PROPOSED CONTINUOUS DISPOSAL OF ASH AT THE TUTUKA POWER STATION

Noise Specialist Study

Environmental Impact Assessment Phase

June 2014

Report No 12/7/1

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GLOSSARY OF ACOUSTICAL TERMINOLOGY

A-weighting	An electronic filter that simulates the human hearing characteristic which is less sensitive to sounds at low frequencies than at high frequencies.
Broad band noise	Noise that contains a wide range of frequencies and cannot be associated with a specific frequency or tone. ôWhite noiseô (like the sound of a radio that is not tuned on a station) is a typical example of broad band noise.
Decibel (dB)	A descriptor that is used to indicate a level determined as 10 times the logarithmic ratio of two quantities of the same physical unit.
dBA	A descriptor that is used to indicate that 10 times the logarithmic ratio of two quantities of the same physical unit has been A-weighted.
Equivalent noise level	A single value noise level that has the same energy content as a time varying noise level measured over a given period of time. Therefore, it is in essence a time- and energy averaged noise level.
Frequency	The characteristic of a time varying signal that describes the number of cycles per second, expressed in Hertz, Hz.
Integrated noise level	A time- and energy averaged measure of a noise signal varying as a function time
L_{Aeq}	The A-weighted equivalent sound pressure level. This descriptor is internationally used for quantifying and evaluating noise in human-related circumstances. A vast amount of research links this parameter to human physiological and psychological responses.
L_{Aeq} (T)	The A-weighted equivalent sound pressure level, where T indicates the time over which the noise is averaged, i.e. L_{Aeq} (10 min) indicates that the L_{Aeq} was measured over a period of 10 min.

$L_{Req,d}$	The L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the day-time period, i.e. from 06:00 to 22:00.
$L_{Req,n}$	The L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the night-time period, i.e. from 22:00 to 06:00.
Level	The property of any parameter that expresses its magnitude as 10x the logarithm of the ratio of the value of the parameter to a reference value of the same physical unit. The reference value is 20 µPa (micro- or $20x10^{-6}$ Pascal, or N/m^2) for a sound pressure level and 1 pW (pico or $1x10^{-12}$ Watt) for a sound power level.
Noise	Unwanted sound
Noise emission	The noise energy that is emitted by a noise source into the environment.
Noise immission	The noise energy that impinges on a receiver.
Octave frequency band	The frequency spectrum is divided into bands with centre frequencies an octave apart from each other, an octave being a doubling in frequency. In practice the standard octave bands most often used are 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz and 4000 Hz. Used for specifying sound power emission levels of equipment and calculating sound propagation over longer distances.
Sound power level	The level of the sound energy radiated by a given source per unit time. The magnitude does not depend on physical surroundings, e.g. distance, screening, weather. Cannot be directly measured, but has to be calculated from sound pressure level measurements.
Sound pressure level	The level of the varying sound pressure caused by a sound/noise source. The magnitude depends on the physical parameters of the surroundings.

PROPOSED CONTINUOUS DISPOSAL OF ASH AT THE TUTUKA POWER STATION

NOISE SPECIALIST STUDY

1. INTRODUCTION

Tutuka Power Station currently disposes of ash in a dry form by means of conveyors, spreader and a stacker system from the station terrace to the ash disposal site. According to Eskomôs plans, the complete ash disposal site would eventually cover an area of 2 500 ha and is located approximately 4.5 km east of the station terrace.

Ideally, Tutuka Power Station envisages the continuation of dry ash disposal over Eskom owned land, which was purchased before the commencement of environmental laws, the Environment Conservation Act, in particular. As part of its planning processes, Eskom developed designs which were approved internally, during this time. With the promulgation of the environmental laws, and the National Environmental Management Waste Act, NEMWA, Act 59 of 2008, in particular, Eskom would like to pro-actively align its continued ash disposal activities, preferably at the planned site, with the requirements of the NEMWA waste licensing processes.

This report describes the methodology, results and findings of a study investigating the noise aspects of the proposed alternative sites.

2. PURPOSE OF THE NOISE STUDY

The purpose of this noise study is to:

- Identify the existing major noise sources and noise sensitive areas in the environment of the proposed ash dam extension;
- Estimate the current ambient noise levels in the affected areas;
- Carry out sample calculations in order to estimate the impact of noise emissions on ambient noise levels at the identified noise sensitive areas; and
- Assess the noise impact in terms of the regulations applicable in Mpumalanga.

3. REGULATORY FRAMEWORK

The original noise regulations were published in 1990 under the Environment Conservation Act, 1989 [1]. They were at first made non-compulsory with a local authority having to apply to make them compulsory in its area of jurisdiction. Since this lead to an unsatisfactory number of applications, the noise regulations were made compulsory in 1992. However, the arrival of the new Constitution in 1994 voided the legal driving force behind the regulations, since the responsibility for them was devolved from national to provincial level. The Minister of the Environment did circulate sample noise regulations to the provinces in 1997 [2], which they could adopt

unchanged or adapt to their own requirements. This has happened in only three provinces, i.e. the Free State, Gauteng and Western Cape.

