Acoustic Impact Assessment for Proposed Newcastle Gas Engine Power Plant, KwaZulu-Natal

Report Prepared for

Newcastle Energy (Pty) Ltd.

Report Number 566508/AIA/1

Report Prepared by

srk consulting

June 2021

Acoustic Impact Assessment for Proposed Newcastle Gas Engine Power Plant, KwaZulu-Natal

Newcastle Energy (Pty) Ltd.

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Executive Summary

Newcastle Energy (Pty) Ltd. (Newcastle Energy), a subsidiary of Vutomi Energy (Pty) Ltd. (Vutomi), own an 18.5-megawatt (MW) capacity gas fired cogeneration (steam and power) plant within the Karbochem Industrial Complex in Newcastle, KwaZulu-Natal. Through the Newcastle Gas Engine Power Plant (NGEPP) Independent Power Producer (IPP) project, Newcastle Energy proposes to increase its electricity generation capacity to approximately 100 MW. In terms of the latest amendments to the 2014 Environmental Impact Assessment (EIA) Regulations[1], as published on 07 April 2017, a power generation project of this magnitude requires an application for Environmental Authorisation via a Scoping and Environmental Impact Reporting (S&EIR) process.

SRK Consulting (South Africa) (Pty) Ltd. (SRK) has been appointed as the Environmental Assessment Practitioner (EAP) to undertake the required environmental applications on behalf of Newcastle Energy for the proposed project. To support the environmental authorisation process, a screening level Environmental Acoustic Impact Assessment (AIA) was undertaken. Comparisons of the existing and predicted noise levels at various specified receptors (noise receivers) enabled an assessment of potential changes in noise levels at these locations which may result from the proposed development. The estimated changes were then compared to the South African National Standards (SANS, 2008) community or group responses to effectively assess the anticipated impacts/responses that may result from such changes.

Based on a cumulative sound power level of 112 dB(A) propagating from equipment associated with all 12 Rolls-Royce (Bergen B3540V20) gas engines operating simultaneously, the resultant sound levels at specified distances from the plant were determined by acoustic calculations. Noise levels in the immediate vicinity of the operational activities (i.e. within or at the fenceline of the plant) are predicted to be high (potentially exceeding the industrial SANS sound rating level by less than 1 dB), as would be expected for an industrial operation. At distances greater than 25 m from the source (approximately fenceline location) noise levels decrease considerably, and at approximately 150 m and 500 m from the source decrease further to below the SANS 10103:2008 urban day-time and night-time typical sound rating level of 60 dB(A) and 50 dB(A), respectively.

Predicted increases in noise levels at all offsite receptor points as a result of the NGEPP operational activities range from 0.0 to 2.2 dB(A) during the day-time. Such marginal increases are classified as likely resulting in “little” community response according to the SANS (2008) community response categories. For instance, whilst the predicted noise levels at Arbor Park for day-time was higher than the Urban district rating level (SANS, 2008), the predicted levels at this site did not increase at all from the measured ambient levels, because the ambient sound level environment at Arbor Park (pre-NGEPP plant) is already higher than the Urban district sound rating level (SANS, 2008). At night-time, increases in noise levels at the offsite receptor points as a result of the NGEPP operational activities will range from 0.1 to 5.0 dB(A) during the night-time. Whilst the predicted cumulative noise level at the Airport Lodge, Arbor Park and Engen are above the SANS 10103 urban night-time rating level (50 dB(A)), these marginal increases are classified as likely resulting in “little” community response. The predicted increases in ambient sound levels at all *offsite receptors* for day and night-time are below the 7 dB(A) threshold for a “disturbing noise” as per the South African Noise Control Regulations.

It was noted that although the NGEPP fence line receptor experienced high predicted noise levels as result of the operational activities on site, the increase in sound pressure levels compared to the

[1] The EIA Regulations, as amended in 2017, are promulgated under the National Environmental Management Act (No. 107 of 1998) (NEMA).

ambient levels will not impact community members directly. As such, the “strong” predicted community response is unlikely to occur within this industrial area.

All impacts associated with the proposed NGEPP were evaluated using a risk matrix, which is a semi-quantitative risk assessment methodology. The resultant environmental acoustic risks for residential receptors were ranked as “low” during the operational phase. With minor increases in noise levels during the operational phase, it is envisaged that the facility be authorised with anticipation of no major impacts or complaints. The facility is suitably positioned within an industrial area, away from sensitive receptors and will likely not negatively impact the ambient sound level environment at the receptors. Nonetheless, the following key general mitigation and management measures related to the operational phase include but are not limited to:

- Investigate the use of installing acoustic barriers around noise operations at the plant.
- Ensure that all gas engines are located within brick walled buildings.
- Undertaking frequent maintenance and repairs for onsite machinery and equipment.
- Employees to make use of necessary Personal Protective Equipment (PPE) (example: ear plugs) in operational areas of the plant where noise can pose as a potential risk.
- Ambient noise monitoring campaign to be undertaken once the NGEPP is operational to confirm/refine changes in noise levels at sensitive receptors.
- Any noise-related complaints received during the operational phase are to be registered and result in the implementation of appropriate modified practices.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd. (SRK) by Newcastle Energy (Pty) Ltd. (Newcastle Energy). The opinions in this Report are provided in response to a specific request from Newcastle Energy to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

AIA	-	Acoustic Impact Assessment
BA	-	Basic Assessment
dB	-	Decibel
dB(A)	-	A-weighted sound measurement
dB(B)	-	C-weighted sound measurement
dB(C)	-	Z-weighted sound measurement
DEA	-	Department of Environmental Affairs
DC	-	Direct Current
EA	-	Environmental Authorisation
ECA	-	Environmental Conservation Act 73 of 1989
EDTEA	-	KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs
EIA	-	Environmental Impact Assessment
GN	-	Government Notice
Hz	-	Hertz
HV	-	High voltage
IBL	-	Inside battery limits
IPP	-	Independent Power Producer
L_{Aeq}		Equivalent continuous sound pressure level
$L_{R,dn}$	-	Equivalent continuous day/night rating level
$L_{Req,d}$	-	Equivalent continuous rating level for day-time
$L_{Req,n}$	-	Equivalent continuous rating level for night-time
$L_{Req,T}$	-	Typical noise rating levels
LNG	-	Liquefied Natural Gas
Mamsl	-	Mean above sea level
MW	-	Megawatt

NEM:AQA	-	National Environmental Management Air Quality Act
NEMA	-	National Environmental Management Act
Newcastle Energy	-	Newcastle Energy (Pty) Ltd.
NGEPP	-	Newcastle Gas Engine Power Plant
PWL	-	Sound Power Level
SABS	-	South African Bureau of Standards
SANS	-	South African National Standards
SPL	-	Sound Pressure Level
SRK	-	SRK Consulting (South Africa) (Pty) Ltd.
Vutomi	-	Vutomi Energy (Pty) Ltd

Glossary of Terms

A-weighting The human ear is not equally sensitive to sound of all frequencies, i.e. it is less sensitive to low pitched (or 'bass') than high pitched (or 'treble') sounds. In order to compensate when making sound measurements, the measured value is passed through a filter that simulates the human hearing characteristic. Internationally this is an accepted procedure when working with measurements that relate to human responses to sound/noise.

Ambient sound level Ambient noise will be defined as the totally encompassing sound in a given situation at a given time, and is usually composed of sound from many sources, both near and far.

Annoyance General negative reaction of the community or person to a condition creating displeasure or interference with specific activities.

dB or dB(A) The human ear is a sensitive instrument that can detect fluctuations in air pressure over a wide range of amplitudes. This limits the usefulness of sound quantities in absolute terms. For this reason, a sound measurement is expressed as ten times the logarithm of the ratio of the sound measurement to a reference value, 20 micro (millionth) Pa. This process converts a scale of constant increases to a scale of constant ratios and considerably simplifies the handling of sound measurement quantities. The attached 'A' indicates that the sound measurement has been A-weighted.

dB(Z) Historically sound levels were read off a hand held meter and the noise levels were noted in dB, after the development of different weighting curves sound levels were noted as Z-weighting or dB(Z) to reduce the confusion with different type of weighting applied noise levels. dB(Z) refers to linear noise levels.

Sound Sound is small fluctuations in air pressure, measured in Newtons per square meter (N/m^2) or Pascals (Pa) that are transmitted as vibrational energy via a medium (air) from the source to the receiver. The human ear is a pressure transducer, which converts these small fluctuations in air pressure into electrical signals, which the brain then interprets as sound.

Noise Noise is generally defined as unwanted sound.

Noise nuisance Noise nuisance means any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person.

Octave bands The octave bands refer to the frequency groups that make a sound. The sound is generally divided in to nine groups (octave bands) ranging from 32 Hertz (Hz) to 8,000 Hz. The lower frequency ranges of a sound have a vibrating character where the higher frequency of sound has the character of high-pitched sound. In viewing the total octave bands scale from 32 Hz to 8000 Hz the character of the sound can be described.

Sound or noise level A sound or noise level is a sound measurement that is expressed in decibels (dB or dB(A)).

Sound pressure Sound pressure is the force of sound exerted on a surface area perpendicular to the direction of the sound and is measured in N/m^2 or Pa. The human ear perceives sound pressure as loudness and can also be expressed as the number of air pressure fluctuations that a noise source creates.

Sound pressure level The sound pressure level is a relative quantity as it is a ratio between the actual sound pressure and a fixed reference pressure. The reference pressure is usually the threshold of hearing, namely 20 micro Pascals (µPa).

Sound power Sound power is the rate of sound energy transferred from a noise source per unit of time in Joules per second (J/s) or Watts (W).

Sound power level The sound power level is a relative quantity as it relates the sound power of a source to the threshold of human hearing (10^{-12} W). Sound power levels are expressed in dB(A), as they are referenced to sound detected by the human ear (A-weighted).

1 Introduction

1.1 Background

Newcastle Energy (Pty) Ltd. (Newcastle Energy), a subsidiary of Vutomi Energy (Pty) Ltd. (Vutomi), own an 18.5-megawatt (MW) capacity gas fired cogeneration (steam and power) plant within the Karbochem Industrial Complex in Newcastle, KwaZulu-Natal. Through the Newcastle Gas Engine Power Plant (NGEPP) Independent Power Producer (IPP) project, Newcastle Energy proposes to increase its electricity generation capacity to approximately 100 MW.

In terms of the latest amendments to the 2014 Environmental Impact Assessment (EIA) Regulations[2], as published on 07 April 2017, a power generation project of this magnitude requires an application for Environmental Authorisation via a Scoping and Environmental Impact Reporting (S&EIR) process.

SRK Consulting (South Africa) (Pty) Ltd. (SRK) has been appointed as the Environmental Assessment Practitioner (EAP) to undertake the required environmental applications on behalf of Newcastle Energy for the proposed project. To support the environmental authorisation process, a screening level Environmental Acoustic Impact Assessment (AIA) has been undertaken, which investigated the noise associated with the proposed NGEPP. Included in this report is a description of the project; followed by a discussion on the fundamentals of noise; a description of the methodology utilised in the study; the results of the study; and the assessment of related impacts.

1.2 Terms of Reference

To ensure that the project requirements are effectively achieved, the following terms of reference were established:

- Assessment of the baseline noise environment in the vicinity of the facility.
- Compilation of an acoustic inventory to identify and define all sources of noise during the operational phases.
- Calculations of acoustic propagation to determine the impact of the noise associated with the proposed NGEPP.
- Submission of a Screening Environmental Acoustic Impact Assessment report (this report), detailing all findings from the baseline assessment, acoustic inventory, and acoustic calculations.
- Provision of recommendations for mitigation measures that may be applied to reduce noise impacts associated with the new NGEPP.

1.2.1 Specialist study requirements

The specialist report requirements are specified in Appendix 6 of the Amendments to the 2014 EIA Regulations, as published by the Department of Environmental Affairs (DEA) in Government Notice (GN) 326 on 07 April 2017. **Table 1-1** lists the requirements from GN 326 and provides a reference to the applicable chapter of this document where each objective is addressed.

[2] The EIA Regulations, as amended in 2017, are promulgated under the National Environmental Management Act (No. 107 of 1998) (NEMA).

Table 1-1: Specialist report requirements (Appendix 6 of GN 326, 07 April 2017)

Specialist reports requirements	Reference in this Document
(1) A specialist report prepared in terms of these Regulations must contain -	
(a) details of—	
(i) the specialist who prepared the report; and	This report
(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Chapter 1
(cA) an indication of the quality and age of base data used for the specialist report;	Chapter 7.1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Chapter 7 and Chapter 8
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Chapter 6
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Chapter 6
(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;	Chapter 3
(g) an identification of any areas to be avoided, including buffers;	Chapter 3 and Chapter 7
(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;	Chapter 7
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Chapter 6.3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Chapter 7 and Chapter 8
(k) any mitigation measures for inclusion in the EMPr;	Chapter 8 and Chapter 9
(l) any conditions for inclusion in the environmental authorisation;	Chapter 9
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Chapter 8 and Chapter 9
(n) a reasoned opinion—	
(i) whether the proposed activity, activities or portions thereof should be authorised;	
(iA) regarding the acceptability of the proposed activity or activities; and	Chapter 8 and Chapter 9
(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;	
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
(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

Specialist reports requirements	Reference in this Document
(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.	Chapter 1

2 Project Location

The proposed NGEPP IPP plant has a development footprint of 126-hectare (ha) (1.26 km^2) and is proposed to be constructed within the 1.78-hectare (ha) site located on the southwestern boundary of the Karbochem Industrial Complex. Other major industries within the Karbochem Industrial Complex include: African Amines (alkyl amines plant), Brother CISA (formerly Lanxess CISA) (chrome chemicals plant) and SA Calcium Carbide.

The coordinates of the boundary of the property are provided in **Table 2-1**.

Table 2-1: Geographical Coordinates for the Site

Point	Longitude	Latitude
1	29° 58.170' E	27° 47.078' S
2	29° 58.112' E	27° 47.107' S
3	29° 58.218' E	27° 47.181' S
4	29° 58.245' E	27° 47.168' S

Refer to **Figure 2-1** for a map showing an aerial view of the NGEPP project site.

29°58.0001'E
29°58.5'E
29°59.0001'E
29°59.5'E
27°46.5'S
27°47'S

Karbochem Industrial Complex containing NGEPP Project Site

N

Inset of NGEPP Project Site

LNG Dispensing Station

2100m^3 LNG Tank Farm (including pump station and bound area)

LNG pipeline system

Regas facility (including vaporizers and gas oderization system)

0 125 250 500 Meters

Legend

- Proposed area for LNG Facilities
- NGEPP Project Site
- Karbochem Industrial Complex

Data Source: ESRI Basemap Imagery	
Scale: 1:10 000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo 29	
Date: 15/10/2020	Compiled by: INBRO
Project No: 566508	Fig No: 2-1

srk consulting

NEWCASTLE GAS ENGINE POWER PLANT (NGEPP)

AERIAL VIEW OF NGEPP SITE

Path: G:\566508_NEWCASTLE_ENERGEY_ENV_VHUY\8GIS\GISPROJ\MXD\566508_F4_4_NGEPP_ArealView_A3CL_20210412.mxd

Revision: A Date: 12 04 2021

3 Project Details

3.1 NGEPP and Associated Infrastructure Development

The proposed NGEPP project entails the construction of a gas fired open cycle thermal power generating plant, with a generation capacity of approximately 100 megawatt (MW). The 100 MW capacity will be achieved via 13 Rolls-Royce (Bergen B3540V20) gas engines of 8.8 MW each. These engines will be four-stroke medium-speed (750 rpm) gas fuelled engines that will dive 11 kV electrical generators. Radiators will be used for the engines' cooling systems.

[Note: Although the directly calculated output would be around 121 MW, one engine will always be on stand-by while the 12 others will output the nominal 100 MW, with allowance made for a 2.5% parasitic plan loss which would bring the output capacity down to approximately 100 MW.]

The fuel interface point for the new plant will be located at the existing gas metering station supplying methane rich gas to the existing cogeneration plant (i.e. Spring Lights Gas /Sasol Gas transported via Lily Pipeline). For the electricity produced, the connection to the grid is proposed to be via the existing 132 kV switchyard located within the Karbochem Industrial Complex where it interconnects with the external Eskom Grid system, making use of existing servitudes.

The NGEPP requires the storage of back-up fuel (to the volume equivalent of a three-day supply reserve) in the form of Liquefied Natural Gas (LNG).

In this regard, Newcastle Energy has proposed the development of a 2 100 m^3 LNG storage facility constituting the following:

- 7 x 300 m^3 cryogenic tanks.
- A regassification facility.
- An LNG offloading skid.
- Pressure reduction station.

The proposed LNG storage facility is proposed to be located within the Karbochem Industrial Complex, on the site to the east of the NGEPP site as shown in **Figure 2-1**.

Water and effluent systems will be supplied by Karbochem. These plant interfaces are existing.

