



A member of the ATB GROUP

PROJECT

Noise Impact Assessment (NIA) for the Proposed Hartland School and Hospital Project on the Remainder of the Farm Vaalevalley 219, Mossel Bay - **DRAFT**

Eco Thunder

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EXECUTIVE SUMMARY

Project overview

Mere Group (Pty) Ltd (The Applicant) proposes the establishment of the Hartland mixed land-use development in support of the surrounding Hartland residential development on the Remainder of the Farm Vaalevalley 219 in Mossel Bay. The proposed development includes three (3) primary components: School precinct; Tertiary education precinct; and Hospital precinct with emergency helicopter landing pad. These components are supported by internal and external auxiliary infrastructure.

Sharples Environmental Services cc (SES), was appointed by The Applicant as the Environmental Assessment Practitioner, to undertake the necessary Environmental Authorisation processes for the proposed development. ATB Environmental Consulting, a member of the ATB Group (Pty) Limited was contracted by Eco Thunder (Pty) Limited to undertake the required Noise Impact Assessment for the Environmental Authorisation process.

Location

The location of the proposed Hartland mixed land-use development is approximately 2 km to the north-east of the town of Hartenbos and approximately 32 km west-south-west of the town of George, along the National route 2 (N2) (GPS location: 34° 5'56.49"S 22° 6'56.90"E). The proposed development is situated within the Mossel Bay Local Municipality which falls under the Garden Route District Municipality in the Western Cape Province.

Assumptions and Limitations

- The proposed project infrastructure were extracted from information provided to ATB by the Applicant. The NIA has been undertaken against this provided project description. Changes in this description after assessment may influence the outcomes of the noise impacts.
- Hospital helipad aviation aspects:
 - Helipad site location: S34.098012° E22.116444°;
 - Helicopter type: Bell222 and/or Bell 430 helicopter types based on companies currently operating in the Western Cape Garden Route district;
 - Flight routes:
 - Routes are informed by prevailing seasonal wind patterns: easterly to south-easterly winds in summer and westerly to south-westerly winds in winter. During take-off and landing, helicopters are typically operated into the wind;
 - Where possible, flight paths should avoid overflying the planned neighbouring school and hostel;
 - Where possible, flight paths should avoid overflying nearby Hartland residential developments; and
 - Preferred routing should follow the N2 highway corridor.
 - Flight numbers: 2 flights landing and 2 flights departing per day (i.e. 4 flights per day in total); and
 - Operational 24-hours per day, seven (7) days a week.
- Stadia lights will not exceed ten (10) metres in height and will meet aviation specifications such that they don't interfere with aviation flight paths;
- The proposed project does not trigger any listed activities under the Mineral and Petroleum Resources Development Act (Act no. 28 of 2002) (MPRDA) which governs the acquisition, use and disposal of mineral rights in South Africa; and
- No blasting is required during the construction phase and thus the Mine Health and Safety Act (Act No. 29 of 1996) regarding the management and control of blasting, vibration and shock is not applicable.
- The specialist assessment excludes quantitative modelling of the noise impacts for the following scenarios but includes the calculation of anticipated noise levels at various distances from the proposed infrastructure, aligned with the SANS methods 10328 (2008) and 10103 (2008):

- Scenario 1: Typical operational noise emitted from the Hartland development (Excludes scenario 2 & 3 emissions contributions);
- Scenario 2: Noise levels emitted from the Hartland development during sporting events including public address systems; and
- Scenario 4: Cumulative Scenarios 1, 2 and 3
- Scenario 3: Medical aviation flights includes formal noise modelling for the operational phase with the AEDT 3g tool;
- The Applicant was not positioned to provide much information on the hospital helipad aviation aspects. Reliance was thus placed on a series of assumptions regarding hospital emergency helipad operations. These assumptions were derived from the aviation noise modellers experience on similar projects within South Africa. Changes in these assumed aviation aspects after assessment may influence the outcomes of the noise impacts; and
- No blasting is required during the construction phase and thus the assessment thereof are excluded.

Summary impact opinion

Based on the assessment of the anticipated noise impacts, there is no substantive reason why the proposed Hartland development cannot be authorised as no noise impacts serve as project fatal flaws. However, the recommendations and best practice measures as per Section 10 must be implemented to mitigate the anticipated impacts wherever practically possible. These recommendations must be included in the Environmental Management Plan (EMP) for the project.

Acronym List

Acronyms	
ATB	ATB Environmental Consulting, a member of the ATB Group (Pty) Limited
AEDT 3g	Aviation Environmental Design Tool
dB	Decibel
dB(A)	Decibel average weighted
CARs	Civil Aviation Regulations
°C	Degree centigrade
CDC	United States Centres for Disease Control and Prevention
EA	Environmental authorisation
EAP	Environmental Assessment Practitioner
EHS	Environmental, Health, and Safety
EIA	Environmental impact assessment
ha	Hectare
Hz	Hertz
IFC	International Finance Corporation
km	Kilometre
km/h	Kilometre per hour
L _{Aeq}	A-weighted, equivalent continuous sound level
L _{Amax}	Maximum sound pressure level of a noise event, normally measured on a weighted decibel scale
L _{Amin}	Lowest instantaneous sound pressure level in decibels with a specified frequency and time weighting
L _{A90}	Sound levels the receiving environment is exposed to 90% of the time (excludes the loudest events)
L _{A10}	Sound levels the receiving environment is exposed to 10% of the time (includes the loudest events only)
L _{Peak}	The highest instantaneous sound pressure level, in decibels, with no time weighting
m	Meter
mm	Millimeter
m ²	Square meter
m ³	Cubic meter
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)

Acronyms	
m/s	Meters per second
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM: AQA	National Environmental Management Act: Air Quality Act (Act No. 39 of 2004)
NIA	Noise impact assessment
NIHL	Noise induced hearing loss
OHSAct	Occupational Health and Safety Act (Act No. 85 of 1993)
OECD	Organization for Economic Co-ordination and Development
OEM	Original Equipment Manufacturer
%	Percentage
SACA	South African Civil Aviation Authority
SANAS	South African National Accreditation System
SANS	South African National Standard
SES	Sharples Environmental Services cc
SLM	Sound level meter
SR	Sensitive receptor
WHO	World health organisation
WWTW	Wastewater Treatment Works

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1. INTRODUCTION

Mere Group (Pty) Ltd (The Applicant) proposes the establishment of the Hartland mixed land-use development in support of the surrounding Hartland residential development on the Remainder of the Farm Vaalevalley 219 in Mossel Bay. The proposed development includes three (3) primary components: School precinct; Tertiary education precinct; and Hospital precinct with emergency helicopter landing pad. These components are supported by internal and external auxiliary infrastructure.

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2. PROJECT BACKGROUND

2.1 Location of the proposed project

The location of the proposed Hartland mixed land-use development is approximately 2 km to the north-east of the town of Hartenbos and approximately 32 km west-south-west of the town of George, along the National route 2 (N2) (GPS location: 34° 5'56.49"S 22° 6'56.90"E). The proposed development is situated within the Mossel Bay Local Municipality which falls under the Garden Route District Municipality in the Western Cape Province (Figure 1).

2.2 Surrounding land use cover

The land use cover within a 10 km radius of the proposed development (Figure 2):

- Commercial agriculture and grazing for livestock;
- Game farming;
- Individual farm residences and associated farming infrastructure;
- Mining operations (aggregates);
- Protected areas and game reserves;
- Air strip;
- Small craft harbour;
- Power generation;
- Residential areas (formal and informal);
- Recreational activities such as hunting, golf, mountain biking, angling etc;
- Sewage treatment plants;
- Industrial activities and hydrocarbon fuel storage;
- National rail infrastructure;
- National and regional road infrastructure (i.e. N2, R102, R320 etc)
- Open vacant land and natural bush; and
- An extensive network of unnamed gravel access roads.

2.3 Proposed infrastructure

The Hartland mixed land-use development is being developed to support of the surrounding Hartland residential development on the Remainder of the Farm Vaalevalley 219 in Mossel Bay. The proposed development includes three (3) primary components:

- School precinct, which includes a Secondary School with supporting facilities such as a school hostel, an administration building and main hall, together with a clubhouse and rugby fields/athletics track;
- Tertiary precinct, comprising a Tertiary Education Centre with student accommodation and associated action sports fields and courts; and
- Hospital precinct, including the hospital building(s) and associated infrastructure, as well as provision for future staff accommodation and an emergency helicopter landing pad.

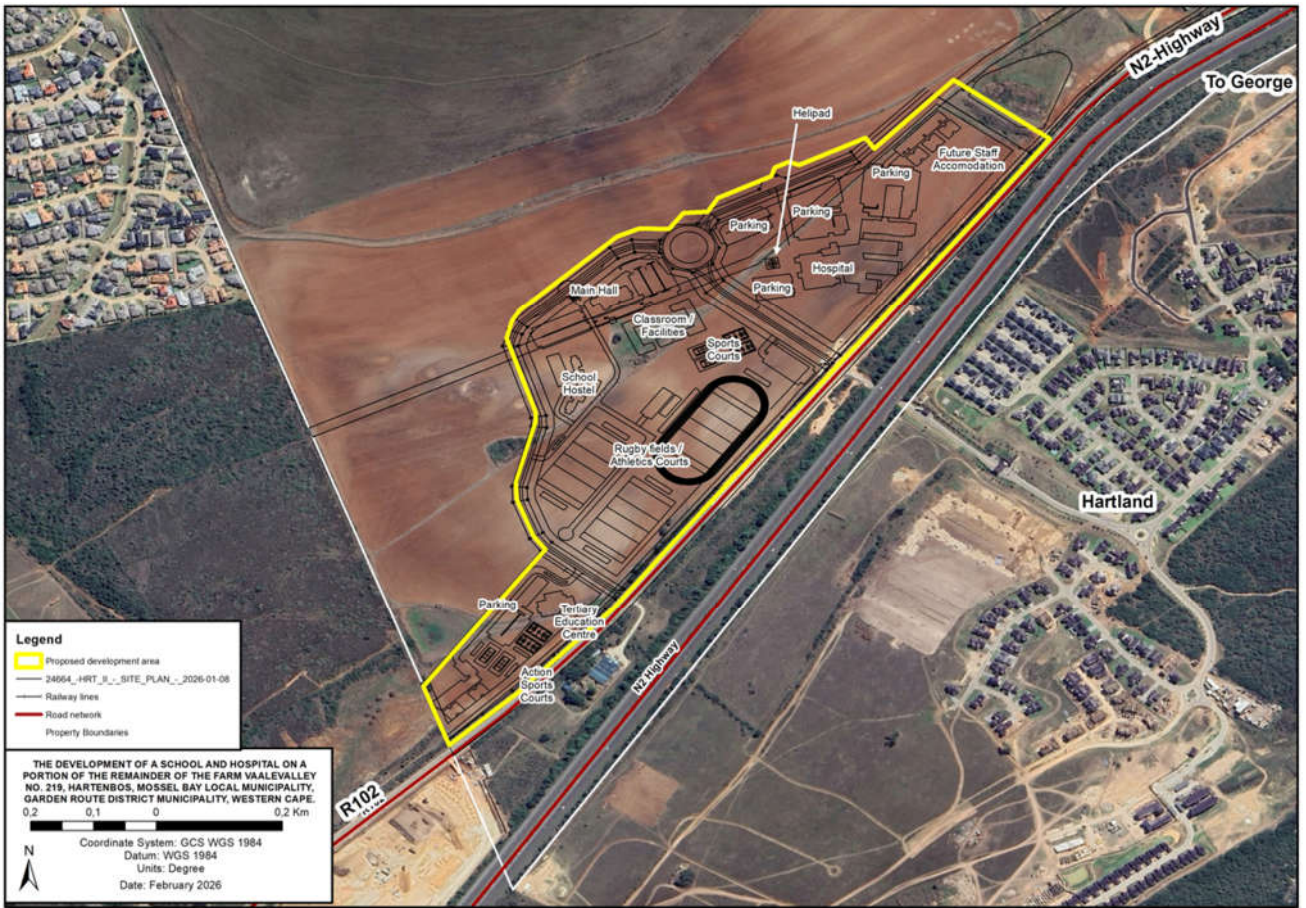


Figure 1: Location of the proposed Hartland mixed land-use development (Eco Thunder, 2026)



Figure 2: Surrounding land-use within a 10km radius of the proposed Hartland development (Map Source: Google Earth, March 2026)

These components are supported by internal and external auxiliary infrastructure including: Internal roads and parking bays serving the different portions of the development; Wastewater servicing infrastructure, comprising a new sewer pump station on site and a new pressure line connecting the development to the Hartenbos Regional Wastewater Treatment Works (WWTW); Electrical distribution infrastructure for the provision of power, augmented by rooftop Solar PV installations on certain infrastructure.

None of the proposed infrastructure is considered as a significant noise source except for:

- The Hartland hospital emergency helipad which will have several emergency flights per day; and
- The sport courts, rugby field and athletic track which are likely to host sporting events and may include the projection of sound via loudspeakers and or public address systems.

3. STUDY APPROACH AND METHODOLOGY

3.1 Background literature review

A background literature review was conducted to gain an understanding of the proposed project, the typical ambient baseline noise levels experienced within the surrounding region, and the anticipated noise emissions from the proposed project. Documentation reviewed included the following:

- The EAP's provided project description;
- Mossel Bay Municipality by-law relating to public nuisances – noise nuisance aspects;
- Approximate hearing range of various animals (after Fay, 1988 and Warfield, 1973); <https://www.lsu.edu/deafness/HearingRange.html>, 9 October 2020;
- British Standard Institute, 2014: BS 5228-1:2009+A1:2014, Code of practice for noise and vibration Control on construction and open sites, Part 1: Noise, 2014;
- Fay, RR.: Hearing in Vertebrates: A Psychophysics Data book. Hill-Fay Associates, 1988;
- Google Earth, base map imagery, March 2026;
- Meteorological data for the site/local area sourced from Meteoblue.com (nearest towns data – Hartenbos)
- International Finance Corporation (IFC), 2007: IFC Environmental, Health, and Safety (EHS) Guidelines for noise management;
- Provision for the control of noise is made under the National Environmental Management Act: Air Quality Act (Act No. 39 of 2004) (NEM: AQA);
- SANS 10103, 2008: The measurement and rating of environmental noise with respect to annoyance and to speech communication;
- SANS 10328, 2008: The SANS Method for environmental noise impact assessment;
- Noise-Induced Hearing Loss Regulations, 2013: Occupational Health and Safety (Act, Act 85 of 1993), March 2003.
- Occupational Health and Safety Act (Act No. 85 of 1993) (OHSAct) Noise-induced hearing loss regulations (NIHLR).
- The minimum criterion for reporting on noise impacts in terms of Sections 24(5)(a) and (h) of NEMA as per GG 43110, 20 March 2020, GNR 320;
- Typical noise levels generated by construction equipment, www.fhwa.dot.gov;
- Typical noise levels generated by the envisaged construction and operational equipment; after: www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm;
- United States Centers for Disease Control and Prevention (CDC), 2020: Loud Noise can cause hearing loss publication;
- Warfield, D.: The study of hearing in animals. In: W Gay, ed., Methods of Animal Experimentation, IV. Academic Press, 1973; and
- World Health Organization (WHO), 1999: Guidelines for Community Noise.

3.2 Baseline noise monitoring

3.2.1 Sensitive receptor selection

Noise impacts are typically experienced at relatively close proximity to the emitting source. Noise sensitive receptors are considered by SANS 10328:2008 to include residential dwellings, institutional and culturally important sites, such as schools, hospitals and places of worship. Noise sensitive receptors for this survey were identified and selected in alignment with the SANS 10328:2008 sensitive receptor definition.

3.2.2 Equipment used

A Rion NL53 Class 1 Sound Level Meter (SLM) was used to undertake the noise monitoring survey measurements. The microphone was encased within a windshield, to reduce the effect of wind passing over the diaphragm on the measured levels. The SLM was placed on a tripod at approximately human chest height as per standard requirements.

All instrumentation was certified by a SANAS accredited facility and was within its laboratory calibration date. An infield calibration check of the sound level meter was undertaken prior to the start and at the end of the noise sampling. No significant deviation in calibration was noted.

The Rion NL53 SLM used meets the accuracy requirements specified for a Class 1 instrument described in SANS 656 *Sound level meters*, SANS 658 *Integrating-averaging sound level meters* and SANS 61672-1 *Electroacoustics – Sound level meters – Part 1: Specifications*.

3.2.3 Measurements and duration

Daytime (06:00 to 22:00) and night-time (22:00 to 06:00) ambient baseline noise monitoring was undertaken in alignment with GN320 minimum noise reporting requirements for Environmental Authorisation (EA) purposes between the 27th to 29th January 2026 (i.e. over 2-days and 2-nights as per GN320 requirements) (Figure 3). Representative ten (10) minute noise samples were collected continuously to determine the ambient noise conditions in accordance with the SANS 10103 requirements. A copy of monitoring log sheets can be found in Appendix 1.

The sound level parameters recorded and their application in interpretation in this study included:

- L_{Aeq} - The equivalent continuous A-weighted decibel scale (dBA) sound level. The L_{Aeq} is an average of the recorded sound levels over the entire recording interval. The decibel scale is logarithmic and thus relatively high intensity, albeit short-duration sound episodes will have a significant impact on the L_{Aeq} . Legislated noise limits and guidelines that are administered are the L_{Aeq} levels since this closely replicates the sensitivity of human hearing.

The following sound level parameters were recorded and saved on the SLM data files for reference purposes (*if needed*) however, are not presented in this assessment:

- L_{Peak} – The highest instantaneous sound pressure level, in decibels, with no time weighting;
- L_{Amax} - The maximum sound pressure level of a noise event, normally measured on a weighted decibel scale (i.e. A-weighted dBA scale for this assessment). L_{Amax} is the loudest sound interval recorded, and provides an idea of the loudest instantaneous peak that occurred;
- L_{Amin} - This is the lowest instantaneous sound pressure level in decibels with a specified frequency and time weighting. The L_{Amin} shows the lowest levels recorded throughout the survey at each monitoring site.
- LA_{90} - This parameter indicates the sound levels the receiving environment is exposed to 90% of the time however it excludes the loudest events; and
- LA_{10} - This parameter indicates the sound levels that the receiving environment will be exposed to 10% of the time (i.e. includes the loudest events only).

Note: Some acoustic specialists will often use the LA_{90} or L_{Amin} to be more representative of the impact than the L_{Aeq} ; the latter being easily distorted by even a short duration interference (i.e. passing vehicle or a barking dog etc.).



Figure 3: Ambient baseline noise monitoring locations

3.2.4 Meteorological conditions

Approximate weather conditions (i.e. temperature and wind speed) were monitored during the noise monitoring via a Uni-T UT363 Mini Anemometer. The weather conditions during the monitoring can be found in Appendix 1.

In addition to the monitoring of the weather conditions during the noise survey, and to develop a better understanding of the typical local meteorological conditions which influence noise propagation around the site, ATB sources web accessible modelled wind roses relevant to the local area.

3.2.5 Contributing noise sources

To determine the constant and occasional contributing noise sources at each monitoring location, the noise monitor was accompanied by ATB's specialist noise consultant during each noise survey. The constant and occasional contributing noise sources at each monitoring location can be found in Appendix 1.

3.3 Baseline assessment

The assessment of ambient noise levels in the near vicinity of the proposed project included:

- A review of applicable noise policy, legislation and standards;
- Identification of sensitive receptors within a 10 km radius of the proposed development;
- Identification of local noise emission sources;
- The identification and discussion of the potential health effects associated with applicable noise emissions from the proposed project; and
- Integration of the baseline noise monitoring results to characterise local baseline noise levels.

3.4 Impact assessment

Sharples Environmental Services cc (SES), as the project Environmental Assessment Practitioner (EAP), provided all specialists with the impact assessment methodology and ranking scales for use in all specialist studies as presented below (*Note: Credit is ascribed to SES regarding the following text – with nominal modification*).

