

14. NOISE IMPACT ASSESSMENT

14.1. Introduction

Eskom has proposed to establish a new coal-fired power station in the vicinity of the existing Matimba Power Station, which is located to the west of Lephalale (Ellisras) in Limpopo Province. Eight alternative sites were investigated initially during the Scoping Phase of the project. Two sites, namely the farms Naauwontkomen 509-LQ and Eenzaamheid 687-LQ, were selected as suitable for the development of the power station and ancillary infrastructure (such as the ash dump) respectively. Jongens Keet Associates undertook to investigate the potential noise impact of the new development. This chapter documents our approach, findings and recommendations.

The terms of reference (TOR) was as follows:

- A sufficiently detailed quantitative (by measurement) and qualitative assessment within the area of influence of the planned Matimba B Power Station (namely that on the farm Naauwontkomen 509-LQ with the ash dump on Eenzaamheid 510-LQ) was to be undertaken in order to enable a full appreciation of the nature, magnitude, extent and implications of the potential noise impact of all aspects of the project.
- The level of investigation was to be that of an EIA.
- All aspects of the investigation were to conform to the requirements of relevant environmental legislation and noise standards.
- The potential impacts at the pre-construction, construction and operational phases of the project were to be assessed.
- Where relevant, appropriate noise mitigating measures were to be identified. These need only be conceptual at this stage.

14.1.1. Study Area

The study area was that within the area of influence of the noise generated by the operations of and traffic generated by the proposed power station.

14.1.2. Details of the Proposed Power Station Project

The proposed power station is to be developed 6 500 metres to the south-west of the existing Matimba Power Station, which is located approximately 5 kilometres west of Lephalale (Ellisras) municipal boundary. The proposed power station will be developed on the farm Naauwontkomen with the ash dump on the farm Eenzaamheid. The likely position and orientation of the new Power Station buildings and ancillary works have been provided by Eskom.

The proposed Power Station is planned to have a generating capacity of about 4 800 Mega-watts (MW) from six generator units.

It is anticipated that the proposed Power Station will be provided with coal from the Grootgeluk Colliery, which also services Matimba power station. The Colliery is located to the immediate north of the proposed power station.

The Steenbokpan Road, which at present is aligned through the centre of the farms Naauwontkome and Eenzaamheid will have to be re-aligned. Two alignments have been investigated, namely one along the northern boundary of the two aforementioned farms (Alternative 1) and a second which initially follows the southern boundary of the farm Naauwontkome and then veers northwards to follow the northern boundary of the farm Eenzaamheid. Refer to the Traffic Impact Report for the project by *Goba Consulting Engineers and Project Managers* for more details (see Chapter 13).

14.2. Details of the Study Area

Only the aspects which have an influence on the potential noise impact, are dealt with in this Section.

14.2.1. Topography

The general terrain of the area is relatively flat. The site of the new power station is at a local high point in the area, with the land falling gently to the north-east north of the development site and to the south-west to the south of the site.

14.2.2. Roads

The main roads influencing the study area are:

- The main road from Lephallale to Matimba Power Station and Grootegeluk Colliery. This road continues north-westwards to Stockpoort (border post). For convenience in the report this road has been divided into three sections:
 - * Section 1: Nelson Mandela Drive - through Lephallale.
 - * Section 2: Nelson Mandela Drive Extension - west of Lephallale (Onverwacht Township) to the Steenbokpan Road intersection.
 - * Section 3: Stockpoort Road - west of the Steenbokpan Road intersection.
- The Steenbokpan Road. This east-west aligned road intersects with Nelson Mandela Drive Extension approximately 5 kilometres west of Onverwacht.
- The Afguns Road, which links to the Steenbokpan Road 3 kilometres west of the latter's intersection with Nelson Mandela Drive Extension.

14.2.3. Railway Lines

The only railway line in the area links from the Grootegeluk Colliery southwards to Thabazimbi. Its main use is the export of coal from the colliery. There are at present usually two trains per day. This could increase to 4 trains per day in the event that sorbent material is necessary.

14.2.4. Land Use

- *Existing Situation*

The existing land uses in the area are:

- * Residential:
 - Town of Lephalale. The nearest section of the town to the study area namely Onverwacht Township lies approximately 5 kilometres to the south-east of the existing Matimba Power Station. The new power station will be approximately 11 kilometres west of the town's present western boundary.
 - Marapong Township lies 6500 metres to the north-east of Matimba Power Station.
 - There are several farmhouses and farm labourer houses spread out through the study area.
- * Educational: There are schools in Lephalale but these are too far away from the planned development site to be affected by the noise generated by the new power station.
- * Industrial:
 - Matimba Power Station.
 - There is a small industrial area just to the north of Onverwacht Township.
- * Mining: The Grootegeluk Colliery, which will provide the new proposed power station with coal is located just to the north of the new power station site.
- * Agriculture: The main land use in the study area and its environs is cattle and game farming.

