UPDATED ENVIRONMENTAL NOISE IMPACT ASSESSMENT

GAS TO POWER POWERSHIP PROJECT

AT THE PORT OF RICHARD'S BAY

UMHLATHUZE LOCAL MUNICIPALITY

KWAZULU-NATAL

SOUTH AFRICA

SPECIALIST STUDY ON TERRESTRIAL NOISE IMPACTS

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TABLE OF CONTENTS

List of Tables

List of Figures

Amendment History

Version 1	Original	12/02/2021
Version 2	Minor editorial changes	19/02/2021
Version 3	Corrections made & Results of Alternative Site 2	21/02/2021
Version 4	Updated with information from Karpowership Ghana Noise Study	22/04/2021
Version 5	Modelling results updated based on new information supplied by the Subacoustech Osman Khan Powership Noise Field Study conducted in September 2022.	28/10/2022

INFORMATION PAGE

CLIENT NAME	Triplo4 Sustainable Solutions (Pty) Ltd
PROJECT	Proposed Gas to Power - Powership Project at the Port of Richard's Bay, uMhlathuze Municipality, Kwazulu-Natal Province.
CONTACT PERSON	Ms Shanice Singh
TYPE OF SURVEY	Terrestrial Noise Specialist Study as part of the Environmental Impact Assessment
DATE OF FIELD SURVEY	5th of October 2020 – 7th of October 2020
REPORT PREPARED BY	Dr Brett Williams and Mr Jason Hutten

This report only pertains to the conditions found at the above site at the time of the survey. This report may not be copied electronically, physically, or otherwise, except in its entirety. If sections of the report are to be copied the approval of the author, in writing, is required.

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Dr B WILLIAMS

DECLARATION OF INDEPENDENCE	
Noise Impact Assessment	I, Brett Williams, declare that I am an independent consultant and have no business, financial, personal, or other interest in the Proposed Gas to Power - Powership (Richard's Bay, KZN) application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application, or appeal. There are no circumstances that compromise the objectivity of my performing such work.  **Brett Williams**

EXECUTIVE SUMMARY

Safetech were appointed to conduct a specialist noise impact assessment for a Gas to Power - Powership Project to be located within the Port of Richard's Bay in Kwazulu-Natal. The project involves the generation of electricity by means of two mobile Powerships to be berthed in the Port of Richard's Bay. Additional components of the project under investigation include a Floating Storage Regasification Unit (FSRU), gas pipelines, and a Liquid Natural Gas Carrier (LNGC).

Baseline monitoring of the ambient noise levels adjacent to the proposed site was conducted. Noise levels at the proposed site are heavily influenced by passing cars and community noise such as people talking and dogs barking.

The results of the noise impact assessment of the proposed Gas to Power - Powership Project in the Port of Richard's Bay indicates that noise levels during the operational phase will most likely be below the ambient noise levels and therefore be of **Low** significance after mitigation from a human impact perspective. The construction related noise impacts will be of **Low** significance.

The following is highly recommended:

a) Periodic terrestrial noise measurements are taken during the construction and operational phases.
b) Ensure that all acoustic enclosures or attenuators that are fitted to the vessel are in place during operations.
c) As a precautionary measure vibro-piling (if required) should not occur at night.
d) If possible, position the ship so that the port side that contains the air inlets is positioned away from highly sensitive receptors.

If the above mitigation measures are implemented, it is recommended that the project receive environmental authorisation.

Dr Brett Williams

ABBREVIATIONS AND DEFINITIONS

Ambient Noise	Means the reading on an integrating impulse sound level meter taken at a measuring point, in the absence of any alleged disturbing noise, at the end of a total period of at least 10 minutes after such meter was put into operation. ***Authors Note:*** *Ambient noise excludes the noise alleged to be causing a noise nuisance or disturbing noise.*
Ambient Noise (SANS 10103)	Totally encompassing sound in each situation at a given time, and usually composed of sound from many sources, both near and far *NOTE: Ambient noise includes the noise from the noise source under investigation.*
Annoyance	General negative reaction of the community or person to a condition creating displeasure or interference with specific activities.
dB(A)	Decibels weighted A scale - Value of the sound pressure level in decibels, determined using a frequency weighting network A (with reference to 20 µPa).
Disturbing Noise	Means a noise level that causes the ambient sound level to rise above the designated sound level, or if no sound level has been designated, a sound level that exceeds the ambient sound level by 7 dBA or more or that exceeds the typical rating levels for ambient noise in districts, indicated in table 2 of SANS 10103.
Equivalent Continuous Rating Level ($L_{Req, T}$)	The equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$) during a specified time interval, plus specified adjustments for tonal character and impulsiveness of the sound and derived from the applicable equation. $L_{Aeq, T} + Ci + C_t + kn$ where $L_{aeq, T}$ is the equivalent A-weighted sound pressure level in decibels. Ci is the impulse correction. C_t is the correction for tonal character. Kn is the adjustment for day or night (0dB for day and +10dB for night measurements
FSRU	Floating Storage Regasification Unit. A ship that has been designed and built to store and transport Liquified Natural Gas (LNG).
HRSG	Heat Recovery Steam Generator.
Low Frequency Noise	Means sound which contains sound energy at frequencies predominantly below 100 Hz.
LNG	Liquified Natural Gas. An odourless, colourless and non-toxic mixture of predominantly methane with additional ethane that has been cooled to -162°C for easy of transport and increased safety of storage within non-pressurized containers.

LNGC	Liquified Natural Gas Carrier. A ship specializing in the transport of LNG.
NIA	Noise Impact Assessment
NEMA	National Environmental Management Act
Noise Nuisance	Any sound which impairs or may impair the convenience or peace of a reasonable person.
Noise Rating Level	The applicable outdoor equivalent continuous rating level indicated in SANS 10103.
NSA	Noise Sensitive Area
Residual Noise (SANS 10103)	The all-encompassing sound in a given situation at a given time, measured as the reading on an integrated impulse sound level meter for a total period of at least 10 minutes, excluding noise alleged to be causing a noise nuisance or disturbing noise.
SANS 10103:2008	The South African national standards code of practice for the measurement and rating of environmental noise with respect to annoyance and to speech communication.
SEZ	Special Economic Zone. Refers to an area in which business and trade laws are different to the rest of the country in order to increase economic activity.
Sound Level	The equivalent continuous rating level as defined in SANS 10103, considering impulse, tone, and night-time corrections.

1. INTRODUCTION AND METHODOLOGY

1.1. Scope and Objective

Karpowership SA (Pty) Ltd wishes to establish a Gas-to-Power - Powership Project (The Proposed Project) within the Port of Richard's Bay in the uMlhathuze Local Municipality, Kwazulu-Natal, with a contracted capacity of 450 MW (which cannot be exceeded under the terms of the RMIPPPP). Details pertaining to the project will be discussed further in Section 2.

The objective of this study is to provide a comprehensive and detailed Noise Impact Assessment (NIA) that presents and evaluates the noise impact of the proposed project.

The scope of work of the noise study includes the following:

- Provide a brief review of noise legislation and standards applicable in South Africa as well as international standards.
- Identify relevant protocols, legal and permit requirements.
- Conduct a desktop study of available information that can support and inform the specialist noise study.
- Identify issues and potential impacts, as well as possible cumulative impacts related to the noise aspects of the project.
- Measure the existing residual noise at the proposed site, during both the day and nighttime.
- Identify the components of the project that could generate significant noise levels.
- Identify the sensitive noise receptors in the vicinity of the proposed project.
- Conduct a noise study of the predicted (future) noise impacts during construction and operation of the proposed project.
- Identify management and mitigation actions to enhance positive impacts and avoid/reduce negative impacts, respectively.
- This report is to only be used in the application for environmental authorization of the Gas to Power Powership Project at the **Port of Richard's Bay, Kwazulu-Natal.**

1.2. Approach and Methodology

The methodology used in the study consisted of two approaches to determine the noise impact from the proposed project and associated infrastructures. These are as follows:

- A desktop study to model the likely noise emissions from the proposed operations.
- Field measurements of the existing ambient noise at the Port of Richard's Bay where the Powerships will be located.
- Review of the Subacoustech report from a similar project in Ghana.

1.3. Desktop Study Methodology

CadnaA 2020 noise modelling software was used to predict the noise from the proposed development. The method used in the modelling is described in:

- ISO 9613-1: Attenuation of sound during propagation outdoors, Part 1: Calculation of sound by the atmosphere and
- ISO 9613-2: Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

It has been assumed that the operations will run continuously, as a 'worst-case' assessment. Meteorological parameters were set to 10°C and 70% relative humidity (as required in ISO 9613:1996). Additional modelling using different meteorological conditions showed a negligible difference in the final noise level results.

The above meteorological conditions will result in the worst-case sound transmission over distance. Several Noise Sensitive Areas were identified and included as receptors in the noise modelling.

1.4. Field Study

A field study was conducted at the beginning of October 2020. The survey was conducted over 2 nights as per the GNR320. The ambient noise monitoring point was chosen based on the proximity to the proposed project site. These points are referred to as Noise Sensitive Areas (NSA's).

A number of measurements were taken by placing a noise meter on a tripod and ensuring that it was placed at least 1.2 m from floor level and 3.5 m from any large flat reflecting surface. For the ambient noise monitoring, two short term points and two long term points were selected. At the long-term points, 1-hour average intervals were recorded under day and night-time conditions. The noise meter was calibrated before and after the survey, the certificates of calibration can be found in appendix B. At no time was the difference more than one decibel (dB) (Note: If the difference between measurements at the same point under the same conditions is more than 1 dB, then this is an indication that the noise meter is not properly calibrated). The weighting used was on the A scale and the meter was placed on "fast", which is the preferred method as per *SANS 10103:2008: The Measurement and Rating of Environmental Noise*. The meter was fitted with a windscreen, which is supplied by the manufacturer. The windscreen is designed so as to reduce wind noise around the microphone and not bias the measurements.

The test environment contained the following noise sources:

- Vehicular traffic;
- Birds;
- Wind; and
- Community Noise such as dogs barking and people talking.