The project would broadly involve the following components:

1) Main gas station, including gas distribution piping to gas engines at 4 to 6 bar pressure and gas flow meters.
2) Portable water supply.
3) Raw water supply points.
4) Fire water supply, including underground fire water ring main, fire hydrants, fire hose reels.
5) Demineralised water supply points.
6) Engine house, including:
    - Rolls-Royce Gas Engines 13 X 8.8 MW B35:40V20AG2 (N+1) coupled to 11kV/50Hz alternators fitted on a main frame and suspended on rubber vibration damping mountings.
    - Noise supressing sheet metal powerhouse structure.
    - 5 000 kg crane to run along the length of the engine house to facilitate maintenance activities.
    - Engines main gas supply piping.
    - Compressed air system for starting the engines including 30 bar receiver, starting air module and piping.
    - Silencers (45 dBA) and exhaust stacks with 33 m height. The stacks are grouped together to support each other and to reduce construction cost.
    - Engines oil cooling system.

- Engines oil filling system.
- Oil storage area for new oil.
- Oil storage area for used oil.
- Engines intercooler and jacket water cooling radiators fitted with electric fan motors mounted at ground level so as to optimize construction cost and to facilitate maintenance activities.
- Header tanks at normal atmospheric pressure with a surface area of approximately 1 m^2, to facilitate coolant level maintenance.
- Air intake system with filtration elements.
- Air ventilation system to remove heat generated by air flow through the alternators and radiation from other hot surfaces from the powerhouse.
- Fire protection system.
- Gas and fire detectors.
- Offloading bay.

7) High voltage (HV) yard to step up from 11 kV to 132 kV, including interconnecting transformers, line feeders and Eskom tie in point.
8) HV Substation, including switchgear, synchronising breakers, uninterrupted power supply and direct current (DC) systems.
9) Compressor room with 30 bar starting air compressors.
10) Effluent management infrastructure, including sump and electric pump and piping to Karbochem.
11) Main gate security office, including toilets.
12) Road access and storm drainage.
13) Office block, including:
    - Admin office.
    - Power plant manager office.
    - CEO office.
    - Board room.
    - Control room including layout plan.
    - Library/documentation centre.
    - Storeroom.
    - Kitchen.
    - Toilets.
    - Staff parking.
    - Visitors parking.
14) Maintenance workshop, including:
    - Working and tool areas.
    - Offices.
    - Spares storeroom.
    - Kitchen.
    - Toilets.

A conceptual block diagram showing what infrastructure will be within the site boundary (i.e. inside battery limits (IBL)) and what infrastructure will be outside of the site boundary (i.e. outside battery limits (OBL)) is shown in **Figure 3-1**. A provisional general arrangement layout for the NGEPP is shown in **Figure 3-2**.

3.2 Gas Engine Details

Bergen Engines supplies medium-speed engines for marine and power generation applications, and for the oil and gas industry. Marine engines are marketed through the Rolls-Royce Marine sales organization while engines for the power and for the oil and gas industry via the Rolls-Royce Power Systems sales organization. Since 1984, Rolls-Royce have developed, manufactured and installed more than 600 lean-burn gas engines for industrial power stations and municipal uses. The B-gas

engine's design philosophy is to achieve increasingly stringent exhaust emission standards, industry leading electrical and heat recovery efficiency and high and dependable power levels to suit present and future applications.

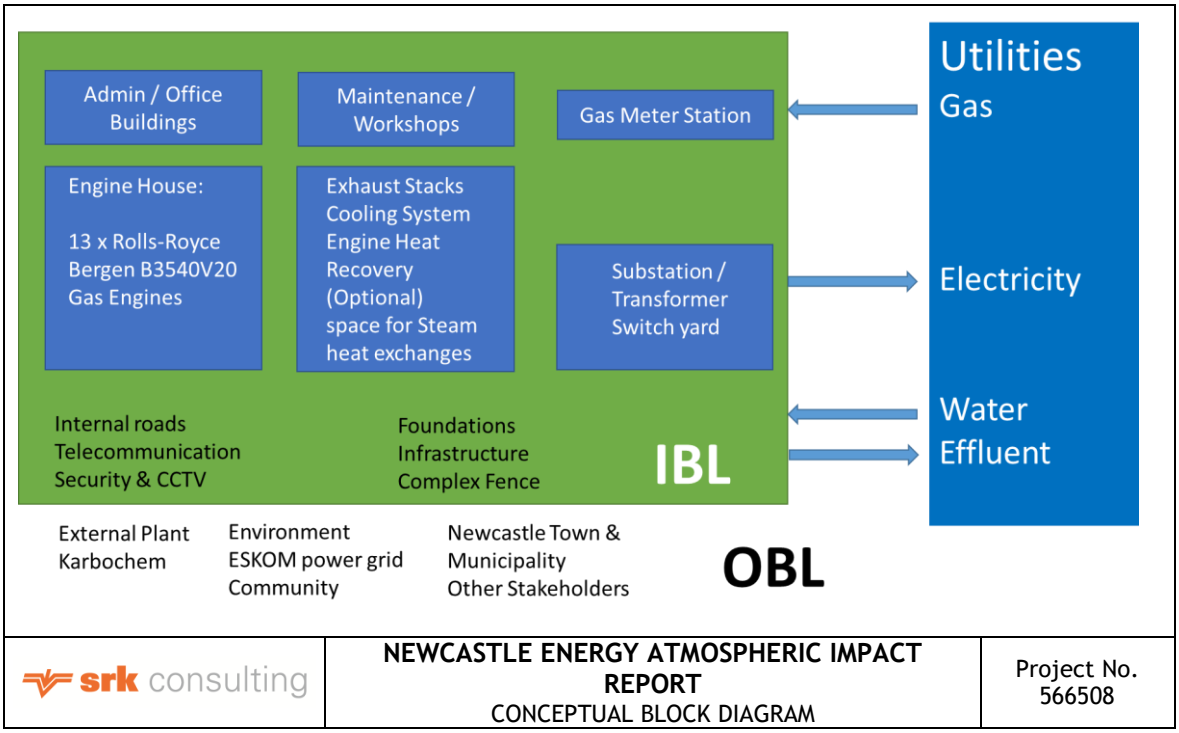
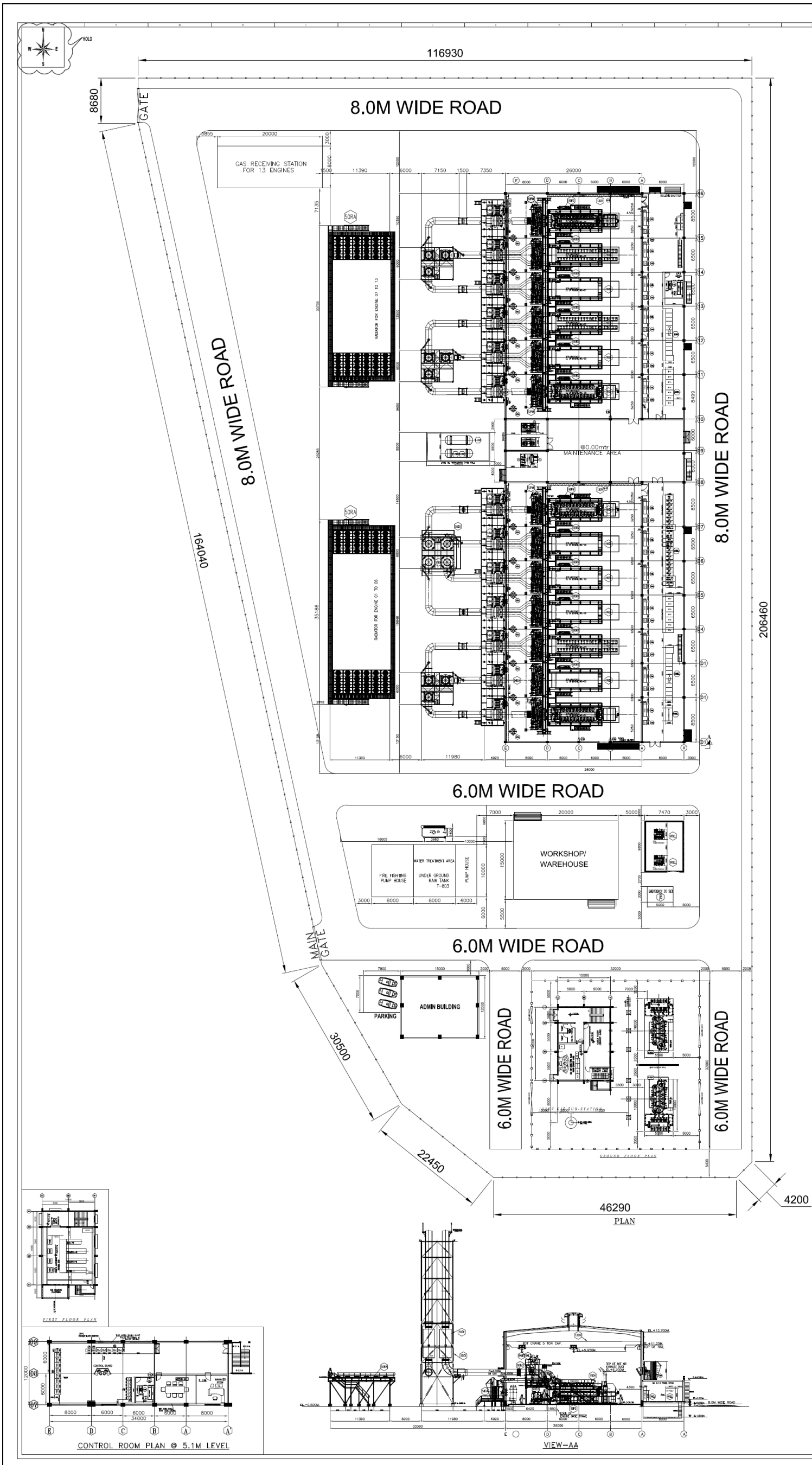


Figure 3-1: Conceptual Block Diagram



NOTES:-

1. All dimensions are in mm, Elevations are in metres, unless otherwise specified.
2. Elevation 0.00m corresponds to Finished Floor Level (FFL) of Engine hall.
3. Outside Engine hall floor FGL (-) 0.500m minimum.
4. North direction to be confirmed depends on site location.(Indicated Tentatively)
5. Explosion Relief Valve location Qty decided during engineering.

SCHEDULE OF MECHANICAL EQUIPMENT

Tag. No.	EQUIPMENT DESCRIPTION	QTY.	WT/Unit, kg
11EN	ENGINE B35:40V20AG1	13 NOS.	
12PM	AUXILIARY MODULE	13 NOS.	
13CR	EOT CRANE ENGINE HALL (5TON)	01 NO.	
14CR	EOT CRANE WORKSHOP (2TON)	01 NO.	
14VA	VENTILATION UNIT	13 SET	
30SA	STARTING AIR COMPRESSOR	02 NOS.	
43LO	LUBE OIL TRANSFER PUMP	01 NO.	
44LO	USED LUBE OIL DRAIN TRANSFER PUMP	01 NO.	
50RA	RADIATOR-02 Nos/Engine	13 SET	
51EX	EXHAUST SILENCER	13 NOS.	
54CA	CHARGE AIR FILTER (BUILT IN WITH SILENCER)	13 NOS.	
59EX	EXHAUST CHIMNEY STRUCTURES	13 NOS.	
84SA	START AIR BOTTLE 3000 Ltrs	13 NOS.	
84LT	LT EXPANSION TANK	13 NOS.	
84HT	HT EXPANSION TANK	13 NOS.	
86LO	CRANKCASE VENTILATION UNIT	13 NOS.	
90EX	PRE-VENTILATION SYSTEM	13 NOS.	
90FG	FUEL GAS MODULE	13 NOS.	
94SA	CONTROL AIR MODULE	06 NOS.	
100SA	MOUNTING PLATE	13 NOS.	
ERV	EXPLOSION RELIEF VALVE	26 NOS.	
-	GAS RECEIVING STATION	01 NO.	
68FG	SLAM SHUT OFF VALVE	01 NO.	
77FG	BLEED OFF VALVE	01 NO.	
99FG	MAIN GAS FILTER	01 NO.	
T-301	LUBE OIL MAKE UP TANK-10KL	01 NO.	
T-302	USED LUBE OIL TANK-10KL	01 NO.	
T-303	LUBE OIL MAINTENANCE TANK-10KL	01 NO.	
T-304	USED LUBE OIL DRAIN TANK-1KL	01 NO.	
T-802	POTABLE WATER TANK 20KL-	01 NO.	
T-803	RAW WATER TANK UNDERGROUND	01 NO.	
T-804	MAKE UP WATER TANK-2KL /06 ENGINE	02 NOS.	

SCHEDULE OF ELECTRICAL EQUIPMENT

TAG NO	EQUIPMENT DESCRIPTION	QTY.	WT/Unit, kg
10EL	MV PANEL BOARD	01 NO	-
20EL	BATTERY CHARGER	01 NO	-
21EL	220V DC BATTERY BANK	01 NO	-
30EL	ENGINE CONTROL CABINET (ECC)	13 NOS	-
31EL	ENGINE MOTOR CONTROL CABINET (EMCC)	13 NOS	-
50EL	NEUTRAL GROUNDING TRANSFORMER (NGT)	13 NOS	-
60EL	PLANT CONTROL CABINET (PCC)	02 NOS	
70EL	UTILITY CONTROL CABINET (U1)	02 NOS	-
71EL	BATTERY CONTROL CABINET (B1)	07 NOS	-
80EL	GENERATOR CONTROL CABINET (G1)	13 NOS	-
91EL	EMERGENCY PUSH BUTTON	04 NOS	-
98EL	AUXILIARY TRANSFORMER	02 NOS	-
99EL	BLACK START D.G SET	01 NO	-
101EL	PCCP	01 NO	-
-	BSDG DISTRIBUTION PANEL	01 NO	-
-	MLDB	01 NO	-
-	MPDB	01 NO	-
-	NETWORK SWITCH PANEL	01 NO	
-	WEATHER STATION PANEL	01 NO	

AREA REQUIRED : 19732.00 Sqmtr / 4.86 Acres

NOTES & LEGENDS FOR 132KV GIS SUB-STATION:-

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
2. THE PHYSICAL APPEARANCE AND THE DIMENSIONS OF ALL PANELS ARE INDICATIVE ONLY, THE EXACT DIMENSIONS SHALL BE INCORPORATED AFTER THE APPROVAL OF GA DRAWINGS OF THE RESPECTIVE EQUIPMENTS OR PANELS.
3. THIS DRAWING SHALL BE REFERED ONLY FOR PANEL ARRANGEMENT PURPOSE TO CHECK ADEQUATE CLEARANCES.
4. HEIGHT OF ACID PROOF TILEING SHALL BE UP TO 2.1 MTR. IN BATTERY ROOM
5. DOORS IN SWITCHGEAR ROOM/CABLE VAULTS/BATTERY ROOM SHALL BE FIRE RATED FOR 2 HOURS.
6. BATTERY ROOM FLOOR SHALL BE WITH ACID PROOF TILES.
7. 132KV LA FOR TRANSFORMER TO BE FITTED ALONG WITH BUSHING.

LEGENDS :-

PANEL NO.	PANEL DESCRIPTION
1CRP	G/G-1 CONTROL & RELAY PANEL
2CRP	BUS PT
T1CRP	TRAFO.1 CONTROL & RELAY PANEL
T2CRP	TRAFO.2 CONTROL & RELAY PANEL
RT1	RTCC PANEL TRAFO.-1
RT2	RTCC PANEL TRAFO.-2
SCP	SCADA PANEL
BC	BATTERY CHARGER

FOR TENDER PURPOSE ONLY
PRELIMINARY ISSUE

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CUSTOMER : VUTOMI - NEW CASTLE - SOUTH AFRICA

PROJECT : 13 X B35:40 V20 AG GAS BASED ENGINE 100MW COMBINED CYCLE POWER PLANT

Title: POWER PLANT LAYOUT

Rolls Royce Power System Bergen Engines

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NEWCASTLE GAS ENGINE POWER PLANT
PROVISIONAL PLANT GENERAL ARRANGEMENT LAYOUT

Project No. 566508

Figure 3-2: Provisional plant general arrangement layout

4 Noise Principles

Sound is defined as any pressure variation (in air, water or other medium) that the human ear can detect. Noise is defined as “unwanted sound”. Noise can lead to health impacts and can negatively affect people’s quality of life. Hearing impairment is typically defined as a decrease in the threshold of hearing. Severe hearing deficits may be accompanied by tinnitus (ringing in the ears). Noise-induced hearing impairment occurs predominantly in the higher frequency range of 3,000 to 6,000 Hertz (Hz), with the largest effect at 4,000 Hz. With increasing equivalent continuous sound pressure level ($L_{Aeq)}$ and increasing exposure time, noise induced hearing impairment occurs even at frequencies as low as 2,000 Hz. However, hearing impairment is not expected to occur at L_{Aeq} levels of 75 dB(A) or below, even for prolonged occupational noise exposure.

The annoyance due to a given noise source is subjective from person to person, and is also dependent upon many non-acoustic factors such as the prominence of the source, its importance to the listener’s economy (wellbeing), and his or her personal opinion of the source. Increased exposure to noise can have negative effects on individuals, both physiological (influence on communication, productivity and even impaired hearing) and psychological effects (stress, frustration and disturbed sleep). As such, noise impacts need to be understood to mean one or a combination of negative physical, physiological or psychological responses experienced by individuals, whether consciously or unconsciously, caused by exposure to noise.

More technically, noise impacts are defined as the capacity of noise to induce a nuisance depending upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time. Sound levels during the evening and night is approximately 5 to 10 dB(A) lower than during the day (World Health Organisation, 1999).