It is only the existing residential areas in the study area that may be defined as noise sensitive land uses.

- *Planned Land Use*

There are presently no known developments in the study area that could be adversely affected by the proposed power station.

14.2.5. Aspects of Acoustical Significance

The terrain across the study area is flat falling gently to the north-east. There are no natural features that will assist in the attenuation of noise.

The main meteorological aspect that will affect the transmission (propagation) of the noise is the wind. The wind can result in periodic enhancement downwind or reduction upwind of noise levels. Analysis of the wind records for the area indicates that overall (day and night average) the main prevailing winds blow from the northeast (44%). Approximately 30% *still* periods are experienced annually.

14.3. Methodology

14.3.1. General

The general procedure used to determine the noise impact was guided by the requirements of the Code of Practice SANS 10328:2003: *Methods for Environmental Noise Impact Assessments*. The level of investigation was the equivalent of an EIA. A comprehensive assessment of all noise impact descriptors (standards) has been undertaken. The noise impact criteria used specifically take into account those as specified in the South African National Standard SANS 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication* as well as those in the National Noise Control Regulations. The investigation comprised the following:

- Determination of the existing situation (prior to the planned development).
- Determination of the situation during and after development.
- Assessment of the change in noise climate and impact.
- Identification of mitigating measures.

14.3.2. Determination of the Existing Conditions

This phase comprised the following:

- The relevant technical details of the existing and the planned power stations, the existing traffic patterns and the existing and planned land use in the study area were reviewed in order to establish a comprehensive understanding of all aspects of the project that will influence the future noise climate in the study area.
- Using these data, the limits of the study area of the development site were determined and the potential noise sensitive areas, other major noise sources and potential problems in these areas were identified.

- Applicable noise standards were established. The National Noise Control Regulations, and the SANS 10103:2003 standards were applied.
- The existing *noise climate* of the Study Area was determined by means of a field inspection and a noise measurement survey. The measurement survey appropriately covered the whole of the study area, focussing specifically on the identified noise sensitive/problem areas. Measurements were initially taken at 13 monitoring sites in the study area. A further 4 sites specifically related to the selected development site were measured during this EIA phase. Both the daytime and night-time conditions were measured. The sound pressure level (SPL) (noise) measurements were taken in accordance with the requirements of the Code of Practice SANS 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication*. Type 1 Integrating Sound Level meters were used for the noise measurements. All measurements were taken under dry weather and normal traffic (that is mid-week/school term) conditions. Refer to Appendix AB.
- On the general field inspection and at the same time as each individual measurement was being taken, the qualitative nature of the *noise climate* in the area of the measurement site was assessed and recorded. This comprised an appraisal of the general prevailing acoustic conditions based on the subjective response to the sounds as perceived by the listener (i.e. *auditory observation* by the surveyor), as well as identifying those noise incidents, which influenced the noise meter readings during that measurement period. This procedure is essential in order to ensure that there is a *human* correlation between the noise as perceived by the human ear and that, which is measured by the meter, as well as to establish any anomalies in the general ambient noise conditions.
- The existing noise climates along the main roads as related to the current traffic volumes and patterns were established. These traffic noise levels were calculated using the South African National Standard SANS 10210 (SABS 0210) *Calculating and Predicting Road Traffic Noise* for Route. The Year 2005 traffic was used as the baseline reference.
- The calculated 24-hour period noise indicators, as well as those for the daytime period and night-time period provided the main data for the impact assessment were established. The measured data provided a field check of the acoustic conditions.

14.3.3. Assessment of Planning/Design Phase and Construction Phase Impacts

Aspects of the pre-design field surveys and construction activities that potentially will have a noise impact were identified and, where appropriate, mitigating measures have been recommended.

14.3.4. Assessment of Operational Phase Impacts

The main focus of the operational phase assessment was to establish the nature, magnitude and extent of the potential change in *noise climate* in the study area directly related to and within the area of influence of the new development site. This was done as follows:

- The impact of the new power station with its ancillary operations (including traffic) was established, and then its cumulative effects with Matimba Power Station were determined.
- Based on the findings, appropriate noise mitigating measures (site scale) have been investigated and recommendations made. **These are conceptual and not detailed to final design level.**

14.4. Findings and Assessment Of Impact

The following conditions were observed in the study area and the following aspects were determined from the surveys, calculations of noise indicators and the predictive modelling undertaken for the assessment of the noise impact of the planned power station.

