4*	51.1*												
02:00 to 03:00				48.6	47.6	48.3	56.4*	49*	54*												
03:00 to 04:00				48.3	47.3	47.9	59*	52.2*	56.1*												
04:00 to 05:00				47.3	44.3	46.1	58.3*	52.3*	56.3*												
05:00 to 06:00				45.6	40.2	44.1	65.2*	54.7*	61.3*												
06:00 to 07:00				43.9	37.3	42.7	59.8*	50.8*	57.4*												
07:00 to 08:00				43.3	37.5	41.4	50.3	48.0	49.5												
08:00 to 09:00				60.2	38.2	66.7	61.6	46.3	66.7												
09:00 to 10:00	70.1	35.9	81.1	45.2	38.2	47.9	46.8	44.9	46.2												
10:00 to 11:00	40.0	35.3	38.9	44.9	37.9	60.9	46.9	43.9	59.6												
11:00 to 12:00	54.1	36.1	53.8	58.8	37.5	63.2	45.0	42.5	44.0												
12:00 to 13:00	39.7	36.6	38.5	45.7	37.3	54.1															
13:00 to 14:00	40.6	36.2	40.2	41.1	38.1	40.0															
14:00 to 15:00	42.6	36.9	40.3	66.6	36.9	63.5															
15:00 to 16:00	46.7	35.5	53.0	52.8	37.1	54.3															
16:00 to 17:00	59.3	36.8	56.4	56.1	38.2	62.8															
17:00 to 18:00	50.1	39.4	47.6	49.2	36.7	48.1															
18:00 to 19:00	52.2	40.8	51.0	43.1	39.8	51.6															
19:00 to 20:00	61.1*	46.4*	56.7*	43.0	41.4	45.3															
20:00 to 21:00	56.4*	52.8*	55.2*	51.7	42.5	49.0															
21:00 to 22:00	47.7	46.4	47.3	49.0	46.4	48.1															
22:00 to 23:00	47.3	45.9	46.8	50.9	46.6	48.6															
23:00 to 24:00	47.9	47.0	47.6	52.3	47.1	50.1															
$L10_{(18h),\ ar.av.}$ 6-24h				49.9																	
$L_{eq(15h),\ log\ av.}$ 7-22h						59.4															
$L_{eq(9h),\ log\ av.}$ 22-7h			46.9																		
$L_{eq(24h),\ log\ av.}$ 0-24h						57.5															
L90 Day, 7-22h		37.8			38.9			45.1													
L90 Evening, 18-22h		43.6			42.5																
L90 Night, 22-7h		44.9			47.2																
Wind @0900h, km/h																					
Wind @1500h, km/h																					

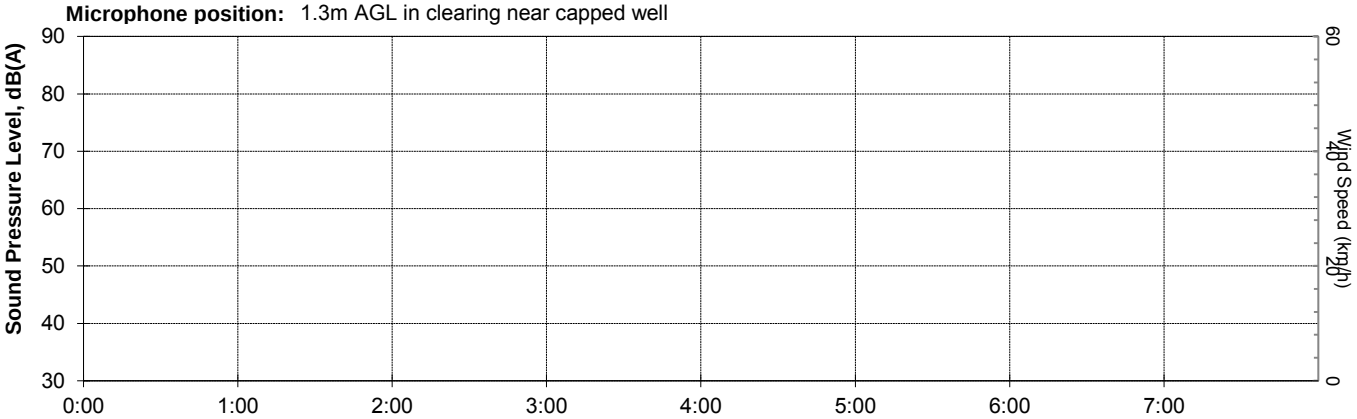
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

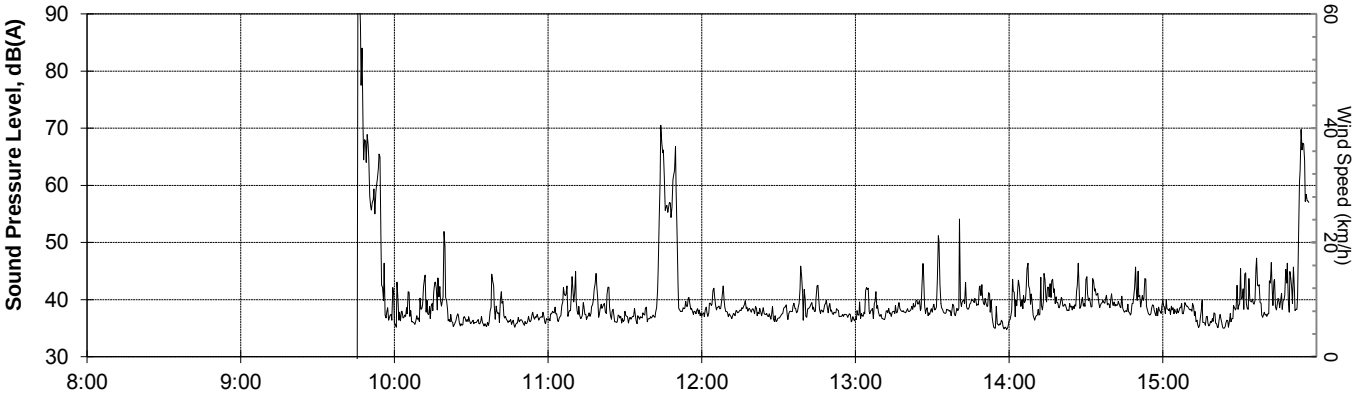
Results of Noise Monitoring

Client: ToTAL **Location** ANT-3 Wellpad **Date:** Thursday 10 Nov 2016

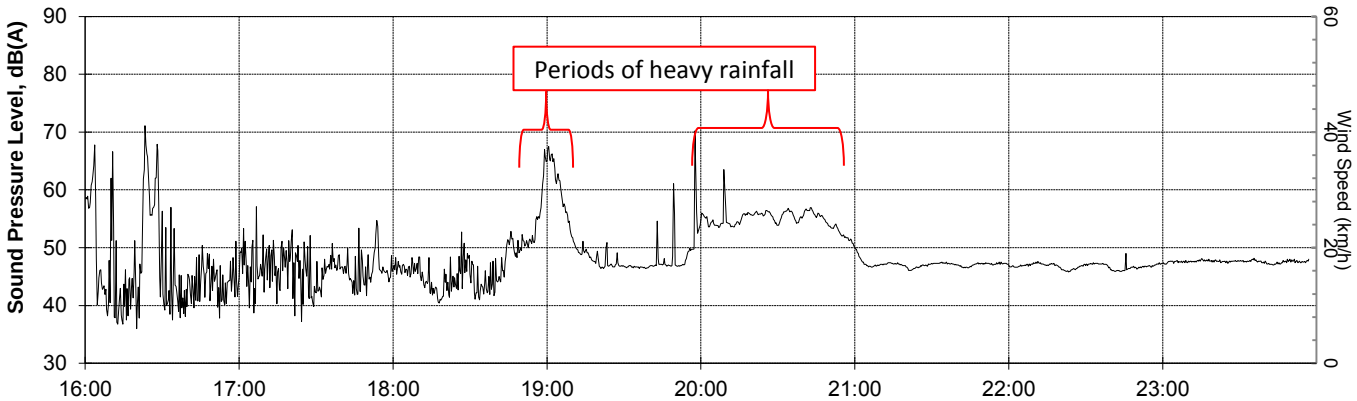
Microphone position: 1.3m AGL in clearing near capped well



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax = 102.3	Lmax = 62.8	Lmax = 74.4	Lmax = 52.3	Lmax = 70.0	Lmax = 57.6	Lmax = 74.1
L01 =	L01 = 93.9	L01 = 48.1	L01 = 67.7	L01 = 44.3	L01 = 47.6	L01 = 47.3	L01 = 67.3
L05 =	L05 = 87.0	L05 = 42.2	L05 = 59.9	L05 = 41.1	L05 = 42.5	L05 = 44.2	L05 = 57.5
L10 =	L10 = 70.1	L10 = 40.0	L10 = 54.1	L10 = 39.7	L10 = 40.6	L10 = 42.6	L10 = 46.7
L50 =	L50 = 55.9	L50 = 36.4	L50 = 37.6	L50 = 37.7	L50 = 38.0	L50 = 38.8	L50 = 38.1
L75 =	L75 = 38.5	L75 = 35.8	L75 = 36.6	L75 = 37.1	L75 = 37.2	L75 = 37.9	L75 = 36.8
L90 =	L90 = 35.9	L90 = 35.3	L90 = 36.1	L90 = 36.6	L90 = 36.2	L90 = 36.9	L90 = 35.5
L95 =	L95 = 35.0	L95 = 34.8	L95 = 35.4	L95 = 35.9	L95 = 34.7	L95 = 34.8	L95 = 34.6
Leq =	Leq = 81.1	Leq = 38.9	Leq = 53.8	Leq = 38.5	Leq = 40.2	Leq = 40.3	Leq = 53.0



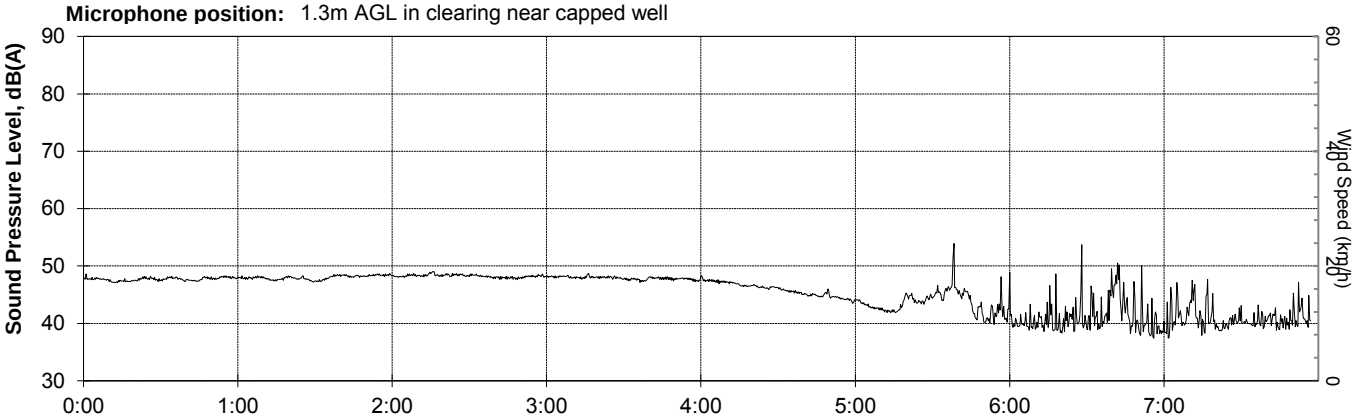
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 81.7	Lmax = 69.7	Lmax = 69.6	Lmax = 80.9	Lmax = 71.9	Lmax = 53.5	Lmax = 60.8	Lmax = 49.2
L01 = 69.0	L01 = 56.9	L01 = 63.5	L01 = 67.2	L01 = 58.5	L01 = 50.7	L01 = 47.8	L01 = 48.3
L05 = 63.0	L05 = 52.6	L05 = 55.4	L05 = 64.9	L05 = 56.9	L05 = 48.6	L05 = 47.5	L05 = 48.1
L10 = 59.3	L10 = 50.1	L10 = 52.2	L10 = 61.1	L10 = 56.4	L10 = 47.7	L10 = 47.3	L10 = 47.9
L50 = 41.6	L50 = 44.5	L50 = 45.0	L50 = 47.3	L50 = 54.7	L50 = 47.0	L50 = 46.7	L50 = 47.5
L75 = 38.2	L75 = 41.5	L75 = 42.0	L75 = 46.6	L75 = 53.7	L75 = 46.7	L75 = 46.3	L75 = 47.2
L90 = 36.8	L90 = 39.4	L90 = 40.8	L90 = 46.4	L90 = 52.8	L90 = 46.4	L90 = 45.9	L90 = 47.0
L95 = 35.7	L95 = 36.7	L95 = 39.5	L95 = 45.9	L95 = 50.8	L95 = 45.8	L95 = 45.4	L95 = 46.6
Leq = 56.4	Leq = 47.6	Leq = 51.0	Leq = 56.7	Leq = 55.2	Leq = 47.3	Leq = 46.8	Leq = 47.6

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

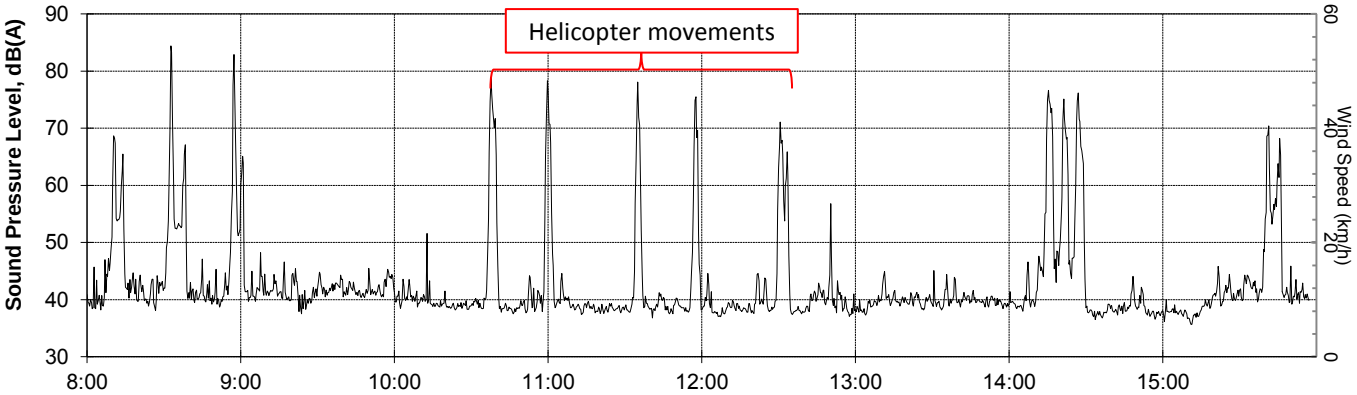
Results of Noise Monitoring

Client: ToTAL **Location** ANT-3 Wellpad **Date:** Friday 11 Nov 2016

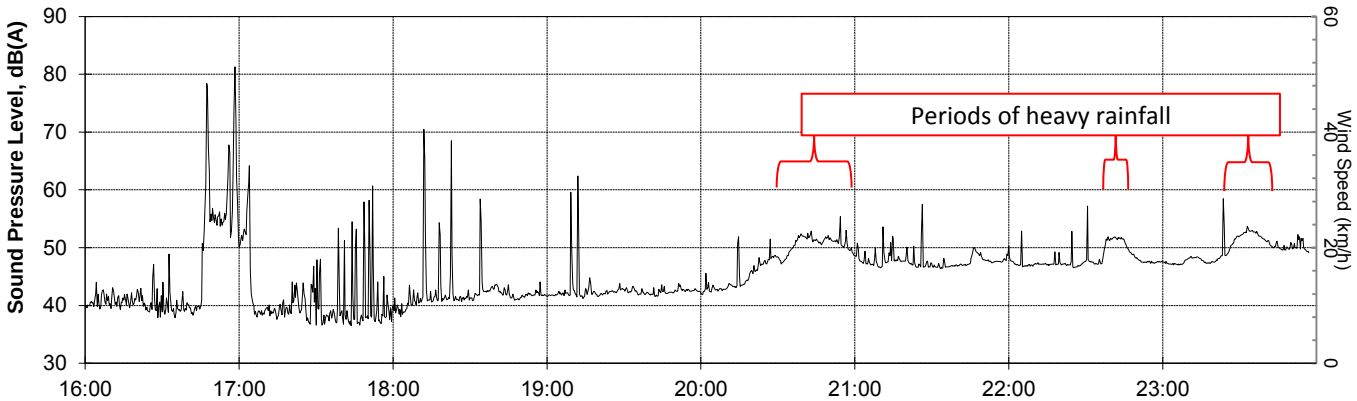
Microphone position: 1.3m AGL in clearing near capped well



Lmax =	52.8	Lmax =	53.0	Lmax =	52.4	Lmax =	50.9	Lmax =	50.7	Lmax =	67.0	Lmax =	70.0	Lmax =	61.3
L01 =	48.6	L01 =	48.9	L01 =	49.1	L01 =	48.9	L01 =	47.9	L01 =	50.9	L01 =	52.6	L01 =	49.8
L05 =	48.3	L05 =	48.6	L05 =	48.8	L05 =	48.5	L05 =	47.5	L05 =	47.1	L05 =	46.7	L05 =	45.5
L10 =	48.1	L10 =	48.5	L10 =	48.6	L10 =	48.3	L10 =	47.3	L10 =	45.6	L10 =	43.9	L10 =	43.3
L50 =	47.6	L50 =	47.9	L50 =	48.1	L50 =	47.8	L50 =	46.0	L50 =	42.8	L50 =	39.1	L50 =	39.4
L75 =	47.3	L75 =	47.6	L75 =	47.9	L75 =	47.5	L75 =	44.9	L75 =	41.9	L75 =	38.2	L75 =	38.4
L90 =	47.1	L90 =	47.3	L90 =	47.6	L90 =	47.3	L90 =	44.3	L90 =	40.2	L90 =	37.3	L90 =	37.5
L95 =	46.7	L95 =	46.9	L95 =	47.2	L95 =	46.8	L95 =	43.6	L95 =	38.9	L95 =	36.1	L95 =	36.2
Leq =	47.7	Leq =	48.0	Leq =	48.3	Leq =	47.9	Leq =	46.1	Leq =	44.1	Leq =	42.7	Leq =	41.4



Lmax =	90.1	Lmax =	72.9	Lmax =	83.5	Lmax =	83.7	Lmax =	73.5	Lmax =	59.6	Lmax =	82.1	Lmax =	79.1
L01 =	81.7	L01 =	61.6	L01 =	76.1	L01 =	77.1	L01 =	68.3	L01 =	45.1	L01 =	76.1	L01 =	69.0
L05 =	66.1	L05 =	47.7	L05 =	63.7	L05 =	70.4	L05 =	59.8	L05 =	42.1	L05 =	72.4	L05 =	57.3
L10 =	60.2	L10 =	45.2	L10 =	44.9	L10 =	58.8	L10 =	45.7	L10 =	41.1	L10 =	66.6	L10 =	52.8
L50 =	41.3	L50 =	40.2	L50 =	39.0	L50 =	38.7	L50 =	38.4	L50 =	39.4	L50 =	39.2	L50 =	39.8
L75 =	39.2	L75 =	39.2	L75 =	38.3	L75 =	38.0	L75 =	37.7	L75 =	38.8	L75 =	37.7	L75 =	38.0
L90 =	38.2	L90 =	38.2	L90 =	37.9	L90 =	37.5	L90 =	37.3	L90 =	38.1	L90 =	36.9	L90 =	37.1
L95 =	36.6	L95 =	36.4	L95 =	37.2	L95 =	36.9	L95 =	36.7	L95 =	37.3	L95 =	36.2	L95 =	35.7
Leq =	66.7	Leq =	47.9	Leq =	60.9	Leq =	63.2	Leq =	54.1	Leq =	40.0	Leq =	63.5	Leq =	54.3



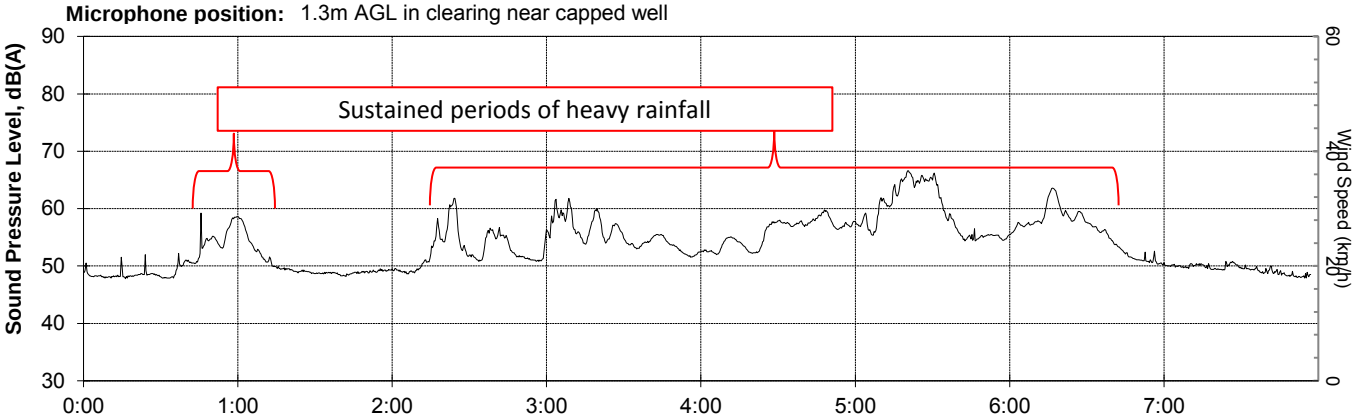
Lmax =	85.7	Lmax =	72.6	Lmax =	87.3	Lmax =	73.5	Lmax =	64.0	Lmax =	71.4	Lmax =	69.6	Lmax =	74.3
L01 =	77.2	L01 =	61.4	L01 =	58.1	L01 =	47.6	L01 =	54.5	L01 =	53.4	L01 =	53.3	L01 =	53.9
L05 =	62.5	L05 =	52.5	L05 =	44.1	L05 =	43.6	L05 =	52.5	L05 =	49.9	L05 =	51.6	L05 =	52.7
L10 =	56.1	L10 =	49.2	L10 =	43.1	L10 =	43.0	L10 =	51.7	L10 =	49.0	L10 =	50.9	L10 =	52.3
L50 =	40.4	L50 =	38.2	L50 =	41.4	L50 =	42.1	L50 =	47.7	L50 =	47.2	L50 =	47.3	L50 =	49.2
L75 =	39.1	L75 =	37.4	L75 =	40.6	L75 =	41.7	L75 =	43.5	L75 =	46.7	L75 =	46.9	L75 =	47.6
L90 =	38.2	L90 =	36.7	L90 =	39.8	L90 =	41.4	L90 =	42.5	L90 =	46.4	L90 =	46.6	L90 =	47.1
L95 =	37.1	L95 =	35.9	L95 =	37.4	L95 =	41.0	L95 =	41.7	L95 =	45.9	L95 =	46.2	L95 =	46.7
Leq =	62.8	Leq =	48.1	Leq =	51.6	Leq =	45.3	Leq =	49.0	Leq =	48.1	Leq =	48.6	Leq =	50.1

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

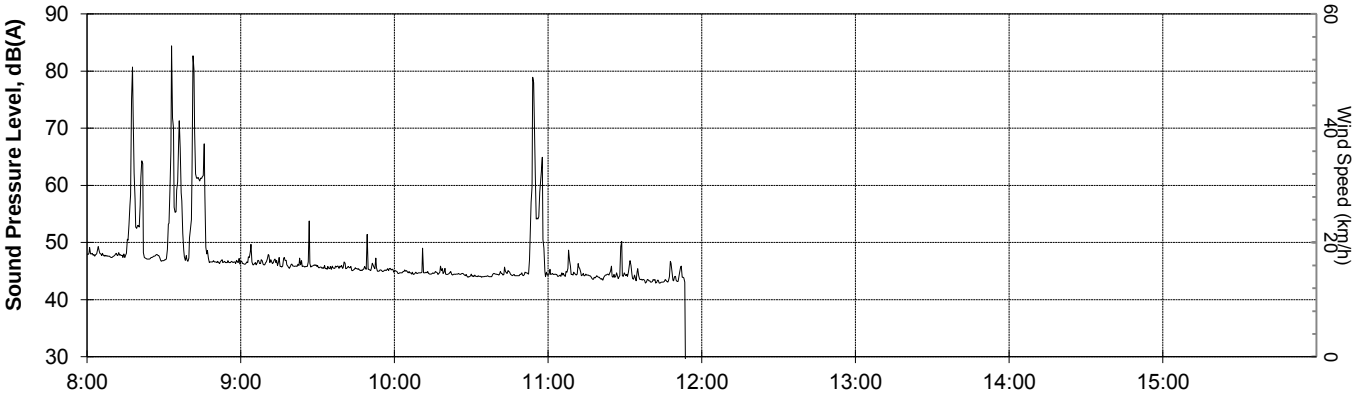
Results of Noise Monitoring

Client: ToTAL **Location** ANT-3 Wellpad **Date:** Saturday 12 Nov 2016

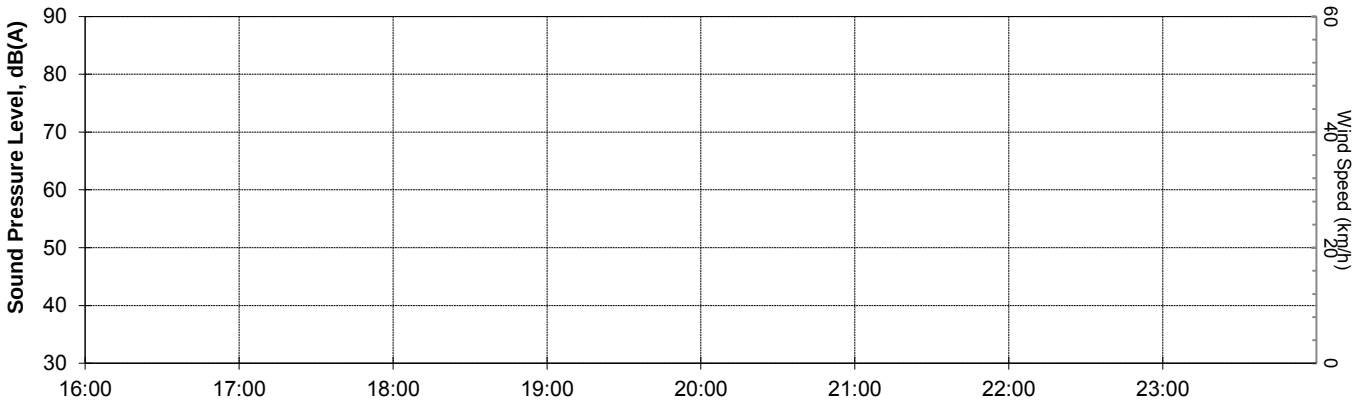
Microphone position: 1.3m AGL in clearing near capped well



Lmax =	68.1	Lmax =	63.1	Lmax =	66.1	Lmax =	64.9	Lmax =	66.6	Lmax =	68.8	Lmax =	64.7	Lmax =	59.7
L01 =	58.8	L01 =	58.4	L01 =	61.5	L01 =	61.5	L01 =	59.8	L01 =	66.4	L01 =	63.5	L01 =	52.0
L05 =	57.4	L05 =	56.4	L05 =	59.4	L05 =	59.9	L05 =	58.9	L05 =	65.7	L05 =	62.3	L05 =	50.6
L10 =	55.1	L10 =	53.4	L10 =	56.4	L10 =	59.0	L10 =	58.3	L10 =	65.2	L10 =	59.8	L10 =	50.3
L50 =	48.6	L50 =	49.1	L50 =	51.6	L50 =	54.8	L50 =	56.4	L50 =	58.1	L50 =	56.7	L50 =	49.4
L75 =	48.1	L75 =	48.7	L75 =	50.5	L75 =	53.6	L75 =	53.1	L75 =	55.3	L75 =	52.9	L75 =	48.6
L90 =	47.8	L90 =	48.4	L90 =	49.0	L90 =	52.2	L90 =	52.3	L90 =	54.7	L90 =	50.8	L90 =	48.0
L95 =	47.5	L95 =	47.9	L95 =	48.4	L95 =	51.4	L95 =	51.9	L95 =	54.1	L95 =	50.2	L95 =	47.5
Leq =	51.9	Leq =	51.1	Leq =	54.0	Leq =	56.1	Leq =	56.3	Leq =	61.3	Leq =	57.4	Leq =	49.5



Lmax =	89.9	Lmax =	68.6	Lmax =	84.0	Lmax =	66.6	Lmax =		Lmax =		Lmax =		Lmax =	
L01 =	81.3	L01 =	49.9	L01 =	70.0	L01 =	47.9	L01 =		L01 =		L01 =		L01 =	
L05 =	69.0	L05 =	47.5	L05 =	56.4	L05 =	45.8	L05 =		L05 =		L05 =		L05 =	
L10 =	61.6	L10 =	46.8	L10 =	46.9	L10 =	45.0	L10 =		L10 =		L10 =		L10 =	
L50 =	47.6	L50 =	45.6	L50 =	44.4	L50 =	43.9	L50 =		L50 =		L50 =		L50 =	
L75 =	46.8	L75 =	45.2	L75 =	44.1	L75 =	43.2	L75 =		L75 =		L75 =		L75 =	
L90 =	46.3	L90 =	44.9	L90 =	43.9	L90 =	42.5	L90 =		L90 =		L90 =		L90 =	
L95 =	45.9	L95 =	44.6	L95 =	43.6	L95 =	21.2	L95 =		L95 =		L95 =		L95 =	
Leq =	66.7	Leq =	46.2	Leq =	59.6	Leq =	44.0	Leq =		Leq =		Leq =		Leq =	



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Fly Camp D
Measurement period: Tuesday 8 to Friday 11 November 2016
GPS Coordinates (UTM Zone 55): 294442m E, 9191245m S
Microphone position: 1.6m AGL in scrub on bund east of clearing on logging road
Prevailing ambient noise environment: Continuous high levels of insect & local wildlife noise
Prevailing weather conditions: Predominantly calm & dry with heavy rain on Wednesday evening from 5pm to 7pm.
Measured noise level, dBA L90, Day: 48, 41, 43, 38
Measured noise level, dBA L90, Night: 56, 55, 56

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 620.11227 **Location:** Fly Camp D
Microphone position: 1.6m AGL under open tree canopy
Initial calibration: 94 dBA **Final calibration:** 94.1 dBA

Hour	Sound Pressure Level, dB(A)																				
	Tue, 08-11-2016			Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016											
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				62.6	61.3	62.0	61.8	60.4	61.3	62.3	59.6	61.2									
01:00 to 02:00				63.1	61.0	62.2	61.7	60.0	61.0	61.5	59.5	60.6									
02:00 to 03:00				62.2	60.4	61.5	61.1	58.8	60.1	61.1	59.6	60.5									
03:00 to 04:00				61.5	59.5	60.7	58.8	57.3	58.2	61.0	59.0	60.1									
04:00 to 05:00				60.7	53.7	58.5	57.6	51.9	55.6	58.7	53.4	57.1									
05:00 to 06:00				56.4	47.2	54.3	55.2	46.7	53.5	53.8	48.3	52.8									
06:00 to 07:00				51.6	41.1	48.4	50.7	42.5	47.9	52.6	43.6	49.6									
07:00 to 08:00				46.0	39.0	45.7	47.7	40.7	46.6	49.3	39.3	48.3									
08:00 to 09:00				52.2	38.7	50.2	49.4	37.9	45.2	53.5	39.0	48.9									
09:00 to 10:00				56.1	36.3	50.2	56.5	37.2	51.3	52.9	38.7	48.6									
10:00 to 11:00				59.0	36.3	55.9	53.5	37.9	49.8	52.4	36.0	48.2									
11:00 to 12:00				56.9	31.8	50.6	47.3	35.2	44.1	53.2	36.4	49.0									
12:00 to 13:00				56.7	32.0	50.8	57.1	35.9	52.0												
13:00 to 14:00				53.2	35.9	48.3	56.9	36.4	54.0												
14:00 to 15:00	60.0	45.2	76.6	50.8	35.4	49.6	53.3	36.6	50.1												
15:00 to 16:00	63.6	39.8	74.8	47.6	34.9	43.3	54.5	42.4	52.3												
16:00 to 17:00	54.9	38.3	50.5	51.2	40.5	49.0	53.2	41.5	49.5												
17:00 to 18:00	53.1	43.6	49.9	78.2*	56.5*	72.2*	51.8	41.2	47.8												
18:00 to 19:00	63.3	52.3	59.8	65.1*	55.6*	60.7*	64.3	51.7	59.7												
19:00 to 20:00	54.4	51.4	53.3	58.7	56.7	57.9	56.4	54.2	55.5												
20:00 to 21:00	56.8	54.3	56.0	59.3	57.1	58.4	57.4	54.4	56.2												
21:00 to 22:00	60.5	57.6	59.4	60.7	57.6	59.5	59.9	57.3	58.8												
22:00 to 23:00	62.4	60.1	61.7	61.5	60.0	60.9	61.3	59.1	60.4												
23:00 to 24:00	62.1	60.6	61.5	62.1	60.6	61.5	61.8	58.9	60.5												
$L10_{(18h),\ ar.av.}$ 6-24h				55.2			55.2														
$L_{eq(15h),\ log\ av.}$ 7-22h						54.1			53.8												
$L_{eq(9h),\ log\ av.}$ 22-7h			60.4			59.3			59.3												
$L_{eq(24h),\ log\ av.}$ 0-24h						57.7			56.5												
L90 Day, 7-22h		47.8			40.9			42.7			37.9										
L90 Evening, 18-22h		53.9						54.4													
L90 Night, 22-7h		56.1			55.4			55.7													
Wind @0900h, km/h																					
Wind @1500h, km/h																					

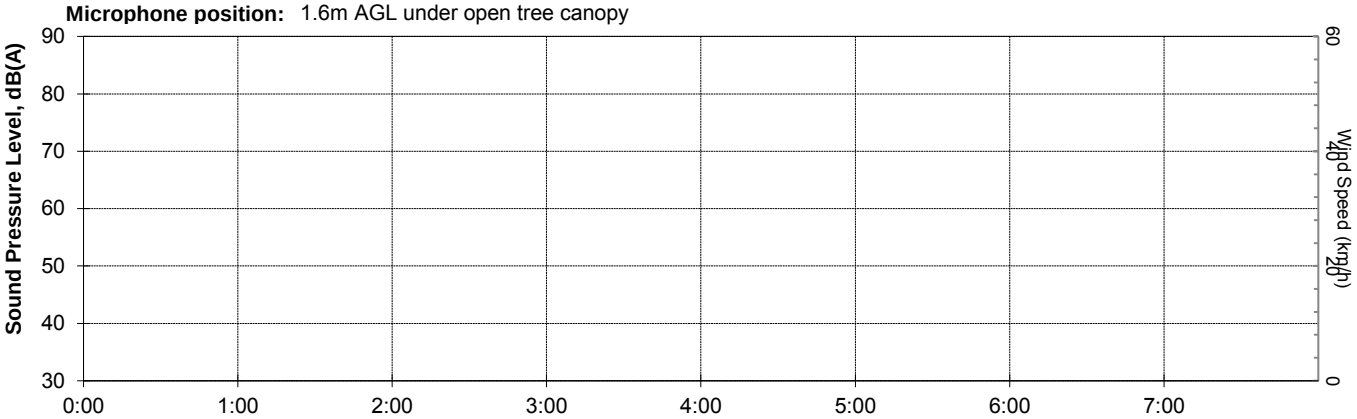
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

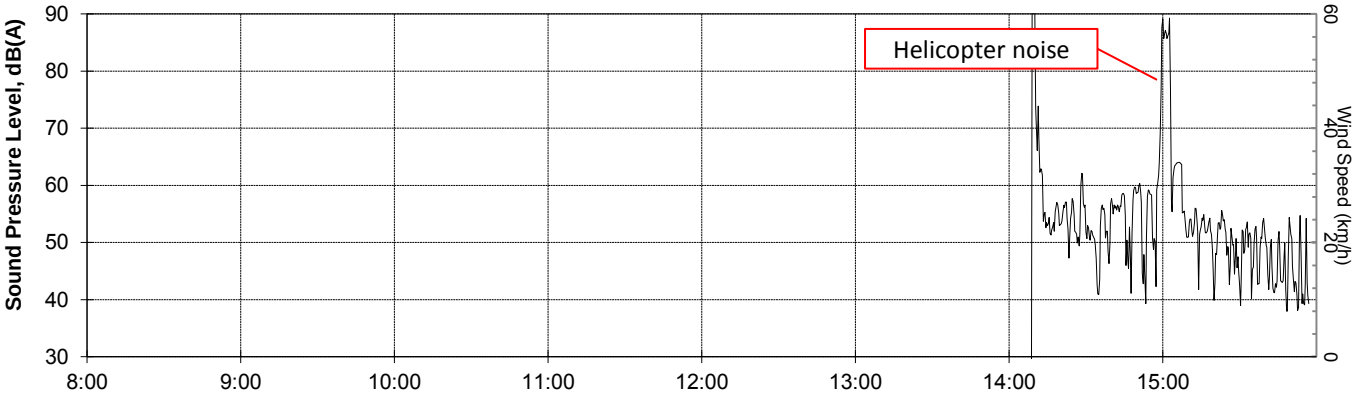
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp D **Date:** Tuesday 08 Nov 2016

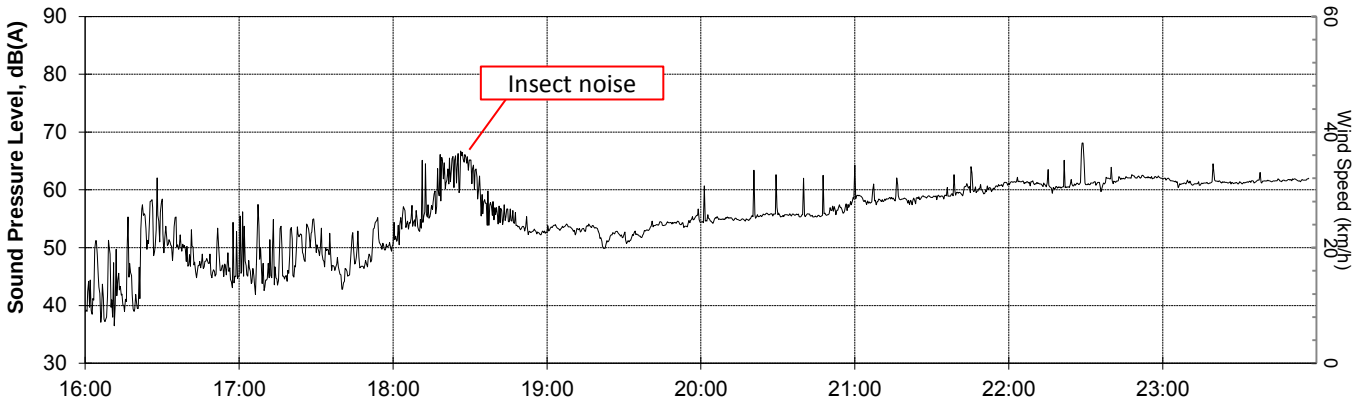
Microphone position: 1.6m AGL under open tree canopy



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax = 102.6	Lmax = 93.2
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 = 93.9	L01 = 88.3
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 = 62.4	L05 = 85.0
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 = 60.0	L10 = 63.6
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 = 54.5	L50 = 51.1
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 = 49.9	L75 = 43.4
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 = 45.2	L90 = 39.8
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 = 38.8	L95 = 37.4
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq = 76.6	Leq = 74.8



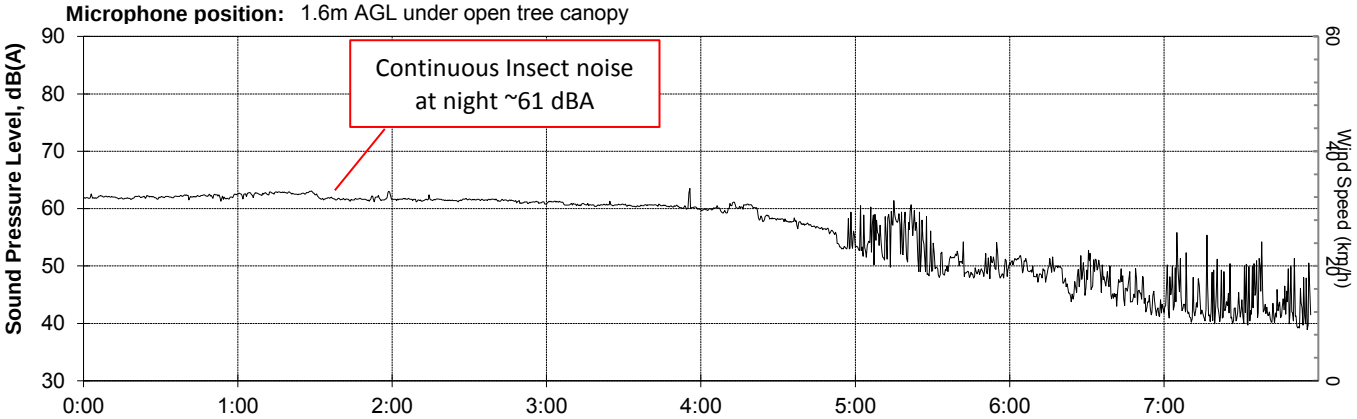
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 69.2	Lmax = 69.6	Lmax = 71.4	Lmax = 66.8	Lmax = 76.9	Lmax = 69.1	Lmax = 78.4	Lmax = 68.5
L01 = 58.8	L01 = 56.8	L01 = 69.3	L01 = 55.8	L01 = 60.2	L01 = 64.4	L01 = 68.0	L01 = 62.9
L05 = 56.5	L05 = 54.2	L05 = 66.5	L05 = 54.8	L05 = 57.5	L05 = 60.9	L05 = 62.7	L05 = 62.3
L10 = 54.9	L10 = 53.1	L10 = 63.3	L10 = 54.4	L10 = 56.8	L10 = 60.5	L10 = 62.4	L10 = 62.1
L50 = 46.5	L50 = 47.4	L50 = 54.7	L50 = 53.2	L50 = 55.3	L50 = 58.8	L50 = 61.3	L50 = 61.3
L75 = 42.6	L75 = 45.1	L75 = 53.4	L75 = 52.3	L75 = 54.7	L75 = 58.2	L75 = 60.7	L75 = 60.9
L90 = 38.3	L90 = 43.6	L90 = 52.3	L90 = 51.4	L90 = 54.3	L90 = 57.6	L90 = 60.1	L90 = 60.6
L95 = 36.0	L95 = 41.2	L95 = 50.1	L95 = 49.7	L95 = 53.5	L95 = 56.1	L95 = 58.9	L95 = 59.9
Leq = 50.5	Leq = 49.9	Leq = 59.8	Leq = 53.3	Leq = 56.0	Leq = 59.4	Leq = 61.7	Leq = 61.5

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

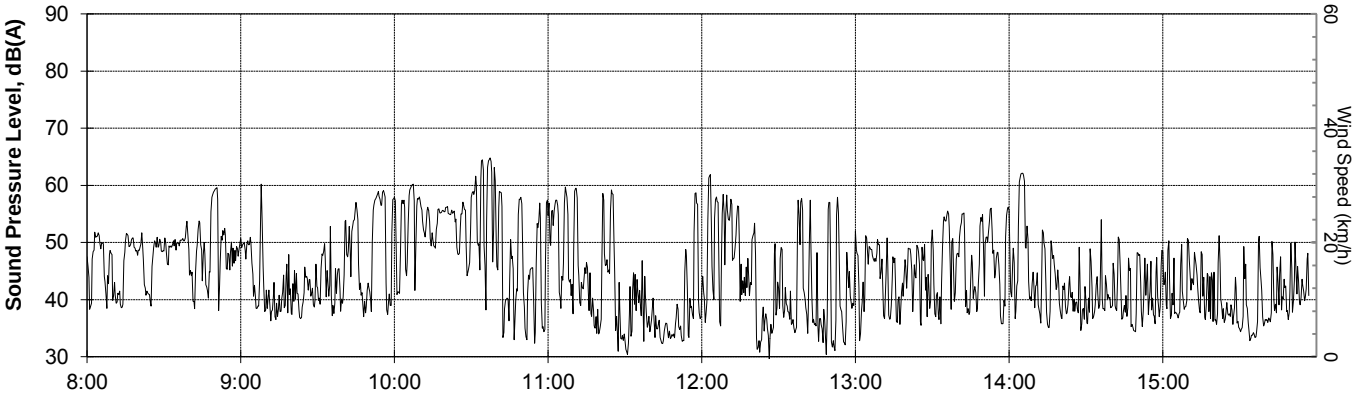
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp D **Date:** Wednesday 09 Nov 2016