The instrumentation that was used to conduct the study is as follows:

Rion Sound Level Calibrator

Model no.: NC-73

Serial no.: 10644864

Calibrated by: M and N Acoustic Services cc on 28 October 2019 (calibration due end October 2020 as per SANS 10083: 2013)

Certificate number: 2019-AS-1161

Total uncertainty of measurements: Sound level calibrator: ± 0.19 dB

Rion Integrating Sound Meter

Model no.: NL-32; NH-21; UC-53A; and NX-22RT

Serial no.: 00151075; 13814; 319366 and 00150957 V2.2

Calibrated by: M and N Acoustic Services cc on 24-25 October 2019 (calibration due end October 2020 as per SANS 10083: 2013)

Certificate number: 2019-AS-1162.

Total uncertainty of measurements:

Sound level meter ± 0.3 dB

½" Microphone ± 0.3 dB

1/3-Octave Filter Card ± 0.3 dB

Calibration certificates are included in Appendix B.

1.5. Assumptions and Limitations

The following assumptions and limitations are based on a worst-case scenario:

1.5.1 Assumptions:

- The proposed location of the project was supplied by the client.
- The noise emissions and impacts around an *existing* operational Powership in Ghana was used as a reference. The study was conducted by Subacoustech Environmental Ltd. and provided to Safetech for reference. The report citation is referenced in the Appendices and Section 1.6 below. It is assumed that the information contained in this report is accurate.
- The sound power levels for the operational equipment were supplied by the client. Where no information regarding the sound power levels was available, the author used values based on similar studies conducted elsewhere.
- The Powerships noise impact will be modelled based on a combined electrical power output of 540 MW to give a worst-case assessment (since the contracted capacity will be 450 MW maximum).
- The components' physical positions have been plotted according to information supplied by the client.
- Although the contracted operational period with Eskom is 16.5 hours per day (05h00 to 21h30), the impacts have been assessed by assuming the noise can be generated within any period in a 24-hour cycle. This implies that the noise emissions could occur in periods when there is very little solar atmospheric mixing, such as at night when calm conditions occur. There will thus be very little wind masking noise during these periods. The modelled noise impacts have thus been assessed assuming no wind masking noise (worst-case scenario).

1.5.2 Limitations:

- This report ONLY addresses the human impact of the terrestrial noise emissions and not the natural environment receptors such as birds, marine animals etc. which are addressed by other specialists.
- Furthermore, this report excludes the scope of other specialist studies where additional impacts have been assessed. These studies include the Underwater Noise Report, the Marine Ecological Report, the Avifauna Report, and the Biodiversity Report. These studies were however considered and referenced in this report.

1.6. Sources of Information

1.6.1 Standards and Guidelines

The sources of information included a site visit and information supplied by the client. In addition, the following standards have been used to aid this study and guide the decision-making process with regards to noise pollution:

- South Africa - GNR.154 of January 1992: Noise control regulations in terms of section 25 of the Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989).
- South Africa - GNR.155 of 10 January 1992: Application of noise control regulations made under section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989).

- South Africa - National Environmental Management Act, 107 OF 1998 - Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the Act when applying for Environmental Authorization" – GN 320 of 20th March 2020. Page 53 – 56 Section on Noise.
- uMlhathuze Local Municipality: Nuisances By-Law (date unknown).
- SANS 10103:2008 Version 6 - The measurement and rating of environmental noise with respect to annoyance and to speech communication.
- SANS 10357:2004 Version 2.1 - The calculation of sound propagation by the Concawe method).
- ISO 9613-1: Attenuation of sound during propagation outdoors, Part 1: Calculation of sound by the atmosphere and
- ISO 9613-2: Attenuation of sound during propagation outdoors, Part 2: General method of calculation.
- SANS 10328:2008 - Methods for environmental noise impact assessments.
- GDS R&D Incorporated Noise Study on a Karpowership Noise Emissions (17th April 2021) – supplied by client (This report was merely for information purposes and as in previous versions of this Safetech report was not used in determining the noise impacts),
- Subacoustech Report No.: P292R1102. Measurement of airborne noise around the Osman Khan Powership, Ghana (9th September 2022) – Supplied by the client.
- Subacoustech Report No.: P292R0901. Underwater Noise Assessment Port of Richard's Bay (14th October 2022) – Supplied by the client.

1.6.2 Polycentric Integrated Specialist Reports

The findings and recommendations of this report have been considered by the relevant professional team and discussed at the specialist integration meetings on the polycentric approach. The following specialist studies have considered this noise report:

- Terrestrial Biodiversity – The Biodiversity Company
- Socio-economic – Social Risk Research
- Air Quality – Umoya-NILU
- Terrestrial Avifauna – The Biodiversity Company
- Marine Avifauna – Anchor Environmental
- Tourism – 3T Business Fusion
- Aquatic – GCS
- Coastal and Estuary – Coastwise
- Marine Ecological – Anchor Environmental
- Fisheries – Anchor Environmental

In addition, this noise report also used the Underwater Noise Report as a source of information.

2. DESCRIPTION OF PROJECT ASPECTS RELEVANT TO NOISE IMPACTS

A detailed description of the proposed project is provided in the Draft Environmental Impact Report as well as the Final Scoping Report. This section provides additional information on aspects of the project specifically related to noise impacts.

2.1. Detailed Project Description

Karpowership SA (Pty) Ltd proposes to place Powerships in the Port of Richard's Bay within uMlhathuze Local Municipality. The objective is to generate electricity from natural gas and transmit the electricity through a 132kV transmission line to a substation, before entering the national grid. During the lifespan of the project, a minimum of three ships will be berthed at any given time, two Powerships and one Floating Storage Regasification Unit (FSRU). A liquid natural gas carrier (LNGC) will dock adjacent to the FSRU for 1-2 days at a time in order to offload LNG cargo. The LNG offloading will occur approximately every 20-30 days.

The Project will consist of the following main components:

- LNG storage and regasification facilities onboard the FSRU. LNG cargo will be periodically offloaded to replenish the storage on the FSRU via an LNGC every 20-30 days. Each refilling period will take one to two days.
- Subsea gas pipeline infrastructure will be used for the distribution of natural gas from the FSRU to the Powerships. This has not been assessed as they have negligible terrestrial operational noise impacts.
- The two berthed Powerships (Khan and Shark Class) are capable of generating up to 540 MW of electricity using 27 gas engines and 3 steam turbines. The maximum contract capacity, however, is 450 MW, which can only be dispatched based on ESKOM's dispatch instructions from 05h00 to 21h30. (The maximum power output of 540 MW has been considered in this study to represent a worst-case scenario).
- Overhead transmission lines and ancillary infrastructure have not been assessed as they have very little operational noise impact.

The location of the proposed project is in the Port of Richard's Bay. The Port of Richard's Bay lies approximately 150km to the North of Durban and falls under the uMlhathuze Local Municipality in Kwazulu-Natal.

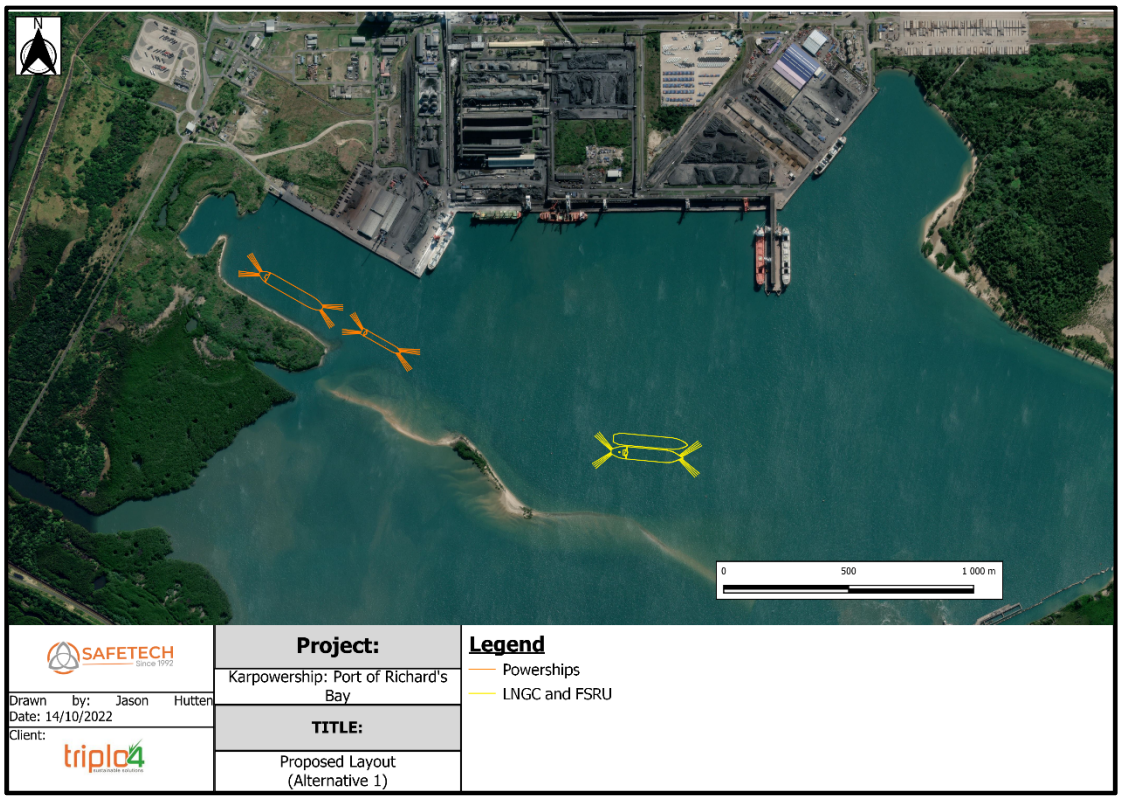

Figure 1: Location of proposed developments (Preferred Alternative 1)

The proposed location lies just over 1km to the north of the Richard's Bay Nature Reserve, an important bird area that is home to species such as flamingos and cormorants. The Nature Reserve is also a nursery ground for fish species such as grunter and perch. These impacts were however considered in other specialists' reports.