14.4.1. General Details

General aspects of note were as follows:

- The main sources of noise (or potential sources of noise) which presently affect the residual *noise climate* in the Study Area were found to be the following:
 - * Matimba Power Station.
 - * Grootegeluk Colliery.
 - * Traffic on Nelson Mandela Drive/Stockpoort Road.
 - * Conveyor belt systems.
 - * Operations at the ash dump.
 - * Trains on the coal haul railway line.
 - * Operations at the power station sewage works.
- The existing noise sensitive areas, which are likely or could possibly be impacted by the proposed power station are:
 - * The western sector of Onverwacht Township.
 - * Marapong Township.
 - * Various farmhouses and farm labourer houses.
 - * Certain operations on game farms.
- The potentially farmhouses, farm labourer homes and "game lodges" as identified by the social impact team (SIT) are as follows:

- * SIT Reference Site 6: Game lodge (no permanent residents) on the farm Zwartwater, situated approximately 6000 metres to the east of the new power station.
- * SIT Reference Site 7: Farm worker dwellings on the farm Hanglip, situated just north of the Steenbokpan Road, just west of the conveyor to the existing ash dump and approximately 3000 metres east of the proposed power station.
- * SIT Reference Site 8: Weekend Lodge (no permanent residents) on the farm Kuipersbult, situated south of the Afguns Road and approximately 1000 metres south of the proposed power station.
- * SIT Reference Site 9: Farmhouse on the farm Kromdraai, situated just west of the Afguns Road, and approximately 5000 metres south-west of the proposed power station.
- * SIT Reference Site 10: Farm worker dwellings on the farm Nooitgedacht, situated just south of the Soutpan Road, and approximately 8500 metres south-west of the proposed power station.
- * SIT Reference Site 11: Farm worker dwellings on the farm Hieromtrent, situated just north of the Steenbokpan Road and approximately 6500 metres west of the proposed power station. The buildings are in the vicinity of the western extremity of the planned ash dump.
- * SIT Reference Site 13: Farm worker dwellings situated near the Steenbokpan Road and approximately 10 000 metres west of the proposed power station. The buildings are approximately 4000 metres west the western extremity of the planned ash dump.
- * SIT Reference Site 14: Farmhouses on the farm Hanglip, situated approximately 4500 metres east of the proposed power station.

14.4.2. The Existing Ambient Noise Climate

Measurements and *auditory observations* were taken initially at five main sites during Scoping and at a further four sites during the EIA phase in order to establish the ambient noise conditions of the study area. Measurements were taken at another eight (8) sites where it was attempted to isolate the noise from the existing Matimba Power Station. These were taken at appropriate sites at varying distances from the power station. For a description of the all of the measurement sites and for more technical details of the measurement survey, refer to Appendix AB. Briefly the main sites are:

- Site G1: In the northern sector of Onverwacht.
- Site G2: In the southern sector of Onverwacht.
- Site G3: In Marapong.
- Site G4: Along Steenbokpan Road.
- Site G5: On farm Peerboom to the east of Matimba.
- Site G6: At SIT Reference Site 7.

- Site G7: At SIT Reference Site 8.
- Site G8: At SIT Reference Site 9.
- Site G9: At SIT Reference Site 11.

Conditions for the daytime and evening periods were ascertained. The summary of all the noise measurements taken at the main sites is given in Table 14.1. The equivalent sound pressure (noise) level (L_{Aeq}), the maximum sound pressure level (L_{Amax}) and the minimum sound pressure level (L_{Amin}) are indicated. Note that the equivalent sound pressure (noise) level may, in layman's terms, be taken to be the average noise level over the given period. This "average" is also referred to as the residual noise level (excluding the impacting noise under investigation) or the ambient noise level (if the impacting noise under investigation is included). The definitions/details of the noise descriptors for the measurements are given in Appendix AA and Appendix AB.