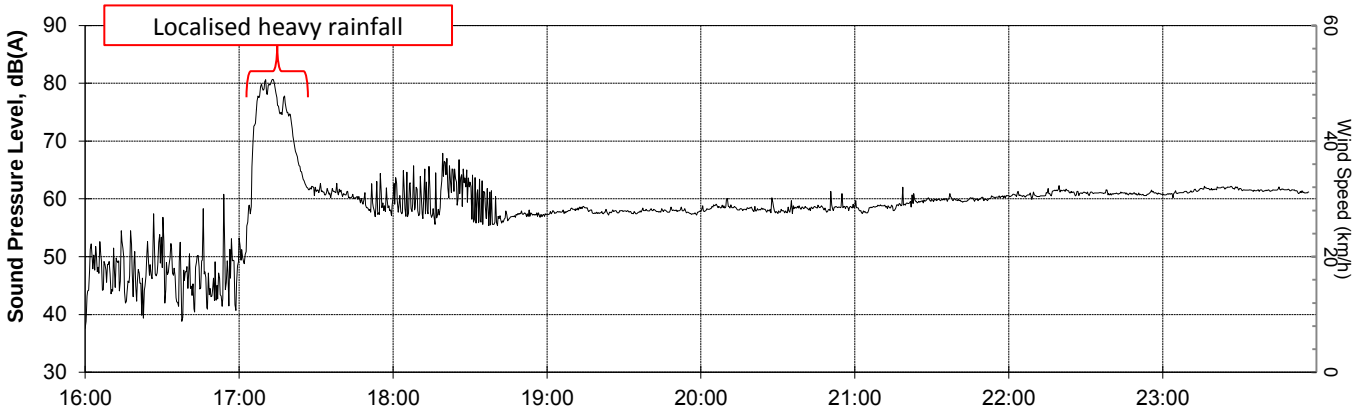
Microphone position: 1.6m AGL under open tree canopy



Lmax =	65.9	Lmax =	65.7	Lmax =	65.4	Lmax =	78.1	Lmax =	66.9	Lmax =	73.2	Lmax =	62.3	Lmax =	68.1
L01 =	63.1	L01 =	64.0	L01 =	63.1	L01 =	62.6	L01 =	63.4	L01 =	65.8	L01 =	55.5	L01 =	58.0
L05 =	62.7	L05 =	63.4	L05 =	62.5	L05 =	61.8	L05 =	61.6	L05 =	59.6	L05 =	53.1	L05 =	49.3
L10 =	62.6	L10 =	63.1	L10 =	62.2	L10 =	61.5	L10 =	60.7	L10 =	56.4	L10 =	51.6	L10 =	46.0
L50 =	61.9	L50 =	62.1	L50 =	61.3	L50 =	60.4	L50 =	58.1	L50 =	50.2	L50 =	46.5	L50 =	40.9
L75 =	61.6	L75 =	61.5	L75 =	60.8	L75 =	59.9	L75 =	55.8	L75 =	48.4	L75 =	43.4	L75 =	39.7
L90 =	61.3	L90 =	61.0	L90 =	60.4	L90 =	59.5	L90 =	53.7	L90 =	47.2	L90 =	41.1	L90 =	39.0
L95 =	60.6	L95 =	60.3	L95 =	59.7	L95 =	58.8	L95 =	52.1	L95 =	45.7	L95 =	39.3	L95 =	37.9
Leq =	62.0	Leq =	62.2	Leq =	61.5	Leq =	60.7	Leq =	58.5	Leq =	54.3	Leq =	48.4	Leq =	45.7



Lmax =	62.5	Lmax =	66.4	Lmax =	66.4	Lmax =	61.4	Lmax =	63.9	Lmax =	61.6	Lmax =	64.4	Lmax =	58.3
L01 =	59.4	L01 =	59.1	L01 =	64.9	L01 =	59.7	L01 =	61.4	L01 =	55.9	L01 =	62.0	L01 =	52.2
L05 =	55.0	L05 =	57.8	L05 =	62.8	L05 =	58.6	L05 =	57.8	L05 =	54.5	L05 =	55.8	L05 =	50.1
L10 =	52.2	L10 =	56.1	L10 =	59.0	L10 =	56.9	L10 =	56.7	L10 =	53.2	L10 =	50.8	L10 =	47.6
L50 =	48.4	L50 =	41.4	L50 =	52.3	L50 =	38.2	L50 =	39.1	L50 =	44.7	L50 =	39.8	L50 =	38.3
L75 =	43.1	L75 =	38.1	L75 =	44.2	L75 =	33.8	L75 =	35.1	L75 =	38.2	L75 =	37.2	L75 =	36.4
L90 =	38.7	L90 =	36.3	L90 =	36.3	L90 =	31.8	L90 =	32.0	L90 =	35.9	L90 =	35.4	L90 =	34.9
L95 =	37.2	L95 =	34.4	L95 =	31.8	L95 =	29.5	L95 =	29.3	L95 =	33.0	L95 =	33.3	L95 =	32.1
Leq =	50.2	Leq =	50.2	Leq =	55.9	Leq =	50.6	Leq =	50.8	Leq =	48.3	Leq =	49.6	Leq =	43.3



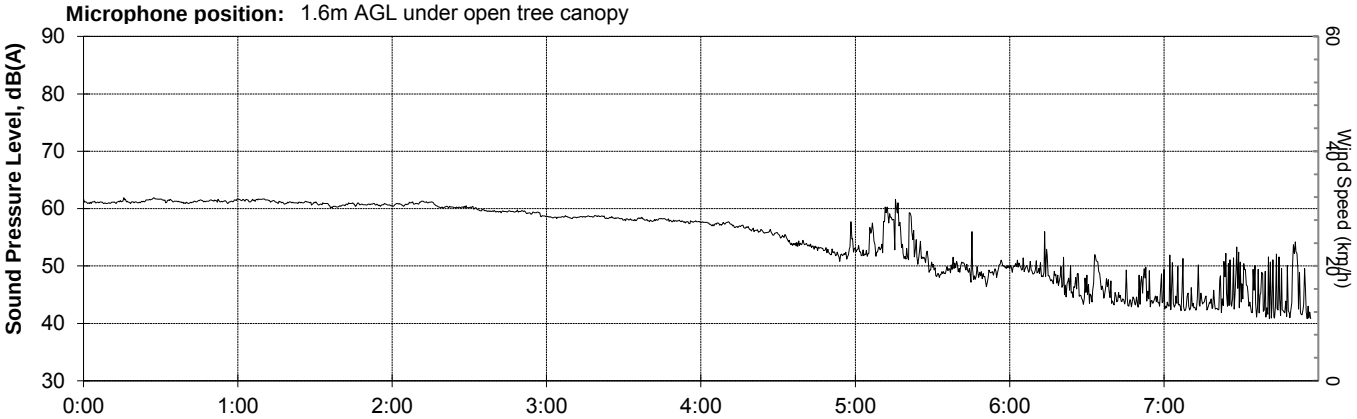
Lmax =	74.5	Lmax =	81.8	Lmax =	71.1	Lmax =	69.2	Lmax =	66.1	Lmax =	66.8	Lmax =	67.8	Lmax =	65.4
L01 =	57.7	L01 =	80.5	L01 =	68.4	L01 =	59.7	L01 =	61.3	L01 =	61.8	L01 =	62.5	L01 =	62.7
L05 =	53.0	L05 =	79.7	L05 =	67.6	L05 =	59.0	L05 =	59.7	L05 =	61.1	L05 =	61.8	L05 =	62.3
L10 =	51.2	L10 =	78.2	L10 =	65.1	L10 =	58.7	L10 =	59.3	L10 =	60.7	L10 =	61.5	L10 =	62.1
L50 =	46.0	L50 =	61.1	L50 =	57.2	L50 =	57.6	L50 =	58.1	L50 =	59.3	L50 =	60.8	L50 =	61.3
L75 =	43.0	L75 =	58.8	L75 =	56.2	L75 =	57.2	L75 =	57.5	L75 =	58.4	L75 =	60.4	L75 =	60.9
L90 =	40.5	L90 =	56.5	L90 =	55.6	L90 =	56.7	L90 =	57.1	L90 =	57.6	L90 =	60.0	L90 =	60.6
L95 =	37.4	L95 =	48.2	L95 =	54.7	L95 =	56.0	L95 =	56.3	L95 =	56.7	L95 =	59.2	L95 =	60.0
Leq =	49.0	Leq =	72.2	Leq =	60.7	Leq =	57.9	Leq =	58.4	Leq =	59.5	Leq =	60.9	Leq =	61.5

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

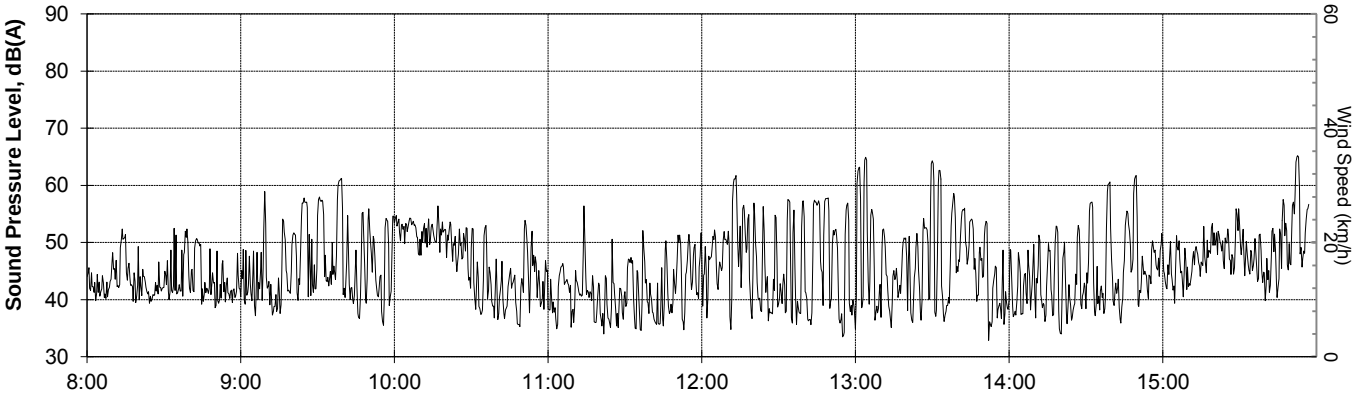
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp D **Date:** Thursday 10 Nov 2016

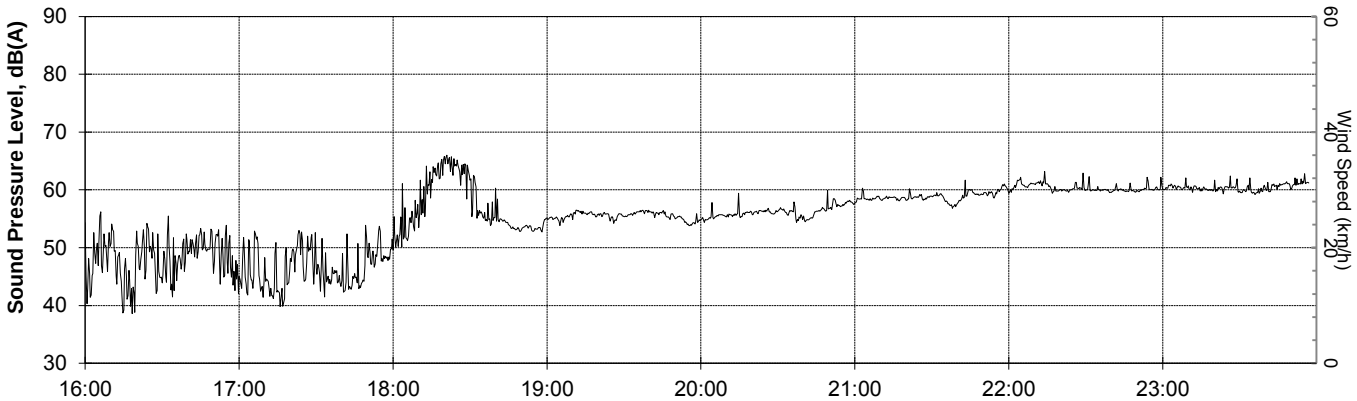
Microphone position: 1.6m AGL under open tree canopy



Lmax =	63.7	Lmax =	65.6	Lmax =	63.9	Lmax =	62.8	Lmax =	65.4	Lmax =	72.5	Lmax =	67.2	Lmax =	64.5
L01 =	62.5	L01 =	62.5	L01 =	61.9	L01 =	59.4	L01 =	58.7	L01 =	63.7	L01 =	55.8	L01 =	58.6
L05 =	62.1	L05 =	62.0	L05 =	61.4	L05 =	59.0	L05 =	58.0	L05 =	58.0	L05 =	51.6	L05 =	51.9
L10 =	61.8	L10 =	61.7	L10 =	61.1	L10 =	58.8	L10 =	57.6	L10 =	55.2	L10 =	50.7	L10 =	47.7
L50 =	61.1	L50 =	60.8	L50 =	59.9	L50 =	58.1	L50 =	55.2	L50 =	50.4	L50 =	45.5	L50 =	42.3
L75 =	60.7	L75 =	60.4	L75 =	59.3	L75 =	57.7	L75 =	53.2	L75 =	48.2	L75 =	43.5	L75 =	41.4
L90 =	60.4	L90 =	60.0	L90 =	58.8	L90 =	57.3	L90 =	51.9	L90 =	46.7	L90 =	42.5	L90 =	40.7
L95 =	59.9	L95 =	59.5	L95 =	58.1	L95 =	56.6	L95 =	49.9	L95 =	45.2	L95 =	41.7	L95 =	39.9
Leq =	61.3	Leq =	61.0	Leq =	60.1	Leq =	58.2	Leq =	55.6	Leq =	53.5	Leq =	47.9	Leq =	46.6



Lmax =	66.4	Lmax =	67.7	Lmax =	63.4	Lmax =	65.6	Lmax =	62.7	Lmax =	66.7	Lmax =	66.2	Lmax =	66.3
L01 =	54.2	L01 =	61.0	L01 =	54.9	L01 =	52.8	L01 =	61.1	L01 =	64.7	L01 =	61.3	L01 =	64.9
L05 =	50.9	L05 =	57.6	L05 =	54.1	L05 =	50.0	L05 =	57.7	L05 =	62.6	L05 =	57.2	L05 =	56.5
L10 =	49.4	L10 =	56.5	L10 =	53.5	L10 =	47.3	L10 =	57.1	L10 =	56.9	L10 =	53.3	L10 =	54.5
L50 =	41.0	L50 =	42.4	L50 =	47.4	L50 =	40.2	L50 =	45.7	L50 =	44.6	L50 =	42.0	L50 =	47.5
L75 =	39.3	L75 =	39.2	L75 =	41.2	L75 =	36.7	L75 =	38.2	L75 =	38.6	L75 =	38.4	L75 =	44.4
L90 =	37.9	L90 =	37.2	L90 =	37.9	L90 =	35.2	L90 =	35.9	L90 =	36.4	L90 =	36.6	L90 =	42.4
L95 =	36.8	L95 =	35.0	L95 =	34.8	L95 =	33.6	L95 =	33.0	L95 =	33.5	L95 =	34.1	L95 =	39.3
Leq =	45.2	Leq =	51.3	Leq =	49.8	Leq =	44.1	Leq =	52.0	Leq =	54.0	Leq =	50.1	Leq =	52.3



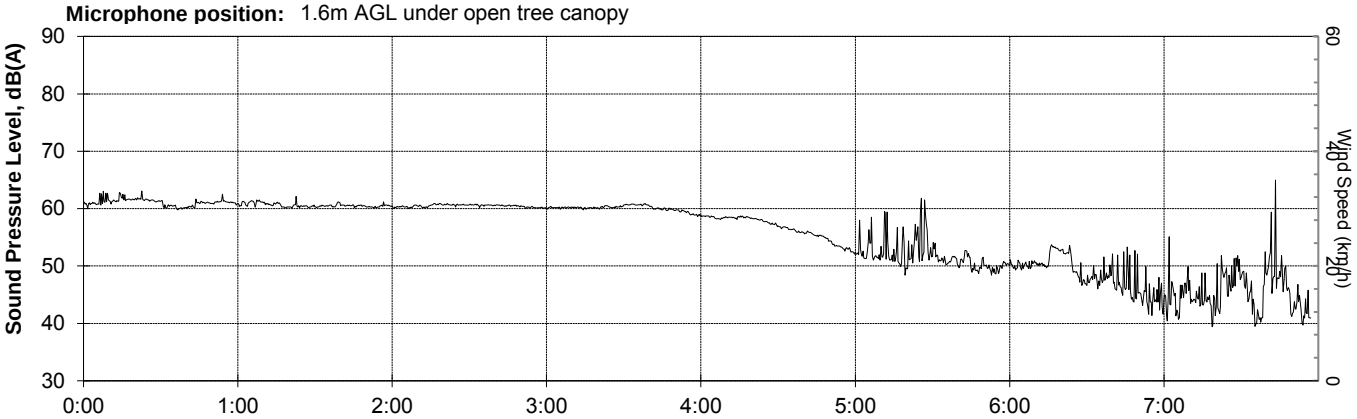
Lmax =	63.9	Lmax =	68.5	Lmax =	70.7	Lmax =	64.9	Lmax =	66.3	Lmax =	69.0	Lmax =	69.9	Lmax =	69.3
L01 =	55.7	L01 =	54.4	L01 =	68.9	L01 =	57.1	L01 =	59.8	L01 =	61.5	L01 =	63.6	L01 =	63.9
L05 =	54.2	L05 =	53.2	L05 =	66.4	L05 =	56.7	L05 =	57.9	L05 =	60.4	L05 =	61.7	L05 =	62.5
L10 =	53.2	L10 =	51.8	L10 =	64.3	L10 =	56.4	L10 =	57.4	L10 =	59.9	L10 =	61.3	L10 =	61.8
L50 =	47.6	L50 =	45.0	L50 =	54.8	L50 =	55.4	L50 =	55.8	L50 =	58.5	L50 =	60.1	L50 =	60.0
L75 =	44.1	L75 =	42.7	L75 =	53.0	L75 =	54.8	L75 =	55.0	L75 =	57.9	L75 =	59.6	L75 =	59.4
L90 =	41.5	L90 =	41.2	L90 =	51.7	L90 =	54.2	L90 =	54.4	L90 =	57.3	L90 =	59.1	L90 =	58.9
L95 =	37.7	L95 =	39.6	L95 =	48.3	L95 =	52.9	L95 =	53.4	L95 =	56.4	L95 =	58.4	L95 =	58.3
Leq =	49.5	Leq =	47.8	Leq =	59.7	Leq =	55.5	Leq =	56.2	Leq =	58.8	Leq =	60.4	Leq =	60.5

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

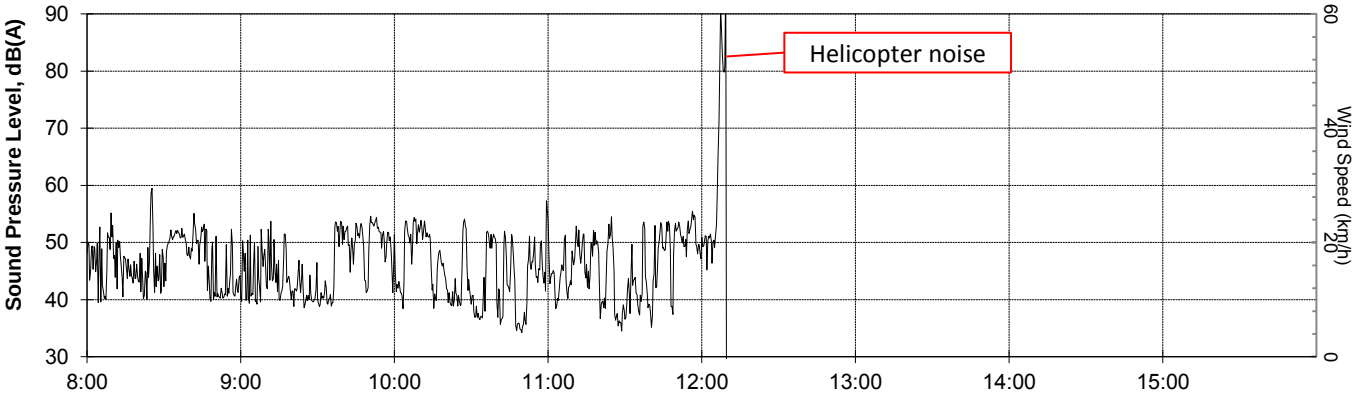
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp D **Date:** Friday 11 Nov 2016

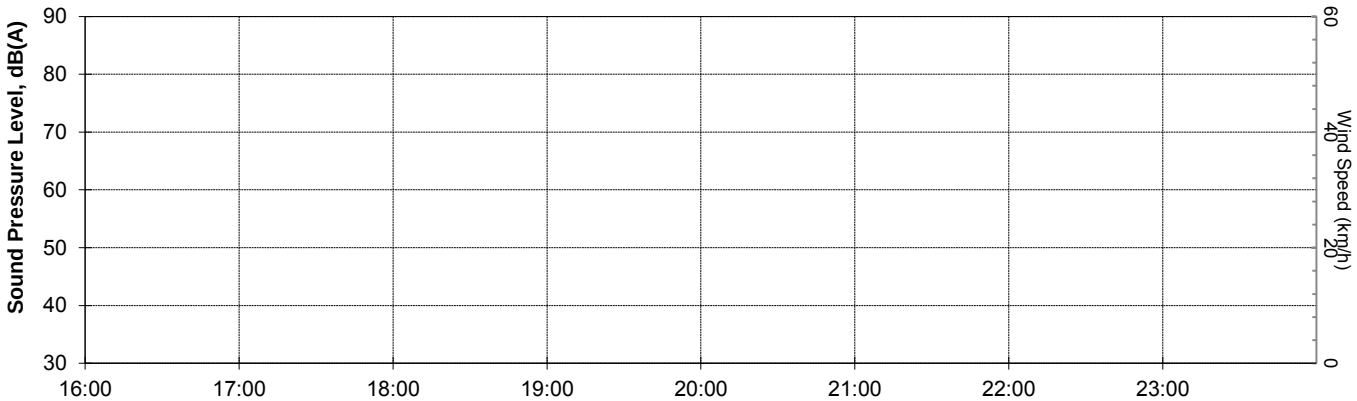
Microphone position: 1.6m AGL under open tree canopy



Lmax =	74.7	Lmax =	65.5	Lmax =	66.7	Lmax =	63.4	Lmax =	63.2	Lmax =	73.0	Lmax =	65.9	Lmax =	75.5
L01 =	63.8	L01 =	62.7	L01 =	61.8	L01 =	61.8	L01 =	59.6	L01 =	62.2	L01 =	55.1	L01 =	57.2
L05 =	62.8	L05 =	61.9	L05 =	61.3	L05 =	61.2	L05 =	59.0	L05 =	56.3	L05 =	53.2	L05 =	51.6
L10 =	62.3	L10 =	61.5	L10 =	61.1	L10 =	61.0	L10 =	58.7	L10 =	53.8	L10 =	52.6	L10 =	49.3
L50 =	60.7	L50 =	60.4	L50 =	60.3	L50 =	60.0	L50 =	57.0	L50 =	50.7	L50 =	48.2	L50 =	43.0
L75 =	60.0	L75 =	59.9	L75 =	59.9	L75 =	59.5	L75 =	55.3	L75 =	49.3	L75 =	45.3	L75 =	40.3
L90 =	59.6	L90 =	59.5	L90 =	59.6	L90 =	59.0	L90 =	53.4	L90 =	48.3	L90 =	43.6	L90 =	39.3
L95 =	58.9	L95 =	58.9	L95 =	59.0	L95 =	58.1	L95 =	52.0	L95 =	46.8	L95 =	39.8	L95 =	38.1
Leq =	61.2	Leq =	60.6	Leq =	60.5	Leq =	60.1	Leq =	57.1	Leq =	52.8	Leq =	49.6	Leq =	48.3



Lmax =	65.2	Lmax =	65.5	Lmax =	70.0	Lmax =	66.2	Lmax =		Lmax =		Lmax =		Lmax =	
L01 =	59.3	L01 =	55.6	L01 =	54.6	L01 =	57.8	L01 =		L01 =		L01 =		L01 =	
L05 =	56.2	L05 =	53.6	L05 =	53.4	L05 =	54.9	L05 =		L05 =		L05 =		L05 =	
L10 =	53.5	L10 =	52.9	L10 =	52.4	L10 =	53.2	L10 =		L10 =		L10 =		L10 =	
L50 =	41.7	L50 =	42.6	L50 =	43.7	L50 =	43.6	L50 =		L50 =		L50 =		L50 =	
L75 =	39.8	L75 =	39.8	L75 =	39.1	L75 =	39.3	L75 =		L75 =		L75 =		L75 =	
L90 =	39.0	L90 =	38.7	L90 =	36.0	L90 =	36.4	L90 =		L90 =		L90 =		L90 =	
L95 =	38.2	L95 =	37.9	L95 =	33.6	L95 =	33.2	L95 =		L95 =		L95 =		L95 =	
Leq =	48.9	Leq =	48.6	Leq =	48.2	Leq =	49.0	Leq =		Leq =		Leq =		Leq =	



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Poroi 1 Village
Measurement period: Wednesday 9 to Saturday 12 November 2016
GPS Coordinates (UTM Zone 55): 300455m E, 9182429m S
Microphone position: 2m AGL next to solar panel near centre of village
Prevailing ambient noise environment: General village environment with continuous insect noise
Prevailing weather conditions: Calm winds with heavy rains on Wed afternoon 4pm to 5pm (didn't affect noise levels) and Sat morning from 2am to 6am
Measured noise level, dBA L90, Day: 40, 40, 39, 39
Measured noise level, dBA L90, Night: 43, 42, 42

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 620.11227 **Location:** Poroi 1 Village
Microphone position: 2.0m AGL near solar panel in centre of village
Initial calibration: 94.1 dBA **Final calibration:** 94 dBA

Hour	Sound Pressure Level, dB(A)																				
	Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016			Sat, 12-11-2016											
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				46.6	44.3	45.7	45.7	42.9	44.5	50.0	42.2	48.4									
01:00 to 02:00				47.6	44.9	46.4	46.2	43.1	45.1	48.2	42.5	52.0									
02:00 to 03:00				46.4	44.5	48.8	46.9	43.9	48.9	60.4*	45.7*	58.3*									
03:00 to 04:00				46.2	43.9	51.3	45.3	43.1	49.8	62.1*	54.1*	59.2*									
04:00 to 05:00				59.2	41.2	56.9	60.3	41.7	57.0	55.5*	49.4*	58.7*									
05:00 to 06:00				64.7	39.7	61.1	65.7	40.5	62.4	63.2*	48.4*	61.7*									
06:00 to 07:00				56.0	40.5	58.0	54.3	39.5	52.7	61.8*	44.1*	61.8*									
07:00 to 08:00				56.1	40.7	65.7	53.9	39.8	56.4	59.8	42.0	58.8									
08:00 to 09:00				53.7	39.4	53.3	55.5	39.1	53.5	54.1	41.0	56.1									
09:00 to 10:00				58.7	38.6	56.1	54.5	39.1	54.4	57.4	39.9	55.6									
10:00 to 11:00				52.5	38.8	52.6	55.8	37.3	57.2	55.7	40.0	54.5									
11:00 to 12:00	54.6	38.0	73.7	52.1	37.4	51.2	49.7	35.3	51.5	55.7	38.7	55.2									
12:00 to 13:00	54.1	37.5	56.8	55.7	39.5	54.2	55.1	35.9	54.0	53.1	37.4	53.5									
13:00 to 14:00	54.5	36.9	53.7	54.0	37.7	52.5	52.6	37.3	51.0	48.1	37.1	51.8									
14:00 to 15:00	51.8	35.9	52.1	58.0	37.5	57.9	52.7	39.3	55.3	53.1	37.5	54.3									
15:00 to 16:00	51.8	36.8	54.0	58.3	41.8	59.2	53.7	38.4	54.1	55.3	38.0	54.7									
16:00 to 17:00	58.2	41.0	56.9	58.3	41.6	59.4	56.6	39.2	56.0												
17:00 to 18:00	57.9	41.7	56.7	57.1	41.5	57.6	55.1	39.8	57.8												
18:00 to 19:00	50.9	42.3	51.2	50.2	39.3	53.9	55.3	40.9	55.3												
19:00 to 20:00	50.9	42.9	50.8	46.2	41.6	46.4	51.3	42.2	54.0												
20:00 to 21:00	51.8	43.4	51.3	49.7	40.8	53.8	45.5	42.1	44.4												
21:00 to 22:00	47.8	42.9	51.9	45.6	42.4	45.4	44.9	42.6	44.0												
22:00 to 23:00	46.2	43.4	45.6	45.6	42.5	45.7	44.9	42.3	43.8												
23:00 to 24:00	46.5	44.1	45.6	45.9	43.0	44.7	45.0	41.4	44.8												
$L10_{(18h), ar.av.}$ 6-24h				53.0			52.0														
$L_{eq(15h), log av.}$ 7-22h						57.6			54.5												
$L_{eq(9h), log av.}$ 22-7h			54.9			54.8			54.5												
$L_{eq(24h), log av.}$ 0-24h						56.7			54.6												
L90 Day, 7-22h		39.9			39.9			39.2			39.1										
L90 Evening, 18-22h		42.9			41.0			42.0													
L90 Night, 22-7h		42.9			42.2			42.1													
Wind @0900h, km/h																					
Wind @1500h, km/h																					

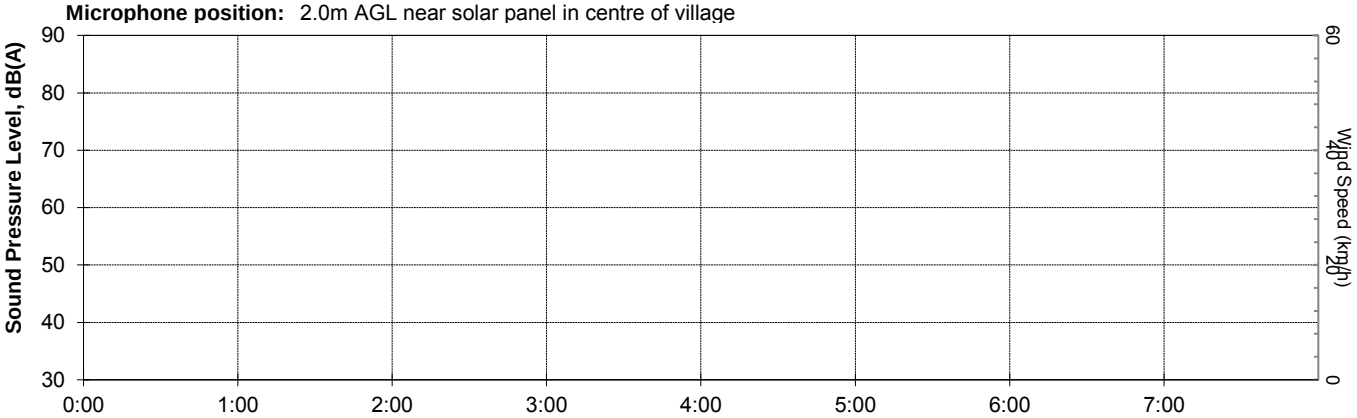
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

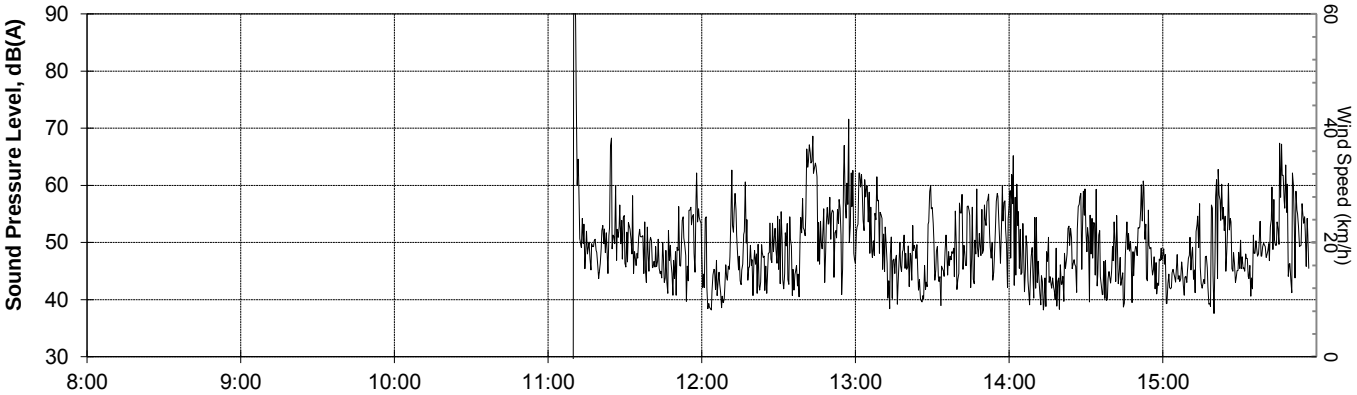
Results of Noise Monitoring

Client: ToTAL **Location** Poroi 1 Village **Date:** Wednesday 09 Nov 2016

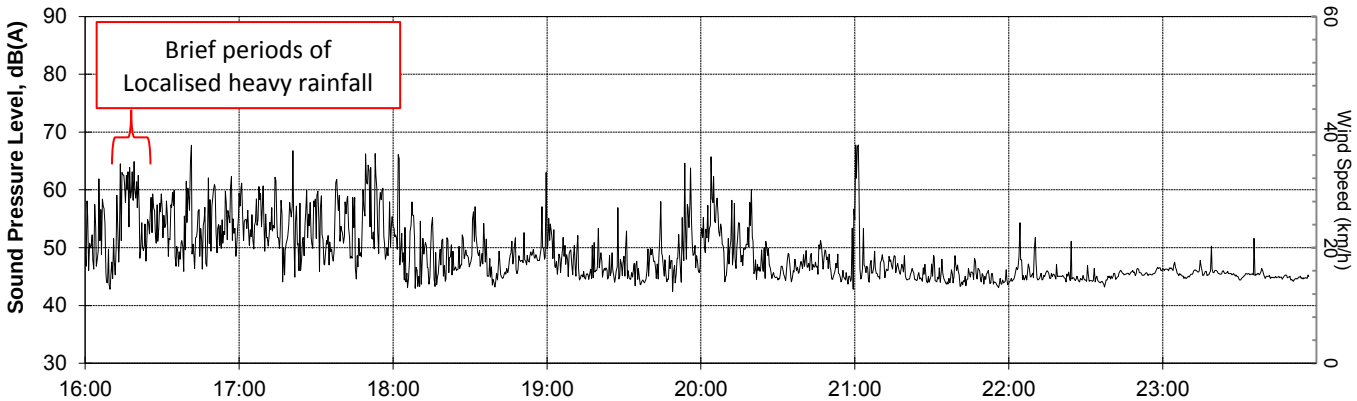
Microphone position: 2.0m AGL near solar panel in centre of village



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax =	Lmax = 96.9	Lmax = 83.9	Lmax = 78.2	Lmax = 78.2	Lmax = 80.2
L01 =	L01 =	L01 =	L01 = 76.8	L01 = 70.0	L01 = 66.0	L01 = 64.1	L01 = 67.1
L05 =	L05 =	L05 =	L05 = 58.1	L05 = 58.6	L05 = 58.6	L05 = 55.8	L05 = 55.9
L10 =	L10 =	L10 =	L10 = 54.6	L10 = 54.1	L10 = 54.5	L10 = 51.8	L10 = 51.8
L50 =	L50 =	L50 =	L50 = 44.9	L50 = 43.2	L50 = 43.4	L50 = 40.7	L50 = 43.5
L75 =	L75 =	L75 =	L75 = 40.9	L75 = 39.7	L75 = 39.4	L75 = 37.6	L75 = 39.3
L90 =	L90 =	L90 =	L90 = 38.0	L90 = 37.5	L90 = 36.9	L90 = 35.9	L90 = 36.8
L95 =	L95 =	L95 =	L95 = 34.6	L95 = 35.0	L95 = 34.0	L95 = 33.7	L95 = 34.6
Leq =	Leq =	Leq =	Leq = 73.7	Leq = 56.8	Leq = 53.7	Leq = 52.1	Leq = 54.0



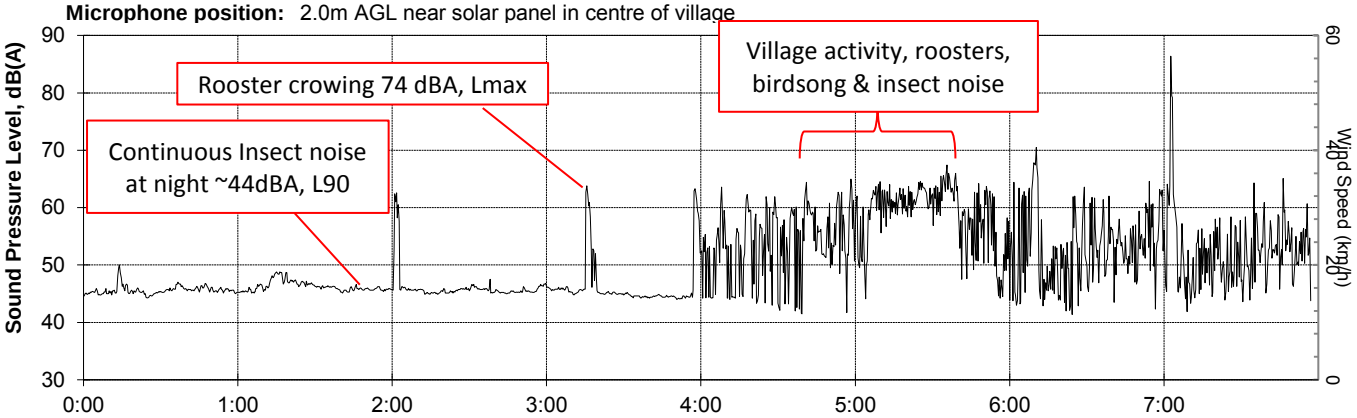
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 83.6	Lmax = 84.1	Lmax = 83.6	Lmax = 78.1	Lmax = 78.3	Lmax = 80.6	Lmax = 71.6	Lmax = 65.7
L01 = 69.5	L01 = 69.1	L01 = 61.4	L01 = 60.9	L01 = 61.2	L01 = 56.7	L01 = 49.8	L01 = 47.7
L05 = 62.3	L05 = 61.7	L05 = 54.1	L05 = 53.9	L05 = 54.6	L05 = 49.8	L05 = 46.7	L05 = 46.8
L10 = 58.2	L10 = 57.9	L10 = 50.9	L10 = 50.9	L10 = 51.8	L10 = 47.8	L10 = 46.2	L10 = 46.5
L50 = 47.3	L50 = 47.5	L50 = 46.5	L50 = 44.9	L50 = 45.5	L50 = 44.3	L50 = 44.7	L50 = 45.2
L75 = 43.6	L75 = 43.9	L75 = 44.3	L75 = 43.7	L75 = 44.2	L75 = 43.4	L75 = 44.0	L75 = 44.6
L90 = 41.0	L90 = 41.7	L90 = 42.3	L90 = 42.9	L90 = 43.4	L90 = 42.9	L90 = 43.4	L90 = 44.1
L95 = 38.0	L95 = 39.3	L95 = 39.6	L95 = 41.9	L95 = 42.3	L95 = 42.3	L95 = 42.7	L95 = 43.3
Leq = 56.9	Leq = 56.7	Leq = 51.2	Leq = 50.8	Leq = 51.3	Leq = 51.9	Leq = 45.6	Leq = 45.6

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

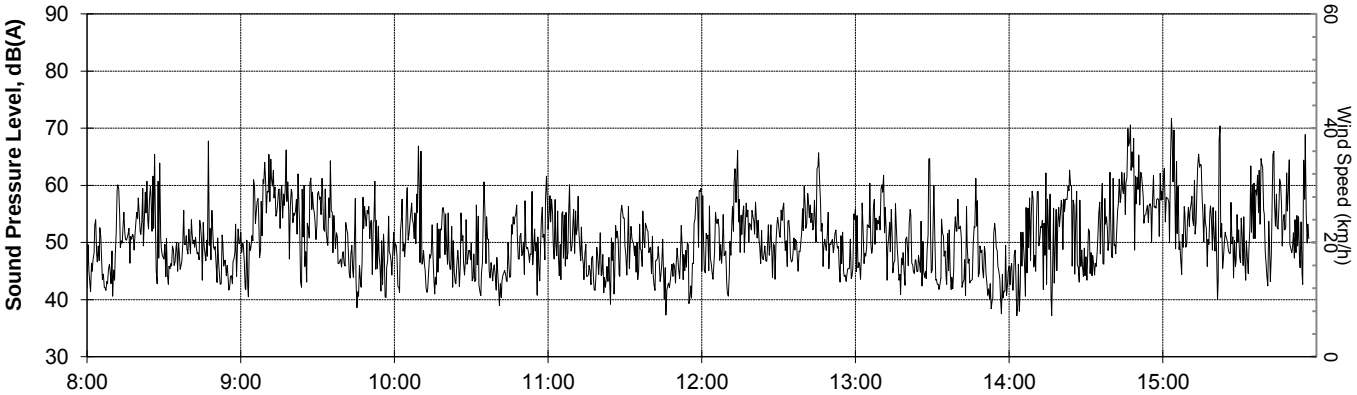
Results of Noise Monitoring

Client: ToTAL **Location** Poroi 1 Village **Date:** Thursday 10 Nov 2016

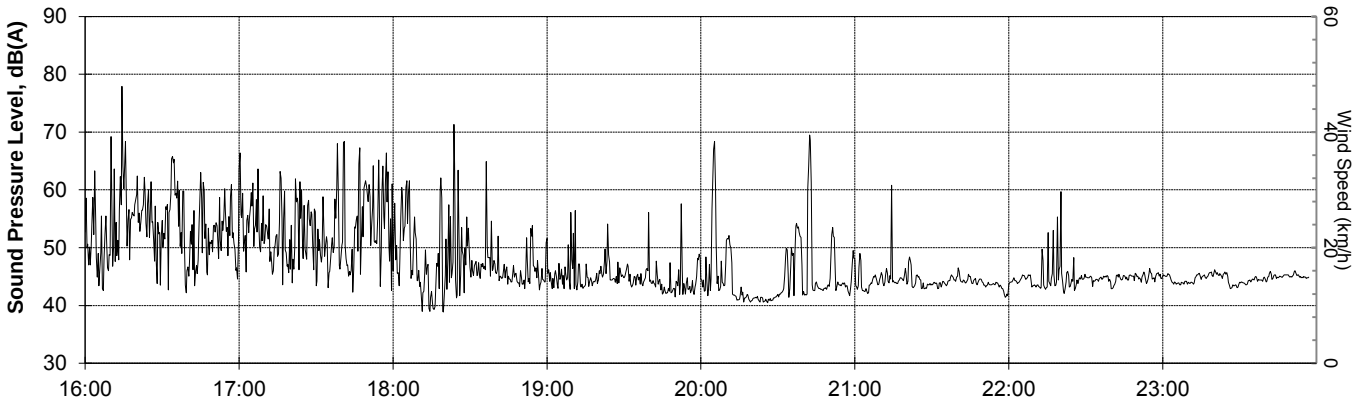
Microphone position: 2.0m AGL near solar panel in centre of village



Lmax =	56.3	Lmax =	57.5	Lmax =	71.6	Lmax =	74.2	Lmax =	76.7	Lmax =	79.9	Lmax =	82.6	Lmax =	97.9
L01 =	49.2	L01 =	49.0	L01 =	57.8	L01 =	65.6	L01 =	69.7	L01 =	73.2	L01 =	71.2	L01 =	69.2
L05 =	47.0	L05 =	48.3	L05 =	46.7	L05 =	47.0	L05 =	63.7	L05 =	68.9	L05 =	61.2	L05 =	60.4
L10 =	46.6	L10 =	47.6	L10 =	46.4	L10 =	46.2	L10 =	59.2	L10 =	64.7	L10 =	56.0	L10 =	56.1
L50 =	45.4	L50 =	46.0	L50 =	45.4	L50 =	44.8	L50 =	43.6	L50 =	43.3	L50 =	44.6	L50 =	46.2
L75 =	44.8	L75 =	45.4	L75 =	44.9	L75 =	44.3	L75 =	42.0	L75 =	40.8	L75 =	41.9	L75 =	42.4
L90 =	44.3	L90 =	44.9	L90 =	44.5	L90 =	43.9	L90 =	41.2	L90 =	39.7	L90 =	40.5	L90 =	40.7
L95 =	43.5	L95 =	44.2	L95 =	44.0	L95 =	43.4	L95 =	40.5	L95 =	38.3	L95 =	38.8	L95 =	38.5
Leq =	45.7	Leq =	46.4	Leq =	48.8	Leq =	51.3	Leq =	56.9	Leq =	61.1	Leq =	58.0	Leq =	65.7