The objective of the noise impact assessment is to identify and assess all significant noise impacts that may arise from the proposed project. The process of assessing the potential impacts encompasses the following four key activities:

- Identification and assessment of potential noise impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant noise impacts;
- Identification of suitable noise mitigation measures that could be implemented to reduce the severity or significance of the impacts; and
- Evaluation of the significance of the residual impact after mitigation measures have been implemented.

In accordance with the EIA Regulations, 2014, the significance of potential noise impacts is assessed in terms of the following criteria:

- The **nature/status**, which shall include a description of what causes the effect, what will be affected and how it will be affected, which will be described as either *positive, negative or neutral*.
- The **extent**, wherein it will be indicated whether:
 - *Site specific*: On site or within 100 m of the site boundary, but not beyond the property boundaries (1);
 - *Local*: Impacted area includes the whole or a measurable portion of the site and property, but could affect the area surrounding the development, including the neighbouring properties and wider municipal area (2).
 - *Regional*: Impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties (3); or
 - *National*: Impact would affect the whole country (*if applicable*) (4).
- **Probability** of the impact occurring which describes the likelihood of the impact actually occurring:
 - *Improbable*: Possibility of the impact occurring is very low, due either to the circumstances, design or experience (1);
 - *Probable*: Possibility that the impact will occur to the extent that provisions must therefore be made (3); or
 - *Highly probable*: Most likely that the impacts will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences (4).
- The **duration** of the impact occurring:
 - *Temporary*: Impact limited to the construction phase (1);
 - *Short-term*: Impact will either disappear with mitigation or will be mitigated through a natural process in a period less than eight (8) months after the completion of the construction phase (2);
 - *Medium-term*: Impact will last up to the end of the construction phase, where after it will be entirely negated in a period shorter than three (3) years after the completion of construction activities (3);
 - *Long-term*: Impact will continue for the entire operational lifetime of the development but will be mitigated by direct human action or by natural processes thereafter (4); or
 - *Permanent*: This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied (5).
- The **consequence of significance (magnitude)**, wherein it will be indicated whether:
 - *Negligible*: Impact would result in negligible to no consequences (2);
 - *Low*: Impact would result in insignificant consequences (4);
 - *Medium*: Impact would result in minor consequences (6); or
 - *High*: Impact would result in significant consequences (8).
- The **significance**, shall be determined through a synthesis of the characteristics described above and can be assessed as *no significance, low, medium or high*;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources; and
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

$$S = (E+D+M)*P$$

- S = Significance weighting
- E = Extent
- M = Magnitude
- P = Probability
- D = Duration

The significance weightings for each potential impact are as follows:

- < 30 points: **Low** (i.e. Impact would not have a direct influence on the decision to develop in the area);
- 30-60 points: **Medium** (i.e. Impact could influence the decision to develop in the area unless it is effectively mitigated); or
- > 60 points: **High** (i.e. Impact must have an influence on the decision process to develop in the area).

3.5 Noise modelling

The aviation noise modelling for the operational phase of helipad was undertaken with the Aviation Environmental Design Tool (AEDT 3g) as prescribed by the SANS 10117 Code of Practice. The modelling results are used to calculate the approach and departure noise levels and impacts.

3.6 Mitigation and monitoring

Recommendations for control and/or mitigation measures were made in response to the identified noise impacts.

3.7 Assumptions and Limitations

3.7.1 Assumptions

The following is applicable:

- The proposed project infrastructure were extracted from information provided to ATB by the Applicant. The NIA has been undertaken against this provided project description. Changes in this description after assessment may influence the outcomes of the noise impacts.
- Hospital helipad aviation aspects:
 - Helipad site location: S34.098012° E22.116444°;
 - Helicopter type: Bell222 and/or Bell 430 helicopter types based on companies currently operating in the Western Cape Garden Route district;
 - Flight routes:
 - Routes are informed by prevailing seasonal wind patterns: easterly to south-easterly winds in summer and westerly to south-westerly winds in winter. During take-off and landing, helicopters are typically operated into the wind;
 - Where possible, flight paths should avoid overflying the planned neighbouring school and hostel;
 - Where possible, flight paths should avoid overflying nearby Hartland residential developments; and
 - Preferred routing should follow the N2 highway corridor.
 - Flight numbers: 2 flights landing and 2 flights departing per day (i.e. 4 flights per day in total); and
 - Operational 24-hours per day, seven (7) days a week.
- Stadia lights will not exceed ten (10) metres in height and will meet aviation specifications such that they don't interfere with aviation flight paths;
- The proposed project does not trigger any listed activities under the Mineral and Petroleum Resources Development Act (Act no. 28 of 2002) (MPRDA) which governs the acquisition, use and disposal of mineral rights in South Africa; and
- No blasting is required during the construction phase and thus the Mine Health and Safety Act (Act No. 29 of 1996) regarding the management and control of blasting, vibration and shock is not applicable.

3.7.2 Limitations

The following is applicable:

- The specialist assessment excludes quantitative modelling of the noise impacts for the following scenarios but includes the calculation of anticipated noise levels at various distances from the proposed infrastructure, aligned with the SANS methods 10328 (2008) and 10103 (2008):
 - Scenario 1: Typical operational noise emitted from the Hartland development (Excludes scenario 2 & 3 emissions contributions);
 - Scenario 2: Noise levels emitted from the Hartland development during sporting events including public address systems; and
 - Scenario 4: Cumulative Scenarios 1, 2 and 3
- Scenario 3: Medical aviation flights includes formal noise modelling for the operational phase with the AEDT 3g tool;
- The Applicant was not positioned to provide much information on the hospital helipad aviation aspects. Reliance was thus placed on a series of assumptions regarding hospital emergency helipad operations. These assumptions were derived from the aviation noise modellers experience on similar projects within South Africa. Changes in these assumed aviation aspects after assessment may influence the outcomes of the noise impacts; and
- No blasting is required during the construction phase and thus the assessment thereof are excluded.

4 NOISE TERMINOLOGY AND EFFECTS

4.1 Noise terminology

Note: The following text has been extracted from multiple literature sources and modified to form ATB's definition of noise terminology.

Noise is typically defined as any unwanted acoustic sound deemed as disruptive to hearing and/or communication, is loud and unpleasant, and thus poses a nuisance. The accepted range of human audible sound is typically from 0 dB to 140 dB and the frequency response of the ear is generally accepted as ranging of 20 Hz to 20000 Hz. The human ear does not respond equally across all frequencies. It is more sensitive in the mid-frequency range than in the low and high frequencies. To account for this variation in sensitivity, a weighting filter is applied during noise monitoring. The filter commonly applied is the 'A weighting' filter as this filter is an internationally accepted standard for noise measurements representing a human's subjective response to sound.

Regarding noise levels, a change in the noise level (i.e. increase and/or decrease) of approximately 1 dB(A) is not normally perceptible to most people (Note: may be under controlled laboratory conditions). An increase/decrease of approximately 3 dB(A) is normally just perceptible. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/decrease of approximately 10 dB(A) which corresponds to a doubling/halving in the perceived loudness.

Noise levels typically fluctuate according to the surrounding activities and are rarely steady. The relevant noise parameter to this assessment is the L_{Aeq} . The L_{Aeq} level is the equivalent continuous A-weighted sound pressure level, expressed in decibels. The L_{Aeq} level is a unit commonly used to describe construction and industrial plant noise and is the most suitable unit for the description of many forms of environmental noise.

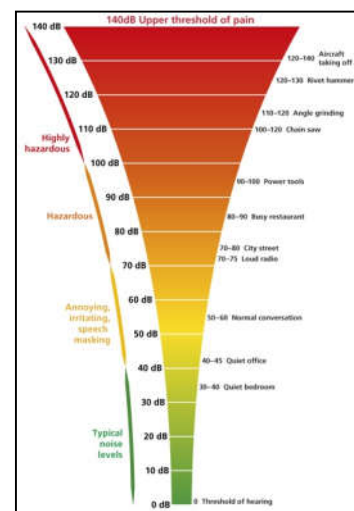


Figure 4: Typical sound levels (source: <https://boomspeaker.com/noise-level-chart-db-level-chart>, October 2020)

4.2 Effects of noise

Typical sound levels (dB(A)) are shown in Figure 4 for reference.

4.2.1 Impacts on humans

An increase in ambient noise levels of over 3 dB(A) will be noticeable to most people, although such an increase is unlikely to cause disturbance to leisure activities or sleep. An increase of 10 dB(A), however, is likely to cause disturbance or require people to modify their behaviour to avoid that disturbance, depending on the absolute level of noise.

The following health impacts are typically associated with noise impacts:

- Permanent noise-induced hearing loss (NIHL);
- Tinnitus, which is an auditory disorder characterised by the perception of a sound (i.e. ringing, chirping, buzzing, etc.) in the ear in the absence of an external sound source;
- Physiological responses such as: increase in blood pressure and hypertension, increase in frequency of headaches, increase the risk of myocardial infarction due to chronically elevating cortisol (stress hormone) production, effects on nervous system, liver, and other organs;
- Acute and chronic fatigue due to sleep disturbance;
- Reduction in cognitive processes associates with fatigue; and
- Psychological effects such as annoyance, increase in stress and psychiatric disorders, and general effects on psychosocial well-being leading to the reduction in the quality of life.

Permanent NIHL can be caused by an acute one-time exposure to an intense “impulse” sound (e.g. explosion/gunshot), or by chronic continuous exposure to loud sounds over an extended period of time (e.g. listening to excessively loud music repeatedly, industrial manufacturing noise etc.). With noise levels at or below 70 dB(A), NIHL is unlikely even with chronic exposure. According to the United States Centers for Disease Control and Prevention (CDC), acute exposure to 80 - 85 db(A) can lead to NIHL after approximately two hours exposure; 95 db(A) can lead to NIHL after approximately 50 minutes of exposure; 100 db(A) can lead to NIHL after approximately 15 minutes of exposure; 105 - 110 db(A) can lead to NIHL after approximately 5 minutes of exposure; greater than 110 db(A) can lead to NIHL after approximately 2 minutes of exposure; greater 120 db(A) can lead to NIHL after a few seconds of exposure with pain generation and ear injury.

4.2.2 Impacts on animals

The accepted range of animal audible sound is far greater than that audible to humans. Data from Fay (1988) and Warfield (1973) provide animal hearing ranges from the infrasound range (i.e. less than 20 Hz) to the ultrasound range (i.e. greater 200 000 Hz) (Table 1).

Table 1: Approximate hearing range of various animals (after Fay, 1988 and Warfield, 1973, <https://www.lsu.edu/deafness/HearingRange.html>, 9 October 2020)

Species	Approximate Range (Hz)	Species	Approximate Range (Hz)
Dog	67 - 45 000	Bat	2 000 - 110 000
Cat	45 - 64 000	Whales	1 000 - 123 000
Cattle	23 - 35 000	Elephant	16 - 12 000
Horse	55 - 33 500	Dolphin/porpoise	75 - 150 000
Sheep	100 - 30 000	Goldfish	20 - 3 000
Rabbit/hare	360 - 42 000	Catfish	50 - 4 000
Rat	200 - 76 000	Tuna	50 - 1 100
Mouse	1 000 - 91 000	Bullfrog	100 - 3 000
Gerbil	100 - 60 000	Tree frog	50 - 4 000
Hedgehog	250 - 45 000	Birds (species dependent)	125 - 12 000
Chicken	125 - 2 000		

The following impacts are typically associated with noise impacts on animals:

- Permanent NIHL;
- Physiological responses such as: stress induced urination, defecating, panting, drooling, trembling; cardiovascular impacts, increased stress hormone production, effects on nervous system, liver, and other organs;
- Acute and chronic fatigue due to sleep disturbance;
- Reduction in cognitive processes associated with fatigue which mainly include increased frequency of commands being disregarded by trained animals;
- Psychological effects such as annoyance, increase in stress and psychiatric disorders, and general effects on well-being leading to the reduction in the quality of life, increased aggression levels;
- Reduced physical endurance;
- Interference with breeding cycles;
- Changes in population densities and distributions as some animals may flee and migrate away from the noise source; and
- Eco-locating marine animal and bat communication can become disrupted.

4.2.3 Aviation related noise impacts on hospital patients

Noise and vibration associated with the operation of emergency medical transport helicopters at the Hartland hospital may cause disturbance to convalescing patients.

From available literature, there appears to be consensus that a maximum noise level (L_{Amax}) of around 45 dB is the lower limit to avoid any sleep disturbance for frequent noise events (James & Zoontjens, 2012). However, this L_{Amax} is often unachievable under typical hospital operating conditions. An L_{Amax} of around 65 dB for general hospital wards and sensitive spaces appears reasonable against the typical hospital operating conditions (James & Zoontjens, 2012). Critically sensitive areas in the hospitals (i.e. NICU / PICU / ICU) may potentially benefit from further acoustic controls and should be carefully considered on a case-by-case basis (James & Zoontjens, 2012).

5 LEGISLATION, STANDARDS AND GUIDELINES

5.1 The National Environmental Management Air Quality Act (Act No. 39 of 2004) (NEM:AQA)

Provision for the control of noise is made under the NEM:AQA. The act states:

(1) *“The Minister may prescribe essential national standards: -*

- a. For the control of noise, either in general or in my specified machinery or activities or in specified places or areas; or*
- b. For determining:*
 - i. A definition of noise; and*
 - ii. The maximum levels of noise.*

(2) *When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards”.*

Currently, noise standards under NEM:AQA have not been published however the South African National Standard (SANS) 10103 Code of Practice provides typical ambient noise rating levels ($L_{Req,T}$) in various districts and SANS 10103:2008 provided the measurement and rating of environmental noise with respect to annoyance and to speech communication.

5.2 International Standards and guidelines

The World Health Organization (WHO) in collaboration with the Organization for Economic Co-ordination and Development (OECD) developed ambient sound level guidelines based on the effects of exposure to environmental noise. The WHO recommends a standard guideline values for average outdoor noise levels of 55 dB(A) during the daytime and 45 dB(A) during the night-time to prevent significant interference with local communities' normal activities. The WHO further recommends that, during the night-time, the maximum level of any single event should not exceed 60 dB(A) to avoid sleep disruption. Specific ambient guidelines are also set for dwellings, bedrooms and schools. The above guideline levels are presented in Table 2. This daytime and night-time indoor noise level guideline may be applied to the Hartland Hospital however maybe unachievable under typical hospital operating conditions.

The WHO also specifies that an environmental noise impact assessment must be undertaken prior to implementing any project that would significantly increase the level of environmental noise in a community by more than 5 dB(A) (WHO, 1999).

The World Bank Group developed a program in pollution management to ensure that the projects they finance in developing countries are environmentally sound. This programme specifies that noise levels measured at the sensitive receptors located outside the project's boundary should not be 3 dB(A) greater than the background noise levels or exceed the noise levels depicted in Table 3.

Table 2: WHO Guidelines for ambient sound levels

Environment	Ambient sound level L_{Aeq} (dB(A))			
	Day time		Night-time	
	Indoor	Outdoor	Indoor	Outdoor
Dwellings	50	50	-	-
Bedrooms	-	-	30	45
Schools	35	55	-	-
Average outdoor	-	55	-	45
Maximum single event	-	-	60	-

The International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines for noise management (IFC, 2007) adopt the WHO Guidelines for Community Noise (WHO, 1999) presented in Table 3. Noise impacts should not exceed these levels or result in a maximum increase in background levels of 3 dB(A) at the nearest sensitive receptor located off-site.

Table 3: IFC Ambient Noise Guidelines

Receptor	Maximum allowable ambient noise levels (1-hour L_{Aeq} dB(A))	
	Day time (07:00 – 22:00)	Night-time (22:00 – 07:00)
Residential/institutional/educational	55	45
Industrial/commercial	70	70

Note: L_{Aeq} values are not specified for rural areas

5.3 South African National Standard (SANS)

SANS 10328:2008 provides a standardised method for evaluating environmental noise impacts associated with a proposed development/project. SANS 10328:2008 makes references to SANS 10103:2008: Code of Practice regarding the measurement and rating of environmental noise with respect to annoyance and to speech communication. SANS 10103 provides typical outdoor ambient and indoor noise rating levels ($L_{Req,T}$) for various districts (Table 4).

Under SANS, noise is considered a nuisance and/or intrusive at nearby sensitive receptors if the rating level of the ambient noise under investigation exceeds the applicable rating level of the residual noise (determined

in the absence of the specific noise under investigation), or the typical rating level for the ambient noise for the applicable environment given in Table 4 (i.e. Table 2 of SANS 10103).

Table 4: Typical Rating Levels for Ambient Noise

Type of district	Equivalent continuous rating level ($L_{Req,T}$) for noise (dB(A))					
	Outdoors			Indoors, with open windows		
	Day night $L_{R,dn}$	Day time $L_{Req,d}$	Nigh-time $L_{Req,n}$	Day night $L_{R,dn}$	Day time $L_{Req,d}$	Night-time $L_{Req,n}$
Rural districts	45	45	35	35	35	25
Suburban districts with little road traffic	50	50	40	40	40	30
Urban districts	55	55	45	45	45	35
Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40
Central business districts	65	65	55	55	55	45
Industrial districts	70	70	60	60	60	50

Notes:

- 1) If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result;
- 2) If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken, and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in Column 5 to 7;
- 3) In districts where outdoor $L_{R,dn}$ exceeds 55 dB, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor $L_{Req,T}$ values;
- 4) For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, $L_{Req,d} = L_{Req,n} = 70$ dB can be considered as typical and normal;
- 5) The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day;
- 6) The values given in columns 3, 4, 6 and 7 in this table are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise; and
- 7) The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as national parks, wilderness areas and bird sanctuaries should not exceed a maximum A-weighted sound pressure level of 50 dB(A) at a distance of 15 m from each individual source.
- 8) SANS daytime period 06:00 to 22:00 and night-time period 22:00 to 06:00.

SANS 10103 provides criteria, for the evaluation of the community and/or group response to a noise source (Table 5).

Table 5: SANS 10103 Categories of community or group response

Excess, $\Delta L_{Req,T}$ dB(A)	Category	Description
0 to 10	Little	Sporadic complaints
5 to 15	Medium	Widespread complaints
10 to 20	Strong	Threats of community or group action
>15	Very Strong	Vigorous community or group action

SANS 10103 provides three methods for determining the excess level ($\Delta L_{Req,T}$) of a development / proposed development:

- $\Delta L_{Req,T} = L_{Req,T}$ of ambient noise under investigation minus $L_{Req,T}$ of the residual noise (determined in the absence of the rated noise, i.e. the specific noise under investigation);

- $\Delta L_{Req,T} = L_{Req,T}$ of ambient noise under investigation minus the typical rating level for the applicable district as determined from Table 4 of SANS 10103:2008; or
- $\Delta L_{Req,T} =$ Expected increase in $L_{Req,T}$ of ambient noise in an area because of a proposed development under investigation.

5.4 Mossel Bay Municipality By-Law Relating to Public Nuisances

The management of noise within the Mossel Bay Municipality is regulated under the Public Nuisance By-laws as promulgated under Section 156(2) of the Constitution of the Republic of South Africa, 1996 and in accordance with Section 13(a) of the Local Government: Municipal Systems Act (Act No. 32 of 2000).

Noise nuisance is defined in the by-law as *“any sound which disturbs or impairs or may disturb or may impair the convenience or peace of any person”*.

Under Section 4, Behaviour and conduct: *“(1) No person shall:*

- a. *Cause or allow the disturbance of the ordinary comfort, convenience, peace or quiet of other people by the utilization or use of malfunctioning or defect electrical appliances, machinery, appliances or similar equipment;*
- c. *At any time during the day or night disturb the convenience, quietness or public peace in any public or private place or premises or a street by making unseemly noises or...*
- d. *In or upon any property or premises disturb the convenience, quietness or public peace in the neighbourhood of such premises by making therein or thereon or permit any singing or playing therein instruments, radios, television sets or the like or any loudspeaker or other device for the reproduction or amplification of sound, in such manner or at such a time or in such circumstances that the sound thereof is audible beyond the boundaries of such property or premises and materially interfere with the ordinary comfort, convenience, peace or quiet of other people;*
- i. *By an action directly or indirectly or by negligence allow that a nuisance be created or continued.”*

Under Section 18, Aircraft: *“(1) No person shall:*

- c. *Fly or operate an aircraft close to any property, person or group of persons (for example; at a sports field, road races, schools, social events, beaches, public spaces) in a manner which creates a nuisance.”*

The proposed project and emergency medical aviation flights will need to comply with these by-law requirements.