The original sample noise regulations contain a number of serious flaws and a revision was undertaken by the Department of Environmental Affairs. The resulting new regulations [3] were published on 2 July 2010 under the Air Quality Act, 2005 [4]. They are in essence also a model that can be adapted by municipalities.

In terms of the setting of standards the new regulations make direct and extensive reference to SANS 10103 [5]. This document successfully addresses the manner in which environmental noise measurements are to be taken and assessed in South Africa. It also provides guidelines to typical ambient noise levels that may be expected in different types of districts. Therefore, SANS 10103 [5] was followed for the purpose of this noise impact study.

4. METHODOLOGY OF THE NOISE STUDY

4.1 STUDY OF THE AVAILABLE INFORMATION

All the available and information [6] relevant to aspects of noise was studied and processed.

4.2 ESTIMATION OF PRESENT AMBIENT NOISE LEVELS

Based on the information study it was clear that the noise impact caused by the construction and operation of the new dry ash disposal facility will only be of minor importance for the outcome of the Environmental Impact Assessment (EIA). Therefore, it was decided not to conduct costly ambient noise level measurements, but rather to apply the typical ambient noise levels listed for different kind of districts listed in Table 2 of SANS 10103 [5], as summarised in Table 4.2.1:

TABLE 4.2.1: Estimated present ambient noise levels (from Table 2 of SANS 10103 [5])

Type of district	Ambient noise level, dBA	
	Daytime $L_{Req,d}$	Night-time $L_{Req,n}$
a) Rural districts	45	35

Previous ambient noise level measurements conducted by the consultant in very similar environments on the Highveld have confirmed that the levels in Table 4.2.1 provide a reliable estimate.

4.3 CALCULATION OF NOISE EMISSION LEVELS

The severity and extent of the impact existing ambient noise levels greatly depends on the locations where the main activities take place. The disposal of dry ash is not a stationary activity. Therefore, it was decided to calculate the noise emissions from the processes assuming that they take place on the maximum extents of the dry ash disposal facility, i.e. on the boundary of each of the proposed alternative sites. Furthermore, the potential screening of the topography was not included in the

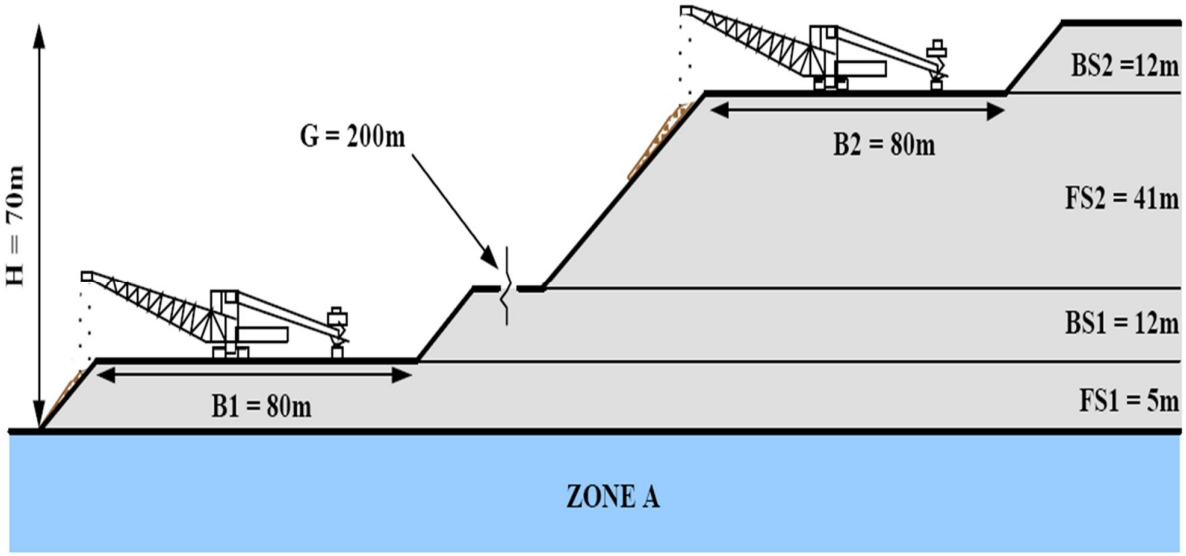
calculations. These assumptions result in a conservative estimate of the severity and extent of the noise impacts.

The noise sources included in the modelling were:

- Two stackers;
- A conveyor feeding each of the stackers;
- A bulldozer at each of the stacking locations.

These noise sources were located according to the diagram given in Figure 4.3.1 and which is reproduced from the provided information.