5 Environmental Noise Legislation and Guidelines

5.1 Noise Control Regulations

In South Africa, environmental noise control has been implemented for three decades, introduced in the 1980s with codes of practice issued by the South African National Standards (formerly the South African Bureau of Standards, SABS) to address noise pollution in various sectors of the country. Under the previous generation of environmental legislation, specifically the Environmental Conservation Act 73 of 1989 (ECA), provisions were made to control noise from a National level in the form of the Noise Control Regulations (GNR 154 of January 1992). In later years, the ECA was replaced by the National Environmental Management Act 107 of 1998 (NEMA) as amended. The National Environmental Management: Air Quality Act 39 of 2004 (NEM: AQA) was published in line with NEMA and contains noise control provisions under Section 34:

"(1) The minister may prescribe essential national standards –

(a) for the control of noise, either in general or by specific 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."

Under ECA, the Noise Control Regulations were updated and are to be applied to all provinces in South Africa. The Noise Control Regulations give all the responsibilities of enforcement to the Local Provincial Authority, where location specific by-laws can be created and applied to the locations with approval of Provincial Government. Where province-specific regulations have not been promulgated, acoustic impact assessments must follow the Noise Control Regulations. These regulations define the following:

- **Ambient Sound Level:** 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 had been put into operation.
- **Zone Sound Level**: a derived dB(A) value determined indirectly by means of a series of measurements, calculations or table readings and designated by a local authority for an area.
- **Disturbing Noise**: 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 dB(A) or more.

With the above definitions in mind, regulation 4 of the Noise Control Regulations stipulate that no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof.

Furthermore, NEM:AQA prescribes that the Minister must publish maximum allowable noise levels for different districts and national noise standards. These have not yet been accomplished and as a result all monitoring and assessments are done in accordance with the South African National Standards (SANS) 10103:2008 and 10328:2008 as discussed in the sections that follow.

5.2 South African National Standards (SANS)

The SANS 10328:2008 (*Methods for Environmental Noise Impact Assessment*s) presently inform environmental acoustic impact assessments in South Africa. This standard defines the purpose of an Environmental Acoustic Impact Assessment to be to determine and quantify the acoustical impact of, or on, a proposed development. It also stipulates the methods used to assess impacts as well as the minimum requirements to be investigated and included in the Environmental Acoustic Impact Assessment report as part of the S&EIR. These minimum requirements include:

1) The purpose of the investigation.
2) A brief description of the planned development or the changes that are being considered.
3) A brief description of the existing environment including, where relevant, the topography, surface conditions and meteorological conditions during measurements.
4) The identified noise sources together with their respective sound pressure levels or sound power levels (or both) and, where applicable, the operating cycles, the nature of sound emission, the spectral composition and the directional characteristics.
5) The identified noise sources that were not taken into account and the reasons as to why they were not investigated.
6) The identified noise-sensitive developments and the noise impact on them.
7) Where applicable, any assumptions, with references, made with regard to any calculations or determination of source and propagation characteristics.
8) An explanation, either by a brief description or by reference, of all measuring and calculation procedures that were followed, as well as any possible adjustments to existing measuring methods that had to be made, together with the results of calculations.
9) An explanation, either by description or by reference, of all measuring or calculation methods (or both) that were used to determine existing and predicted rating levels, as well as other relevant information, including a statement of how the data were obtained and applied to determine the rating level for the area in question.
10) The location of measuring or calculating points in a sketch or on a map.
11) Quantification of the noise impact with, where relevant, reference to the literature consulted and the assumptions made.
12) Alternatives that were considered and the results of those that were investigated.
13) A list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation.
14) A detailed summary of all the comments received from interested or affected parties as well as the procedures and discussions followed to deal with them.
15) Conclusions that were reached.
16) Proposed recommendations.
17) If remedial measures will provide an acceptable solution which would prevent a significant impact, these remedial measures should be outlined in detail and included in the final record of decision if the approval is obtained from the relevant authority. If the remedial measures deteriorate after time and a follow-up auditing or maintenance programme (or both) is instituted, this programme should be included in the final recommendations and accepted in the record of decision if the approval is obtained from the relevant authority.
18) Any follow-up investigation which should be conducted at completion of the project as well as at regular intervals after the commissioning of the project so as to ensure that the recommendations of this report will be maintained in the future.

The SANS 10103:2008 document (*The measurement and rating of environmental noise with respect to speech communication*) provides methods and guidelines to assess working and living environments with respect to acoustic comfort as well as respect to possible annoyance by noise. As applicable to this assessment, SANS 10103:2008 provides typical rating levels for noise in different districts. A summary of the rating levels from SANS (2008) are presented in **Table 5-1**. The typical sound rating categories for this investigation are determined based on the position of the identified off-site sensitive receptors relevant to the current land-uses/town planning scheme.

Table 5-1: Typical rating levels for noise in districts (adapted from SANS 10103:2008)

Type of District	Classification	Equivalent Continuous Rating level for Noise ($L_{Req,T}$) (dB(A))	
		Outdoors	
		Day-time ($L_{Req,d}$)	Night-time ($L_{Req,n}$)
a) Rural	A	45	35
b) Suburban (with little road traffic)	B	50	40
c) Urban	C	55	45
d) **Urban (with one or more of the following: workshops, business premises and main roads)**	D	60	50
e) Central Business Districts	E	65	55
f) **Industrial District**	F	70	60*
*For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n **70 dBA** can be considered as typical and normal. Since the NGEPP operates within the Karbochem industrial park, the Night-time ($L_{Req,n}$) of 70 dBA has been applied in this study.			

As stipulated in SANS 10103:2008, noise can pose a nuisance impact to a community if the increase in average noise levels exceeds the ambient noise by a certain degree. These specified increases together with the relevant estimated community responses are presented in **Table 5-2**. Such changes in ambient (residual) noise levels are assessed in this report and compared with the resultant community response determined.

Table 5-2: Categories of community/group response (adapted from SANS 10103:2008)

Excess ($\Delta L_{Req,T}$)[a] dB(A)	Estimated Community or Group Response	
	Category	Description
0 – 10	Little	Sporadic Complaints
5 – 15	Medium	Widespread Complaints
10 – 20	Strong	Threats of community/group action
>15	Very Strong	Vigorous community/group action

Overlapping ranges for the excess values are given because a spread in the community reaction might be anticipated.

[a] $\Delta L_{Req,T}$ should be calculated from the appropriate of the following:

1) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS $L_{Req,T}$ of the residual noise (determined in the absence of the specific noise under investigation);

2) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the maximum rating level of the ambient noise given in Table 1 of the code;

3) $L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the typical rating level for the applicable district as determined from Table 2 of the code; or

4) $L_{Req,T}$ = Expected increase in $L_{Req,T}$ of ambient noise in the area because of the proposed development under investigation.

6 Methodology

To assess the environmental acoustic impacts of the proposed NGEPP, both baseline ambient (monitored) and proposed cumulative operational (modelled) noise levels were determined. Comparisons of the existing (ambient baseline) and proposed (impacted) noise levels at the nearest potential sensitive receptors (noise receivers) enabled an assessment of potential increases in noise levels as a result of the proposed development. Estimated potential increases were then assessed against the applicable SANS (2008) community or group response categories (**Table 5-2**) to determine the likely impacts/responses to be anticipated at receptor sites as a result of such increases. The SANS 10103:2008 guidelines apply to L_{Aeq} levels and resultant changes in these levels. As such, in this assessment the L_{Aeq} levels have been measured and predicted to assess impacts and compliance with the relevant rating levels.

6.1 Baseline Monitoring

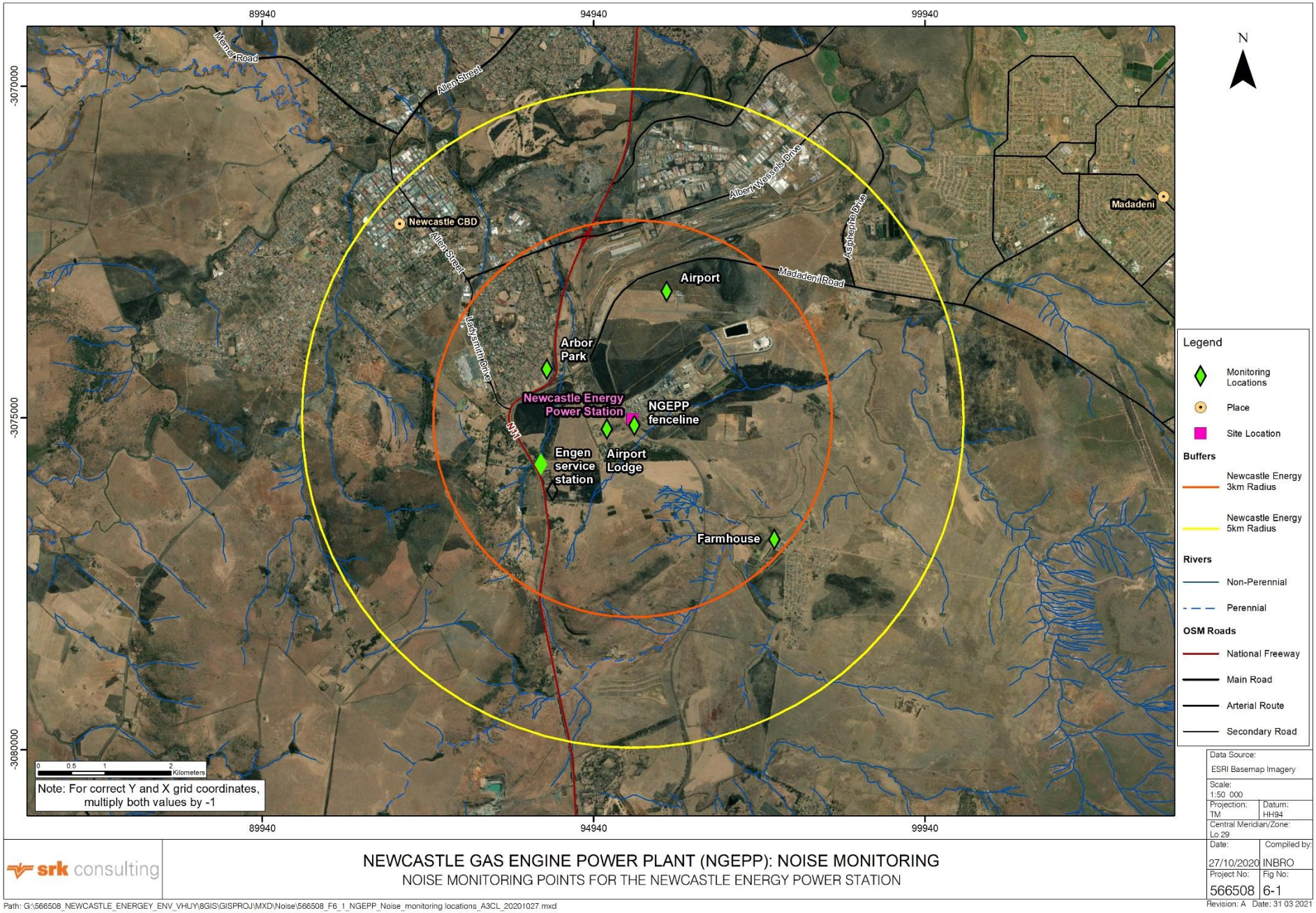
Ambient sound level measurements were undertaken on 29 to 30 October 2020 at six (6) receptor locations as indicated in **Table 6-1** and **Figure 6-1**. All receptor sound level measurements were free-

field measurements (i.e. at least 3.5 m away from any vertical reflecting surfaces). Measurement procedures were undertaken according to the relevant South African Code of Practice SANS 10103:2008, which guides the selection of monitoring locations, microphone positioning and equipment specifications. Sound level measurements were taken with a SANAS-calibrated Type 1 Integrating Sound Level Meter (CEL 63X). The instrument was calibrated in October 2020 and the calibration is valid for a period of 1 year (until October 2021). The calibration certificate is shown in Appendix A

Table 6-1: Locations of acoustic monitoring points

Receptor ID	Receptor Description	Latitude (S)	Longitude (E)	Distance from Boundary (m)
REC1	Airport Lodge	-27.786614°	29.965367°	385
REC2	Arbour Park	-27.778558°	29.956112°	1440
REC3	Engen Service Station	-27.791493°	29.955326°	1500
REC4	Farmhouse	-27.801456°	29.991131°	2800
REC5	Airport	-27.767829°	29.974360°	1900
REC6	NGEPP Fenceline	-27.786100°	29.969563°	20

Measurements were taken during the prescribed timeframes in SANS 10103: 2003, 2004 & 2008, with day-time monitoring between 06:00 and 22:00 and night-time between 22:00 and 06:00. Measurements were conducted for fifteen minutes at each monitoring location. The sound level meter was calibrated before and after measurements were conducted and no significant drifts (differences greater than 0.5 dB(A)) were found to occur. At each point, the equivalent (L_{Aeq}), maximum (L_{Amax}), and minimum (L_{Amin}) continuous sound pressure levels were measured.



Data Source: ESRI Basemap Imagery
Scale: 1:50 000
Projection: TM
Datum: HH94
Central Meridian/Zone: Lo 29
Date: 27/10/2020
Compiled by: INBRO
Project No: 566508
Fig No: 6-1

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NEWCASTLE GAS ENGINE POWER PLANT (NGEPP): NOISE MONITORING

NOISE MONITORING POINTS FOR THE NEWCASTLE ENERGY POWER STATION

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6.2 Acoustic Calculations

Typical sound power levels (PWL) for different components associated with each of the 13 Rolls-Royce (Bergen B3540V20) gas engines were obtained from the Rolls-Royce Engineers **(Table 6-2)**. Typical sound PWLs were summed (logarithmically) together to obtain a cumulative PWL for the proposed operations, assuming all equipment will be operated simultaneously.

Table 6-2: Operational phase equipment sound power level ratings associated with each gas engine component

Source per generator	Sound Power Level (dB(A))
Engine noise - mechanical sound	98.0
Cooling fan noise - sound of air being moved across the engine	85.0
Alternator noise - cooling air and brush friction	95.0
Induction noise – mechanical sound	95.0
Engine exhaust with silencer	85.0
Logarithmic Total (per engine)	**101.2**

Although 13 Rolls-Royce (Bergen B3540V20) gas engines exist on the facility, one is always on standby. Therefore, only the impacts of the 12 gas engines in operation were assessed. The logarithmic sum PWLs from 12 gas engines operating simultaneously was calculated to be 112 dB(A). This logarithmic total noise level was applied to the closest boundary of the proposed operations in relation to each receptor and resultant noise levels at specified distances from the site were calculated using attenuation-over-distance acoustic calculations.

6.3 Assumptions and Limitations

In this screening AIA, the following assumptions were made:

- All operating activities are assumed to be operational for 24 hours a day.
- As an environmentally conservative approach, the sum of all the operational equipment used simultaneously was used in the acoustic propagation calculation with the noise emanating from the nearest boundary to each respective sensitive receptor.
- Operational phase noise sources are based on estimated sound level data provided by the client.
- The effects of acoustic barriers (i.e. warehouse brick wall enclosures, noise supressing sheet metal powerhouse structure, hood lining, etc.) have not been accounted for in the calculations. As such, predicted impacts are representative of an environmental conservative.
- Noise impacts from the office block (storeroom, boardroom, admin office, toilets etc.) and the maintenance workshop (tool areas, spares storeroom etc.) have not been included in this assessment as these are expected to be negligible.

7 Results

7.1 Baseline (Existing) Noise Environment

Since the proposed NGEPP is located within an industrial complex next to a large chrome chemicals plant, the existing noise climate in the vicinity of the facility is classified as being typically industrial in nature while ambient noise at surrounding offsite receptor locations can be described as being typically urban in nature. Sources of ambient noise recorded during the monitoring campaign include road traffic, other industries, business premises, construction activities, as well as birds chirping and insects. Daytime and night-time results from this monitoring campaign are presented in **Table 7-1** and **Table 7-2.**

The average day-time (L_{Aeq}) sound level measured outside the proposed NGEPP fenceline was below the SANS 10103 (2008) industrial rating level (70 dB(A)), as the existing 18.5 MW cogeneration plant has been mothballed. Average day-time (L_{Aeq}) sound levels measured at Arbour Park was above the SANS 10103 (2008) urban rating level (60 dB(A)). Key sources at Arbour Park originated from vehicles travelling along the N11, people talking and people walking, birds chirping and insects as well as industrial noises (example: African Amines (alkyl amines plant), Brother CISA (chrome chemicals plant) and SA Calcium Carbide) from the Karbochem Industrial Complex. Average day-time (L_{Aeq}) sound levels measured at all other urban receptor locations (i.e. Airport Lodge, Engen, Farmhouse, and the Airport) were below this SANS urban rating level. The dominant noise sources at these urban receptor locations originated from road traffic, people talking and people walking, a train passing by, an aircraft flying overhead, dogs barking occasionally as well as light construction activities. Industrial noises from the existing Karbochem Industrial Complex were slightly audible only at the Airport Lodge and Farmhouse receptor points.