Lmax =	80.9	Lmax =	78.7	Lmax =	84.3	Lmax =	74.2	Lmax =	78.5	Lmax =	76.5	Lmax =	84.6	Lmax =	84.7
L01 =	64.3	L01 =	67.9	L01 =	63.8	L01 =	64.1	L01 =	65.6	L01 =	65.2	L01 =	69.3	L01 =	71.0
L05 =	57.1	L05 =	62.1	L05 =	56.2	L05 =	56.2	L05 =	59.2	L05 =	58.0	L05 =	62.6	L05 =	63.2
L10 =	53.7	L10 =	58.7	L10 =	52.5	L10 =	52.1	L10 =	55.7	L10 =	54.0	L10 =	58.0	L10 =	58.3
L50 =	44.1	L50 =	46.1	L50 =	44.1	L50 =	42.7	L50 =	46.2	L50 =	43.3	L50 =	45.6	L50 =	47.0
L75 =	41.0	L75 =	41.5	L75 =	41.0	L75 =	39.5	L75 =	42.3	L75 =	39.9	L75 =	41.1	L75 =	44.0
L90 =	39.4	L90 =	38.6	L90 =	38.8	L90 =	37.4	L90 =	39.5	L90 =	37.7	L90 =	37.5	L90 =	41.8
L95 =	37.4	L95 =	35.8	L95 =	36.2	L95 =	35.1	L95 =	36.3	L95 =	34.6	L95 =	34.4	L95 =	39.2
Leq =	53.3	Leq =	56.1	Leq =	52.6	Leq =	51.2	Leq =	54.2	Leq =	52.5	Leq =	57.9	Leq =	59.2



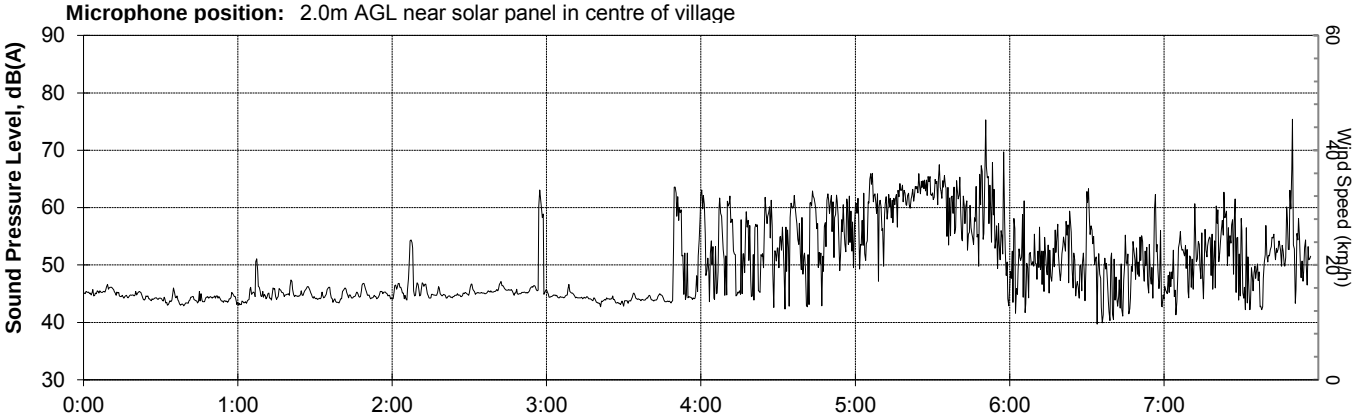
Lmax =	89.7	Lmax =	85.9	Lmax =	89.1	Lmax =	74.1	Lmax =	79.8	Lmax =	74.9	Lmax =	76.9	Lmax =	49.5
L01 =	71.3	L01 =	69.6	L01 =	64.3	L01 =	54.8	L01 =	64.0	L01 =	50.6	L01 =	48.0	L01 =	46.8
L05 =	62.3	L05 =	61.7	L05 =	54.2	L05 =	48.2	L05 =	53.6	L05 =	46.7	L05 =	46.1	L05 =	46.2
L10 =	58.3	L10 =	57.1	L10 =	50.2	L10 =	46.2	L10 =	49.7	L10 =	45.6	L10 =	45.6	L10 =	45.9
L50 =	47.1	L50 =	46.4	L50 =	43.7	L50 =	43.3	L50 =	42.4	L50 =	43.8	L50 =	44.3	L50 =	44.6
L75 =	43.8	L75 =	43.5	L75 =	41.9	L75 =	42.4	L75 =	41.4	L75 =	43.1	L75 =	43.3	L75 =	43.8
L90 =	41.6	L90 =	41.5	L90 =	39.3	L90 =	41.6	L90 =	40.8	L90 =	42.4	L90 =	42.5	L90 =	43.0
L95 =	38.1	L95 =	38.8	L95 =	37.1	L95 =	40.8	L95 =	39.9	L95 =	41.5	L95 =	41.3	L95 =	42.1
Leq =	59.4	Leq =	57.6	Leq =	53.9	Leq =	46.4	Leq =	53.8	Leq =	45.4	Leq =	45.7	Leq =	44.7

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

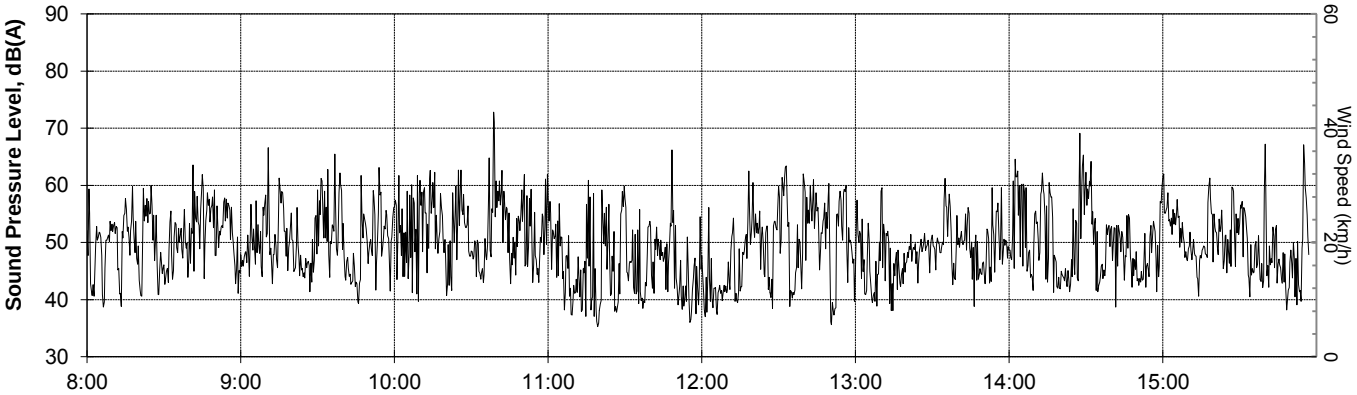
Results of Noise Monitoring

Client: ToTAL **Location** Poroi 1 Village **Date:** Friday 11 Nov 2016

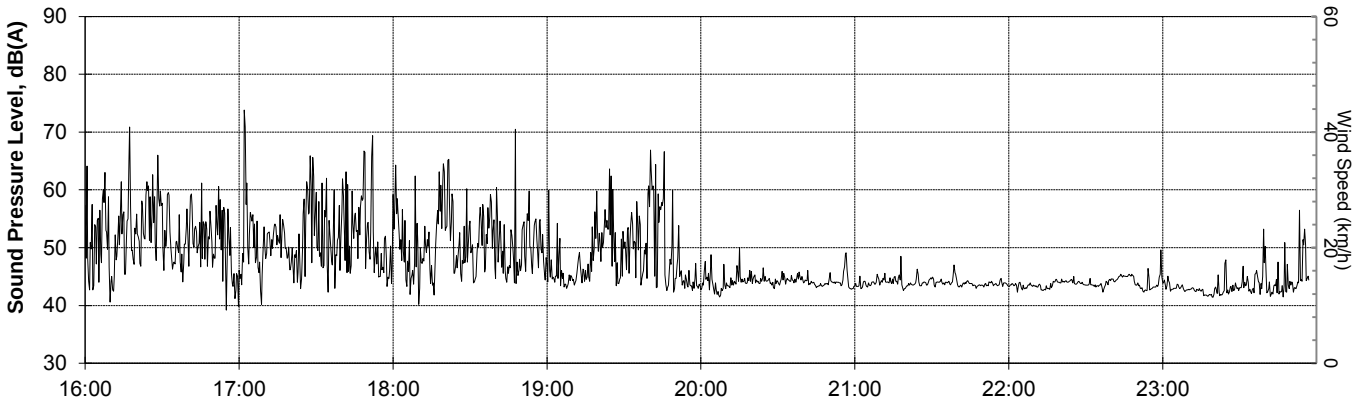
Microphone position: 2.0m AGL near solar panel in centre of village



Lmax =	61.7	Lmax =	56.3	Lmax =	71.1	Lmax =	75.0	Lmax =	75.7	Lmax =	87.2	Lmax =	76.7	Lmax =	87.1
L01 =	47.1	L01 =	49.7	L01 =	58.6	L01 =	62.8	L01 =	69.6	L01 =	74.2	L01 =	64.7	L01 =	67.5
L05 =	46.2	L05 =	47.0	L05 =	48.1	L05 =	46.1	L05 =	64.4	L05 =	69.2	L05 =	58.2	L05 =	58.7
L10 =	45.7	L10 =	46.2	L10 =	46.9	L10 =	45.3	L10 =	60.3	L10 =	65.7	L10 =	54.3	L10 =	53.9
L50 =	44.2	L50 =	44.4	L50 =	45.1	L50 =	44.0	L50 =	43.9	L50 =	45.3	L50 =	42.6	L50 =	45.0
L75 =	43.5	L75 =	43.7	L75 =	44.5	L75 =	43.5	L75 =	42.6	L75 =	42.2	L75 =	40.6	L75 =	41.5
L90 =	42.9	L90 =	43.1	L90 =	43.9	L90 =	43.1	L90 =	41.7	L90 =	40.5	L90 =	39.5	L90 =	39.8
L95 =	42.3	L95 =	42.4	L95 =	43.1	L95 =	42.4	L95 =	40.1	L95 =	38.4	L95 =	37.8	L95 =	37.7
Leq =	44.5	Leq =	45.1	Leq =	48.9	Leq =	49.8	Leq =	57.0	Leq =	62.4	Leq =	52.7	Leq =	56.4



Lmax =	77.3	Lmax =	81.3	Lmax =	85.3	Lmax =	80.1	Lmax =	77.5	Lmax =	71.8	Lmax =	81.8	Lmax =	79.8
L01 =	65.2	L01 =	66.7	L01 =	68.7	L01 =	64.2	L01 =	66.9	L01 =	63.3	L01 =	68.7	L01 =	66.0
L05 =	59.2	L05 =	58.4	L05 =	61.0	L05 =	55.6	L05 =	59.4	L05 =	55.5	L05 =	58.9	L05 =	58.7
L10 =	55.5	L10 =	54.5	L10 =	55.8	L10 =	49.7	L10 =	55.1	L10 =	52.6	L10 =	52.7	L10 =	53.7
L50 =	46.2	L50 =	43.9	L50 =	42.9	L50 =	38.6	L50 =	40.7	L50 =	45.1	L50 =	43.6	L50 =	44.9
L75 =	41.3	L75 =	40.8	L75 =	39.3	L75 =	36.6	L75 =	38.0	L75 =	40.0	L75 =	41.2	L75 =	40.9
L90 =	39.1	L90 =	39.1	L90 =	37.3	L90 =	35.3	L90 =	35.9	L90 =	37.3	L90 =	39.3	L90 =	38.4
L95 =	37.2	L95 =	36.2	L95 =	35.1	L95 =	33.7	L95 =	33.6	L95 =	34.7	L95 =	36.6	L95 =	35.5
Leq =	53.5	Leq =	54.4	Leq =	57.2	Leq =	51.5	Leq =	54.0	Leq =	51.0	Leq =	55.3	Leq =	54.1



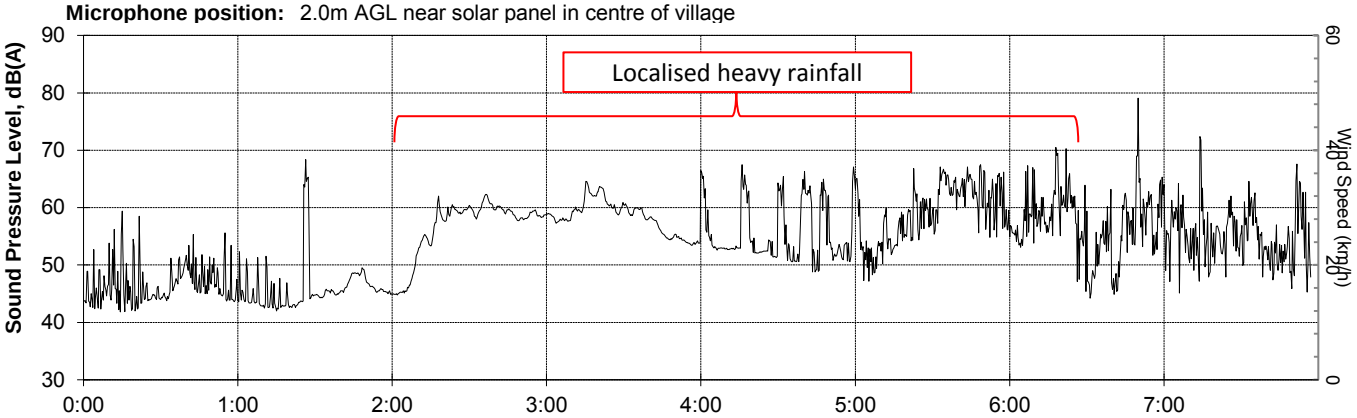
Lmax =	80.3	Lmax =	88.4	Lmax =	86.6	Lmax =	82.3	Lmax =	65.5	Lmax =	66.5	Lmax =	53.6	Lmax =	67.6
L01 =	68.8	L01 =	68.2	L01 =	66.4	L01 =	65.5	L01 =	50.4	L01 =	46.9	L01 =	46.1	L01 =	53.9
L05 =	61.2	L05 =	59.0	L05 =	59.3	L05 =	55.9	L05 =	46.5	L05 =	45.3	L05 =	45.3	L05 =	46.6
L10 =	56.6	L10 =	55.1	L10 =	55.3	L10 =	51.3	L10 =	45.5	L10 =	44.9	L10 =	44.9	L10 =	45.0
L50 =	45.4	L50 =	45.3	L50 =	45.0	L50 =	43.6	L50 =	43.6	L50 =	43.6	L50 =	43.5	L50 =	42.6
L75 =	41.7	L75 =	42.0	L75 =	42.8	L75 =	42.8	L75 =	42.8	L75 =	43.0	L75 =	42.8	L75 =	41.9
L90 =	39.2	L90 =	39.8	L90 =	40.9	L90 =	42.2	L90 =	42.1	L90 =	42.6	L90 =	42.3	L90 =	41.4
L95 =	36.5	L95 =	37.0	L95 =	38.0	L95 =	41.2	L95 =	41.0	L95 =	41.9	L95 =	41.5	L95 =	40.8
Leq =	56.0	Leq =	57.8	Leq =	55.3	Leq =	54.0	Leq =	44.4	Leq =	44.0	Leq =	43.8	Leq =	44.8

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

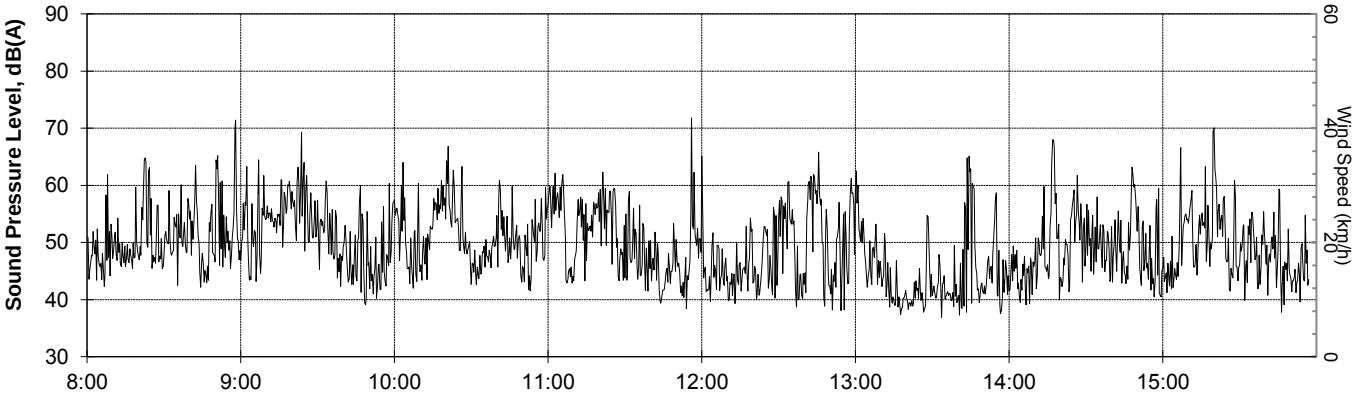
Results of Noise Monitoring

Client: ToTAL **Location** Poroi 1 Village **Date:** Saturday 12 Nov 2016

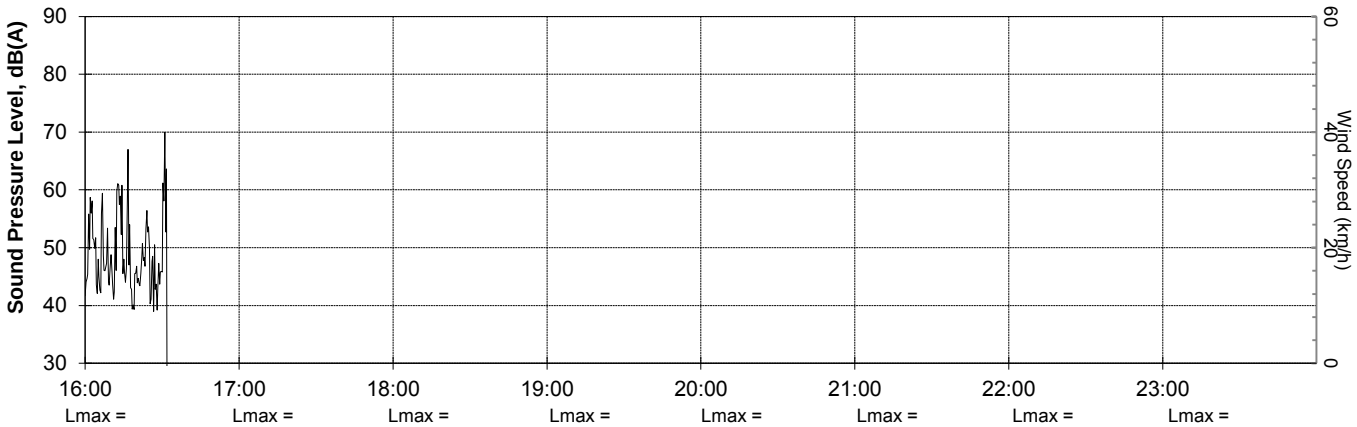
Microphone position: 2.0m AGL near solar panel in centre of village



Lmax =	73.6	Lmax =	78.5	Lmax =	64.5	Lmax =	66.3	Lmax =	77.8	Lmax =	81.3	Lmax =	93.1	Lmax =	87.5
L01 =	58.1	L01 =	57.0	L01 =	62.2	L01 =	64.2	L01 =	72.4	L01 =	73.8	L01 =	72.1	L01 =	70.5
L05 =	52.3	L05 =	48.9	L05 =	61.0	L05 =	63.1	L05 =	62.8	L05 =	68.9	L05 =	65.9	L05 =	63.6
L10 =	50.0	L10 =	48.2	L10 =	60.4	L10 =	62.1	L10 =	55.5	L10 =	63.2	L10 =	61.8	L10 =	59.8
L50 =	44.8	L50 =	44.7	L50 =	58.5	L50 =	58.5	L50 =	52.0	L50 =	53.9	L50 =	49.9	L50 =	48.1
L75 =	43.2	L75 =	43.3	L75 =	54.7	L75 =	56.1	L75 =	50.7	L75 =	52.1	L75 =	45.6	L75 =	44.3
L90 =	42.2	L90 =	42.5	L90 =	45.7	L90 =	54.1	L90 =	49.4	L90 =	48.4	L90 =	44.1	L90 =	42.0
L95 =	41.3	L95 =	41.8	L95 =	44.2	L95 =	53.2	L95 =	47.9	L95 =	46.8	L95 =	42.2	L95 =	39.3
Leq =	48.4	Leq =	52.0	Leq =	58.3	Leq =	59.2	Leq =	58.7	Leq =	61.7	Leq =	61.8	Leq =	58.8



Lmax =	80.6	Lmax =	83.0	Lmax =	81.9	Lmax =	86.9	Lmax =	77.9	Lmax =	79.0	Lmax =	81.8	Lmax =	78.8
L01 =	69.4	L01 =	67.2	L01 =	66.2	L01 =	66.7	L01 =	67.0	L01 =	64.8	L01 =	66.8	L01 =	65.7
L05 =	59.2	L05 =	60.7	L05 =	59.9	L05 =	60.4	L05 =	59.3	L05 =	52.8	L05 =	58.0	L05 =	58.7
L10 =	54.1	L10 =	57.4	L10 =	55.7	L10 =	55.7	L10 =	53.1	L10 =	48.1	L10 =	53.1	L10 =	55.3
L50 =	45.4	L50 =	45.3	L50 =	44.8	L50 =	43.3	L50 =	40.5	L50 =	39.1	L50 =	41.9	L50 =	43.9
L75 =	42.7	L75 =	41.7	L75 =	41.8	L75 =	40.5	L75 =	38.5	L75 =	38.0	L75 =	38.9	L75 =	40.0
L90 =	41.0	L90 =	39.9	L90 =	40.0	L90 =	38.7	L90 =	37.4	L90 =	37.1	L90 =	37.5	L90 =	38.0
L95 =	39.0	L95 =	37.8	L95 =	37.8	L95 =	36.8	L95 =	35.8	L95 =	35.6	L95 =	35.6	L95 =	35.6
Leq =	56.1	Leq =	55.6	Leq =	54.5	Leq =	55.2	Leq =	53.5	Leq =	51.8	Leq =	54.3	Leq =	54.7



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Purari Airstrip
Measurement period: Wednesday 9 to Friday 11 November 2016
GPS Coordinates (UTM Zone 55): 296941m E, 9183119m S
Microphone position: 1.3m AGL east of hut
Prevailing ambient noise environment: General village habitation w/ continuous insect noise.
Prevailing weather conditions: Predominantly calm & dry with heavy rain on Wed afternoon from 4pm to 5pm.
Measured noise level, dBA L90, Day: 45, 43, 44
Measured noise level, dBA L90, Night: 47, 47

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: Total
Job Number: 640.11227 **Location:** Purari Airstrip
Microphone position: 1.3m AGL east of Hut
Initial calibration: 94 dBA **Final calibration:** 94 dBA

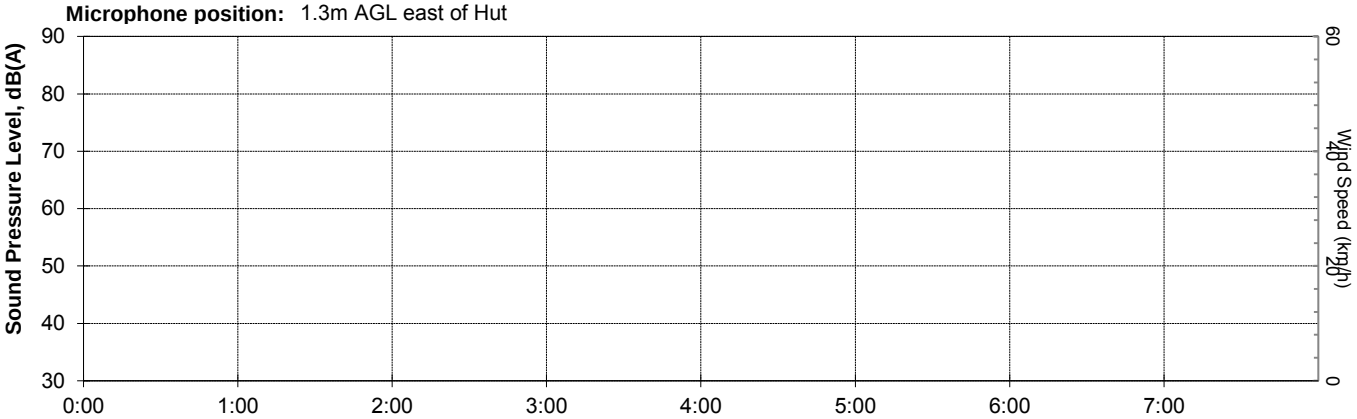
Hour	Sound Pressure Level, dB(A)																				
	Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016														
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				53.9	47.7	61.8	50.7	48.7	50.0												
01:00 to 02:00				58.9	52.0	57.7	57.4	48.4	52.9												
02:00 to 03:00				52.0	49.4	53.8	57.1	49.9	54.8												
03:00 to 04:00				54.8	47.9	54.9	52.7	49.4	54.8												
04:00 to 05:00				59.5	46.9	59.7	61.3	46.8	58.9												
05:00 to 06:00				59.5	42.9	62.4	64.2	43.3	62.6												
06:00 to 07:00				57.3	42.5	58.7	49.9	43.9	53.0												
07:00 to 08:00				61.2	43.9	60.2	53.4	44.0	58.0												
08:00 to 09:00				63.3	44.6	60.6	59.9	43.9	63.9												
09:00 to 10:00				62.3	43.1	62.1	63.8	44.2	61.5												
10:00 to 11:00	94.0	43.2	84.5	63.1	42.8	61.5	67.2	45.4	64.7												
11:00 to 12:00	62.6	43.1	59.7	59.2	41.6	60.0	58.3	43.6	58.4												
12:00 to 13:00	61.7	42.9	59.2	49.2	39.1	59.6															
13:00 to 14:00	59.2	42.6	59.9	56.0	40.3	59.5															
14:00 to 15:00	61.3	43.7	60.7	53.1	41.0	54.4															
15:00 to 16:00	60.9	43.2	60.6	52.4	41.1	54.6															
16:00 to 17:00	62.2	45.4	59.6	59.2	43.0	62.5															
17:00 to 18:00	63.9	45.0	62.9	62.3	41.8	62.9															
18:00 to 19:00	61.7	46.9	61.1	61.1	44.9	58.9															
19:00 to 20:00	54.3	48.8	53.9	54.7	45.0	66.4															
20:00 to 21:00	51.3	45.8	54.6	50.3	44.7	58.6															
21:00 to 22:00	62.1	46.5	69.3	50.2	46.3	49.1															
22:00 to 23:00	76.9	49.3	73.4	49.4	47.2	48.7															
23:00 to 24:00	75.6	48.4	73.6	50.0	46.8	48.9															
$L10_{(18h),\ ar.av.}$ 6-24h				56.4																	
$L_{eq(15h),\ log\ av.}$ 7-22h						60.9															
$L_{eq(9h),\ log\ av.}$ 22-7h			67.5			56.3															
$L_{eq(24h),\ log\ av.}$ 0-24h						60.1															
L90 Day					42.0			44.2													
L90 Evening		47.0			45.2																
L90 Night		47.4			47.2																
Wind @0900h, km/h																					
Wind @1500h, km/h																					

Hourly percentiles based on Lp at 0.1s intervals.

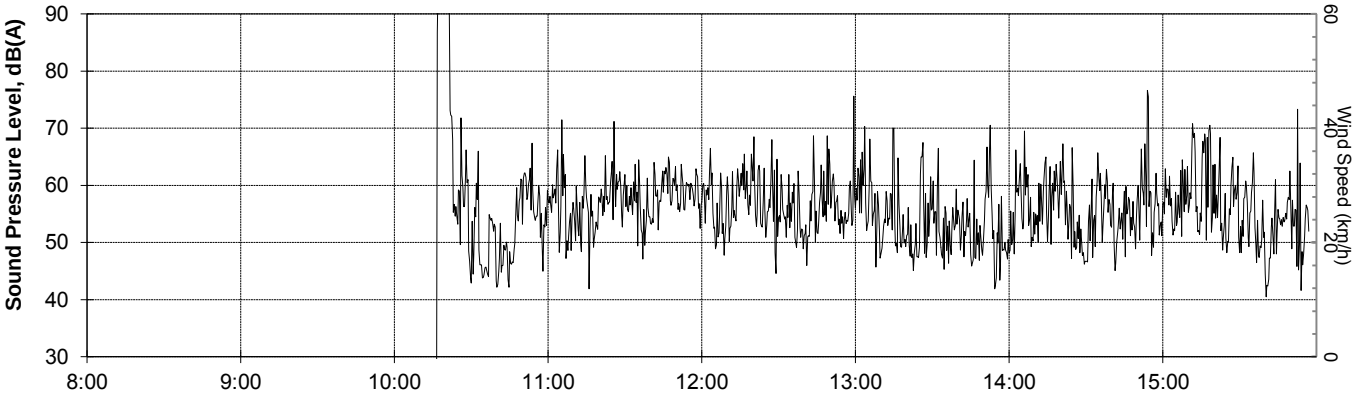
Results of Noise Monitoring

Client: Total **Location** Purari Airstrip **Date:** Wednesday 09 Nov 2016

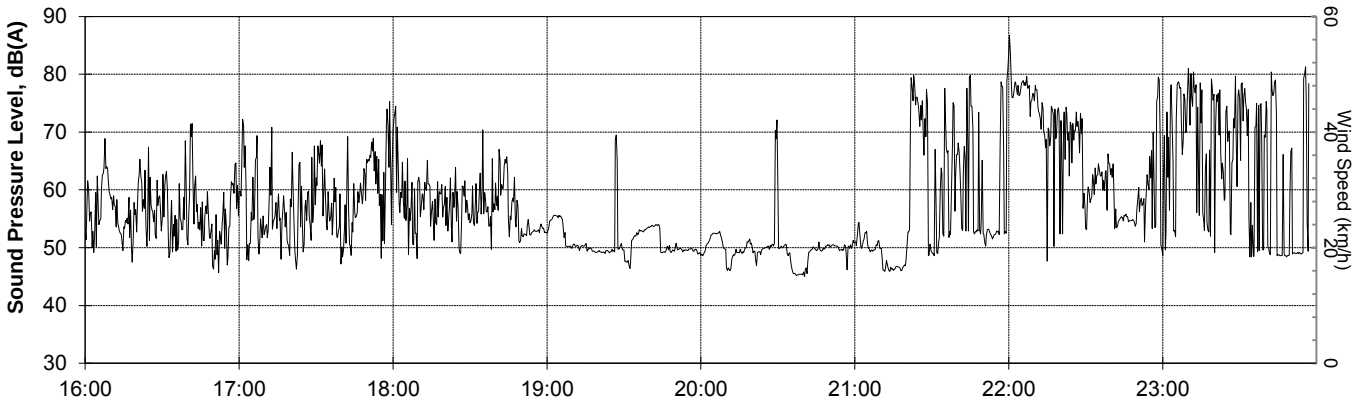
Microphone position: 1.3m AGL east of Hut



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax = 98.1	Lmax = 84.0	Lmax = 85.0	Lmax = 94.2	Lmax = 90.3	Lmax = 86.6
L01 =	L01 =	L01 = 94.0	L01 = 70.5	L01 = 71.1	L01 = 71.1	L01 = 71.1	L01 = 73.5
L05 =	L05 =	L05 = 94.0	L05 = 65.3	L05 = 65.0	L05 = 63.2	L05 = 64.7	L05 = 64.5
L10 =	L10 =	L10 = 94.0	L10 = 62.6	L10 = 61.7	L10 = 59.2	L10 = 61.3	L10 = 60.9
L50 =	L50 =	L50 = 48.1	L50 = 51.8	L50 = 49.0	L50 = 48.0	L50 = 48.7	L50 = 48.8
L75 =	L75 =	L75 = 44.8	L75 = 46.0	L75 = 44.8	L75 = 44.9	L75 = 45.4	L75 = 45.5
L90 =	L90 =	L90 = 43.2	L90 = 43.1	L90 = 42.9	L90 = 42.6	L90 = 43.7	L90 = 43.2
L95 =	L95 =	L95 = 40.5	L95 = 39.6	L95 = 40.3	L95 = 39.1	L95 = 41.1	L95 = 39.6
Leq =	Leq =	Leq = 84.5	Leq = 59.7	Leq = 59.2	Leq = 59.9	Leq = 60.7	Leq = 60.6



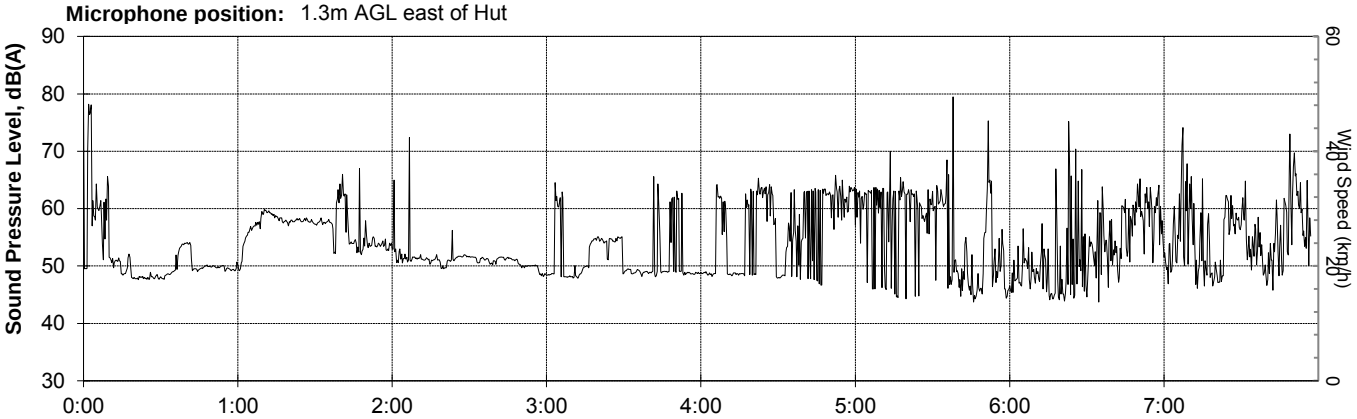
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 82.9	Lmax = 85.9	Lmax = 88.1	Lmax = 80.3	Lmax = 84.4	Lmax = 91.5	Lmax = 97.5	Lmax = 95.5
L01 = 71.3	L01 = 75.6	L01 = 72.9	L01 = 57.3	L01 = 52.9	L01 = 83.5	L01 = 85.2	L01 = 86.7
L05 = 64.4	L05 = 67.9	L05 = 65.2	L05 = 55.3	L05 = 52.3	L05 = 75.0	L05 = 80.9	L05 = 80.2
L10 = 62.2	L10 = 63.9	L10 = 61.7	L10 = 54.3	L10 = 51.3	L10 = 62.1	L10 = 76.9	L10 = 75.6
L50 = 51.8	L50 = 51.1	L50 = 52.2	L50 = 49.9	L50 = 49.6	L50 = 51.6	L50 = 54.2	L50 = 52.5
L75 = 47.8	L75 = 47.3	L75 = 49.4	L75 = 49.3	L75 = 48.7	L75 = 48.8	L75 = 52.6	L75 = 48.9
L90 = 45.4	L90 = 45.0	L90 = 46.9	L90 = 48.8	L90 = 45.8	L90 = 46.5	L90 = 49.3	L90 = 48.4
L95 = 42.6	L95 = 42.3	L95 = 43.9	L95 = 46.4	L95 = 44.7	L95 = 45.5	L95 = 46.8	L95 = 47.7
Leq = 59.6	Leq = 62.9	Leq = 61.1	Leq = 53.9	Leq = 54.6	Leq = 69.3	Leq = 73.4	Leq = 73.6

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

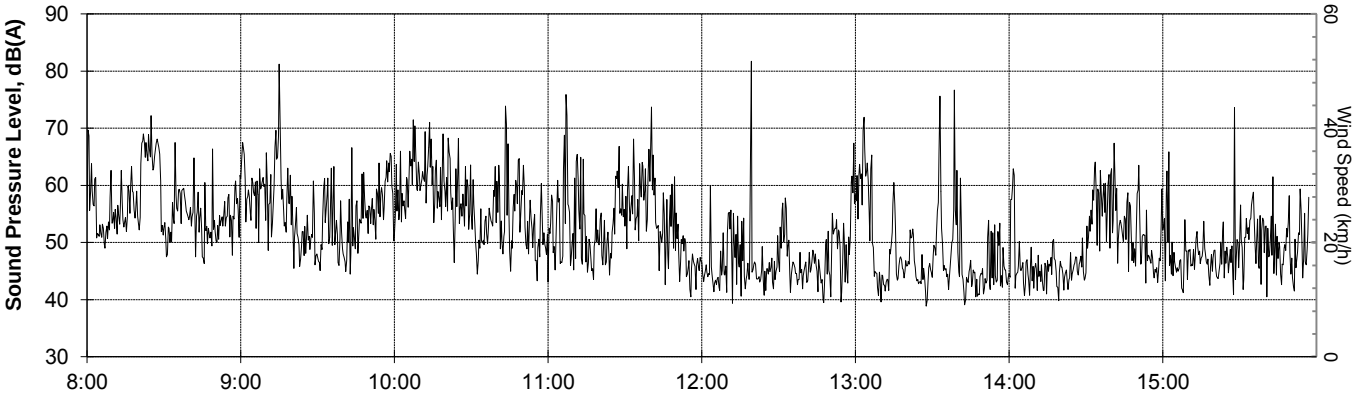
Results of Noise Monitoring

Client: Total **Location** Purari Airstrip **Date:** Thursday 10 Nov 2016

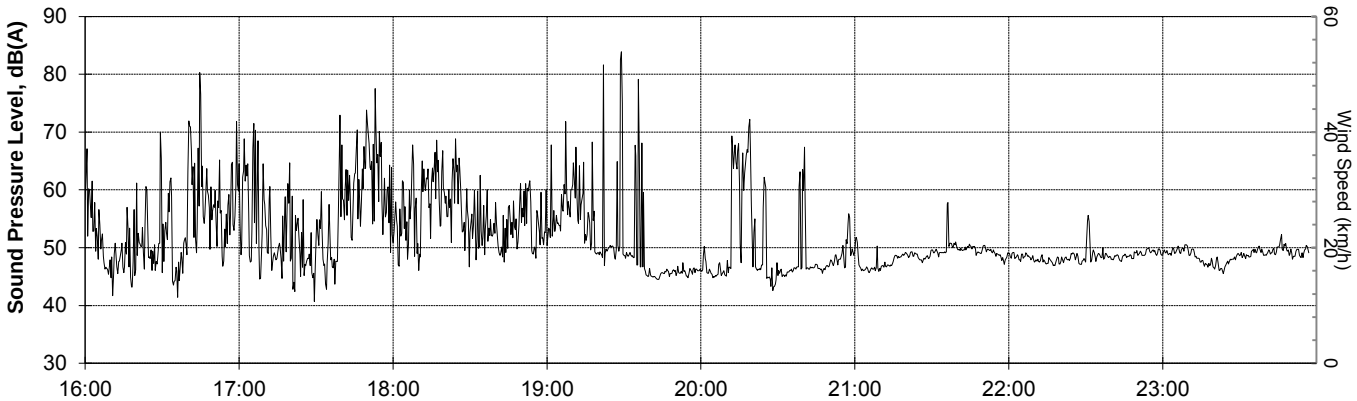
Microphone position: 1.3m AGL east of Hut



Lmax =	90.0	Lmax =	84.0	Lmax =	85.2	Lmax =	77.5	Lmax =	76.0	Lmax =	91.4	Lmax =	90.1	Lmax =	89.4
L01 =	70.6	L01 =	66.4	L01 =	54.5	L01 =	68.6	L01 =	72.5	L01 =	73.2	L01 =	69.7	L01 =	71.5
L05 =	56.5	L05 =	59.5	L05 =	52.4	L05 =	55.2	L05 =	68.5	L05 =	68.7	L05 =	61.9	L05 =	64.6
L10 =	53.9	L10 =	58.9	L10 =	52.0	L10 =	54.8	L10 =	59.5	L10 =	59.5	L10 =	57.3	L10 =	61.2
L50 =	49.5	L50 =	56.7	L50 =	50.8	L50 =	48.8	L50 =	48.1	L50 =	45.6	L50 =	45.7	L50 =	48.7
L75 =	48.4	L75 =	53.2	L75 =	50.1	L75 =	48.2	L75 =	47.5	L75 =	43.8	L75 =	43.8	L75 =	45.6
L90 =	47.7	L90 =	52.0	L90 =	49.4	L90 =	47.9	L90 =	46.9	L90 =	42.9	L90 =	42.5	L90 =	43.9
L95 =	47.1	L95 =	49.1	L95 =	48.0	L95 =	47.4	L95 =	45.8	L95 =	41.6	L95 =	40.5	L95 =	41.6
Leq =	61.8	Leq =	57.7	Leq =	53.8	Leq =	54.9	Leq =	59.7	Leq =	62.4	Leq =	58.7	Leq =	60.2



Lmax =	85.3	Lmax =	85.9	Lmax =	87.8	Lmax =	89.4	Lmax =	99.5	Lmax =	84.4	Lmax =	79.9	Lmax =	86.8
L01 =	72.1	L01 =	73.5	L01 =	73.1	L01 =	72.8	L01 =	62.0	L01 =	72.0	L01 =	67.1	L01 =	63.7
L05 =	66.9	L05 =	65.9	L05 =	66.4	L05 =	63.6	L05 =	53.9	L05 =	61.5	L05 =	58.6	L05 =	56.2
L10 =	63.3	L10 =	62.3	L10 =	63.1	L10 =	59.2	L10 =	49.2	L10 =	56.0	L10 =	53.1	L10 =	52.4
L50 =	50.4	L50 =	49.0	L50 =	49.9	L50 =	45.9	L50 =	43.3	L50 =	44.4	L50 =	44.9	L50 =	45.3
L75 =	46.6	L75 =	45.7	L75 =	45.5	L75 =	43.5	L75 =	41.4	L75 =	42.3	L75 =	42.8	L75 =	43.2
L90 =	44.6	L90 =	43.1	L90 =	42.8	L90 =	41.6	L90 =	39.1	L90 =	40.3	L90 =	41.0	L90 =	41.1
L95 =	41.2	L95 =	39.0	L95 =	39.6	L95 =	39.6	L95 =	36.1	L95 =	37.7	L95 =	38.5	L95 =	38.9
Leq =	60.6	Leq =	62.1	Leq =	61.5	Leq =	60.0	Leq =	59.6	Leq =	59.5	Leq =	54.4	Leq =	54.6