Table 14.1: Existing (year 2005) ambient noise levels in the area of the proposed power station

Measurement Site	Measured Sound Pressure Level (dBA)					
	Daytime Period			Evening Period		
	L_{Aeq}	L_{max}	L_{min}	L_{Aeq}	L_{max}	L_{min}
SITE G1	51.9	66.7	39.2	53.5	72.5	36.1
SITE G2	43.8	57.6	36.6	45.4	51.6	31.0
SITE G3	50.2	68.2	42.5	53.2	61.1	51.6
SITE G4	45.1	57.1	37.3	39.6	42.3	33.3
SITE G5	44.3	58.4	23.6	-	-	-
SITE G6	56.4	58,4	54,2	56.1	58.7	53.9
SITE G7	36.2	46.7	30.2	35.1	44.1	28.7
SITE G8	36.9	46.6	28.7	38.1	48.1	28.1
SITE G9	46.2	57.7	29.7	47.2	56.3	42.3

The details of the sites where measurements were taken to isolate the Matimba Power Station noise, and measurements at ancillary works are given in AB.

In order to complement the short-term noise measurements in the study area, the existing 24-hour residual noise levels related to the average daily traffic (ADT) flows on Nelson Mandela Drive Extension and Steenbokpan Road were also calculated. These data provide an accurate base for the SANS 10103 descriptors. The noise levels generated from the traffic on these roads were calculated using the South African National Standard SANS 10210 (SABS 0210), *Calculating and*

Predicting Road Traffic Noise. Typical situations were used for the calculation sites. The Year 2005 traffic was used as the baseline for the calculations. The traffic data were obtained from the consulting engineers *Goba Consulting Engineers and Project Management*.

The noise levels at various offsets from the centreline of Nelson Mandela Drive and Steenbokpan Road are summarised in Table 14.2. The noise descriptors used are those prescribed in SANS 10103:2003, namely:

- Daytime equivalent continuous rating (noise) level ($L_{Req,d}$) (L_d used in Table), namely for the period from 06h00 to 22h00).
- Night-time equivalent continuous rating (noise) level ($L_{Req,n}$) (L_n used in Table), namely for the period from 22h00 to 06h00).
- Day-night equivalent continuous rating (noise) level ($L_{R,dn}$) (L_{dn} used in Table), namely for the 24 hour period from 06h00 to 06h00).

The noise levels given are the unmitigated values. A conservative approach has been taken in that a hard intervening ground condition has been modeled to simulate winter conditions (burnt veld). The thick vegetation in the area will generally result in greater attenuation with distance than shown. There will also be greater attenuation with distance than shown where there are houses, other buildings and terrain restraints in the intervening ground between the source and the receiver point.

Table 14.2: Existing noise climate adjacent to main roads (year 2005)

Road	Noise Levels Alongside Roads at Given Offset from Centreline (SANS 10103 Indicator) (dBA)											
	50m Offset			100m Offset			200m Offset			500m Offset		
	L_d	L_n	L_{dn}	L_d	L_n	L_{dn}	L_d	L_n	L_{dn}	L_d	L_n	L_{dn}
N Mandela Dr Ext	58.4	47.5	58.1	55.4	44.5	55.1	52.4	41.5	52.1	48.4	37.5	48.1
Sterkpoort Road	58.4	47.5	58.1	55.4	44.5	55.1	52.4	41.5	52.1	48.4	37.5	48.1
Steenbokpan Rd	47.7	34.7	46.9	44.7	31.7	43.9	41.7	28.7	40.9	37.7	24.7	36.9

In overview, the existing situation with respect to the *noise climates* in the study area was found to be as follows:

- The areas relatively far from the main roads and Matimba Power Station are generally very quiet. Most of the area has a typical rural *noise climate*.

- The main sources of noise in the area are from traffic on the main roads, Matimba Power Station, power station infrastructure remote from the facility, and Grootegeluk Colliery.
- With regard to Nelson Mandela Drive, existing residences in the residential areas of Lephalale (Ellisras) and Onverwacht up to approximately a 250 metre offset from the road are impacted. In these areas the noise levels exceed acceptable suburban residential living conditions as specified in SANS 10103:2003. Ideally the ambient noise level should not exceed 50dBA during the daytime period (06h00 to 22h00) and 40dBA during the night-time period (22h00 to 06h00). Refer to the SANS 10103:2003 standards as given in Appendix AA.
- Ambient noise levels due to traffic in the areas along Steenbokpan Road are not high and impact is insignificant.
- Noise levels from Matimba Power Station adversely affect the daytime noise climate at any residences in the surrounding area for up to a distance of 3000 metres around the facility base on the rural standards that need to be applied for this area. At night the radius of impact increases to approximately 6000 metres. Lephalale is not adversely affected by this noise source.
- There are also noise sources from power station equipment at locations remote from the power station as well as other isolated (or infrequent) noise sources such as:
 - * Coal conveyor belt from the colliery to the power station and the conveyor belt transporting the ash residue from the existing power station to the existing ash dump on the farm Zwartwater.
 - * Operations at the ash dump that include the dumping and spreading of the ash, and the rehabilitation of the dump.
 - * The sewage works serving the power station, which is located 3 kilometres to the north of the power station.
 - * Coal haul trains on the railway line from the Grootegeluk Colliery to Thabazimbi.