Figure 4.3.1: Diagram indicating the locations of the different noise sources used for the calculations. The toe of the dry ash disposal facility was assumed to be on the boundary of each alternative site.



The propagation of the noise emissions were calculated in accordance with the procedures specified in SANS 10357 [7].

The results were used to determine the resulting total ambient noise levels and the increase in ambient noise levels caused by the noise emissions from the new ash dam operations during construction and operation. A list of the noise emission levels used in the calculations and the assumed meteorological and ground conditions are given in Appendix A.

4.4 CRITERIA FOR THE ASSESSMENT OF NOISE IMPACTS

Table 2 of SANS 10103 [5] provides a guideline recommended for average ambient noise levels in different types of districts. For rural areas these limits are:

- Day (06:00 to 22:00): $L_{Req,d}$ = 45 dBA

- Night (22:00 to 06:00): $L_{Req,n}$ = 35 dBA

For each of the alternative sites the distance from the boundaries where the total ambient noise level approaches either 45 dBA or 35 dBA during the day and night respectively, was calculated.

Table 5 of SANS 10103 [5] provides a guideline for estimating community response to an increase in the general ambient noise level caused by an intruding noise. If Δ is the increase in noise level, the following criteria are of relevance:

- **$\Delta \leq 1$ dB:** An increase of less than 1 dB may be regarded as insignificant.

- **$\Delta \leq 3$ dB:** It is generally accepted that for a person with average hearing acuity an increase of less than 3 dB in the ambient noise level will not be noticeable. This is, therefore, a useful significance indicator;

- **$0 < \Delta \leq 10$ dB:** An increase of between 0 dBA and 10 dB an increase will elicit "little" community response with "sporadic complaints", and

For each of the alternative sites contours were determined for increases in the ambient noise of less than 1 dB and 3 dB.

4.5 ASSUMPTIONS

The following assumptions were made:

- 45 dBA and 35 dBA provide good estimates of average ambient noise levels in the Tutuka environment;

- The sound power emission levels listed in Appendix A are typical for the equipment to be used at the dry ash disposal facility;

- The topographical screening of noise was not taken account of resulting in order a conservative estimate of the noise impacts;

- The noise emissions from the dry ash disposal facility during construction will differ very little from the operational phase, especially in view of the calculation methodology described in section 4.3. This also holds for the de-commissioning phase. Therefore, calculations were carried out for the operational phase only;

- The meteorological and ground conditions used in the calculations are given in Table 4.5.1.

TABLE 4.5.1: Summary of the assumptions made for the calculations

Parameter	Assumed value
Temperature	22 °C max
	10 °C min
Wind	2 m/s
	Source to receiver
Humidity	60% (am) 35% (pm) RHD
Static air pressure	84 kPa
Acoustically soft ground conditions	60 %

4.6 LIMITATIONS

Although an effort was made to provide a conservative estimate of the noise impacts the results can only serve as an indication of whether they will be significant or negligible at any specific location.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The environment of the Tutuka Power Station and the proposed alternative sites for the dry ash disposal facility has a rural character. Farmsteads are spread out at long distances from another and many of them have been abandoned, especially in the closer proximity to the power station.

The topography is characterised by low to medium sized hills that can provide screening against the propagation of noise. The vegetation is primarily grass land with only a few trees interspersed. The grass land provides some attenuation through sound absorption of noise energy propagating over longer distances.

The major sources of noise in the area are at present:

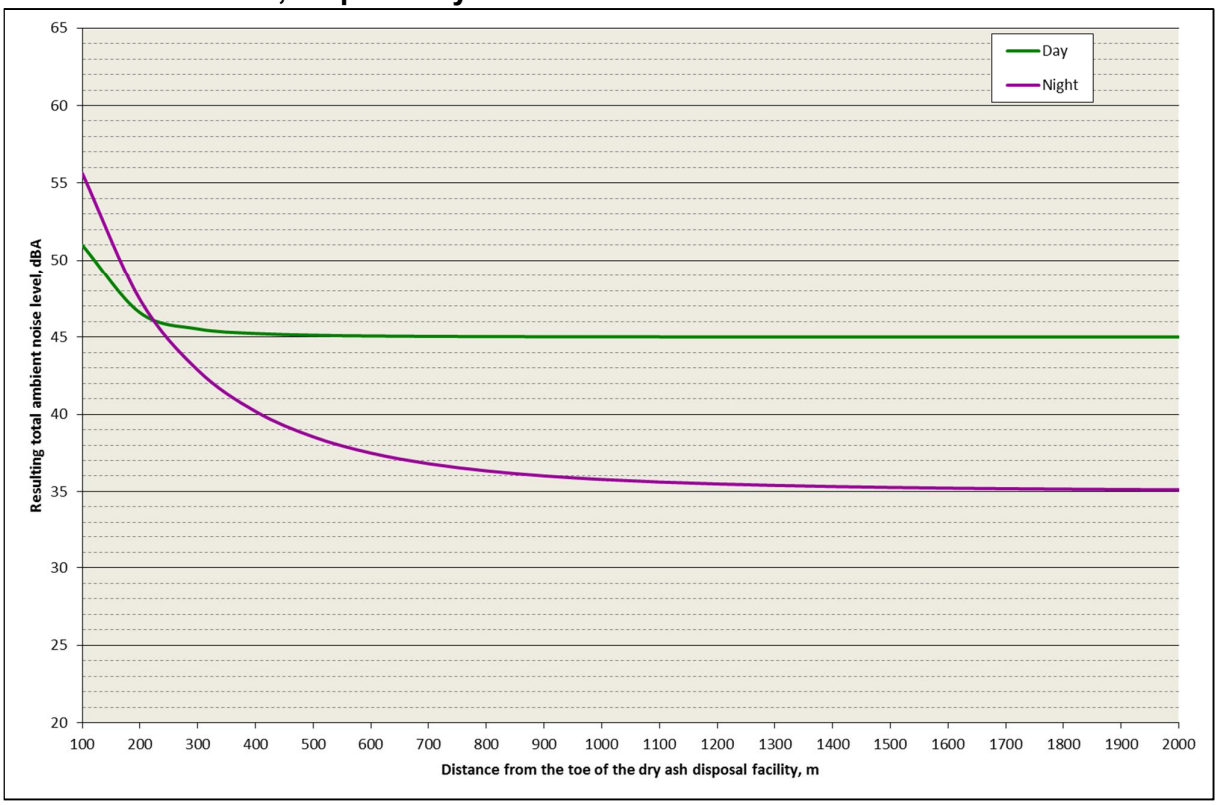
- The Tutuka Power Station and ancillary activities;
- The railway line that supplies the coal for the power station;
- The conveyor systems that transport the coal to the power station and the current dry ash disposal facility; and
- Traffic on the local roads in the area. There are no major transport routes crossing the area.

6. FINDINGS

6.1 THE CUMULATIVE IMPACT ON PRESENT AMBIENT NOISE LEVELS

The generalised cumulative impact of the noise emissions on existing ambient noise levels, expressed as a function of distance is presented in Figure 6.1.1.

FIGURE 6.1.1: Graph presenting the cumulative effect of the noise emissions on the existing ambient noise levels as a function of distance during the day and night, i.e. 45 dBA and 35 dBA, respectively.



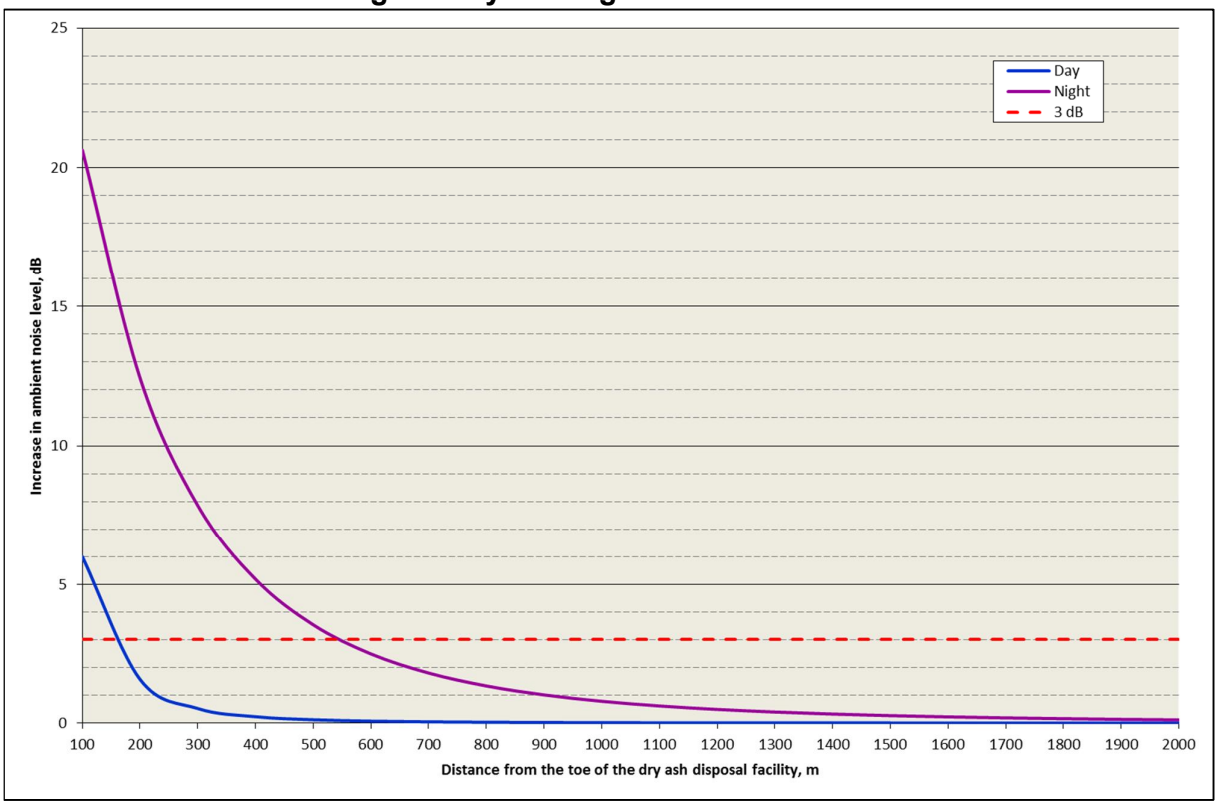
The results in Figure 6.1.1 indicate that the cumulative effect of the noise emissions from the dry ash disposal facility decreases exponentially with increasing distance, and asymptotically approaches the present ambient noise levels during the day and night.