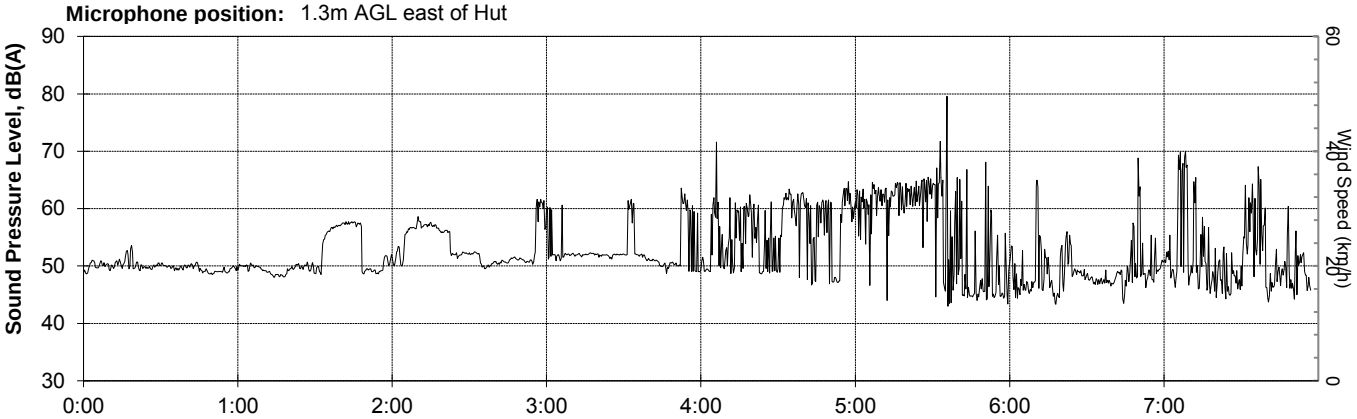
Lmax =	88.6	Lmax =	92.0	Lmax =	82.7	Lmax =	98.1	Lmax =	83.6	Lmax =	75.8	Lmax =	59.4	Lmax =	59.7
L01 =	74.5	L01 =	75.1	L01 =	70.6	L01 =	76.7	L01 =	72.3	L01 =	51.7	L01 =	53.4	L01 =	51.5
L05 =	63.9	L05 =	67.0	L05 =	64.6	L05 =	60.0	L05 =	56.2	L05 =	50.7	L05 =	49.8	L05 =	50.4
L10 =	59.2	L10 =	62.3	L10 =	61.1	L10 =	54.7	L10 =	50.3	L10 =	50.2	L10 =	49.4	L10 =	50.0
L50 =	47.7	L50 =	47.9	L50 =	49.8	L50 =	47.8	L50 =	46.3	L50 =	48.7	L50 =	48.2	L50 =	48.8
L75 =	45.2	L75 =	44.7	L75 =	46.8	L75 =	45.7	L75 =	45.5	L75 =	47.5	L75 =	47.7	L75 =	48.0
L90 =	43.0	L90 =	41.8	L90 =	44.9	L90 =	45.0	L90 =	44.7	L90 =	46.3	L90 =	47.2	L90 =	46.8
L95 =	40.5	L95 =	38.8	L95 =	41.1	L95 =	44.2	L95 =	42.5	L95 =	45.3	L95 =	46.5	L95 =	45.6
Leq =	62.5	Leq =	62.9	Leq =	58.9	Leq =	66.4	Leq =	58.6	Leq =	49.1	Leq =	48.7	Leq =	48.9

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

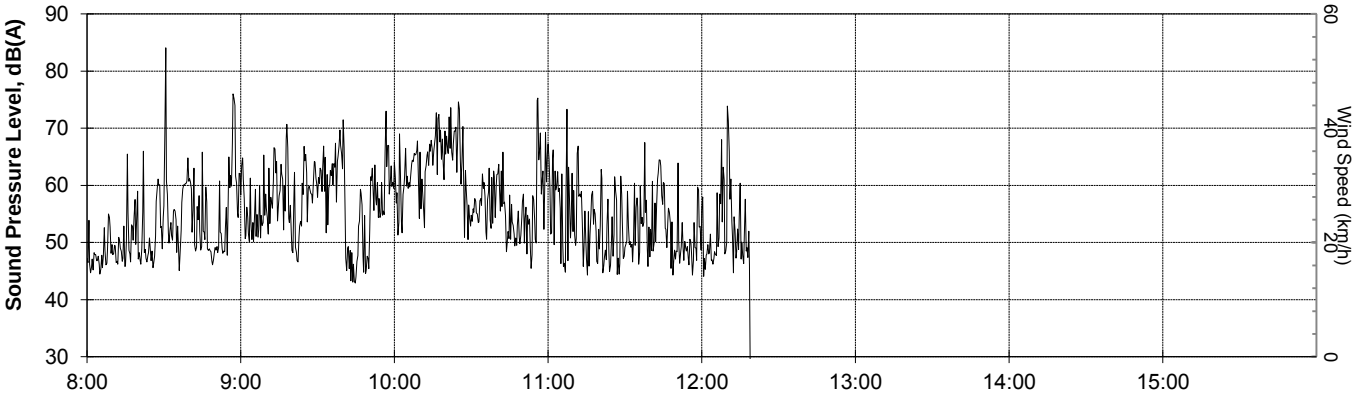
Results of Noise Monitoring

Client: Total **Location** Purari Airstrip **Date:** Friday 11 Nov 2016

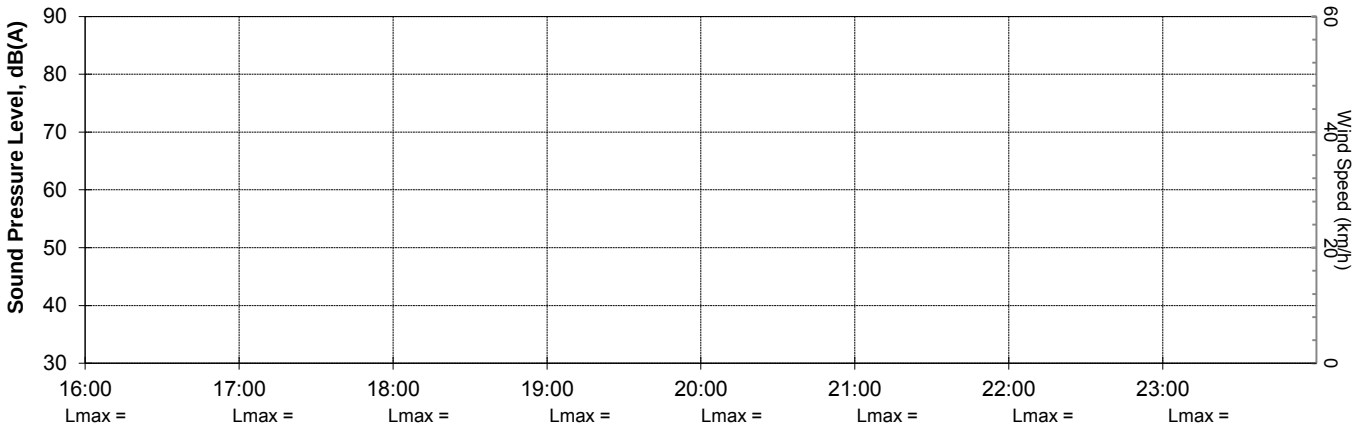
Microphone position: 1.3m AGL east of Hut



Lmax =	56.8	Lmax =	58.4	Lmax =	73.9	Lmax =	74.0	Lmax =	81.7	Lmax =	91.4	Lmax =	79.4	Lmax =	82.6
L01 =	53.6	L01 =	57.8	L01 =	63.3	L01 =	68.2	L01 =	71.2	L01 =	73.7	L01 =	62.0	L01 =	71.5
L05 =	51.2	L05 =	57.6	L05 =	57.6	L05 =	53.2	L05 =	66.3	L05 =	69.3	L05 =	52.7	L05 =	58.0
L10 =	50.7	L10 =	57.4	L10 =	57.1	L10 =	52.7	L10 =	61.3	L10 =	64.2	L10 =	49.9	L10 =	53.4
L50 =	49.7	L50 =	49.7	L50 =	51.7	L50 =	51.3	L50 =	48.6	L50 =	44.7	L50 =	47.0	L50 =	47.7
L75 =	49.1	L75 =	49.0	L75 =	50.6	L75 =	50.4	L75 =	47.7	L75 =	43.9	L75 =	45.3	L75 =	45.1
L90 =	48.7	L90 =	48.4	L90 =	49.9	L90 =	49.4	L90 =	46.8	L90 =	43.3	L90 =	43.9	L90 =	44.0
L95 =	48.1	L95 =	47.6	L95 =	49.1	L95 =	48.1	L95 =	46.0	L95 =	42.3	L95 =	41.9	L95 =	42.4
Leq =	50.0	Leq =	52.9	Leq =	54.8	Leq =	54.8	Leq =	58.9	Leq =	62.6	Leq =	53.0	Leq =	58.0



Lmax =	90.4	Lmax =	86.1	Lmax =	89.4	Lmax =	86.5	Lmax =		Lmax =		Lmax =		Lmax =	
L01 =	74.6	L01 =	73.3	L01 =	76.6	L01 =	70.8	L01 =		L01 =		L01 =		L01 =	
L05 =	61.6	L05 =	67.5	L05 =	70.7	L05 =	63.1	L05 =		L05 =		L05 =		L05 =	
L10 =	59.9	L10 =	63.8	L10 =	67.2	L10 =	58.3	L10 =		L10 =		L10 =		L10 =	
L50 =	48.2	L50 =	50.4	L50 =	51.9	L50 =	46.9	L50 =		L50 =		L50 =		L50 =	
L75 =	46.0	L75 =	46.6	L75 =	47.4	L75 =	44.9	L75 =		L75 =		L75 =		L75 =	
L90 =	43.9	L90 =	44.2	L90 =	45.4	L90 =	43.6	L90 =		L90 =		L90 =		L90 =	
L95 =	41.8	L95 =	41.0	L95 =	42.2	L95 =	41.1	L95 =		L95 =		L95 =		L95 =	
Leq =	63.9	Leq =	61.5	Leq =	64.7	Leq =	58.4	Leq =		Leq =		Leq =		Leq =	



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Mapaio Fish Camp
Measurement period: Wednesday 9 to Saturday 12 November 2016
GPS Coordinates (UTM Zone 55): 292084m E, 9185342m S
Microphone position: 2.2m AGL in front of closest hut to Purari River bank
Prevailing ambient noise environment: General village habitation w/ continuous insect noise.
Prevailing weather conditions: Predominantly calm & dry with heavy rain on Wed afternoon from 4pm to 6pm, and Sat Morning from 1am to 6am.
Measured noise level, dBA L90, Day: 35, 35, 35, 32
Measured noise level, dBA L90, Night: 41, 41, 40

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 620.11227 **Location:** Mapaio Fish Camp
Microphone position: 2.2m AGL in front of closest hut to Purari River bank
Initial calibration: 93.5 dBA **Final calibration:** 93.4 dBA

Hour	Sound Pressure Level, dB(A)																				
	Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016			Sat, 12-11-2016											
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				45.5	42.6	44.7	44.7	41.3	43.4	47.1	41.6	45.6									
01:00 to 02:00				46.4	43.0	45.0	46.7	43.0	46.7	53.4*	43.8*	49.8*									
02:00 to 03:00				47.1	44.2	46.0	50.1	45.2	47.8	54.8*	50.3*	53.5*									
03:00 to 04:00				49.2	45.3	47.8	48.0	45.5	47.0	52.1*	49.1*	51.1*									
04:00 to 05:00				46.5	43.3	49.0	47.4	44.6	49.2	49.5*	47.5*	49.9*									
05:00 to 06:00				52.9	34.8	55.5	50.3	34.6	54.9	56.7*	41.4*	54.7*									
06:00 to 07:00				44.7	33.1	51.0	43.4	32.6	52.9	53.8	38.8	65.9									
07:00 to 08:00				44.7	32.8	51.8	46.9	34.7	44.9	56.3	35.0	57.6									
08:00 to 09:00	57.6	32.1	81.3	46.6	31.0	43.1	42.3	32.9	39.9	46.7	34.2	60.7									
09:00 to 10:00	50.4	33.2	49.2	41.5	28.8	46.0	39.5	31.7	39.6	41.6	31.8	44.0									
10:00 to 11:00	42.8	29.6	45.6	38.0	28.6	42.6	42.1	31.4	43.7	41.0	31.1	51.5									
11:00 to 12:00	48.2	28.2	45.4	40.4	28.2	42.2	43.5	27.8	41.8	38.7	32.5	37.7									
12:00 to 13:00	41.8	28.5	43.2	37.3	29.8	38.1	37.9	26.3	37.7	36.9	26.7	36.1									
13:00 to 14:00	35.5	28.2	36.2	39.3	29.8	40.8	40.4	26.1	43.4	51.5	27.5	55.8									
14:00 to 15:00	41.4	28.3	45.5	50.6	31.1	48.2	50.3	39.5	46.6	39.0	33.2	46.1									
15:00 to 16:00	44.6	33.6	43.2	50.6	41.6	47.5	45.0	34.6	42.8												
16:00 to 17:00	60.5*	40.6*	56.8*	54.1	42.3	52.1	47.1	35.6	48.3												
17:00 to 18:00	55.5*	40.2*	55.4*	45.3	38.4	50.7	44.0	36.6	56.3												
18:00 to 19:00	48.4	42.5	47.1	47.3	39.8	50.0	49.1	40.2	47.5												
19:00 to 20:00	48.3	45.2	47.1	46.3	42.9	45.0	49.4	46.0	48.4												
20:00 to 21:00	45.7	44.2	45.1	45.8	42.4	44.4	47.0	41.8	50.1												
21:00 to 22:00	47.8	41.2	57.5	45.6	41.5	44.1	48.7	41.0	48.4												
22:00 to 23:00	49.9	43.4	46.9	46.1	41.2	48.4	48.5	40.5	48.4												
23:00 to 24:00	49.3	42.2	46.1	45.2	40.4	43.7	46.3	40.4	45.3												
$L10_{(18h),\ ar.av.}$ 6-24h				45.0			45.1														
$L_{eq(15h),\ log\ av.}$ 7-22h						47.5			48.1												
$L_{eq(9h),\ log\ av.}$ 22-7h			49.5			49.8															
$L_{eq(24h),\ log\ av.}$ 0-24h						48.4			48.8												
L90 Day, 7-22h		34.6			35.3			35.1			31.5										
L90 Evening, 18-22h		43.3			41.7			42.3													
L90 Night, 22-7h		41.3			40.9			40.3													
Wind @0900h, km/h																					
Wind @1500h, km/h																					

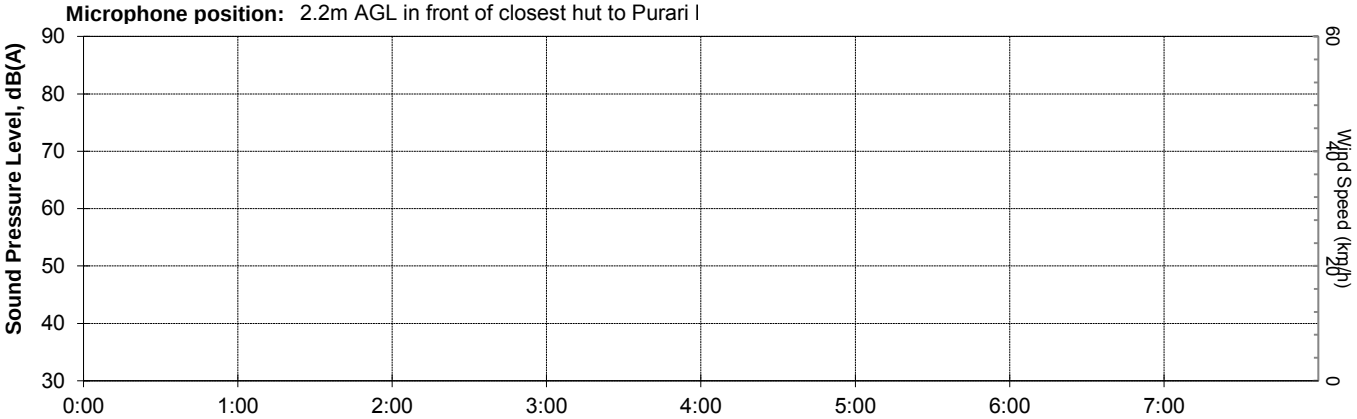
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

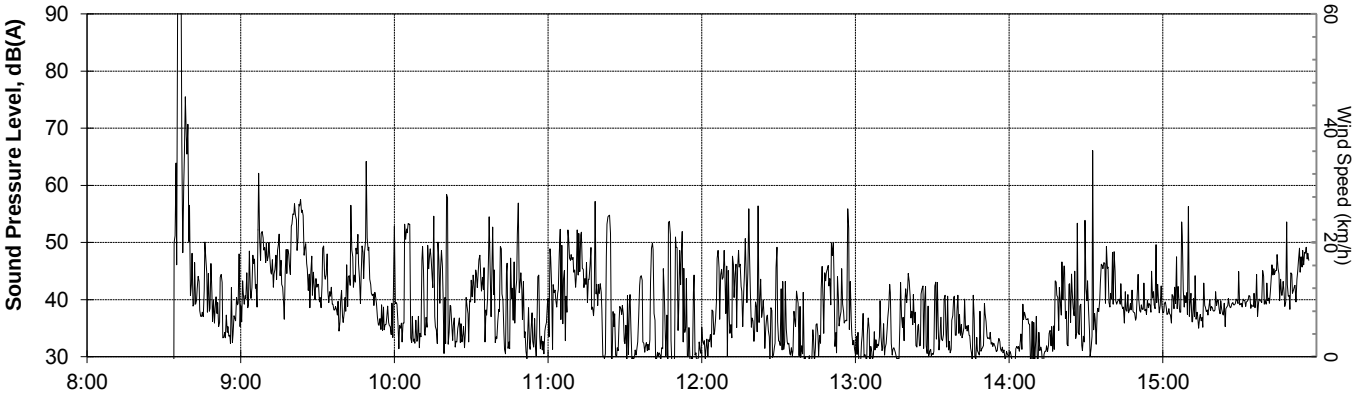
Results of Noise Monitoring

Client: ToTAL **Location** Mapaio Fish Camp **Date:** Wednesday 09 Nov 2016

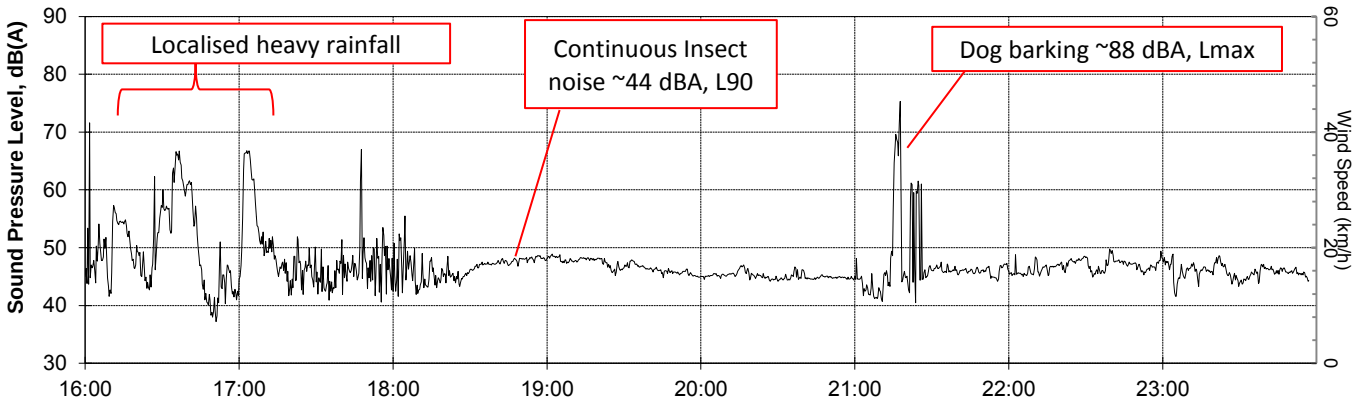
Microphone position: 2.2m AGL in front of closest hut to Purari I



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax = 102.0	Lmax = 79.4	Lmax = 71.0	Lmax = 70.3	Lmax = 69.4	Lmax = 57.5	Lmax = 80.6	Lmax = 73.1
L01 = 93.4	L01 = 59.4	L01 = 58.0	L01 = 56.7	L01 = 55.3	L01 = 49.0	L01 = 52.2	L01 = 52.3
L05 = 93.3	L05 = 53.7	L05 = 48.9	L05 = 52.6	L05 = 47.4	L05 = 39.9	L05 = 45.0	L05 = 46.8
L10 = 57.6	L10 = 50.4	L10 = 42.8	L10 = 48.2	L10 = 41.8	L10 = 35.5	L10 = 41.4	L10 = 44.6
L50 = 36.7	L50 = 39.5	L50 = 32.0	L50 = 30.9	L50 = 31.2	L50 = 30.8	L50 = 33.0	L50 = 39.1
L75 = 33.6	L75 = 35.3	L75 = 30.4	L75 = 29.1	L75 = 29.5	L75 = 29.2	L75 = 29.7	L75 = 35.9
L90 = 32.1	L90 = 33.2	L90 = 29.6	L90 = 28.2	L90 = 28.5	L90 = 28.2	L90 = 28.3	L90 = 33.6
L95 = 30.4	L95 = 31.2	L95 = 28.8	L95 = 27.1	L95 = 27.2	L95 = 27.0	L95 = 26.3	L95 = 30.7
Leq = 81.3	Leq = 49.2	Leq = 45.6	Leq = 45.4	Leq = 43.2	Leq = 36.2	Leq = 45.5	Leq = 43.2



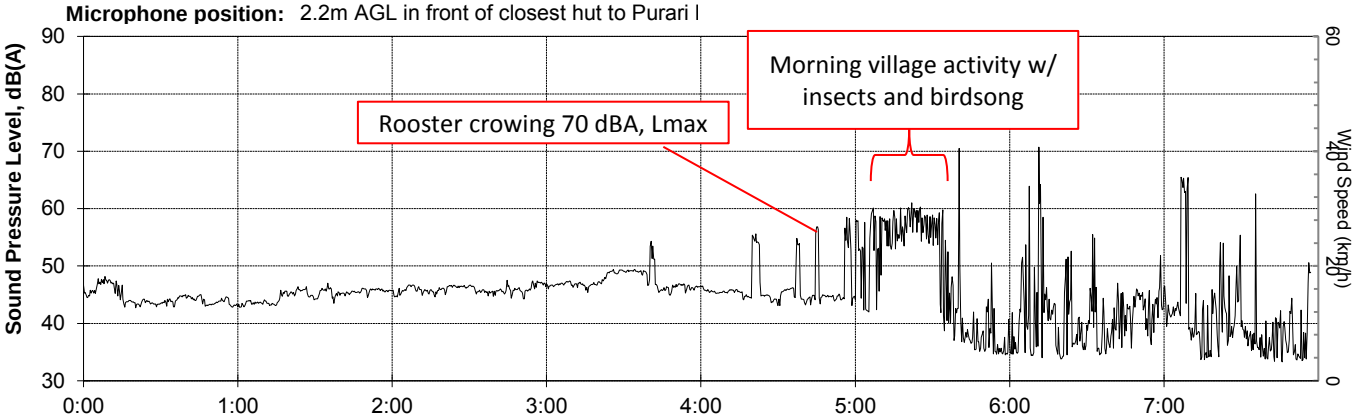
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 88.2	Lmax = 79.6	Lmax = 64.2	Lmax = 52.0	Lmax = 52.8	Lmax = 88.4	Lmax = 57.7	Lmax = 53.6
L01 = 66.5	L01 = 66.8	L01 = 53.8	L01 = 49.2	L01 = 47.8	L01 = 70.5	L01 = 52.9	L01 = 52.3
L05 = 63.0	L05 = 63.1	L05 = 48.8	L05 = 48.6	L05 = 46.4	L05 = 50.1	L05 = 51.3	L05 = 51.0
L10 = 60.5	L10 = 55.5	L10 = 48.4	L10 = 48.3	L10 = 45.7	L10 = 47.8	L10 = 49.9	L10 = 49.3
L50 = 47.9	L50 = 45.5	L50 = 46.6	L50 = 46.8	L50 = 44.8	L50 = 45.0	L50 = 45.5	L50 = 44.4
L75 = 43.4	L75 = 42.1	L75 = 43.9	L75 = 45.8	L75 = 44.5	L75 = 43.5	L75 = 44.7	L75 = 43.4
L90 = 40.6	L90 = 40.2	L90 = 42.5	L90 = 45.2	L90 = 44.2	L90 = 41.2	L90 = 43.4	L90 = 42.2
L95 = 36.9	L95 = 38.1	L95 = 39.2	L95 = 44.4	L95 = 43.7	L95 = 39.5	L95 = 42.3	L95 = 40.4
Leq = 56.8	Leq = 55.4	Leq = 47.1	Leq = 47.1	Leq = 45.1	Leq = 57.5	Leq = 46.9	Leq = 46.1

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

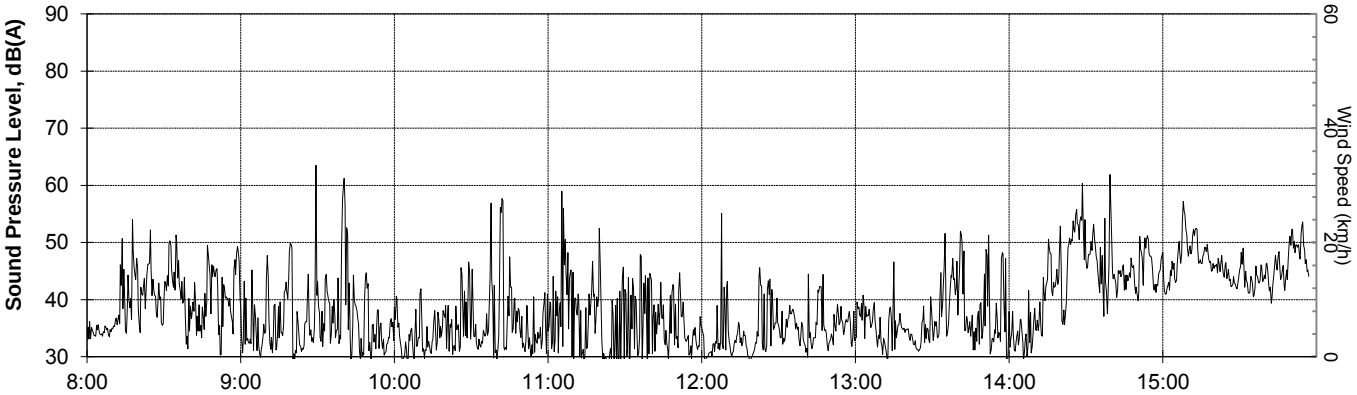
Results of Noise Monitoring

Client: ToTAL **Location** Mapaio Fish Camp **Date:** Thursday 10 Nov 2016

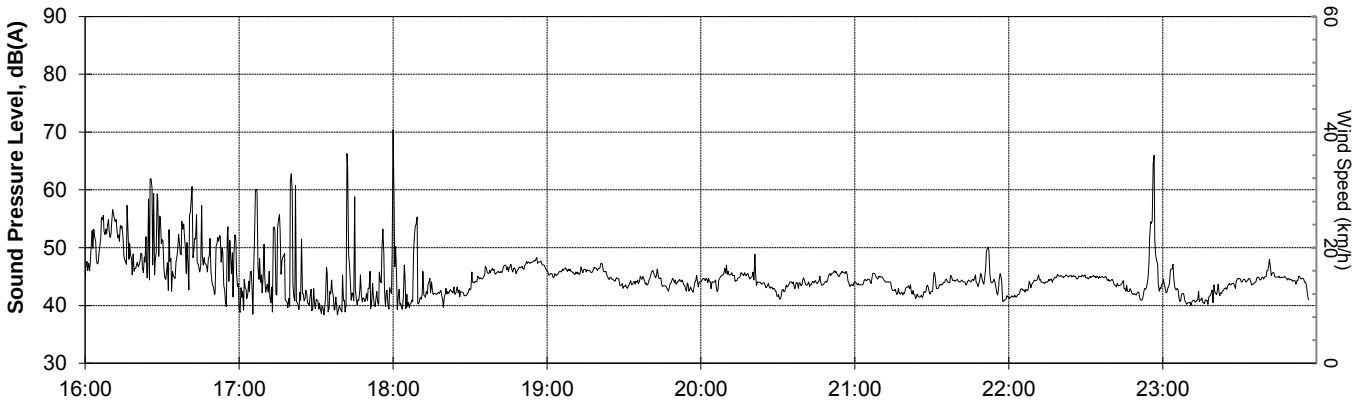
Microphone position: 2.2m AGL in front of closest hut to Purari I



Lmax =	54.3	Lmax =	52.1	Lmax =	53.1	Lmax =	63.9	Lmax =	70.4	Lmax =	87.2	Lmax =	83.0	Lmax =	78.2
L01 =	51.3	L01 =	48.6	L01 =	48.9	L01 =	50.2	L01 =	62.3	L01 =	68.3	L01 =	56.5	L01 =	59.6
L05 =	47.5	L05 =	47.1	L05 =	47.6	L05 =	49.5	L05 =	47.0	L05 =	62.5	L05 =	48.5	L05 =	48.5
L10 =	45.5	L10 =	46.4	L10 =	47.1	L10 =	49.2	L10 =	46.5	L10 =	52.9	L10 =	44.7	L10 =	44.7
L50 =	43.8	L50 =	44.6	L50 =	45.7	L50 =	46.9	L50 =	44.8	L50 =	41.0	L50 =	35.2	L50 =	35.6
L75 =	43.1	L75 =	43.6	L75 =	44.9	L75 =	46.0	L75 =	44.0	L75 =	36.9	L75 =	33.8	L75 =	33.5
L90 =	42.6	L90 =	43.0	L90 =	44.2	L90 =	45.3	L90 =	43.3	L90 =	34.8	L90 =	33.1	L90 =	32.8
L95 =	41.6	L95 =	42.2	L95 =	43.1	L95 =	44.3	L95 =	42.1	L95 =	33.5	L95 =	32.2	L95 =	32.0
Leq =	44.7	Leq =	45.0	Leq =	46.0	Leq =	47.8	Leq =	49.0	Leq =	55.5	Leq =	51.0	Leq =	51.8



Lmax =	65.5	Lmax =	79.4	Lmax =	71.0	Lmax =	71.4	Lmax =	66.8	Lmax =	69.0	Lmax =	75.8	Lmax =	59.2
L01 =	53.9	L01 =	56.4	L01 =	52.0	L01 =	52.7	L01 =	49.2	L01 =	52.3	L01 =	58.2	L01 =	55.6
L05 =	49.2	L05 =	45.7	L05 =	42.8	L05 =	45.9	L05 =	39.2	L05 =	43.4	L05 =	52.3	L05 =	52.3
L10 =	46.6	L10 =	41.5	L10 =	38.0	L10 =	40.4	L10 =	37.3	L10 =	39.3	L10 =	50.6	L10 =	50.6
L50 =	35.1	L50 =	31.1	L50 =	31.0	L50 =	30.4	L50 =	32.8	L50 =	32.7	L50 =	42.5	L50 =	45.4
L75 =	33.1	L75 =	29.6	L75 =	29.6	L75 =	29.0	L75 =	31.1	L75 =	31.0	L75 =	35.8	L75 =	43.0
L90 =	31.0	L90 =	28.8	L90 =	28.6	L90 =	28.2	L90 =	29.8	L90 =	29.8	L90 =	31.1	L90 =	41.6
L95 =	28.7	L95 =	28.0	L95 =	27.7	L95 =	27.3	L95 =	28.3	L95 =	28.1	L95 =	28.7	L95 =	39.7
Leq =	43.1	Leq =	46.0	Leq =	42.6	Leq =	42.2	Leq =	38.1	Leq =	40.8	Leq =	48.2	Leq =	47.5



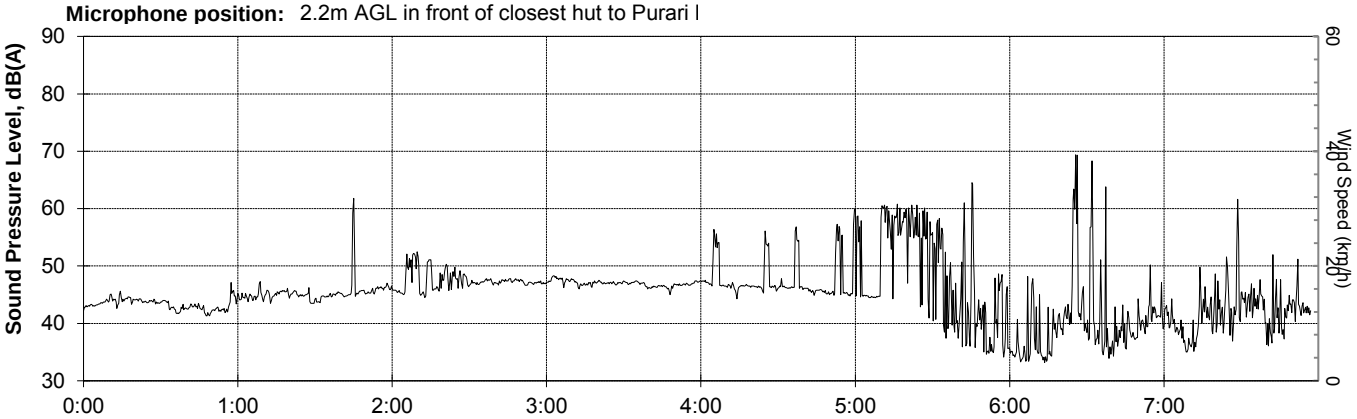
Lmax =	77.6	Lmax =	82.3	Lmax =	89.4	Lmax =	55.2	Lmax =	53.8	Lmax =	58.9	Lmax =	75.7	Lmax =	52.4
L01 =	61.7	L01 =	62.6	L01 =	52.9	L01 =	47.8	L01 =	47.9	L01 =	49.7	L01 =	56.1	L01 =	49.0
L05 =	56.0	L05 =	49.0	L05 =	47.7	L05 =	46.7	L05 =	46.2	L05 =	46.9	L05 =	47.3	L05 =	45.7
L10 =	54.1	L10 =	45.3	L10 =	47.3	L10 =	46.3	L10 =	45.8	L10 =	45.6	L10 =	46.1	L10 =	45.2
L50 =	47.1	L50 =	40.3	L50 =	43.8	L50 =	44.7	L50 =	44.0	L50 =	43.3	L50 =	43.9	L50 =	43.5
L75 =	44.6	L75 =	39.2	L75 =	41.6	L75 =	43.6	L75 =	43.1	L75 =	42.3	L75 =	42.4	L75 =	41.7
L90 =	42.3	L90 =	38.4	L90 =	39.8	L90 =	42.9	L90 =	42.4	L90 =	41.5	L90 =	41.2	L90 =	40.4
L95 =	39.5	L95 =	37.4	L95 =	38.4	L95 =	41.7	L95 =	40.6	L95 =	40.5	L95 =	40.1	L95 =	39.4
Leq =	52.1	Leq =	50.7	Leq =	50.0	Leq =	45.0	Leq =	44.4	Leq =	44.1	Leq =	48.4	Leq =	43.7

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

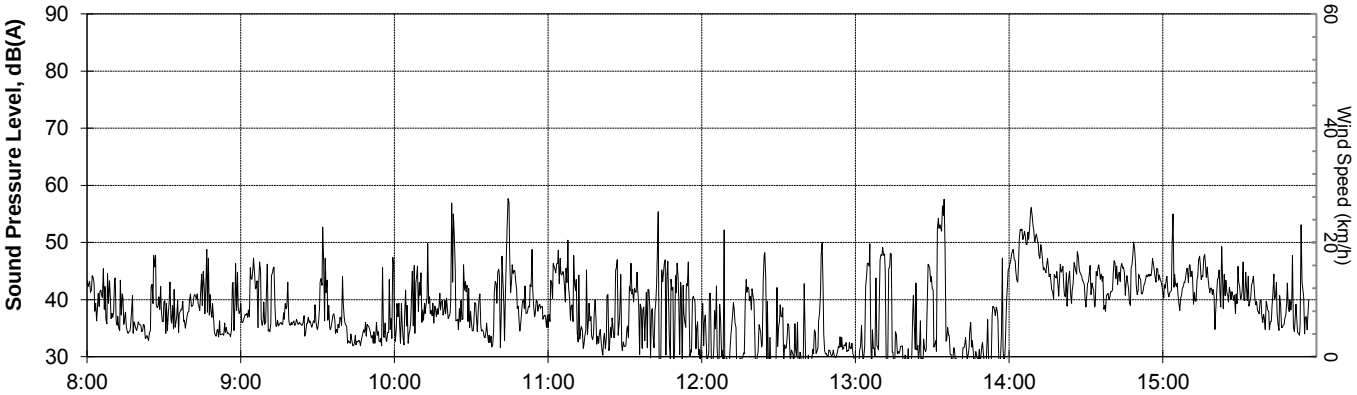
Results of Noise Monitoring

Client: ToTAL **Location** Mapaio Fish Camp **Date:** Friday 11 Nov 2016

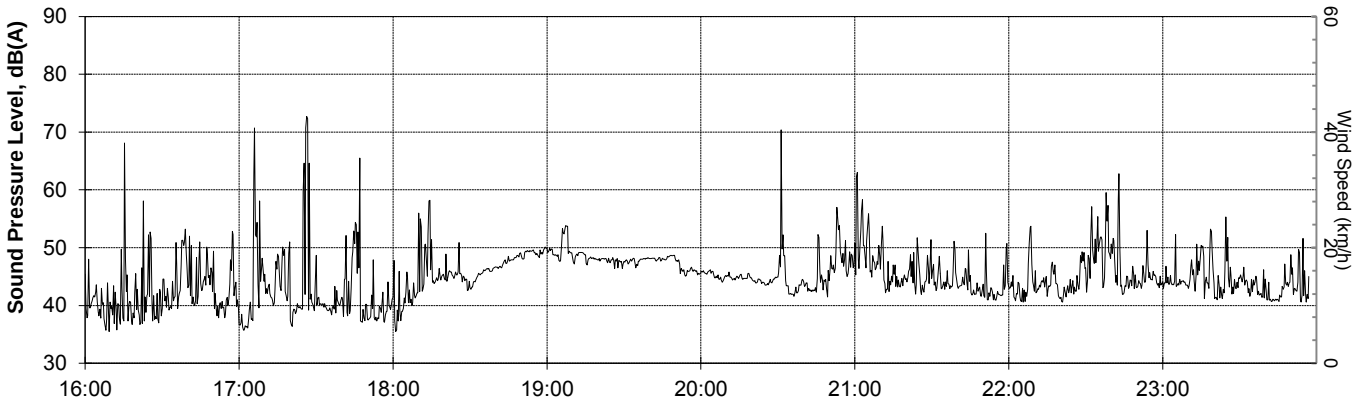
Microphone position: 2.2m AGL in front of closest hut to Purari I



Lmax =	51.5	Lmax =	65.8	Lmax =	53.3	Lmax =	51.4	Lmax =	67.8	Lmax =	79.5	Lmax =	81.7	Lmax =	65.7
L01 =	47.8	L01 =	52.0	L01 =	52.5	L01 =	49.9	L01 =	62.2	L01 =	68.5	L01 =	57.7	L01 =	55.9
L05 =	45.4	L05 =	48.1	L05 =	51.7	L05 =	48.6	L05 =	47.9	L05 =	62.2	L05 =	46.5	L05 =	49.9
L10 =	44.7	L10 =	46.7	L10 =	50.1	L10 =	48.0	L10 =	47.4	L10 =	50.3	L10 =	43.4	L10 =	46.9
L50 =	43.0	L50 =	44.7	L50 =	46.8	L50 =	46.7	L50 =	46.0	L50 =	42.0	L50 =	35.2	L50 =	38.1
L75 =	42.0	L75 =	43.7	L75 =	45.9	L75 =	46.1	L75 =	45.3	L75 =	37.0	L75 =	33.5	L75 =	35.9
L90 =	41.3	L90 =	43.0	L90 =	45.2	L90 =	45.5	L90 =	44.6	L90 =	34.6	L90 =	32.6	L90 =	34.7
L95 =	39.8	L95 =	41.8	L95 =	44.1	L95 =	44.4	L95 =	43.1	L95 =	32.8	L95 =	31.5	L95 =	33.3
Leq =	43.4	Leq =	46.7	Leq =	47.8	Leq =	47.0	Leq =	49.2	Leq =	54.9	Leq =	52.9	Leq =	44.9



Lmax =	59.9	Lmax =	68.0	Lmax =	71.4	Lmax =	67.9	Lmax =	61.6	Lmax =	67.4	Lmax =	59.6	Lmax =	67.4
L01 =	50.5	L01 =	51.3	L01 =	54.7	L01 =	53.7	L01 =	49.7	L01 =	56.3	L01 =	55.0	L01 =	50.6
L05 =	45.3	L05 =	42.8	L05 =	46.0	L05 =	48.1	L05 =	42.4	L05 =	46.0	L05 =	51.8	L05 =	47.1
L10 =	42.3	L10 =	39.5	L10 =	42.1	L10 =	43.5	L10 =	37.9	L10 =	40.4	L10 =	50.3	L10 =	45.0
L50 =	35.0	L50 =	34.3	L50 =	35.5	L50 =	31.8	L50 =	29.1	L50 =	28.3	L50 =	44.0	L50 =	39.4
L75 =	33.7	L75 =	32.6	L75 =	32.7	L75 =	29.7	L75 =	27.2	L75 =	26.9	L75 =	41.7	L75 =	36.7
L90 =	32.9	L90 =	31.7	L90 =	31.4	L90 =	27.8	L90 =	26.3	L90 =	26.1	L90 =	39.5	L90 =	34.6
L95 =	32.0	L95 =	30.8	L95 =	30.0	L95 =	26.4	L95 =	25.2	L95 =	25.3	L95 =	33.9	L95 =	32.9
Leq =	39.9	Leq =	39.6	Leq =	43.7	Leq =	41.8	Leq =	37.7	Leq =	43.4	Leq =	46.6	Leq =	42.8



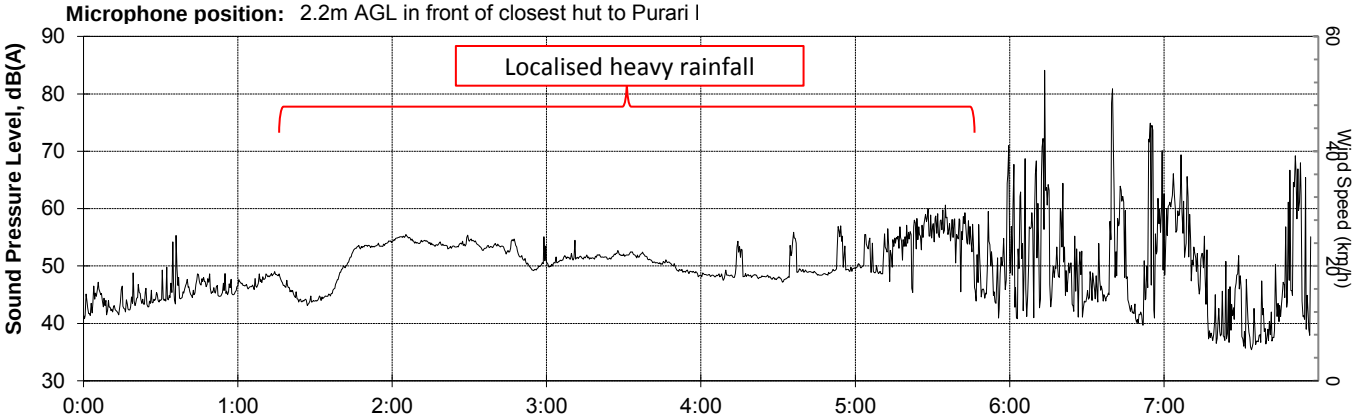
Lmax =	82.6	Lmax =	85.5	Lmax =	70.7	Lmax =	56.1	Lmax =	86.7	Lmax =	80.3	Lmax =	79.5	Lmax =	69.9
L01 =	55.7	L01 =	63.1	L01 =	55.3	L01 =	54.1	L01 =	55.3	L01 =	57.6	L01 =	57.8	L01 =	55.1
L05 =	50.6	L05 =	48.6	L05 =	49.7	L05 =	50.1	L05 =	49.2	L05 =	51.6	L05 =	51.6	L05 =	48.7
L10 =	47.1	L10 =	44.0	L10 =	49.1	L10 =	49.4	L10 =	47.0	L10 =	48.7	L10 =	48.5	L10 =	46.3
L50 =	38.9	L50 =	39.1	L50 =	45.5	L50 =	47.9	L50 =	44.3	L50 =	43.1	L50 =	42.8	L50 =	42.3
L75 =	36.9	L75 =	37.4	L75 =	43.4	L75 =	47.0	L75 =	43.1	L75 =	41.9	L75 =	41.3	L75 =	41.1
L90 =	35.6	L90 =	36.6	L90 =	40.2	L90 =	46.0	L90 =	41.8	L90 =	41.0	L90 =	40.5	L90 =	40.4
L95 =	33.8	L95 =	35.2	L95 =	35.8	L95 =	44.5	L95 =	39.9	L95 =	39.7	L95 =	39.5	L95 =	39.1
Leq =	48.3	Leq =	56.3	Leq =	47.5	Leq =	48.4	Leq =	50.1	Leq =	48.4	Leq =	48.4	Leq =	45.3