Table 7-1: Day-time sound level monitoring results

Receptor Description	SANS rating level (dBA)	L_{Aeq} (dBA)	L_{Amax} (dBA)	L_{Amin} (dBA)
Airport Lodge	**60**	52.0	77.6	40.4
Arbor Park	**60**	61.3	74.9	40.8
Engen service station	**60**	52.1	68.7	42.6
Farmhouse	**60**	50.2	76.1	36.2
Airport	**60**	52.8	62.1	43.5
NGEPP fenceline	**70**	48.6	67.6	39.3
*Values in red exceed the SANS 10103:2008 rating levels				

Average night-time (L_{Aeq}) sound levels measured outside the proposed NGEPP fenceline was below the SANS 10103 industrial rating level (70 dB(A))[3] as the existing 18.5 MW cogeneration plant has been mothballed. Average night-time (L_{Aeq}) sound levels measured at Arbour Park and the Engen service station was above the SANS 10103 urban rating level (50 dB(A)). Key sources at both Arbour park and Engine service station originated from vehicles travelling along the N11, insects, dogs barking as well as industrial noises from the Karbochem Industrial Complex. Average day-time (L_{Aeq}) sound levels measured at all other urban receptor locations (i.e. Airport Lodge, Farmhouse and the Airport) were below this SANS urban rating level. The dominant noise sources at these urban locations originated from road traffic, dogs barking occasionally, light wind noise and traffic. Industrial noises from the existing Karbochem Industrial Complex were slightly audible only at the Airport Lodge and Farmhouse receptor points.

Table 7-2: Night-time sound level monitoring results

Receptor Description	SANS rating level (dBA)	LA_{eq} (dBA)	L_{Amax} (dBA)	L_{Amin} (dBA)
Airport Lodge	**50**	46.9	68.2	38.4
Arbor Park	**50**	56.9	78.4	37.2
Engen service station	**50**	58.7	74	39.4
Farmhouse	**50**	47.9	71.4	40.2
Airport	**50**	42.0	55.1	32.1
NGEPP fenceline	**70**	46.8	57.1	42.5
*Values in red exceed the SANS 10103:2008 rating levels				

[3] Since NGEPP is proposed to operate within the Karbochem Industrial Complex, the Night-time ($L_{Req,n}$) of 70 dBA has been applied in this study.

7.2 Proposed Noise Climate

Based on a worst-case cumulative sound power level of 112 dB(A) generated by all equipment associated with the proposed NGEPP operating simultaneously (**Table 6-2)**, the resultant predicted noise levels at specified distances from the facility are presented in **Figure 7-1**. Noise levels in the immediate vicinity of the operational activities are predicted to be high, as would be expected. At distances greater than 25 m from the source (approximate location of the fenceline), noise levels reduce considerably, with noise levels at approximately 150 m and 500 m from the source reducing to below the SANS 10103:2008 urban day-time and night-time rating level of 60 dB(A) and 50 dB(A), respectively.

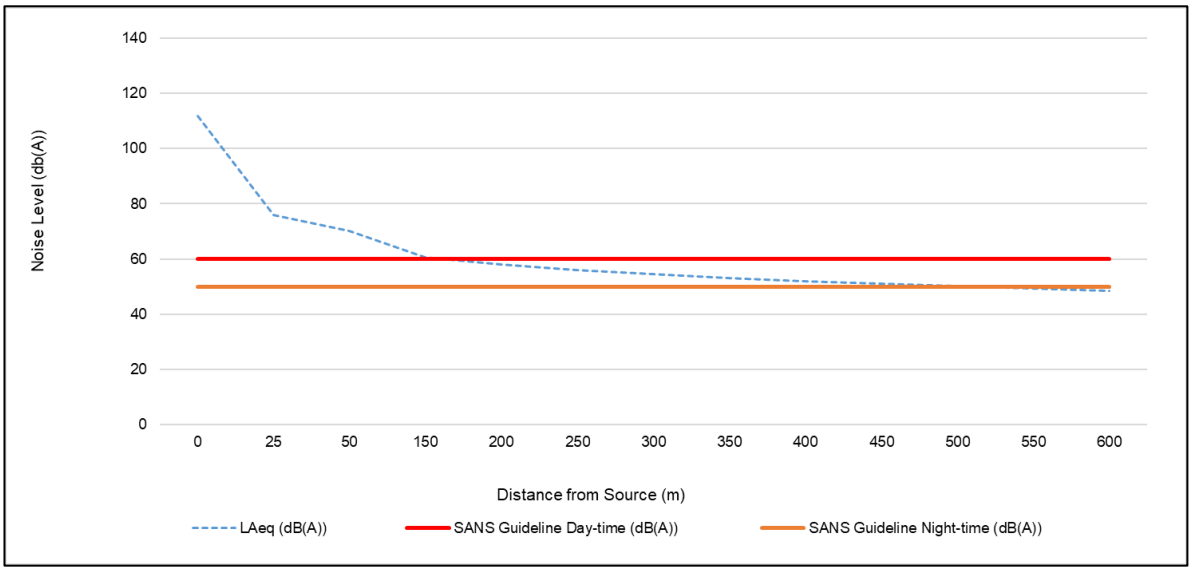


Figure 7-1: Worst case predicted noise levels associated with the operational phase

Baseline, predicted and resultant noise levels for day-time and night-time at the residential locations are presented in **Table 7-3** and **Table 7-4**, respectively. The difference in baseline and cumulative noise levels was assessed using the classifications presented in **Table 5-2**. It must be noted that these results represent an environmentally conservative scenario when operational activities are occurring on the closest boundary of the proposed NGEPP to the receptor in question and do not represent noise levels that will occur all the time.

Increases in noise levels at all offsite receptor points as a result of the NGEPP operational activities will range from 0.0 to 2.2 dB(A) during the day-time. Such marginal increases are classified as resulting in “little” community response. While the predicted cumulative noise level at Arbor Park is above the SANS 10103 urban day time rating level (60 dB(A)), it must be noted that the existing baseline measured at this point was already above the rating level. No changes in day-time noise levels are however expected at this receptor. The predicted cumulative noise level at the NGEPP fenceline is above the SANS 10103 industrial day time rating level (70 dB(A)) and is most likely due to its close proximity to the site operations. While this increase is classified as having a strong community response, this point is located along the plant fenceline away from community receptors. Therefore, no community receptors or sensitive receptors are likely to experience the noise levels at the fenceline of the proposed plant and thus, the predicted community response (strong) at this receptor site likely won’t be experienced. At the fenceline, and within the fenceline of the proposed plant, occupational health and safety standards apply.

At night-time, increases in noise levels at the offsite receptor points as a result of the NGEPP operational activities will range from 0.1 to 5.0 dB(A) during the night-time. While the predicted cumulative noise level at the Airport Lodge, Arbor Park and Engen are above the SANS 10103 urban

night-time rating level (50 dB(A)), these marginal increases are classified as resulting in “little” community response. Furthermore, existing baseline noise levels measured at Arbor Park and Engen were already above the rating level. The Airport Lodge is the closest off-site receptor site to the proposed NGEPP site and thus, the predicted sound pressure level raises the ambient (baseline) sound pressure level above the Urban District rating level (SANS 10103:2004).

The predicted cumulative noise level at the NGEPP fenceline is above the SANS 10103 industrial night time rating level (70 dB(A)) and is most likely due to its close proximity to the site operations. While, this increase is classified as having a strong community response, this point is located along the plant fenceline away from community receptors. Therefore, no community receptors or sensitive receptors are likely to experience the noise levels at the fenceline of the proposed plant and thus, the predicted community response (strong) at this receptor site likely would not be experienced. At the fenceline, and within the fenceline of the proposed plant, occupational health and safety standards apply.

The predicted increases in ambient sound levels at all *offsite receptors* for day and night-time are below the 7 dB(A) threshold for a “disturbing noise” as per the South African Noise Control Regulations.

Table 7-3: Day-time sound level monitoring results

Receptor Description	Predicted Noise Level dB(A)	Baseline Noise Level dB(A)	Cumulative Noise Level dB(A)	Change in Noise Level dB(A)	Estimated Community Response
Airport Lodge	50.3	52	54.2	2.2	Little
Arbor Park	40.5	61.3	61.3	0.0	Little
Engen service station	40.2	52.1	52.4	0.3	Little
Farmhouse	36.4	50.2	50.4	0.2	Little
Airport	38.7	52.8	53.0	0.2	Little
NGEPP fenceline	70.0	48.6	70.1	21.5	Strong
*Values in red exceed the SANS 10103:2008 rating levels					

Table 7-4: Night-time sound level monitoring results

Receptor Description	Predicted Noise Level dB(A)	Baseline Noise Level dB(A)	Cumulative Noise Level dB(A)	Change in Noise Level dB(A)	Estimated Community Response
Airport Lodge	50.3	46.9	51.9	5.0	Little
Arbor Park	40.5	56.9	57.0	0.1	Little
Engen service station	40.2	58.7	58.8	0.1	Little
Farmhouse	36.4	47.9	48.2	0.3	Little
Airport	38.7	42.0	43.7	1.7	Little
NGEPP fenceline	70.0	46.8	70.1	23.3	Strong
*Values in red exceed the SANS 10103:2008 rating levels					

8 Impact assessment

The assessment of impacts will be based on the professional judgement of specialists and the EAP according to the SRK impact assessment methodology presented below. The impact ratings will be informed by the findings of specialist assessments conducted, fieldwork, and desk-top analysis. The significance of potential impacts that may result from the proposed development will be determined in order to assist Department of Environment, Forestry and Fisheries (DEFF) in making a decision.

This section describes the anticipated impacts of the NGEPP. During the Environmental Impact Reporting phase, these impacts will be given a rating based on the methodology as described below

and the findings of the specialist assessments. The identification of potential impacts of the proposed activity is based on the following factors:

- The legal requirements.
- The nature of the proposed activity.
- The nature of the receiving environment.
- The DEFF Screening Tool.

8.1 Impact Assessment Methodology

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria that are used to determine impact consequences are presented in **Table 8-1** below.

Table 8-1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
None		0
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as shown in Table 8-2.

Table 8-2: Method used to determine the Consequence Score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence has been derived, the probability of the impact occurring will be considered using the probability classifications presented in Table 8-3.

Table 8-3: Probability Classification

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of impacts will be determined by considering consequence and probability using the rating system prescribed in Table 8-4 below.

Table 8-4: Impact Significance Ratings

		Probability			
		Improbable	**Possible**	**Probable**	**Definite**
Consequence	**Very Low**	Insignificant	Insignificant	Very Low	Very Low
	Low	Very Low	Very Low	Low	Low
	Medium	Low	Low	Medium	Medium
	High	Medium	Medium	High	High
	Very High	High	High	Very High	Very High

Finally, the impacts will also be considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The system for considering impact status and confidence (in assessment) is laid out in Table 8-5 below.

Table 8-5: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings as described below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

Practicable mitigation measures will be recommended, and impacts will be rated in the prescribed way both with and without the assumed effective implementation of mitigation measures. Mitigation measures will be classified as either:

- **Essential:** must be implemented and are non-negotiable; or
- **Optional:** must be shown to have been considered, and sound reasons provided by the proponent, if not implemented.

8.2 Noise Impact Assessment

8.2.1 Impact N1: Noise impacts during the construction phase

The construction phase will initially include demolition and removal of the existing plant (18.5 MW cogeneration plant) and thereafter construction of a gas fired open cycle thermal power generating plant and axillary infrastructure. Noise generated during the construction phase is considered temporary in nature and the extent, probability, consequence, and significance can readily be managed through standard construction techniques (Table 8-6).

Table 8-6: Impact N1: Noise impacts during the construction phase

Activity	Demolition and removal of the existing plant (18.5 MW cogeneration plant) followed by construction of the new gas fired open cycle thermal power generating plant and axillary infrastructure.							
Project Phase	Construction phase							
Potential impact rating	Extent	Intensity	Duration	Consequence	Probability	Significance	Status of impact	Confidence
Before Management	Local (1)	Medium (2)	Short-term (1)	Very Low (4)	Definite (>90%)	Very Low	-ve	High
Management measures: – Planning construction activities in consultation with local communities to ensure activities with the greatest potential to generate noise are planned during periods of the day, thereby less likely resulting in a disturbance. Information regarding construction activities should be provided to all local communities; – All equipment, machines and vehicles to be used onsite during the construction phase are to be the quietest reasonably available and are to be routinely maintained to ensure the effectiveness of the noise suppression systems. – Through site induction programmes, all construction personal (including contractors) should be informed of their responsibilities and the importance of managing noise levels during the construction phase of the project. – When working near a potential sensitive receptor, limit the number of simultaneous activities to a minimum as far as possible; and – Any noise-related complaints received during the construction phase are to be registered and result in the implementation of appropriate modified practices.								
Potential impact rating	Extent	Intensity	Duration	Consequence	Probability	Significance	Status of impact	Confidence
After Management	Local (1)	Low (1)	Short-term (1)	Very low (3)	Definite (>90%)	Very Low	- ve	High

8.2.2 Impact N2: Noise generated during the operational phase

The probability of ambient noise being generated from operation of the NGEPP is definite and its impacts are considered irreversible and unavoidable. This screening assessment predicted impacts to result in little community response in the area in which it is proposed to operate. The significance of the impact before and after management measures will therefore be low (Table 8-7).

Table 8-7: Impact N2: Noise impacts during the operational phase

Impact N2: Noise generated during the operational phase								
Activity	Operation for the gas fired open cycle thermal power generating plant							
Project Phase	Operational phase							
Potential impact rating	Extent	Intensity	Duration	Consequence	Probability	Significance	Status of impact	Confidence
Before Management	Local (1)	Medium (2)	Long-term (3)	Medium (6)	Definite	Medium	- ve	High
Management measures: – Ensure that all gas engines are located within brick walled buildings. – Ensure that exhaust silencers are installed across all engines. – Investigate the use of installing acoustic barriers around noisy operations at the plant. – Undertaking maintenance and repairs for equipment and prioritising quieter models/options. – Ambient noise monitoring campaign to be undertaken once the NGEPP is operational to confirm/refine changes in noise levels at sensitive receptors. – Avoid unnecessary noise, such as shouting, the use of horns, loud site radios, rough handling of material and equipment. – Require employees to wear Personal Protective Equipment (PPE) in noisy areas. – Any noise-related complaints received during the operational phase are to be registered and result in the implementation of appropriate modified practices.								
Potential impact rating	Extent	Intensity	Duration	Consequence	Probability	Significance	Status of impact	Confidence
After Management	Local (1)	Low (1)	Long-term (3)	Low (5)	Definite	Low	- ve	High

9 Conclusions and Recommendations

To assess the environmental acoustic impacts of the proposed NGEPP, both baseline (monitored) and proposed operational (modelled) noise levels were assessed. Comparisons of the existing and proposed noise levels at various specified receptors (noise receivers) enabled an assessment of changes in noise levels at these locations as a result of the proposed development. Such changes were then assessed against the SANS community or group responses in order to assess the anticipated impacts/responses as a result of such increases.

Based on a cumulative sound power level of 112 dB(A) stemming from all equipment associated with the 12 Rolls-Royce (Bergen B3540V20) gas engines operating simultaneously the resultant noise levels at specified distances from the source were determined. Noise levels in the immediate vicinity of the operational activities are predicted to be high, as would be expected for an industrial operation. At distances greater than 25 m from the source (approximately fenceline location), noise levels reduce considerably, with noise levels at approximately 150 m and 500 m from the source dropping to below the SANS urban day-time and night-time rating level of 60 dB(A) and 50 dB(A), respectively.

Increases in noise levels at all offsite receptor points as a result of the NGEPP operational activities will range from 0.0 to 2.2 dB(A) during the day-time. Such marginal increases are classified as resulting in “little” community response. At night-time, increases in noise levels at the offsite receptor points as a result of the NGEPP operational activities will range from 0.1 to 5.0 dB(A) during the night-time. While the predicted cumulative noise level at the Airport Lodge, Arbor Park and Engen are above the SANS 10103 urban night-time rating level (50 dB(A)), these marginal increases are classified as resulting in “little” community response.

All impacts associated with the proposed NGEPP were evaluated using a risk matrix, which is a semi-quantitative risk assessment methodology. The resultant environmental acoustic risks for residential receptors were ranked “low” during the operational phase. With such minimal increases in noise levels during the operational phase, it is envisaged that the facility can be authorised without any major impacts or complaints. The facility is adequately positioned within an industrial area, away from sensitive receptors and will not negatively impact the noise climate at the receptors. Nonetheless, the following recommendations for mitigation and management measures for the operational phase include but are not limited to:

- Ensure that all gas engines are located within brick walled buildings.
- Investigate the use of installing acoustic barriers around noise operations at the plant.
- Undertaking frequent maintenance and repairs for onsite machinery and equipment.
- Employees to make use of Personal Protective Equipment (PPE) (example: ear plugs) in areas of exposure to elevated noise levels.
- Ambient noise monitoring campaign to be undertaken once the NGEPP is operational to confirm/refine changes in noise levels at sensitive receptors.
- Any noise-related complaints received during the operational phase are to be registered and result in the implementation of appropriate modified practices, as/if appropriate.