5.5 Minimum criteria for reporting on identified environmental themes

The minimum criteria for reporting on noise impacts in terms of Sections 24(5)(a) and (h) of NEMA as per GG 43110, 20 March 2020, GNR 320 are applicable. As per GNR 320, both daytime and night-time baseline noise monitoring was undertaken over a minimum two (2) days and two (2) nights. The baseline noise characterisation for the local area is based on the monitoring results as observed.

5.6 Environment Conservation Act (Act No. 73 of 1989): Noise Control Regulations, 1992 (GN R.154)

In terms of Section 25 of the Environment Conservation Act (Act No. 73 of 1989), National Noise Control Regulations (GN R. 154) were published in Government Gazette No. 13717 dated 10 January 1992. The National Noise Control Regulations were revised under GN R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. The National Noise Control Regulations will need to be considered in relation to the potential noise that may be generated during the project life cycle.

Section 4 of the Regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Regulations as “a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more”. Section 5 of the National Noise Control Regulations in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as “any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person”.

5.7 South African aviation noise standards

South African aviation noise standards are governed by the South African Civil Aviation Authority (SACAA) under the Civil Aviation Regulations (CARs) Part 36, which mandates noise certification for aircraft. Chapter 2 Phase-out, details noisy aircraft which are prohibited from operating in South Africa as of 1 January 2016. The South Africa aviation noise standards are aligned to international best practices and aim at noise reduction around airports and often use a 65 dBA threshold for noise management. All aircraft must hold a noise certificate of compliance with Part 36 regulations and SA-CATS 36, which covers environmental protection standards. In addition, pilots are expected to use noise abatement procedures during all aspects of the flights.

The South African aviation noise standards and guidelines are however specific to airports and aerodromes and are thus not directly applicable to the Hartland emergency helicopter landing pad however:

- Aircraft noise certification is mandatory under the CARs;
- Project should adopt the 65 dBA threshold for noise management regarding the Hartland emergency helicopter flights (*where possible*); and
- All pilots are expected to use noise abatement procedures during all aspects of the flights to and from the Hartland emergency helicopter landing pad.

In South Africa, two (2) National Standards pertain to the calculation of aircraft noise and determining the impact of aircraft noise. The SANS 10103:2008 (discussed above) covers the typical rating levels for noise in districts, and SANS 10117:2025 describes the calculation of aircraft and helicopter noise.

5.8 Proposed standards regarding baseline noise monitoring and assessment

Assessment of the noise levels could be benchmarked against either the IFC/WHO requirements and/or SANS, however as the project is within South Africa and international benchmarking is not required, it is proposed that the SANS standards are selected for compliance evaluation (Table 6). The proposed project is located within a “rural” area outside of Hartenbos however, the R102 and N2 highway are located immediately to the south east of the site and carry relatively high volumes of traffic, including heavy vehicles which elevate the ambient noise levels within the local area. The “Suburban district” allowable ambient noise level has been selected as the proposed standard for assessment of the noise levels at the nearby sensitive receptors (i.e. SR monitoring sites). SANS 10117:2025 will be used to describe and calculate the anticipated helicopter noise levels.

Table 6: Proposed allowable ambient noise levels (from SANS 10103)

Environment	Applicable	Day-night ($L_{R,dn}$)	Day time ($L_{Req,d}$)	Night-time ($L_{Req,n}$)
Suburban districts with little road traffic	SR monitoring sites	50	50	40

Note: SANS daytime period 06:00 to 22:00 and night-time period 22:00 to 06:00.

6 BASELINE NOISE ASSESSMENT

Noise impacts are typically experienced at relatively close proximity to the emitting source. The noise sensitive receptors are considered by SANS 10328:2008 to include residential dwellings, institutional and culturally important sites, such as schools, hospitals and places of worship.

6.1 Existing noise sources

Existing noise sources influencing the local noise baseline in close proximity (i.e. within 5 km) of the project footprint were identified (Figure 5).

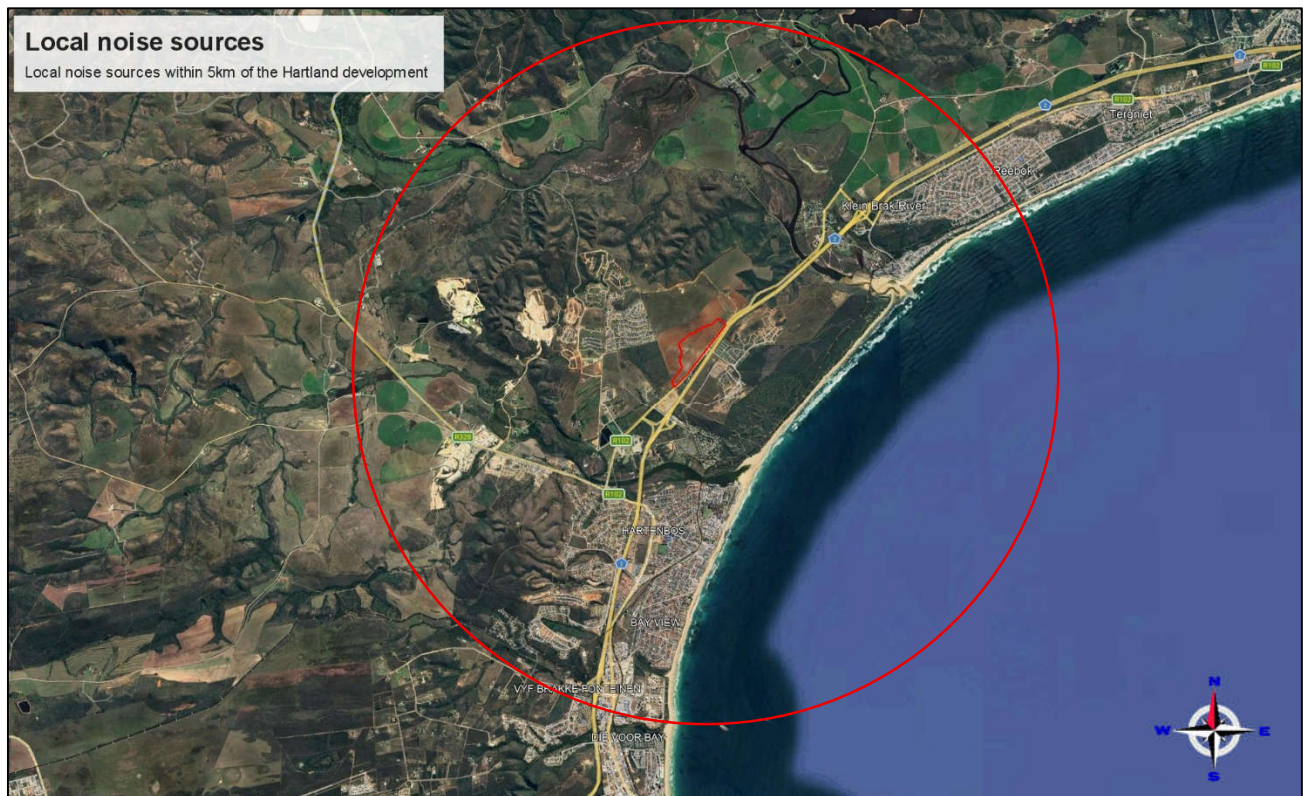


Figure 5: Local noise sources within an approximate 5km radius of the proposed Hartland development (Map Source: Google Earth, March 2026).

6.1.1 Road infrastructure

The main roads influencing the local noise baseline in close proximity (i.e. within 5 km) of the proposed development (Figure 5):

- National route 2 (N2): Aligned south-west to north-east direction approximately 60-120m south-east of the project footprint linking the regional towns of Mossel Bay to George;
- Regional road R102: Aligned south-west to north-east direction, directly adjacent to the project footprint;
- Regional road R328: Aligned east-south-east to north-west direction approximately 1.9km south-south-east to the project footprint; and
- An extensive network of secondary unnamed roads and/or gravel access roads to the individual farms surround the project footprint.

6.1.2 Commercial agriculture

Noise associated with commercial agriculture including cattle and sheep farming (predominant) will contribute to the baseline noise levels locally.

6.1.3 Natural environmental noise

Natural environmental noise is also identified as a contribution source to the baseline noise levels including the following:

- Noise generated by local fauna during the day and night-time (i.e. bird calls and other animal communications); and
- Wind whistling through the local flora including grass and/or rustling of tree and shrub leaves etc.

6.1.4 Recreational activities

Noise associated with local recreational activities (i.e. hunting, off road 4x4 driving etc) may also contribute to the baseline noise levels although the contribution is likely to be highly sporadic and dispersed throughout the local area.

6.1.5 Residential noise

The residential areas influencing the local noise baseline in close proximity (i.e. within 5 km) of the proposed development (Figure 5):

- The existing Hartland Phase 1 development located approximately 200m south-east of the project footprint. The Hartland Phase 1 development is still under construction and thus additional construction noise is applicable from this source;
- The Fairview farmyard small holdings, located approximately 280m south-west of the project footprint;
- The Monte Christo residential development located approximately 350m west-north-west of the project footprint;
- The Hartenbos Landgoed residential development located approximately 820m south-east of the project footprint;
- The town of Hartenbos and surrounding suburbs located approximately 1.5km south of the project footprint;
- The Outeniquasbosch wildlife village residential development located approximately 1.2km west-north-west of the project footprint;
- The residential area of Klein Brakrivier and surrounding residential developments located approximately 2km north-east of the project footprint;
- The residential area of Fraai Uitsig located approximately 3.7km north-east of the project footprint; and
- The residential area of Reebok located approximately 5km north-east of the project footprint.

Domestic noise from these residential areas is anticipated to contribute to the baseline noise levels although the contribution is likely to be sporadic and dispersed throughout the local area.

6.1.6 Mining and brick making activities

There are several aggregate mining and brick making operations influencing the local noise baseline in close proximity (i.e. within 5 km) of the proposed development (Figure 5):

- Aggregate mining operation approximately 1.9km west-north-west of the of the project footprint;
- Mobicast aggregate mining and brick manufacturing operation approximately 3.2km west-north-west of the of the project footprint;
- Transand aggregate mining and brick manufacturing operation approximately 2.9km west-south-west of the of the project footprint; and

- Henra aggregate mining and brick manufacturing operation approximately 3.5km west-south-west of the of the project footprint.

6.1.7 Aviation traffic

High altitude aviation traffic was observed once or twice per day above the proposed development and contributes to the noise baseline although the contribution is nominal and highly sporadic.

6.1.8 Wastewater treatment

The Mossel Bay Wastewater Treatment Plant is located approximately 780m west-south-west of the proposed development and is influencing the local noise baseline in close proximity of the proposed development.

6.1.9 Industrial noise

Industrial noise from the Die Voor Bay industrial area contributes to the noise baseline although the contribution is nominal and highly sporadic as the industries are located approximately 5km from the proposed development.

6.1.10 Rail infrastructure

National railway infrastructure within the local area contributes to the noise baseline in close proximity (i.e. within 5 km) of the proposed development (Figure 5):

- Railway line running south-west to north-east approximately 1.5km south-east of the of the project footprint;
- The railway shunting yard located adjacent to the Bay View residential area located approximately 3.5km south of the of the project footprint; and
- Railway line running south-west to north-east approximately 1.5km south-east of the of the project footprint; and
- Railway line running east to west approximately 4.2km south of the of the project footprint linking Bay View to Mossdustra.

6.2 Local aspects of acoustical significance

6.2.1 Terrain

Topography within the project area is relatively “uncomplex” with only minor elevation changes within the development area and nearby surrounds (Figure 6). As the topography is “uncomplex”, noise generated onsite is anticipated to radiate outwards in a relatively simple manner. The topography may influence the transmission of the noise to the sensitive receptors.

6.2.2 Vegetation

The Hartenbos region is renowned for its vegetation diversity, influenced by its coastal location, varied topography, and distinct climatic conditions. The vegetation surrounding the proposed project footprint is dominated by grazing lands, cultivated agricultural land and natural low-growing shrubs, grasses and geophytes. The vegetation is thus anticipated to provide very limited noise attenuation.

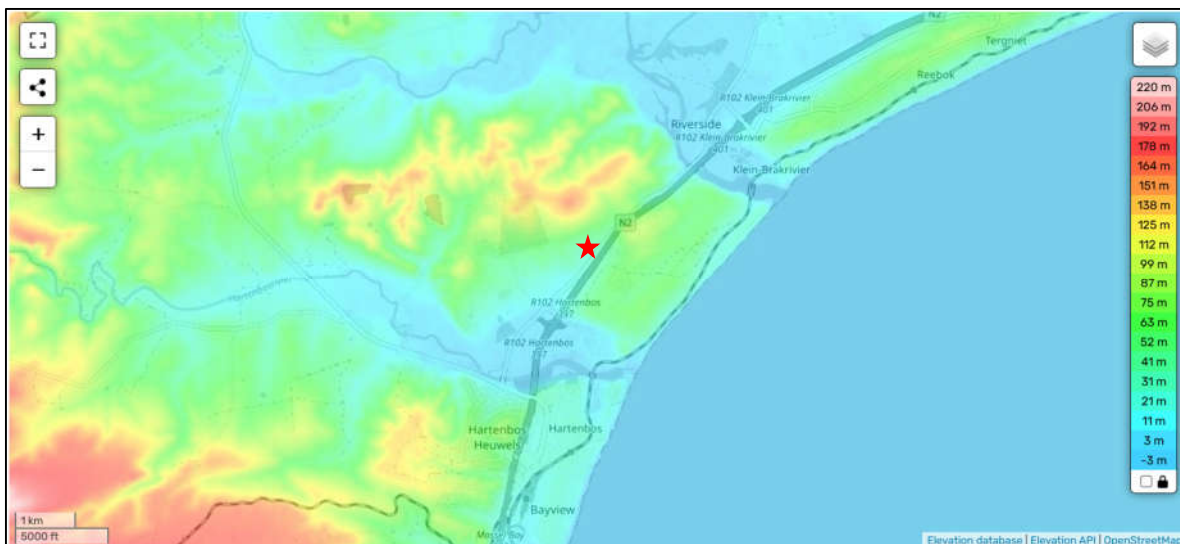


Figure 6: Topography of the area surrounding the proposed development (Red star) (<https://en-za.topographic-map.com/map-sk12f3/Hartenbos/?center=-34.10376%2C22.11737, 11/03/2026>)

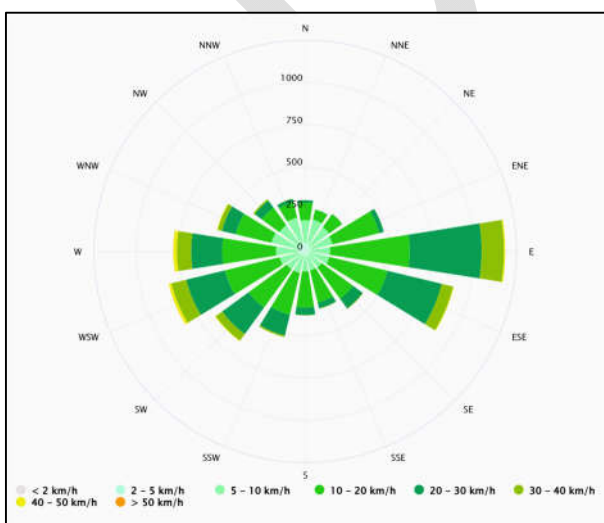
6.2.3 Meteorological Aspects

The main meteorological aspect that will affect the transmission (propagation) of the noise is wind and atmospheric temperature. Wind can either result in the periodic enhancement of noise levels at downwind sensitive receptors or a reduction at upwind sensitive receptors in relation to the noise source locations.

No meteorological monitoring is undertaken at the proposed project footprint and/or within the local area. Reliance was therefore placed on available modelled meteorological data from www.meteoblue.com for the town of Hartenbos located approximately 2 km south-west of the proposed development. As the topography is “uncomplex” with only minor elevation changes between Hartenbos and the proposed development, the predominant wind directions and other meteorological parameters are anticipated to be similar in the proposed development footprint to those experienced in Hartenbos. The data is presented for reference purposes only as formal verification of the modelled data is not possible as the full data source and data recovery levels are unknown.

6.2.3.1 Wind rose

Winds at Hartenbos are predominantly from the north-westerly to south-south-westerly sector and to a lesser degree from the east-north-easterly to east-north-easterly sector (Figure 7). Wind speeds are generally moderate.



Note: convert km/h to m/s by dividing by 3.6.

Figure 7: Modelled wind rose for Hartenbos (Meteoblue, 2026)

6.2.3.2 Atmospheric temperature

Atmospheric temperature has a significant effect on the propagation character of an area. The propagation of a sound wave is faster in warm air than in cold air and thus when a sound wave propagates in air whose temperature varies with altitude, refraction occurs. Sound waves refract towards areas of lower temperature. At night, the air near the surface is cooler and sound waves are refracted towards the ground with the sinking air mass. During the day, the sun radiation heats the surface of the ground which heats the air in contact with the surface. The air near the surface is heated more than the air above which results in the sound waves being refracted upwards along with the rising air mass. For this reason, colder atmospheric temperatures typically increase noise levels at a distance from a source hence why noise carries further at night than compared to the day. Thermal inversions typically increase noise levels at a distance from the source as the noise reflects off the inversion layer and is directed back towards the ground with little to no attenuation.

Average hourly temperatures within Brandvlei typically range between approximately 34°C during the summer months to 10°C during the winter months and are anticipated to be relatively representative of temperatures experienced within the project footprint (Figure 8).

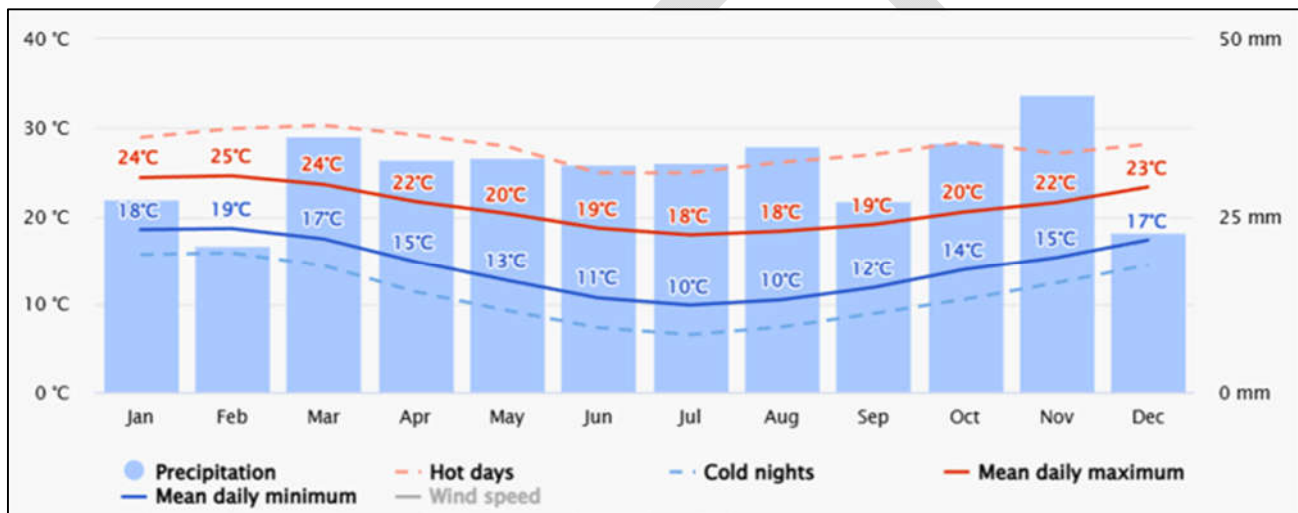


Figure 8: Modelled meteorological data for Hartenbos (Meteoblu, 2026)

7 SENSITIVE RECEPTORS

Seventeen (17) sensitive receptors (SR) are within a within an approximate 3km radius of the proposed development boundary were identified (Table 7 and Figure 9). These receptors are thus considered as the sensitive receptors for this assessment.