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

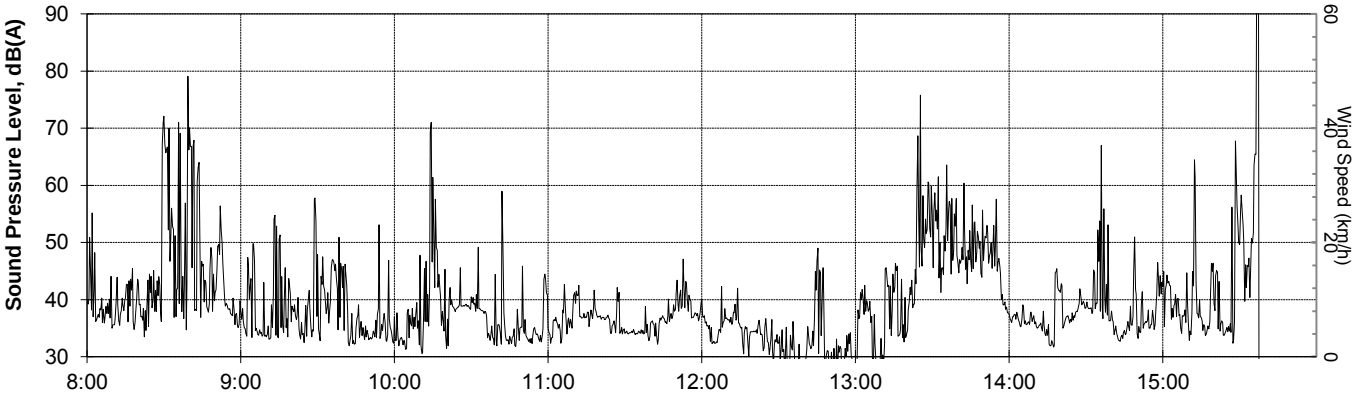
Results of Noise Monitoring

Client: ToTAL **Location** Mapaio Fish Camp **Date:** Saturday 12 Nov 2016

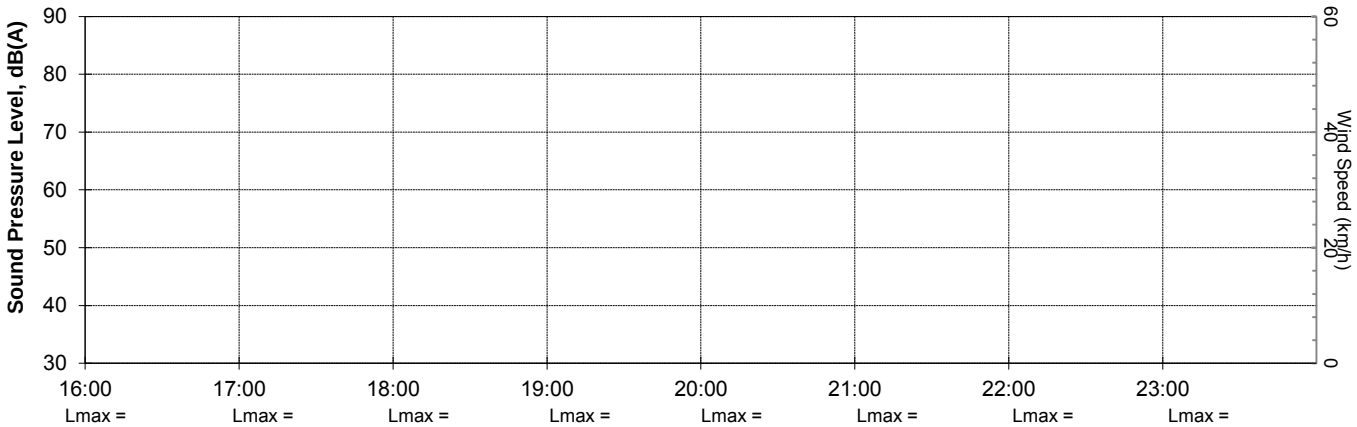
Microphone position: 2.2m AGL in front of closest hut to Purari I



Lmax =	71.1	Lmax =	63.8	Lmax =	67.6	Lmax =	67.9	Lmax =	67.4	Lmax =	74.4	Lmax =	96.6	Lmax =	84.4
L01 =	52.2	L01 =	55.2	L01 =	56.7	L01 =	53.8	L01 =	60.1	L01 =	66.5	L01 =	76.5	L01 =	70.1
L05 =	48.4	L05 =	53.9	L05 =	55.2	L05 =	52.5	L05 =	50.1	L05 =	62.4	L05 =	60.6	L05 =	60.9
L10 =	47.1	L10 =	53.4	L10 =	54.8	L10 =	52.1	L10 =	49.5	L10 =	56.7	L10 =	53.8	L10 =	56.3
L50 =	44.1	L50 =	47.2	L50 =	53.4	L50 =	51.0	L50 =	48.3	L50 =	47.2	L50 =	43.0	L50 =	39.5
L75 =	42.8	L75 =	45.0	L75 =	52.6	L75 =	50.1	L75 =	47.8	L75 =	43.9	L75 =	40.7	L75 =	36.0
L90 =	41.6	L90 =	43.8	L90 =	50.3	L90 =	49.1	L90 =	47.5	L90 =	41.4	L90 =	38.8	L90 =	35.0
L95 =	40.4	L95 =	42.8	L95 =	48.7	L95 =	48.1	L95 =	46.9	L95 =	37.9	L95 =	36.9	L95 =	34.0
Leq =	45.6	Leq =	49.8	Leq =	53.5	Leq =	51.1	Leq =	49.9	Leq =	54.7	Leq =	65.9	Leq =	57.6



Lmax =	93.1	Lmax =	70.0	Lmax =	87.8	Lmax =	66.4	Lmax =	67.0	Lmax =	90.9	Lmax =	79.9	Lmax =
L01 =	74.5	L01 =	55.6	L01 =	53.8	L01 =	46.7	L01 =	43.5	L01 =	64.0	L01 =	52.0	L01 =
L05 =	51.5	L05 =	46.1	L05 =	43.4	L05 =	40.7	L05 =	38.0	L05 =	55.2	L05 =	40.2	L05 =
L10 =	46.7	L10 =	41.6	L10 =	41.0	L10 =	38.7	L10 =	36.9	L10 =	51.5	L10 =	39.0	L10 =
L50 =	37.3	L50 =	33.6	L50 =	34.0	L50 =	35.5	L50 =	31.5	L50 =	40.2	L50 =	35.9	L50 =
L75 =	35.1	L75 =	32.6	L75 =	32.0	L75 =	33.7	L75 =	27.9	L75 =	32.4	L75 =	34.6	L75 =
L90 =	34.2	L90 =	31.8	L90 =	31.1	L90 =	32.5	L90 =	26.7	L90 =	27.5	L90 =	33.2	L90 =
L95 =	33.0	L95 =	30.9	L95 =	29.6	L95 =	31.2	L95 =	25.6	L95 =	25.9	L95 =	31.5	L95 =
Leq =	60.7	Leq =	44.0	Leq =	51.5	Leq =	37.7	Leq =	36.1	Leq =	55.8	Leq =	46.1	Leq =



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

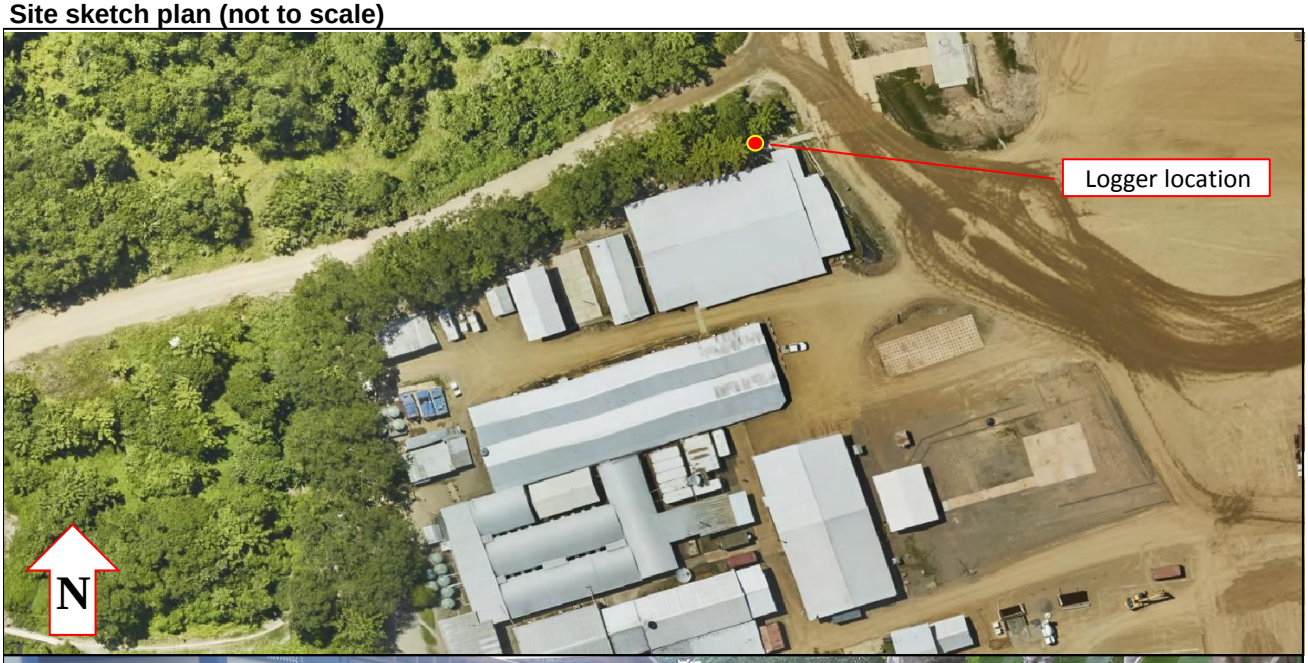
Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Herd Base 'M Block' Accommodation
Measurement period: Thursday 10 to Saturday 12 November 2016
GPS Coordinates (UTM Zone 55): 303842m E, 9186586m S
Microphone position: 1.3m AGL in clearing 18m SSE of capped wellpad
Prevailing ambient noise environment: Continuous noise from generators, AC plant & insects
Prevailing weather conditions: Calm winds with heavy rains on Fri night 9pm to midnight and Sat morning from midnight to 7am
Measured noise level, dBA L90, Day: 52, 53, 52
Measured noise level, dBA L90, Night: 50, 50

Site sketch plan (not to scale)



SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 640.11227 **Location:** Herd Base 'M Block' Accommodation
Microphone position: 1.3m AGL
Initial calibration: 94 dBA **Final calibration:** 94 dBA

Hour	Sound Pressure Level, dB(A)																				
	Fri, 11-11-2016			Sat, 12-11-2016			Sun, 13-11-2016														
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				59.2*	54*	57.3*	51.5	50.5	51.2												
01:00 to 02:00				60.1*	52.4*	60.7*	51.2	50.1	50.8												
02:00 to 03:00				73.3*	66.2*	70.6*	51.1	50.1	50.7												
03:00 to 04:00				69.1*	62.8*	65.8*	50.9	50.0	50.6												
04:00 to 05:00				60.5*	52.8*	56.7*	51.4	50.1	50.9												
05:00 to 06:00				59.9*	53.7*	58.2*	60.8	50.0	62.6												
06:00 to 07:00				55.2	50.1	53.6	54.9	49.8	54.8												
07:00 to 08:00				65.2	50.2	64.8	63.2	50.4	59.6												
08:00 to 09:00				66.1	51.7	69.4	66.8	51.9	66.3												
09:00 to 10:00				58.5	51.3	56.5	64.2	51.4	67.8												
10:00 to 11:00				65.4	51.4	70.9	79.9	52.0	75.4												
11:00 to 12:00				79.5	52.4	75.1	75.2	51.5	73.7												
12:00 to 13:00				79.1	53.5	73.8	75.7	51.4	71.2												
13:00 to 14:00				79.4	53.0	75.4	68.8	50.7	69.5												
14:00 to 15:00				76.9	54.5	71.9	73.6	52.1	70.1												
15:00 to 16:00				67.0	52.5	63.5	60.7	52.0	59.0												
16:00 to 17:00	70.8	52.5	77.7	67.5	53.1	67.6															
17:00 to 18:00	58.5	50.7	63.2	57.5	51.8	55.3															
18:00 to 19:00	52.6	50.6	53.4	56.1	51.3	54.3															
19:00 to 20:00	57.7	54.2	56.6	67.3	58.1	62.7															
20:00 to 21:00	57.2	50.2	54.4	63.5	61.5	62.7															
21:00 to 22:00	56.7*	50.8*	54.1*	57.3	52.3	55.2															
22:00 to 23:00	51.4	49.7	50.8	51.9	50.9	51.5															
23:00 to 24:00	59.3*	52.1*	56.9*	52.0	50.8	51.7															
$L10_{(18h), ar.av.}$ 6-24h				64.7																	
$L_{eq(15h), log av.}$ 7-22h						69.8															
$L_{eq(9h), log av.}$ 22-7h						55.3															
$L_{eq(24h), log av.}$ 0-24h																					
L90 Day, 7-22h		51.6			53.2			51.5													
L90 Evening, 18-22h		51.7			55.8																
L90 Night, 22-7h		49.9			50.3																
Wind @0900h, km/h																					
Wind @1500h, km/h																					

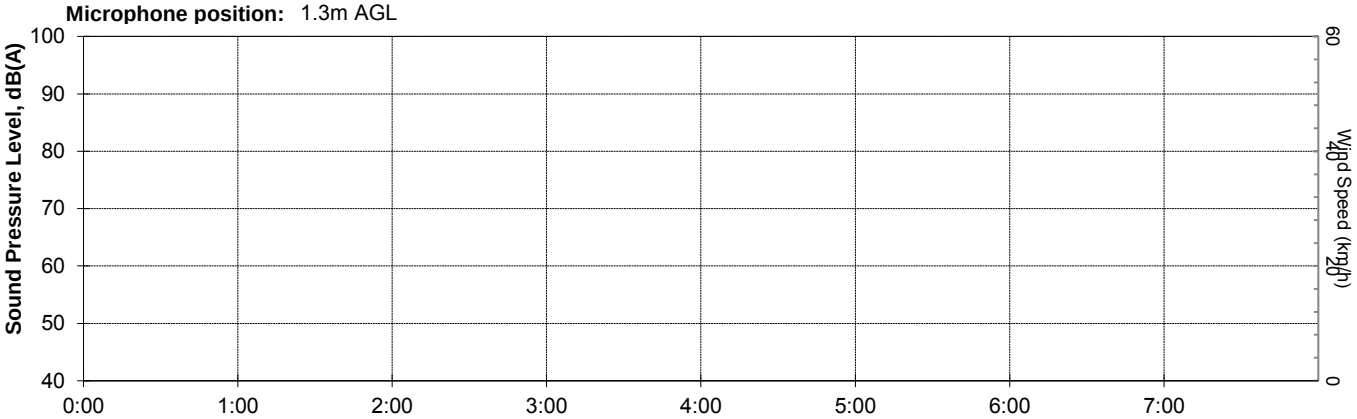
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

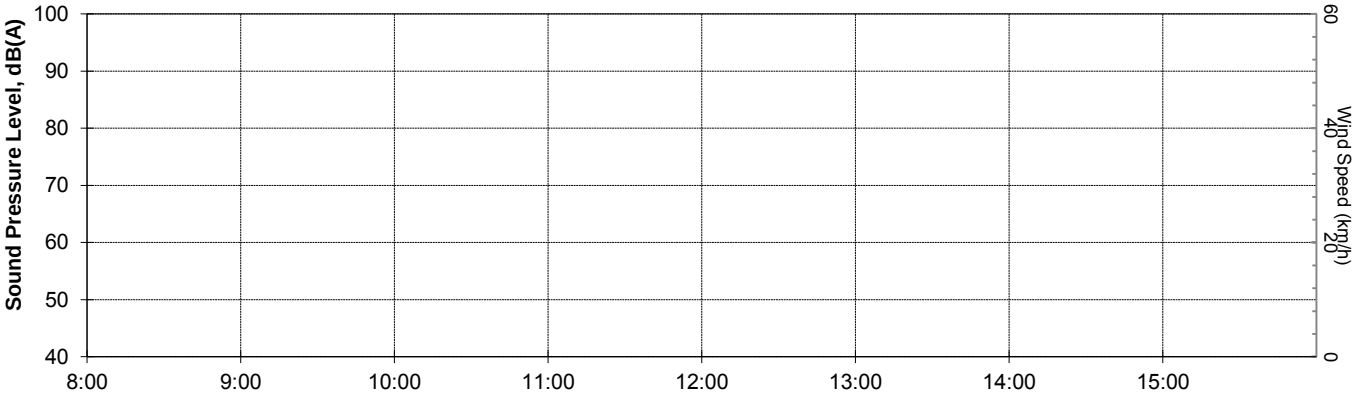
Results of Noise Monitoring

Client: ToTAL **Location** Herd Base 'M Block' Accommodation **Date:** Friday 11 Nov 2016

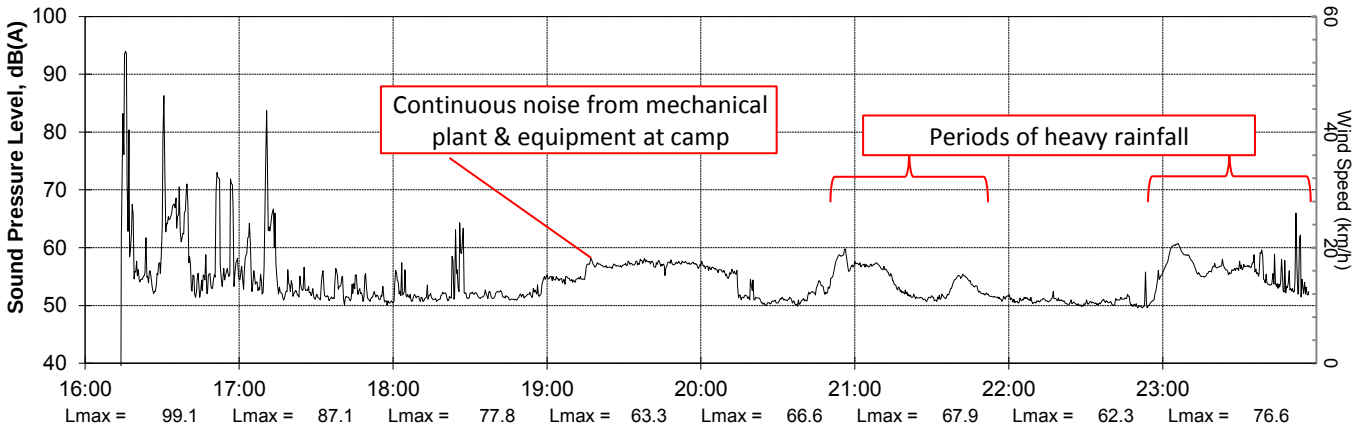
Microphone position: 1.3m AGL



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



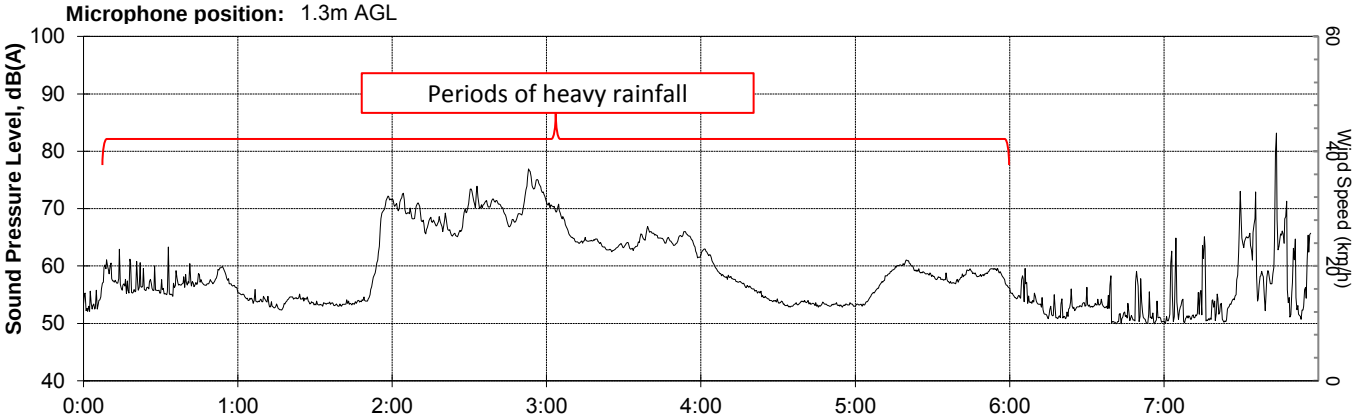
16:00		17:00		18:00		19:00		20:00		21:00		22:00		23:00	
Lmax =	99.1	Lmax =	87.1	Lmax =	77.8	Lmax =	63.3	Lmax =	66.6	Lmax =	67.9	Lmax =	62.3	Lmax =	76.6
L01 =	93.9	L01 =	76.0	L01 =	59.7	L01 =	59.3	L01 =	59.4	L01 =	58.8	L01 =	53.9	L01 =	62.8
L05 =	74.0	L05 =	63.4	L05 =	54.0	L05 =	58.1	L05 =	58.3	L05 =	57.2	L05 =	51.9	L05 =	60.2
L10 =	70.8	L10 =	58.5	L10 =	52.6	L10 =	57.7	L10 =	57.2	L10 =	56.7	L10 =	51.4	L10 =	59.3
L50 =	55.9	L50 =	52.2	L50 =	51.4	L50 =	56.7	L50 =	52.4	L50 =	52.6	L50 =	50.5	L50 =	55.7
L75 =	54.2	L75 =	51.3	L75 =	51.0	L75 =	55.2	L75 =	50.6	L75 =	51.3	L75 =	50.1	L75 =	53.9
L90 =	52.5	L90 =	50.7	L90 =	50.6	L90 =	54.2	L90 =	50.2	L90 =	50.8	L90 =	49.7	L90 =	52.1
L95 =	51.3	L95 =	49.9	L95 =	50.0	L95 =	53.0	L95 =	49.5	L95 =	50.3	L95 =	49.3	L95 =	51.1
Leq =	77.7	Leq =	63.2	Leq =	53.4	Leq =	56.6	Leq =	54.4	Leq =	54.1	Leq =	50.8	Leq =	56.9

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

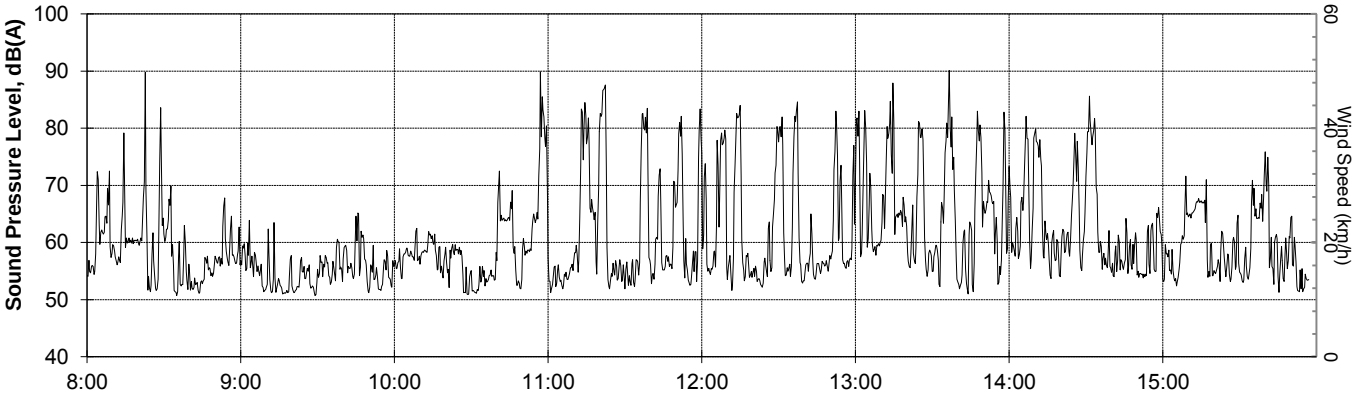
Results of Noise Monitoring

Client: ToTAL **Location** Herd Base 'M Block' Accommodation **Date:** Saturday 12 Nov 2016

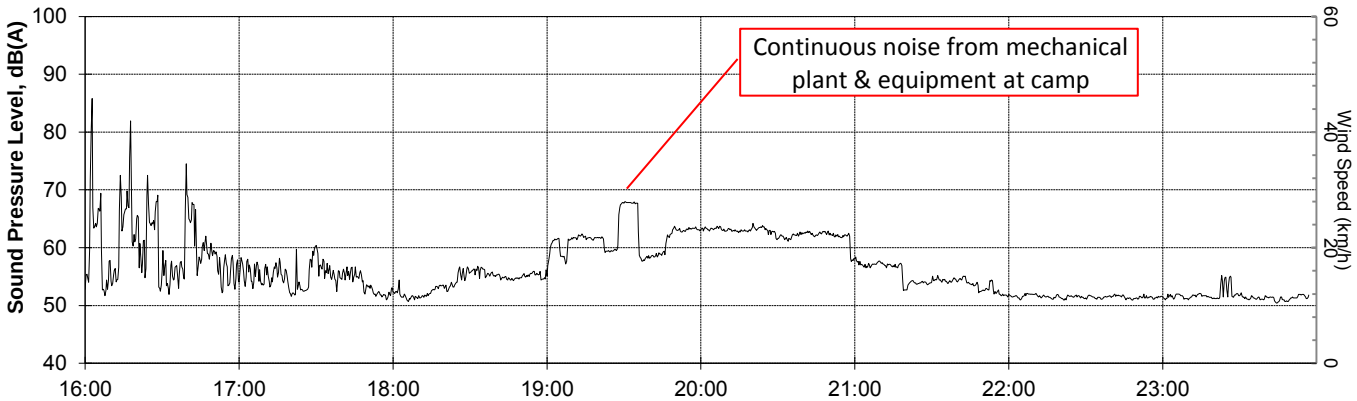
Microphone position: 1.3m AGL



Lmax =	73.4	Lmax =	73.8	Lmax =	77.6	Lmax =	73.1	Lmax =	67.7	Lmax =	67.4	Lmax =	72.7	Lmax =	86.7
L01 =	63.5	L01 =	71.9	L01 =	76.5	L01 =	71.3	L01 =	62.9	L01 =	61.5	L01 =	60.0	L01 =	76.3
L05 =	60.2	L05 =	69.7	L05 =	74.4	L05 =	70.3	L05 =	61.9	L05 =	60.4	L05 =	56.4	L05 =	67.2
L10 =	59.2	L10 =	60.1	L10 =	73.3	L10 =	69.1	L10 =	60.5	L10 =	59.9	L10 =	55.2	L10 =	65.2
L50 =	56.3	L50 =	53.6	L50 =	69.7	L50 =	64.4	L50 =	53.9	L50 =	58.1	L50 =	52.3	L50 =	53.6
L75 =	55.3	L75 =	52.9	L75 =	67.6	L75 =	63.5	L75 =	53.1	L75 =	56.9	L75 =	50.6	L75 =	50.8
L90 =	54.0	L90 =	52.4	L90 =	66.2	L90 =	62.8	L90 =	52.8	L90 =	53.7	L90 =	50.1	L90 =	50.2
L95 =	51.6	L95 =	51.7	L95 =	64.9	L95 =	61.7	L95 =	52.3	L95 =	52.7	L95 =	49.5	L95 =	49.6
Leq =	57.3	Leq =	60.7	Leq =	70.6	Leq =	65.8	Leq =	56.7	Leq =	58.2	Leq =	53.6	Leq =	64.8



Lmax =	96.5	Lmax =	80.0	Lmax =	94.4	Lmax =	94.1	Lmax =	89.2	Lmax =	95.8	Lmax =	92.8	Lmax =	80.4
L01 =	80.0	L01 =	65.4	L01 =	84.2	L01 =	87.2	L01 =	84.8	L01 =	86.9	L01 =	82.6	L01 =	73.7
L05 =	69.1	L05 =	60.4	L05 =	74.3	L05 =	82.6	L05 =	81.5	L05 =	81.9	L05 =	79.1	L05 =	68.9
L10 =	66.1	L10 =	58.5	L10 =	65.4	L10 =	79.5	L10 =	79.1	L10 =	79.4	L10 =	76.9	L10 =	67.0
L50 =	57.5	L50 =	54.1	L50 =	56.7	L50 =	56.3	L50 =	56.7	L50 =	62.5	L50 =	59.8	L50 =	56.7
L75 =	54.4	L75 =	52.1	L75 =	53.0	L75 =	53.8	L75 =	54.9	L75 =	57.0	L75 =	55.8	L75 =	53.7
L90 =	51.7	L90 =	51.3	L90 =	51.4	L90 =	52.4	L90 =	53.5	L90 =	53.0	L90 =	54.5	L90 =	52.5
L95 =	50.5	L95 =	50.6	L95 =	50.6	L95 =	51.3	L95 =	51.8	L95 =	50.9	L95 =	53.3	L95 =	51.0
Leq =	69.4	Leq =	56.5	Leq =	70.9	Leq =	75.1	Leq =	73.8	Leq =	75.4	Leq =	71.9	Leq =	63.5



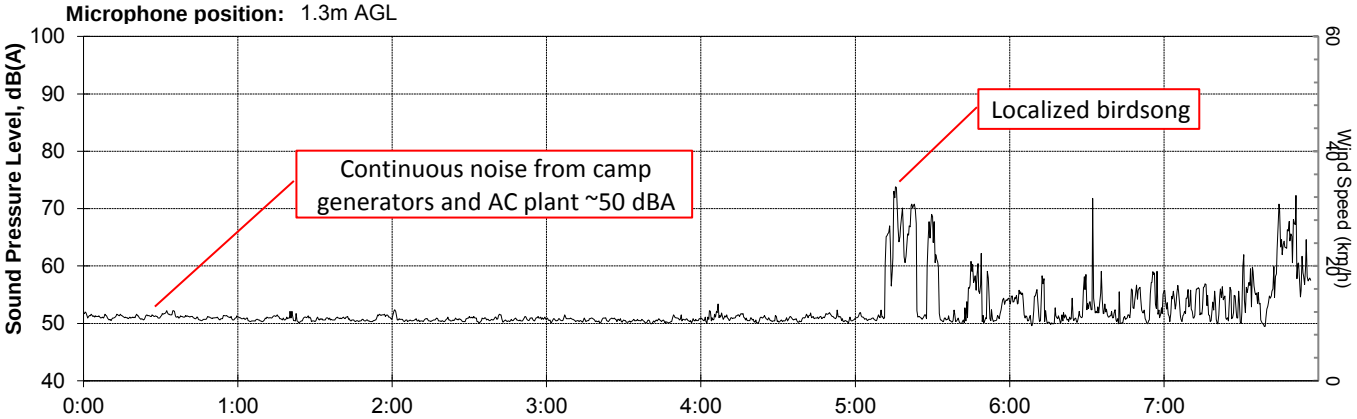
Lmax =	90.2	Lmax =	72.7	Lmax =	63.5	Lmax =	69.2	Lmax =	66.6	Lmax =	63.2	Lmax =	58.9	Lmax =	59.7
L01 =	79.5	L01 =	60.4	L01 =	56.9	L01 =	68.2	L01 =	64.2	L01 =	58.2	L01 =	52.4	L01 =	55.2
L05 =	70.9	L05 =	58.2	L05 =	56.4	L05 =	67.8	L05 =	63.7	L05 =	57.6	L05 =	52.0	L05 =	53.2
L10 =	67.5	L10 =	57.5	L10 =	56.1	L10 =	67.3	L10 =	63.5	L10 =	57.3	L10 =	51.9	L10 =	52.0
L50 =	58.1	L50 =	54.4	L50 =	54.3	L50 =	61.5	L50 =	62.6	L50 =	54.2	L50 =	51.4	L50 =	51.3
L75 =	54.8	L75 =	52.7	L75 =	52.4	L75 =	59.0	L75 =	62.0	L75 =	53.5	L75 =	51.1	L75 =	51.0
L90 =	53.1	L90 =	51.8	L90 =	51.3	L90 =	58.1	L90 =	61.5	L90 =	52.3	L90 =	50.9	L90 =	50.8
L95 =	51.7	L95 =	51.0	L95 =	50.6	L95 =	55.6	L95 =	58.5	L95 =	51.5	L95 =	50.6	L95 =	50.3
Leq =	67.6	Leq =	55.3	Leq =	54.3	Leq =	62.7	Leq =	62.7	Leq =	55.2	Leq =	51.5	Leq =	51.7

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

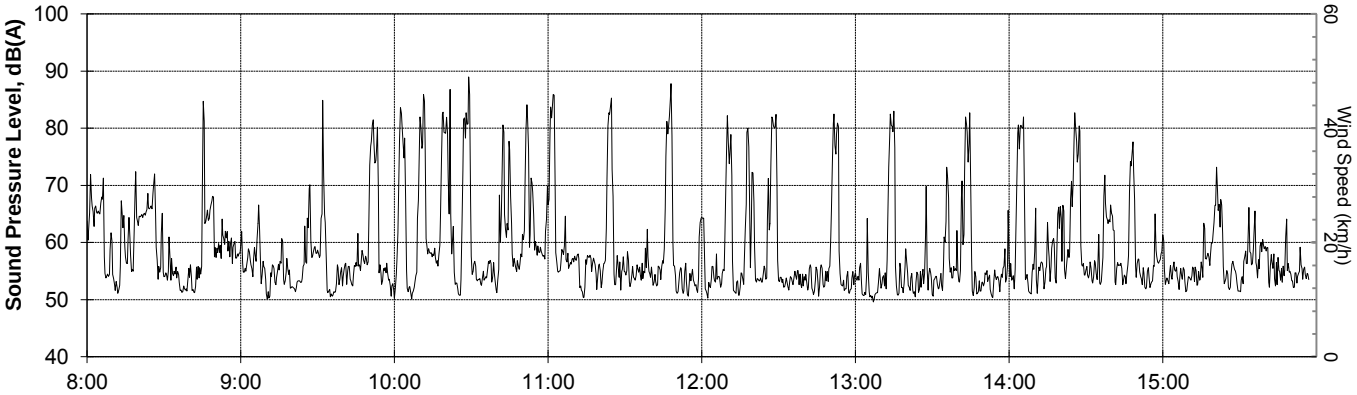
Results of Noise Monitoring

Client: ToTAL **Location** Herd Base 'M Block' Accommodation **Date:** Sunday 13 Nov 2016

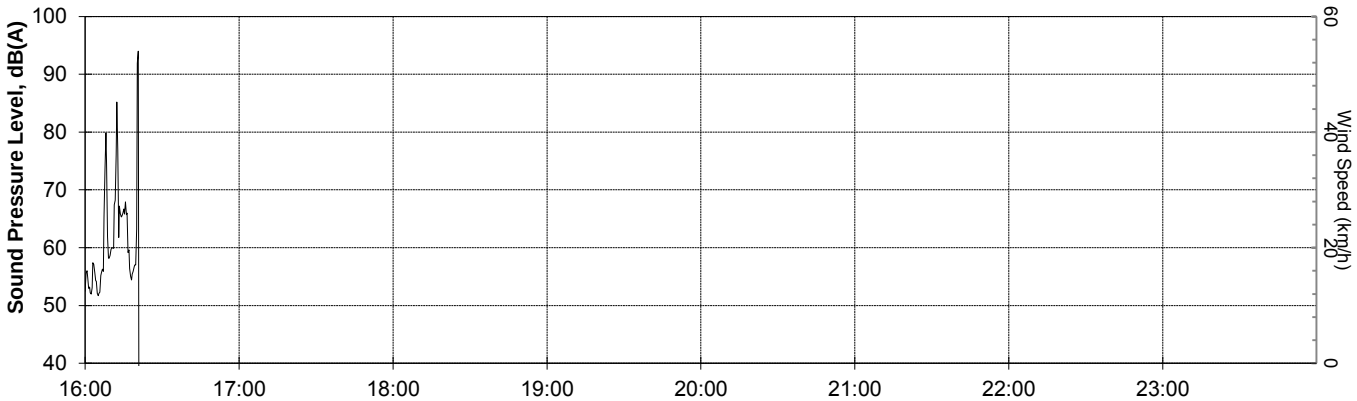
Microphone position: 1.3m AGL



Lmax =	57.0	Lmax =	63.0	Lmax =	55.6	Lmax =	57.0	Lmax =	60.1	Lmax =	84.0	Lmax =	88.2	Lmax =	78.0
L01 =	52.4	L01 =	52.0	L01 =	52.4	L01 =	51.5	L01 =	53.7	L01 =	76.3	L01 =	61.3	L01 =	70.1
L05 =	51.7	L05 =	51.5	L05 =	51.3	L05 =	51.1	L05 =	51.7	L05 =	68.2	L05 =	56.0	L05 =	65.7
L10 =	51.5	L10 =	51.2	L10 =	51.1	L10 =	50.9	L10 =	51.4	L10 =	60.8	L10 =	54.9	L10 =	63.2
L50 =	51.0	L50 =	50.6	L50 =	50.5	L50 =	50.4	L50 =	50.7	L50 =	50.7	L50 =	51.4	L50 =	54.3
L75 =	50.7	L75 =	50.3	L75 =	50.3	L75 =	50.2	L75 =	50.3	L75 =	50.3	L75 =	50.4	L75 =	51.6
L90 =	50.5	L90 =	50.1	L90 =	50.1	L90 =	50.0	L90 =	50.1	L90 =	50.0	L90 =	49.8	L90 =	50.4
L95 =	50.2	L95 =	49.8	L95 =	49.8	L95 =	49.7	L95 =	49.7	L95 =	49.4	L95 =	49.3	L95 =	49.3
Leq =	51.2	Leq =	50.8	Leq =	50.7	Leq =	50.6	Leq =	50.9	Leq =	62.6	Leq =	54.8	Leq =	59.6



Lmax =	89.2	Lmax =	92.4	Lmax =	95.7	Lmax =	92.0	Lmax =	89.6	Lmax =	89.0	Lmax =	87.4	Lmax =	79.0
L01 =	74.9	L01 =	80.3	L01 =	86.8	L01 =	86.7	L01 =	83.1	L01 =	82.7	L01 =	82.5	L01 =	69.5
L05 =	69.1	L05 =	73.7	L05 =	82.5	L05 =	82.2	L05 =	79.6	L05 =	77.9	L05 =	78.1	L05 =	64.7
L10 =	66.8	L10 =	64.2	L10 =	79.9	L10 =	75.2	L10 =	75.7	L10 =	68.8	L10 =	73.6	L10 =	60.7
L50 =	57.7	L50 =	55.4	L50 =	58.0	L50 =	55.5	L50 =	54.0	L50 =	53.6	L50 =	55.9	L50 =	54.5
L75 =	53.9	L75 =	53.0	L75 =	53.8	L75 =	53.0	L75 =	52.3	L75 =	51.5	L75 =	53.7	L75 =	53.0
L90 =	51.9	L90 =	51.4	L90 =	52.0	L90 =	51.5	L90 =	51.4	L90 =	50.7	L90 =	52.1	L90 =	52.0
L95 =	50.7	L95 =	50.0	L95 =	50.2	L95 =	50.3	L95 =	50.2	L95 =	49.8	L95 =	50.8	L95 =	50.9
Leq =	66.3	Leq =	67.8	Leq =	75.4	Leq =	73.7	Leq =	71.2	Leq =	69.5	Leq =	70.1	Leq =	59.0



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

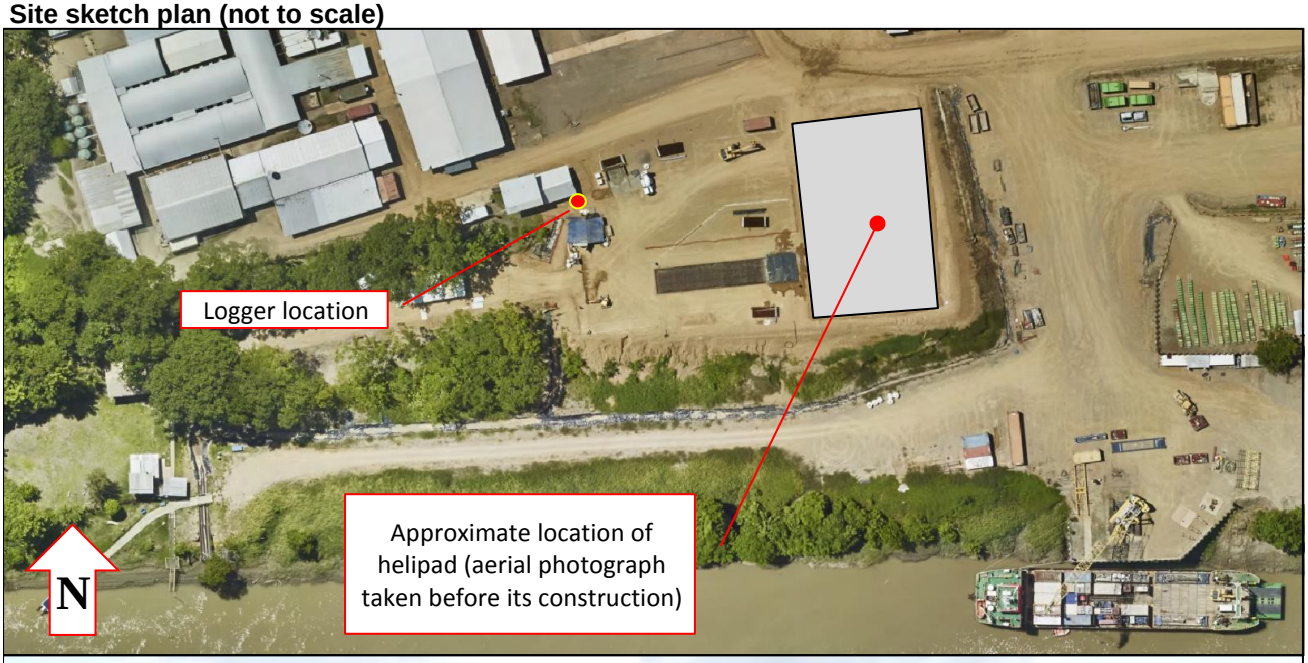
Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Herd Base Aviation Tower
Measurement period: Thursday 10 to Saturday 12 November 2016
GPS Coordinates (UTM Zone 55): 303885m E, 9186466m S
Microphone position: 1.3m AGL SE of aviation tower, and 50m west of helipad
Prevailing ambient noise environment: Continuous noise from reefers w/ int. noise from helicopters
Prevailing weather conditions: Calm winds with heavy rains on Fri night 9pm to midnight and Sat morning from midnight to 7am
Measured noise level, dBA L90, Day: 51, 53, 51
Measured noise level, dBA L90, Night: 51, 51

Site sketch plan (not to scale)



SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: Total
Job Number: 620.11227 **Location:** Herd Base Aviation Tower
Microphone position: 1.3m AGL
Initial calibration: 94 dBA **Final calibration:** 94 dBA

Hour	Sound Pressure Level, dB(A)																				
	Fri, 11-11-2016			Sat, 12-11-2016			Sun, 13-11-2016														
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				65.1*	58.5*	63.1*	53.6	50.9	52.5												
01:00 to 02:00				65.1*	58.2*	63.6*	53.4	50.7	52.5												
02:00 to 03:00				74.3*	67.7*	71.6*	53.4	51.2	52.4												
03:00 to 04:00				70.8*	64.8*	68.2*	54.1	51.1	53.0												
04:00 to 05:00				64*	55.6*	61*	58.5	51.6	55.7												
05:00 to 06:00				66*	55.6*	63.7*	60.0	52.2	57.1												
06:00 to 07:00				63.2*	53.5*	59.7*	60.0	51.5	56.8												
07:00 to 08:00				85.2	54.1	79.5	82.8	52.0	77.7												
08:00 to 09:00				86.1	53.8	81.8	85.7	53.2	81.1												
09:00 to 10:00				60.7	52.1	57.6	77.8	51.6	74.5												
10:00 to 11:00				78.8	52.2	77.3	82.5	52.0	78.9												
11:00 to 12:00				84.8	51.9	79.7	74.3	50.7	74.2												
12:00 to 13:00				81.8	52.3	76.4	77.4	50.6	72.7												
13:00 to 14:00				83.8	52.5	78.7	70.5	50.3	70.7												
14:00 to 15:00				73.9	53.1	72.1	83.7	50.9	78.4												
15:00 to 16:00				86.6	52.1	80.8	59.7	50.2	59.9												
16:00 to 17:00	86.3	50.2	81.7	87.3	52.3	82.0															
17:00 to 18:00	61.5	50.8	73.3	56.9	51.4	54.7															
18:00 to 19:00	55.6	51.4	54.1	55.6	51.3	54.3															
19:00 to 20:00	56.0	51.9	54.5	54.8	53.4	54.2															
20:00 to 21:00	57.3	50.9	56.0	55.2	52.6	54.3															
21:00 to 22:00	63*	54.2*	60*	54.4	51.9	53.3															
22:00 to 23:00	56.2	51.1	54.1	54.0	51.5	53.0															
23:00 to 24:00	65.6*	56.7*	62.5*	53.9	51.4	53.0															
$L10_{(18h),\ ar.av.}$ 6-24h																					
$L_{eq(15h),\ log\ av.}$ 7-22h						77.3															
$L_{eq(9h),\ log\ av.}$ 22-7h						54.4															
$L_{eq(24h),\ log\ av.}$ 0-24h																					
L90 Day, 7-22h		51.0			52.5			51.3													
L90 Evening, 18-22h		51.4			52.3																
L90 Night, 22-7h		51.1			51.3																
Wind @0900h, km/h																					
Wind @1500h, km/h																					