Prepared by	**Project Partner**
SRK Consulting - Certified Electronic Signature srk consulting 566508/44347/Report 8293-5090-8184-HOWG-02/06/2021 This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database	SRK Consulting - Certified Electronic Signature srk consulting 566508/AIA/1/44368/Report 9956-6367-9464-VHUY-03/06/2021 This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database
H. Tularam (Pr. Sci. Nat)	M. Van Huyssteen
Senior Scientist (Air Quality/Noise)	Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

10 References

- Cowan, J (1993): Handbook of environmental acoustics, New York: Van Nostrand Reinhold.
- South Africa (2005): National Environmental Management: Air Quality Act (No. R. 39 of 2004) Government Gazette, 24 February 2005 (No. 27318).
- BSI British Standards (2009): Code of practice for noise and vibration control on construction and open sites – Part1: Noise. British Standard: BS 5228-1:2009.
- World Health Organisation (WHO) (1999): Guidelines for Community Noise. Available online at: http://www.who.int/docstore/peh/noise/guidelines2.html.

Appendices

Appendix A: Specialist Declaration and CV

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/
Date Received:	

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

Acoustic Impact Assessment for Proposed Newcastle Gas Engine Power Plant, 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:	SRK Consulting South Africa (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	125%
Specialist name:	Hasheel Tularam			
Specialist Qualifications:	MSc Environmental Science			
Professional affiliation/registration:	Pr. Sci. Nat 117336			
Physical address:	2nd Floor Norfolk House, 54 Norfolk Terrace, Westville			
Postal address:	PO Box 1969, Westville, 3630			
Postal code:	3630	Cell:	083 282 5724	
Telephone:	031 279 1235	Fax:		
E-mail:	Htularam@srk.co.za			

2. DECLARATION BY THE SPECIALIST

I, Hasheel Tularam, 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

SRK Consulting South Africa (Pty) Ltd

Name of Company:

26 April 2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Hasheel Tularam, 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

SRK Consulting South Africa (Pty) Ltd

Name of Company

26 April 2021

Date

Signature of the Commissioner of Oaths

28/04/2021

Date

I certify that the deponent has acknowledged that he/she knows and understands the contents of this declaration Sworn to/affirmed and Signed before me at Westville *on* 28/04/2021

Reesha Bissesar (Administrator)
REF No: 9/1/8/2 (R/O) KZN (Pinetown)
Commissioner of Oaths

Hasheel Tularam

Senior Scientist

Profession	Environmental Science (Air Quality)
Education	Doctor of Philosophy in Environmental Science, University of University of KwaZulu-Natal, South Africa (Current) Bachelor of Science (Masters), Environmental Science, University of KwaZulu-Natal, South Africa (2014) Bachelor of Science (Honours), Environmental Science, University of KwaZulu-Natal, South Africa (2011) Bachelor of Science, Geography and Environmental Management, University of KwaZulu-Natal, South Africa (2009)
Registrations/ Affiliations	Pr.Sci.Nat, South Africa, Reg No 117336 Chairman for National Association for Clean Air KZN Branch

Specialisation

Hasheel is a passionate and enthusiastic environmental consultant with nine years' cumulative experience in the air quality management industry. He is actively involved in a range of meteorological, ambient air quality and stack emission monitoring campaigns in his career. This background, complimented by his knowledge in Geographic Information Systems (GIS) has allowed him to undertake atmospheric dispersion modelling assessments ranging from initial screening level to complex source and terrain models using various predictive modelling platforms such as ADMS, AERMOD and CALPUFF. Compiling atmospheric emission license (AEL) applications (SAAELIP), undertaking National Atmospheric Emissions Inventory Submissions (NAEIS), developing industry specific air quality management plans along with practicing a range of other air quality services, has allowed him to attain a comprehensive understanding of the principles National Environmental Management: Air Quality Act 39 of 2004.

Expertise

Hasheel currently holds an MSc in Environmental Science and is broadening his prospects in the air quality management field by working towards a PhD focused on "Air pollution Monitoring and Dispersion Modelling in the eThekwini Municipality" through the University of Kwa-Zulu Natal. He also has recently begun exploring his talents into acoustic monitoring and modelling for a diverse range of client operations in Southern Africa. By playing an active role in the National Association for Clean Air (NACA) committee (KZN Branch Chairman 2015 - 2020), Hasheel keeps abreast with current air quality related matters in South Africa. His is also a SACNASP registered Professional Natural Scientist. His expertise includes:

- Atmospheric Impact Assessment Reports
- Air Quality Management Plans
- Atmospheric emission licensing;
- Air quality and acoustic monitoring
- Acoustic impact assessments

Employment

2020 – Current	SRK Consulting (Pty) Ltd, Senior Scientist, Environmental Department, Durban
2017 – 2019	WSP Environmental (Pty) Ltd, Senior Consultant, Durban
2013 – 2016	WSP Environmental (Pty) Ltd, Consultant, Durban
2010 – 2012	WSP Environmental (Pty) Ltd, Assistant Consultant, Durban

Languages

English – read, write, speak (Excellent)

Hasheel Tularam

Senior Scientist

Publications

1. Tularam, Hasheel & Ramsay, Lisa. (2011) Air Quality of the Durban South Basin linked to Synoptic Events for the Year 2009. NACA Journal, Page 21 – 25.

2. Tularam, Hasheel & Ramsay, Lisa. (2014) Synoptic Influences on Air Pollution Events in the Durban South basin, 2006 to 2010. University of KwaZulu-Natal, August, 2014, http://hdl.handle.net/10413/11065

3. Tularam, H. Ramsay, L. Muttoo, M. Brunekreef, B. Meliefste, K. de Hoog, K. Naidoo, R (2019): Harbour and Intra-City Drivers of Air Pollution: Findings from a Land Use Regression Model, Durban, South Africa. NACA Journal, Page 20 – 26.

Presentations

1. Tularam, Hasheel. “Air Quality of the Durban South Basin linked to Synoptic Events for the Year 2009.” National Clean Air Association, East London, South Africa, 2012.
2. Tularam, Hasheel. “Screen3 Dispersion Modelling Seminar.” EO2HEAVEN, Durban, South Africa, 2013.
3. Tularam, Hasheel. “Air Pollution Modelling and Monitoring Seminar.” Guest Lecturer University of KwaZulu-Natal, Durban, South Africa, 2013.
4. Tularam, Hasheel. “Synoptic Influences on Air Pollution Events in the Durban South Basin, 2006 to 2010.” National Association Clean Air, Durban, South Africa, 2014.
5. Tularam, Hasheel. “Harbour and Intra-City Drivers of Air Pollution: Findings from a Land Use Regression Model, Durban, South Africa”. National Association Clean Air, Stellenbosch, South Africa, 2019.
6. Tularam, Hasheel. “Harbour and Intra-City Drivers of Air Pollution: Findings from a Land Use Regression Model, Durban, South Africa”. International Society for Environmental Epidemiology, Utrecht, Netherlands,

Hasheel Tularam

Senior Scientist

Key Experience: Air Quality Compliance

Location:	Kwa-Zulu Natal, South Africa
Project duration & year:	2020
Client:	Richards Bay Coal Terminals (RBCT)
Name of Project:	Air Quality Impact Assessment for RBCT
Project Description:	SRK were appointed to conduct a specialist Air Quality Impact Assessment (AQIA) for the RBCT operations. The primary aim of this AQIA was to assess the air pollutant emission concentrations (primarily particulate matter) emanating from the terminal operations. AERMOD View was used as a modelling platform to calculate pollutant concentrations at key receptor points away from the Port and to compare these concentrations with the relevant National Ambient Air Quality Standards (NAAQS).
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging
Value of Project:	N/A

Location:	Kwa-Zulu Natal, South Africa
Project duration & year:	2018 - 2019
Client:	SAPREF
Name of Project:	Air Quality Impact Assessment for SAPREF
Project Description:	A specialist Air Quality Impact Assessment (AQIA) for SAPREF operations was undertaken to fulfil their AEL requirements. The primary aim of this AQIA was to assess the air pollutant emission concentrations emanating from the refinery. Californian Puff (CALPUFF) View 8.1 was used as a dispersion modelling platform to calculate pollutant concentrations at key receptor points away from the refinery and to compare these concentrations with the relevant National Ambient Air Quality Standards (NAAQS).
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience: Air Quality Compliance

Location:	Kwa-Zulu Natal, South Africa
Project duration & year:	2016 - 2017
Client:	Transnet Port Terminals
Name of Project:	Transnet Port Terminals AEL Application
Project Description:	The terminal undertakes a listed activity in terms of Section 21 of the National Environmental Management: Air Quality Act, Act. No 39 of 2004 (NEM: AQA) and was issued with a Provisional AEL which requires consistent monitoring and management of the terminal's emissions. Assisted TPT with their initial AEL application in 2012 following which the terminal was awarded with a provisional AEL valid until 21 March 2017.
Job Title and Duties:	Duties included undertaking the AEL application, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging
Value of Project:	N/A

Location:	Kwa-Zulu Natal, South Africa
Project duration & year:	2016
Client:	Transnet Port Terminals
Name of Project:	Air Quality Impact Assessment for Proposed Tippler Shed, Richards Bay
Project Description:	This specialist AQIA aimed to assess the ambient impact of particulate matter emissions from the proposed tippler. A cumulative air pollution dispersion model for the Richards Bay airshed using Californian Puff (CALPUFF) View 7.5.1 as part of the then proposed Slab EF project was previously developed. This model has been built upon for the third tippler assessment and has been conducted in accordance with the Regulations Regarding Air Dispersion Modelling (the Modelling Regulations from here forward), Government Notice 533 of 2014 (Government Gazette 37804). To assess the impact of the third tippler predicted concentrations between the current TPT emissions (2016 emissions excl. tippler 3) and proposed TPT emissions (2016 emissions incl. tippler 3) have been compared
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging
Value of Project:	N/A

Location:	Tugela, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Sappi Tugela (Pty) Ltd
Name of Project:	Air Quality Impact Assessment for a Green Energy Power Project
Project Description:	Sappi proposed the installation and operation of a biomass boiler. The installation is termed the Green Energy Power Project (GEPP) and will generate up to 40 MW of electrical power to supply the mill as well as the national grid. To investigate the impact of this project on the surrounding environment, a Basic Assessment was undertaken. A specialist Air Quality Impact Assessment (AQIA) formed a critical part of this study was also undertaken. AERMOD was used as a dispersion modelling platform to assess the current (baseline) scenario and a proposed scenario that included the biomass boiler. All current and proposed concentrations were compared against the NAAQS.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience — Air Quality Compliance

Location:	Vanderbijlpark, Gauteng, South Africa
Project duration & year:	2016
Client:	The Council for Scientific and Industrial Research (CSIR).
Name of Project:	Air Quality Management Plan for SARCO Foundry
Project Description:	The Council for Scientific and Industrial Research (CSIR) appointed us to develop and undertake an Air Quality Management Plan (AQMP) for SARCO. The AQMP aimed to assess and manage any potential impacts that on the surrounding environment from SARCO's operations as well as update the existing AEL. AERMOD was used as a dispersion modelling platform and results compared to the NAAQS. Results from an occupational monitoring survey were used to further augment the foundry's AQMP.
Job Title and Duties:	Duties included undertaking the AQMP, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging
Value of Project:	N/A

Location:	Cape Town, Western Cape, South Africa
Project duration & year:	October 2014 – April 2015
Client:	FFS Refiners (Pty) Ltd
Name of Project:	Proposed Modifications to FFS Brackenfell storage facility
Project Description:	Client required an Air Quality Impact Assessment and Atmospheric Emissions License amendment application for the proposed modifications of the FFS Brackenfell storage facility. Fugitive tank emissions were estimated for total volatile organic compounds (TVOCs) and benzene using the United States Environmental Protection Agency TANKS 4.09d model. The assessment was then conducted using the screening level modelling platform, SCREEN3, to predict cumulative ambient concentrations resulting from both existing and proposed scenarios of the FFS Brackenfell storage facility.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Dormac – Division of Southerly Holdings (Pty) Ltd.
Name of Project:	Air Quality Impact Assessment for a Proposed Dry Dock
Project Description:	Undertook an environmental authorisation process for a proposed dry-docking facility in Durban. An AQIA was required to evaluate the significance of the potential impacts on ambient air quality due to the dry-docking facility operating in the area. Air pollution emissions from the abrasive blasting and spray painting of ship hulls were calculated using emission factors and equations while SCREEN3 was used as a dispersion modelling platform for the study
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience Air Quality Compliance

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Shell and British Petroleum (BP) South African Petroleum Refineries (SAPREF).
Name of Project:	Independent Verification of Tank Emissions
Project Description:	An independent verification of all storage tank emission calculations was undertaken for SAPREF's Atmospheric Emission License (AEL) application. Volatile organic compound (VOC) emissions from storage tanks were calculated with use of United States Environmental Protection Agency's (USEPA) TANKS model (Tanks 4.0.9d) as it is a recommended model in terms of the NEMAQA. A report was compiled outlining results of the TANKS model calculations, with comparison and verification of the SAPREF Shell model calculations
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Saldanha, Western Cape, South Africa
Project duration & year:	2016
Client:	Transnet Port Terminals
Name of Project:	Iron Oxide Relationship to Staining Study for TPT Saldanha
Project Description:	This study aimed to assess the ambient particulate and dust fallout levels and the relationship between these and the staining of surfaces in Bluewater Bay, Langebaan and Vredenburg. The analysis comprised a literature review on iron ore staining, an interrogation of continuous ambient particulate measurements and meteorological data at Bluewater Bay and Vredenburg. The data was assessed to determine the relationships between concentrations peaks and specific meteorological scenarios. A Tier 3 (CALPUFF) modelling analysis of worst case (highest) iron ore throughputs at the site and potential impacts at key receptors as well as the decreases in ambient particulates and dust fallout associated with recommended dust abatement technologies and practices was developed and assessed accordingly. Recommendations as to how the facility can reduce its emissions were also provided.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience — Air Quality Compliance

Location:	Cape Town, Western Cape, South Africa
Project duration & year:	2016
Client:	FFS Refiners (Pty) Ltd
Name of Project:	Proposed Modifications to FFS Cape Town Harbour storage facility
Project Description:	During 2010, FFS Refiners (Pty) Ltd (FFS) proposed to expand their Cape Town Harbour (CTH) tank farm with the addition of five storage tanks and two oil fired heaters (one for back-up purposes). FFS wished to change product storage (from heavy fuel oil, HFO, to naphtha) in two of the proposed tanks for which environmental authorisation was granted. However, to assess the change in emissions as a result of the product change, the existing emissions inventory was updated using the United States Environmental Protection Agency's (US EPA) TANKS model as well as National Pollutant Inventory (NPI) emission factors. SCREEN3 was used as the Tier 1 dispersion modelling platform for this study. Modelled output concentrations were compared to the National Ambient Air Quality Standards (NAAQS) under the National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) where applicable.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Newcastle, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	Silicon Technology (Pty) Ltd
Name of Project:	Air Quality Screening Assessment - Air Pollution Incident
Project Description:	Two baghouse compartments on Siltech's Furnace Stacks became congested, causing the system to significantly overheat and resulting in a fire incident. The Amajuba District Municipality had requested Siltech to undertake an air pollution dispersion modelling assessment in accordance with The Regulations Regarding Air Dispersion Modelling (2014). Predicted air pollutant concentrations were compared with the South African National Ambient Air Quality Standards (NAAQS) by using SCREEN3 as a dispersion modelling platform.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Air Quality Compliance

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2013
Client:	Shell and British Petroleum (BP) South African Petroleum Refineries (SAPREF).
Name of Project:	Air Quality Impact Assessment - SAPREF Cleaner Fuels Phase 2
Project Description:	In order to meet stringent fuel specifications that were issued by the National Department of Environmental Affairs, SAPREF was required to undertake various modifications to their existing fuel refining process. This upgrade triggered the need for Environmental Impact Assessment (EIA) for which a comprehensive air quality impact assessment was required. Emissions from petroleum storage tanks were estimated using United States Environmental Protection Agency's (USEPA) TANKS 4.0.9 model while proposed stack emissions were calculated. ADMS (Tier 2) was used as a dispersion modelling platform to estimate emissions during the construction phase as well as the operational phase of the project. Modelled outputs where plotted onto a solid GIS platform (ArcGIS 10) and predicted concentrations were tested for compliance with national air quality standards as a result of the upgrade.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2013
Client:	Shell and British Petroleum (BP) South African Petroleum Refineries (SAPREF).
Name of Project:	Air Quality Impact Assessment - SAPREF Cleaner Fuels Phase 2
Project Description:	In order to meet stringent fuel specifications that were issued by the National Department of Environmental Affairs, SAPREF was required to undertake various modifications to their existing fuel refining process. This upgrade triggered the need for Environmental Impact Assessment (EIA) for which a comprehensive air quality impact assessment was required. Emissions from petroleum storage tanks were estimated using United States Environmental Protection Agency's (USEPA) TANKS 4.0.9 model while proposed stack emissions were calculated. ADMS (Tier 2) was used as a dispersion modelling platform to estimate emissions during the construction phase as well as the operational phase of the project. Modelled outputs where plotted onto a solid GIS platform (ArcGIS 10) and predicted concentrations were tested for compliance with national air quality standards as a result of the upgrade.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Air Quality Compliance