This decrease is much more drastic during the day than at night, when meteorological and other atmospheric conditions favour the propagation of noise. During the day the resulting total ambient noise level approaches 45 dBA to within 1 dBA at a distance of around 300 m, whereas at night the corresponding distance is at approximately 1000 m.

6.2 THE INCREASE IN AMBIENT NOISE LEVELS

The generalised increase in ambient noise levels due to the noise emissions from the dry ash disposal facility as a function of distance is presented in Figure 6.2.1.

FIGURE 6.2.1: Graph presenting the increase in existing ambient noise levels as a function of distance during the day and night.



The results given in Figure 6.2.1 confirm the remarks made in section 6.1for the resulting total ambient noise levels, i.e. that the most severe noise impact occurs during the night. The increase drops below the significance indicator of 3 dB at a distance of around 560 m and below 1 dB at approximately 950 m.

The contours describing the increases of 3 dB and 1 dB are illustrated for each of the proposed alternatives in Figures 6.2.2, 6.2.3 and 6.2.4.

FIGURE 6.2.2: Image indicating the 1 dB (orange) and 3 dB (yellow) contours of increase in ambient noise levels associated with Alternative A. The red circles indicate the locations of affected farmsteads with their names displayed in red letters.

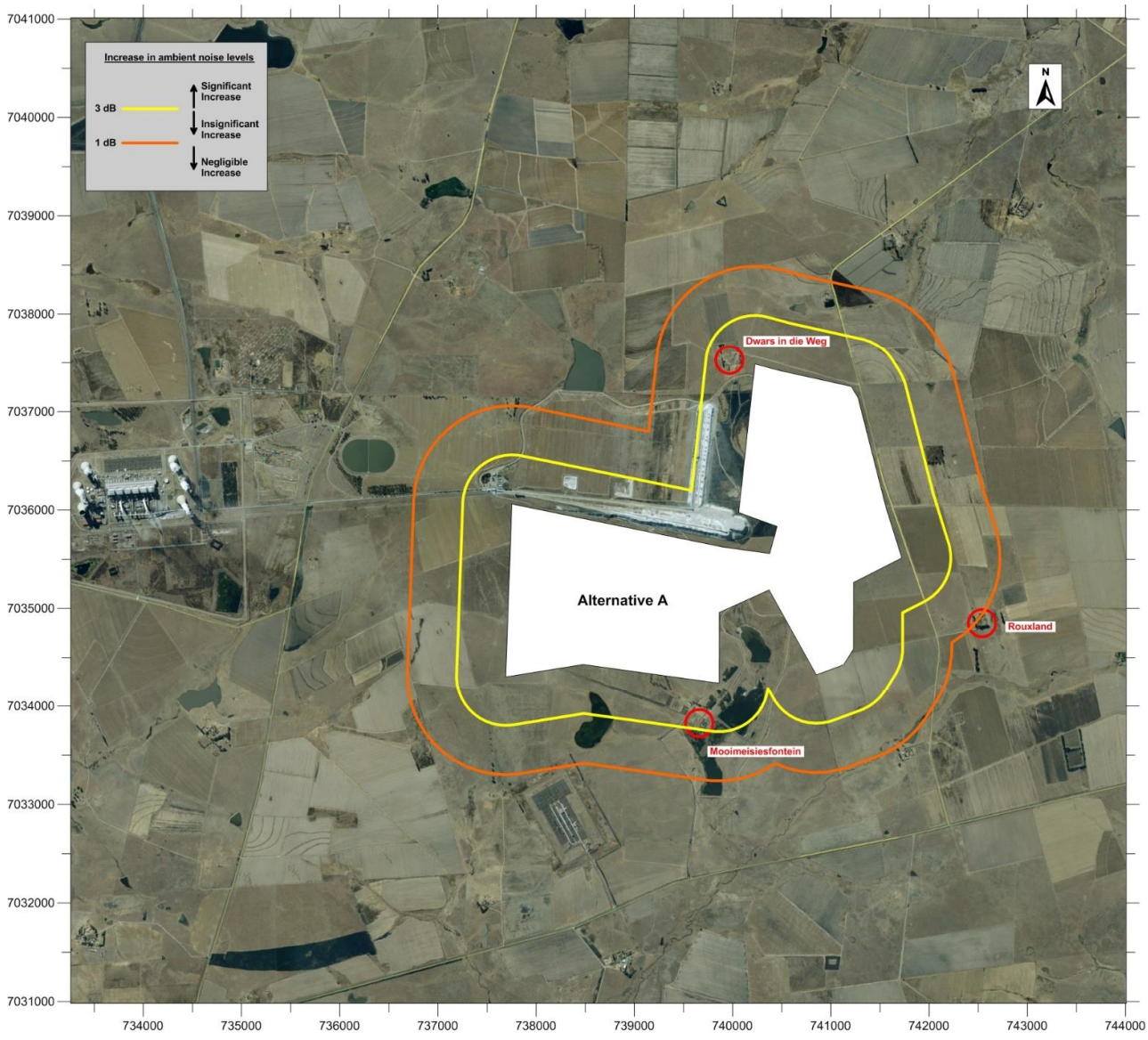
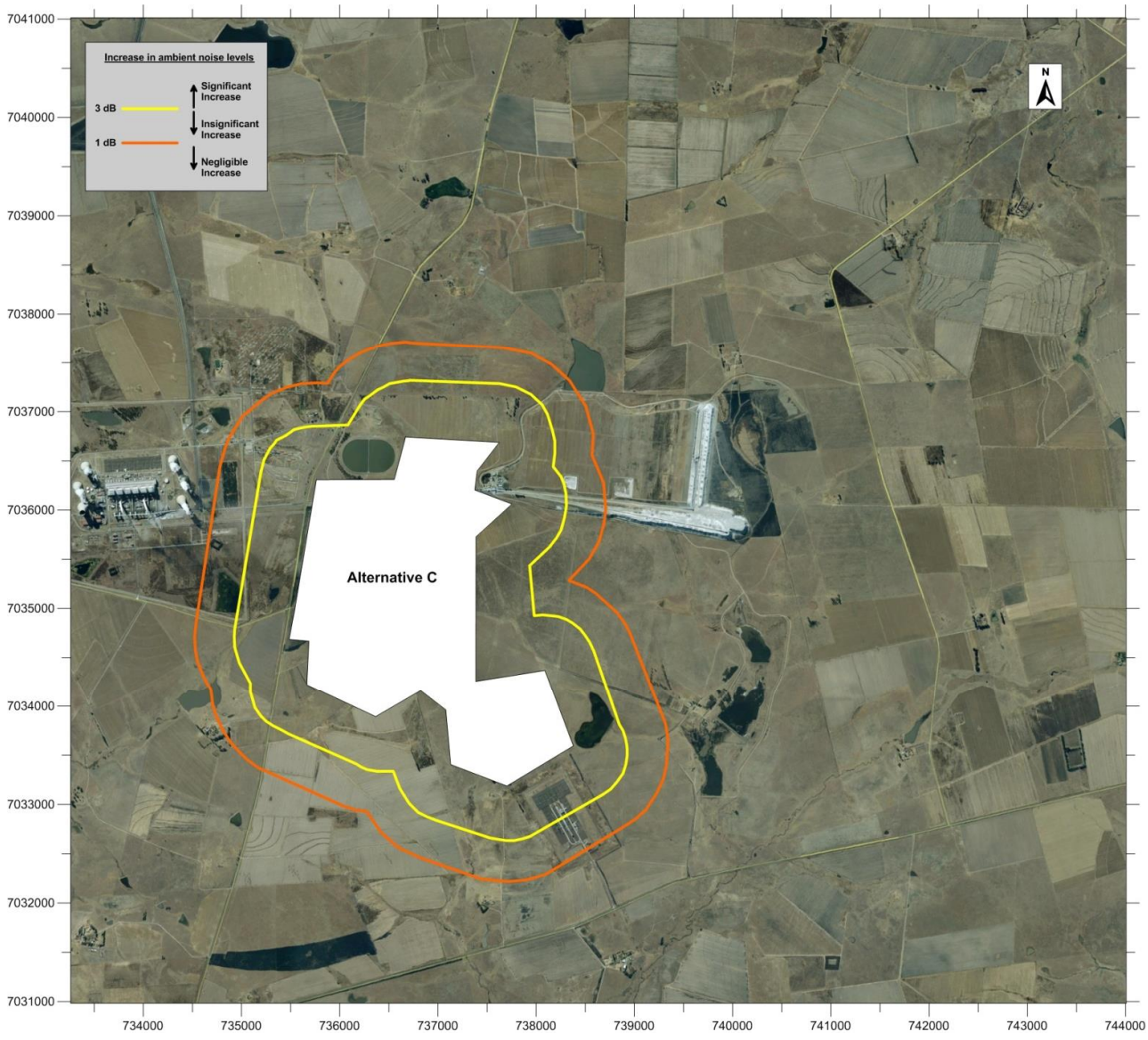


FIGURE 6.2.3: Image indicating the 1 dB (orange) and 3 dB (yellow) contours of increase in ambient noise levels associated with Alternative B.