Furthermore, Alternative 2, as seen in Figure 2 below, was also assessed.

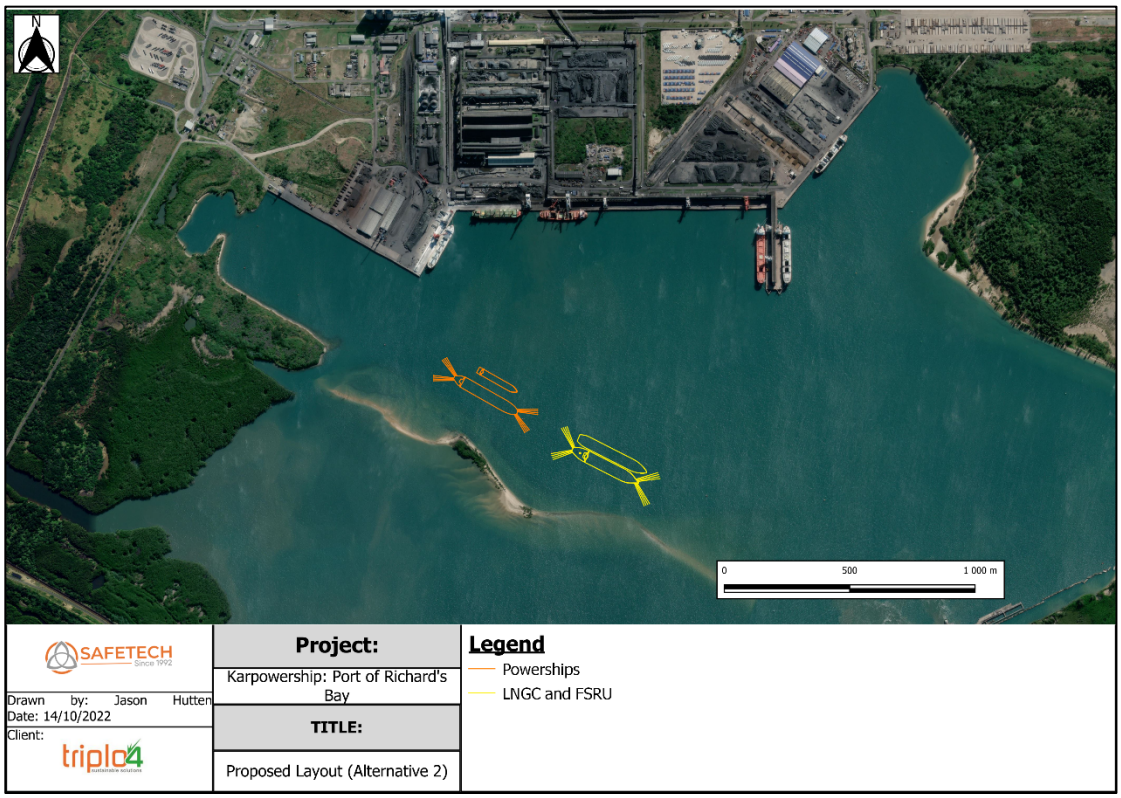

Figure 2: Proposed Layout (Alternative 2- not preferred)

3. IDENTIFICATION OF NOISE SOURCES

3.1. Noise Sources from the Project during the Construction Phase

Most components associated with the proposed project will be constructed off-site, such as the Powerships, LNGC and FSRU. However, the underground pipelines and transmission lines will require construction on-site that may impact surrounding receptors, from a noise perspective. The construction phase could generate noise during different activities such as:

- Site remediation and earthworks;
- Construction of infrastructure using mobile equipment, cranes, and concrete mixing equipment;
- Vehicle use and movement; and
- Pile driving.

The types of vehicles and equipment that could be used on site are presented in Table 1 below.

Table 1-Types of equipment to be used on site (Construction Phase).

Type	Description	Typical Sound Power Level (dB)
Trucks	10 tonne capacity	95
Cranes	Overhead and mobile	109
Mobile Construction Vehicles	Front end loaders	100
Mobile Construction Vehicles	Excavators	108
Mobile Construction Vehicles	Bulldozer	111
Mobile Construction Vehicles	Dump Truck	107
Mobile Construction Vehicles	Grader	98
Stationary Construction Equipment	Concrete mixers	110
Compressor	Air compressor	100
Compactor	Vibratory compactor	110

3.2. Noise sources from the project during the Operational Phase

3.2.1 Initial Noise Impact Data

The Powership's noise data for the operational phase has been compiled using information supplied by the manufacturer of the generators (Wartsïla) as well as information supplied by the client. Major noise emitting components used in the operation of the FSRU and LNGC were sourced from previous reports issued by this author for similar projects as well as a literature survey. Table 2 illustrates the components of the Powership, LNGC and FSRU and their respective parameters used for the prediction of noise levels during the operational phase.

Table 2- Major noise sources from the LNGC, the FSRU and one Powership.

Quantity	Name	Sound Power Level (dB(A))	Height(m) above water level	Attenuation
27	Engine*	132.2	11	
27	Exhausts*	82.8	55	Modelling conducted with a 47 dBA Silencer fitted
27	Charge Air (Turbocharger)*	109.1	4	Modelling conducted with a 33 dBA Silencer fitted
27	Ventilation Fan*	103.0	2	
3	Steam Turbine*	108.0	4	
1	FSRU**	106.5	5	
1	LNGC**	115.0	5	

* Information sourced from Wartsila
**Information from AECOM Report

The values in Table 2 were used in the original noise report (Version 4). An area source with a sound power level of 106.5dB(A) at 500Hz was used to represent the FSRU and 115dB(A) for the moored LNGC. A value of 68dB(A) per metre of pipeline was implemented into the modelling parameters. These figures are based on information from a study on a similar project conducted by AECOM in 2018.

The sound power levels from the sources listed above presents a worst-case scenario and is thus a conservative approach.

3.2.2 Additional Data from Subacoustech Field Study Report

Noise emission modelling was re-conducted using the information from a Subacoustech Environmental Ltd study of an existing Osman Khan Powership in Ghana (Subacoustech, 2022).

During the study, the Subacoustech author noted that there were only two major noise sources, namely, the Engine Air Intakes along the port side of the ship and the Exhaust Heat Outlets on the upper deck.

The updated noise sources identified are shown in Table 3 below.

Table 3 - Major Noise Sources from one Powership (Khan Class) updated from Subacoustech Field Study in 2022.

Component	Sound Power Level (dB(A))	Height(m)	Source
Engine Air Intake	114.9	6 - 9	Subacoustech, 2022.
Exhaust Heat Outlet	111.5	37	Subacoustech, 2022.
Liquid Natural Gas Carrier	115.0	5	AECOM, 2018.
Floating Storage & Regasification Unit	106.5	5	AECOM, 2018

The *approximate* Sound Power Levels were calculated from the measured Sound Pressure Levels at the Osman Khan Powership in Ghana Sound Pressure Levels, at set distances were gathered during the field studies, these are shown in Table 4 below.

The measured Sound Pressure Levels from the Subacoustech Report and distance to the source were used in the equation below to obtain the approximate Sound Power Levels of the sources.

$$L_W = L_P + \left|10log\left(\frac{Q}{4\pi r^2}\right)\right|$$

Where:

L_w = Sound Power Level;
L_p = Sound Pressure Level;
Q = propagation (set to 2 for hemispherical propagation of the noise emissions)
r = distance from source (in metres)

Table 4 - Ghana Field Study Data

Component	Sound Pressure Level measured (dB(A))	Distance from Source (m)	Sound Power Level inferred (dB(A))	Comment
Engine Air Intake	69.9	50	114.9	420MW Power output 23 Engines.
Exhaust Heat Outlet	91.0	3	111.5	18.2MW Power Output

The locations of these noise sources were inferred from photographs taken by Subacoustech during the Ghana Powership Airborne Noise Study. Figure 3 shows the engine air inlets and the exhaust heat outlets from a distance, while Figure 4 shows a close up of the louvres where the exhaust heat outlet measurements were taken on board the vessel.

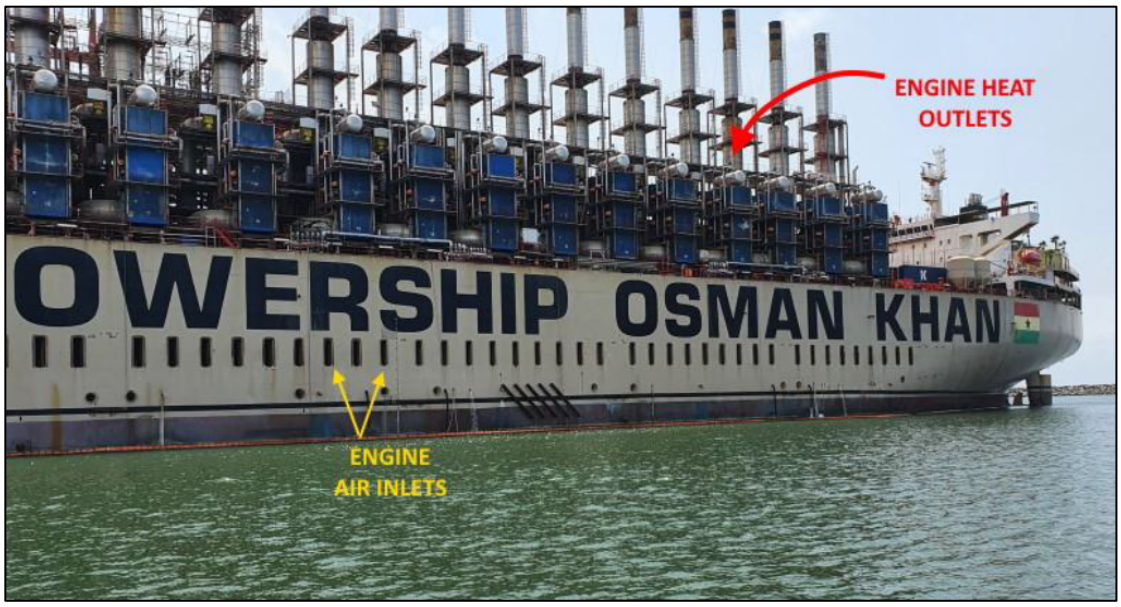

Figure 3: Noise Sources from the Khan Class Powership in Ghana (Subacoustech, 2022)

In Figure 4 below, the engines are located at the lower level within the enclosure pictured. Seven of these enclosures are found on the upper deck of the Khan vessel and one enclosure is present on the Shark vessel. Each enclosure contains three engines.