Location:	Richards Bay, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	Transnet National Ports Authority (TNPA).
Name of Project:	Air Quality Impact Assessment on a Galley Waste Compactor
Project Description:	TNPA wished to install a galley waste compactor as well as associated infrastructure at the port of Richards Bay. A specialist air quality impact assessment was required to assess the odour impact of the waste compactor. The New South Wales (NSW) Environmental Protection Agency (EPA) 2001 approach was adopted as it presents odour concentration criteria for complex mixtures of odorous air pollutants and considers the population density of the area in which the facility is to be installed. ADMS v5 was used as a dispersion modelling platform to calculate odour concentrations away from the waste compactor. Odour plumes were generated on ArcGIS 10 and presented against backdrop imagery for ease of interpretation. Different scenarios were identified and developed to assess the worst-case odour emissions from compaction of galley waste
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Pietermaritzburg, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	Air Quality Impact Assessment on the Recycling of Poly polychlorinated biphenyl (PCB)-contaminated transformer oils.
Name of Project:	Air Quality Impact Assessment on a Galley Waste Compactor
Project Description:	FFS Refiners Pietermaritzburg plant proposed to recycle polychlorinated biphenyl (PCB)-contaminated transformer oils through their existing hydrogenation plant. As part of the environmental authorisation process, a specialist air quality impact assessment was required to quantify the increase in criteria air pollutant concentrations in the vicinity of the FFS plant with addition of the hydrogenation plant stack. A complete emissions inventory was developed using stack monitoring data, engineering specifications for the proposed stack as well the United States Environmental Protection Agency's (US EPA) TANKS model. AERMOD was used as a dispersion modelling platform for this study. Modelled concentrations where compared against results measured during a passive sampling campaign to allow for model validation as well as the National Ambient Air Quality Standards (NAAQS) defined under the NEM:AQA 2004 to ascertain compliance.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Air Quality Compliance

Location:	Eastern Cape, South Africa
Project duration & year:	2014
Client:	Great White Ltd.
Name of Project:	Air Quality Impact Assessment for Emissions Emanating the Koedoeskloof Landfill Site.
Project Description:	This study served to scientifically inform the delineation of an effective and locally representative buffer zone that limits the nuisance potential of the site and protects human health. The application of internationally-recognised methods, environmentally conservative assumptions and site-specific data was used to compile an emissions inventory of gaseous and particulate pollutants for the site. A Tier 2 atmospheric dispersion model (ADMS v5) together with emission scenarios that incorporated site-specific terrain, meteorological and emission data was developed for this study. Furthermore, geospatial tools (ArcGIS 10) was used to plot dispersion outputs such that an appropriate buffer zone based on relevant South African or internationally accepted human health and nuisance criteria could be identified.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	Africa SunOil Refineries (Pty) Ltd.
Name of Project:	Air Quality Impact Assessment for a Proposed Coal-fired Boiler
Project Description:	Africa SunOils wished transfer of a coal-fired boiler from an existing plant in Verulam to their plant in Mobeni, Durban South Basin (DSB). Given the sensitivity of the local community and steps taken by the eThekwini Municipality to reduce air pollution in the DSB, it was considered imperative that an elementary screening analysis be conducted to assess impacts on ambient concentrations on key pollutants. SCREEN3 was used as a modelling platform and emissions were combined with background concentrations to ascertain compliance with the respective NAAQS.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience	Key Experience
Location:	Saldhana, Western Cape, South Africa
Project duration & year:	2014
Client:	ArcelorMittal - Saldanha Works (Pty) Ltd.
Name of Project:	Air Quality Impact Assessment for a Proposed Briquetting Operation
Project Description:	The production process undertaken at ArcelorMittal, generates a high-value fine material by-product that can be briquetted and used in other processes. The proposed briquetting operation required a specialist air quality impact assessment to further inform those involved in environmental authorisation process. ADMS v5 was used as a modelling platform and ArcGIS10 was used as the geospatial software tool to generate isopleths showing the plume dispersion away from the plant. Results were compared with the relevant National Ambient Air Quality Standards to assess the impact on surrounding receptors.
Job Title and Duties:	Duties included undertaking the impact assessment, project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	Sappi Saiccor (Pty) Ltd
Name of Project:	Air Quality Impact Assessment, Durban, KwaZulu-Natal, South Africa
Project Description:	The Amakhulu Project saw the expansion of the Sappi Saiccor Mill to increase its chemical cellulose production as well as expand the magnesium cooking process by the installation of magnesium digesters and a reduction in number of calcium digesters. The emissions inventory for the plant included emissions from the plant's point sources (stacks), line sources (roads and rail) and area sources (coal and woodchip stockpiles). The emissions from the N2 (National Route 2) were used to calculate background concentrations of key pollutants. ADMS v5 was used to calculate annual average and worst-case 24-hour and hourly concentrations for selected pollutants for comparison with the NAAQS. Recommendations were made as to how the facility can further reduce its environmental impact.
Job Title and Duties:	Duties included project undertaking the impact assessment, coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience	**Key Experience**
Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2014
Client:	eThekwini Municipality.
Name of Project:	Air emissions Testing and Air Quality Assessment
Project Description:	Facilitated an air emissions testing and air quality assessment at the Tongaat and Mobeni Crematoriums each owned and managed by the eThekwini Municipality. The survey aimed at quantitatively determining the TOC, PM, metals, HCL, HF, NH_3, CO, SO_2, NO_x, as well as dioxin and furan emissions concentrations from the crematorium stack. Comparisons were made with the Minimum Emission Standards (MES) in terms of Section 21(3)(a) of NEMAQA. Recommendations were provided to each crematorium to reduce the impact of the incineration system currently operated at the plant
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming, budgeting, invoicing and progress reporting, and product packaging.
Value of Project:	N/A

Key Experience:	**Air Quality Monitoring**
Location:	East London, South Africa
Project duration & year:	2019-present
Client:	East London Industrial Development Zone
Name of Project:	East London Industrial Development Zone ambient air quality monitoring
Project Description:	Ambient air quality monitoring study for the ELIDZ over a three-year period from January 2019 to December 2021 and quarterly reporting.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A
Location:	Gauteng, South Africa
Project duration & year:	2020-present
Client:	Transnet Pipelines
Name of Project:	Transnet Pipelines ambient air quality monitoring
Project Description:	Ambient air quality monitoring study for Transnet Pipelines over a three-year period from January 2020 to December 2022 and quarterly reporting.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Air Quality Monitoring

Location:	South Africa
Project duration & year:	2019
Client:	Transnet Port Terminals
Name of Project:	Installation and maintenance of Weather Stations for Transnet Port Terminals
Project Description:	Installed three meteorological stations located at Transnet Port Terminals (Transnet) Durban Container Terminal, Cape Town Container Terminal and Cape Town Agri Ro-Ro Terminal. These meteorological stations serve to provide meteorological conditions specific to the Ports locality. Each meteorological station is an *iWeathar Edge 6+* unit that measures temperature, humidity, barometric pressure, wind speed, wind direction, solar radiation and rainfall
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	Richards Bay, KwaZulu-Natal, South Africa
Project duration & year:	2011 - 2020
Client:	Transnet Port Terminals
Name of Project:	Dust Management and Monitoring Program for Transnet Port Terminals
Project Description:	Provided Transnet Port Terminals with specialist air quality support and monitoring services in the Port of Richards Bay. The project includes monitoring of ambient concentrations of fine particulate matter (PM_{10}) and dust deposition, compiling an Atmospheric Emission Licence (AEL) for the facility and developing site-specific dust reduction and management strategies.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2019 - 2020
Client:	Transnet Port Terminals.
Name of Project:	Air Quality Monitoring Survey for Transnet, Durban
Project Description:	The aim of the project was to assess the current levels of dust pollution with relevance to the national ambient air quality standards published in the National Environmental Management: Air Quality Act (No 39 of 2004) as well as guidelines contained in SANS 1929:2005. Once an understanding of ambient dust levels and emission sources had been obtained, a management and control system was developed in order to mitigate the potential for exceedence of the relevant standards and guidelines.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Project duration & year:	2016
Client:	Hosaf Fibres (Pty) Ltd.
Name of Project:	Air Quality Monitoring Survey for Hosaf
Project Description:	Hosaf Fibres wished to quantify their VOC emission contribution to the surrounding air quality in the Durban South Industrial Basin. An ambient air quality monitoring survey with the use of passive samplers as well as active (real-time) monitoring equipment. Results not only informed the client of their VOC emission contribution but, were also used in the atmospheric emission license process.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Air Quality Monitoring

Location:	Durban, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Buckman Laboratories.
Name of Project:	Air Quality Monitoring Survey for Buckman Laboratories
Project Description:	A fenceline and source apportionment survey was conducted at Buckman Laboratories in Hammarsdale, KZN. As a US-based company, Buckman Laboratories pride themselves on achieving minimal environmental impact, which is being assessed through a passive sampling network, supported by a multi-parameter mobile monitoring trailer
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	Richards Bay, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Transnet Port Terminals.
Name of Project:	Air Quality Specialist Study for Proposed Storage Area Expansion
Project Description:	Transnet Port Terminals (TPT) had proposed to expand storage areas within their existing Richards Bay Terminal (RBT). The RBT has historically experienced challenges with regard to air quality issues. This specialist air quality assessment sought to evaluate the air quality impacts associated with the proposed open storage area and associated increases in materials handling within the RBT. Results from the study revealed that PM_{10} emissions emanating from the proposed stockpile are not expected to have significant impacts at off-site receptors. The findings and recommendations of this specialist study were intended to further inform those involved in the Environmental Impact Report (EIR) for the project.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	FFS Refiners (Pty) Ltd
Name of Project:	Seasonal Air Quality Monitoring Surveys for FFS
Project Description:	FFS Refiners has six process plants that perform a number of activities which include the production and blending of different grades of fuel oil, made from used lubricating oil, and other waste oils from industry. The production process results in a host of environmental externalities being generated. Facilitated the monitoring of various air pollutants at each of the FFS plants in terms of the current South African National Ambient Air Quality Standards where applicable. Monitoring and providing sound advice to FFS refiners has been an on-going task for several years.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience: Acoustics

Location:	Richards Bay, KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	FFS Refiners (Pty) Ltd
Name of Project:	Acoustic Impact Assessment
Project Description:	TPT RCB proposed the installation of a third rail wagon tippler to increase the export capacity of the port. The specialist environmental Acoustic Impact Assessment (AIA) aimed to quantify all noise sources from the proposed third tippler facility as well as determine how this will impact the existing noise climate in Richards Bay. To characterise the ambient noise climate in the vicinity of the port, a noise monitoring campaign was conducted at five sampling points (the port's main entrance gates, at Foskor and at the two closest residential areas, Arboretum and Tuzi Gazi) on the 9th and 10th of February 2016. The Computer Aided Nosie Abatement (CadnaA) acoustic modelling software was used to predict noise levels, which were then added to the background (measured) sound levels for each receptor. The change was evaluated and categorised in terms of the SANS 10103.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	Mpumalanga, South Africa
Project duration & year:	2016
Client:	Anglo American Thermal Coal
Name of Project:	Acoustic Impact Assessment
Project Description:	Undertook a comprehensive Environmental Impact Assessment (EIA) for a proposed mining area Block Z. A specialist was required to assess potential noise levels during the mining of Block Z and determine how this noise will impact on the existing noise climate of the region. A comprehensive noise monitoring survey was conducted at the colliery to characterise the baseline (existing) noise environment while Noise Navigator™, a well validated sound level database was used to source the sound power level of various sources while CadnaA Version 4.3 was used as a modelling platform.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Location:	Nelspruit, Mpumalanga, South Africa
Project duration & year:	2016
Client:	Sappi Southern Africa Limited.
Name of Project:	Acoustic Impact Assessment
Project Description:	Sappi wished to embark on an expansion project which comprises of two main project components, namely (i) expansion to the existing specialised cellulose production; and (ii) construction of a sawmill. The specialist environmental acoustic impact assessment (AIA) aimed to quantify all noise sources at the mill during both construction and operational phases of the expansion project and identify how this will impact on the existing noise climate of the region. Noise levels from potential sources as a result of the proposed expansion project were estimated using data from the Noise Navigator™, a well validated sound level database while CadnaA version 4.3 was used as a modelling platform.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Hasheel Tularam

Senior Scientist

Key Experience

Acoustics

Location:	Pemba, Mozambique
Project duration & year:	2016
Client:	Mozambique National Port and Rail Authority
Name of Project:	Acoustic Impact Assessment
Project Description:	Undertook a comprehensive Environmental Impact Assessment (EIA) of the proposed Logistics Base, Sub-Sea Area and Residential Area. As part of the EIA phase, a specialist environmental acoustic impact assessment (AIA) was required to assess potential noise sources at the port during both the construction and operational phases and determine how this noise will impact on the existing noise climate of the region. Various mitigation measures were outlined in the Environmental Management Plan to aid the Port in further reducing their noise impact
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A
Location:	KwaZulu-Natal, South Africa
Project duration & year:	2016
Client:	Scheepers, Spies & Mdaka Inc
Name of Project:	Acoustic Impact Assessment on a Proposed Taxi Rank
Project Description:	A specialist noise impact assessment was required for a proposed taxi rank to be developed at the Mtubatuba Ridge Estate. The assessment included a baseline investigation of the existing noise climate through environmental monitoring; a compliance assessment of the existing noise levels against the relevant South African National Standards (SANS) day- and night-time guidelines; a review of the meteorological character of the site; the development of a comprehensive noise inventory of all proposed noise sources associated with the taxi rank; and acoustic modelling with the use of CadnaA, to determine the impacts of the proposed taxi rank development on surrounding community. Further to the impact assessment, a range of recommendations were provided to ensure that the noise impact is contained as much as possible.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A
Location:	White River, Mpumalanga, South Africa
Project duration & year:	2016
Client:	Sonae Novobord (Pty) Ltd.
Name of Project:	Environmental Noise Survey (June 2013 – May 2014)
Project Description:	Conducted environmental noise monitoring at the Sonae Novobord White River plant since 2009. The project includes day and night time monitoring in accordance with the SANS 10103:2008 methodology, data analysis, compliance assessment and reporting. Recommendations as to how the plant can reduce its noise impact in the area in which it operates are also provided.
Job Title and Duties:	Duties included project coordination and management of the project team, liaison with the client, project programming.
Value of Project:	N/A

Appendix B: Sound Meter Calibration Certificate

Certificate of Conformity and Calibration

Instrument Model:-	CEL-633C		
Serial Number	2206806		
Firmware revision	V006-04		
Microphone Type:-	CEL-251	**Preamplifier Type:-**	CEL-495
Serial Number	4375	Serial Number	004640
Instrument Class/Type:-	1		

Applicable standards:-

IEC 61672: 2002 / EN 60651 (Electroacoustics - Sound Level Meters)
IEC 60651 1979 (Sound Level Meters), ANSI S1.4: 1983 (Specifications For Sound Level Meters)

Note:- The test sequences performed in this report are in accordance with the current Sound level meter *Standard - IEC61672. The combination of tests performed are considered to confirm the products electro-acoustic performance to all applicable standards including superceeded Sound Level Meter Standards - IEC60651 and IEC60804.*

Test Conditions:-	30 °C 63 %RH 999 mBar	**Test Engineer:-** **Date of Issue:-**	Stephen Potten October 2, 2020

Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2008 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

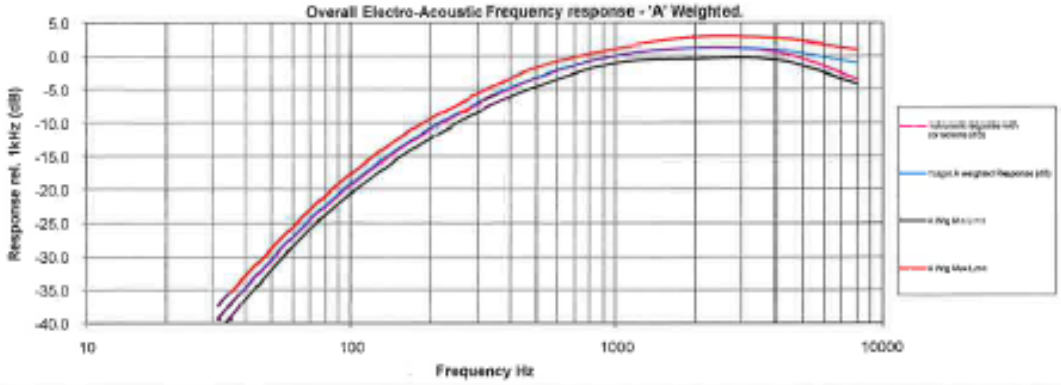
Test Summary:-

Self Generated Noise Test	**All Tests Pass**
Electrical Signal Test Of Frequency Weightings	**All Tests Pass**
Frequency & Time Weightings At 1 kHz	**All Tests Pass**
Level Linearity On The Reference Level Range	**All Tests Pass**
Toneburst Response Test	**All Tests Pass**
C-peak Sound Levels	**All Tests Pass**
Overload Indication	**All Tests Pass**
Acoustic Tests	**All Tests Pass**

Combined Electro-Acoustic Frequency Response - A Weighted

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61672-3:2006)

The following A-Weighted frequency response graph shows this instruments overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.