FIGURE 6.2.4: Image indicating the 1 dB (orange) and 3 dB (yellow) contours of increase in ambient noise levels associated with Alternative C. The red circles indicate the locations of affected farmsteads with their names displayed in red letters.



The results presented in Figures 6.2.2, 6.2.3 and 6.2.4 indicate that:

- For each of the alternatives only very few farmsteads will be affected by the noise emissions from the dry ash disposal facility;
- For the majority of these the severity of the noise impact will barely be significant or insignificant;
- There are four farmsteads that will experience significant noise impacts, i.e. Racer Bult and Dwars in die Weg (Alternative 1), Mooimeisiesfontein and another Dwars in die Weg (Alternative 3); No farmsteads are affected by noise emissions from Alternative 2; and
- All the significantly affected farmsteads are located in close proximity to the boundaries of the respective alternatives. Therefore, the actual severity of the noise impacts will largely depend on the final operational shapes and procedures of the dry ash disposal facility for each alternative.

7. ASSESSMENT OF THE NOISE IMPACTS

The assessment of the noise impacts is summarised in Tables 7.1 and 7.2. The detailed assessment tables are reproduced in Appendix B of this report.

TABLE 7.1: Noise impact assessment: Adherence to SANS 10103 45 dBA & 35 dBA

Alternative	Phase	Status	Significance
Alternative A	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Alternative B	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Alternative C	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
No-Go	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Linear Infrastructure Corridor - Alternative1	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Linear Infrastructure Corridor - No-Go	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW

TABLE 7.2: Noise impact assessment: Increase in ambient noise levels

Alternative	Phase	Status	Significance
Alternative A	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Alternative B	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Alternative C	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
No-Go	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Linear Infrastructure Corridor - Alternative 1	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW
Linear Infrastructure Corridor - No-Go	Construction	-	LOW
	Operational	-	LOW
	Decommissioning	-	LOW
	Cumulative	-	LOW

8. SITE PREFERENCE RANKING

The preference rating criteria and final ranking of the different site alternatives are given in Tables 8.1 and 8.2.

TABLE 8.1: Noise criteria for site preference rankings

Site preference ranking	Criteria
4 Preferred	Noise impact is significant or negligible at not more than 1 receiver
3 Acceptable	Noise impact is significant at a minimum number of affected receivers
2 Not preferred	Noise impact significance is MEDIUM at any of the affected receivers
1 No-Go	Noise impact significance is HIGH at any of the affected receivers

TABLE 8.2: Final site ranking

Study	Alternative		
	A	B	C
Noise	3	3	4

9. CONLUSIONS

Based on the findings of this noise study the drawn conclusions are:

- The extent of the significant noise impact, i.e. where the increase in ambient noise level will be equal or less than 3 dB, is limited to within approximately 560 m from the boundary of each of the alternatives;
- There are only four farmsteads where the increase in ambient noise level could be in excess of 3 dB. Without exception these are located right at the boundary of the respective alternatives;
- For each of the investigated alternatives and phases the significance rating is LOW; and
- In terms of their noise impacts the preferred site is Alternative C, while the rest are acceptable.

10. REFERENCES

In this report reference was made to the following documentation:

(1) Environment Conservation Act (Act No. 73 of 1989)

(2) Model noise regulations published under the Environment Conservation Act, Act 73 of 1989, by the Minister of the Environment in 1997.

(3) Model air quality management by-law for easy adoption and adaptation by municipalities, 2010, published under the National Environment Management Air Quality Act, Act 39 of 2004, Government Gazette No. 33342, 2 July 2010.

(4) National Environment Management Air Quality Act, Act 39 of 2004.

(5) SANS 10103:2008 ôThe measurement and rating of environmental noise with respect to annoyance and to speech communicationõ, Edition 6, ISBN 978-0-626-20832-5

(6) Lidwala Consulting Engineers, Tutuka Continuous Ashing EIA: Final Scoping Report December 2012, Chapter 4: Project Description EIA Ref Number: 14/12/16/3/3/3/52 NEAS Reference: DEA/EIA/0001416/2012

(7) SANS 10357:2004 ôThe calculation of sound propagation by the Concawe methodõ Edition 1.2.

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APPENDIX A

Sound power emission levels

11. APPENDIX A: SOUND POWER EMISSION LEVELS

The sound power emission levels that were used in the calculations are summarised in Table A-1.

TABLE A-1
Sound power emission levels.