Figure 4: Louvres where Exhaust Heat Outlet is located (Subacoustech, 2022)

The Sound Power Levels for the LNGC and FSRU remain the same as in the original report (Version 4), these were taken from an AECOM study of an Australian pipeline project published in 2018.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The section below provides specific information on the receiving environment with regards to the noise impact assessment, including the results of field monitoring.

The noise sensitive areas (NSA's) have been identified and illustrated in Table 3 and Figure 4 below. The distances are calculated based on the noise source in relation to the noise sensitive area.

Table 5-Location of Noise Sensitive Areas.

#	Description	Latitude	Longitude	Distance to Project Location (m)
NSA 1	Bayside Aluminium	28°47'17.88"S	32° 0'52.59"E	1755
NSA 2	Seafarer's Club	28°47'17.74"S	32° 1'36.65"E	975
NSA 3	SPS Manufacturing	28°46'49.88"S	32° 3'37.62"E	3190
NSA 4	Small Craft Harbour	28°47'43.18"S	32° 4'41.73"E	4440
NSA 5	Meerensee Residential	28°47'25.94"S	32° 5'33.49"E	6005
NSA 6	Gubhethuka Residential	28°50'29.00"S	31°59'41.05"E	6375

**The Noise Sensitive Areas remain the same as in the original reports.*

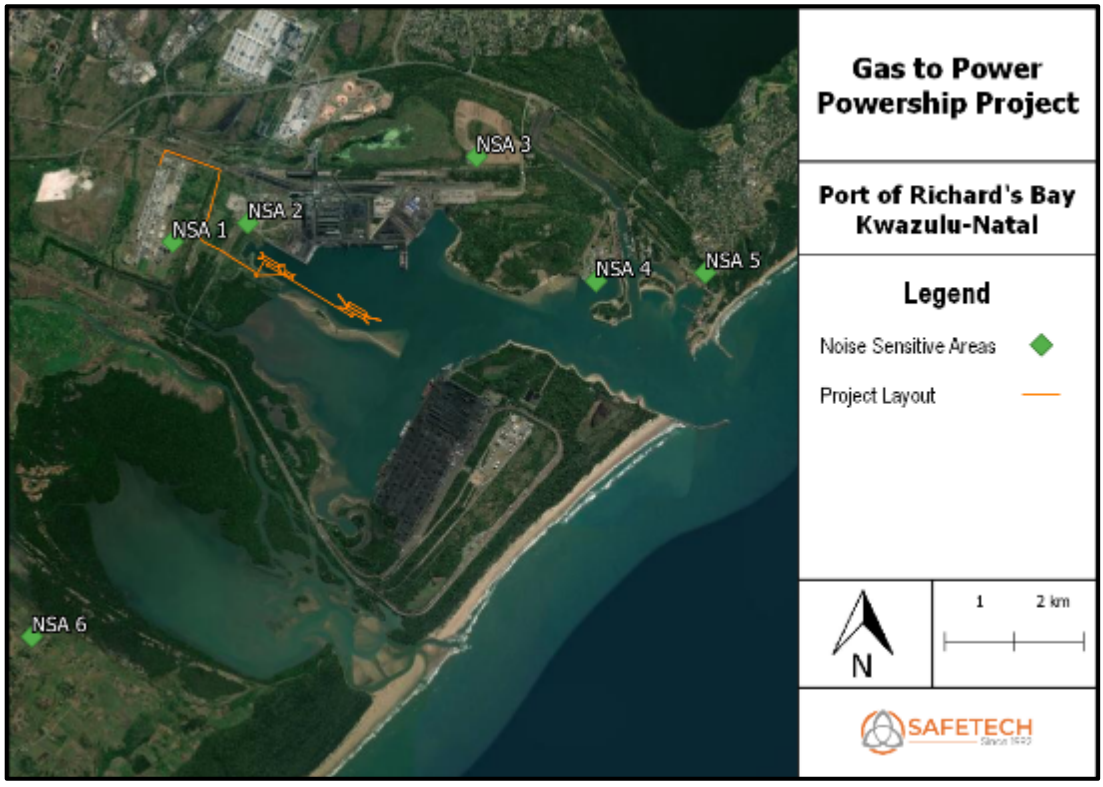

Figure 5: Noise Sensitive Areas

4.1 Residual Noise Monitoring

A field study was conducted to determine the current residual noise in the Port of Richard's Bay. The most sensitive areas from a noise perspective will be the Seafarer's Club and the several facilities in close proximity to the proposed project, such as the Bayside Aluminium facility to the north-east of the site (NSA 1). The other sensitive areas are too far away from the noise source to be of concern as is indicated in the results table. This is due to the attenuation of noise by distance. Due to access and security issues, setting up a long-term monitoring point was not possible at NSA 1 or NSA 2, therefore long-term measurements were taken in the Meerensee suburb. This location was chosen as a proxy for the residential areas where the residual noise is expected to be lower. This area will be more sensitive to a disturbing noise than in the port where noise from trucks, factories and other operational facilities will contribute to a higher residual noise level.

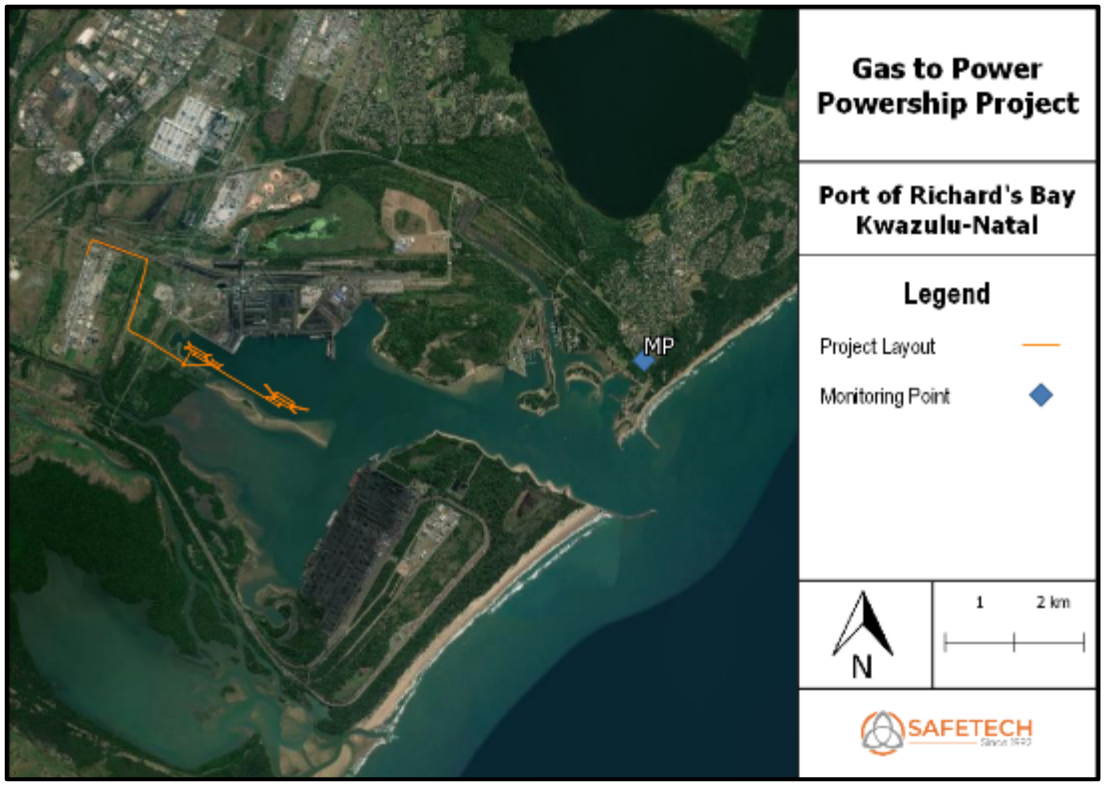

Figure 6: Residual Noise Monitoring Points

The results of the ambient noise monitoring are contained in Figure 7 below and illustrates the relationship between wind speed and noise levels. The ambient noise does not appear to vary significantly with low windspeeds. This is most likely due to the protected area of the measurement point.

The results of the ambient noise monitoring indicate that, during the monitoring period, a maximum noise level of 52.9 dB(A) was reached. The average noise levels over the course of the study was 45 dB(A).