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Tested to CEL-63X test sheet TP444 revision 01-00

Addendum to Acoustic Impact Assessment Report: External Peer Review

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28 May 2021 **Our Ref: 20210528_SRK**

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PROPOSED GAS-TO-POWER PLANT AT NEWCASTLE ENERGY (PTY) LTD. IN NEWCASTLE, KWAZULU-NATAL, SOUTH AFRICA

REVIEW OF ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT

1. INTRODUCTION

IMA Trader was approached by SRK Consulting (South Africa) (Pty) Ltd on behalf of Newcastle Energy (Pty) Ltd to conduct a high-level review of the Newcastle Gas Engine Power Plant (NGEPP) Acoustic Impact Assessment (AIA) conducted by SRK Consulting (Pty) Ltd (SRK), dated April 2021. Given that this is a high-level review and many readers are not likely to be Environmental Noise / Acoustic Specialists, complex technical jargon is avoided where possible; replaced by our professional opinion on whether the AIA answers, as best practically possible in a planning stage, fundamental questions of sound level impacts that may be raised by stakeholders.

2. PROJECT OVERVIEW

Through the Newcastle Gas Engine Power Plant (NGEPP) Independent Power Producer (IPP) project, Newcastle Energy proposes to increase its electricity generation capacity to approximately 100 MW, which will provide them with the opportunity to submit a bid for new electricity generation capacity under the Department of Mineral Resources and Energy's (DMRE's) Risk Mitigation Independent Power Producer (RM IPP) Procurement Programme (Tender No.: DMRE001/2020/21). The proposed project requires Environmental Authorisation (EA), and subsequently Newcastle Energy appointed SRK Consulting (Pty) Ltd (SRK) to be the Environmental Assessment Practitioner (EAP). To support the EA process, SRK completed a screening level Acoustic Impact Assessment (AIA) for Newcastle Energy's proposed Gas-to-Power Plant in Newcastle, KwaZulu-Natal (KZN), South Africa.

To investigate the potential sound level impacts that may result from the proposed NGEPP project, SRK measured the baseline ambient noise environment at various receptor locations and compared this with a prediction of impacted sound levels at the same receptor sites. SRK then compared the estimated

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changes in sound levels with the South African National Standards (SANS:2004 & 2008) community or group responses to assess the anticipated community responses that may arise from the predicted changes in sound levels.

Predictive sound level estimations and comparisons against the measured baseline sound level environment indicated that, whilst the predicted cumulative noise levels transgressed the SANS:2004 Urban district and Industrial district sound ratings at some sites, the potential increases in noise levels at receptor sites due to the NGEPP project will likely result in "little" community response, according to the SANS 10103:2008. In order to reduce sound level impacts from the proposed NGEPP project, SRK provided key recommendations for mitigation and management measures.

3. CHAPTER COMMENTS

3.1 Chapter 1: Introduction, Background and Terms of Reference

- A concise background and description of the reason / requirement for the project is provided as the introduction to this Chapter.
- Details of the appointment by Newcastle Energy and SRK (Pty) Ltd and the purpose of the AIA by SRK (Pty) Ltd, are clearly explained and defined in a logical and easy-to-read format in this Chapter.
- The contents of the report and sequence thereof is briefly summarised.
- Readers will find the Section "Terms of Reference" (Section 1.2) informative, as it defines the aims of the study, which have been established to fulfil the project requirements.
- The information provided in Section 1.2.1, although largely generic for all EIA specialist studies, has been linked with some detail to the specific chapters of the AIA from which the required information can be found.
- The project phases and their estimated durations have not been defined, nor have any deliverable timeframes been stated.

3.2 Chapter 2: Background and Project Location,

- The use of a first-order chapter heading, "Background", and immediately after a second-order chapter heading "Project Location" is inept, given that there is only one sub-section under the "Background" chapter. This could be avoided by having the "Project Location" sub-section as the major chapter (i.e. 2. Project Location). This also avoid the duplication of having two "Background" Section titles in Chapter 1 ("1.1 Background") and Chapter 2: "Background".
- The presentation of the information in this chapter in tabular format is useful and easy to read. However, the details provided in the first two tables (Table 2-1 and above Table 2-1 on page

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3), although useful for the EAP's purposes or for submission of EA applications, are not essential and possibly deviate from the purpose of this specialist study.

- In Table 2-2 in Section 2.1 the coordinates for the boundary of the property are provided in latitude and longitude. The units appear to be degrees and decimal minutes (DD MM.MM). This is acceptable but must be stated as opposed to conventional degrees, minutes and seconds (DD MM SS).
- A site locality map is provided to present the location of the new NGEPP site within the Karbochem Industrial Complex in Newcastle. The fact that the facility is within an existing industrial zone is an immediate trigger for cumulative impact assessment.
- No specific detail or map is provided for the locations of selected sensitive receptors – this is required along with the selection rationale for each site.

3.3 Chapter 3: Project Details

- A brief but informative description of the new project and the processes, as well as process and plant diagrams, are provided in this Chapter.
- There is some repetition between the information in this Chapter and that in the preceding chapters which could be removed.
- The logical flow between "Chapter 3: Project Details" and the "Chapter 4: Noise Principles" is not clear and could be improved by adding link sentences.

3.4 Chapter 4: Noise Principles

- Whilst this Chapter on "Noise Principles" (Chapter 4) is interesting and provides a broad background to the definitions, behaviours and characterisations of noise, such high-level technical information is probably not required for the purposes of the AIA report as this falls within the specialist skills set. It would make more sense to condense (or remove) Chapter 4 and go straight into Chapter 5 (Legislative Framework), which is directly relevant to this study.
- Furthermore, whilst the typical noise levels listed in Table 4-1 are again interesting, such unrelated data is possibly not required for the purposes of this AIA, since it may cause confusion to the layperson (community stakeholder). This table could optionally be removed to avoid any confusion.

3.5 Chapter 5: Legislative Framework

- Legislative frameworks and guidelines should be easy to read and understand for the reader in this Chapter. The Noise Control Regulations as set out in GNR 154 of January 1992,

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provisioned in the Environmental Conservation Act 73 of 1989 (ECA), as well as the Noise Control Provisions contained within NEMAQA, should be familiar to most regulatory readers.

- The information in Chapter 5 is difficult to follow, as the text jumps backwards and forwards between reference to NEMAQA (containing overarching noise control provisions) and the Noise Control Regulations (set out in the ECA). It is easy to become confused between the "Noise Control Provisions" prescribed under Section 34 of NEMAQA and the "Noise Control Regulations" as set out in the ECA. This can be clarified by explicit referencing of the ECA when referring the "Noise Control Regulations".
- It may be useful to re-name this Chapter (Chapter 5) to "Applicable Environmental Noise Legislation and Guidelines", given that the Chapter contains information on both the legislation (Noise Control Regulations, ECA) and on the SANS Guidelines (Section 5.1). Furthermore, in this regard, it may be useful to add a second sub-heading/sub-section prior to Section 5.1 (SANS) which could be named "Noise Control Regulations". This new Section heading (Noise Control Regulations) could be inserted directly below point (2), paragraph one under Chapter 5, where the text then goes on to describe the Noise Control Regulations.
- A clear and well-structured presentation of all applicable SANS methods / typical rating levels / categories of response are provided in this Chapter.
- In Section 5.1 on page 11, whilst the list of minimum requirements for an Environmental Acoustic Impact Assessment Report is informative and provides a useful guide for the Acoustic Specialist and EAP to follow, it is not necessary to include all this detail in this report, which detracts from the assessment itself. Knowledge of the appropriate technical procedures again falls within the ambit of the author as a specialist consultant and need not be explained in full for readers of this application.
- In Chapter 5.1, reference to the "Typical rating levels for noise in districts" from the SANS must be referenced as "SANS 10103:2004, Edition 5.1; Government Notice No. 1373 of 8 November 2002", because the latest SANS version i.e. SANS 10103:2008 *does not refer to these typical land-use values.*
- It must be noted that the SANS 10103:2004 typical rating levels for noise in districts are *typical values* or bands of sound pressure levels likely to be experienced in the various land use zones and are *not directly legally enforceable*.
- In Table 5-1, the "Urban District" row and the "Industrial District" row are highlighted in bold, but no explanation is given as to why these two rows have been highlighted. It is assumed by the reviewers that these two districts are most applicable to this study. However, this needs to be stated should that be the intended purpose of bold lettering.
- There is no rationale provided for the selection of "Urban" and "Industrial" district categories for this study. For instance, it may be useful to have a sentence stating: *"The typical sound*

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rating categories for this investigation are determined based on the position of the identified off-site sensitive receptors relevant to the current land-uses / town planning scheme" or words to that effect.

3.6 Chapter 6: Methodology

- The introduction to Chapter 6 provides a brief and clear description of the two components of the methodology applied; the baseline ambient monitoring and the predictive cumulative assessment. This introduction to the Chapter also defines the legislated regulations and SANS guidelines that were applied for comparative compliance purposes.
- In the last two sentences of paragraph one under Chapter 6, it is difficult to distinguish whether the writer is referring to the typical sound rating levels for districts in SANS:2004 or whether they are referring to the categories of community responses in SANS:2008. It appears that reference is being made to the typical rating levels (SANS:2004) by saying *"apply to LAeq levels"*, but it then goes on to say *"and resultant changes in these levels"* – SANS:2004 typical rating levels for districts do not refer to any resultant changes in LAeq levels. The study may compare changes in LAeq levels against the SANS:2004 district rating levels, but the SANS method itself does not provide any details about the impact of potential increase to the sound pressure level. This line of argument needs to be expanded further to clarify, especially for non-technical readers.
- Furthermore, the writer continuously refers to the SANS *"guidelines"*. They are not guidelines, but rather typical rating levels for noise in districts as stated previously in this review. It is important to note that the SANS 10103:2004 *typical rating levels* for noise in districts are those sound pressure levels likely to be experienced in the various land use zones, but are not directly legally enforceable.
- Section 6.1 provides a clear indication of the procedure undertaken in the baseline monitoring survey. Table 6-1 is clear and provides good, useful data which is relevant to the study.
- Further in Section 6.1, the reference to the *"relevant South African Code of Practice SANS 10103:2008"* should be referenced including all the applicable SANS documents, such as: *"relevant South African Code of Practice, including SANS 10103:2004 & 2008 – 'The measurement and rating of environmental noise with respect to land use (excluded from the 2008 version), health, annoyance and to speech communication'".*
- In Section 6.1, at the end of paragraph one, there is no mention of the status of the SANAS calibration of the sound level meter that was used, nor is there any SANAS calibration certificate provided as an Appendix. The validity of the instrument's calibration is essential to any noise investigation since the response of sound level meters is highly sensitive and can

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deviate if not calibrated regularly (typically annually, although every two years is acceptable dependent upon usage).

- Below Table 6-1, the reference to the prescribed timeframes in SANS should be stated as all relevant versions, such as: *"SANS 10103: 2004 & 2008",* and not just the 2008 version, since typical land-use values form part of this assessment.
- No mention is made for the provision of schedule of results from the sound level meter. This unaltered schedule must be provided as an Appendix to the AIA report.
- In Section 6.2, below Table 6-2, it would be useful to have an explanation of why only 12 (out of the 13) engines was included in the calculation. Whilst this explanation is initially provided in Chapter 3, it has further relevance to the context in this paragraph.
- Chapter 6.3 provides a list of the assumptions and limitations of the methodology applied in this study. It is clarified that the approach taken was largely environmentally conservative, as is standard practice.

3.7 Chapter 7: Results

- In Section 7.1, all references to the typical sound rating levels must reference SANS 10103 correctly (2004). In addition, all references the *"SANS guidelines"* should be changed to the *"SANS typical sound rating levels (2004)"*.
- The measured results for each daytime and night-time survey period are presented in a concise and simple structured format on pages 15 - 17. Each paragraph provides a brief interpretation of results, followed by a clear table of measured results compared with the relevant SANS typical sound rating levels for the applicable districts (Industrial and Urban).
- Whilst the presentation of measured data in Tables 7-1 and 7-2 are clear and easy to understand, supporting graphical representation of this data would assist interpretation for the reader. Plotting the statistics on a graph also assists in interpretation based on the spread or clustering of results from LAmax to LAmin versus LAeq, etc.
- It can be determined from the tables and subsequent interpretation in Section 7.1 that measured ambient sound levels during the daytime and night-time at all receptor locations, bar the Arbor Park (day- and night-time) and Engen service station (only night-time), were below the SANS:2004 typical sound rating levels for the applicable Urban and Industrial districts.
- Based on the interpretation of predicted noise levels in the first paragraph under Section 7.2, it is difficult to determine whether the predicted noise levels (as illustrated in Figure 7-1) are cumulative (i.e. including the baseline ambient levels) or if they are in isolation (non-cumulative predictions). Only further down in the text, below Figure 7-1, is it explained that

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the predicted noise levels discussed above were non-cumulative (not including the ambient baseline measurements). The following paragraph then goes on to explain how the predicted noise levels were then added logarithmically to the baseline measurements to obtain the cumulative impact assessment.

- Paragraph two below Figure 7.1 in sub-section 7.2 can be difficult to follow in a logical sequence, as the interpretation jumps from describing the presentation of results, to describing the way in which the changes were assessed, to emphasizing that the results represent a worst-case scenario; then returning to a description of the way in which the cumulative sound levels were calculated. This paragraph should be split up in a logical structure or perhaps use bullet points to enable the reader to follow a lengthy but logical argument.
- Directly above Table 7-3 in Section 7.2, the key statement regarding the results: *"The predicted increases in ambient sound levels at all offsite receptors for day and night-time are below the 7 dB(A) threshold for a "disturbing noise" as per the South African Noise Control Regulations."* should be included as a *key finding in the Executive Summary* of the AIA report, especially given the legal context of this regulation. This is noted in track changes in the original document.
- The predicted results and cumulative sound pressure levels, as well as the calculated 'change' in sound pressure levels, for daytime and night-time are presented in a concise and simple structured format on pages 17 - 19. Each paragraph provides a brief interpretation of results, followed by a clear table of estimated results compared with the relevant SANS (2004) typical sound rating levels for the applicable districts (Industrial and Urban, from SANS 10103:2004), and the estimated changes are compared with the relevant categories of community responses (from SANS 10103:2008).
- Similar to Section 7.1, whilst the presentation of measured data in Tables 7-3 and 7-4 are clear and easy to understand, the complementary representation of this data in graphs would be beneficial to the study. Graphs enhance the understanding of sound pressure level statistics for both the author and the intended audience by showing the spread of statistics that is not obvious from tabulated results.
- It can easily be determined from the tables and subsequent interpretation (although more difficult to follow than tables) in Section 7.2 that predicted cumulative sound levels during the daytime at all receptor locations, bar the Arbor Park, were below the SANS:2004 typical sound rating levels for the applicable Urban District. Whilst the cumulative noise level at Arbor Park exceeded the Urban District rating level, cumulative impacts were already above typical levels in the baseline survey (SANS:2004). Therefore, there was no discernible change in sound

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pressure levels calculated at this site, which is possible with the logarithmic addition of a lower sound pressure level to an already higher sound pressure level.

- The above finding, however, does make it more appropriate to refer to *"sound pressure levels"* than *"noise"*; the latter having a subjective component.
- The high cumulative noise level predicted at the Airport Lodge for night-time (Table 7-4) should be explained in the interpretive text. e.g. *"the Airport Lodge is the closest off-site receptor site to the proposed NGEPP site and thus, the predicted sound pressure level raises the ambient (baseline) sound pressure level above the Urban District rating level (SANS 10103:2004)."*
- In terms of the results presented in Tables 7-3 and 7-4, given that the NGEPP fence line site is essentially an on-site location (i.e. occupational site and not a sensitive community receptor site), the writer may wish to distinguish this site in the tables (using bold or colour). It should also be clarified that the fence line sites, although having markedly higher predicted sound pressure levels caused by the proposed NGEPP, and thus a high calculated increase in sound pressure levels compared with ambient, will not impact on community members directly. As such, the predicted community response ('strong') is unlikely to occur within this industrial zoned land. However, occupational noise protection measures (PPE) must be strictly adhered.

3.8 Chapter 8: Impact Assessment

- Chapter 8 (pages 19 – 22) provides the Impact Assessment for the AIA study. Whilst this is sometimes only included as an Appendix to the AIA or, most commonly and obligatory in the Acoustic Impact Section of the collated EIA document, there is also value to having these impact tables in the AIA report.

3.9 Chapter 9: Conclusions

- Given that the Conclusions (Chapter 9) provide the essential findings of the study, leading into specific, proposed mitigation measures, it would be more appropriate to name this Chapter *"Conclusions and Recommendations"*. Otherwise, it may be better to divide the final Chapter into two sections, with the latter being *"Mitigation Measures"*.
- The essential findings of the AIA are briefly summarised for the average reader in the concluding remarks. The large technical document was effectively condensed by distilling out the salient points in this Chapter. Lengthy and complex scientific documents such as an AIA are often overwhelming for stakeholders and hence not properly read, understood, or utilised for decision making purposes by the layperson, which defeats their purpose. A concise but

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thorough Executive Summary itemising all key aspects of the study (background, approach, methods, results, and interpretation) accompanied by a bullet point Conclusion that draws together the key findings only (not methods or assumptions, etc.) is therefore essential to convey the findings explicitly.

- Recommendations are clearly defined in this Chapter. The summary offers a good guideline for promoting effective management and maintenance at the proposed plant in order to maintain and promote compliance with the regulations and guidelines regarding environmental noise. This is essential, since there are discernible impacts, and 'environmental noise' can be an emotive and subjective issue.