Note: Additional sensitive receptors along the emergency helicopter flight paths may also be encountered however their sensitivity is dependent on various aviation aspects.

Table 7: Sensitive Receptors (SR) within a 3 km radius of the proposed development and

Sensitive receptors	Description	Lat (south)	Long (east)
SR1	Monte Christo residential development 350m WNW	34° 5'52.64"S	22° 6'28.85"E
SR2	Fairview farmyard small holdings 280m SW	34° 6'22.25"S	22° 6'32.27"E
SR3	Outeniquasbosch wildlife village residential development 1.2km WNW	34° 5'59.21"S	22° 5'57.71"E
SR4	Hartland Phase 1 200m SE	34° 5'58.06"S	22° 7'9.58"E
SR5	Hartenbos Landgoed residential development 820m SE	34° 6'38.10"S	22° 6'57.20"E
SR6	Town of Hartenbos and surrounding suburbs 1.5km S	34° 7'5.20"S	22° 6'51.54"E
SR7	Farm house 1.6km NE	34° 5'7.35"S	22° 7'51.73"E
SR8	Residential area outside Klein Brakrivier 2.1km NE	34° 5'9.19"S	22° 8'19.92"E
SR9	Residential area at Klein Brak beach 2.3km ENE	34° 5'20.85"S	22° 8'38.95"E
SR10	Town of Hartenbos and surrounding suburbs 1.8km NE	34° 5'1.34"S	22° 7'54.75"E
SR11	Residential area Klein Brakrivier 2.8km NE	34° 4'56.87"S	22° 8'43.88"E
SR12	Farm residences 2.45km N	34° 4'26.53"S	22° 6'50.30"E
SR13	Hartland Phase 1 400m SE	34° 6'12.47"S	22° 7'10.78"E
SR14	Farm residences 1.55km WSW	34° 6'36.82"S	22° 5'46.20"E
SR15	Klenigeluk multi-function venue 2.5km W	34° 6'25.71"S	22° 5'8.44"E
SR16	Hartenbos surrounding suburb 1.85km SW	34° 7'8.61"S	34° 7'8.61"S
SR17	Sonskynvallei residential area 2.35km WSW	34° 6'57.91"S	22° 5'23.35"E

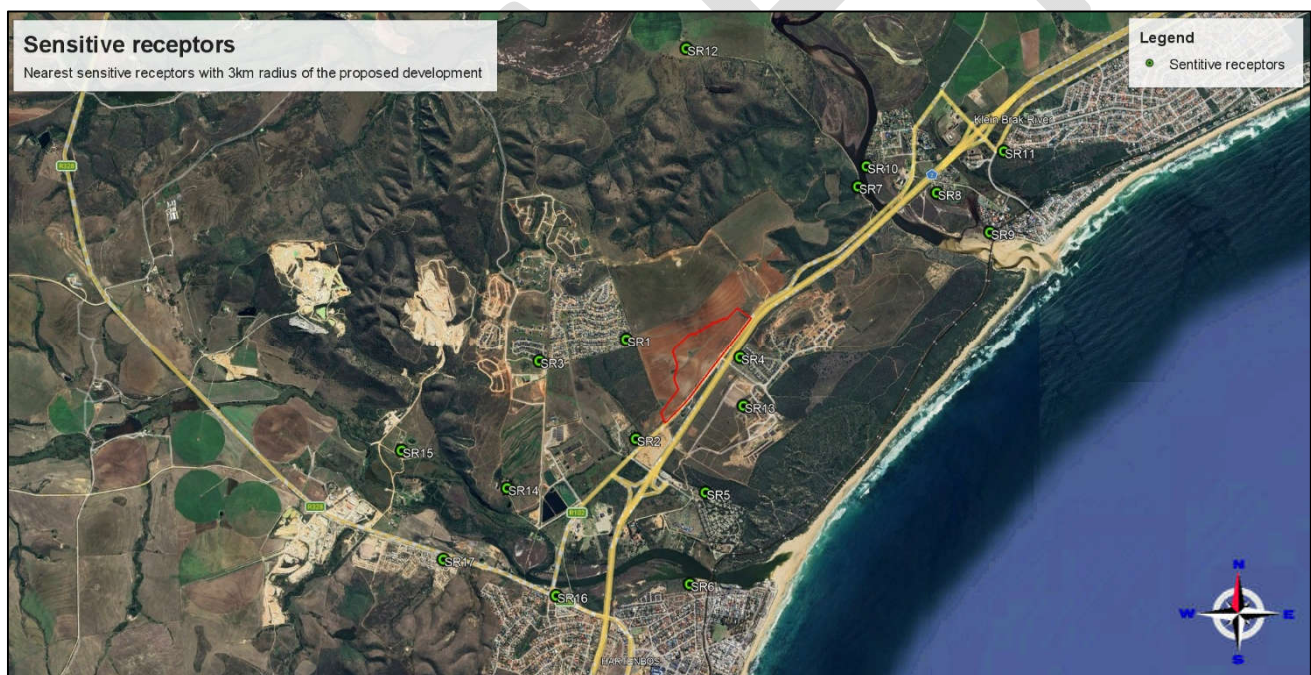


Figure 9: Sensitive Receptor (SR) map (Map sources: Google Earth, March 2026)

8 BASELINE NOISE SURVEY

In the absence of available baseline noise monitoring data for the local area, ATB undertook a baseline noise survey in the vicinity of the proposed project.

8.1 Monitoring methodology

The monitoring was conducted in alignment with South African National Standard (SANS) 10103:2018 and as per GN320 regarding the minimum noise reporting requirements for Environmental Authorisation (EA) purposes.

8.1.1 Equipment

The following information regarding the equipment used is applicable:

- Rion NL-53 SLM (SN#: 00251790), last calibration 10 April 2025 (Next calibration April 2027);
- The Rion NL-53 meets the accuracy requirements specified for a Class 1 instrument described in SANS 656 Sound level meters, SANS 658 Integrating-averaging sound level meters and SANS 61672-1 Electroacoustics – Sound level meters – Part 1: Specifications;
- Rion NC-75 Acoustic calibrator (SN#: 35046099), last calibration 16 October 2025 (Next calibration October 2026);
- Rion NL-53 and Rion NC-75 were certified by a suitably accredited facility and was within the respective laboratory calibration date (Note: Calibration certificates provided in the appendix);
- SLM microphone was encased within a windshield, to reduce the effect of wind passing over the diaphragm on the measured levels and the SLM was placed on a secure tripod with the microphone at the appropriate height;
- A field calibration check of the SLM was undertaken prior to the start of noise sampling and at the end of the noise sampling. No significant deviation in calibration was noted (93.8 dBA at start, gain adjusted to 94.0 dBA and 94.0 dBA at end observed);
- ATB stored record file name for the project – 0005;
- Frequency weighted, A-Time weighted, L_{Aeq} , L_{peak} , L_{90} , and, L_{10} recorded on the log sheets (Note: The Rion N-53 was set to record a variety of frequency weighted and averaged data periods. For reporting purposes ATB is only reports on the L_{Aeq}); and
- A Uni-T UT360 mini anemometer was used to provide the approximate wind speeds and temperature during the sampling period. Other meteorological conditions were recorded based on visual observations.

8.1.2 Duration

The baseline monitoring was conducted at ten (10) locations between the 27th to 29th January 2026. Two (2) daytime (06:00 to 22:00) and two (2) night-time (22:00 to 06:00) surveys were conducted at different times to meet the GN320 minimum noise reporting requirements for Environmental Authorisation (EA) purposes. The monitoring locations were selected to obtain a suitable baseline data set considering the various sensitive receptor types. In the absence of sensitive receptors in some areas, local area samples were collected to be representative of the general baseline throughout the proposed project area. The monitoring was undertaken in alignment with the South African National Standard (SANS) 10103:2018 and each noise measurement duration was no less than 10-minutes as a minimum to be representative of the ambient noise conditions. A copy of monitoring log sheets can be found in Appendix 1 and photographs of the monitoring locations in Appendix 2.

8.1.3 Noise monitoring assumptions, limitations and exclusions

The following noise monitoring assumptions, limitations and exclusions apply:

- It is assumed the four (4) survey periods are representative of normal baseline daytime and night-time noise conditions typically experienced throughout the local area and at the proposed Hartland project footprint; and
- Noise measurement duration of 10-minutes per site is representative of the ambient noise conditions.

8.2 Survey results

8.2.1 Meteorological conditions

Weather conditions during each survey were noted and recorded in the log-sheets (Appendix 1)

8.2.2 Contributing noise sources

Contributing noise sources during each survey were noted and recorded in the log-sheets (Appendix 1). A summary of the contributing noise sources noted during the monitoring is summarised in Table 8.

Table 8: Summary of key contributing noise sources noted during the monitoring surveys

Daytime	Night-time
<p>Continuous / Frequent:</p> <ul style="list-style-type: none"> • N2 traffic; • Wind in trees, plants, bushes and grass; • Birds and insects; • R102 traffic; • R102 road construction activities; • Hartland construction traffic & reverse beepers; • Construction noise from the nearby mall; and • Hartland construction noise. <p>Occasional:</p> <ul style="list-style-type: none"> • Heartland domestic residential noise; • Birds and insects; • N2 traffic & loud truck air brakes; • R102 traffic; • R102 road construction activities; • R102/N2 feeder road traffic; • Dogs barking; • Construction noise from the nearby Mall; • Hartland construction traffic & reverse beepers; • Cows mooing, grazing and walking in the fields; • Loud bird calls; • Aeroplane in distance; • People talking and yelling; • Heartland security gate activities; • Farm traffic; and • Traffic – hooting. 	<p>Continuous / Frequent:</p> <ul style="list-style-type: none"> • Night birds and insects; • N2 traffic; • Soft distant traffic hum (Hartenbos side); • Pump from waste-water treatment works (WWTW); and • Wind in trees, plants, bushes and grass. <p>Occasional:</p> <ul style="list-style-type: none"> • N2 traffic (faint hum); • People talking; • Frogs (limited to a few sites); • Rooster crowing; • Dogs barking; • Pump from waste-water treatment works (WWTW); • Cows mooing, grazing and walking in the fields; • Soft distant traffic hum (Hartenbos side); • R102 traffic (70% of time); • Loud night bird calls; • Light drizzle noise; • Hartland traffic; • Heartland security gate activities; and • Heartland domestic residential noise.

8.2.3 Data interferences

Wind speed and direction play a role in determining baseline noise levels. Noise monitoring is usually discouraged when wind speed exceeds 5 m/s (18 km/h) as the monitor's wind shield is typically effective at mitigating wind noise at wind speeds under 5 m/s. At wind speeds greater than 5 m/s, the efficiency of the wind shield is reduced and wind noise may distort the baseline noise levels while the contributions from some noise sources are masked.

Wind speed meteorological conditions during the daytime and night-time noise surveys over the two (2) days were noted as being ideal for noise monitoring as average wind speeds were typically below 5 m/s and thus little wind interference noise is anticipated.

8.2.4 Results

Table 9 below presents a summary of the monitoring results:

- L_{Aeq} baseline daytime noise levels at H1, H3, H4, H6, H7, and H9 exceeded the "Suburban" standard on both survey days. The exceedances may be attributed to elevated baseline environmental noise levels associated with R102 and N2 highway traffic as well as the numerous construction activities in near proximity the project footprint (i.e. Hartland Phase 1, New mall development, R102 road upgrades etc)

- L_{Aeq} baseline daytime noise levels at H2 and H10 exceeded the “Suburban” standard on one of the survey days each. The exceedances may be attributed to elevated baseline environmental noise levels associated with R102 and N2 highway traffic as well as the numerous construction activities in near proximity the project footprint (i.e. Hartland Phase 1, New mall development, R102 road upgrades etc);
- L_{Aeq} baseline daytime noise levels at H5 and H8 were within the “Suburban” standard on both survey days;
- L_{Aeq} baseline night-time noise levels at all “Suburban” monitoring locations exceeded the “Suburban” standard. The exceedances may be attributed to elevated baseline environmental noise levels associated with N2 highway traffic and occasional R102 traffic; and
- Observed L_{Aeq} baseline daytime and night-time noise levels exceeded the range typically expected for “Suburban” districts.

Table 9: Summary of noise survey results, L_{Aeq}, 10 mins dBA

Site	Description	Location		SANS district class.	Standard for compliance (dB)		Day		Night	
		Lat.	Long.		Day	Night	27/01/2026	27-28/08/2025	28/01/2026	28-29/01/2026
							Decibel (dB)			
H1	Hartland Villas	34°5'57.97212'S	22° 7'8.975064"E	Sub-urban	50	40	57.0	60.0	48.5	54.6
H2	Fairview farm area - Fairview farm road	34°6'25.66188"S	22°6'26.66985"E	Sub-urban	50	40	49.3	60.8	46.2	44.3
H3	H3	34°06' 16.59"S	22° 06'41.78"E	Sub-urban	50	40	56.5	55.6	46.6	46.1
H4	H4	34°06'02.69"S	22° 06'44.05"E	Sub-urban	50	40	56.5	55.2	47.4	46.1
H5	By houses	34° 5' 54.19"S	22° 06' 32.03"E	Sub-urban	50	40	47.4	47.0	44.1	47.2
H6	H6	34° 6' 6.53976"S	22° 06' 32.03"E	Sub-urban	50	40	55.2	51.5	49.8	42.4
H7	Borrow Pit	34° 5' 43.54"S	22° 07' 08.87"E	Sub-urban	50	40	55.5	53.3	44.5	45.2
H8	By power pole and CCTV Camera	34° 5' 44.07612"S	22° 07' 26.16"E	Sub-urban	50	40	49.2	49.6	41	40.9
H9	H9	34° 5' 58.09"S	22° 07' 1.98"E	Sub-urban	50	40	55.7	59.5	50	48.9
H10	North of H10 access gate to Hartland	34° 6' 26.784"S	22° 06' 49.33183"E	Sub-urban	50	40	49.3	61.2	48.1	42.5
Daily average per survey							53.2	55.4	46.6	45.8
Total survey average							54.3		46.2	
Notes:	Red text indicates exceedance of the rural standards Refer to Appendix 1 for the detailed log sheets and monitoring data and Appendix 3 for the noise monitor calibration documentation.									

9 IMPACT ASSESSMENT – QUALITATIVE OPINION

9.1 Construction phase

The full details of the construction plans regarding the proposed Hartland development have yet to be finalised. To provide a sound basis for the analysis of anticipated noise impacts, data related to typical construction activities has been sourced from various consultants and contractors, British Standard BS 5228 and the experience that ATB Environmental Consulting has working on similar projects.

Daily construction related traffic will vary over the duration of the construction period. The main percentage of the trips will be concentrated in the morning and late afternoon peak periods when construction material deliveries are made. All construction activities will be limited to the daytime hours (i.e. 06:00 to 18:00). It is estimated that the proposed construction phase will be approximately 24 months.

By comparing the calculated noise levels at the sensitive receptors against the SANS 10103 criteria for evaluating the community or group response to a noise source (i.e. against the respective district standards) (Table 4), the anticipated future construction noise impacts can be qualitatively assessed at a high level regarding nuisance effects and thus used to infer the anticipated level of impact at the sensitive receptors.

9.1.1 Sources of construction noise

The following are anticipated to be the key noise sources related to the construction activities which may impact on nearby sensitive receptors:

- General earthworks equipment including scrapers, dozers, compactors, water tankers and cranes associated with project footprint preparations;
- Road construction equipment including scrapers, dozers, compactors, water tankers associated with the creation of the temporary access roads to the pits and stockpile areas;
- Earthworks to strip topsoil and preparation of infrastructure foundations
- Earthworks associated with the installation of service infrastructure (i.e. water, sewerage, telecommunications etc.);
- Concrete works including: Erection of shuttering; Fixing of steel reinforcing; Placing and vibration (i.e. with poker vibrators) of concrete; and stripping of shuttering after concrete pouring.
- Crane lifting operations and erection of infrastructure;
- Finishing operations on temporary building structures (i.e. park homes) and services installations etc.;
- General movement of heavy vehicles on site;
- Construction material and equipment delivery vehicles; and
- The level and character of construction noise experienced at the nearby sensitive receptors will be highly variable as different activities with different plant/equipment will take place at different times, over different periods, in different combinations, in different sequences on the construction site. Typical noise levels generated by various types of construction equipment at difference distances is provided in Table 10 for reference purposes.

Table 10: Typical noise levels generated by the envisaged construction equipment (After: www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm)

Equipment Description	Actual Measured dB L _{max} @ ±15.24 m	Equipment Description	Actual Measured dB L _{max} @ ±15.24 m
All Other Equipment > 5 HP	85	Hydra Break Ram	90
Air Compressor	81	Impact Pile Driver	101
Auger Drill Rig	84	Impact Wrench	85
Backhoe	83	Jackhammer	89
Bar Bender	80	Loader	85
Blasting	94	Man Lift	75
Chain Saw	84	Mounted Impact Hammer (hoe ram)	90
Clam Shovel (dropping)	87	Pavement Scarifier	90
Compactor (ground)	83	Paver	89
Compressor (air)	79	Pickup Truck	75
Compactor	82	Pneumatic Tools	85
Concrete Mixer	85	Pumps	81
Concrete Pump	82	Pile Driver (Impact)	101
Concrete Vibrator	76	Pile Driver (Sonic)	96
Concrete Batch Plant	83	Pneumatic Tool	85
Concrete Mixer Truck	79	Rail Saw	90
Concrete Pump Truck	81	Rivit Buster/Chipping Gun	79
Concrete Saw	90	Rock Drill	81
Crane Mobile	79	Roller	80
Dozer	85	Sand Blasting (single nozzle)	96
Drill Rig Truck	79	Scraper	84
Drum Mixer	80	Sheers (on backhoe)	96
Dump Truck	76	Saw	76
Excavator	81	Scarifier	83
Flat Bed Truck	74	Scraper	89
Front End Loader	79	Shovel	82
Generator	81	Truck	88
Generator (<25KVA, VMS Signs)	73	Vacuum Street Sweeper	82
Grader	85	Vibratory Concrete Mixer	80

Gradall	83	Vibratory Pile Driver	101
Grapple (on backhoe)	87	Warning Horn	83
Horizontal Boring Hydraulic Jack	82	Welder/Torch	74
L_{Amax} (dBA)			84

9.1.2 Construction noise impacts

The envisioned construction machinery for this assessment was based on that typically used at residential and office park type infrastructure projects and refinement of those deemed most likely to be included from ATB Environmental Consulting's experience. Based on the typical noise levels generated by the envisioned construction machinery and ATB Environmental Consulting's experience, a one-hour equivalent noise level of between 70 dB(A) to 110 dB(A) may be anticipated within the construction area adjacent to the specific noise sources (*Note: Likely to be in the order of approximately 75 dB(A)*). Based on the envisioned construction machinery, an estimated noise generation level of 84.0 dB(A) (@ ±15.24 m) was calculated (Based on L_{max} data) and has therefore been assumed as the uniform boundary one-hour equivalent noise level for the purpose of assessing the anticipated construction phase impacts (*Note: L_{max} captures the maximum sound pressure level of a noise event, versus L_{Aeq} which represents the equivalent continuous sound level. L_{max} is always higher than the L_{Aeq}. Use of the L_{max} is thus considered the "worst case" scenario regarding the envisioned construction activity noise levels at the project boundary*).