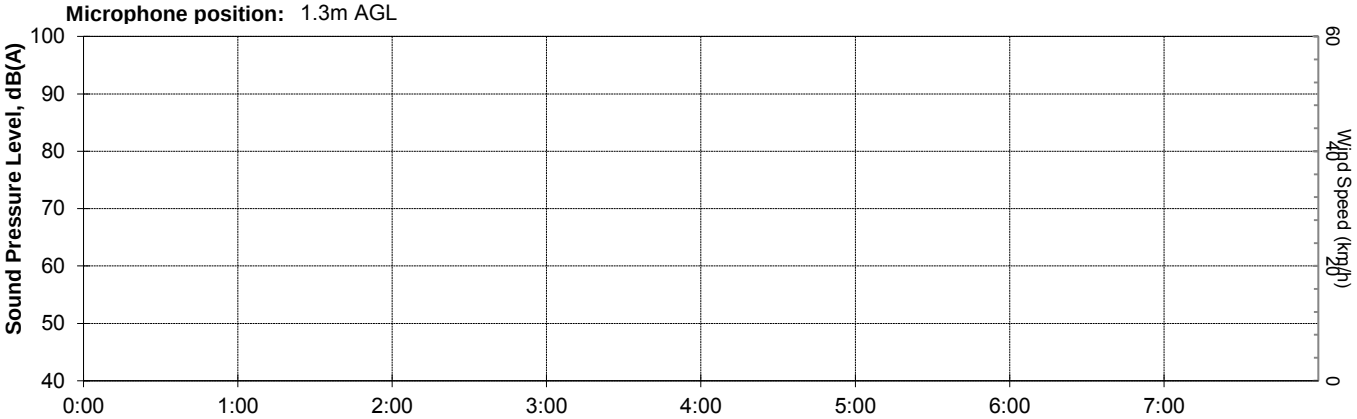
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

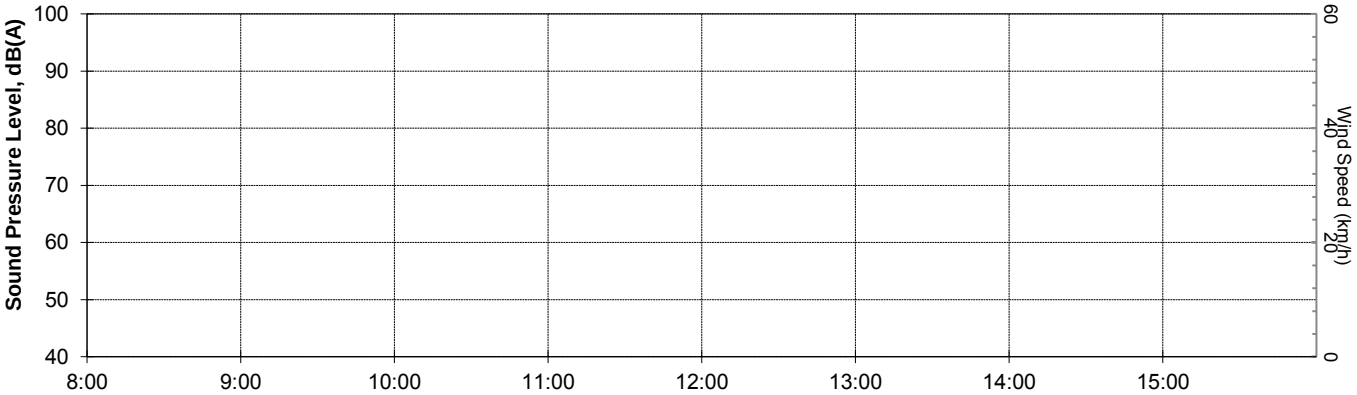
Results of Noise Monitoring

Client: Total **Location** Herd Base Aviation Tower **Date:** Friday 11 Nov 2016

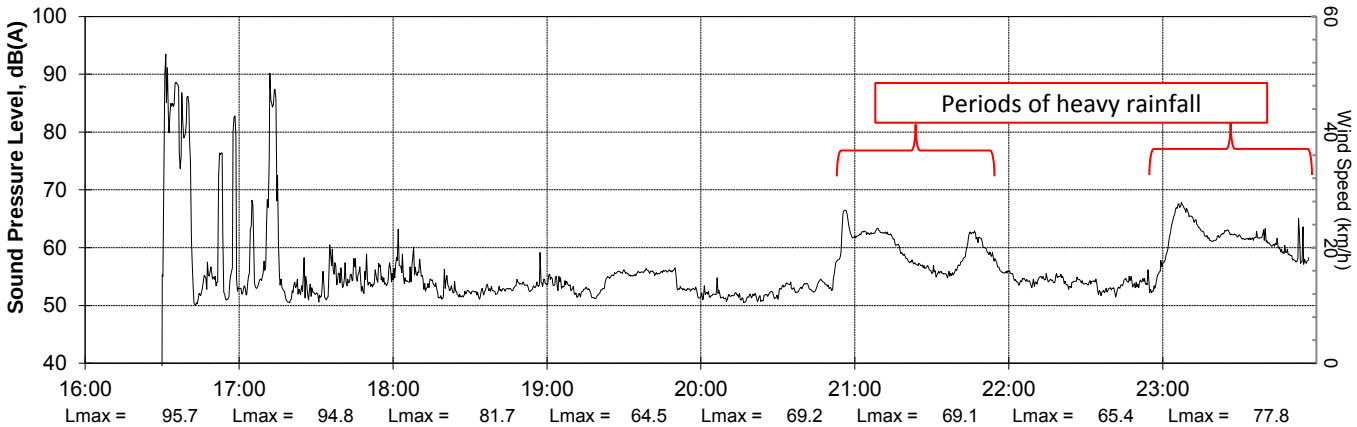
Microphone position: 1.3m AGL



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



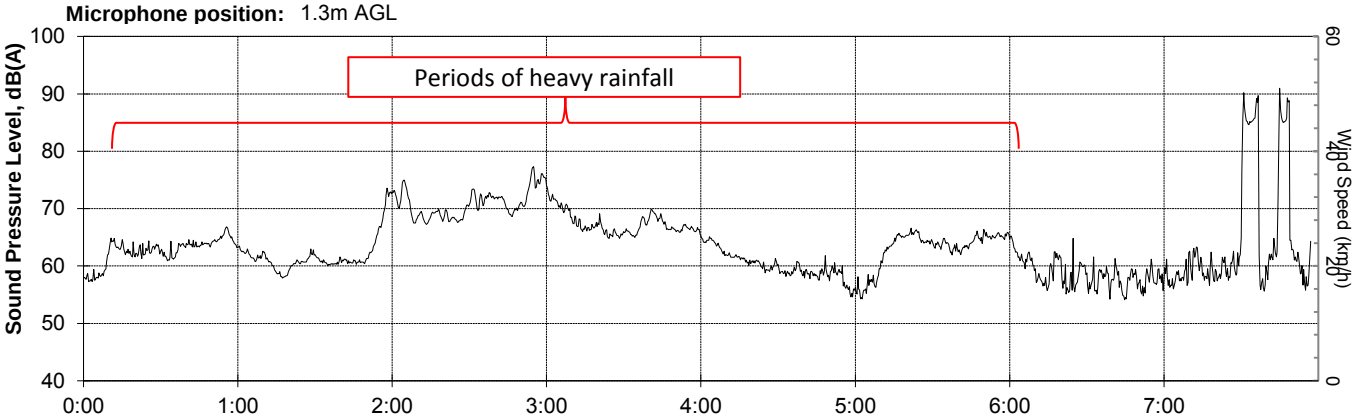
16:00		17:00		18:00		19:00		20:00		21:00		22:00		23:00	
Lmax =	95.7	Lmax =	94.8	Lmax =	81.7	Lmax =	64.5	Lmax =	69.2	Lmax =	69.1	Lmax =	65.4	Lmax =	77.8
L01 =	93.4	L01 =	87.9	L01 =	60.8	L01 =	56.9	L01 =	66.5	L01 =	64.6	L01 =	59.6	L01 =	68.1
L05 =	88.5	L05 =	71.3	L05 =	57.3	L05 =	56.2	L05 =	63.1	L05 =	63.6	L05 =	57.5	L05 =	66.8
L10 =	86.3	L10 =	61.5	L10 =	55.6	L10 =	56.0	L10 =	57.3	L10 =	63.0	L10 =	56.2	L10 =	65.6
L50 =	57.4	L50 =	53.0	L50 =	52.8	L50 =	54.1	L50 =	52.2	L50 =	59.0	L50 =	53.1	L50 =	61.3
L75 =	51.8	L75 =	51.7	L75 =	52.0	L75 =	52.5	L75 =	51.4	L75 =	55.8	L75 =	52.1	L75 =	59.3
L90 =	50.2	L90 =	50.8	L90 =	51.4	L90 =	51.9	L90 =	50.9	L90 =	54.2	L90 =	51.1	L90 =	56.7
L95 =	49.4	L95 =	50.1	L95 =	50.7	L95 =	51.0	L95 =	50.2	L95 =	52.6	L95 =	50.1	L95 =	54.0
Leq =	81.7	Leq =	73.3	Leq =	54.1	Leq =	54.5	Leq =	56.0	Leq =	60.0	Leq =	54.1	Leq =	62.5

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

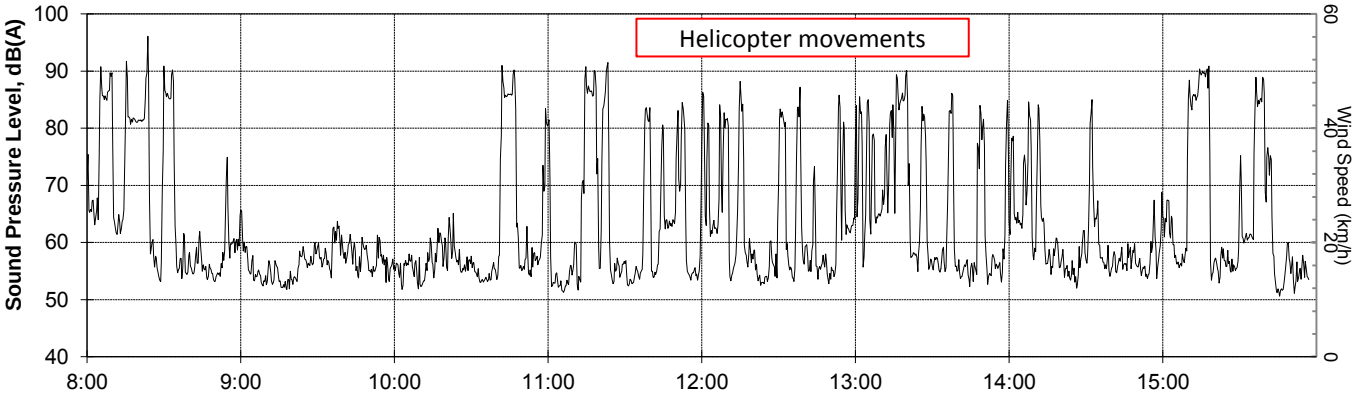
Results of Noise Monitoring

Client: Total **Location** Herd Base Aviation Tower **Date:** Saturday 12 Nov 2016

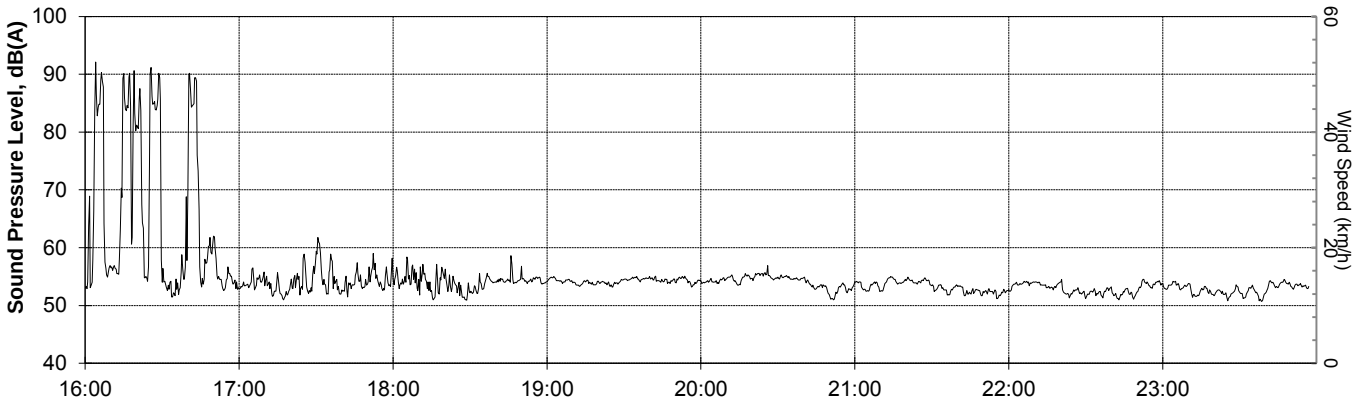
Microphone position: 1.3m AGL



Lmax =	73.9	Lmax =	74.7	Lmax =	78.7	Lmax =	77.2	Lmax =	71.5	Lmax =	71.5	Lmax =	79.7	Lmax =	95.3
L01 =	67.2	L01 =	73.1	L01 =	77.0	L01 =	74.6	L01 =	66.5	L01 =	67.7	L01 =	67.1	L01 =	90.6
L05 =	65.8	L05 =	69.4	L05 =	75.3	L05 =	71.8	L05 =	64.9	L05 =	66.5	L05 =	64.8	L05 =	87.1
L10 =	65.1	L10 =	65.1	L10 =	74.3	L10 =	70.8	L10 =	64.0	L10 =	66.0	L10 =	63.2	L10 =	85.2
L50 =	62.7	L50 =	60.9	L50 =	70.4	L50 =	66.8	L50 =	59.8	L50 =	63.6	L50 =	57.1	L50 =	59.1
L75 =	61.1	L75 =	59.5	L75 =	68.7	L75 =	65.6	L75 =	57.5	L75 =	61.4	L75 =	54.7	L75 =	55.9
L90 =	58.5	L90 =	58.2	L90 =	67.7	L90 =	64.8	L90 =	55.6	L90 =	55.6	L90 =	53.5	L90 =	54.1
L95 =	55.2	L95 =	55.5	L95 =	66.6	L95 =	63.6	L95 =	52.7	L95 =	52.6	L95 =	52.2	L95 =	52.8
Leq =	63.1	Leq =	63.6	Leq =	71.6	Leq =	68.2	Leq =	61.0	Leq =	63.7	Leq =	59.7	Leq =	79.5



Lmax =	102.6	Lmax =	75.5	Lmax =	95.3	Lmax =	98.0	Lmax =	92.7	Lmax =	94.2	Lmax =	90.9	Lmax =	95.7
L01 =	92.3	L01 =	65.6	L01 =	90.1	L01 =	91.1	L01 =	87.4	L01 =	90.1	L01 =	85.0	L01 =	90.6
L05 =	88.7	L05 =	62.5	L05 =	85.9	L05 =	87.0	L05 =	84.3	L05 =	85.6	L05 =	79.8	L05 =	89.3
L10 =	86.1	L10 =	60.7	L10 =	78.8	L10 =	84.8	L10 =	81.8	L10 =	83.8	L10 =	73.9	L10 =	86.6
L50 =	62.1	L50 =	54.8	L50 =	55.2	L50 =	56.6	L50 =	59.3	L50 =	61.7	L50 =	57.4	L50 =	58.4
L75 =	55.4	L75 =	52.9	L75 =	53.2	L75 =	52.9	L75 =	53.9	L75 =	54.8	L75 =	54.5	L75 =	53.9
L90 =	53.8	L90 =	52.1	L90 =	52.2	L90 =	51.9	L90 =	52.3	L90 =	52.5	L90 =	53.1	L90 =	52.1
L95 =	52.7	L95 =	51.2	L95 =	50.9	L95 =	50.6	L95 =	50.8	L95 =	50.6	L95 =	50.6	L95 =	50.0
Leq =	81.8	Leq =	57.6	Leq =	77.3	Leq =	79.7	Leq =	76.4	Leq =	78.7	Leq =	72.1	Leq =	80.8



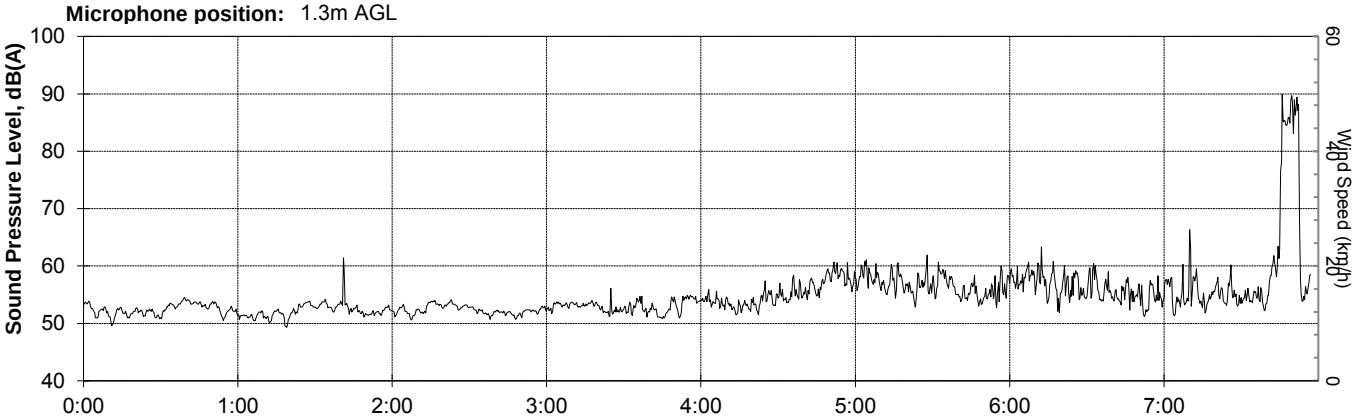
Lmax =	96.3	Lmax =	72.1	Lmax =	72.1	Lmax =	63.8	Lmax =	65.6	Lmax =	57.6	Lmax =	57.3	Lmax =	56.6
L01 =	92.5	L01 =	62.0	L01 =	60.7	L01 =	55.3	L01 =	55.8	L01 =	55.2	L01 =	54.6	L01 =	54.6
L05 =	89.6	L05 =	59.1	L05 =	57.0	L05 =	54.9	L05 =	55.4	L05 =	54.7	L05 =	54.2	L05 =	54.1
L10 =	87.3	L10 =	56.9	L10 =	55.6	L10 =	54.8	L10 =	55.2	L10 =	54.4	L10 =	54.0	L10 =	53.9
L50 =	57.4	L50 =	52.9	L50 =	53.7	L50 =	54.1	L50 =	54.2	L50 =	53.1	L50 =	52.8	L50 =	52.9
L75 =	53.4	L75 =	52.0	L75 =	52.2	L75 =	53.7	L75 =	53.5	L75 =	52.4	L75 =	52.0	L75 =	52.1
L90 =	52.3	L90 =	51.4	L90 =	51.3	L90 =	53.4	L90 =	52.6	L90 =	51.9	L90 =	51.5	L90 =	51.4
L95 =	50.1	L95 =	50.7	L95 =	50.5	L95 =	52.9	L95 =	50.9	L95 =	51.0	L95 =	50.8	L95 =	50.4
Leq =	82.0	Leq =	54.7	Leq =	54.3	Leq =	54.2	Leq =	54.3	Leq =	53.3	Leq =	53.0	Leq =	53.0

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

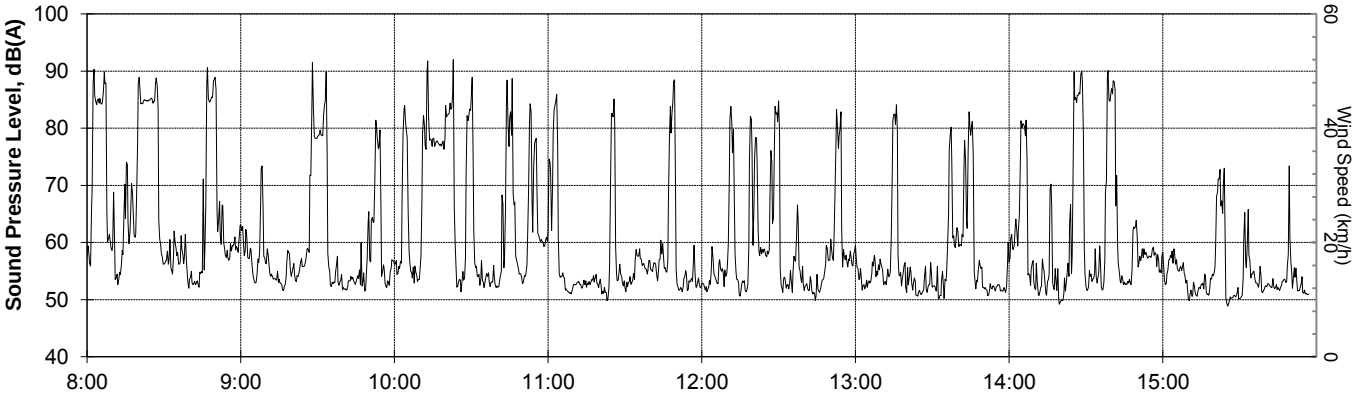
Results of Noise Monitoring

Client: Total **Location** Herd Base Aviation Tower **Date:** Sunday 13 Nov 2016

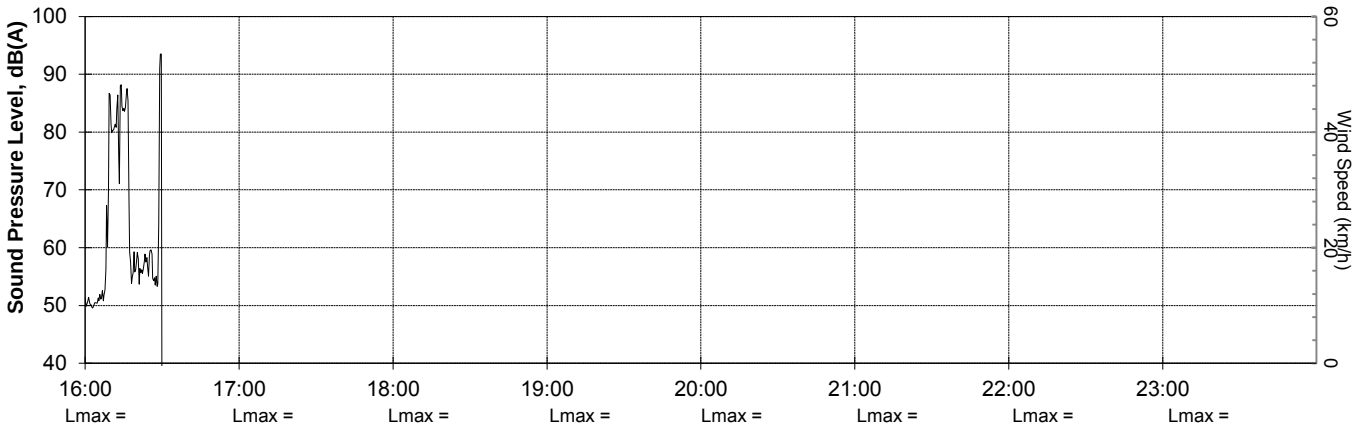
Microphone position: 1.3m AGL



Lmax =	56.2	Lmax =	72.8	Lmax =	57.0	Lmax =	64.4	Lmax =	69.2	Lmax =	72.6	Lmax =	72.5	Lmax =	93.0
L01 =	54.4	L01 =	54.8	L01 =	54.2	L01 =	57.2	L01 =	62.8	L01 =	64.3	L01 =	65.2	L01 =	89.8
L05 =	53.9	L05 =	53.7	L05 =	53.7	L05 =	55.0	L05 =	60.1	L05 =	61.5	L05 =	62.0	L05 =	86.4
L10 =	53.6	L10 =	53.4	L10 =	53.4	L10 =	54.1	L10 =	58.5	L10 =	60.0	L10 =	60.0	L10 =	82.8
L50 =	52.3	L50 =	51.9	L50 =	52.2	L50 =	52.6	L50 =	53.7	L50 =	55.0	L50 =	54.0	L50 =	54.3
L75 =	51.6	L75 =	51.3	L75 =	51.6	L75 =	51.8	L75 =	52.5	L75 =	53.3	L75 =	52.5	L75 =	53.0
L90 =	50.9	L90 =	50.7	L90 =	51.2	L90 =	51.1	L90 =	51.6	L90 =	52.2	L90 =	51.5	L90 =	52.0
L95 =	49.7	L95 =	49.3	L95 =	50.4	L95 =	50.3	L95 =	50.7	L95 =	50.7	L95 =	50.3	L95 =	50.9
Leq =	52.5	Leq =	52.5	Leq =	52.4	Leq =	53.0	Leq =	55.7	Leq =	57.1	Leq =	56.8	Leq =	77.7



Lmax =	97.1	Lmax =	97.6	Lmax =	100.8	Lmax =	95.1	Lmax =	90.7	Lmax =	88.7	Lmax =	94.4	Lmax =	79.7
L01 =	90.5	L01 =	87.2	L01 =	90.3	L01 =	87.1	L01 =	84.5	L01 =	83.3	L01 =	90.3	L01 =	73.0
L05 =	87.9	L05 =	79.8	L05 =	84.2	L05 =	82.6	L05 =	81.2	L05 =	79.5	L05 =	86.6	L05 =	66.0
L10 =	85.7	L10 =	77.8	L10 =	82.5	L10 =	74.3	L10 =	77.4	L10 =	70.5	L10 =	83.7	L10 =	59.7
L50 =	60.3	L50 =	54.9	L50 =	59.7	L50 =	53.0	L50 =	54.3	L50 =	52.6	L50 =	55.3	L50 =	52.2
L75 =	55.8	L75 =	52.7	L75 =	53.4	L75 =	51.5	L75 =	51.6	L75 =	51.2	L75 =	52.2	L75 =	51.0
L90 =	53.2	L90 =	51.6	L90 =	52.0	L90 =	50.7	L90 =	50.6	L90 =	50.3	L90 =	50.9	L90 =	50.2
L95 =	51.7	L95 =	50.7	L95 =	50.9	L95 =	49.8	L95 =	49.6	L95 =	49.4	L95 =	49.1	L95 =	48.8
Leq =	81.1	Leq =	74.5	Leq =	78.9	Leq =	74.2	Leq =	72.7	Leq =	70.7	Leq =	78.4	Leq =	59.9



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Fly Camp E
Measurement period: Tuesday 8 to Friday 11 November 2016
GPS Coordinates (UTM Zone 55): 308327m E, 9153987m S
Microphone position: 1.6m AGL in scrub on bund east of clearing on logging road
Prevailing ambient noise environment: Continuous high levels of insect & local wildlife noise
Prevailing weather conditions: Calm and dry weather

Measured noise level, dBA L90, Day: 47, 45, 45, 46
Measured noise level, dBA L90, Night: 56, 55, 55

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 640.11227 **Location:** Fly Camp E
Microphone position: 1.6m AGL in thick forest above bund east of clearing on logging road
Initial calibration: 94 dBA **Final calibration:** 94.1 dBA

Hour	Sound Pressure Level, dB(A)																				
	Tue, 08-11-2016			Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016											
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				64.5	61.3	63.2	63.0	59.7	61.6	62.6	58.8	61.1									
01:00 to 02:00				64.5	60.9	63.1	62.9	60.1	61.7	63.4	60.1	62.0									
02:00 to 03:00				64.3	61.1	63.0	62.4	59.8	61.3	63.3	60.1	61.9									
03:00 to 04:00				63.4	59.8	62.0	61.4	57.9	60.0	61.4	58.3	60.0									
04:00 to 05:00				60.2	51.8	58.0	58.6	49.3	55.9	58.3	51.8	56.0									
05:00 to 06:00				51.6	45.8	51.3	49.2	44.7	48.3	51.0	46.7	49.7									
06:00 to 07:00				49.4	46.9	48.4	49.9	47.0	48.7	53.1	45.9	49.7									
07:00 to 08:00				51.6	46.2	48.7	55.3	45.8	52.6	52.0	46.1	49.1									
08:00 to 09:00				52.6	45.8	49.4	55.5	46.1	53.1	49.4	45.8	48.2									
09:00 to 10:00				54.5	45.8	50.7	60.4	46.2	54.9												
10:00 to 11:00				55.2	45.9	52.3	60.6	46.9	56.1												
11:00 to 12:00				52.3	41.8	48.9	60.6	43.1	55.4												
12:00 to 13:00	51.7	42.1	78.3	52.7	40.8	48.7	63.6	39.4	57.5												
13:00 to 14:00	66.0	41.1	76.2	52.5	38.0	48.6	55.2	39.7	50.1												
14:00 to 15:00	59.5	44.2	57.2	52.1	41.3	48.7	54.8	40.7	49.9												
15:00 to 16:00	57.0	42.5	52.3	52.9	43.0	49.2	55.0	42.7	51.1												
16:00 to 17:00	55.8	44.2	53.4	56.1	42.7	52.2	53.0	41.1	48.2												
17:00 to 18:00	49.2	43.0	46.4	55.9	44.1	51.8	54.4	42.4	49.5												
18:00 to 19:00	60.2	48.5	58.1	59.4	49.8	56.9	58.7	46.9	55.9												
19:00 to 20:00	58.9	55.7	57.8	55.2	51.5	53.6	55.5	51.9	54.0												
20:00 to 21:00	57.8	54.4	56.6	57.5	52.8	55.6	58.8	52.3	56.3												
21:00 to 22:00	58.5	54.4	56.8	60.4	53.7	57.9	59.3	55.0	57.5												
22:00 to 23:00	62.9	58.0	60.9	62.8	59.1	61.3	60.7	57.3	59.2												
23:00 to 24:00	63.8	59.9	62.2	62.9	59.5	61.4	61.0	57.7	59.6												
$L10_{(18h), ar.av.}$ 6-24h				55.3			57.4														
$L_{eq(15h), log av.}$ 7-22h						52.8			54.4												
$L_{eq(9h), log av.}$ 22-7h			61.0			59.8			59.4												
$L_{eq(24h), log av.}$ 0-24h						57.7			56.9												
L90 Day, 7-22h		47.0			45.5			45.3			46.0										
L90 Evening, 18-22h		53.3			52.0			51.5													
L90 Night, 22-7h		56.2			55.2			55.2													
Wind @0900h, km/h																					
Wind @1500h, km/h																					

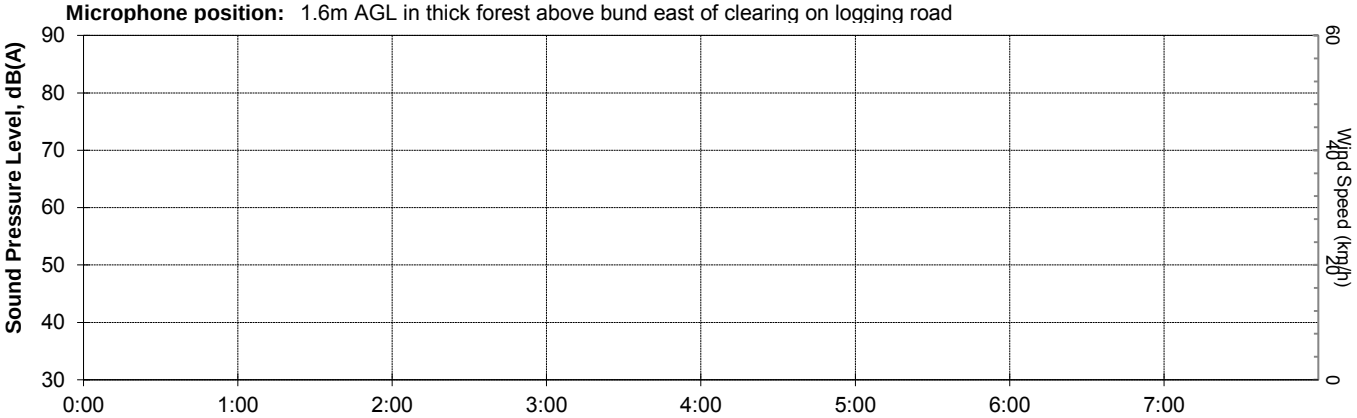
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds

Hourly percentiles based on Lp at 0.1s intervals.

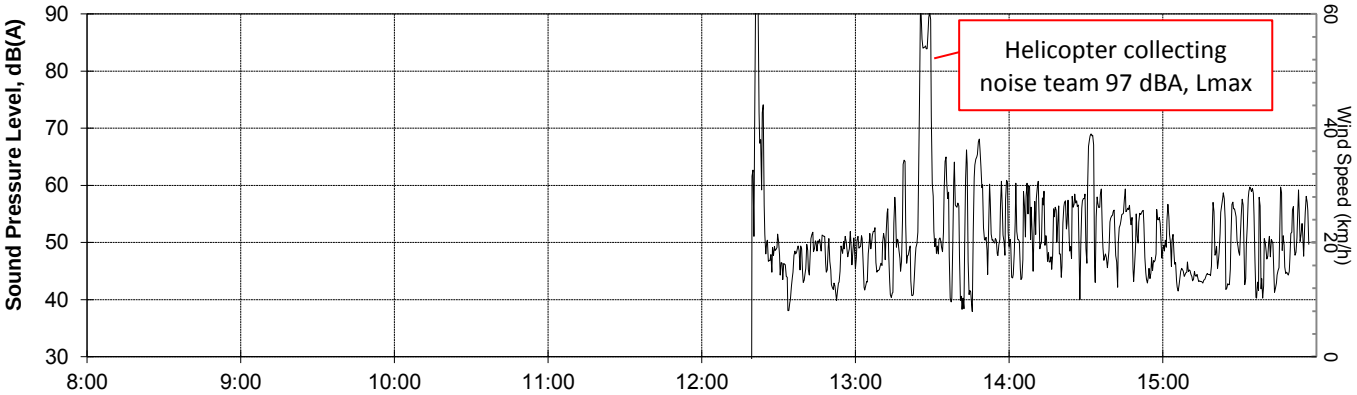
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp E **Date:** Tuesday 08 Nov 2016

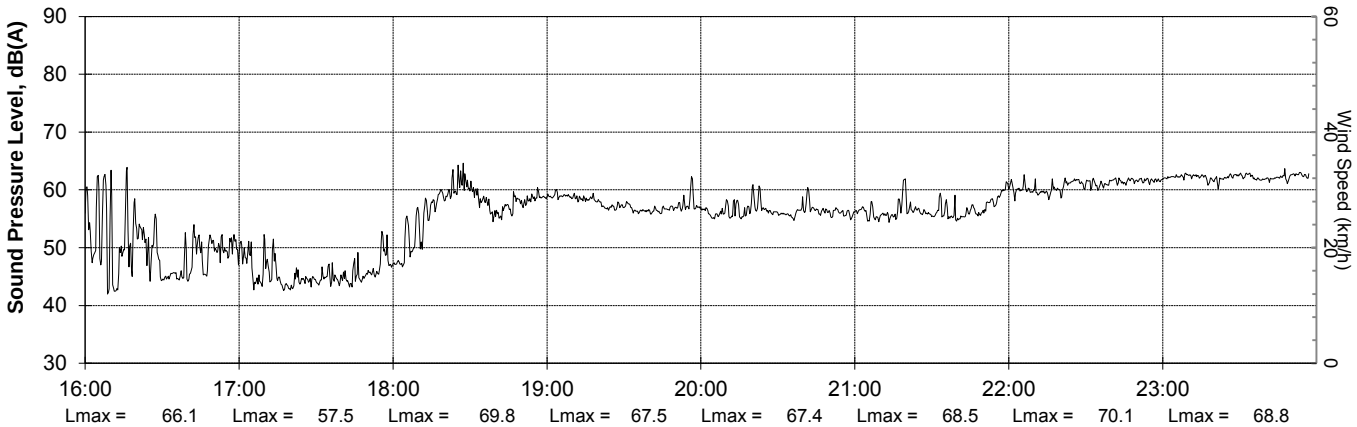
Microphone position: 1.6m AGL in thick forest above bund east of clearing on logging road



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax = 101.7	Lmax = 97.0	Lmax = 70.4	Lmax = 62.2
L01 =	L01 =	L01 =	L01 =	L01 = 93.9	L01 = 89.9	L01 = 69.1	L01 = 60.4
L05 =	L05 =	L05 =	L05 =	L05 = 59.7	L05 = 83.9	L05 = 61.1	L05 = 58.3
L10 =	L10 =	L10 =	L10 =	L10 = 51.7	L10 = 66.0	L10 = 59.5	L10 = 57.0
L50 =	L50 =	L50 =	L50 =	L50 = 47.6	L50 = 50.1	L50 = 51.5	L50 = 47.9
L75 =	L75 =	L75 =	L75 =	L75 = 44.4	L75 = 46.0	L75 = 47.3	L75 = 44.1
L90 =	L90 =	L90 =	L90 =	L90 = 42.1	L90 = 41.1	L90 = 44.2	L90 = 42.5
L95 =	L95 =	L95 =	L95 =	L95 = 37.7	L95 = 37.8	L95 = 40.3	L95 = 39.8
Leq =	Leq =	Leq =	Leq =	Leq = 78.3	Leq = 76.2	Leq = 57.2	Leq = 52.3



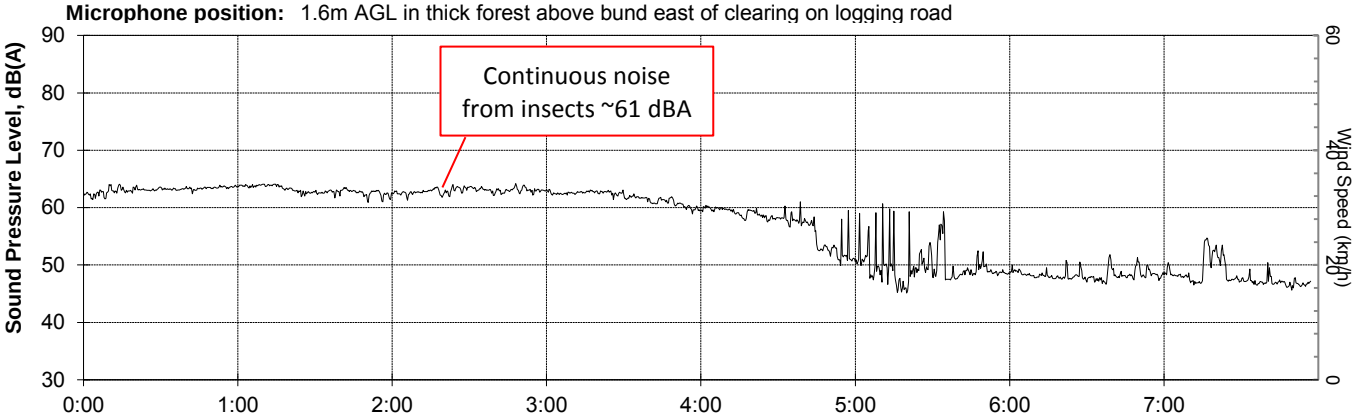
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 66.1	Lmax = 57.5	Lmax = 69.8	Lmax = 67.5	Lmax = 67.4	Lmax = 68.5	Lmax = 70.1	Lmax = 68.8
L01 = 63.6	L01 = 52.7	L01 = 65.9	L01 = 62.9	L01 = 62.0	L01 = 62.4	L01 = 64.6	L01 = 65.1
L05 = 61.0	L05 = 50.9	L05 = 61.0	L05 = 59.6	L05 = 58.5	L05 = 59.8	L05 = 63.5	L05 = 64.3
L10 = 55.8	L10 = 49.2	L10 = 60.2	L10 = 58.9	L10 = 57.8	L10 = 58.5	L10 = 62.9	L10 = 63.8
L50 = 49.0	L50 = 44.6	L50 = 57.3	L50 = 57.2	L50 = 56.0	L50 = 55.9	L50 = 60.4	L50 = 61.9
L75 = 45.4	L75 = 43.8	L75 = 55.3	L75 = 56.4	L75 = 55.2	L75 = 55.0	L75 = 59.0	L75 = 60.8
L90 = 44.2	L90 = 43.0	L90 = 48.5	L90 = 55.7	L90 = 54.4	L90 = 54.4	L90 = 58.0	L90 = 59.9
L95 = 41.9	L95 = 41.9	L95 = 46.3	L95 = 54.9	L95 = 53.6	L95 = 53.5	L95 = 56.5	L95 = 58.5
Leq = 53.4	Leq = 46.4	Leq = 58.1	Leq = 57.8	Leq = 56.6	Leq = 56.8	Leq = 60.9	Leq = 62.2

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

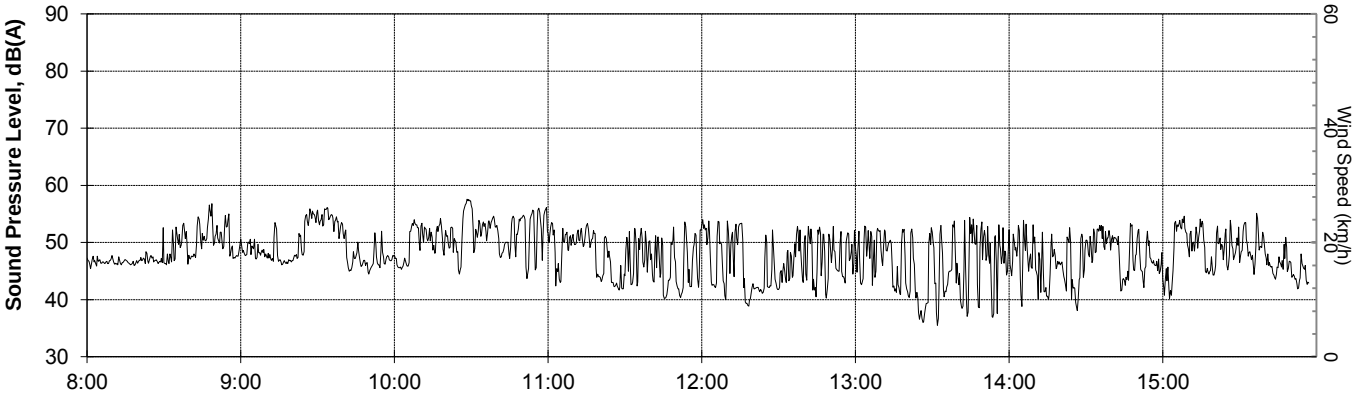
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp E **Date:** Wednesday 09 Nov 2016

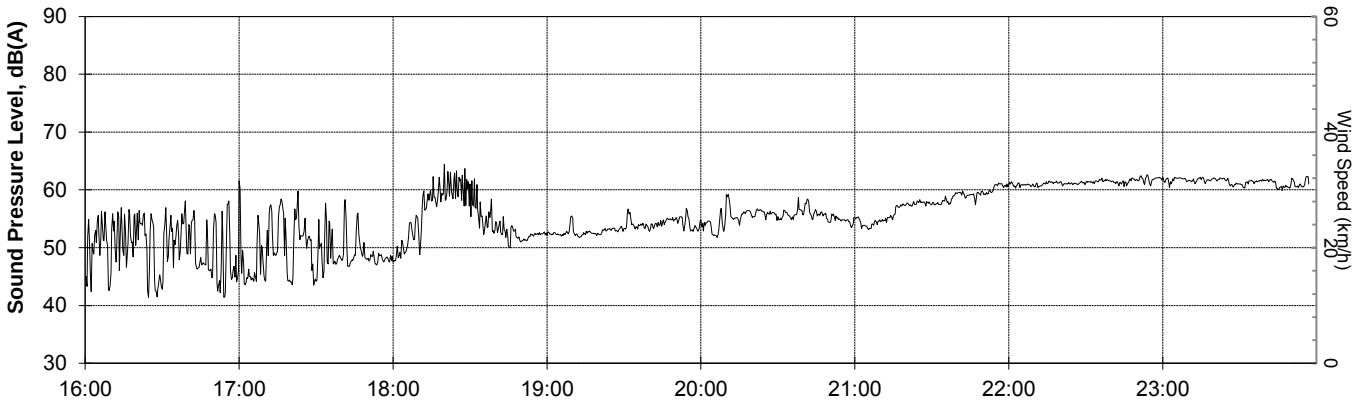
Microphone position: 1.6m AGL in thick forest above bund east of clearing on logging road