4. INDEPENDENT REVIEW CONCLUSIONS

SRK appear to have covered all the essential requirements for an AIA being used for EIA purposes. It is important to note that clear, prescriptive guidance (regulations) on acoustics are lacking versus, for example, air quality, where the format on an Atmospheric Impact Report (AIR) is prescribed.

The measurement of baseline ambient sound levels and modelled predictions with cumulative sound pressure levels are reported to assess noise impacts from the proposed source at receptor sites. In parts, the reader may benefit from simpler descriptions of specific scientific terms and concepts, or bullet lists in logical arguments of complex technical themes. However, in most cases sufficient and succinct detail is provided. The latter are merely style and formatting suggestions to make some complex logic easier to follow.

As such, the report is technically detailed, yet still suitable for an audience with some understanding of acoustic concepts. The findings are clear, and the results are presented in scientifically sound and conventional formats to enable relatively easy reading and support decision-making by the Assessing Officer.

Independent Review drafted by:

Megan McNamara B.Sc. (Hons) M.Sc.
Air Quality Scientist

Reviewed & finalised by:

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Revision 01
Dated 28 May 2021

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3 June 2021
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Principal Environmental Scientist
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Attention: Marius van Huyssteen

Dear Mr. Van Huyssteen

Response to Peer Review of the Newcastle Energy Acoustic Impact Assessment

SRK Consulting (South Africa) (Pty) Ltd. (SRK) has been appointed as the Environmental Assessment Practitioner (EAP) to undertake the required environmental applications on behalf of Newcastle Energy for the proposed project. As part of the EIA, the need for an Acoustic Impact Assessment (AIA) has been identified and SRK has also been appointed to undertake the AIA. As the AIA was undertaken by an in-house specialist IMA Trader 20 CC (IMA) was appointed by SRK to undertake a peer review.

This letter details the comments received from the peer reviewer on the 28 May 2021 and the associated responses by SRK in Table 1 below.

Table 1: Comments and Responses

Peer Review Comment	SRK Response
Chapter 1: Introduction, Background and Terms of Reference	
A concise background and description of the reason / requirement for the project is provided as the introduction to this Chapter.	Noted with thanks
Details of the appointment by Newcastle Energy and SRK (Pty) Ltd and the purpose of the AIA by SRK (Pty) Ltd, are clearly explained and defined in a logical and easy-to-read format in this Chapter.	Noted with thanks
The contents of the report and sequence thereof is briefly summarised.	Noted with thanks
Readers will find the Section “Terms of Reference” (Section 1.2) informative, as it defines the aims of the study, which have been established to fulfil the project requirements.	Noted with thanks

Peer Review Comment	SRK Response
The information provided in Section 1.2.1, although largely generic for all EIA specialist studies, has been linked with some detail to the specific chapters of the AIA from which the required information can be found.	Noted with thanks
The project phases and their estimated durations have not been defined, nor have any deliverable timeframes been stated	Noted with thanks
Chapter 2: Background and Project Location	
The use of a first-order chapter heading, "Background", and immediately after a second-order chapter heading "Project Location" is inept, given that there is only one sub-section under the "Background" chapter. This could be avoided by having the "Project Location" sub-section as the major chapter (i.e. 2. Project Location).	Noted this has been addressed.
The presentation of the information in this chapter in tabular format is useful and easy to read. However, the details provided in the first two tables (Table 2-1 and above Table 2-1 on page 3), although useful for the author's or EAP's purposes or for submission of EA applications, are not essential and possibly deviate from the purpose of the report.	Note – this has been removed.
In Table 2-2 in Section 2.1 the coordinates for the boundary of the property are provided and stated in Longitude and Latitude units.	Noted
A site locality map is provided to present the location of the new NGEPP site within the Karbochem Industrial Complex in Newcastle. The fact that the facility is within an existing industrial zone is an immediate trigger for some form of cumulative impact assessment.	Note – agreed. A cumulative impact assessment has been undertaken.
No specific detail or map is provided for the locations of selected sensitive receptors – this is required along with the selection rationale for each site.	A receptor maps has been presented in figure 6-1.
Chapter 3: Project Details	
A brief but informative description of the new project and the processes, as well as process and plant diagrams, are provided in this chapter.	Noted with thanks
There is some repetition between the information in this chapter and that in the preceding chapters which could be removed.	Note- this has been addressed
The logical flow between "Chapter 3: Project Details" and the "Chapter 4: Noise Principles" is not clear and could be improved by adding link sentences.	Note- this has been addressed
Chapter 4: Noise Principles	
Whilst the chapter on "Noise Principles" (Chapter 4) is interesting and provides a broad background to the definitions, behaviours and characterisations of noise (and not necessarily "noise principles"), such high-level (macroscale) information is	Noted with thanks

Peer Review Comment	SRK Response
probably not required for the purposes of the AIA report. It would make more sense to condense or remove Chapter 4 and go straight into Chapter 5 (Legislative Framework), which is directly relevant to this study.	
Furthermore, whilst the typical noise levels listed in Table 4-1 are interesting, such unrelated data is probably not required for the purposes of this AIA, possibly causing the reader to be confused. This table could be removed to avoid unnecessary confusion.	Noted – table has been removed.
Chapter 5: Legislative Framework	
Legislative frameworks and guidelines should be easy to read and understand for the reader in this Chapter. The Noise Control Regulations as set out in GNR 154 of January 1992, provisioned in the Environmental Conservation Act 73 of 1989 (ECA), as well as the Noise Control Provisions contained within NEM:AQA, should be familiar to most regulatory readers.	Noted.
The information in Chapter 5 is difficult to follow, as the text jumps backwards and forwards between referring NEM:AQA (containing noise control provisions) and the Noise Control Regulations (set out in ECA). The writer could be getting confused between the "noise control provisions" prescribed under Section 34 of NEM:AQA and the "Noise Control Regulations" as set out in the ECA. This can be clarified by referencing the ECA when referring the "Noise Control Regulations".	Noted – this has been corrected.
It may be useful to re-name this chapter (Chapter 5) to "Applicable Environmental Noise Legislation and Guidelines", given that the chapter contains information on both the legislation (Noise Control Regulations, ECA) and on the SANS Guidelines (sub-section 5.1). Furthermore, in this regard, it may be useful to add a second sub-heading/sub-section prior to sub-section 5.1 (SANS) which could be named "Noise Control Regulations". This new sub-section heading (Noise Control Regulations) could be inserted directly below point (2), paragraph one under Chapter 5, where the text then goes on to describe the Noise Control Regulations.	Noted – this has been corrected.
A clear and well-structured presentation of all applicable SANS guidelines/rating levels/categories are provided in this Chapter.	Noted with thanks.
In Chapter 5.1 on page 11, whilst the list of minimum requirements for an Environmental Acoustic Impact Assessment Report is informative and provides a useful guide for the AIA practitioner to follow, it is not necessary to include this detail in this report.	Noted with thanks.
In Chapter 5.1, reference to the "Typical rating levels for noise in districts" from the SANS must be referenced as "SANS 10103:2004, Edition 5.1; Government Notice No. 1373 of 8	Noted with thanks.

Peer Review Comment	SRK Response
November 2002", because the latest SANS version i.e. SANS 10103:2008 does not refer to these typical land-use values.	
It must be noted that the SANS 10103:2004 typical rating levels for noise in districts are what is likely to be experienced in the various land use zones and are not directly legally enforceable.	Noted with thanks.
In Table 5-1, the "Urban district" row and the "Industrial District" row are highlighted in bold, but no explanation is given as to why these two rows have been highlighted. It is assumed by the reviewer that these two districts have been selected for the purposes of this study. However, this could be more explicitly stated.	Noted – additional text has been provided describing why these two districts have been selected for the purposes of this study.
There is no explanation provided for the selection of "Urban" and "Industrial" district categories for this study. For instance, it would be useful to have a sentence stating: "The typical sound rating level categories for this investigation are determined based on the position of the identified off-site sensitive receptors relevant to the current land-uses".	Noted – additional text has been provided describing why these two districts have been selected for the purposes of this study.
Chapter 6: Methodology	
The introduction to this chapter provides a brief and clear description of the two components of the methodology applied; the baseline ambient monitoring and the predictive/modelled cumulative assessment. This introduction to the chapter also defines the legislated regulations and SANS guidelines that were applied for comparative compliance purposes.	Noted with thanks.
In the last two sentences of paragraph one under Chapter 6, it is difficult to distinguish whether the writer is referring to the typical sound rating levels for districts in SANS (2004) or whether they are referring to the categories of community responses in SANS (2008). It seems as though they are referring to the typical rating levels (SANS: 2004) by saying "apply to LAeq levels", but it then goes on to say "and resultant changes in these levels" – The SANS (2004) typical rating levels for districts do not refer to any resultant changes in LAeq levels. The study may assess compare their resultant changes in LAeq levels against the SANS (2004) district rating levels, but the SANS rating levels themselves do not provide any details about resultant changes in these levels. This could be more explicitly stated.	Noted – this has been corrected.
Furthermore, the writer continuously refers to the SANS "guidelines". They are not in fact guidelines, but rather "typical rating levels for noise in districts". It must be noted that the SANS 10103:2004 typical rating levels for noise in districts are what is likely to be experienced in the various land use zones and are not directly legally enforceable.	Noted – this has been corrected.
Sub-section 6.1 provides a clear indication of the procedure undertaken in the baseline monitoring survey. Table 6-1 is clear and provides good, useful data which is relevant to the study.	Noted with thanks.

Peer Review Comment	SRK Response
In sub-section 6.1, the reference to the "relevant South African Code of Practice SANS 10103:2008" should be referenced including all the applicable SANS documents, such as: "relevant South African Code of Practice, including SANS 10103:2003, 2004 & 2008 – 'The measurement and rating of environmental noise with respect to land use (only in 2003 and 2004 versions), health, annoyance and to speech communication'".	Noted – this has been corrected.
In sub-section 6.1, at the end of paragraph one, there is no mention of the status of the calibration of the sound level meter that was used, nor is there any calibration certificate provided. The validity of the instrument's calibration is essential to any noise investigation.	The instrument was calibrated in October 2020 and the calibration is valid for a period of 1 year (until October 2021). This has been mentioned in the text and the calibration certificate has been included in the appendix.
Below Table 6-1, the reference to the prescribed timeframes in SANS should be stated as all relevant versions, such as: "SANS 10103:2003, 2004 & 2008", and not just the 2008 version.	Noted – this has been corrected.
No mention is made for the provision of the actual downloaded SLM data. This must be provided as an Appendix to the AIA report.	Noted - this can be provided should it be requested from the licensing authority.
In sub-section 6.2, below Table 6-2, it would be useful to have one sentence explaining why only 12 (out of the 13) engines was included in the calculation. Whilst this explanation is initially provided in Chapter 3, it would have relevance to the context in this paragraph.	Noted – this has been corrected.
Given that air quality is a major concern and a sensitive issue to stakeholders within the region, but especially from this industrial zone, as stipulated in the Newcastle Environmental Management Framework Desired State of The Environment Report (2014), it is considered critical to assess the cumulative noise impacts of the new NGEPP project.	Noted - cumulative noise impacts of the new NGEPP project have been addressed.
Chapter 6.3 provides a list of the assumptions and limitations of the methodology applied in this study. It is clear that the approach taken was largely environmentally conservative.	Noted with thanks.
Chapter 7: Results	
In sub-section 7.1, all references to the typical sound rating levels must reference SANS 10103 correctly (2004). In addition, all references the "SANS guidelines" should be changed to the "SANS typical sound rating levels (2004)".	Noted – this has been corrected.
The measured results for each day-time and night-time survey period are presented in a concise and simple structured format on pages 15 - 17. Each paragraph provides a brief interpretation of results, followed by a clear table of measured results compared with the relevant SANS typical sound rating levels for the applicable districts (Industrial and Urban).	Noted with thanks.
Whilst the presentation of measured data in Tables 7-1 and 7-2 are clear and easy to understand, the complimentary graphical representation of this data in graphs would be beneficial to the study.	Noted – these graphs can be generated for future studies.
One can easily deter from the tables and subsequent interpretation in sub-section 7.1 that measured ambient sound levels during the day-time and night-time at all receptor locations, bar the Arbor Park (day- and night-time) and Engen	Noted.

Peer Review Comment	SRK Response
service station (only night-time), were below the SANS (2004) typical sound rating levels for the applicable Urban and Industrial districts.	
Based on the interpretation of predicted noise levels in the first paragraph under sub-section 7.2, it is difficult to determine whether the predicted noise levels (as illustrated in Figure 7-1) are cumulative (i.e. including the baseline ambient levels) or if they are in isolation (non-cumulative). It is only once one continues to read the continued interpretation text below Figure 7-1 that once can realise that the predicted noise levels discussed above were non-cumulative (not including the baseline measurements), as the paragraph to follow then goes on to explain how the baseline measurements were then added logarithmically to the predicted noise levels to obtain the cumulative assessment.	Noted – this has been corrected.
Paragraph two below Figure 7.1 in sub-section 7.2 is rather difficult to follow in a logical sequence, as the interpretation jumps from describing the presentation of results, to describing the way in which the changes were assessed, to emphasizing that the results represent a worst-case scenario, then going back to describing the way in which the cumulative sound levels were calculated. This paragraph should be split up in a logical structure to enable easier reading.	Noted – this has been corrected.
Directly above Table 7-3 in sub-section 7.2, the key statement regarding the results: “The predicted increases in ambient sound levels at all offsite receptors for day and night-time are below the 7 dB(A) threshold for a “disturbing noise” as per the South African Noise Control Regulations.” Should be included as a key finding in the executive summary of the AIA report, especially given the legal context of this regulation.	Noted – this has been corrected.
The predicted results and cumulative noise levels, as well as the calculated ‘change’ in noise levels, for day-time and night-time are presented in a concise and simple structured format on pages 17 - 19. Each paragraph provides a brief interpretation of results, followed by a clear table of estimated results compared with the relevant SANS (2004) typical sound rating levels for the applicable districts (Industrial and Urban), and the estimated changes are compared with the relevant categories of community responses (SANS 10103:2008).	Noted with thanks.
Similarly, to sub-section 7.1, whilst the presentation of measured data in Tables 7-3 and 7-4 are clear and easy to understand, the complimentary graphical representation of this data in graphs would be beneficial to the study.	Noted – these graphs can be generated for future studies.
One can easily deter from the tables and subsequent interpretation (although more difficult to follow than tables) in sub-section 7.2 that predicted cumulative sound levels during the day-time at all receptor locations, bar the Arbor Park, were below the SANS (2004) typical sound rating levels for the applicable Urban district. Whilst the cumulative noise level at Arbor Park exceeded the Urban district rating level, the predicted cumulative level did not increase from the baseline level, where the baseline level was already exceeding the Urban	Noted.

Peer Review Comment	SRK Response
district level (SANS: 2004). Therefore, there was no change in noise levels calculated at this site.	
The high cumulative noise level predicted at the Airport Lodge for night-time (Table 7-4) should be explained in the interpretive text. i.e. the Airport Lodge is the closest off-site receptor site to the proposed NGEPP site and thus, the predicted noise level raises the ambient (baseline) noise level above the Urban district rating level (SANS: 2004).	Noted – this has been corrected.
In terms of the results presented in Tables 7-3 and 7-4, given that the NGEPP fenceline site is essentially an on-site location (i.e. occupational site and not a sensitive community receptor site), the writer may wish to separate this site in the tables and make it clear (in bold or colour) that the fence line site, although having a markedly high predicted noise level due to the new NGEPP, and thus a very high calculated change (increase) in noise levels compared with ambient, it must be made clear that this site is not going to be exposed to community members and thus the predicted community response (strong) is likely never to occur in this industrial and occupational zone. However, occupational noise prevention methods must apply.	Noted – this has been corrected.
1.7 Chapter 8: Impact Assessment	
Chapter 8 (pages 19 – 22) provides the "Impact Assessment" for the AIA study. Whilst this is sometimes only included as an Appendix to the AIA or, most commonly and obligatory in the Acoustic Impact Section of the collated EIA document, there is also value to having these impact tables in the AIA report.	Noted with thanks.
Chapter 9: Conclusions	
Given that the Conclusions chapter (Chapter 9) provides the conclusions of the study as well as the recommendations for mitigation measures, it may be more suitable to name this chapter "Conclusions and Recommendations".	Noted – this has been corrected.
The essential findings of the AIA are briefly summarised for the average reader in the concluding chapter. The larger technical document was effectively condensed by distilling out the salient points in this chapter. Long scientific documents such as an AIA are often overwhelming for stakeholders and hence not properly read, understood, or utilised for decision making purposes by the layperson, which defeats their purpose. A concise but thorough Executive Summary itemising all key aspects of the study (background, approach, methods, results, and interpretation) accompanied by a bullet point Conclusion that draws together the key findings only (not methods or assumptions, etc.) is therefore essential for the non-technical reader.	Noted – this has been corrected.
Recommendations are clearly defined in this chapter. The basic summary offers a good guideline for promoting effective management and maintenance at the proposed plant in order to	Noted – this has been corrected.

Peer Review Comment	SRK Response
maintain and promote compliance with the regulations and guidelines.	

Yours faithfully,

SRK Consulting (South Africa) (Pty) Ltd

Hasheel Tularam *PrSciNat*
Senior Scientist (Air Quality and Noise)