By comparing an average of the envisioned constructions equipment's typical construction noise levels at a given offset with the expected/measured baseline noise levels at the sensitive receptors, and against the SANS 10103 criteria for evaluating the community or group response to a noise source (Table 5), the noise impacts can be qualitatively assessed at a high level regarding nuisance effects and thus used to infer the anticipated level of impact at the sensitive receptors.

The construction noise impacts during the daytime are anticipated to be limited to within an approximate 800m radius of the noise source and construction areas (Table 11). Sub-urban receptor SR4 is highly likely to be significantly impacted by construction noise. A *very strong* community response is expected and the environmental consequence of the impacts are anticipated to be *medium* detrimental (Table 12). With the implementation of typical construction noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *medium* detrimental but with a reduced impact (Table 12).

Sub-urban receptors SR1 and SR2 are likely to be impacted by construction noise. A strong community response is expected and the environmental consequence of the impacts are anticipated to be *medium* detrimental (Table 12). With the implementation of typical construction noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *medium* detrimental but with a reduced impact (Table 12).

Sub-urban receptor SR13 is likely to be impacted by construction noise. A *medium* community response is expected and the environmental consequence of the impacts are anticipated to be *medium* detrimental (Table 12). With the implementation of typical construction noise mitigation measures, the residual risk of the noise impacts is anticipated to reduce to *low* detrimental impact (Table 12).

Sub-urban receptors SR3, SR5 to SR 12, and SR 14 to SR 17 might be impacted by construction noise. A little / negligible community response is expected and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 12). With the implementation of typical construction noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 12).

The cumulative daytime construction noise impacts of the proposed project in addition to the local noise sources and existing elevated baseline noise levels throughout the wider local area is anticipated to be *medium* detrimental pre-mitigation and *low* detrimental post mitigation at the nearby sensitive receptors (Table 12).

Table 11: Assessment of construction nuisance level during the day

Plant/Equipment	Noise Level (dBA) during the daytime										
	100m	SR4	SR2	SR1	SR13	500m	750m	SR5	SR3	SR6	SR14
Distance to Hartland boundary (m)	100	200	280	350	400	500	750	820	1200	1500	1550
L _{Aeq} calculated noise level	67.7	61.7	58.8	56.8	55.7	53.7	50.2	49.4	46.1	44.2	43.9
Standard value	50	50	50	50	50	50	50	50	50	50	50
Excess, ΔLReq,T dB(A)	18	12	9	7	6	4	0	-1	-4	-6	-6
Community response	Very strong	Very strong	Strong	Strong	Medium	Little	Little	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Plant/Equipment	Noise Level (dBA) during the daytime										
	SR7	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11	3000m	3500m
Distance to Hartland boundary (m)	1600	1800	1850	2100	2300	2350	2450	2500	2800	3000	3500
L _{Aeq} calculated noise level	43.6	42.6	42.2	41.3	40.5	40.3	39.9	39.7	38.8	38.2	36.8
Standard value	50	50	50	50	50	50	50	50	50	50	50
Excess, ΔLReq,T dB(A)	-6	-7	-8	-9	-10	-10	-10	-10	-11	-12	-13
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Note: Red text indicates baseline monitoring data exceeding the standards

Table 12: Impact assessment – Daytime nuisance, construction phase at specific sub-urban sensitive receptors

Activity	Impact summary	Nature / Status	E Geographic extent	D Duration	M Consequence of significance (Magnitude)	P Probability	Environmental Significance	
							S (Before Mitigation)	S (After Mitigation)
Construction phase	Nuisance noise disturbance at SR1	Negative	Regional 3	Short-term 2	High 8	Highly probable 4	Medium 52	Medium 39
	Nuisance noise disturbance at SR2	Negative	Regional 3	Short-term 2	High 8	Highly probable 4	Medium 52	Medium 39
	Nuisance noise disturbance at SR3	Negative	Regional 3	Short-term 2	Low 4	Probable 3	Low 27	Low 18
	Nuisance noise disturbance at SR4	Negative	Regional 3	Short-term 2	High 8	Highly probable 4	Medium 52	Medium 39
	Nuisance noise disturbance at SR5	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR6	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR7	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR8	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR9	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR10	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR11	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR12	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR13	Negative	Regional 3	Short-term 2	Medium 6	Probable 3	Medium 33	Low 22
	Nuisance noise disturbance at SR14	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR15	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR16	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Nuisance noise disturbance at SR17	Negative / Neutral	Regional 3	Short-term 2	Negligible 2	Improbable 1	Low 7	Low 7
	Cumulative noise impacts	Negative	Regional 3	Short-term 2	Medium 6	Probable 3	Medium 33	Low 22

9.2 Operational phase

9.2.1 Sources of operational noise

The Hartland mixed land-use development will include three (3) primary components:

- School precinct, which includes a Secondary School with supporting facilities such as a school hostel, an administration building and main hall, together with a clubhouse and rugby fields/athletics track;
- Tertiary precinct, comprising a Tertiary Education Centre with student accommodation and associated action sports fields and courts; and
- Hospital precinct, including the hospital building(s) and associated infrastructure, as well as provision for future staff accommodation and an emergency helicopter landing pad.

These components will be supported by internal and external auxiliary infrastructure including: Internal roads and parking bays serving the different portions of the development; Wastewater servicing infrastructure, comprising a new sewer pump station on site and a new pressure line connecting the development to the Hartenbos Regional Wastewater Treatment Works (WWTW); Electrical distribution infrastructure for the provision of power, augmented by rooftop Solar PV installations on certain infrastructure.

None of the proposed infrastructure is considered as a significant noise source for the operational phase of the proposed development except for:

- The Hartland hospital emergency helipad which will have several emergency flights per day; and
- The sport courts, rugby field and athletic track which are likely to host sporting events with mass spectator crowds and may include the projection of sound via loudspeakers and or public address systems.

Considering the above there are thus four (4) scenarios needing assessment:

- Scenario 1: Typical operational noise emitted from the Hartland development (Excludes scenario 2 & 3 emissions contributions);
- Scenario 2: Noise levels emitted from the Hartland development during sporting events including public address systems;
- Scenario 3: Hospital emergency helipad noise emissions; and
- Scenario 4: Cumulative Scenarios 1, 2 and 3

9.2.2 Scenario 1: Typical operational noise emitted from the Hartland development

Observed L_{Aeq} baseline daytime and night-time noise levels within the project footprint exceeded the range typically expected for “Suburban” districts (Table 9). The exceedances may be attributed to elevated baseline environmental noise levels associated with R102 and N2 highway traffic as well as the numerous construction activities in near proximity the project footprint (i.e. Hartland Phase 1, New mall development, R102 road upgrades etc).

It is likely that the daily noise emissions contribution from the “Sub-urban” Hartland development may be expected to be similar to a “Sub-urban” district. For operational phase assessment purposes and considering the existing elevated baseline linked with major roads, the “Urban district with main roads” noise level of 60 dB(A) within 10m of the Hartland boundary has therefore been assumed as the uniform boundary one-hour equivalent noise level for the purpose of assessing the anticipated Scenario 1 operational phase daytime noise impact contributions (i.e. application of the worst case scenario). Similarly, 50 dB(A) within 10m of the Hartland boundary has therefore been assumed as the uniform boundary one-hour equivalent noise level for the purpose of assessing the anticipated Scenario 1 operational phase night-time noise impact contributions. By comparing the calculated average operational noise levels for the proposed development at given offsets against the expected/monitored baseline noise levels at the sensitive receptors, and against the SANS 10103 criteria for evaluating the community or group response to a noise source (Table 5), the noise impacts associated with the proposed development can be qualitatively assessed at a high level regarding nuisance effects and thus used to infer the anticipated level of impact at the sensitive receptors.

The operational noise impacts during the daytime are anticipated to be limited to within an approximate 30m to 50m radius of the noise source and operational areas (Table 15). None of the nearby sensitive receptors are thus anticipated to be impacted by the daily daytime noise emissions contribution from the Hartland

development (*Note: Scenario 1 excludes scenario 2 & 3 emissions contributions*). In addition, due to the elevated baseline noise levels, most of the “domestic” type noise generated by the Hartland development during the daytime is likely to be masked by the elevated baseline noise levels within the local area surrounding the development.

All “*Sub-urban*” sensitive receptors are unlikely to be impacted by the daytime Scenario 1 operational noise. A *little / negligible* community response is expected and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 14). With the implementation of typical operational phase noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 14).

Table 13: Assessment of Scenario 1 operational nuisance level during the

Plant/Equipment	Noise Level (dBA) during the daytime										
	100m	SR4	SR2	SR1	SR13	500m	750m	SR5	SR3	SR6	SR14
Distance to Hartland boundary (m)	100	200	280	350	400	500	750	820	1200	1500	1550
L_{Aeq} calculated noise level	40.0	34.0	31.1	29.1	28.0	26.0	22.5	21.7	18.4	16.5	16.2
Standard value	50	50	50	50	50	50	50	50	50	50	50
Excess, $\Delta L_{Req,T}$ dB(A)	-10	-16	-19	-21	-22	-24	-28	-28	-32	-34	-34
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Plant/Equipment	Noise Level (dBA) during the daytime										
	SR7	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11	3000m	3500m
Distance to Hartland boundary (m)	1600	1800	1850	2100	2300	2350	2450	2500	2800	3000	3500
L_{Aeq} calculated noise level	15.9	14.9	14.7	13.6	12.8	12.6	12.2	12.0	11.1	10.5	9.1
Standard value	50	50	50	50	50	50	50	50	50	50	50
Excess, $\Delta L_{Req,T}$ dB(A)	-34	-35	-35	-36	-37	-37	-38	-38	-39	-40	-41
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Note: Red text indicates baseline monitoring data exceeding the standards

Table 14: Impact assessment – Daytime nuisance, Scenario 1 operational phase at specific sub-urban sensitive receptors

Activity	Impact summary	Nature / Status	E	D	M	P	Environmental Significance	
			Geographic extent	Duration	Consequence of significance (Magnitude)	Probability	S (Before Mitigation)	S (After Mitigation)
Operational phase - Scenario 1 Daytime	Nuisance noise disturbance at all sensitive receptors (SR1-SR17)	Neutral	Site specific 1	Temporary 1	Negligible 2	Improbable 1	Low 4	Low 4

The operational noise impacts during the night-time are anticipated to be limited to within an approximate 30m to 50m radius of the noise source and operational areas (Table 15). None of the nearby “*Sub-urban*” sensitive receptors are thus anticipated to be impacted by the daily night-time noise emissions contribution from the Hartland development (*Note: Scenario 1 excludes scenario 2 & 3 emissions contributions*). In addition, due to the elevated baseline noise levels, most of the “domestic” type noise generated by the Hartland development during the daytime is likely to be masked by the elevated baseline noise levels within the local area surrounding the development.

All “*Sub-urban*” sensitive receptors are unlikely to be impacted by the night-time Scenario 1 operational noise. A *little / negligible* community response is expected and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 16). With the implementation of typical operational phase noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 16).

Table 15: Assessment of Scenario 1 operational nuisance level during the night

Plant/Equipment	Noise Level (dBA) during the night-time										
	100m	SR4	SR2	SR1	SR13	500m	750m	SR5	SR3	SR6	SR14
Distance to Hartland boundary (m)	100	200	280	350	400	500	750	820	1200	1500	1550
L _{Aeq} calculated noise level	30.0	24.0	21.1	19.1	18.0	16.0	12.5	11.7	8.4	6.5	6.2
Standard value	40	40	40	40	40	40	40	40	40	40	40
Excess, ΔLReq,T dB(A)	-10	-16	-19	-21	-22	-24	-28	-28	-32	-34	-34
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Plant/Equipment	Noise Level (dBA) during the night-time										
	SR7	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11	3000m	3500m
Distance to Hartland boundary (m)	1600	1800	1850	2100	2300	2350	2450	2500	2800	3000	3500
L _{Aeq} calculated noise level	5.9	4.9	4.7	3.6	2.8	2.6	2.2	2.0	1.1	0.5	0.0
Standard value	40	40	40	40	40	40	40	40	40	40	40
Excess, ΔLReq,T dB(A)	-34	-35	-35	-36	-37	-37	-38	-38	-39	-40	-40
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Table 16: Impact assessment – Night-time nuisance, Scenario 1 operational phase at specific sub-urban sensitive receptors

Activity	Impact summary	E	D	M	P	Environmental Significance	
						S (Before Mitigation)	S (After Mitigation)
Operational phase - Scenario 1 Night-time	Nuisance noise disturbance at all sensitive receptors (SR1-SR17)	Neutral	Temporary 1	Negligible 2	Improbable 1	Low 4	Low 4

9.2.3 Scenario 2: Noise levels emitted from the Hartland development during sporting events including public address systems

The sport courts, rugby field and athletic track are likely to host sporting events with mass spectator crowds and may include the projection of sound via loudspeakers and or Public Address (PA) systems. Crowd noise levels typically range from 70 dB(A) to 90 dB(A) for general excitement, spiking above 110 dB(A) to 130 dB(A) during major sporting events or concerts (Navvab and Heilmann, 2008). Typical Public Address (PA) system noise levels range from 70 dB(A) to over 120 dB(A) at a one-meter distance, depending on the application (www.sponcomm.com, 30 March 2026). Optimal levels for speech are generally 6 dB(A) to 10 dB(A) above ambient noise, while music systems often target 95 dB(A) to 105 dB(A) for live, high-energy events (www.sponcomm.com, 30 March 2026). During sporting events with mass spectator crowds, nearby sensitive receptors may experience noise disturbance and annoyance.

For operational phase assessment purposes, we have assumed that the crowd noise levels with PA system sound projection during such events may emit noise levels such 75 dB(A) may be experienced within 10m of the nearest Hartland boundary. 75 dB(A) has therefore been assumed as the uniform boundary one-hour equivalent noise level for the purpose of assessing the anticipated operational phase impacts of Scenario 2 excluding the Hartland hospital emergency helipad noise impacts which are assessed separately. By comparing the calculated average Scenario 2 operational noise levels for the proposed development at given offsets against the expected/monitored baseline noise levels at the sensitive receptors, and against the SANS 10103 criteria for evaluating the community or group response to a noise source (Table 5), the noise impacts associated with the proposed development can be qualitatively assessed at a high level regarding nuisance effects and thus used to infer the anticipated level of impact at the sensitive receptors.

The operational noise impacts during the daytime are anticipated to be limited to within an approximate 100-200m radius of the noise source and operational areas (Table 17). None of the nearby Sub-urban sensitive

receptors are thus anticipated to be impacted by the daytime noise emissions contribution from sporting events within the Hartland development (*Note: Scenario 2 excludes scenario 3 emissions contributions*). In addition, due to the elevated baseline noise levels, most of the noise generated by the sporting events during the daytime is likely to be masked by the elevated baseline noise levels within the local area surrounding the development.

All “Sub-urban” sensitive receptors are unlikely to be impacted by the daytime Scenario 2 operational noise. A *little / negligible* community response is expected and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 18). With the implementation of typical crowd and PA system noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 18).

Table 17: Assessment of Scenario 2 operational nuisance level during the day and the observed baseline at specific sub-urban sensitive receptors

Plant/Equipment	Noise Level (dBA) during the daytime											
	100m	150m	SR4	SR2	SR1	SR13	500m	750m	SR5	SR3	SR6	SR14
Distance to Hartland boundary (m)	100	150	200	280	350	400	500	750	820	1200	1500	1550
L_{Aeq} calculated noise level	55.0	51.5	49.0	46.1	44.1	43.0	41.0	37.5	36.7	33.4	31.5	31.2
Standard value	50	50	50	50	50	50	50	50	50	50	50	50
Excess, $\Delta L_{Req,T}$ dB(A)	5	1	-1	-4	-6	-7	-9	-13	-13	-17	-19	-19
Community response	Medium	Little	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Plant/Equipment	Noise Level (dBA) during the daytime											
	SR7	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11	3000m	3500m	
Distance to Hartland boundary (m)	1600	1800	1850	2100	2300	2350	2450	2500	2800	3000	3500	
L_{Aeq} calculated noise level	30.9	29.9	29.7	28.6	27.8	27.6	27.2	27.0	26.1	25.5	24.1	
Standard value	50	50	50	50	50	50	50	50	50	50	50	
Excess, $\Delta L_{Req,T}$ dB(A)	-19	-20	-20	-21	-22	-22	-23	-23	-24	-25	-26	
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	

Table 18: Impact assessment – Daytime noise nuisance, Scenario 2 operational phase at specific sub-urban sensitive receptors

Activity	Impact summary	E	D	M	P	Environmental Significance		
						Nature / Status	Geographic extent	Duration
Operational phase - Scenario 2 Daytime	Nuisance noise disturbance at all sensitive receptors (SR1-SR17)	Neutral	Site specific 1	Temporary 1	Negligible 2	Improbable 1	Low 4	Low 4

The operational noise impacts during the night-time are anticipated to increase to approximate 650m radius of the noise source and operational areas (Table 19). “Sub-urban” receptors SR2 and SR4 are highly likely to be impacted by the Scenario 2 operational noise. A *medium* community response (Table 19) is expected from “Sub-urban” receptors SR2 and SR4 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 20). With the implementation of typical crowd and PA system noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 20).

Sub-urban” receptors SR1 and SR13 are likely to be impacted by the Scenario 2 operational noise. A *Low* community response (Table 19) is expected from “Sub-urban” receptors SR1 and SR13 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 20). With the

implementation of typical crowd and PA system noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 20).

All other “*Sub-urban*” sensitive receptors are unlikely to be impacted by the night-time Scenario 2 operational noise. A *little / negligible* community response (Table 19) is expected and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 20). With the implementation of typical crowd and PA system noise mitigation measures, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 20).

Table 19: Assessment of Scenario 2 operational nuisance level during the night and the observed baseline at specific sub-urban sensitive receptors

Plant/Equipment	Noise Level (dBA) during the night-time											
	100m	150m	SR4	SR2	SR1	SR13	500m	750m	SR5	SR3	SR6	SR14
Distance to Hartland boundary (m)	100	150	200	280	350	400	500	750	820	1200	1500	1550
L _{Aeq} calculated noise level	55.0	51.5	49.0	46.1	44.1	43.0	41.0	37.5	36.7	33.4	31.5	31.2
Standard value	40	40	40	40	40	40	40	40	40	40	40	40
Excess, ΔL _{Req,T} dB(A)	15	11	9	6	4	3	1	-3	-3	-7	-9	-9
Community response	Strong	Strong	Medium	Medium	Little	Little	Little	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible

Plant/Equipment	Noise Level (dBA) during the night-time											
	SR7	SR10	SR16	SR8	SR9	SR17	SR15	SR11	3000m	3500m		
Distance to Hartland boundary (m)	1600	1800	1850	2100	2300	2350	2450	2500	2800	3000	3500	
L _{Aeq} calculated noise level	30.9	29.9	29.7	28.6	27.8	27.6	27.2	27.0	26.1	25.5	24.1	
Standard value	40	40	40	40	40	40	40	40	40	40	40	
Excess, ΔL _{Req,T} dB(A)	-9	-10	-10	-11	-12	-12	-13	-13	-14	-15	-16	
Community response	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	Little / negligible	

Table 20: Impact assessment – Night-time noise nuisance, Scenario 2 operational phase at specific sub-urban sensitive receptors

Activity	Impact summary	Nature / Status	E Geographic extent	D Duration	M Consequence of significance (Magnitude)	P Probability	Environmental Significance	
							S (Before Mitigation)	S (After Mitigation)
Operational phase - Scenario 2 Night-time	Nuisance noise disturbance at all SR2 and SR4	Negative	Regional 3	Temporary 1	Medium 6	Probable 3	Low 27	Low 9
	Nuisance noise disturbance at SR1 and SR13	Negative	Regional 3	Temporary 1	Low 4	Probable 3	Low 24	Low 8
	Nuisance noise disturbance at all remaining sensitive receptors	Neutral	Site specific 1	Temporary 1	Negligible 2	Improbable 1	Low 4	Low 4

9.2.4 Scenario 3: Hospital emergency helipad noise emissions

Very little information regarding the operation of the Hartland emergency helipad was available from the Client. ATB was required to compile a list of suitable assumptions for aviation noise modelling purposes in the absence of the aviation information from the Client. The following assumptions were made for Scenario 3:

- Helipad site coordinates: S34.098012°; E22.116444° (Figure 1);
- Helicopter type: Bell 222 and/or Bell 430 Helicopter types based on companies currently operating in the Western Cape Garden Route district;
- Flight routes:
 - Routes are informed by prevailing seasonal wind patterns: easterly to south-easterly winds in summer and westerly to south-westerly winds in winter. During take-off and landing, helicopters are typically operated into the wind;
 - Where possible, flight paths should avoid overflying the planned neighbouring school and hostel;

- Where possible, flight paths should avoid overflying nearby Hartland residential developments;
- Preferred routing should follow the N2 highway corridor; and
- Stadia lights will not exceed 10 m in height and will meet aviation specifications such that they don't interfere with aviation flight paths.
- Flight numbers: One (1) flight landing and one (1) flight departing per day (i.e. two flights per day in total); and
- Helipad operational 24-hours per day, seven (7) days a week.