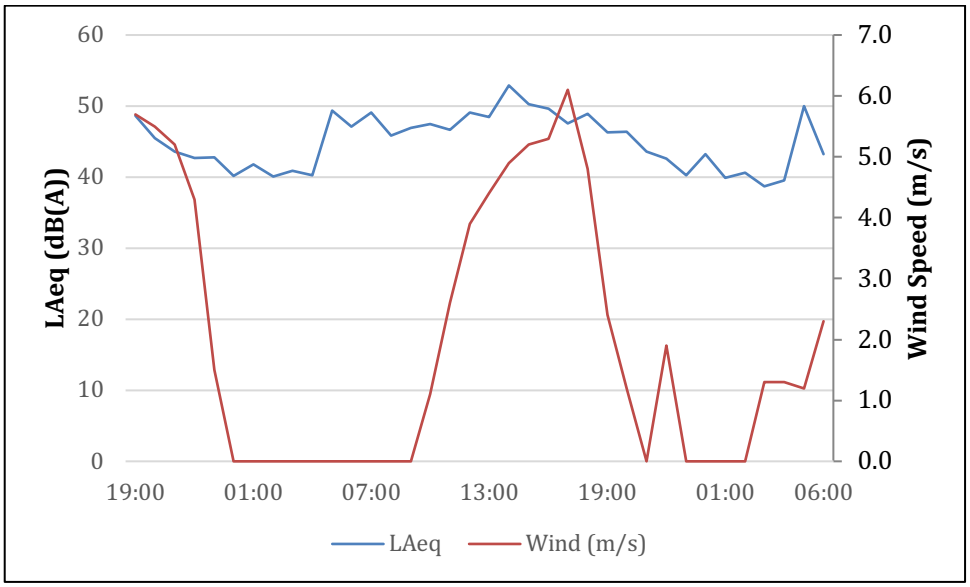

Figure 7: Residual Noise Levels vs Wind Speed

5. IDENTIFICATION OF KEY ISSUES

The key issues regarding the noise impacts that were identified are:

- Current noise profile for the proposed project area, by day and night;
- Noise impact during construction and operation of the proposed project;
- Location of local sensitive human receptors (e.g., closest residential areas); and
- Location of natural environment sensitive receptors

The noise sources could impact on the local residents outside the study area, as well as persons working within the Port of Richard's Bay. Various ecological receptors have also been identified such as fauna and flora in the Richard's Bay. The noise will include audible, low frequency and infra sound.

This noise impact assessment will therefore address the following possible noise sources:

- Construction equipment and vehicle noise;
- Noise from the operation of the Gas to Power - Powerships and ancillary infrastructure.

6. RELEVANT LEGISLATION AND GUIDELINES

SANS 10103:2008 provides typical rating levels for noise in various types of districts, as described in Table 6 below.

Table 6-Typical rating levels for noise in various types of districts.

Type of District	Equivalent Continuous Rating Level, LReq.T for Noise					
	Outdoors (dB(A))			Indoors, with open windows (dB(A))		
	Day-night	Daytime	Night-time	Day-night	Daytime	Night-time
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

Note 6 under Table 2 of the SANS 10103 documents states: *"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 dBA at a distance of 15 m from each individual source."*

The rating levels above indicate that in industrial districts (i.e., Port of Richard's Bay) the noise should not exceed 70 dB(A) during the day and 60 dB(A) at night.

These rating levels can thus be seen as the target levels for any noise emissions from a nearby industrial noise source. As can be seen from the residual noise monitoring results, the current residual noise is not exceeding the recommended day/night rating levels of industrial districts during high wind periods. It is however highly likely that the residual will be below the SANS 10103:2008 rating limit for industrial areas during calm conditions.

Furthermore, the South African Noise Control Regulations describe a disturbing noise as any noise that exceeds the residual noise by more than 7dB. This difference is usually measured at the complainant's location should a noise complaint arise. The local authority municipality Nuisances By-Law merely states that a noise nuisance should not be made. In Section 7.6 a short discussion is presented on the potential underwater noise impacts. This report only deals with terrestrial noise.

7. NOISE IMPACT ASSESSMENT

The noise impacts of the different phases of development are assessed according to the methodology provided by Triplo4 Sustainable Solutions. A detailed description of the methodology is provided in Appendix F.

7.1. Weather Conditions

The impact of the noise pollution that can be expected from the site during the construction and operational phase will largely depend on the climatic conditions at the site. The noise impact will be the most significant during calm meteorological conditions when little wind noise masking will occur, therefore the wind speed and direction was not considered in the modelling.

7.2. Construction Phase

The impact of the construction noise that can be expected at the proposed site can be extrapolated from Table 7. As an example, if several pieces of equipment are used simultaneously, the noise levels can be added logarithmically and then calculated at various distances from the site to determine the distance at which the ambient level will be reached (refer to Table 8 and Table 9).

Table 7- Combining Construction Noise Sources – Worst Case.

Description	Typical Sound Power Level (dB)
Overhead and mobile cranes	109
Front end loaders	100
Excavators	108
Bull Dozers	111
Piling machines (mobile)*	115
Total	**117.7**

Table 8- Combining Different Construction Noise Sources – Low Impact.

Description	Typical Sound Power Level (dB)
Front end loaders	100
Excavators	108
Truck	95
Total	**111.8**

The information in the tables above can now be used to calculate the attenuation by distance. Noise will also be attenuated by topography and atmospheric conditions such as temperature, humidity, wind speed and direction, but this is ignored for this purpose as worst-case conditions are calculated i.e., calm conditions. The distances calculated in Table 9 below would be representative of the maximum distance to reach ambient noise levels. Table 9 below gives an illustration of attenuation by distance from a noise source with a sound power level of 118 dB(A). These figures do not consider terrain and other obstacle attenuation. The equipment will be situated on undulating topography and this would therefore provide an attenuation effect.

Table 9- Attenuation by distance of a 118dB(A) Noise Source

Distance from noise source (metres)	Noise level dB(A)
10	90
20	84
40	78
80	72
160	66
320	60
640	54
1280	48
2560	42
3000	40

The field study results showed that the ambient noise levels in the area of the proposed development was 45 dB(A). NSA 2 is approximately 520m away from the nearest major noise source (The Powership). Taking this distance and Table 8 into consideration, it can be inferred that NSA 2 will experience noise levels of 56.7 dB(A), which is lower than the SANS 10103 rating limits. Given that this is an industrial zone, there are several facilities that will also contribute to the ambient noise levels in the area. The receptor at NSA 2 will therefore experience no noise impact as the noise from construction will be masked by the ambient noise from the other port operations.

Mitigation actions for the Construction phase:

As a precautionary measure piling should not occur at night. Secondly, all staff on the construction project should receive training to mitigate the noise impacts. In summary, for the construction phase it is unlikely that the construction noise will impact on the noise sensitive areas.

With the effective implementation of the above recommended mitigation measures, the residual noise impact associated with construction activities are predicted to be of **low** significance. It is recommended that the ambient noise around the project and at the closest receptors be monitored during the construction phase.

The construction environmental noise impact rating is presented in Table 10 below.

Table 10- Noise Impact Statement for the Construction Phase

	Severity	Duration	Spatial Scale	Consequence	Frequency	Probability	Likelihood	Significance	Status	Confidence	Reversibility	Irreplaceability	Fatal Flaw
Before Management	2	4	2	2.6	2	2	2	5.2	Medium -Low	High	Yes	No	No
Management Measures													
Measures related to the construction phase: • All construction operations should only occur during daylight hours if possible. • No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions that aids noise attenuation. A noise survey should be conducted at the noise sensitive receptors during the construction phase.													
After Management	2	4	2	2.6	2	1	1.5	3.9	Low	High	Yes	No	No
No-go Option	-	-	-	-	-	-	-	-	-	High	-	-	-

7.3. Alternative 1 (Preferred) Operational Phase – Terrestrial Impacts

Modelling of noise levels during the operational phase was performed using CadnaA Version 2022 MR2. The parameters selected were based on conditions that represent the worst-case scenario (i.e., highest impact).

The modelling results are only for noise from the operational activities and exclude other noise sources around the site, such as road traffic and the noise in the existing port areas, which are part of the existing residual noise (therefore all points where negative values are computed are shown as zero as the noise is attenuated by distance). Furthermore, the effects of wind noise have been ignored, as the highest impact will be under calm atmospheric conditions. Other weather conditions considered were a temperature of 20°C and 70% relative humidity (as opposed to 10°C as per ISO 9613:1996). The infrastructure is predicted to be 100% operational and 80% of the time (to represent a worst-case scenario). The projected noise levels resulting from the operations are contained in Table 11 below. The modelling results are valid for the terrestrial impacts only and does not apply to the underwater impacts.

Table 11 shows the modelling results from the 2021 modelling data as well as the latest data from the Subacoustech report. It will be noted that the results differ significantly due to the following:

- The 2021 modelling did not take into account the attenuation of the noise due to the vessel structure. The sound emissions in this updated report are thus significantly lower than previously modelled and contained in previous versions of this report.
- The 2021 survey did not take into account that all of the air intakes are only on one side of the vessel (the port side)

Table 11: Noise Level at receivers during operational phase (Alternative 1 – Preferred)

NSA No.	Name	SANS 10103:2008 District	SANS 10103:2008 Limits dB(A)		2021 Alternative 1 Predicted Noise Levels dB(A)	2021 Comment on Alternative 1 Results dB(A)	2022 Alternative 1 Updated Predicted Noise Levels dB(A)	2022 Alternative 1 Updates Comment on Results dB(A)
			Day	Night				
NSA 1	Bayside Aluminium	Industrial	70	60	61,3	Exceeds Night Limit	30.6	Within Limits
NSA 2	Seafarer's Club	Industrial	70	60	73,9	Exceeds Day and Night Limit	44.6	Within Limits
NSA 3	SPS Manufacturing	Industrial	70	60	0.0	Within Limits	0.0	Within Limits
NSA 4	Small Craft Harbour	Industrial	70	60	0.0	Within Limits	0.0	Within Limits
NSA 5	Meerensee Residential	Suburban	50	40	0.0	Within Limits	0.0	Within Limits
NSA 6	Gubhethuka Residential	Suburban	50	40	0.0	Within Limits	0.0	Within Limits

Figure 8 Below illustrates the noise contours predicted during the operational phase.