Lmax =	67.0	Lmax =	67.3	Lmax =	67.2	Lmax =	67.6	Lmax =	67.0	Lmax =	74.4	Lmax =	62.4	Lmax =	59.6
L01 =	65.6	L01 =	65.7	L01 =	65.6	L01 =	64.8	L01 =	62.1	L01 =	64.0	L01 =	53.0	L01 =	54.7
L05 =	64.9	L05 =	65.0	L05 =	64.8	L05 =	63.9	L05 =	60.8	L05 =	52.9	L05 =	50.4	L05 =	52.9
L10 =	64.5	L10 =	64.5	L10 =	64.3	L10 =	63.4	L10 =	60.2	L10 =	51.6	L10 =	49.4	L10 =	51.6
L50 =	62.9	L50 =	62.8	L50 =	62.7	L50 =	61.7	L50 =	57.8	L50 =	47.8	L50 =	47.8	L50 =	47.2
L75 =	62.0	L75 =	61.7	L75 =	61.8	L75 =	60.7	L75 =	55.0	L75 =	46.8	L75 =	47.3	L75 =	46.6
L90 =	61.3	L90 =	60.9	L90 =	61.1	L90 =	59.8	L90 =	51.8	L90 =	45.8	L90 =	46.9	L90 =	46.2
L95 =	59.9	L95 =	59.8	L95 =	60.1	L95 =	58.4	L95 =	49.3	L95 =	44.3	L95 =	46.0	L95 =	45.3
Leq =	63.2	Leq =	63.1	Leq =	63.0	Leq =	62.0	Leq =	58.0	Leq =	51.3	Leq =	48.4	Leq =	48.7



Lmax =	62.1	Lmax =	57.1	Lmax =	59.2	Lmax =	58.2	Lmax =	59.0	Lmax =	55.8	Lmax =	66.5	Lmax =	62.5
L01 =	56.3	L01 =	56.1	L01 =	57.7	L01 =	54.2	L01 =	54.1	L01 =	54.7	L01 =	54.3	L01 =	55.2
L05 =	54.1	L05 =	55.3	L05 =	56.3	L05 =	52.8	L05 =	53.3	L05 =	53.1	L05 =	53.1	L05 =	53.8
L10 =	52.6	L10 =	54.5	L10 =	55.2	L10 =	52.3	L10 =	52.7	L10 =	52.5	L10 =	52.1	L10 =	52.9
L50 =	47.0	L50 =	47.8	L50 =	51.5	L50 =	47.6	L50 =	45.4	L50 =	46.1	L50 =	46.8	L50 =	47.1
L75 =	46.3	L75 =	46.5	L75 =	48.2	L75 =	42.9	L75 =	42.4	L75 =	41.2	L75 =	44.2	L75 =	44.6
L90 =	45.8	L90 =	45.8	L90 =	45.9	L90 =	41.8	L90 =	40.8	L90 =	38.0	L90 =	41.3	L90 =	43.0
L95 =	45.1	L95 =	44.2	L95 =	43.8	L95 =	39.7	L95 =	38.7	L95 =	35.5	L95 =	38.2	L95 =	40.2
Leq =	49.4	Leq =	50.7	Leq =	52.3	Leq =	48.9	Leq =	48.7	Leq =	48.6	Leq =	48.7	Leq =	49.2



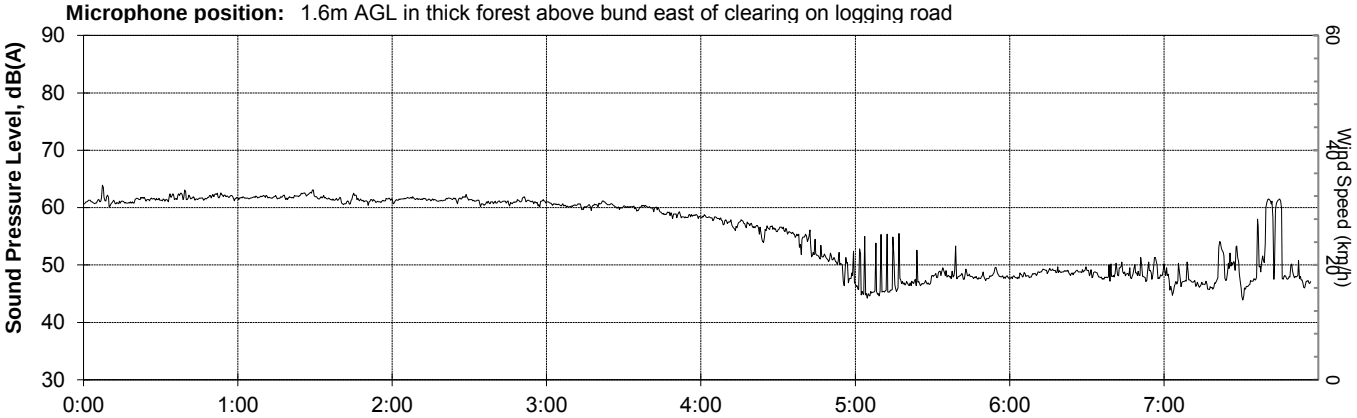
Lmax =	61.6	Lmax =	72.8	Lmax =	67.6	Lmax =	60.5	Lmax =	63.8	Lmax =	65.3	Lmax =	65.7	Lmax =	66.6
L01 =	57.9	L01 =	59.1	L01 =	65.7	L01 =	57.6	L01 =	60.2	L01 =	62.4	L01 =	64.1	L01 =	64.3
L05 =	56.9	L05 =	57.4	L05 =	62.3	L05 =	55.9	L05 =	58.4	L05 =	61.1	L05 =	63.3	L05 =	63.4
L10 =	56.1	L10 =	55.9	L10 =	59.4	L10 =	55.2	L10 =	57.5	L10 =	60.4	L10 =	62.8	L10 =	62.9
L50 =	49.7	L50 =	48.2	L50 =	53.1	L50 =	53.0	L50 =	54.9	L50 =	57.0	L50 =	60.9	L50 =	61.1
L75 =	45.7	L75 =	46.7	L75 =	51.2	L75 =	52.1	L75 =	53.8	L75 =	55.1	L75 =	59.9	L75 =	60.2
L90 =	42.7	L90 =	44.1	L90 =	49.8	L90 =	51.5	L90 =	52.8	L90 =	53.7	L90 =	59.1	L90 =	59.5
L95 =	40.7	L95 =	42.3	L95 =	47.4	L95 =	50.3	L95 =	51.1	L95 =	52.3	L95 =	57.8	L95 =	58.4
Leq =	52.2	Leq =	51.8	Leq =	56.9	Leq =	53.6	Leq =	55.6	Leq =	57.9	Leq =	61.3	Leq =	61.4

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

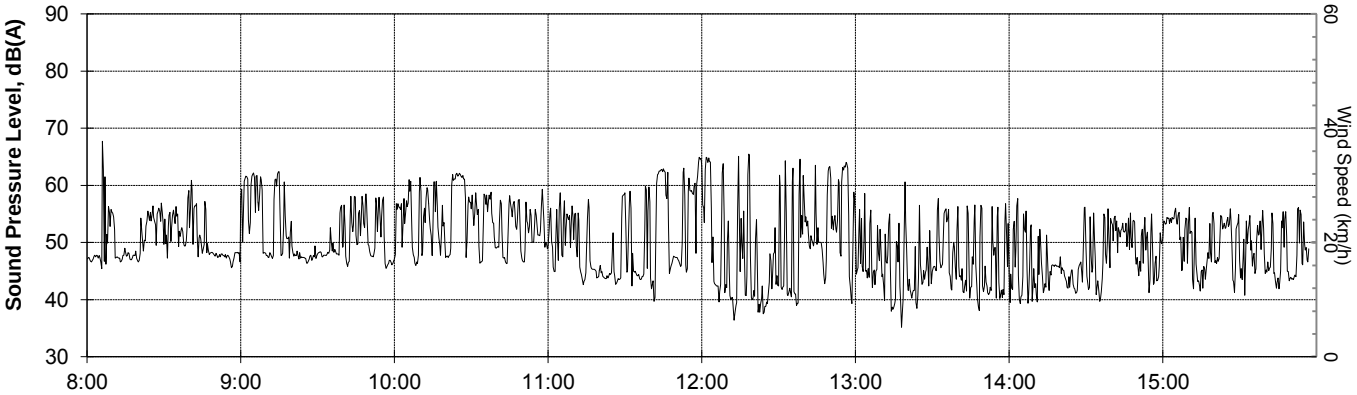
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp E **Date:** Thursday 10 Nov 2016

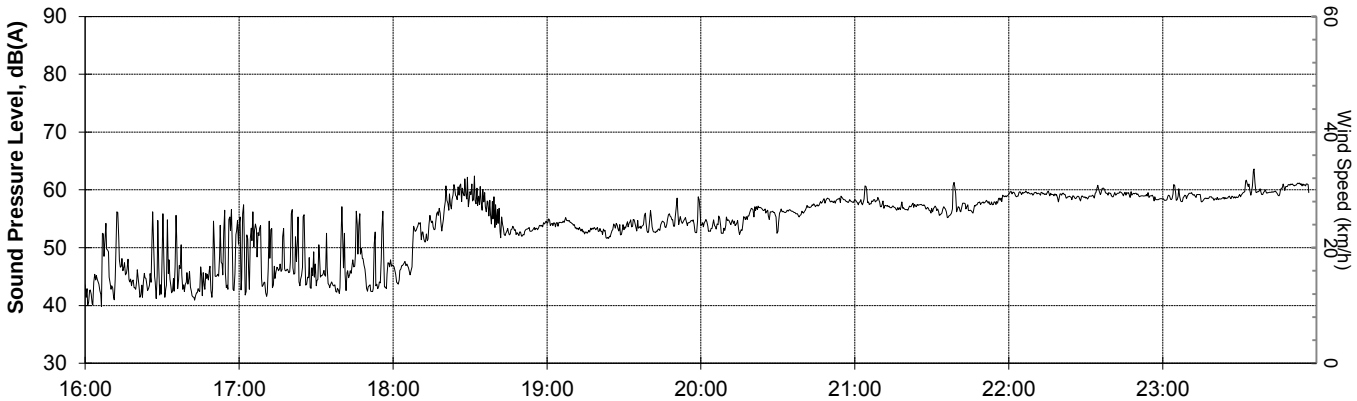
Microphone position: 1.6m AGL in thick forest above bund east of clearing on logging road



Lmax =	67.0	Lmax =	65.8	Lmax =	65.2	Lmax =	64.4	Lmax =	62.5	Lmax =	63.4	Lmax =	63.6	Lmax =	62.9
L01 =	64.7	L01 =	64.2	L01 =	63.4	L01 =	62.6	L01 =	60.3	L01 =	58.1	L01 =	53.3	L01 =	61.8
L05 =	63.6	L05 =	63.4	L05 =	62.8	L05 =	61.9	L05 =	59.3	L05 =	50.2	L05 =	50.6	L05 =	60.9
L10 =	63.0	L10 =	62.9	L10 =	62.4	L10 =	61.4	L10 =	58.6	L10 =	49.2	L10 =	49.9	L10 =	55.3
L50 =	61.2	L50 =	61.3	L50 =	61.0	L50 =	59.7	L50 =	55.4	L50 =	46.8	L50 =	48.1	L50 =	47.4
L75 =	60.3	L75 =	60.6	L75 =	60.3	L75 =	58.8	L75 =	52.1	L75 =	45.8	L75 =	47.5	L75 =	46.5
L90 =	59.7	L90 =	60.1	L90 =	59.8	L90 =	57.9	L90 =	49.3	L90 =	44.7	L90 =	47.0	L90 =	45.8
L95 =	58.7	L95 =	59.4	L95 =	59.0	L95 =	56.4	L95 =	45.8	L95 =	43.4	L95 =	46.3	L95 =	43.9
Leq =	61.6	Leq =	61.7	Leq =	61.3	Leq =	60.0	Leq =	55.9	Leq =	48.3	Leq =	48.7	Leq =	52.6



Lmax =	83.0	Lmax =	63.5	Lmax =	65.2	Lmax =	66.2	Lmax =	71.7	Lmax =	68.9	Lmax =	59.5	Lmax =	64.9
L01 =	61.1	L01 =	62.5	L01 =	62.4	L01 =	63.3	L01 =	65.7	L01 =	58.7	L01 =	56.9	L01 =	56.5
L05 =	57.0	L05 =	61.6	L05 =	61.6	L05 =	62.4	L05 =	64.7	L05 =	56.9	L05 =	55.5	L05 =	55.7
L10 =	55.5	L10 =	60.4	L10 =	60.6	L10 =	60.6	L10 =	63.6	L10 =	55.2	L10 =	54.8	L10 =	55.0
L50 =	48.4	L50 =	48.9	L50 =	53.7	L50 =	47.1	L50 =	47.0	L50 =	44.4	L50 =	45.6	L50 =	48.3
L75 =	47.0	L75 =	47.1	L75 =	48.9	L75 =	44.4	L75 =	41.2	L75 =	41.4	L75 =	42.6	L75 =	44.4
L90 =	46.1	L90 =	46.2	L90 =	46.9	L90 =	43.1	L90 =	39.4	L90 =	39.7	L90 =	40.7	L90 =	42.7
L95 =	44.7	L95 =	44.9	L95 =	45.4	L95 =	40.6	L95 =	36.6	L95 =	37.3	L95 =	38.2	L95 =	40.6
Leq =	53.1	Leq =	54.9	Leq =	56.1	Leq =	55.4	Leq =	57.5	Leq =	50.1	Leq =	49.9	Leq =	51.1



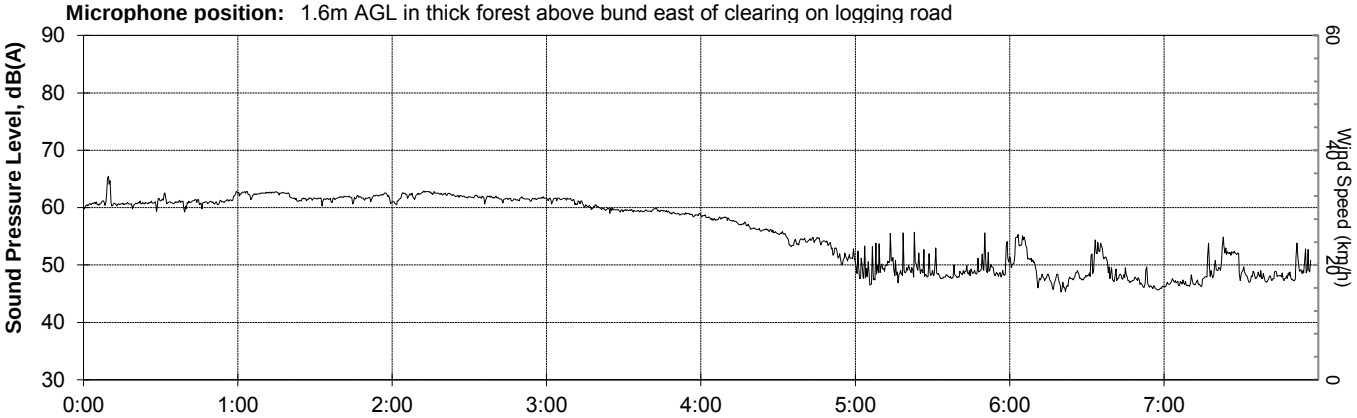
Lmax =	61.1	Lmax =	61.6	Lmax =	65.5	Lmax =	62.6	Lmax =	64.2	Lmax =	65.7	Lmax =	65.0	Lmax =	67.2
L01 =	56.6	L01 =	57.2	L01 =	63.4	L01 =	58.3	L01 =	60.8	L01 =	62.1	L01 =	62.4	L01 =	63.4
L05 =	55.6	L05 =	56.3	L05 =	61.3	L05 =	56.5	L05 =	59.4	L05 =	60.1	L05 =	61.3	L05 =	62.0
L10 =	53.0	L10 =	54.4	L10 =	58.7	L10 =	55.5	L10 =	58.8	L10 =	59.3	L10 =	60.7	L10 =	61.0
L50 =	44.0	L50 =	45.7	L50 =	53.6	L50 =	53.4	L50 =	55.5	L50 =	56.8	L50 =	58.7	L50 =	59.0
L75 =	42.3	L75 =	43.4	L75 =	52.2	L75 =	52.5	L75 =	53.5	L75 =	55.8	L75 =	58.0	L75 =	58.3
L90 =	41.1	L90 =	42.4	L90 =	46.9	L90 =	51.9	L90 =	52.3	L90 =	55.0	L90 =	57.3	L90 =	57.7
L95 =	39.5	L95 =	40.7	L95 =	43.8	L95 =	50.8	L95 =	51.0	L95 =	53.9	L95 =	56.4	L95 =	56.8
Leq =	48.2	Leq =	49.5	Leq =	55.9	Leq =	54.0	Leq =	56.3	Leq =	57.5	Leq =	59.2	Leq =	59.6

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

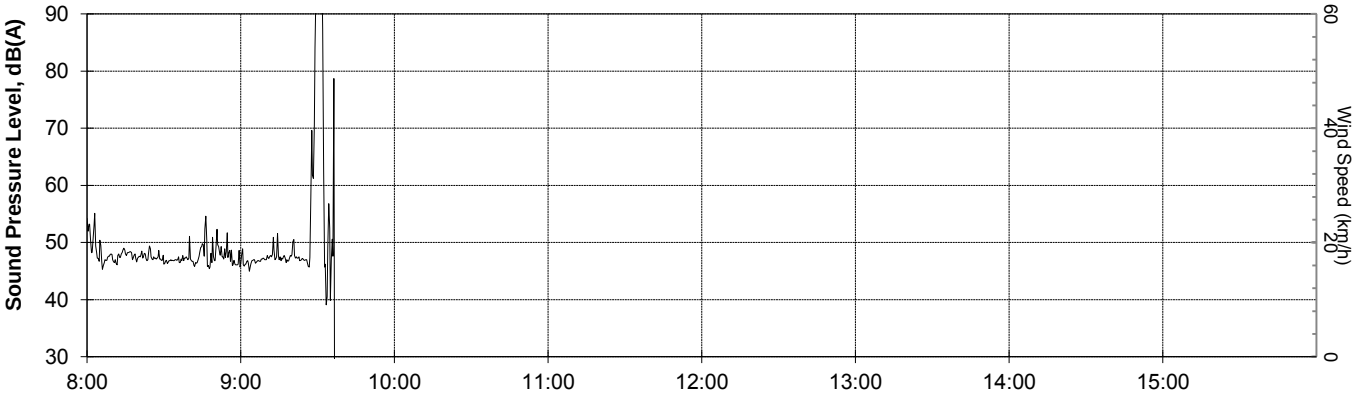
Results of Noise Monitoring

Client: ToTAL **Location** Fly Camp E **Date:** Friday 11 Nov 2016

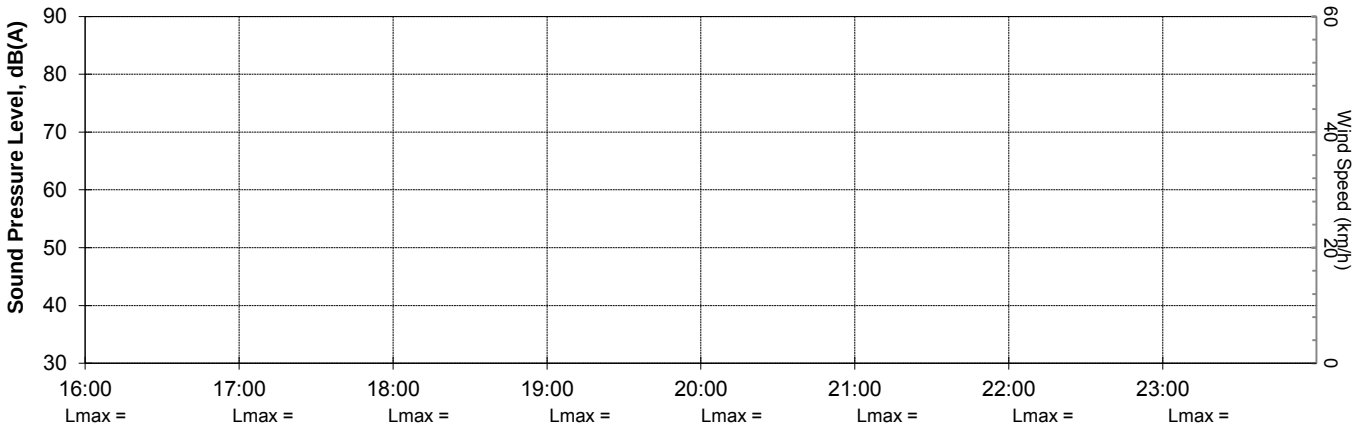
Microphone position: 1.6m AGL in thick forest above bund east of clearing on logging road



Lmax =	69.6	Lmax =	66.6	Lmax =	66.6	Lmax =	65.1	Lmax =	61.8	Lmax =	65.8	Lmax =	60.2	Lmax =	56.5
L01 =	65.0	L01 =	64.7	L01 =	64.5	L01 =	63.2	L01 =	59.6	L01 =	58.6	L01 =	55.4	L01 =	54.6
L05 =	63.1	L05 =	63.8	L05 =	63.7	L05 =	62.2	L05 =	58.8	L05 =	52.9	L05 =	54.1	L05 =	52.7
L10 =	62.6	L10 =	63.4	L10 =	63.3	L10 =	61.4	L10 =	58.3	L10 =	51.0	L10 =	53.1	L10 =	52.0
L50 =	60.6	L50 =	61.6	L50 =	61.5	L50 =	59.6	L50 =	55.5	L50 =	48.0	L50 =	47.6	L50 =	47.6
L75 =	59.5	L75 =	60.7	L75 =	60.7	L75 =	58.9	L75 =	53.6	L75 =	47.3	L75 =	46.6	L75 =	46.7
L90 =	58.8	L90 =	60.1	L90 =	60.1	L90 =	58.3	L90 =	51.8	L90 =	46.7	L90 =	45.9	L90 =	46.1
L95 =	57.8	L95 =	59.1	L95 =	59.2	L95 =	57.3	L95 =	48.9	L95 =	45.7	L95 =	44.5	L95 =	45.2
Leq =	61.1	Leq =	62.0	Leq =	61.9	Leq =	60.0	Leq =	56.0	Leq =	49.7	Leq =	49.7	Leq =	49.1



Lmax =	65.3	Lmax =		Lmax =		Lmax =		Lmax =		Lmax =		Lmax =		Lmax =	
L01 =	54.6	L01 =		L01 =		L01 =		L01 =		L01 =		L01 =		L01 =	
L05 =	52.2	L05 =		L05 =		L05 =		L05 =		L05 =		L05 =		L05 =	
L10 =	49.4	L10 =		L10 =		L10 =		L10 =		L10 =		L10 =		L10 =	
L50 =	47.1	L50 =		L50 =		L50 =		L50 =		L50 =		L50 =		L50 =	
L75 =	46.3	L75 =		L75 =		L75 =		L75 =		L75 =		L75 =		L75 =	
L90 =	45.8	L90 =		L90 =		L90 =		L90 =		L90 =		L90 =		L90 =	
L95 =	44.8	L95 =		L95 =		L95 =		L95 =		L95 =		L95 =		L95 =	
Leq =	48.2	Leq =		Leq =		Leq =		Leq =		Leq =		Leq =		Leq =	



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

SLR Consulting Australia Pty Ltd

Global Environmental and Advisory Solutions

for the Oil & Gas, Built Environment, Mining & Minerals, Infrastructure, Industry and Power Sectors

Noise Monitoring Location Summary Page

Site: Hururu Village
GPS Coordinates (UTM Zone 55): 314854m E, 9131623m S
Measurement period: Tuesday 8 to Friday 11 November 2016
Microphone position: 1.5m above ground level (AGL) in centre of clearing
Prevailing ambient noise environment: General village environment with continuous insect noise
Prevailing weather conditions: Calm and dry weather

Measured noise level, dBA L90, Day: 42, 42, 43, 41
Measured noise level, dBA L90, Night: 40, 37, 37

Site sketch plan (not to scale)

SLR Consulting Australia Pty Ltd
Suite 2, 2 Domville Ave
Hawthorn VIC 3122
AUSTRALIA

Results of Noise Monitoring

Client: ToTAL
Job Number: 620.11227 **Location:** Hururu Village
Microphone position: 1.5m AGL centre of clearing
Initial calibration: 94.2 dBA **Final calibration:** 94 dBA

Hour	Sound Pressure Level, dB(A)																				
	Tue, 08-11-2016			Wed, 09-11-2016			Thu, 10-11-2016			Fri, 11-11-2016											
	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}	L_{10}	L_{90}	L_{eq}
00:00 to 01:00				45.4	40.8	42.9	42.8	37.6	60.7	50.7	38.6	49.8									
01:00 to 02:00				44.4	39.9	41.9	45.2	38.0	41.9	41.3	38.3	45.1									
02:00 to 03:00				43.4	39.4	44.9	42.0	37.4	43.7	43.9	37.6	44.0									
03:00 to 04:00				48.3	36.9	48.1	40.2	35.9	46.3	40.2	37.1	44.6									
04:00 to 05:00				55.3	47.9	53.5	52.2	35.3	50.4	50.2	35.3	50.5									
05:00 to 06:00				57.8	37.9	55.1	58.9	36.1	57.5	54.9	35.3	53.1									
06:00 to 07:00				51.7	37.0	53.7	51.9	37.1	53.7	50.4	35.0	52.8									
07:00 to 08:00				56.8	43.4	64.6	52.3	37.9	52.7	53.0	39.1	52.5									
08:00 to 09:00				53.0	43.7	57.9	53.1	42.9	56.1	54.4	43.6	54.4									
09:00 to 10:00	62.9	41.9	79.9	52.8	42.8	51.1	54.7	43.4	53.1												
10:00 to 11:00	52.9	43.6	54.0	50.5	41.3	49.4	54.8	43.7	57.1												
11:00 to 12:00	54.5	39.3	58.6	51.5	38.7	52.2	51.5	43.7	58.9												
12:00 to 13:00	53.7	41.9	51.2	55.6	41.2	53.1	65.3*	43.6*	58.8*												
13:00 to 14:00	51.8	42.3	49.9	52.3	40.9	50.8	49.6	43.8	48.7												
14:00 to 15:00	55.2	41.9	57.6	51.9	43.3	50.4	53.6	43.4	54.8												
15:00 to 16:00	52.8	42.6	52.5	56.2	43.8	54.0	56.2	45.9	55.6												
16:00 to 17:00	62.7	42.9	62.7	57.3	43.8	56.4	53.5	42.9	54.9												
17:00 to 18:00	58.6	41.0	60.4	58.3	42.6	58.9	54.6	42.1	56.9												
18:00 to 19:00	57.3*	49*	56.3*	58.4	44.7	60.4	65.8*	51.3*	62*												
19:00 to 20:00	54.9*	49.3*	54*	56.2*	47.4*	55.2*	56.6*	48.4*	55.9*												
20:00 to 21:00	53.2*	49.3*	52.5*	54.1*	47.7*	56.4*	54.5*	50.3*	56.6*												
21:00 to 22:00	50.2	40.3	49.0	56.6*	47.5*	53.3*	55.6*	52*	60.2*												
22:00 to 23:00	42.7	40.4	41.8	56.1*	47.5*	53*	54.9*	52.1*	53.9*												
23:00 to 24:00	43.0	40.4	42.1	48.4	37.4	60.7	52*	50.2*	51.3*												
$L10_{(18h),\ ar.av.}$ 6-24h				53.9																	
$L_{eq(15h),\ log\ av.}$ 7-22h																					
$L_{eq(9h),\ log\ av.}$ 22-7h			50.2																		
$L_{eq(24h),\ log\ av.}$ 0-24h						#####															
L90 Day, 7-22h		41.8			42.5			43.0			41.4										
L90 Evening, 18-22h					44.7																
L90 Night, 22-7h		40.1																			
Wind @0900h, km/h																					
Wind @1500h, km/h																					

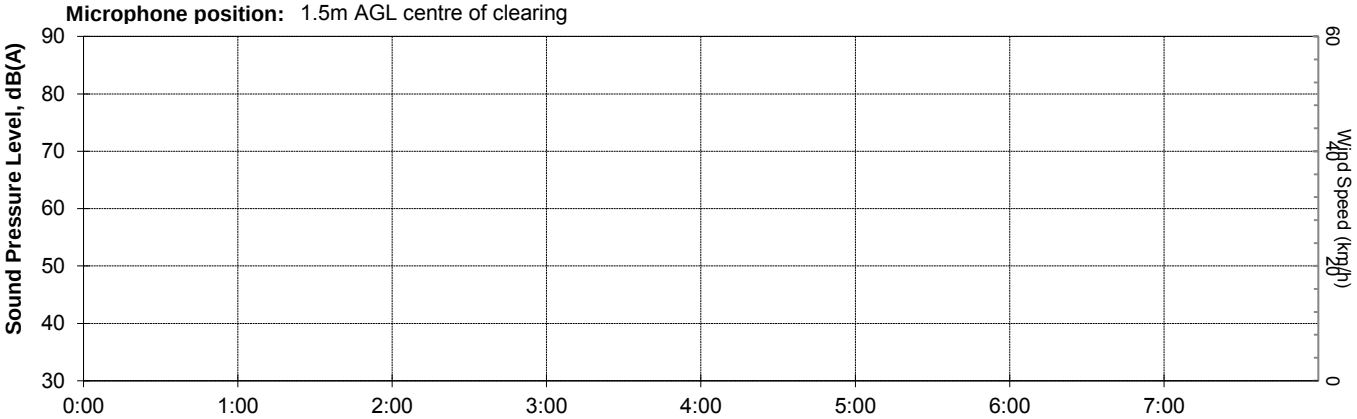
Note: Data marked with a * has been excluded due to periods of heavy rainfall or strong winds or other extraneous noise

Hourly percentiles based on Lp at 0.1s intervals.

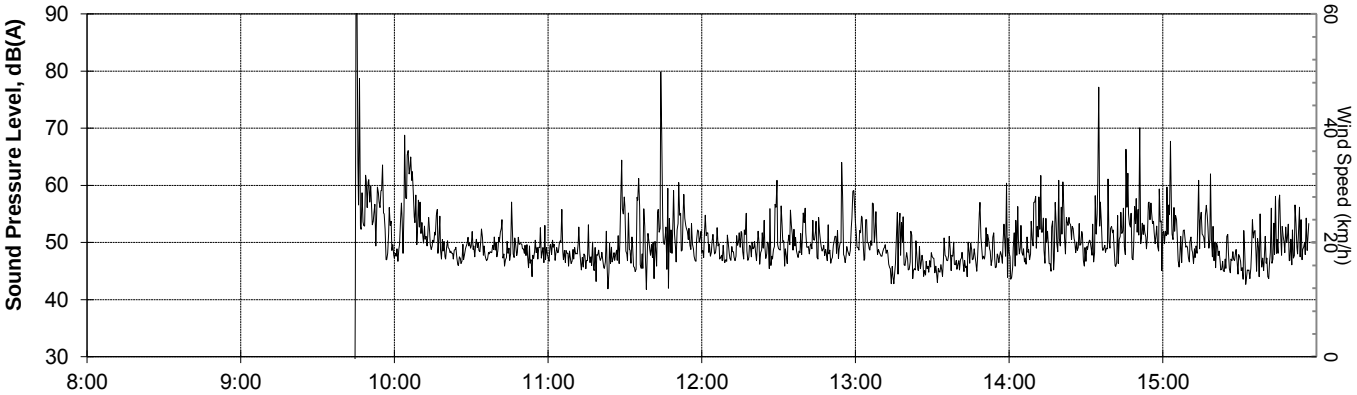
Results of Noise Monitoring

Client: ToTAL **Location** Hururu Village **Date:** Tuesday 08 Nov 2016

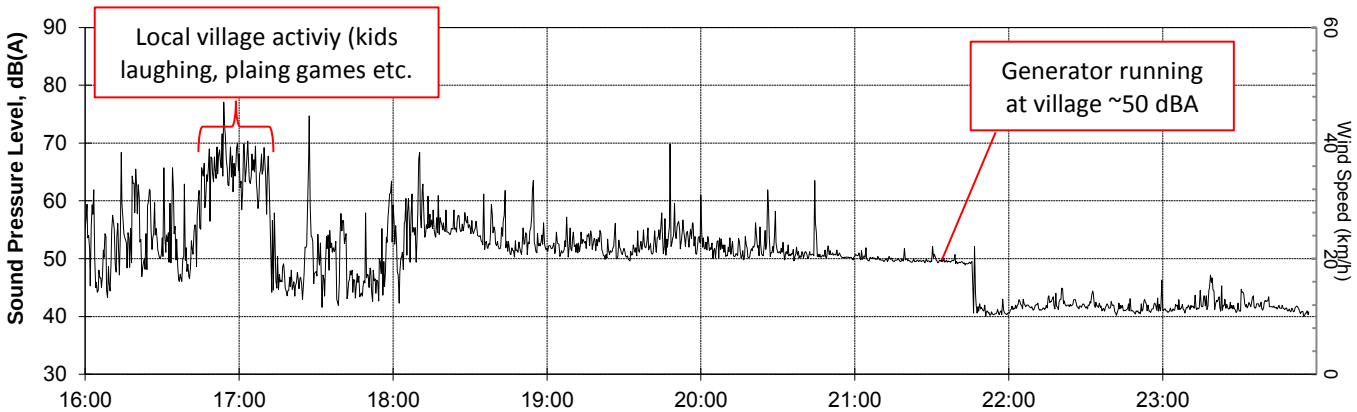
Microphone position: 1.5m AGL centre of clearing



0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
Lmax =	Lmax = 108.5	Lmax = 79.1	Lmax = 93.3	Lmax = 78.1	Lmax = 70.9	Lmax = 91.8	Lmax = 84.8
L01 =	L01 = 94.1	L01 = 64.7	L01 = 63.6	L01 = 60.5	L01 = 61.4	L01 = 65.7	L01 = 63.0
L05 =	L05 = 67.8	L05 = 55.1	L05 = 57.2	L05 = 55.4	L05 = 54.3	L05 = 58.4	L05 = 56.2
L10 =	L10 = 62.9	L10 = 52.9	L10 = 54.5	L10 = 53.7	L10 = 51.8	L10 = 55.2	L10 = 52.8
L50 =	L50 = 49.9	L50 = 46.6	L50 = 44.0	L50 = 45.9	L50 = 45.5	L50 = 46.7	L50 = 45.9
L75 =	L75 = 45.4	L75 = 44.9	L75 = 41.2	L75 = 43.7	L75 = 43.7	L75 = 43.8	L75 = 44.0
L90 =	L90 = 41.9	L90 = 43.6	L90 = 39.3	L90 = 41.9	L90 = 42.3	L90 = 41.9	L90 = 42.6
L95 =	L95 = 39.5	L95 = 40.6	L95 = 37.1	L95 = 39.6	L95 = 39.1	L95 = 39.8	L95 = 40.5
Leq =	Leq = 79.9	Leq = 54.0	Leq = 58.6	Leq = 51.2	Leq = 49.9	Leq = 57.6	Leq = 52.5



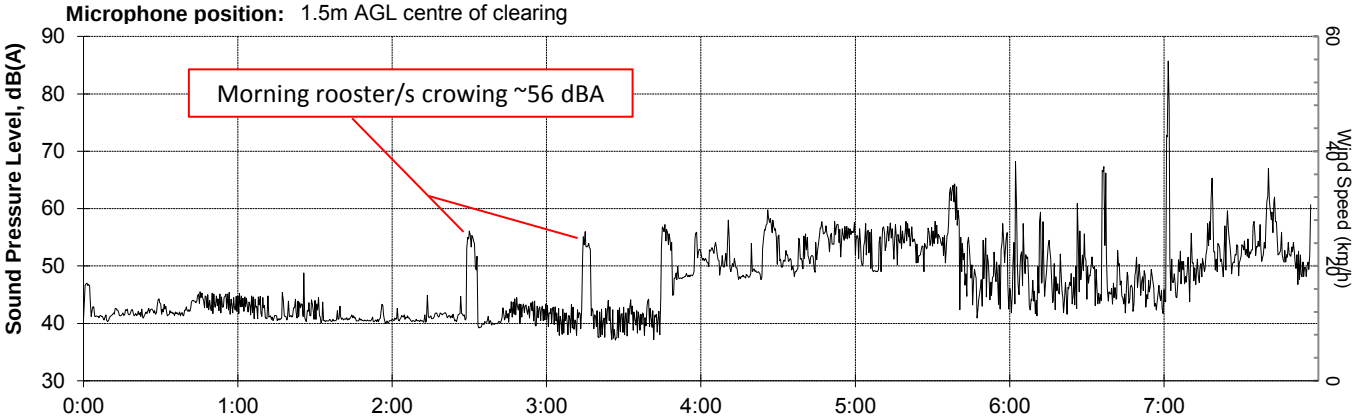
16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Lmax = 93.6	Lmax = 87.2	Lmax = 81.4	Lmax = 83.9	Lmax = 77.1	Lmax = 68.5	Lmax = 61.5	Lmax = 55.1
L01 = 74.8	L01 = 72.6	L01 = 66.6	L01 = 61.3	L01 = 60.9	L01 = 52.2	L01 = 44.8	L01 = 48.1
L05 = 67.5	L05 = 64.0	L05 = 59.9	L05 = 56.7	L05 = 55.1	L05 = 50.6	L05 = 43.4	L05 = 44.2
L10 = 62.7	L10 = 58.6	L10 = 57.3	L10 = 54.9	L10 = 53.2	L10 = 50.2	L10 = 42.7	L10 = 43.0
L50 = 47.8	L50 = 44.9	L50 = 53.2	L50 = 50.9	L50 = 50.3	L50 = 49.3	L50 = 41.4	L50 = 41.3
L75 = 44.8	L75 = 42.6	L75 = 50.7	L75 = 49.9	L75 = 49.7	L75 = 48.7	L75 = 40.9	L75 = 40.8
L90 = 42.9	L90 = 41.0	L90 = 49.0	L90 = 49.3	L90 = 49.3	L90 = 40.3	L90 = 40.4	L90 = 40.4
L95 = 40.7	L95 = 38.9	L95 = 41.1	L95 = 48.6	L95 = 48.6	L95 = 39.5	L95 = 39.7	L95 = 39.6
Leq = 62.7	Leq = 60.4	Leq = 56.3	Leq = 54.0	Leq = 52.5	Leq = 49.0	Leq = 41.8	Leq = 42.1

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

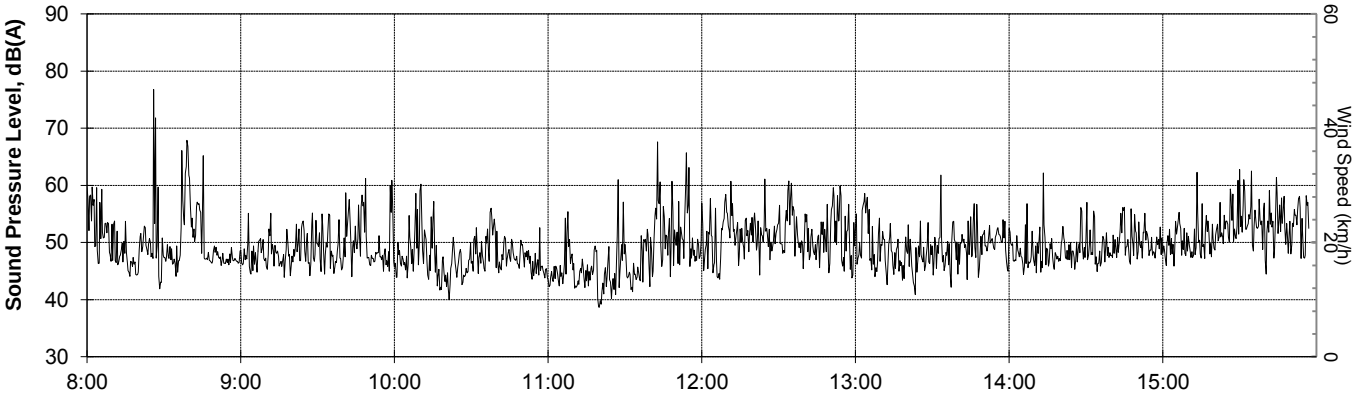
Results of Noise Monitoring

Client: ToTAL **Location** Hururu Village **Date:** Wednesday 09 Nov 2016

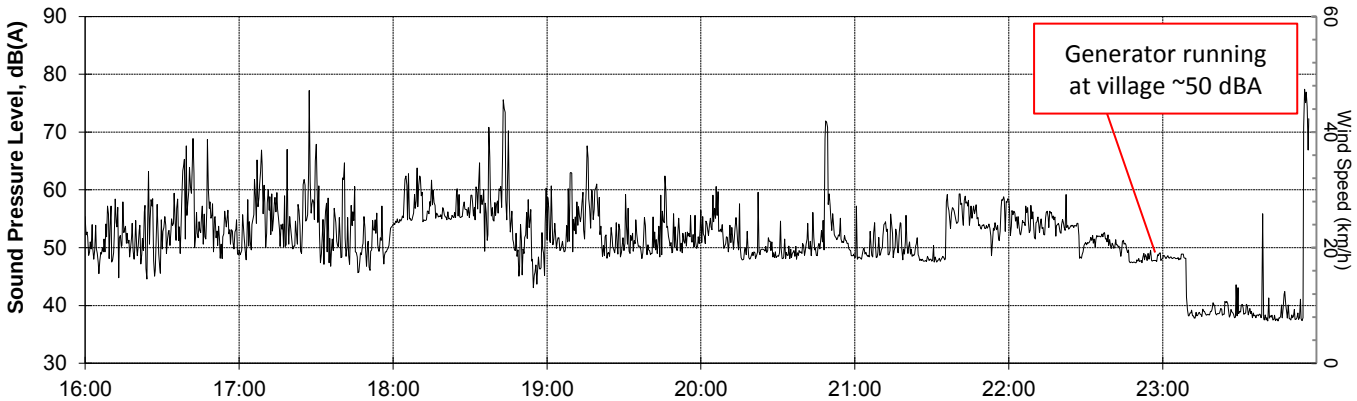
Microphone position: 1.5m AGL centre of clearing



Lmax =	52.9	Lmax =	60.1	Lmax =	66.6	Lmax =	66.6	Lmax =	70.3	Lmax =	75.8	Lmax =	82.1	Lmax =	95.0
L01 =	47.2	L01 =	46.5	L01 =	58.6	L01 =	61.9	L01 =	64.0	L01 =	66.1	L01 =	65.3	L01 =	70.8
L05 =	46.5	L05 =	45.4	L05 =	45.1	L05 =	52.4	L05 =	58.9	L05 =	62.2	L05 =	55.3	L05 =	60.2
L10 =	45.4	L10 =	44.4	L10 =	43.4	L10 =	48.3	L10 =	55.3	L10 =	57.8	L10 =	51.7	L10 =	56.8
L50 =	41.8	L50 =	40.8	L50 =	40.6	L50 =	40.2	L50 =	49.7	L50 =	48.0	L50 =	42.1	L50 =	49.6
L75 =	41.2	L75 =	40.3	L75 =	39.9	L75 =	37.5	L75 =	48.6	L75 =	41.9	L75 =	39.0	L75 =	46.3
L90 =	40.8	L90 =	39.9	L90 =	39.4	L90 =	36.9	L90 =	47.9	L90 =	37.9	L90 =	37.0	L90 =	43.4
L95 =	40.0	L95 =	39.2	L95 =	38.7	L95 =	36.1	L95 =	47.2	L95 =	35.3	L95 =	35.1	L95 =	40.0
Leq =	42.9	Leq =	41.9	Leq =	44.9	Leq =	48.1	Leq =	53.5	Leq =	55.1	Leq =	53.7	Leq =	64.6