The assessment and aviation noise model evaluates the potential noise impacts, using the L_{Amax} noise descriptor, in the vicinity of the proposed Hartland hospital helipad arising from helicopter operations. The term helipad as used in this assessment is defined by the International Civil Aviation Organization (ICAO) describes a single landing and take-off area for helicopters with no additional aviation facilities (International Civil Aviation Organization, Annex 14, Volume II).

9.2.4.1 Location of helipad

The proposed helipad will be located adjacent to the west of the hospital building (GPS location: S34.098012°; E22.116444°) (Figure 1). A school is planned to the west of the helipad and thus the helicopter approach and departure paths must be carefully planned.

9.2.4.2 Method of quantifying helicopter noise

In accordance with SANS 10117, the Aviation Environmental Design Tool (AEDT version 3.0g), developed by the Federal Aviation Administration (FAA), was used for noise modelling purposes. The software incorporates a noise – power - distance database derived from International Civil Aviation Organization (ICAO) certification data. This database contains performance related noise emission levels for a wide range of helicopter types. Using this data, AEDT mathematically estimates the noise level at specified ground grid points for helicopters operating under defined conditions. Points on the ground where equivalent noise levels occur are identified and joined by contour lines, producing noise contours. The software accounts for factors influencing sound propagation, such as the directionality of noise emissions and the distance between the helicopter and the sound receiving location.

The calculation of helicopter noise is inherently complex and involves several parameters. The primary determinants of noise from an individual arrival or departure operation include:

- The flight track of arriving and departing helicopters;
- The flight profile (altitude and power settings);
- The helicopter type;
- The helicopter weight;
- The certified noise level of the helicopter; and
- The time of arrival or departure.

In addition, certain localised factors may affect perceived noise levels but are not included in AEDT calculations. These include:

- The screening effects of terrain, buildings, and other structures;
- Contributions from other noise sources (e.g., road traffic, industry); and
- Localised weather phenomena.

Due to the relatively low number of anticipated helicopter movements, it was not possible to calculate or meaningfully represent $L_{R,dn}$ noise contours. Instead, L_{Amax} contours were calculated. The L_{Amax} metric represents the maximum noise level experienced at a sensitive receptor location during a helicopter overflight event. For the purposes of this assessment, helicopter noise is therefore characterised using the maximum instantaneous sound level (L_{Amax}) likely to be experienced during a helicopter movement. This metric reflects

the peak noise level associated with an event but does not account for the duration over which the helicopter remains audible above the background noise level.

9.2.4.3 Aviation noise model setup

For this assessment, two (2) flight route corridors were modelled. The first extends to the north-east and includes both arrival and departure movements, while the second represents departures to, and arrivals from, the south-west. The flight paths were designed to ensure safe operation during the critical arrival and departure phases near the helipad, while minimising overflight of the planned hospital, school, and nearby residential areas.

The aviation noise modelling process began with entering the coordinates of the proposed helipad into the noise modelling software. Once situated, the helicopter approach and departure flight paths were designed (Figure 10). A typical EMS helicopter type which is expected to operate at the helipad is a Bell 430 which was used as the representative helicopter for the assessment. A typical operational day was assumed to consist of one (1) arrival flight and one (1) departure flight per day, with each flight assigned to the respective approach and departure tracks. The AEDT model outputs the anticipated noise levels at specified ground grid points for the helicopters operating under the model defined conditions. The grid point on the ground where equivalent noise levels occur are then joined from producing noise contours for further interpretation purposes.

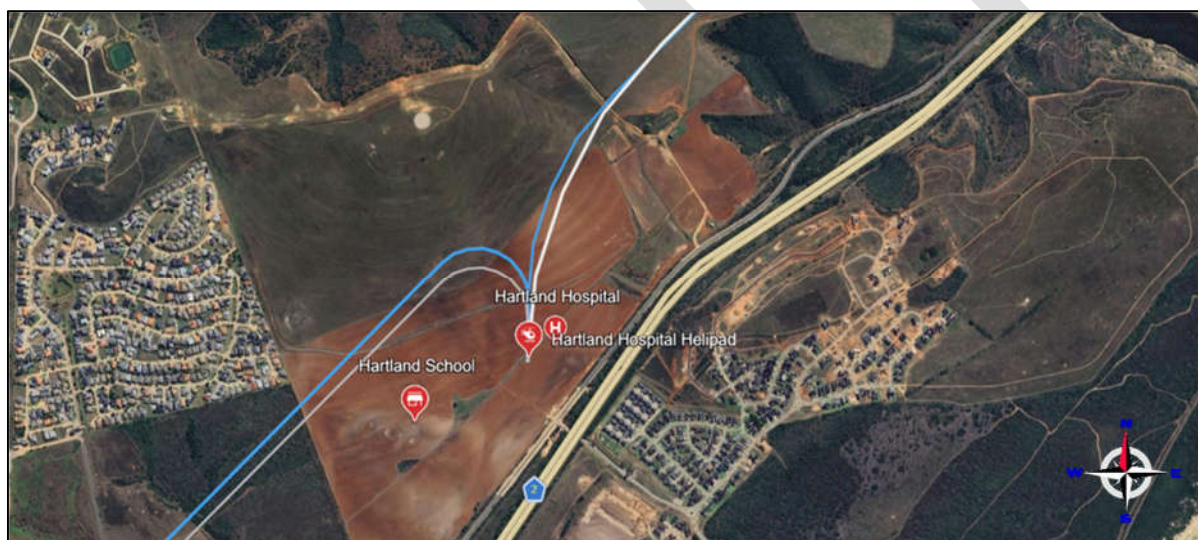


Figure 10: Proposed helicopter flight paths from the helipad. The blue lines represent departures, and the white lines represent arrivals (Goldschagg, 2026)

9.2.4.4 Aviation noise model results

The predicted L_{Amax} noise level contours for helicopter operations are presented in Figure 11 and represent an approach and landing from the north-east and south-west, and a take-off and departure to the north-east and south-west. The contours were generated from 55dB L_{Amax} , increasing in 5dB intervals up to 75dB L_{Amax} . The anticipated noise levels experienced at the ground are anticipated to exceed 55dB for approximately 1500m to the north-west and 750m to the south-east of the helipad and flight paths and will be clearly audible at many of the sub-urban sensitive receptors surrounding the Hartland development and those directly under the flight paths (Figure 12).

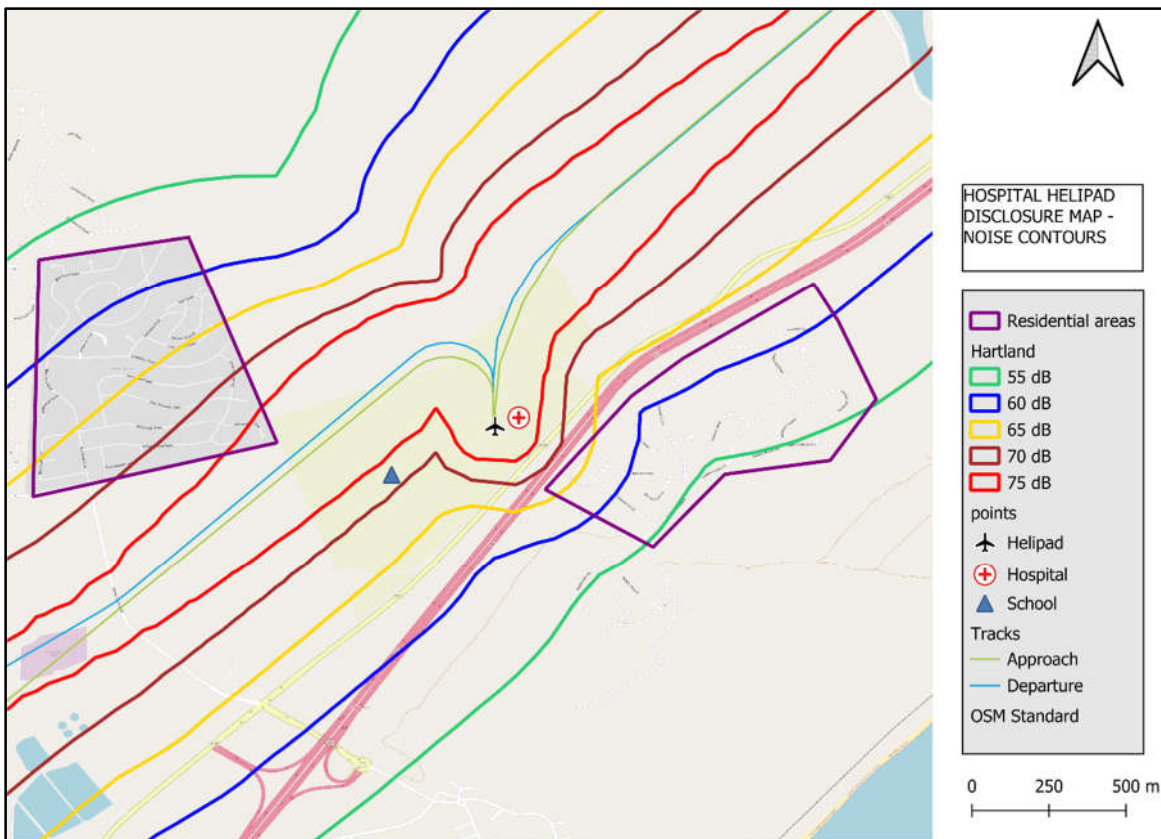


Figure 11: Modelled approach and landing noise contours in the vicinity of the helipad (Goldschagg, 2026)

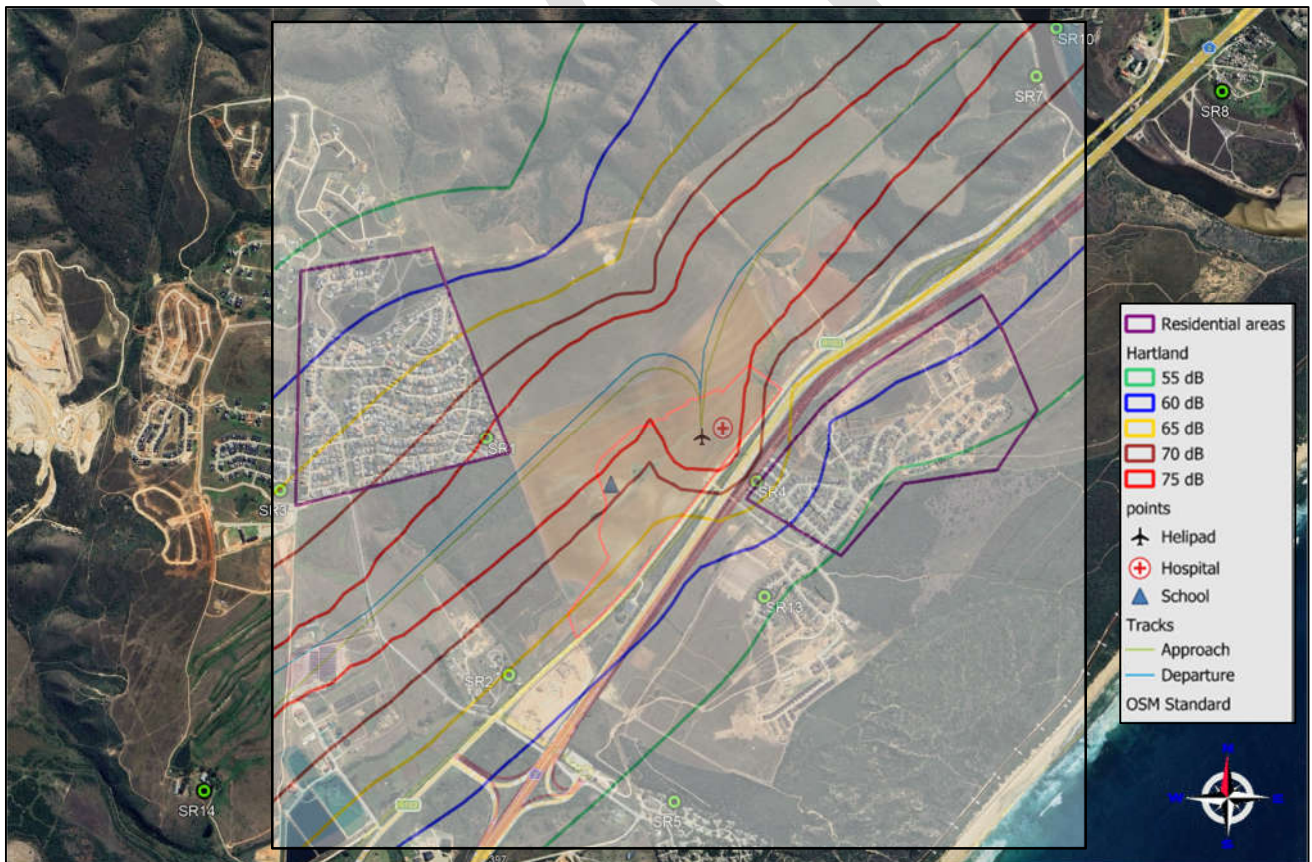


Figure 12: Modelled approach and landing noise contours in the vicinity of the helipad imposed on sensitive receptor map (Google Earth, March 2026 & after Goldschagg, 2026)

Due to the relatively low-altitude nature of helicopter operations, the predicted noise contours typically extend along the flight paths for the duration of the movement. However, the contours presented are limited to the immediate vicinity of the helipad. As distance from the helipad increases, flight paths are likely to become more spatially dispersed, resulting in a broader and less concentrated distribution of noise at ground level (i.e. reduced impact along the flight paths the further away from the helipad the sensitive receptor is located).

Assuming a daytime “sub-urban” district rating sound level of 50dB, both arrival and departure flights will be clearly perceptible in the vicinity of the Heartland development and at the surrounding nearby sensitive receptors (i.e. mainly those within 1.5km of the helipad and/or directly under the flight paths). On approach to and departure from the helipad, the helicopter noise will emerge above the background level of approximately 54.3 dB(A) during the day, attain a maximum exposure for a short duration as the aircraft passes and subsequently diminishing back into the prevailing ambient baseline conditions.

“Sub-urban” receptors SR1 to SR4, SR7, SR10, SR14 and SR17 are highly likely to be impacted by the daytime Scenario 3 helicopter operational noise. A *very strong* community response (Table 21) is expected from “Sub-urban” receptors SR1 to SR4, SR7, SR10, SR14 and SR17 and the environmental consequence of the impacts are anticipated to be *medium* detrimental (Table 22). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated remain *low* detrimental (Table 22).

“Sub-urban” receptors SR8 to SR13, SR15 and SR16 are likely to be impacted by the daytime Scenario 3 helicopter operational noise. A *medium* community response (Table 21) is expected from “Sub-urban” receptors SR8 to SR13, SR15 and SR16 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 22). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 22).

“Sub-urban” receptors SR5 and SR9 may be impacted by the daytime Scenario 3 helicopter operational noise. A *little* community response (Table 21) is expected from “Sub-urban” receptors SR5 and SR9 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 22). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 22).

“Sub-urban” receptors SR6 and SR12 are unlikely to be impacted by the daytime Scenario 3 helicopter operational noise. A *little / negligible* community response (Table 21) is expected from “Sub-urban” receptors SR6 and SR12 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 22). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 22).

Table 21: Assessment of Scenario 3 helicopter operational nuisance level during the day and the observed baseline at specific sub-urban sensitive receptors

Plant/Equipment	Noise Level (dBA) during the daytime								
	SR4	SR2	SR1	SR13	SR5	SR3	SR6	SR14	SR7
Distance to Hartland boundary (m)	200	280	350	400	820	1200	1500	1550	1600
Estimated L _{Amax} based on modelled noise levels	68	70	75	56	50	70	47	73	72
Standard value	50	50	50	50	50	50	50	50	50
Excess, ΔL _{Req,T} dB(A)	18	20	25	6	0	20	-3	23	22
Community response	Very strong	Very strong	Very strong	Medium	Little	Very strong	Little / negligible	Very strong	Very strong

Plant/Equipment	Noise Level (dBA) during the daytime							
	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11
Distance to Hartland boundary (m)	1800	1850	2100	2300	2350	2450	2500	2800
Estimated L _{Amax} based on modelled noise levels	74	57	60	50	70	30	60	60
Standard value	50	50	50	50	50	50	50	50
Excess, ΔL _{Req,T} dB(A)	24	7	10	0	20	-20	10	10
Community response	Very strong	Medium	Medium	Little	Very strong	Little / negligible	Medium	Medium

Table 22: Impact assessment – Daytime noise nuisance, Scenario 3 helicopter operations at specific sub-urban sensitive receptors

Activity	Impact summary	Nature / Status	E Geographic extent	D Duration	M Consequence of significance (Magnitude)	P Probability	Environmental Significance	
							S (Before Mitigation)	S (After Mitigation)
Operational phase - Scenario 3 Daytime	Nuisance noise disturbance at SR1 to SR4, SR7, SR10, SR14 and SR17	Negative	Regional 3	Temporary 1	Medium 6	Highly probable 4	Medium 36	Low 27
	Nuisance noise disturbance at SR8, SR11, SR13, SR15 and SR16	Negative	Regional 3	Temporary 1	Medium 6	Probable 3	Low 27	Low 18
	Nuisance noise disturbance at SR5 and SR9	Negative	Regional 3	Temporary 1	Low 4	Probable 3	Low 21	Low 14
	Nuisance noise disturbance at SR6 and SR12	Neutral	Regional 3	Temporary 1	Negligible 2	Improbable 1	Low 6	Low 6

Assuming a night-time “sub-urban” district rating sound level of 40dB, both arrival and departure flights will be clearly perceptible in the vicinity of the Heartland development and at the surrounding nearby sensitive receptors (i.e. mainly those within 1.5km of the helipad and/or directly under the flight paths). On approach to and departure from the helipad, the helicopter noise will emerge above the background level of approximately 46.2db(A) during the night, attain a maximum exposure for a short duration as the aircraft passes and subsequently diminishing back into the prevailing ambient baseline conditions.

“Sub-urban” receptors SR1 to SR4, SR7, SR8, SR10, SR11, SR13 to SR17 are highly likely to be impacted by the night-time Scenario 3 helicopter operational noise. A *very strong* community response (Table 23) is expected from “Sub-urban” receptors SR1 to SR4, SR7, SR8, SR10, SR11, SR13 to SR17 and the environmental consequence of the impacts are anticipated to be *medium* detrimental (Table 24). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the

flights and very short duration of impact, the residual risk of the noise impacts is anticipated remain *low* detrimental (Table 24).

“Sub-urban” receptors SR5 to SR6 and SR9 are likely to be impacted by the daytime Scenario 3 helicopter operational noise. A *medium* community response (Table 23) is expected from “Sub-urban” receptors SR5 to SR6 and SR9 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 24). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 24).