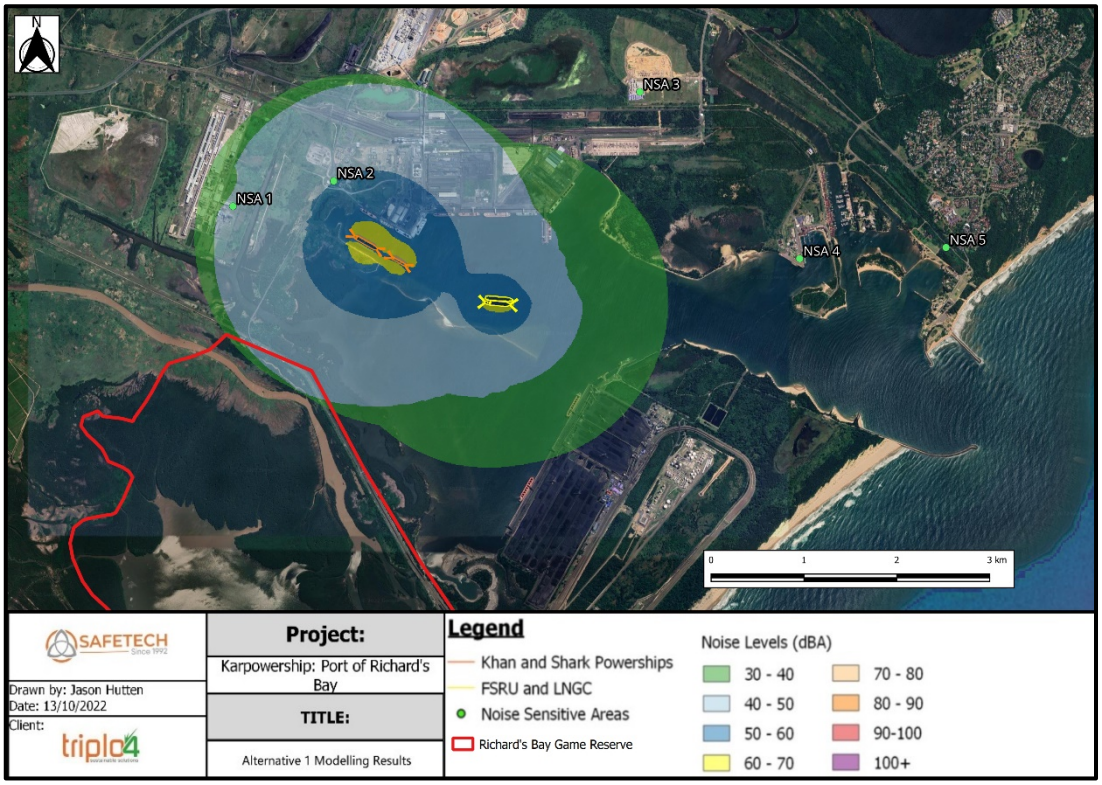

Figure 8: Predicted noise levels during the operational phase (Alternative 1).

Figure 8 shows that a small portion of the Richard's Bay Game Reserve will receive noise above 50db(A). This area is however highly disturbed by trains which travel through the same area. It is thus highly unlikely that the Richard's Bay Nature Reserve will be impacted severely as the noise is predicted to dissipate readily once reaching its boundary.

The operational noise levels of the proposed project are below the SANS 10103:2008 recommended levels for all the human receptors within the Port of Richards Bay. The noise impact associated with the operational activities of the proposed project is predicted to be of **Low** significance after mitigation in the Port of Richard's Bay. The terrestrial environmental noise impact statement for the operational phase rating is presented in Table 12 below.

Table 12- Noise Impact Statement for the preferred alternative 1 (Operational Phase)

	Severity	Duration	Spatial Scale	Consequence	Frequency	Probability	Likelihood	Significance	Status	Confidence	Reversibility	Irreplaceability	Fatal Flaw
Before Management	2	5	2	3	1	3	2	6	Medium Low	High	Yes	No	No
Management Measures													
Measures related to the operational phase: • The noise impact from the proposed project should be measured during the operational phase, to ensure that the impact is within the required legal limits. • Ensure that any acoustic enclosures or attenuators that are installed on the vessel are permanently in place during operations. • If possible, position the ship so that the port side that contains the air inlets is positioned away from the very sensitive receptors such as residential communities.													
After Management	1	4	2	2.3	1	2	1.5	3.45	Low	High	Yes	No	No
No-go Option	-	-	-	-	-	-	-	-	-	High	-	-	-

7.4. Alternative 2 (Not-Preferred) Operational Phase – Terrestrial Impacts

Alternative 2 was also assessed, the results of this are shown in Table 13 below.

Table 13- Noise Impact Statement for the non-preferred Alternative 2 (Operational Phase)

NSA No.	Name	SANS 10103:2008 District	SANS 10103:2008 Limits dB(A)		2021 Alternative 2 Predicted Noise Levels dB(A)	2021 Comment on Alternative 2 Results dB(A)	2022 Alternative 2 Updated Predicted Noise Levels dB(A)	2022 Alternative 2 Updates Comment on Results dB(A)
			Day	Night				
NSA 1	Bayside Aluminium	Industrial	70	60	0.0	Within Limits	0.0	Within Limits
NSA 2	Seafarer's Club	Industrial	70	60	64.2	Exceeds Night Limit	42.2	Within Limits
NSA 3	SPS Manufacturing	Industrial	70	60	0.0	Within Limits	0.0	Within Limits
NSA 4	Small Craft Harbour	Industrial	70	60	0.0	Within Limits	0.0	Within Limits
NSA 5	Meerensee Residential	Suburban	50	40	0.0	Within Limits	0.0	Within Limits
NSA 6	Gubhethuka Residential	Suburban	50	40	0.0	Within Limits	0.0	Within Limits

The modelling results for Alternative 2 show that no NSAs will experience noise levels exceeding the ratings limits set out in SANS 10103:2008. However, it must be noted that no rating limits are set out in SANS 10103:2008 for ecological receptors. Furthermore, this report does not consider Ecological receptors. The impact that the noise levels will have on ecological receptors is addressed by the relevant specialists (e.g. Avifauna Specialist).

The impact rating for alternative 2 is shown in Table 14 below.

Table 14- Noise Impact Statement for the preferred Alternative 2 (Operational Phase)

	Severity	Duration	Spatial Scale	Consequence	Frequency	Probability	Likelihood	Significance	Status	Confidence	Reversibility	Irreplaceability	Fatal Flaw
Before Management	2	5	2	3	1	3	2	6	Medium Low	High	Yes	No	No
Management Measures													
Measures related to the operational phase: • The noise impact from the proposed project should be measured during the operational phase, to ensure that the impact is within the required legal limits. • Ensure that any acoustic enclosures or attenuators that are installed on the vessel are permanently in place during operations. • If possible, position the ship so that the port side that contains the air inlets is positioned away from the very sensitive receptors such as sensitive ecological receptors.													
After Management	1	4	2	2.3	1	2	1.5	3.45	Low	High	Yes	No	No
No-go Option	-	-	-	-	-	-	-	-	-	High	-	-	-

7.5. On-Site Terrestrial Measurements in Ghana

A field study was conducted by Subacoustech, at the Osman Khan Powership in Ghana, in September 2022. The results of this study were used to determine the sound power levels of noise sources for the modelling of noise impacts related to the Port of Richard's Bay project.

Several measurements were taken that are shown in Table 4.1.8 in the Appendix of the Subacoustech Report:

- Several quayside measurements were taken at 35m from the vessel with sound pressure levels in line with the centre of the ship ranging from 74.3 – 61.8 dB(A).
- On the quayside, in line with Engine 6, a sound pressure level of 74.3dB(A) was recorded but was significantly influenced by a venting operation during the measurement period. The Subacoustech author noted this event only occurred once during this study period.

Several measurements were also taken in line with the vessel upwind and downwind at varying distances on the water in and around the harbour. The modelling that was conducted by Safetech is comparable and in line with the onsite measurements conducted by Subacoustech, if the results are compared at similar distances. This indicates

that the modelling is verified by on-site measurements from a similar type of vessel to that which is to be used in South Africa.

7.6. Decommissioning Phase

The decommissioning phase noise impacts will be the same as the construction phase impacts and will be of a short duration. Therefore, noise impacts associated with the decommissioning phase are anticipated to be of **Low** significance after mitigation.

The noise impacts will cease upon decommissioning, and are thus "reversible".

7.7. Cumulative impacts

The cumulative impact from the other noise sources in the Port of Richard's Bay is extremely difficult to predict. As the noise level at a receptor increases, the "loudest noise" will generally be heard. Therefore, if in future another noise source e.g., a power plant, is located closer to the receptor and it is generating more noise energy, the new noise source will be perceived above the other noise sources.

Three power production developments have been proposed (or have had approval) in the area surrounding the Gas to Power Powership Project site. The four developments under consideration are:

- Richard's Bay Gas Power 2 (RBGP2) 400 MW Gas to Power project.
- Nseleni Independent 2 800MW Floating Power Plant;
- Eskom 3000MV Combined Cycle Power Plant (CCPP).
- Phinda Power Producers 320MW Emergency Risk Mitigation Power Plant.

No noise specialist study was conducted during the Environmental Authorization Phase of the Eskom CCPP project, therefore it is unclear whether the project will contribute to the overall noise impacts of the Karpower Powership Project. The Eskom CCPP project is situated approximately 4 400m north-west of the Gas to Power Powership project and is therefore unlikely to contribute to the noise impacts in the project area assessed in this report.

The Richard's Bay Gas Power 2 project is situated further away, approximately 5 700m to the north of the Gas to Power Powership Project. The study found that the noise impacts on the surrounding receptors would be of "low risk" during the operational phase (de Jager M 2017). This, in conjunction with the distance between the two project sites, suggests that the Richard's Bay Gas Power 2 project will have no significant contribution to the cumulative noise impacts of the area.

The specialist noise assessment (conducted by Airshed Planning Professionals) found in the Nseleni Independent Floating Power Plant Final Scoping Report (DEFF reference number: 14/12/16/3/3/2/2032) concluded that the noise impacts would be of "low significance". It is also doubtful whether two power ships will both receive environmental authorisation and operational power agreements with the Department of Energy.

Limited information is available on the Phinda Power Plant. The location of the proposed development is approximately 3 500m away and will therefore have little cumulative effect on the Noise Sensitive Receptors.

7.8. Underwater Noise Impacts

In marine environments sound is important to animals as it is used for a variety of purposes such as communication, navigation, orientation, feeding and the detection of predators. The limitation of vision, touch, taste, and smell in water means that sound is critical due to its physical properties for e.g., speed of transmission and is this an important sensory medium for marine animals.

Marine mammals thus use sound as a primary means for underwater communication and sensing. They emit sound to communicate regarding the presence of danger, food, a conspecific or other animal, and also about their own position, identity, and reproductive or territorial status. Underwater sound is especially important for odontocete cetaceans that have developed sophisticated echolocation systems to detect, localise and characterise underwater objects, for example, in relation to coordinated movement between conspecifics and feeding behaviour (Convention on Biological Diversity 2020).

Anthropogenic changes to the acoustic environment include increases in the number of high-intensity noise events and chronically elevated and homogenised background sound levels (Shannon et al 2015). Any increase in anthropogenic noise could thus have significant effects on the environment in an ecologically sensitive area.

The underwater noise that could be generated in this project includes, but is not limited to, the following:

- An increase in marine traffic during LNG deliveries. The main noise sources will be propellor noise, sonar ranging devices and engine noise transmitted through the hull.
- Pile driving when constructing and installing the LNG offloading infrastructure.
- Noise that is radiated through the ship's hull during power generation.
- Noise from the suction and discharge of cooling water used on the ship into the harbour environment.

The proposed project is situated within the Port of Richard's Bay and adjacent to the Richard's Bay Nature Reserve.

It is therefore of critical importance that the current underwater soundscape of Richards Bay was determined, and the potential noise impacts of the proposed project was assessed. A separate Underwater Noise Impact Assessment was conducted.

8. CONCLUSION & RECOMMENDATIONS

The results of the noise impact assessment of the proposed Gas to Power - Powership Project, within the Port of Richard's Bay in Kwazulu-Natal, shows that at none of the ***terrestrial*** receptors will the SANS 10103:2008 rating limits be exceeded. The noise impact associated with the operational activities of the proposed project is predicted

to be of **Low** significance **after** mitigation measures are implemented. The construction related noise impacts will be of **Low** significance **after** mitigation measures are implemented.

The following is highly recommended:

a) Ensure that all acoustic enclosures or attenuators that are fitted to the vessel are in place during operations.
b) Periodic noise measurements are taken during the construction and operational phases in order to ensure that the local Noise Regulation By-Laws are complied with.
c) As a precautionary measure vibro-piling (if required) should not occur at night
d) If possible, position the ship so that the port side that contains the air inlets is positioned away from highly sensitive noise receptors.

If the above mitigation measures are implemented, it is recommended that the project receive environmental authorisation.

Dr Brett Williams

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APPENDICES

APPENDIX A: AIA Certificate

labour

Department:
Labour
REPUBLIC OF SOUTH AFRICA

National Department of Labour
Republic of South Africa

APPROVED INSPECTION AUTHORITY

Registered in accordance with the provisions of the Occupational Health and Safety Act, Act 85 of 1993, as amended.

This is to certify that:

SAFETRAIN CC

has been approved by the Department of Labour as a Type A, Approved Inspection Authority: Occupational Health and Hygiene under the following regulations:

- Asbestos Regulations 8, 18 & 21.
- Hazardous Chemical Substances Regulations 6 & 12.
- Lead Regulations 7 & 14.
- Noise Induced Hearing Loss Regulation 7

CHIEF INSPECTOR

Valid from: **26 September 2018**
Expires: **25 September 2022**
Certificate Number: **OH0049-CI 09**

APPENDIX B: Calibration Certificates

a) Sound Level Meter

sanas
Calibration Laboratory
148
1382

M AND N ACOUSTIC SERVICES (Pty) Ltd
Co. Reg. No: 2012/124238/07 VAT NO: 4300255876 BEE Status: Level 4
P.O. Box 61713, Pierre van Ryneveld, 0045
No. 15, Mustang Avenue
Pierre van Ryneveld, 0045
Tel: 012 689 2007/8 • Fax: 086 211 4690
E-mail: calservice@mweb.co.za

CERTIFICATE OF CALIBRATION

CERTIFICATE NUMBER	2019-AS-1162
ORGANISATION	SAFETRAIN T/A SAFETECH
ORGANISATION ADRESS	P.O. BOX 27697, GREENACRES, PORT ELIZABETH, 6057
CALIBRATION OF	INTEGRATING SOUND LEVEL METER complete with ½" PRE-AMPLIFIER, ½" MICROPHONE and ⅓-OCTAVE/OCTAVE FILTER CARD
MANUFACTURERS	RION
MODEL NUMBERS	NL-32, NH-21, UC-53A and NX-22RT
SERIAL NUMBERS	00151075, 13814, 319366 and 00150957 V2.2
DATE OF CALIBRATION	24-25 OCTOBER 2019
RECOMMENDED DUE DATE	----------
PAGE NUMBER	PAGE 1 OF 5

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

Authorized/Calibrated by:	Checked by:	Date of issue:
M. NAUDÉ (SANAS TECHNICAL SIGNATORY)	W.S. SIBANYONI (CALIBRATION TECHNICIAN)	28 OCTOBER 2019

Director: Marianka Naudé

b) Sound Level Calibrator

sanas
Calibration Laboratory
148
1302

M AND N ACOUSTIC SERVICES (Pty) Ltd
Co. Reg. No: 2013/[illegible]/07 VAT NO: 4300255876 BEE Status: Level 4
P.O. Box 61713, Pierre van Ryneveld, 0045
No. 15, Mustang Avenue
Pierre van Ryneveld, 0045
Tel: 012 689 2007/8 • Fax: 086 211 4690
E-mail: calservice@mweb.co.za

CERTIFICATE OF CALIBRATION

CERTIFICATE NUMBER	2019-AS-1161
ORGANISATION	SAFETRAIN T/A SAFETECH
ORGANISATION ADRESS	P.O. BOX 27697, GREENACRES, PORT ELIZABETH, 6057
CALIBRATION OF	SOUND LEVEL CALIBRATOR (complete with ½" adaptor)
MANUFACTURER	RION
MODEL NUMBER	NC-73
SERIAL NUMBER	10644864
DATE OF CALIBRATION	28 OCTOBER 2019
RECOMMENDED DUE DATE	----------
PAGE NUMBER	PAGE 1 OF 3

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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 amount 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.

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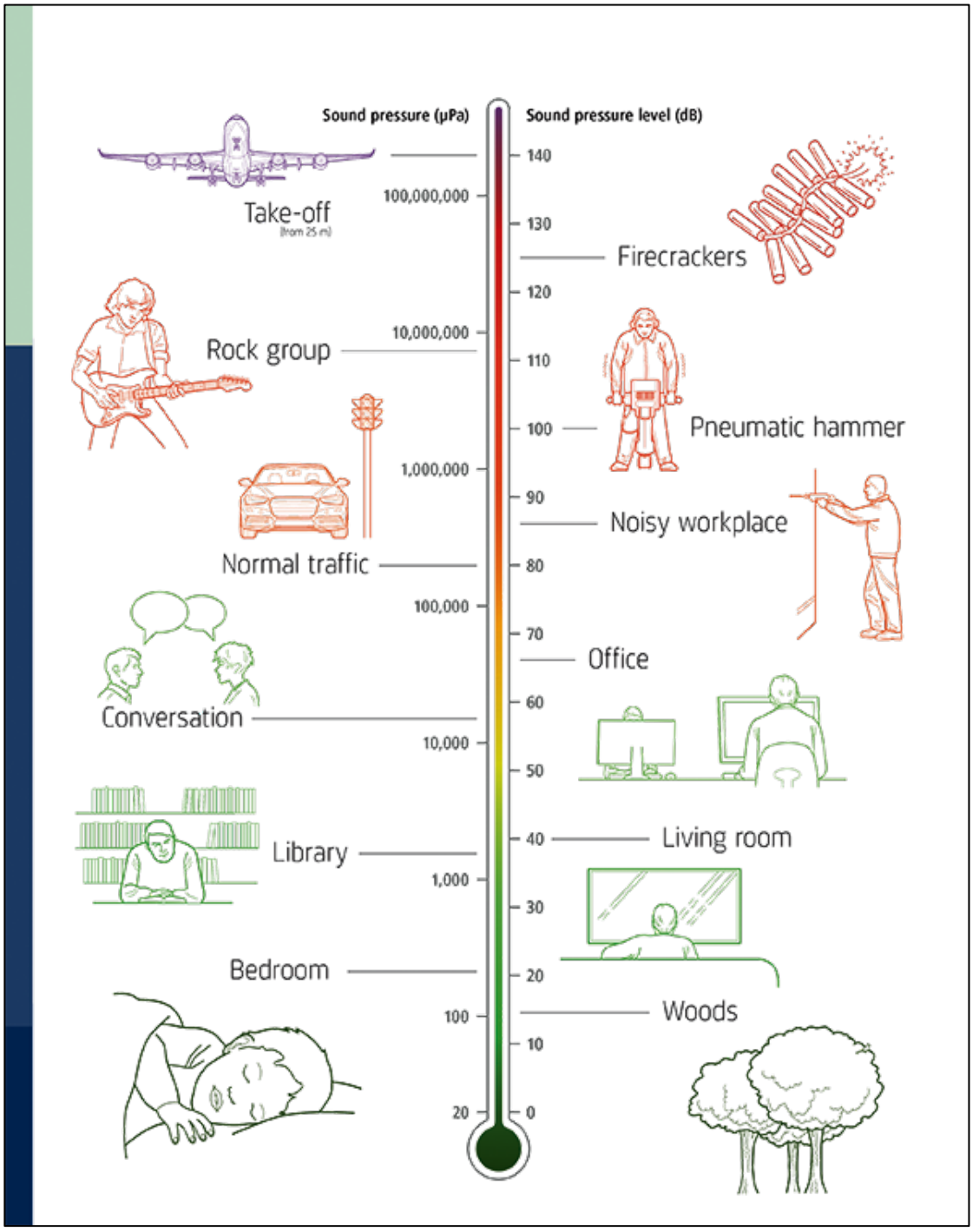
Calibrated by:	Authorized/Checked by:	Date of Issue:
W.S. SIBANYONI (CALIBRATION TECHNICIAN)	M. NAUDE (SANAS TECHNICAL SIGNATORY)	28 OCTOBER 2019

Director: Mariaka Naudé

APPENDIX C: Typical Sound Power and Sound Pressure Levels



Sound Perception

Change in Sound Level	Perception
3 dB	Barely perceptible
5 dB	Clearly perceptible
10 dB	Twice as loud