Lmax =	90.8	Lmax =	76.8	Lmax =	74.0	Lmax =	86.0	Lmax =	74.7	Lmax =	74.9	Lmax =	80.8	Lmax =	77.1
L01 =	65.7	L01 =	61.7	L01 =	60.1	L01 =	62.2	L01 =	64.7	L01 =	62.2	L01 =	60.7	L01 =	65.2
L05 =	56.4	L05 =	55.7	L05 =	53.3	L05 =	55.6	L05 =	58.7	L05 =	55.4	L05 =	54.6	L05 =	59.7
L10 =	53.0	L10 =	52.8	L10 =	50.5	L10 =	51.5	L10 =	55.6	L10 =	52.3	L10 =	51.9	L10 =	56.2
L50 =	46.5	L50 =	46.1	L50 =	44.9	L50 =	42.8	L50 =	46.8	L50 =	44.9	L50 =	46.0	L50 =	47.7
L75 =	45.0	L75 =	44.2	L75 =	43.2	L75 =	40.5	L75 =	43.5	L75 =	42.6	L75 =	44.3	L75 =	45.4
L90 =	43.7	L90 =	42.8	L90 =	41.3	L90 =	38.7	L90 =	41.2	L90 =	40.9	L90 =	43.3	L90 =	43.8
L95 =	41.3	L95 =	40.7	L95 =	38.9	L95 =	36.2	L95 =	38.0	L95 =	38.7	L95 =	41.7	L95 =	42.2
Leq =	57.9	Leq =	51.1	Leq =	49.4	Leq =	52.2	Leq =	53.1	Leq =	50.8	Leq =	50.4	Leq =	54.0



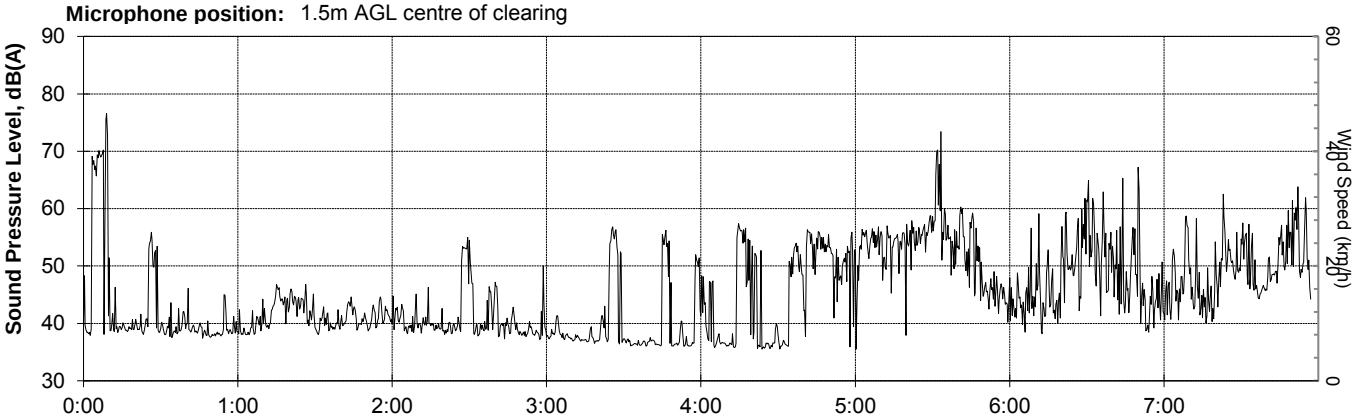
Lmax =	81.7	Lmax =	93.0	Lmax =	90.7	Lmax =	81.8	Lmax =	83.5	Lmax =	67.9	Lmax =	68.3	Lmax =	86.7
L01 =	67.4	L01 =	69.3	L01 =	70.8	L01 =	65.9	L01 =	68.1	L01 =	61.9	L01 =	60.1	L01 =	73.7
L05 =	60.9	L05 =	62.0	L05 =	62.1	L05 =	59.7	L05 =	57.4	L05 =	58.6	L05 =	57.5	L05 =	49.1
L10 =	57.3	L10 =	58.3	L10 =	58.4	L10 =	56.2	L10 =	54.1	L10 =	56.6	L10 =	56.1	L10 =	48.4
L50 =	47.9	L50 =	48.0	L50 =	54.5	L50 =	49.4	L50 =	49.2	L50 =	49.6	L50 =	51.3	L50 =	38.4
L75 =	45.3	L75 =	44.6	L75 =	51.1	L75 =	48.1	L75 =	48.3	L75 =	48.0	L75 =	48.7	L75 =	37.8
L90 =	43.8	L90 =	42.6	L90 =	44.7	L90 =	47.4	L90 =	47.7	L90 =	47.5	L90 =	47.5	L90 =	37.4
L95 =	42.1	L95 =	40.4	L95 =	41.7	L95 =	46.5	L95 =	47.0	L95 =	46.8	L95 =	46.7	L95 =	36.8
Leq =	56.4	Leq =	58.9	Leq =	60.4	Leq =	55.2	Leq =	56.4	Leq =	53.3	Leq =	53.0	Leq =	60.7

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

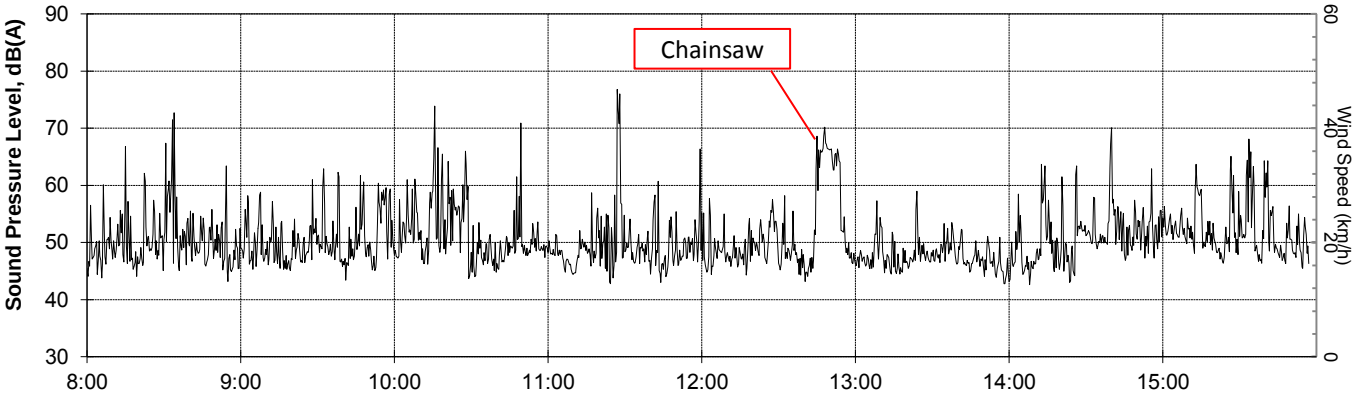
Results of Noise Monitoring

Client: ToTAL **Location** Hururu Village **Date:** Thursday 10 Nov 2016

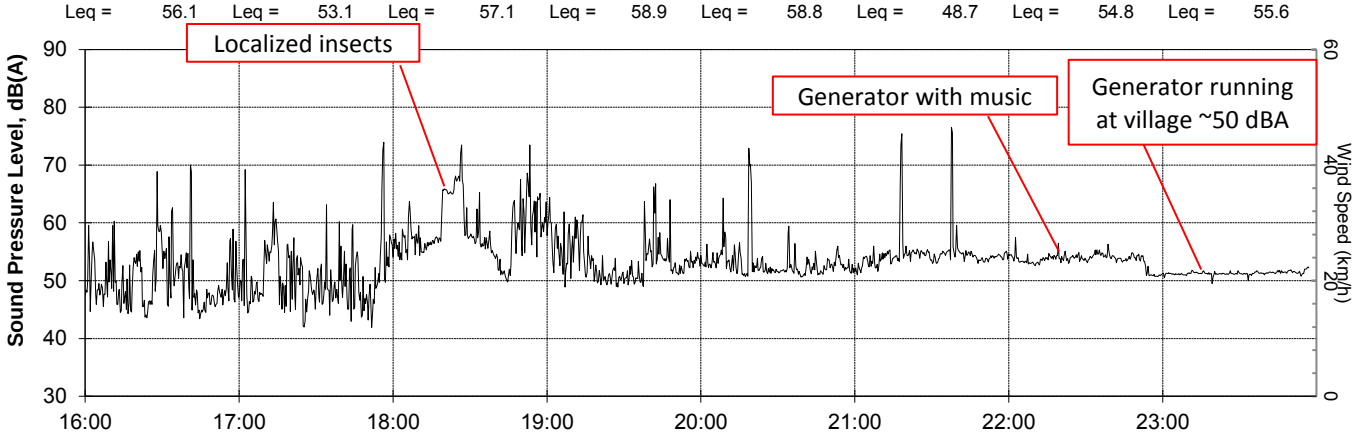
Microphone position: 1.5m AGL centre of clearing



Lmax =	87.5	Lmax =	62.8	Lmax =	65.4	Lmax =	68.9	Lmax =	68.0	Lmax =	83.1	Lmax =	81.2	Lmax =	77.4
L01 =	75.1	L01 =	49.0	L01 =	56.1	L01 =	61.2	L01 =	63.6	L01 =	66.9	L01 =	65.7	L01 =	65.0
L05 =	54.5	L05 =	46.8	L05 =	44.1	L05 =	43.1	L05 =	58.3	L05 =	62.9	L05 =	56.6	L05 =	56.4
L10 =	42.8	L10 =	45.2	L10 =	42.0	L10 =	40.2	L10 =	52.2	L10 =	58.9	L10 =	51.9	L10 =	52.3
L50 =	38.5	L50 =	39.5	L50 =	38.7	L50 =	36.9	L50 =	36.6	L50 =	42.0	L50 =	40.9	L50 =	46.0
L75 =	38.0	L75 =	38.6	L75 =	37.9	L75 =	36.3	L75 =	35.8	L75 =	37.9	L75 =	38.6	L75 =	42.4
L90 =	37.6	L90 =	38.0	L90 =	37.4	L90 =	35.9	L90 =	35.3	L90 =	36.1	L90 =	37.1	L90 =	37.9
L95 =	37.0	L95 =	37.4	L95 =	36.8	L95 =	35.3	L95 =	34.6	L95 =	34.3	L95 =	34.8	L95 =	34.4
Leq =	60.7	Leq =	41.9	Leq =	43.7	Leq =	46.3	Leq =	50.4	Leq =	57.5	Leq =	53.7	Leq =	52.7



Lmax =	90.3	Lmax =	78.4	Lmax =	91.0	Lmax =	80.4	Lmax =	79.2	Lmax =	72.6	Lmax =	84.3	Lmax =	77.6
L01 =	65.3	L01 =	64.5	L01 =	66.2	L01 =	74.8	L01 =	69.0	L01 =	58.4	L01 =	66.3	L01 =	67.9
L05 =	56.6	L05 =	58.3	L05 =	58.7	L05 =	55.2	L05 =	66.5	L05 =	51.5	L05 =	57.3	L05 =	60.3
L10 =	53.1	L10 =	54.7	L10 =	54.8	L10 =	51.5	L10 =	65.3	L10 =	49.6	L10 =	53.6	L10 =	56.2
L50 =	45.9	L50 =	46.6	L50 =	47.8	L50 =	46.5	L50 =	46.7	L50 =	45.9	L50 =	47.5	L50 =	49.0
L75 =	44.2	L75 =	44.7	L75 =	45.6	L75 =	45.0	L75 =	44.7	L75 =	44.8	L75 =	45.3	L75 =	47.2
L90 =	42.9	L90 =	43.4	L90 =	43.7	L90 =	43.7	L90 =	43.6	L90 =	43.8	L90 =	43.4	L90 =	45.9
L95 =	40.5	L95 =	41.6	L95 =	41.2	L95 =	41.7	L95 =	42.1	L95 =	42.4	L95 =	41.5	L95 =	43.8
Leq =	56.1	Leq =	53.1	Leq =	57.1	Leq =	58.9	Leq =	58.8	Leq =	48.7	Leq =	54.8	Leq =	55.6



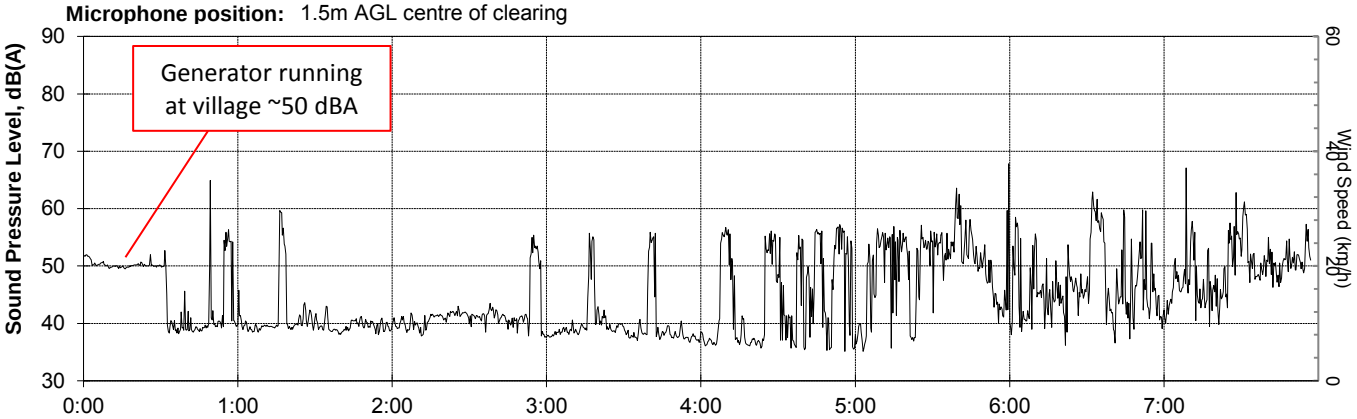
Lmax =	83.6	Lmax =	86.1	Lmax =	85.9	Lmax =	83.0	Lmax =	88.8	Lmax =	94.1	Lmax =	71.0	Lmax =	58.2
L01 =	66.7	L01 =	66.2	L01 =	71.4	L01 =	66.8	L01 =	65.1	L01 =	65.5	L01 =	57.0	L01 =	53.0
L05 =	58.0	L05 =	58.7	L05 =	67.2	L05 =	59.8	L05 =	56.7	L05 =	56.4	L05 =	55.4	L05 =	52.3
L10 =	53.5	L10 =	54.6	L10 =	65.8	L10 =	56.6	L10 =	54.5	L10 =	55.6	L10 =	54.9	L10 =	52.0
L50 =	45.3	L50 =	45.5	L50 =	55.9	L50 =	51.1	L50 =	51.4	L50 =	53.8	L50 =	53.5	L50 =	51.2
L75 =	43.9	L75 =	43.4	L75 =	53.6	L75 =	49.6	L75 =	50.8	L75 =	53.0	L75 =	52.9	L75 =	50.7
L90 =	42.9	L90 =	42.1	L90 =	51.3	L90 =	48.4	L90 =	50.3	L90 =	52.0	L90 =	52.1	L90 =	50.2
L95 =	41.5	L95 =	40.2	L95 =	48.4	L95 =	47.3	L95 =	49.7	L95 =	50.5	L95 =	49.9	L95 =	49.3
Leq =	54.9	Leq =	56.9	Leq =	62.0	Leq =	55.9	Leq =	56.6	Leq =	60.2	Leq =	53.9	Leq =	51.3

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

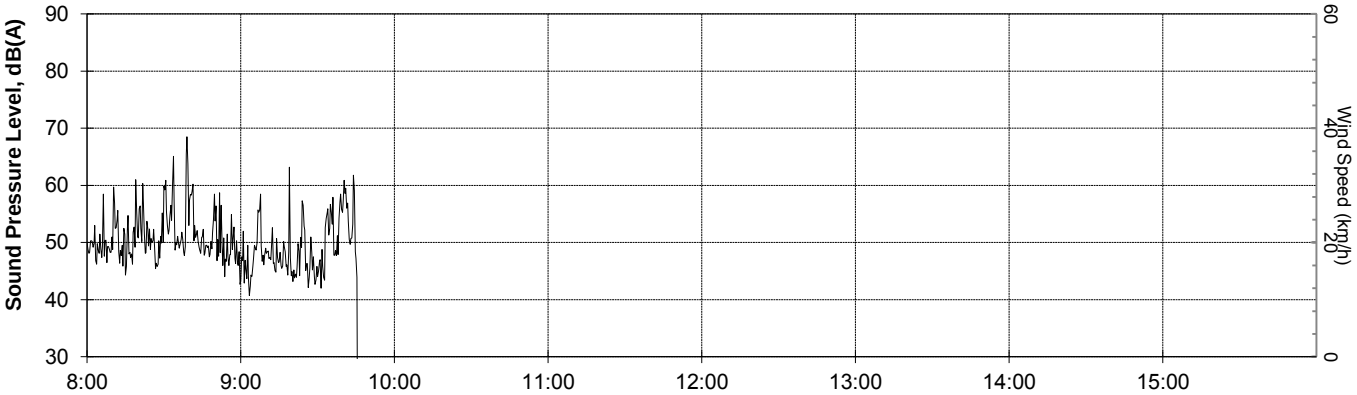
Results of Noise Monitoring

Client: ToTAL **Location** Hururu Village **Date:** Friday 11 Nov 2016

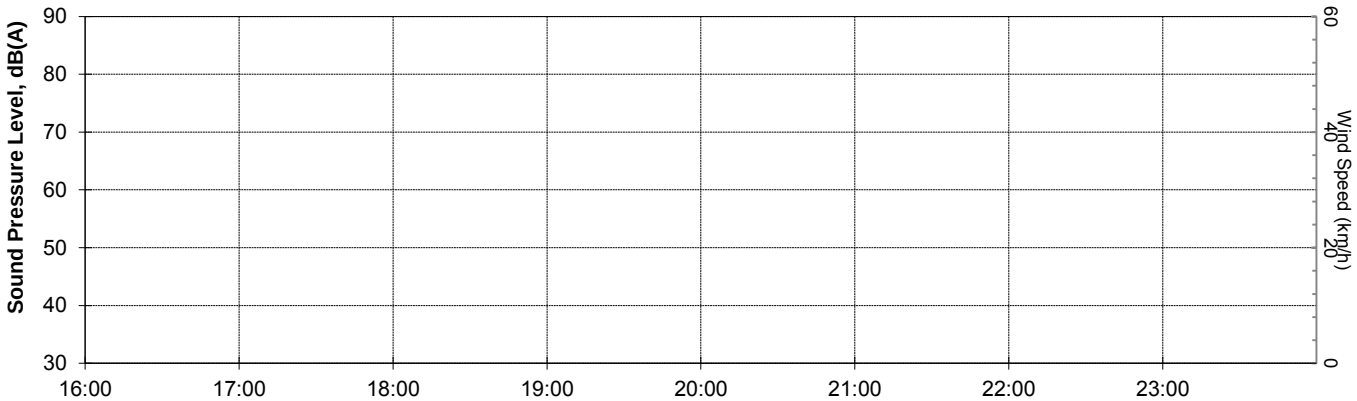
Microphone position: 1.5m AGL centre of clearing



Lmax =	82.9	Lmax =	70.7	Lmax =	66.0	Lmax =	67.3	Lmax =	68.4	Lmax =	77.8	Lmax =	80.7	Lmax =	84.7
L01 =	57.3	L01 =	58.0	L01 =	54.4	L01 =	56.9	L01 =	64.0	L01 =	65.1	L01 =	65.9	L01 =	63.7
L05 =	51.3	L05 =	42.5	L05 =	44.8	L05 =	42.5	L05 =	58.0	L05 =	60.0	L05 =	56.5	L05 =	56.6
L10 =	50.7	L10 =	41.3	L10 =	43.9	L10 =	40.2	L10 =	50.2	L10 =	54.9	L10 =	50.4	L10 =	53.0
L50 =	49.2	L50 =	39.4	L50 =	39.2	L50 =	38.3	L50 =	36.8	L50 =	40.9	L50 =	39.4	L50 =	46.4
L75 =	39.3	L75 =	38.8	L75 =	38.1	L75 =	37.6	L75 =	35.9	L75 =	36.7	L75 =	36.7	L75 =	42.5
L90 =	38.6	L90 =	38.3	L90 =	37.6	L90 =	37.1	L90 =	35.3	L90 =	35.3	L90 =	35.0	L90 =	39.1
L95 =	37.9	L95 =	37.3	L95 =	36.9	L95 =	36.5	L95 =	34.7	L95 =	34.1	L95 =	33.1	L95 =	35.1
Leq =	49.8	Leq =	45.1	Leq =	44.0	Leq =	44.6	Leq =	50.5	Leq =	53.1	Leq =	52.8	Leq =	52.5



Lmax =	80.9	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	65.6	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	57.8	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	54.4	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	47.3	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	45.3	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	43.6	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	38.5	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	54.4	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =



Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =	Lmax =
L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =	L01 =
L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =	L05 =
L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =	L10 =
L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =	L50 =
L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =	L75 =
L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =	L90 =
L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =	L95 =
Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =	Leq =

Graph based on Leq at 20s intervals,
Hourly percentiles based on Lp at 0.1s intervals.

Appendix B Attended Noise Measurement Results – Sensitive / Unattended Noise Monitoring Receptor Locations

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 09:52 / Hururu Village **Way Point 1 (WP1)** PNG94 PNG MG Zone 55 Coordinates: E: 314855, N: 9131617	**Description:** Near logger location in center of village area approximately 410 m north of coast. **Measured Noise Level:** **L_{90} =** 44 dBA **L_{eq} =** 46 dBA **L_{10} =** 47 dBA **L_{01} =** 51 dBA **Comments:** Intermittent noise from roosters crowing ~59 to 64 dBA. Intermittent conversation ~54 to 57 dBA Distant crying up to 55 dBA. Continuous insect noise from bush ~44 dBA. Chickens clucking ~54 to 59 dBA.	**View looking north towards measurement location near noise logger at centre of village with scrub / forest in background**
2016-11-09 14:14h / Hururu Village WP2 PNG94 PNG MG Zone 55 Coordinates: E: 314835, N: 9131670	**Description:** Track at northwest corner of village with nearby scrub to the north and southwest. **Measured Noise Level:** **L_{90} =** 46 dBA **L_{eq} =** 53 dBA **L_{10} =** 59 dBA **L_{01} =** 61 dBA **Comments:** Intermittent rooster crowing up to 64 dBA. Continuous insect noise (noticeably louder due to closer proximity of thick scrub which surrounds village) ~46 dBA.	**View from measurement location at edge of village looking east along track to beach**

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 14:17h / Hururu Village WP3 PNG94 PNG MG Zone 55 Coordinates: E: 315160, N: 9131152	**Description:** On beachfront approximately 500 m southeast of monitoring location. **Measured Noise Level:** **L_{90} =** 56 dBA **L_{eq} =** 64 dBA **L_{10} =** 62 dBA **L_{01} =** 76 dBA **Comments:** Continuous noise from rolling waves / ocean swell ~55 dBA. Nearby conversation ~56 to 68 dBA. Continuous relatively low level noise from insects in scrub approx. 15m to NE~55 dBA. Loud nearby insects in tree up to 75 dBA.	**View from measurement location on beach looking north**

Date / Time / GPS	Measurement Details	Photograph
2016-11-08 12:00h / Fly Camp E WP4 PNG94 PNG MG Zone 55 Coordinates: E: 308302, N: 9153987	**Description:** Thick bushland. Measurement taken on foothill next to helicopter landing zone. **Measured Noise Level:** **L_{90} =** 46 dBA **L_{eq} =** 48 dBA **L_{10} =** 49 dBA **L_{01} =** 51 dBA **Comments:** Continuous mid/high frequency noise from insects and bird song for entire duration of measurement.	**View down foothill towards helicopter landing zone**
2016-11-08 14:14h / Fly Camp D WP5 PNG94 PNG MG Zone 55 Coordinates: E: 294431, N: 9191297	**Description:** Semi cleared area. Measurement taken at edge of bushland. **Measured Noise Level:** **L_{90} =** 41 dBA **L_{eq} =** 47 dBA **L_{10} =** 49 dBA **L_{01} =** 51 dBA **Comments:** Continuous noise from insects and birds. Insect activity noise tended to cycle in waves between approximately 40 to 48 dBA.	**View from edge of bushland towards overgrown fly camp area**

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 08:55h / Mapaio Fish Camp MFCLogger PNG94 PNG MG Zone 55 Coordinates: E: 292084, N: 9185342	**Description:** At logger location approximately 10m west of Purari River and 2m from closest hut. General gathering / seating area located approximately 5m to south. **Measured Noise Level:** **L_{90} =** 31 dBA **L_{eq} =** 43 dBA **L_{10} =** 45 dBA **L_{01} =** 54 dBA **Comments:** Noise level generally dominated by local village noise (i.e. conversation, domesticated animals etc.) with continuous low level insect noise. Intermittent noise from crowing roosters ~47 to 50 dBA. Nearby voice noise/talking in closest hut up to 54 dBA. Distant insect noise ~30 to 34 dBA. Distant thumping from locals smashing palm leaves to extract starch ~39 dBA. Intermittent bird whistling ~38 to 42 dBA.	**View from edge of bank looking west towards monitoring and measurement locations with house and river inlet in background**
2016-11-09 09:05h / Mapaio Fish Camp WP6 PNG94 PNG MG Zone 55 Coordinates: E: 292040, N: 9185351	**Description:** Approximately 60m west of Purari River and 11m from river inlet to north. Measurement location next to large long hut and smaller hut under construction. **Measured Noise Level:** **L_{90} =** 34 dBA **L_{eq} =** 47 dBA **L_{10} =** 44 dBA **L_{01} =** 61 dBA **Comments:** Noise level less affected by village noise with slightly louder levels from insects. Intermittent noise from nearby crowing roosters ~57 to 62 dBA. Distant birds to northeast up to 42 dBA. Continuous whistling from local insects at 8 kHz ~ 34 dBA. Distant thumping from locals smashing palm leaves to extract starch ~39 dBA. Intermittent bird whistling ~38 to 42 dBA.	**View near path along inlet looking south towards measurement location**

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 09:26h / Mapaio Fish Camp WP7 PNG94 PNG MG Zone 55 Coordinates: E: 292005, N: 9185361	**Description:** Approximately 80m west of Purari River and 12m from river inlet. Measurement location next to gardens closer to thick foliage at western edge of cluster of houses closest river. **Measured Noise Level:** **L_{90} =** 42 dBA **L_{eq} =** 45 dBA **L_{10} =** 46 dBA **L_{01} =** 54 dBA **Comments:** Ambient noise levels dominated by insects in nearby scrub. Continuous noise from insects typically 42 dBA with levels up to 54 dBA from closest shrubs. Distant conversation from villagers ~45 dBA.	**View near path along inlet looking west towards measurement location**

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 10:15h / Purari Airstrip **WP8** PNG94 PNG MG Zone 55 Coordinates: E: 296926, N: 9183126	**Description:** approximately 15 m from riverbank on west side of family hut. Human activity present during measurement. **Measured Noise Level:** **L_{90} =** 46 dBA **L_{eq} =** 48 dBA **L_{10} =** 49 dBA **L_{01} =** 51 dBA **Comments:** Continuous noise from local insects 46 dBA. Intermittent noise from distant roosters crowing ~48 dBA. Water turbulence approximately 80 m downstream (on left of photo) was audible.	**View from west end of hut from measurement location looking downstream. Turbulent water visible on left side of photo**
2016-11-09 10:30h / Purari Airstrip **WP9** PNG94 PNG MG Zone 55 Coordinates: E: 296948, N: 9183102	**Description:** South east side of hut in open area near length of clothes line. **Measured Noise Level:** **L_{90} =** 48 dBA **L_{eq} =** 51 dBA **L_{10} =** 53 dBA **L_{01} =** 56 dBA **Comments:** Ambient noise levels dominated by insects in nearby scrub, varied between 46 – 53 dBA. Nearby roster crowing 57 dBA. Minimal intermittent human activity was present during measurement.	**View south towards measurement location from hut entrance way**

Date / Time / GPS	Measurement Details	Photograph
2016-11-09 11:13h / Poroi 1 Village WP10 PNG94 PNG MG Zone 55 Coordinates: E: 300462, N: 9182431	**Description:** East end of village approximately 8m from logger location below solar panel near grave. **Measured Noise Level:** **L_{90} =** 39 dBA **L_{eq} =** 46 dBA **L_{10} =** 50 dBA **L_{01} =** 56 dBA **Comments:** Noise from general village with ambient levels dominated by insect noise. Continuous insect noise ~38 dBA. Distant helicopter flyby up to 45 dBA. Intermittent noise from roosters crowing 53 to 57 dBA, Lmax.	**View from measurement location looking west towards noise logger**

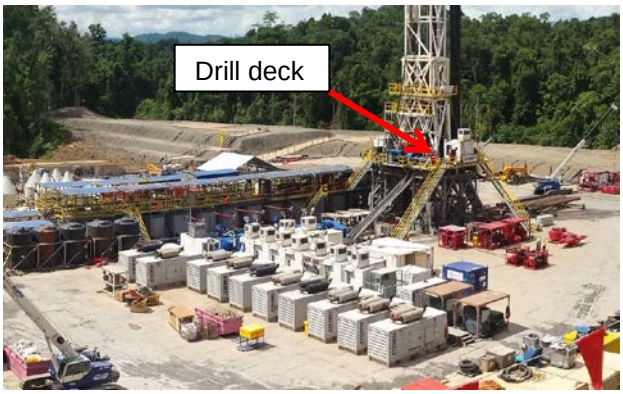
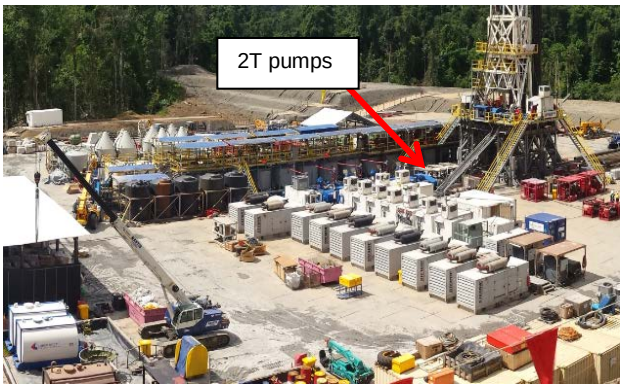
Date / Time / GPS	Measurement Details	Photograph
2016-11-09 11:26h / Poroi 1 Village WP11 PNG94 PNG MG Zone 55 Coordinates: E: 300443, N: 9182424	**Description:** Next to hut 15m southwest of grave. **Measured Noise Level:** **L_{90} =** 36 dBA **L_{eq} =** 51 dBA **L_{10} =** 49 dBA **L_{01} =** 60 dBA **Comments:** Ambient noise levels dominated by insects in nearby scrub. Continuous low level insect noise at 6.3 to 8 kHz ~36 dBA. Distant helicopter flyby up to 50 dBA. Nearby conversation from villagers up to 60 dBA.	**View looking west towards measurement location next to hut**
2016-11-10 09:55h / ANT-3 WP12 PNG94 PNG MG Zone 55 Coordinates: E: 294814, N: 9209993	**Description:** Cleared area around capped wellpad at ANT-3 approximately 400 m north of old campsite on ridge. **Measured Noise Level:** **L_{90} =** 36 dBA **L_{eq} =** 38 dBA **L_{10} =** 39 dBA **L_{01} =** 44 dBA **Comments:** Can hear water flowing down creek ~ 150 m away Intermittent birdsong ~45 dBA. Minimal noise levels from insects ~33 dBA.	**View of measurement location looking west on wellpad site**

Date / Time / GPS	Measurement Details	Photograph
2016-11-10 10:07h / ANT-3 WP13 PNG94 PNG MG Zone 55 Coordinates: E: 294781, N: 9210004	**Description:** wellpad - open area close to cliff edge down to creek. **Measured Noise Level:** **L_{90} =** 41 dBA **L_{eq} =** 43 dBA **L_{10} =** 44 dBA **L_{01} =** 45 dBA **Comments:** Ambient noise levels dominated by insects (mostly crickets) in nearby scrub and water flow of nearby creek. Some bird song present ~ 44dBA Telehandler at camp site was audible with reverse beeper ~44 dBA.	**View over wellpad towards first attended measurement and logger location**
2016-11-10 10:27h / ANT-3 WP14 PNG94 PNG MG Zone 55 Coordinates: E: 294844, N: 9208975	**Description:** Above bridge which crosses river approximately 600 m south of ANT-3 camp. **Measured Noise Level:** **L_{90} =** 51 dBA **L_{eq} =** 52 dBA **L_{10} =** 52 dBA **L_{01} =** 53 dBA **Comments:** Ambient noise levels dominated by water flow of river ~52 dBA. Some bird song and insect noise present (less dominant).	**View from bridge measurement location south of ANT-3 camp**

Papua LNG Project – Upstream Noise Baseline Report: Attended Noise Measurement Results at Reference Operational Facilities: ANT-7 Drill Rig and Herd Base

Date / Time / GPS	Measurement Details	Photograph
2016-11-10 13:20h / ANT-7 WP 15 PNG94 PNG MG Zone 55 Coordinates: E: 292828.5, N: 9207845.7	**Description:** Outside High Arctic Energy Services Rig 115 site offices, 5 m from Turkey Nest[1] pump. **Measured Noise Level:** **L_{90} =** 80 dBA **L_{eq} =** 81 dBA **L_{10} =** 83 dBA **L_{01} =** 83 dBA **Comments:** Water pump dominant noise source ~ 82 dBA.	**View from south east of ANT-7 site overlooking Rig 115**
2016-11-10 13:25h / /ANT-7*	**Description:** Three measurements at various locations near large generators on rig floor space. **Measured Noise Level:** **L_{90} =** 77 dBA **L_{eq} =** 77 dBA **L_{10} =** 77 dBA **L_{01} =** 78 dBA **Measured Noise Level:** **L_{90} =** 84 dBA **L_{eq} =** 85 dBA **L_{10} =** 85 dBA **L_{01} =** 86 dBA **Measured Noise Level:** **L_{90} =** 77 dBA **L_{eq} =** 79 dBA **L_{10} =** 79 dBA **L_{01} =** 86 dBA	**View of measurement taking place near gensets**

[1] A small earth dam adjacent to, and higher than, a larger earth dam, to feed water by gravity

Date / Time / GPS	Measurement Details	Photograph
2016-11-10 13:44h / ANT-7	**Description:** Drill rig main deck approximately 10 m AGL 4 m from drill master cabin. **Measured Noise Level:** **L_{90} =** 87 dBA **L_{eq} =** 88 dBA **L_{10} =** 88 dBA **L_{01} =** 88 dBA **Comments:** Drill deck noise dominated by rotary driver.	**View from south east of ANT-7 site overlooking Rig 115** 
2016-11-10 13:49h / ANT-7	**Description:** Shaker maintenance level measurement taken half a meter from shaker. **Measured Noise Level:** **L_{90} =** 91 dBA **L_{eq} =** 92 dBA **L_{10} =** 92 dBA **L_{01} =** 93 dBA **Comments:** Shaker movement tonal (high frequency)**.**	**View from south east of ANT-7 site overlooking Rig 115**
2016-11-10 13:53h / ANT-7 WP16 PNG94 PNG MG Zone 55 Coordinates: E: 292819.7, N: 9207883.6	**Description:** 2 ton pumps at ground level near base of drilling **Measured Noise Level:** **L_{90} =** 89 dBA **L_{eq} =** 90 dBA **L_{10} =** 90 dBA **L_{01} =** 92 dBA **Comments:** Pumps had an intermittent high frequency tone.	**View from south east of ANT-7 site overlooking Rig 115** 

Date / Time / GPS	Measurement Details	Photograph
2016-11-10 15:29h / ANT-7	**Description:** 55 m from mud pump, west side of Rig 115. **Measured Noise Level:** **L_{90} =** 62 dBA **L_{eq} =** 64 dBA **L_{10} =** 65 dBA **L_{01} =** 68 dBA **Comments:** Mud pump has a continuous pulsing noise ~64 to 67 dBA.	**View from west of ANT-7 site looking towards mud pits and Rig 115**
2016-11-11 15:06h / Herd Base / WP16 PNG94 PNG MG Zone 55 Coordinates: E: 303858 N: 9186524	**Description:** Outside the emergency room, Mil 8 helicopter approximately 230 m away **Measured Noise Level:** **L_{90} =** 65 dBA **L_{eq} =** 78 dBA **L_{10} =** 82 dBA **L_{01} =** 86 dBA **Comments:** helicopter still running while getting refueled.	**No image captured due to helicopter out of direct line of sight**
2016-11-11 15:10h / Herd Base / WP17 PNG94 PNG MG Zone 55 Coordinates: E: 303858 N: 9186524	**Description:** Outside the emergency room, Mil 8 helicopter picking up a load of cargo. **Measured Noise Level:** **L_{90} =** 79 dBA **L_{eq} =** 84 dBA **L_{10} =** 87 dBA **L_{01} =** 89 dBA **Comments:** Helicopter flew to cargo area and held position midair as cargo was attached to cable.	**View from Herd Base emergency room of Mil 8 helicopter**

Date / Time / GPS	Measurement Details	Photograph
2016-11-12 10:41h / Herd Base / WP17 PNG94 PNG MG Zone 55 Coordinates: E: 303858 N: 9186524	**Description:** 160 m North of helipad while AW139 helicopter drops off and loads up with passengers and flies away. **Measured Noise Level:** **L_{90} =** 67 dBA **L_{eq} =** 72 dBA **L_{10} =** 75 dBA **L_{01} =** 78 dBA **Comments:** 4 minutes to unload and load. Level increases to ~ 80 dBA as helicopter lifts off	**View south towards helipad where AW139 unloaded and loaded passengers**
2016-11-12 11:01h / Herd Base 'M Block' Accommodation / WP18 PNG94 PNG MG Zone 55 Coordinates: E: 303773 N: 9186555	**Description:** Measurement at north side of 'M Block' Accommodation near deployed noise logger. **Measured Noise Level:** **L_{90} =** 51 dBA **L_{eq} =** 53 dBA **L_{10} =** 55 dBA **L_{01} =** 56 dBA **Comments:** Constant noise from nearby diesel gensets 40 m away, air conditioning units from rooms and insect noise from nearby bushes.	**View towards east on the north side of Herd Base 'M Block' Accommodation area**
2016-11-13 03:51h / Herd Base 'M Block' Accommodation / WP18 PNG94 PNG MG Zone 55 Coordinates: E: 303773 N: 9186555	**Description:** Measurement at north side of Herd Base 'M Block' Accommodation near deployed noise logger at night time. **Measured Noise Level:** **L_{90} =** 49 dBA **L_{eq} =** 50 dBA **L_{10} =** 51 dBA **L_{01} =** 53 dBA **Comments:** Same position as previous measurement. Constant noise from nearby diesel gensets 40 m away, air conditioning units from rooms and insect noise from nearby bushes.	**No photo due to low night time visibility**

Date / Time / GPS	Measurement Details	Photograph
2016-11-13 03:59h / Herd Base Aviation Tower / WP19 PNG94 PNG MG Zone 55 Coordinates: E: 303871 N: 9186472	**Description:** Aviation tower near noise logger location. **Measured Noise Level:** **L_{90} =** 52 dBA **L_{eq} =** 54 dBA **L_{10} =** 55 dBA **L_{01} =** 58 dBA **Comments:** Continuous noise from insects and refer units to the north. Intermittent bird song from nest on Herd Base Aviation Tower.	**No photo due to low night time visibility**
2016-11-13 04:13h / Herd Base in accommodation room	**Description:** Measurement of ambient levels inside accommodation dorm rooms. **Measured Noise Level:** **L_{90} =** 46 dBA **L_{eq} =** 48 dBA **L_{10} =** 49 dBA **L_{01} =** 50 dBA **Comments:** Continuous noise from air conditioning unit.	**No photo taken**

*Note: waypoint locations not captured at most ANT-7 attended measurement locations. This is due to measurements being plant noise sound power levels (relative to distance) rather than background noise measurements at a specific location.

Appendix C Attended Noise Measurement Results – Reference Operational Facilities

Date / Time / GPS	Measurement Details	Photograph
2016-11-10 13:20h / ANT-7 WP 15 PNG94 PNG MG Zone 55 Coordinates: E: 292828.5, N: 9207845.7	**Description:** Outside High Arctic Energy Services Rig 115 site offices, 5 m from Turkey Nest[1] pump. **Measured Noise Level:** **L_{90} =** 80 dBA **L_{eq} =** 81 dBA **L_{10} =** 83 dBA **L_{01} =** 83 dBA **Comments:** Water pump dominant noise source ~ 82 dBA.	**View from south east of ANT-7 site overlooking Rig 115**
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[1] A small earth dam adjacent to, and higher than, a larger earth dam, to feed water by gravity

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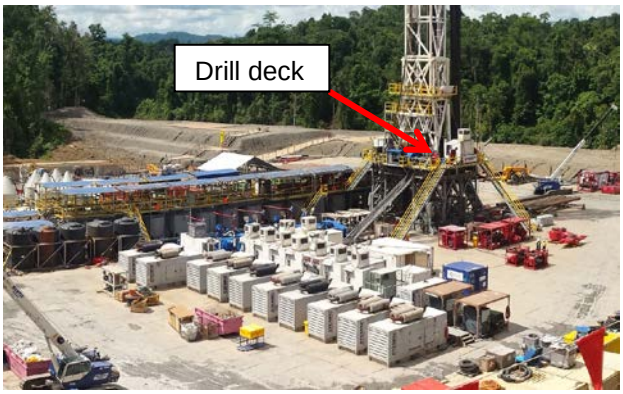
2016-11-10 13:44h / ANT-7	**Description:** Drill rig main deck approximately 10 m AGL 4 m from drill master cabin. **Measured Noise Level:** **L_{90} =** 87 dBA **L_{eq} =** 88 dBA **L_{10} =** 88 dBA **L_{01} =** 88 dBA **Comments:** Drill deck noise dominated by rotary driver.	**View from south east of ANT-7 site overlooking Rig 115** 
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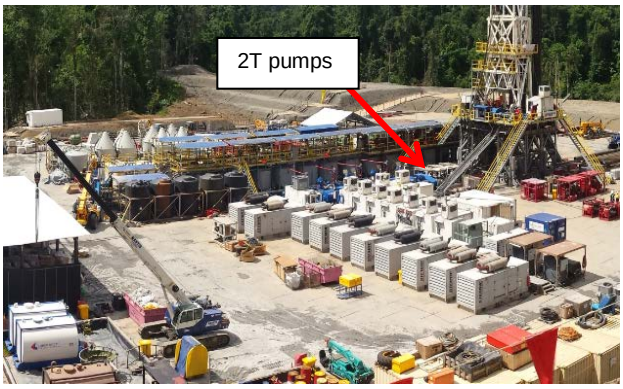
2016-11-10 13:53h / ANT-7 WP16 PNG94 PNG MG Zone 55 Coordinates: E: 292819.7, N: 9207883.6	**Description:** 2 ton pumps at ground level near base of drilling **Measured Noise Level:** **L_{90} =** 89 dBA **L_{eq} =** 90 dBA **L_{10} =** 90 dBA **L_{01} =** 92 dBA **Comments:** Pumps had an intermittent high frequency tone.	**View from south east of ANT-7 site overlooking Rig 115** 

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2016-11-11 15:06h / Herd Base / WP16 PNG94 PNG MG Zone 55 Coordinates: E: 303858 N: 9186524	**Description:** Outside the emergency room, Mil 8 helicopter approximately 230 m away **Measured Noise Level:** **L_{90} =** 65 dBA **L_{eq} =** 78 dBA **L_{10} =** 82 dBA **L_{01} =** 86 dBA **Comments:** helicopter still running while getting refueled.	**No image captured due to helicopter out of direct line of sight**
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2016-11-13 03:51h / Herd Base 'M Block' Accommodation / WP18 PNG94 PNG MG Zone 55 Coordinates: E: 303773 N: 9186555	**Description:** Measurement at north side of Herd Base 'M Block' Accommodation near deployed noise logger at night time. **Measured Noise Level:** **L_{90} =** 49 dBA **L_{eq} =** 50 dBA **L_{10} =** 51 dBA **L_{01} =** 53 dBA **Comments:** Same position as previous measurement. Constant noise from nearby diesel gensets 40 m away, air conditioning units from rooms and insect noise from nearby bushes.	**No photo due to low night time visibility**

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