“Sub-urban” receptor SR12 is unlikely to be impacted by the daytime Scenario 3 helicopter operational noise. A *little / negligible* community response (Table 23) is expected from “Sub-urban” receptor SR12 and the environmental consequence of the impacts are anticipated to be *low* detrimental (Table 24). With the implementation of typical aviation noise mitigation measures, and considering the temporal nature of the flights and very short duration of impact, the residual risk of the noise impacts is anticipated to remain *low* detrimental but with possible nominal reduction in the impact (Table 24).

Table 23: Assessment of Scenario 3 helicopter operational nuisance level during the night and the observed baseline at specific sub-urban sensitive receptors

Plant/Equipment	Noise Level (dBA) during the night-time								
	SR4	SR2	SR1	SR13	SR5	SR3	SR6	SR14	SR7
Distance to Hartland boundary (m)	200	280	350	400	820	1200	1500	1550	1600
Estimated L _{Amax} based on modelled noise levels	68	70	75	56	50	70	47	73	72
Standard value	40	40	40	40	40	40	40	40	40
Excess, ΔL _{Req,T} dB(A)	28	30	35	16	10	30	7	33	32
Community response	Very strong	Very strong	Very strong	Very strong	Medium	Very strong	Medium	Very strong	Very strong

Plant/Equipment	Noise Level (dBA) during the night-time							
	SR10	SR16	SR8	SR9	SR17	SR12	SR15	SR11
Distance to Hartland boundary (m)	1800	1850	2100	2300	2350	2450	2500	2800
Estimated L _{Amax} based on modelled noise levels	74	57	60	50	70	30	60	60
Standard value	40	40	40	40	40	40	40	40
Excess, ΔL _{Req,T} dB(A)	34	17	20	10	30	-10	20	20
Community response	Very strong	Very strong	Very strong	Medium	Very strong	Little / negligible	Very strong	Very strong

Table 24: Impact assessment – Night-time noise nuisance, Scenario 3 helicopter operations at specific sub-urban sensitive receptors

Activity	Impact summary	Nature / Status	E Geographic extent	D Duration	M Consequence of significance (Magnitude)	P Probability	Environmental Significance	
							S (Before Mitigation)	S (After Mitigation)
Operational phase - Scenario 3 Night-time	Nuisance noise disturbance at SR1 to SR4, SR7, SR8, SR10, SR11, SR13 to SR17	Negative	Regional 3	Temporary 1	Medium 6	Highly probable 4	Medium 36	Low 27
	Nuisance noise disturbance at SR5, SR6 and SR 9	Negative	Regional 3	Temporary 1	Medium 6	Probable 3	Low 27	Low 18
	Nuisance noise disturbance at SR12	Neutral	Regional 3	Temporary 1	Negligible 2	Improbable 1	Low 6	Low 6

9.2.5 Scenario 4: Cumulative scenarios 1, 2 and 3

The environmental consequence of the cumulative nuisance noise disturbance associated with combined Scenarios 1, 2, 3 and existing noise sources is anticipated to be *medium* detrimental (Table 25). With the implementation of typical noise mitigation measures, the residual risk of the noise impacts are anticipated to reduce and remain *low* detrimental (Table 25).

Table 25: Impact assessment – Cumulative nuisance noise disturbance associated with combined Scenarios 1, 2, 3 and existing noise sources

Activity	Impact summary	Nature / Status	E	D	M	P	Environmental Significance	
			Geographic extent	Duration	Consequence of significance (Magnitude)	Probability	S (Before Mitigation)	S (After Mitigation)
Cumulative impacts	Cumulative nuisance noise disturbance associated with combined Scenarios 1, 2, 3 and existing noise sources	Negative	Regional 3	Short-term 2	High 8	Probable 3	Medium 39	Low 26

10 RECOMMENDATIONS AND BEST PRACTICE MEASURES

10.1 Design aspects

The following design aspects are recommendations to mitigate the noise emissions and noise impacts of the proposed project:

- Hospital design aspects:
 - The hospital facade orientation and location of sensitive spaces relative to the helipad, notwithstanding operational requirements, should be the primary control mechanism pursued in concept and schematic design of the hospital and wards. Particular care must be paid to the NICU/PICU wards; and
 - An L_{Amax} of 65dB is to be achieved in the wards and sensitive spaces within the hospital to prevent sleep disturbances of convalescing patients. Hospital designs are to allow for the achievement of this the maximum noise limit; and
 - Once more details on the helipad and helipad operations is available, the aviation noise modelling must be re-undertaken to confirm the level of impact on the nearby sensitive receptors prior to construction and operation of the helipad.

10.2 Construction phase

The following recommendations and best practice measures are proposed to mitigate the noise emissions and noise impacts during the construction phase of the proposed project:

- All construction activities are to be limited between 07:00 to 18:00 on weekdays, 08:00 to 15:00 on Saturdays and no construction activities on Sundays and public holidays;
- The developer must compile and implement a detailed noise management plan to mitigate construction noise emissions and the associated noise impacts at the sensitive receptors due to the scale of the development project;

- All vehicles and mobile machinery must be fitted with white noise (“ssh-ssh”) type combination broad band smart self-adjusting reverse beeper alarms versus traditional “beep-beep” type reverse alarms to minimize mobile vehicle noise onsite;
- All vehicles and equipment are to be kept in good repair to reduce construction and operational noise levels;
- All construction vehicles must achieve a sound power level of 105 dB(A) or less within a 10m radius of the vehicle;
- All vehicles/machinery must be subject to an annual noise survey to determine the sound power levels. Appropriate noise-suppression must be implemented on those found to be exceeding the 105dB(A) within a 10m radius of the noise source;
- Ensuring all construction equipment and vehicles onsite is noise-suppressed (or attenuated);
- A materials handling drop height policy should be implemented and maintained onsite. All equipment operators should be trained in the policy such that drop height reduction is implemented to reduce noise generation onsite;
- Equipment found to have defects that lead to elevated noise emissions are not be returned to operations until repaired;
- Ensure all plant and equipment is maintained regularly and in accordance with manufacturer requirements;
- All equipment is to be well maintained and fitted with appropriate noise abatement measures;
- The onsite speed limit of 30km to reduce the level of noise from construction traffic is to be rigorously maintained and enforced;
- Vehicles should not be allowed to idle for more than 5-minutes when not in use;
- All vehicles are to fitted with original equipment manufacturer (OEM) specification silencers/exhaust systems;
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- No blasting is permitted onsite during (all project phases) as blasting noise and blasting safety exclusion zones have not been assessed;
- A noise complaints register must be maintained at the main access gate;
- Any noise complaints should be directed to site management. Complaints and any actions arising from a complaint must be recorded in a complaint’s register to be maintained by site management. An investigation should be undertaken to determine the specific activities and/or equipment / machinery which is generating the nuisance noise resulting in the noise complaints;
- Monitoring:
 - Quarterly perimeter noise monitoring and assessment as per GN320, SANS 10328 and SANS 10103 must be implemented through the construction phases at the Hartland boundary and at a suitable selection of the nearby sensitive receptors as identified in this report (i.e. the baseline monitoring points);
 - The above monitoring requirements are to be stipulated in sites noise management plan which is the report to the project Environmental Management Plan (EMP).

10.2 Operational phase

The following recommendations and best practice measures are proposed to mitigate the noise emissions and noise impacts during the operational phase of the proposed project:

- The Hartland development managing company must develop a set of rules which incorporate noise emission mitigation measure to which all facilities, facility operators, tenants and property users must abide by;
- The onsite speed limit of 40km to reduce the level of noise from traffic is to be rigorously maintained and enforced;
- All vehicles and equipment are to be kept in good repair to reduce operational noise levels;
- Vehicles should not be allowed to idle for more than 5-minutes when not in use;
- All vehicles are to fitted with original equipment manufacturer (OEM) specification silencers/exhaust systems;
- Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- All maintenance activities are to be limited between 07:00 to 18:00 on weekdays, 08:00 to 15:00 on Saturdays and no maintenance activities on Sundays and public holidays;
- The following noise mitigation measures can be implemented on all sports venue PA address systems to mitigate PA system noise (www.Shure.com, 31 March 2026):
 - Mitigate PA system noise by ensuring proper grounding, using balanced cables (XLR/TRS), and optimizing gain structure to keep the noise floor low;
 - Use shielded, balanced high-quality XLR cables or TRS cables instead of unbalanced TS cables to reduce interference;
 - Use a ground loop isolators to break electrical hum;
 - Dedicated circuits: Plug all audio gear into the same power source or a power conditioner to avoid ground loops;
 - Eliminate feedback by keeping the microphones behind the main PA speakers by at least 1-2m from speakers;
 - Use cardioid or supercardioid microphone, pointing the "dead zone" (back) toward speakers;
 - Use a graphic or parametric equalizer to cut problematic screeching frequencies (e.g. 2kHz–8kHz);
 - Use DI boxes or ground loop isolators to stop buzz;
 - Lower the microphone volume in monitors or use in-ear monitoring systems;
 - Set the mixer gain high and the power amp/powered speaker volume lower, rather than boosting low-level inputs;
 - Apply a noise gate to quiet channels, such as microphones, during silences;
 - Use vibration isolation/damping techniques on speakers to stop floor transmission and or transmission to mounting structures;
 - Use ferrite chokes on cables to stop RFI (Radio Frequency Interference);
 - Turn off or mute microphones not currently in us; and

- Speakers can be orientated to face away from sensitive receptors (*where possible*).
- The following noise mitigation measures can be implemented to reduce helicopter noise:
 - Heartland should adopt the South Africa aviation noise standards and aim at noise reduction around the helipad and use a 65dB(A) threshold for noise management (*where possible*);
 - All aircraft must hold a noise certificate of compliance with Part 36 regulations and SA-CATS 36 and all pilots are expected to use noise abatement procedures during all aspects of the flights; and
 - Pilots to utilize steeper ascent/descent angles, optimized speed, and strategic routing to avoid noise-sensitive areas, such as residential zones. Key techniques include using constant acceleration on approach to reduce Blade-Vortex Interaction (BVI) noise (i.e. the classic "thumping" sound) and prioritizing altitude to minimize sound propagation to the ground and avoid turns near sensitive receptors as noise levels during turning are higher than for similar straight line flight conditions.

11 SUMMARY RECCOMENDATION AND CONCLUSION

Based on the assessment of the anticipated noise impacts, there is no substantive reason why the proposed Hartland development cannot be authorised as no noise impacts serve as project fatal flaws. However, the recommendations and best practice measures as per Section 10 must be implemented to mitigate the anticipated impacts wherever practically possible. These recommendations must be included in the Environmental Management Plan (EMP) for the project.

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APPENDIX 1: NOISE MONITORING LOG SHEETS

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
DAY 1																			
Site	File	Description	Lat (south)	Long (east)	Cal.	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L _{min}	Peak	M _{in}	M _{ax}	L ₁₀	L ₅₀
11	0082	HEARTLAND VILLAS	34° 55' 44"S 76° 51' 57.97212	22° 79.33'E 22° 7' 81.97506		12:00	12:10	27/11/20	31	HOT 1/8 CLOUD 54/64	1.9 NNW	N2 TRAFFIC WIND BIRDS + INSECTS	COYS INSECTS PEOPLE TALKING	57.0	91.0	44.2	66.4	54.3	60.1
12	0084	Fairview farm area - Fairview farm road	34° 02' 21.28"S 74° 6' 25.46186 25.632	22° 025.74'E 22° 6' 26.66495		15:57	16:01	27/11/20	30	7 CLOUD 3 WINDY VAPOR	3.8 NW	R102 TRAFFIC R102 TRAFFIC ROAD CONSTRUCTION ACTIVE TIES BIRDS	TRAFFIC ON ROAD LINK TO R102 FARM TRAFFIC HOOPER TRUCK REVVING WIND IN TREE ST GRASS BIRDS MALL CONSTRUCTION	12.57	-	12.57			
13	0093		34° 07' 51.73"S 74° 06' 16.59	22° 041.08'E 22° 06' 41.79		18:10	18:20	27/11/20	25	8 CLOUD 8 OVERCAST	2.7 NNW	N2 TRAFFIC WIND BIRDS	R102 TRAFFIC	56.5	93.3	40.9	66.9	50.9	59.4
14	0094		34° 07' 10.05"S 74° 06' 02.69	22° 040.72'E 22° 6' 44.05		17:09	17:13	27/11/20	26.5	7 CLOUD WIND	3.1 NNE	N2 + R102 TRAFFIC BIRDS WIND IN PLANTS	GEESSE -> GULLS + FOWL DOG BARK	56.5	80.1	49.5	66.1	53.2	59.7
15	0092	WINDY BY HOUSES	34° 054.09"S 74° 06' 02.73 34.5 54.14	22° 032.17'E 22° 6' 00.80 22° 6' 32.10		17:28	17:31	27/11/20	26.9	7 CLOUD WIND	3.1 NNE	WIND IN PLANTS N2 + R102 TRAFFIC BIRDS	PLANE IN DISTANCE PEOPLE PICKING LEMONS DOG BARKING	47.4	67.6	41.3	61.4	45.1	49.1
														12.70	-	12.72			

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
WIND TOWARDS																			
Site	File	Description	Lat (south)	Long (east)	Cal.	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L _{min}	Peak	M _{in}	M _{ax}	L ₁₀	L ₅₀
16	0087		34° 05' 50.5"S 74° 5' 43.96	22° 74.73'E 22° 7' 06.57		12:38	12:48	27/11/20	31.9	WINDY 1/2 CLOUD HOT	2.0 NNW	HEARTLAND CONSTRUCTION VEHICLES BEERS N2 TRAFFIC WIND IN GRASS	TRUCK AIR BREAKS BIRDS	55.2	92.9	44.2	70.7	54.7	57.5
17	0088	BEKLOW P.D.T.	34° 044.42"S 74° 5' 43.96	22° 78.09'E 22° 7' 06.57		16:24	16:24	27/11/20	28.2	WIND 1/2 CLOUD WARM	1.0 NNE	R102 TRAFFIC BIRDS WIND IN PLANTS	COWS MOO X 3	54.5	81.3	47.6	67.4	50.7	57.7
18	0083	BY POWER POLE + CCTV CAMERA	34° 045.84"S 74° 5' 08.16	22° 723.92'E 22° 7' 08.08 22° 7' 23.16		11:29	11:31	27/11/20	31	WINDY 1/2 CLOUD WARM HOT	4.14 NNW	HEARTLAND 1 CONSTRUCTION GRIND DRILL HAMMER WIND N2 + R102 TRAFFIC	HOOPER PEOPLE YELLING CONSTRUCTION TRAFFIC	49.2	79.6	41.6	61.6	45.9	51.3
19	0094		34° 036.09"S 74° 5' 26.76	22° 71.98'E 22° 7' 08.08		16:06	16:08	27/11/20	22.8	WINDY 1/2 CLOUD COOL	1.0 NNW	N2 TRAFFIC BIRDS	R102 TRAFFIC BIRDS	55.7	82.5	39.9	68.5	49.3	54.1
20	0088	WOF H10 ACCESS GATE TO HEARTLAND	34° 028.22"S 74° 6' 26.76	22° 048.85'E 22° 6' 49.13		13:26	13:26	27/11/20	31.9	WINDY HOT 1/2 CLOUD	3.14 NNE	N2 TRAFFIC WIND IN GRASS	INSECTS HEARTLAND CONSTRUCTION TRAFFIC PEOPLE TALKING GARDENING FROM GARDEN INDUSTRY CAR DOOR SLAM	49.3	79.3	41.5	66.6	44.8	50.2
														12.49	-	12.50			

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
						NIGHT 1													
Site	File	Description	Lat (south)	Long (east)	Cal	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L _{min}	Peak	Min	Max	L ₁₀	L ₅₀
H1	010		34° 5'57.44"S	22° 7'9.33"E		0124	0134	28/11	21.2	3/4 CLOUD COOL	< 0.1 CALM	INSECTS, TRAFFIC DISTANT HUM	N2 TRAFFIC BIRDG FROGS	49.5	75.6	32.9	68.8	56.0	52.1
H2	010	Fairview farm area - Fairview farm road (Access 7)	34° 6'21.28"S	22° 6'25.74"E		0243	0303	28/11	20.2	1/3 CLOUD COOL	< 0.1 CALM	PUMP FAN WWTW INSECTS BIRDG	N2 TRAFFIC HUM FAINT. FROGS ROOSTER CROW	46.2	64.2	42.8	50.0	46.7	47.1
H3	000		34° 6'17.61"S	22° 6'41.86"E		2254	2309	27/11	24.1	1/2 CLOUD COOL	1.1	N2 NOISE INSECTS	PHONE RING TALKING	46.6	74.4	29.8	54.2	39.8	31.1
H4	000		34° 6'13.96"S	22° 6'46.73"E		2318	2358	27/11	22.3	3/4 CLOUD COOL	0.1 CALM	N2 TRAFFIC INSECTS	COWS MOO DOG BARKING	47.4	77.1	33	65.5	39.2	50.1
H5	006		34° 5'54.89"S	22° 6'32.17"E		2370	2340	27/11	23	COOL 5/8 CLOUD	< 0.1 CALM	N2 INSECTS	DOG BARKING COWS	44.1	65.2	40.9	49	42.4	49.5

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
						DAY 2													
Site	File	Description	Lat (south)	Long (east)	Cal	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L _{min}	Peak	Min	Max	L ₁₀	L ₅₀
H1	110		34° 5'57.44"S	22° 7'9.33"E		1215	1225	28/11	26.2	Clear	1.3	N2 TRAFFIC BIRDS N2 TRAFFIC WINDEN PLANTS BIRDS	MALL CONSTRUCTION NOISE PHONE RINGING INSECTS Loud TRUCK AIR BREAKS	60.0	83.3	47.4	73.8	52.9	62.3
H2	5010	Fairview farm area - Fairview farm road (Access 7)	34° 6'21.28"S	22° 6'25.74"E		0955	0905	28/11	23.9	3/4 CLOUD VD COOL	1.0 N	*R102 N2 TRAFFIC BIRDS ROAD CONSTRUCTION NOISE WIND	CAR PASSING FARM GATE GENERAL ROAD TRAFFIC DOGS BARK MALL CONSTRUCTION NOISE TRUCKS BEEFERS	60.8	93.3	52.4	78.6	56.8	61.6
H3	6010		34° 6'17.61"S	22° 6'41.86"E		10:04	1019	28/11	25.3	3/4 CLOUD CALM	2.3 N	*N2 + R102 TRAFFIC BIRDS	MALL CONSTRUCTION NOISE MALL CONSTRUCTION NOISE MOVE HERE	54.6	75.0	49.2	63.7	52.4	57.6
H4	7010		34° 6'13.96"S	22° 6'46.73"E		0441	0451	28/11	26.4	5/8 CLOUD WIND	2.2 N	*N2 + R102 TRAFFIC BIRDS	MALL CONSTRUCTION NOISE COWS GRAZING HARTLAND AIR COMPRESSOR H2S HARTLAND HAMMILLING FROM CONSTRUCTION CAMP	55.2	76.8	50.3	59.9	52.4	56.9
H5	8010		34° 5'54.89"S	22° 6'32.17"E		1024	1034	28/11	26.5	3/4 CLOUD WIND	3.7 N	*N2 + R102 TRAFFIC BIRDS WIND IN BUSHES	MALL CONSTRUCTION NOISE Loud BIRD HARTLAND CONSTRUCTION BANGING INTERSECTION MALL ROAD CONSTRUCTION	47.0	73.3	41.7	61.9	44.6	49.3

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
Site	File	Description	Lat (south)	Long (east)	Cal.	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L ₁₀	Peak	L ₅₀	Max	L ₉₀	L ₉₅
H1	0115		34° 05' 44" S	22° 19' 33" E		22:02	22:12	28/11	22.8	4 CLOUD COOL LIGHT WIND	0.13	MIXED TRAFFIC INSECTS WIND	HARTLAND RESIDENCY TV R102 TRAFFIC N2 TRAFFIC ± 70% OF THE TIME	54.6	80.4	38.5	69.7	49.8	76.9
H2	0124	Fairview farm area - Fairview farm road (Access ?)	34° 02' 28" S	22° 02' 54" E		01:40	01:50	24/11	22.0	7 CLOUD COOL LIGHT DRIZZLE VD	0.15	N2 TRAFFIC WIND IN TREES INSECTS	LOAD BIRDY R102 TRAFFIC	44.3	78.3	31.7	67.4	34.8	43.2
H3	0120		34° 01' 17" S	22° 04' 09" E		00:03	00:13	24/11	21.8	3 CLOUD COOL	2.2	WIND IN SHRUBS INSECTS	N2 TRAFFIC ± 60% OF THE TIME BIRDY DOGS BARKING	46.1	72.4	28.7	62.0	31.9	50.5
H4	0122		34° 01' 18" S	22° 04' 10" E		00:46	00:56	24/11	21.5	5 CLOUD COOL	2.14	INSECTS N2 TRAFFIC WIND IN SHRUBS	R102 TRAFFIC BIRDY	46.1	64.8	31.9	62.9	35.3	50.1
H5	0121		34° 04' 09" S	22° 03' 17" E		00:25	00:35	24/11	21.6	4 CLOUD COOL	2.1	INSECTS WIND	N2 TRAFFIC ± 60% OF THE TIME LOW M 60 BIRDY	47.2	68.8	31.4	61.8	34.7	49.8

ATB Environmental Consulting		Monitoring undertaken by: Adam Bennett		Note: 10-minute noise samples		File name: 0005		Noise level (dB)											
Site	File	Description	Lat (south)	Long (east)	Cal.	Start	Finish	Date	Temp (°C)	Met. Conditions	Wind speed (m/s)	Constant noise sources	Occasional noise sources	L ₁₀	Peak	L ₅₀	Max	L ₉₀	L ₉₅
H6	0117		34° 05' 06" S	22° 14' 73" E		22:49	22:59	24/11	23.3	4 CLOUD COOL	1.4	INSECTS WIND IN BUSHES DISTANT TRAFFIC FROM HARTLAND → AIRPORT	N2 TRAFFIC ± 70% LOW MOD OF THE TIME BIRDY	42.4	76.1	26.4	59.0	29.1	46.5
H7	0123		34° 04' 42" S	22° 16' 08" E		01:09	01:19	29/10	21.6	6 CLOUD LIGHT DRIZZLE COOL	1.4	INSECTS WIND IN PLANTS N2 TRAFFIC	BIRDY LIGHT DRIZZLE WIND	47.2	71.4	32.4	60.9	31.6	45.8
H8	0116		34° 04' 56" S	22° 12' 30" E		22:39	22:49	24/11	22.4	4 CLOUD COOL	2.11	INSECTS DISTANT TRAFFIC FROM HARTLAND SIDE WIND IN BUSHES	N2 TRAFFIC ± 70% OF THE TIME BIRDY DOGS BARKING	40.9	66.5	26.4	56.1	29.2	45.0
H9	0119		34° 03' 09" S	22° 11' 08" E		23:39	23:49	29/11	21.9	2 CLOUD COOL	1.0	INSECTS N2 TRAFFIC WIND	HARTLAND TRAFFIC N2 TRAFFIC ± 60% OF THE TIME BIRDY DOGS BARKING	48.9	76.3	30.3	64.9	32.17	51.9
H10	0118		34° 02' 22" S	22° 04' 08" E		23:12	23:22	29/11	22.3	3 CLOUD COOL	2.0	N2 TRAFFIC ± 70% OF THE TIME INSECTS WIND	SECURITY TALKING DOGS BARKING SECURITY RADIOS + STATIC BIRDY	42.5	66.4	27.7	55.7	30.9	46.1

UB VERY LOW TRAFFIC ON R102 AT NIGHT

END CAL 29/01 01:53

94dB

APPENDIX 2: NOISE MONITORING LOCATION PHOTOGRAPHS



Monitoring site H1



Monitoring site H2



Monitoring site H3



Monitoring site H4



Monitoring site N5



Monitoring site N6



Monitoring site H7



Monitoring site H8



Monitoring site H9



Monitoring site H10

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APPENDIX 3: NOISE MONITORING EQUIPMENT CALIBRATION CERTIFICATES



CAL-048-13-00
CAL-048-01-00

M AND N ACOUSTIC SERVICES (Pty) Ltd

Co. Reg. No: 2012/123238/07 VAT NO: 4300255876 BEE Status: Level 4

P.O. Box 61713, Pierre van Ryneveld, 0045

15 Mustang Avenue, Pierre van Ryneveld, 0045

Tel: 012 689-2008 (076 920 3070) • Fax: 086 211 4690
E-mail: admin@mnaoustics.co.za / marianka@mnaoustics.co.za
Website: www.mnaoustics.co.za

CERTIFICATE OF CALIBRATION

CERTIFICATE NUMBER	2025-AS-1173
ORGANISATION	ATB ENVIRONMENTAL CONSULTING
ORGANISATION ADDRESS	21 IMPALA STREET, JOHANNESBURG, 2169
CALIBRATION OF	INTEGRATING SOUND LEVEL METER complete with built-in ½" PRE-AMPLIFIER and ½" MICROPHONE
MANUFACTURERS	RION
MODEL NUMBERS	NL-53, NH-25 and UC-59
SERIAL NUMBERS	00251790, 44845 and 27098
RECEIVE DATE	02 APRIL 2025
DATE OF CALIBRATION	09 – 10 APRIL 2025
RECOMMENDED DUE DATE	APRIL 2027 (SEE REMARKS 4.8)
PAGE NUMBER	PAGE 1 OF 6

This certificate is issued in accordance with the conditions of approval granted by the South African National Accreditation System (SANAS). This Certificate may not be reproduced without the written approval of SANAS and M and N Acoustic Services.

The measurement results recorded in this certificate were correct at the time of calibration. The subsequent accuracy will depend on factors such as care, handling, frequency of use and the number of different users. It is recommended that re-calibration should be performed at an interval, which will ensure that the instrument remains within the desired limits and/or manufacturer's specifications.

The South African National Accreditation System (SANAS) is member of the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). This arrangement allows for mutual recognition of technical test and calibration data by member accreditation bodies worldwide. For more information on the arrangement please consult www.ilac.org

Calibrated/Supervised by Calibration Technician:	 W.S. BANYONI	Clause 3
Authorized/Checked by SANAS Technical Signatory:	 M. NAUDE	Date of Issue: 15 APRIL 2025

Director: Marianka Naudé (082 727 3312)

CERTIFICATE OF CONFORMANCE

CERTIFICATE NUMBER	2025-AS-3066
ORGANISATION	ATB ENVIRONMENTAL CONSULTING
ORGANISATION ADDRESS	21 IMPALA STREET, RANDPARK RIDGE EXT 34, JOHANNESBURG, 2169
CALIBRATION OF	SOUND LEVEL CALIBRATOR (complete with 1/2" Adaptor)
MANUFACTURER	RION
MODEL NUMBER	NC-75
SERIAL NUMBER	35046099
DATE OF CALIBRATION	16 OCTOBER 2025
RECOMMENDED DUE DATE	OCTOBER 2026
PAGE NUMBER	PAGE 1 OF 3

This certificate is issued in accordance with the conditions of approval granted by the South African National Accreditation System (SANAS). This Certificate may not be reproduced without the written approval of SANAS and M and N Acoustic Services.

Calibrations performed by this laboratory are in terms of standards, the accuracies of which are traceable to national measuring standards as maintained by NMISA.

The measurement results recorded in this certificate were correct at the time of calibration. The subsequent accuracy will depend on factors such as care, handling, frequency of use and the number of different users. It is recommended that re-calibration should be performed at an interval, which will ensure that the instrument remains within the desired limits and/or manufacturer's specifications.

The South African National Accreditation System (SANAS) is member of the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). This arrangement allows for mutual recognition of technical test and calibration data by member accreditation bodies worldwide. For more information on the arrangement please consult www.ilac.org

<p>Calibrated by:</p>  <p>W. SIBANYONI (CALIBRATION TECHNICIAN)</p>	<p>Authorized/Checked by:</p>  <p>M. NAUDÉ (SANAS TECHNICAL SIGNATORY)</p>	<p>Date of Issue:</p> <p>21 OCTOBER 2025</p>
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Director: Marianka Naudé (082 727 3312)

APPENDIX 4: DOCUMENT LIMITATIONS

This document has been provided by ATB Environmental Consulting with the following limitations:

- This document has been prepared for the purpose outlined in ATB Environmental Consulting's proposal and no responsibility is accepted for use of this document, in whole or/ or in part, in other contexts and/or for any other purpose;
- This document is provided for sole use by the Client and is confidential;
- The scope of our services are as described in our proposal, and are subject to restrictions and limitations;
- If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by us;
- Conditions may exist at the project site were retained to undertake. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the document. Accordingly, additional studies and actions may be required;
- Our opinions are based upon information that existed at the time of the production of the document. It is understood that the services provided allowed us to form no more than an opinion of the actual conditions of the site at the time. Site visits and site visit observations cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations;
- Assessments and opinions made in this document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this document;
- Where data is supplied by the Client or other external sources have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by us for incomplete and/or inaccurate data supplied by others;
- The Client acknowledges that ATB Environmental Consulting may have retained sub-consultants to provide services for the benefit of ATB Environmental Consulting. We will be fully responsible to the Client for the services and work done by all our sub-consultants and subcontractors. The Client agrees that it will only assert claims against and seek to recover losses, damages or other liabilities from ATB Environmental Consulting and not ATB Environmental Consulting's affiliated companies. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any legal recourse, and waives any expense, loss, claim, demand, or cause of action, against ATB Environmental Consulting's affiliated companies, and their employees, officers and directors;
- Any third-party use of this document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. ATB Environmental Consulting accepts no responsibility for damages, if any, suffered by any third party because of decisions made or actions based on this document; and
- ATB is not a South African National Standards (SANS) approved occupational hygienist. Occupational noise levels presented are thus for reference purposes only. For legal compliance purposes, occupational exposure monitoring must be undertaken by a SANS approved occupational hygienist.

APPENDIX 5: DETAILS OF EAP, DECLARATION OF INTEREST

Details of EAP	
Environmental Assessment Practitioner (EAP)	Adam Bennett
Postal address	21 Impala Street, Randpark Ridge, Ext 34, Johannesburg, South Africa, 2169
Cell	+27 0 83 538 9424
E-mail	adam@atbenviro.co.za
Professional affiliations	SACNASP (# 400142/08); EAPASA (#2021/3860) & SAIOH (#2108)

The Environmental Specialist

I, **Adam Bennett** declare that:

General declaration:

- I act as the independent environmental practitioner in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of this report are made available to the projects EAP for distribution to the interested and affected parties as part of the projects stakeholder engagement process as required under the Regulations. The public and interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on the report which is produced to support the EA application;
- I will ensure that the comments of all interested and affected parties provided to me by the EAP and/or directly by the interested and affected parties are considered in this report and assessment of the impacts. The EAP will be responsible for recording the comments in a report that is to be submitted to the competent authority in respect of the application;
- I will provide the competent authority with access to all information at my disposal regarding the report, whether such information is favourable to the applicant or not; all the particulars furnished by me in this form are true and correct; will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;

I do not have a vested interest in the proposed activity proceeding:



Signature of the specialist:

ATB Environmental Consulting

Name of company:

31 March 2026

Date:

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APPENDIX 6: NOISE SPECIALIST / EAP EXPERIENCE IN NOISE MONITORING AND ASSESSMENT

Noise & vibration monitoring

- Letsatsi La Africa, Noise Nuisance/Compliance Monitoring Survey, mine impacts on game farm, 2 surveys, RSA, 2025
- N2 Swellendam to Lizmore upgrade environmental baseline noise monitoring as per GN320 for EIA purposes, Zitholele, RSA, 2025
- Verdoorstkolk gypsum mine environmental baseline noise monitoring as per GN320 for EIA purposes, EnviroSaint, RSA, 2025
- Cast Products environmental baseline noise monitoring, Geozone, RSA, 2024
- Environmental noise monitoring Nampak Divfood, Geozone, RSA, 2023
- Noise monitoring for the La Parada Restaurant in the Menlyn Maine Complex in Response to Nearby Sensitive Receptor Complaints, Government Employees Pension Fund, RSA, 2023
- Design Quarter Checkers development noise monitoring, SIPP, RSA, 2022
- Rietfontein quarry winter baseline noise monitoring, Afrimat, RSA, 2022.
- Design Quarter mitigation implementation noise monitoring, Broll, RSA, 2021
- Design Quarter baseline noise monitoring, Broll, RSA, 2020
- SeritiCoal Holdings, New Vaal Colliery baseline noise monitoring, RSA, 2020
- Nimba Iron Ore, baseline noise monitoring, Guinea, 2020
- SeritiCoal Holdings, New Vaal Colliery baseline noise monitoring, RSA, 2019
- Quarterly and annual noise monitoring report, October 2019, Exxaro BIP & RTK projects, RSA, 2019
- Maamba Power Station, baseline noise and vibration monitoring, Zambia, 2016
- Noise baseline monitoring for the gas well field development and central processing facility, CNOOC, Uganda, 2016
- Baseline noise monitoring, Khongoni coal mine, Khongoni Haaskraal Coal, 2015
- Baseline noise monitoring, Two Rivers Platinum Mine, RSA, 2015

Noise & Vibration Assessments

- Noise Impact Assessment (NIA), for the Proposed Grootvlei Power Station Solar PV, BESS, and Possible Gas Power Plant, Zitholele, RSA, 2025 - Current
- Letsatsi La Africa, Noise Nuisance/Compliance Assessment, mine impacts on game farm, 2 surveys, RSA, 2025
- Quantitative Noise Impact Assessment (NIA) for the proposed N2 Swellendam to Lizmore upgrade, Zitholele, RSA, 2025
- Quantitative NIA for the proposed Verdoorstkolk gypsum mine, EnviroSaint, RSA, 2025 - current
- Quantitative NIA for the Proposed Upgrade of the Thanda Airfield Hluhluwe, Eco-Thunder, RSA, 2024 - current
- Peer review of the Environmental Noise Impact Assessment and Blasting Impact Assessment for the Proposed Development of an Anthracite Mine as part of the Somkhele Mine Expansion Project North-West of Mtubatuba, KwaZulu-Natal – Tendele Mine, Allrize.org, RSA, 2024
- Quantitative NIA for the Proposed Development of the Hennenman Proposed Solar Photovoltaic project, Free state, RSA, Eco Thunder, 2024
- Noise assessment for the La Parada Restaurant in the Menlyn Maine Complex in Response to Nearby Sensitive Receptor Complaints, Government Employees Pension Fund, RSA, 2023
- Quantitative NIA for the Proposed Development of the Vlermuistlaagte Loops and Sishen Erts Yard Loop, Northern Cape, Sativa, RSA, 2023
- Quantitative NIA for the Ilute Solar Limited, Proposed Solar Photovoltaic Project in Zambia, Armitage Environmental & Social Consulting, Zambia, 2022
- Design Quarter Checkers development noise assessment, SIPP, RSA, 2022
- Quantitative NIA for the Rietfontein quarry EMPr amendment process relating to pit expansion, Afrimat, RSA, 2022.
- Blastrite NIA for the proposed new grit drier, Zitholele, RSA, 2022
- Quantitative NIA for the proposed new Dangote Dwaalboom Opencast Limestone Mine, Thabazimbi, Limpopo Province, SATIVA, RSA, 2022
- Quantitative NIA for the Proposed Limestone, Shale, Gypsum and Iron Ore Mining Operation, Western Cape Province, Blue Waves Properties 198 (Pty) Limited & SATIVA, RSA, 2021
- Quantitative NIA for the Installation of the Mossel Bay Energy 1096MW Gas and Steam Combined Cycle Turbine Power Plant (Phase 1 & 2) in Mossel Bay, Western Cape, SATIVA, RSA, 2021
- Design Quarter noise assessment following mitigation implementation, Broll, RSA, 2021
- Quantitative NIA for the Installation of 100MW Gas Plant on the Remaining Extent of the Farm Vetlaagte No. 4, Portion A, Near De Aar, Northern Cape, 2021
- Quantitative NIA for the VanRhynsdorp mining project, SATIVA & GIBB, RSA, 2021
- Design Quarter NIA, Broll, RSA, 2020
- Quantitative NIA for the Installation of Gas Turbines and Battery Energy Storage System on the Remaining Extent of the Farm Vetlaagte, SATIVA, Northern Cape, 2020
- Mafube debottlenecking NIA, Anglo Coal, RSA, 2020
- Zibulo discard dump NIA, 2020
- South32 coal holdings, Assessment of the status of compliance of the SAEC operations in terms of duty of care regarding compliance with SANS 10103 and SANS 10328, RSA, 2019
- AngloGold Ashanti, proposed surface pipeline NIA, RSA, 2019
- New Largo BFS update to meet IFC noise management requirements, RSA, 2019
- Seriti Coal Holdings, Klipspruit Discard Dump Expansion Project NIA, RSA, 2019
- Seriti Coal, Metsimaholo underground coal mine NIA, RSA, 2019
- South32 Coal Holdings, Klipspruit Colliery NIA, RSA, 2019
- Anglo Gold Ashanti NIA, RSA, 2019
- 2017 to 2013 undertaken > 15 NIA projects for a suite of clients including: Jindal KZN Iron Ore Mine, Jindal Iron Ore, Samancor Chrome Limited, Heidelberg South Rand, Kamoas Copper, Khongoni Haaskraal Coal, Moatize Power Station, Maamba Power

Station, Kamo Copper, CNOOC etc. Funani Environmental management services cc., Nimba Iron Ore, and Jeffares & Green Consulting Engineers (Pty) Ltd, Mafube LifeX coal mine etc.

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APPENDIX 7: NOISE SPECIALIST/EAP SUMMARY CV/BIO



ATB
Environmental
Consulting

ATB Group

ADAM
BENNETT

CONTACT

PHONE:
+27 (0)83 538 9424

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SUMMARY BIO

Adam is a senior environmental consultant with over 20-years' integrated environmental management experience in southern, central, west Africa and other international countries. I hold the following professional registrations:

- The South African Council for Natural Scientific Professions (# 400142/08) in the field of Environmental Science
- Environmental Assessment Practitioners Association of South Africa as an Environmental Assessment Practitioner (#2021/3860)
- The South African Institute for Occupational Hygiene as an Occupational Hygiene Assistant (OHA) (#2108)

My natural entrepreneurship, broad knowledge and market sector experience in: mining and mineral beneficiation, oil and gas, industrial manufacturing, power, renewable energies, waste, urban development, transport, and construction, allows me to critically analyse the enviro-social challenges faced, develop strategic and operational plans to address the gaps, implement the developed strategies and plans in a simplified manner to yield tangible and intangible positive results to an organisation, their operations and projects. This ability is one of my key differentiators, while embracing the core values of integrity, honesty, collaboration, innovation, excellence, and accountability. I am passionate about adding value, leading with significance and in optimizing the integration between people, process, technology and the environment to achieve sustainable enviro-social development.

My experience and capabilities include:

- Project management and business processes
- Enviro-social management and associated integrated regulatory processes: EIA, ESIA, EMP, EMPr, ESMPs, WUL, IWWMPs, WMPs, EMS (ISO 14001), and industrial clustering
- Auditing: Environmental and Social Due Diligence (ESDD) against local, IFC Performance Standards, World Bank guidelines, Equator Principles, and various lender requirements, legal compliance audits, ECO monitoring and reporting, environmental health and safety risk assessments and environmental accident investigations
- Air quality management, monitoring, and licensing
- Noise & Vibration management and monitoring
- Operations level (HAZMAT) support on major chemical incidents, spillages and incident commanding
- Contaminated land assessments
- Rehabilitation plan development and implementation
- Disaster & Emergency management planning and recovery

Adam Bennett
Managing Director & Senior Environmental Specialist
ATB Environmental Consulting
ATB Group (Pty) Limited