Refer to Appendix AB for more details.

14.4.3. Assessment of the Pre-Construction Phase

Activities during the planning and design phase that normally have possible noise impact implications are those related to field surveys (such as seismic testing and geological test borehole drilling for large building foundations). As these activities are usually of short duration and take place during the day, they are unlikely to cause any noise disturbance or nuisance in adjacent areas.

14.4.4. Assessment of the Construction Phase

This Section summarises the more detailed analysis, which is documented in Appendix AC.

Construction will likely be carried out during the daytime only (07h00 to 18h00 or 20h00). It should however be noted that certain activities may occasionally extend into the late evening period, while others such as de-watering operations may need to take place over a 24-hour period. Some of the activities such as the construction of the chimney stacks could take place continuously (24-hours a day) over a number of weeks if a continuous sliding shutter concreting operation is used. It is estimated that the development of the project will take place over a period of 3 to 4 years. A large construction camp (estimated at 10-ha in size and including housing for 2000 workers) could potentially be established on the farm Eenzaamheid. Details of the anticipated main sources of construction noise and the noise levels generated are given in Table C1 in Appendix AC

The nature of the noise impact from the large building and other construction sites is likely to be as follows:

- * Source noise levels from many of the construction activities will be high. Noise levels from all work areas will vary constantly and in many instances significantly over short periods during any day working period.
- * Exact daytime period and night-time period continuous equivalent sound pressure levels are not possible to calculate with certainty at this stage as the final construction site layout, work programme, work *modus operandi* and type of equipment have not been finalised. Working on a worst case scenario basis, it is estimated that the maximum noise levels from general construction operations should not exceed 62dBA at a distance of 1500 metres from the activity site.
- * There are likely to be noise disturbance and noise nuisance effects on people living in the area of the construction site. Several of the farmhouses and farm labourer houses identified as sensitive sites that are within this 1500 metres radius of the focus of construction activity could be affected.
- * Ideally the daytime outdoor ambient noise levels for residential areas (as specified in SANS 10103) should not exceed 50dBA.
- * Also with regard to road construction works, no specific construction details or possible locations of major ancillary activity sites are available at this stage. And therefore the anticipated noise from various types of construction activities cannot be calculated accurately. In general at this stage, it can be said that the typical noise levels of construction equipment at a distance of 15 metres lie in the range of 75 decibels (dBA) to 100dBA. Refer also to Table C1. Based on data from similar "linear" construction sites, a one-hour

equivalent noise level of between 75dBA and 78dBA at a point 50 metres from the construction would be typical for the earthmoving phase.

- * The noise from the construction of the northern road alignment will affect fewer noise sensitive sites than that from the southern road alignment construction.
- * The noise generated by the construction traffic will raise the daytime ambient noise level alongside Nelson Mandela Drive by about only 0,5dBA but will increase the roadside daytime ambient noise level along the Steenbokpan Road (from Nelson Mandela Drive to the construction camp entrance on Eenzaamheid) significantly by 6dBA.
- * For all construction work, the construction workers working with or in close proximity to equipment will be exposed to high levels of noise as can be seen from Table C1 (refer to the 5 metres offset noise levels) in Appendix AC.

14.4.5. Assessment of the Operational Phase

This Section summarises the more detailed analysis, which is documented in Appendix AC. The proposed power station was evaluated on the basis of the noise impact from Matimba B Power Station, the cumulative noise impact effects of both power stations, the noise impact from ancillary works (specifically the ash dump and the conveyor belt systems), and the noise impact from traffic generated by the proposed power station. It was established that:

- Noise sensitive areas (i.e. farm houses and labourers) within about 5500 metres of the new facility will experience ambient noise levels higher than considered acceptable. In particular the noise climate at night at suburban residential homes within 3000 metres and rural residential homes within 5500 metres will be adversely affected. The western periphery of Lephalale and Marapong Township will not be adversely affected by the noise from the new facility.
- Noise impact from ancillary works and equipment (such as the conveyor belts) will in general be low and localised. The drive houses for the conveyor belt system will be sites of high noise levels. The eastern conveyor belt alignment is considered preferable.
- Noise impact from the operations at the new ash dump area on the farm Eenzaamheid in general will not be significant but the noise from work at this site could cause localised problems.
- The following traffic and traffic noise conditions are anticipated. Access to the proposed power station and the new ash dump will be from the Steenbokpan Road. The larger proportion (60%) of the traffic generated by the new facility will route from Lephalale along Nelson Mandela Drive and Steenbokpan Road. The remaining 40% (routed to and from the existing power station and Marapong) will use the Stockpoort Road. The ambient noise levels due to this additional traffic will increase present residual levels along Nelson Mandela

Drive Extension by about 1dBA. The noise levels along the Stockpoort Road will also increase by about 1dBA. Residual noise levels will however be increased significantly by about 5dBA during the day and 8dBA during the night along Steenbokpan Road (from the intersection with Nelson Mandela Drive to the proposed power station entrance).

- The traffic noise from the northern road alignment will affect fewer noise sensitive sites than that from the southern road alignment.

14.5. Mitigating Measures

Potential noise mitigating measures for the project were assessed.

14.5.1. Pre-construction Phase

Local residents are to be notified of any potentially noisy field survey works or other works during the planning and design phase and these activities are to be undertaken at reasonable times of the day. It is considered preferable that these works should not take place at night or on weekends (particularly Sundays), however, discussions with surrounding landowners could result in works being accommodated at night and on weekends.

During this phase, consideration must be given to the noise mitigating measures required during the construction phase and which should be included in the tender document specifications and the design.

14.5.2. Construction Phase

The noise mitigating measures to be considered during the construction phase are as follows:

- Construction site yards, concrete batching plants, asphalt batching plants, construction worker camps (accommodation) and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development site.
- All construction vehicles and equipment are to be kept in good repair.
- Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening.
- With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor should liaise with local residents on how best to minimise impact.
- In general operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).
- Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA should wear ear protection equipment.

14.5.3. Operational Phase

The following noise mitigating measures, which will need to be considered where appropriate, are preliminary indicators that may assist further in the selection of the best alternative site:

- The design of the proposed power station is to incorporate all the necessary acoustic design aspects required in order that the overall generated noise level from the new installation does not exceed a maximum equivalent continuous day/night rating level (L_{Rdn}), namely a noise level of 70dBA (just inside the *property projection plane*, namely the property boundary) as specified for industrial districts in SANS 10103. Refer to Appendix AA. Notwithstanding this provision, the design is also to take into account the maximum allowable equivalent continuous day/night rating level of the potentially impacted sites outside the proposed power station property. Where the L_{Rdn} for the external site is presently lower than the maximum allowed, the maximum shall not be exceeded. Where the L_{Rdn} for the external site is presently at or exceeds the maximum, the existing L_{Rdn} shall not be increased.
- The latest technology incorporating maximum noise mitigating measures for the power station components should be designed into the system.
- The design process is to consider, *inter alia*, the following aspects:
 - * The position and orientation of buildings on the site.
 - * The design of the buildings to minimise the transmission of noise from the inside to the outdoors.
 - * The insulation of particularly noisy new plant and equipment.
- Some of the farm labourer houses affected should be relocated unless these are no longer required or uninhabited.

It should be noted that any measures taken at the development site will limit the impacts in the specific areas designed for, and will not necessarily contribute to improving the degraded noise climates in adjacent areas where there is already a problem.

14.6. Conclusions

The following conclusions may be drawn from the foregoing analysis:

- Although not all of the final baseline noise design data was available for the analysis, the assumptions made are considered adequate to give a meaningful analysis of the noise impact situation, taking into account the fact that the proposed power station was modelled on the data from the

existing Matimba power station and that a conservative approach was used.

- Although the existing general noise climate of much of the study area is still fairly representative of a quiet rural/farming district, that in the corridor between Lephhalale and Matimba power station already severely degraded near to the power station and near to the main roads. The positioning of the proposed power station very close to the existing facility can therefore be supported.
- The area of potentially serious noise impact around the proposed power station will be fairly small (contained within a radius of about 6 kilometres). There are only a few noise sensitive sites within this area of influence, and mitigating measures are possible at these sites.

14.7. Recommendations

The following are recommended:

- The National Noise Control Regulations and SANS 10103 should be used as the main guidelines for addressing the potential noise impact on this project.
- The noise mitigating measures indicated in Section 14.5 should be applied.