APPENDIX D: Compliance checklist

Relevant section in GNR. 982	Requirement description	Relevant section in this report
(a) details of—	(i) the specialist who prepared the report; and	Appendix E
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Appendix E
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 5
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 1.4 & 4.1
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 1.4, 6.0 & 7.6
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.4
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, 1.3 & 1.4
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4
(g)	an identification of any areas to be avoided, including buffers;	Section 4
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 4
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge; Note: Uncertainties should be qualified within the report – there will always be uncertainties due to ?? and gaps in knowledge should also be qualified – a gap is to record that not all knowledge can be obtained for a study.	Section 1.5
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
(k)	any mitigation measures for inclusion in the EMPr; Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 7
(l)	any conditions for inclusion in the environmental authorisation;	Section 8
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8
(n) a reasoned opinion—	(i) whether the proposed activity, activities or portions thereof should be authorised;	Section 8
	(iA) regarding the acceptability of the proposed activity or activities; and	Section 8
	(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan; Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 8
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 1.6
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q)	any other information requested by the competent authority.	N/A
(2)	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

APPENDIX E: Specialist Credentials

Dr Brett Williams

Name of Organization:	Safetech
Position in Firm:	Owner
Date of Birth:	21/04/1963
Years with Firm:	25
Nationality:	South African

MEMBERSHIP OF PROFESSIONAL BODIES

- Southern African Institute of Occupational Hygienists
- Institute of Safety Management
- Mine Ventilation Society
- National Clean Air Association

BIOGRAPHICAL SKETCH

Brett Williams has been involved in Health, Safety and Environmental Management since 1987. He has been measuring noise related impacts since 1996. Brett is the owner of Safetech who have offices in Pretoria and Port Elizabeth. He has consulted to many different industries including, mining, chemical, automotive, food production etc. He is registered with the Department of Labour and Chamber of Mines to measure environmental stressors, which include chemical monitoring, noise, and other physical stresses.

PROJECT EXPERIENCE

Dr Williams has been assigned to various projects to assess environmental noise impacts. The list below presents a selection of Brett Williams' project experience, relevant to noise:

- Arcus Gibb – Kouga Wind Energy Project
- CSIR – Umgeni Water Desalination Plant
- CSIR – Saldanha Desalination Plant
- CSIR – Atlantis Gas to Power Project (current)
- CSIR – Walvis Bay Port Extension
- CSIR – Noise Impact Study of Namwater Desalination Plant
- CSIR – Kouga Wind Energy Project – Background Noise Measurements
- CSIR – Kouga Wind Energy Project
- CSIR – Wind Current Wind Energy Project
- CSIR – Langefontein Wind Energy Project
- CSIR – Mossel Bay Wind Energy Project
- CSIR – Coega IDZ Wind Energy Project
- CSIR – Baakenskop Wind Energy Project
- CSIR – Biotherm Wind Energy Project
- CSIR – Innowind Mossel Bay

- CSIR – Langefontein Wind Energy Project
- CSIR – Bulk Manganese Terminal (Port of Richard's Bay)
- CSIR – Phyto Amandla Biodiesel Project
- CSIR – Vleesbaai Wind Energy Project
- CSIR - Kudusberg Wind Energy Project
- CES – Coega IDZ Gas to Power Project (Current)
- CES – Coega IDZ Wind Energy Project
- CES – Middleton Wind Energy Project
- CES – Waainek Wind Energy Project
- CES – Ncora Wind Energy Project
- CES – Qunu Wind Energy Project
- CES – Nqamakwe Wind Energy Project
- CES – Plan 8 Wind Energy Project
- CES – Qumbu Wind Energy Project
- CES – Peddie Wind Energy Project
- CES – Cookhouse Wind Energy Project
- CES – Madagascar Heavy Minerals
- CES – Richards Bay Wind Energy Project
- CES – Hluhluwe Wind Energy Project
- CEN – Kwandwe Airport Development Project
- CEN – Swartkops Manganese Project
- CEN – N2 Petro Port Project
- SiVest - Rondekop Wind Energy Project
- SRK – Roodeplaat Wind Energy Project
- Savannah - Witberg Wind Energy Project
- Savannah - Kareebosch Wind Energy Project

TERTIARY EDUCATION

- PhD - University of Pretoria (Environmental Management)
- Various Health & Safety Courses.
- National Diploma Health & Safety Management
- Harvard University – Applications of Industrial Hygiene Principles – including noise
- United States EPA Pollution Measurement course conducted at the University Of Cincinnati (EPA Training Centre)
- US EPA Air Dispersion Modelling Training Course
- Master of Business Administration (University of Wales) with dissertation on environmental reporting in South Africa.
- Environmental Auditor (ISO 14001:2004)

APPENDIX F: Impact Assessment Methodology

2014 NEMA EIA Regulations (as amended), Appendix 3 (3) (1) (h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; viii) the possible mitigation measures that could be applied and level of residual risk.

This section describes the processes undertaken to identify impacts, to assess and rank the impacts and risks, to describe environmental impacts and risks identified during the EIA process, to assessment of the significance of each impact, risk and an indication of the extent to which the issue and risk can be avoided or addressed by the management actions, and any deviations from approved Scoping Report (including Plan of Study). Assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation proposed are also discussed. In the EIAR, the significance of the potential impacts are considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term, for all phases of the proposed project. The specialist studies are synthesised and integrated into the overall impact assessment and recommendations for mitigation are included in the EMPr.

The following criteria were considered for the assessment of each impact.

The **nature** of an impact is the type of effect that the activity will have on the environment. It includes what is being affected and how.

The **duration** of the impact is the period during which the impact is occurring. Inherent in this is the **reversibility** of the impact, meaning that if the duration of the impact is not permanent, then it can be reversed, i.e. the impact is reversible. Should an impact not be reversible, then this is explicitly stated.

The **irreplaceable loss of resources** has been assessed, but not explicitly stated as such. For example, a less severe impact will be insignificant or non-harmful and the resultant loss of resources can be replaced. In contrast, the loss of resources from disastrous or extremely harmful impacts cannot be satisfactorily replaced.

The **significance** of an impact is determined by a combination of its consequence and likelihood.

The table below describes the scoring of the impacts and how they determine the overall significance.

Scoring of Impacts		
Consequence		
Severity the degree to which the project affects or changes the environment	1 – Insignificant / Non-harmful 2 – Small / Potentially harmful 3 – Significant / Slightly harmful 4 – Great / Harmful 5 – Disastrous / Extremely harmful	0dB(A) – 29 dB(A) 30 dB(A) – 40 dB(A) Exceeds SANS 10103:2008 day time limit of district. Exceeds SANS 10103:2008 night time limit of district. Widescale exceedance of SANS 10103:2008 limits.
Duration a measure of the lifetime that the impact will be present	1 – Up to 1 month 2 – 1 month to 3 months 3 – 3 months to 1 year 4 – 1 to 10 years 5 – Beyond 10 years / Permanent	
Spatial Scale the extent / size of the area that may be affected	1 – Immediate, fully contained area / within the site 2 – Surrounding area (< 2km) 3 – Within farm / town / city 4 – Within municipal area 5 – Regional, National, International	
Overall Consequence = (Severity + Duration + Extent) / 3		
Likelihood		
Frequency how often the impact will occur	1 – Once a year, or once or more during operation 2 – Once or more in 6 months 3 – Once or more a month 4 – Once or more a week 5 – Daily or hourly	
Probability the likelihood or the chances that the impact will occur	1 – Almost never / almost impossible 2 – Very seldom / highly unlikely 3 – Infrequent / unlikely / seldom 4 – Often / regularly / likely / possible 5 – Daily / highly likely / definitely	
Overall Likelihood = (Frequency + Probability) / 2		
Overall Environmental Significance = Overall Consequence X Overall Likelihood		
Overall Environmental Significance:		
0 - 2.9	Very Low	
3 - 4.9	Low	
5 - 6.9	Medium - Low	
7 - 8.9	Medium	
9 - 10.9	Medium - High	
11 and above	High	
Reversibility		
Reversibility degree to which the impact can be reversed	Reversible – the impact is reversible Irreversible – the impact is not reversible	
Irreplaceable Loss of Resources		
Irreplaceable Loss of Resources degree to which the loss of resources can be replaced	Yes – the impact causes a loss of resources that cannot be replaced No – the impact causes a loss of resources that can be replaced	
Fatal Flaw		
Fatal Flaw degree to which the impact is a fatal flaw	Yes – the impact results in a fatal flaw No – the impact does not result in a fatal flaw	

APPENDIX G Specialist Declaration

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/14/12/16/3/3/2007
Date Received:	02 November 2020

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

The Proposed Gas to Power Powership Project at the Port of Richards Bay, Umhlathuze Local Municipality, King Cetshwayo District, Kwazulu-Natal.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SAFETETRAIN cc T/A SAFETECH			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	NON-COMPLIANT	Percentage Procurement recognition	0%
Specialist name:	BRETT WILLIAMS			
Specialist Qualifications:	PhD Environmental Management			
Professional affiliation/registration:	Registered Occupational Hygienist			
Physical address:	64 Worraker Street, Newton Park, Port Elizabeth. 6045			
Postal address:	PO Box 27607, Greenacres, Port Elizabeth			
Postal code:	6057	Cell:	0825502137	
Telephone:	041-3656846	Fax:	041-3652123	
E-mail:	Brett.williams@safetech.co.za			

2. DECLARATION BY THE SPECIALIST

I, _____Brett Williams_____, declare that –

- I act as the independent specialist 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 the specialist report relevant to this application, 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 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;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Safetech

Name of Company:

13th October 2022

Date

SAFETECH

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _____Brett Williams_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Safetech

Name of Company

13th October 2022

Date

Signature of the Commissioner of Oaths

13th October 2022

Date

CINDY KILLIAN
COMMISSIONER OF OATHS
PRACTISING ATTORNEY
70 WORRAKER STREET, NEWTON PARK
PORT ELIZABETH, 6045