Equipment	Sound power, dB re 1 pW, in octave frequency band, Hz						
	63	125	250	500	1000	2000	4000
Bulldozer D85H	102.3	104.4	105.4	103.4	99.6	101.6	99.5
Stacker	95.0	100.0	103.0	105.0	105.0	100.0	100.0
Conveyor	90.6	90.8	91.0	94.9	95.2	94.0	89.9

APPENDIX B

Detailed assessment tables

12. APPENDIX B: DETAILED ASSESSMENT TABLES

The detailed assessment tables, as provided by the client, are reproduced in Tables B-1 to B-4.

TABLE B-1: Detailed assessment table for the construction phase

Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which	Fully reversible							

	impact can be reversed:								
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Ash Disposal Facility - Alternative C

Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).						
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible						
	degree of impact on irreplaceable resources:	No impact						
Noise	**Nature of impact:**	Increase in present ambient noise levels						
	without	2	2	2	3	**18**	**Low**	-	Definite
	with	2	2	2	3	**18**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible						
	degree of impact on irreplaceable resources:	No impact						

Ash Disposal Facility - No-Go									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**		**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	1	1	0	4	**8**	**Low**	-	Definite
	with	1	1	0	4	**8**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	1	1	0	4	**8**	**Low**	-	Definite
	with	1	1	0	4	**8**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Linear Infrastructure Corridor - Alternative 1									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**		**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	1	2	2	4	**20**	**Low**	-	Definite
	with	1	2	2	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							

	without	1	2	2	4	**20**	**Low**	-	Definite
	with	1	2	2	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Linear Infrastructure Corridor - No Go

Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).						
	without	1	2	2	4	**20**	**Low**	-	Definite
	with	1	2	2	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:								
	degree of impact on irreplaceable resources:								
Noise	**Nature of impact:**	Increase in present ambient noise levels						
	without	1	2	2	4	**20**	**Low**	-	Definite
	with	1	2	2	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:								
	degree of impact on irreplaceable resources:								

TABLE B-2: Detailed assessment table for the operational phase

Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	2	2	3	**18**	**Low**	-	High
	with	2	2	2	3	**18**	**Low**	-	High
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - No-Go									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							

	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Linear Infrastructure Corridor - Alternative 1

Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).						
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible						
	degree of impact on irreplaceable resources:	No impact						
Noise	**Nature of impact:**	Increase in present ambient noise levels						
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible						

	degree of impact on irreplaceable resources:	No impact	

TABLE B-3: Detailed assessment table for the decommissioning phase

No noise impacts to be assessed

TABLE B-4: Detailed assessment table for the cumulative noise impact

Ash Disposal Facility - Alternative A									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - Alternative B									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - Alternative C									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	2	4	2	3	**24**	**Low**	-	Definite
	with	2	4	2	3	**24**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	2	2	2	3	**18**	**Low**	-	High
	with	2	2	2	3	**18**	**Low**	-	High
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Ash Disposal Facility - No-Go									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							

	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

Linear Infrastructure Corridor - Alternative 1

Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**	**Status (+ve or -ve)**	**Confidence**	
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							

	degree of impact on irreplaceable resources:	No impact							
Linear Infrastructure Corridor - No-Go									
Potential Impact	**Mitigation**	**Extent (E)**	**Duration (D)**	**Magnitude (M)**	**Probability (P)**	**Significance (S=(E+D+M)*P)**		**Status (+ve or -ve)**	**Confidence**
Noise	**Nature of impact:**	Adherence to ambient noise levels listed by SANS 10103 for a rural district, i.e. 45 dBA (day) and 35 dBA (night).							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							
Noise	**Nature of impact:**	Increase in present ambient noise levels							
	without	1	4	0	4	**20**	**Low**	-	Definite
	with	1	4	0	4	**20**	**Low**	-	Definite
	degree to which impact can be reversed:	Fully reversible							
	degree of impact on irreplaceable resources:	No impact							

APPENDIX A

Declaration of independence

13. APPENDIX C: DECLARATION OF INDEPENDENCE

François Malherbe
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PROJECT TITLE

Proposed Continuous Disposal of Ash at the Tutuka Power Station

Specialist:	François Malherbe Acoustic Consulting cc		
Contact person:	François Malherbe		
Postal address:	220 Long Avenue, Waterkloof, Pretoria		
Postal code:	0181	Cell:	082 469 8063
Telephone:	(012) 346 8278	Fax:	(012) 460 6743
E-mail:	fm@acousticconsulting.co.za		
Professional affiliation(s) (if any)	ECSA (Professional Engineer), Southern African Acoustics Institute (SAAI) Fellow		

The specialist appointed in terms of the Regulations_

I, **François le Roux Malherbe** , declare that --

General declaration:

- 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 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

François Malherbe Acoustic Consulting cc
Name of company (if applicable):

2013-06-13
Date: