

This Report should be sited as:

De Vries, SF. 2024: "Noise Report for Site Sensitivity Verification for the proposed Uvemvane Wind Energy Facility 1 near Balfour, Gauteng and Mpumalanga Province".
Enviro-Acoustic Research, Pretoria

Client:

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ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd

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Report no:

WSP-UWEF1/SSV/202412-Rev 0

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December 2024

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Appendix A Curriculum Vitae

ABBREVIATIONS

ADT	Articulated Dump Trucks
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BA	Basic Assessment
BESS	Battery Energy Storage System
dB/dBA	Decibel (expression of the relative loudness of the A-weighted sound level)
DFFE	Department of Forestry, Fisheries and the Environment
EARES	Enviro Acoustic Research cc
ECA	Environment Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EHS	Environmental Health and Safety
ENIA	Environmental Noise Impact Assessment
ENPAT	Environmental Potential Atlas for South Africa
ETSU	Energy Technology Support Unit
EPs	Equator Principles
EPC	Engineering, Procurement and Construction
EPFIs	Equator Principles Financial Institutions
GN	Government Notice
GNR	Government Notice Regulation
I&APs	Interested and Affected Parties

IEC	International Electrotechnical Commission
IFC	International Finance Corporation
ISO	International Organization for Standardization
METI	Ministry of Economy, Trade, and Industry
NASA	National Aeronautical and Space Administration
NEMA	National Environmental Management Act
NCR	Noise Control Regulations
NSD	Noise-sensitive Development
NSR	Noise-sensitive Receptors
PPP	Public Participation Process
PWL	Sound Power Level
SABS	South African Bureau of Standards
SANS	South African National Standards
SPL	Sound Power Level
SR	Significance Rating
UTM	Universal Transverse Mercator
WHO	World Health Organization
WEF	Wind Energy Facility

1 INTRODUCTION

1.1 INTRODUCTION AND PURPOSE

Enviro-Acoustic Research cc was commissioned by ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd to undertake a specialist study to determine the potential noise impact on the surrounding environment due to the proposed establishment of the Uvemvane Wind Energy Facility 1 near Balfour, Gauteng and Mpumalanga Province.

This report is the result of a site visit conducted as part of the Site Sensitivity Verification process as per GNR320, dated 20 March 2020 as published in Government Gazette No. 43110. The Environmental Impact Assessment process will be facilitated by WSP SA, the appointed Environmental Assessment Practitioner ("EAP") for this project.

1.2 BRIEF PROJECT DESCRIPTION

The project applicant is proposing the development of a commercial Wind Energy Facility ("WEF") and associated infrastructure near Balfour (location illustrated in **Figure 1-1**). The project will be assessed by way of an impact assessment processes contained in the 2014 Environmental Impact Assessment Regulations (GN No. R982, as amended) for listed activities contained in Listing Notices 1, 2 and 3 (GN R983, R984 and R985, as amended).

This WEF (and associated infrastructure) could include the following components:

- A number of wind turbine generators ("WTGs");
- Temporary laydown, hardstands and storage areas;
- Temporary construction camps and batching plants;
- Medium voltage cabling connecting the WTGs;
- A Battery Energy Storage System ("BESS");
- Internal roads (existing roads will be upgraded wherever possible);
- A 33/132kV on-site Independent Power Producer ("IPP") substation;
- Medium voltage collector system to connect the turbines to the on-site IPP;
- Operation and maintenance ("O&M") buildings; and
- Other supporting infrastructure.

1.3 POTENTIAL NOISE SOURCES

Noises will be associated with the construction and operational phases, though the main and potentially the most significant noise source from this project would be the WTGs and

BESS during the operational phase. Low noise levels are associated with the the substation(s).

The sound power emission levels ("SPL") of the WTG are normally provided by the manufacturer, either as the apparent SPL, maximum warranted SPL, a calculated SPL (for new WTG where the noise levels were not previously measured) or measured sound power levels as reported in terms of IEC 61400-11 or IEC 61400-14. It is unique for each make and model and the sound power levels already include the effect of the hub height, rotor diameter and abatement technologies.

Minor factors in the calculated noise (rating) levels are:

- The spectral characteristics of the WTG;
- Temperature and Humidity;
- Noise abatement technologies implemented by the manufacturer;
- Topography and wind shear effects;
- The hub height of the WTG nacelle (the declared SPL level already include this factor, modelling using different hub height than the level specified by the manufacturer does have a slight influence on the calculated noise levels at a receptor location);
- Ground surface characteristics.

Factors that do influence SPL are:

- The rotor diameter of the WTG (the declared SPL level already include this factor);
- The manufacture of the WTG, the model name or number (the declared SPL level already include this factor).

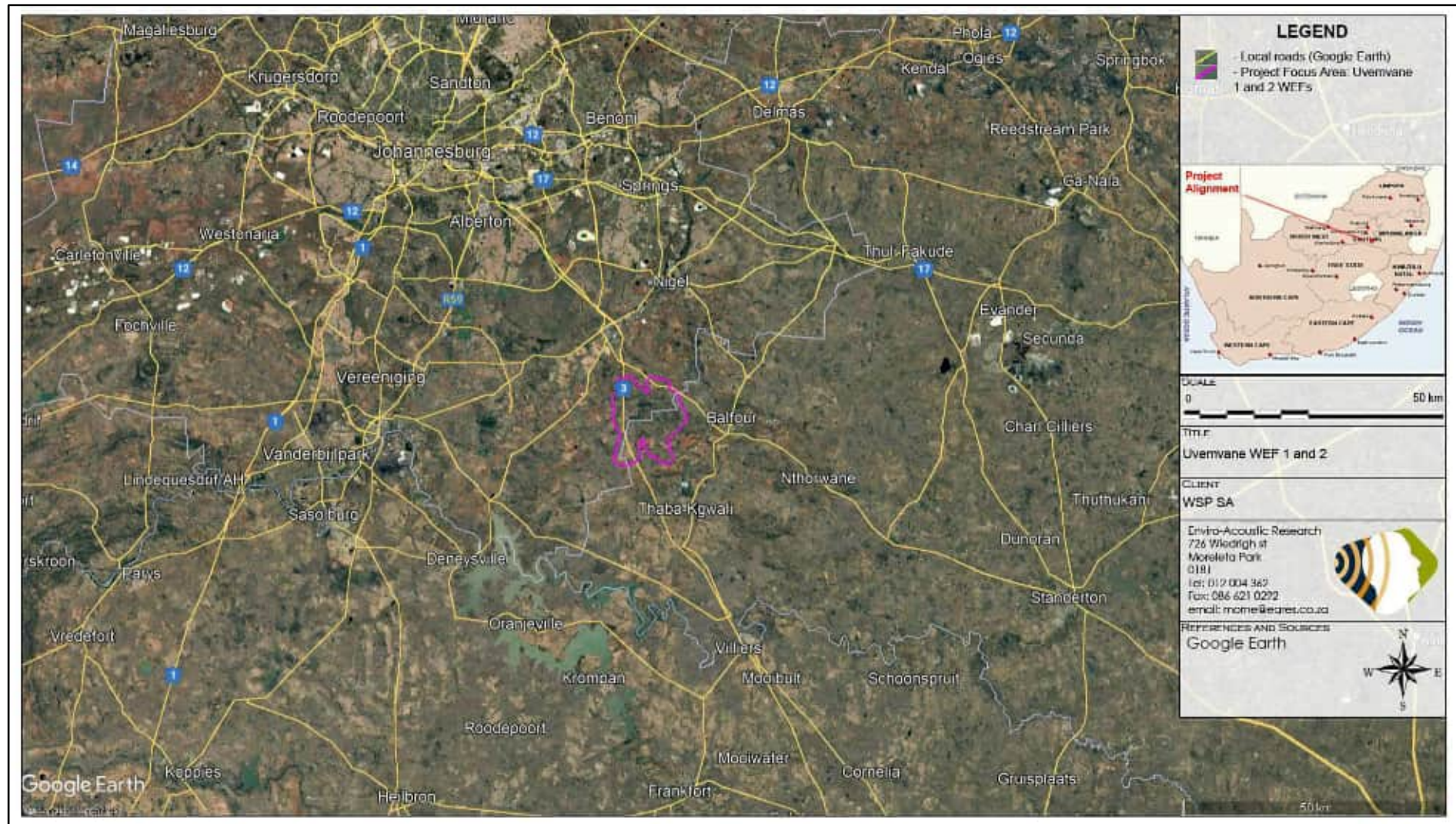


Figure 1-1: Regional Location of the proposed Uvemvane WEFs

2 STUDY AREA

The proposed WEF will be located on the border between Gauteng and Mpumalanga, approximately 9km west of the town of Balfour. The project focus area ("PFA") is an area selected to enclose all potential project infrastructure up to 1,000 m from activities or equipment that may generate significant noise. The regional location of the PFA is illustrated in **Figure 1-1**. The PFA is further described in terms of environmental components that may contribute to or change the sound character in the area.

2.1 TOPOGRAPHY

The topography of the southern section of Uvemvane WEF 1 can be described as slightly undulating plains with hills and lowlands covering the northern part of the WEF. Due to the mountainous nature of certain parts of the study area it is possible that topography could have an effect on the propagation of noise for the WTGs.

2.2 ROADS AND RAIL ROADS

The N3 passes the PFA to the west. While traffic noises may be audible up to 2,000m during quiet periods at night, noise from vehicular traffic will not be considered in this Site Sensitivity Verification or the future reports. There are also a number of small roads exiting from these roads, used by the local communities and farmers.

2.3 LAND USE AND UNRELATED NOISE SOURCES

Based on available aerial images, land use within the PFA is agriculture and wilderness (including ecotourism).

Residential structures are scarcely scattered in a heterogeneous manner within the PFA. Minor noise sources are associated with agricultural and typical household activities. Noise from these sources will not be investigated in this scoping, or the future ENIA.

2.4 RESIDENTIAL AREAS

There are no formal residential areas located within the PFA.

2.5 GROUND CONDITIONS AND VEGETATION

Most of the area falls within the Grassland biome. Agriculture and other anthropogenic activities did impact on the ground surface, though most of the area is well covered by trees, grasses, sedges and shrubs.

Medium (construction phase) to 75% hard (operational phase) ground surface conditions will be used for modelling purposes in the future Environmental Noise Impact Assessment ("ENIA"). It should be noted that this factor is only relevant for air-borne waves being reflected from the ground surface, with certain frequencies slightly absorbed by the vegetation.

2.6 DESIRED RATING LEVELS

Construction activities will impact on the ambient sound levels, and the desired rating levels (recommended noise limits) would be recommended during the future ENIA phase.

The development of the WEF will result in changes in the ambient sound levels during the operational phase. Considering the result of the ambient sound level expected for the area, the fact that the WTG will only operate (and generate noise) during periods with increased winds as well as the noise limits recommended by the International Finance Corporation ("IFC"), desired rating levels will be 45 dBA for the night-time period.

2.7 COMMENTS RECEIVED TO DATE

The author is not aware of any comments raised by the authorities or interested and affected parties at the date this noise scoping report was compiled. It should however be noted that the scoping phase is the start of the Public Participation Process ("PPP") as part of the EIA. Comments regarding noise may only be available during the EIA and PPP process.

2.8 POTENTIAL PROJECT ALTERNATIVES

The decision to develop the WEF at this location is the result of a number of feasibility studies, considering a number of factors, including (amongst others):

- the availability of a viable wind resource;
- the availability of land to develop the WEF;
- grid capacity and the viability to connect the WEF to the national grid or to supply the electrical power to an end-user (potential off-take agreement(s));
- topography and site access;
- land use and suitability;

- landowner support;
- Limited environmental constraints;
- viable alternative options (Photo-voltaic versus concentrated solar versus other power generation technologies).

As a WEF was selected as the most feasible option, secondary alternatives include (amongst others):

- the total electrical power generation capacity;
- the WTG layout of the WEF (to be advised by the various findings of the specialists during the scoping phase); and
- the type and size of the WTG (that will only be decided at a much later stage in the project).

2.9 ENVIRONMENTAL SENSITIVITY – NOISE THEME

The project site was assessed in terms of the Noise Sensitivity Theme using the National Web-based Environmental Screening Tool¹. The output of the Screening Tool is presented on **Figure 3-1**, highlighting a number of areas identified to have a “very high” noise sensitivity. This site sensitivity verification report follows the completion of a site visit to verify the status of areas identified to have a “very high” sensitivity to noise.

2.10 LEGISLATIVE REQUIREMENTS AND TERMS OF REFERENCE

2.10.1 Requirements as per GG 43110 (GNR 320 of March 2020)

The Department of Forestry, Fisheries and Environment (“DFFE”) promulgated Government Notice Regulation (GNR) 320, dated 20 March 2020 as published in Government Gazette No. 43110. The Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation would be applicable to this project.

This regulation defines the requirements for undertaking a site sensitivity verification, specialist assessment and the minimum report content requirements for environmental impact where a specialist assessment is required but no protocol has been prescribed. It requires that the current land use be considered using the national web based environmental screening tool to confirm the site sensitivity available at: <https://screening.environment.gov.za>.

¹ <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

If an applicant intending to undertake an activity identified in the scope of this protocol for which a specialist assessment has been identified on the screening tool on a site identified as being of:

- "very high" sensitivity for noise, must submit a Noise Specialist Assessment; or
- "low" sensitivity for noise, must submit a Noise Compliance Statement.

On a site where the information gathered from the site sensitivity verification differs from the designation of "very high" sensitivity on the screening tool and it is found to be of a "low" sensitivity, a Noise Compliance Statement must be submitted. On a site where the information gathered from the initial site sensitivity verification differs from the designation of "low" sensitivity on the screening tool and it is found to be of a "very high" sensitivity, a Noise Specialist Assessment must be submitted.

If any part of the proposed development footprint falls within an area of "very high" sensitivity, the assessment and reporting requirements prescribed for the "very high" sensitivity apply to the entire footprint excluding linear activities for which noise impacts are associated with construction activities only and the noise levels return to the current levels after the completion of construction activities, in which case a compliance statement applies. In the context of this protocol, development footprint means the area on which the proposed development will take place and includes any area that will be disturbed.

In terms of GNR320 (of 20 March 2020), the Site Sensitivity Verification should be undertaken prior to the commencement of the Specialist assessment. The protocol states:

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a noise specialist, where the noise specialist means someone with relevant academic qualifications and with experience in the domain of acoustic assessments and noise management.
2. The site sensitivity verification must be undertaken through the use of:
 - a) a desktop analysis, using satellite imagery;
 - b) a preliminary onsite inspection; and
 - c) any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure etc.;
 - b) contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and

- c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web based Environmental Screening Tool² was used to screen the proposed site for the noise environmental sensitivity as per the requirements of Government Notice Regulation ("GNR") 320 (of 20 March 2020), considering the site location illustrated in **Figure 3-1**.

A screening report generated by the Online Screening Tool highlighted that a Noise Impact Assessment must be completed and appended to the Environmental Impact Assessment ("EIA") documentation for the project. This screening report was developed for Utilities Infrastructure => Electricity => Generation => Renewable => Wind category, with the noise sensitive areas illustrated on **Figure 3-1**. The areas defined to have a potential "**very high**" sensitivity to noise were downloaded as a layer from the online screening tool.

² <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

3 SITE SENSITIVITY VERIFICATION

A site sensitivity verification has been undertaken in accordance with GNR320 of March 2020, in order to confirm the current land use and environmental sensitivity within the potential PFA.

3.1 OUTPUT FROM NATIONAL ENVIRONMENTAL SCREENING TOOL

The site was initially assessed using the National Environmental Screening tool, available at, <https://screening.environment.gov.za>. The output from the National Online Screening tool indicates a number of areas within and up to 1,000 m from the project boundary to be considered to be of a “very high” sensitivity to noise. These potentially “very high” sensitive areas (in terms of noise) are indicated on **Figure 3-1**.

It was reported that some of the structures identified are used on a permanent or temporary basis and these locations are considered noise sensitive.

3.2 DESCRIPTION ON HOW THE SITE SENSITIVITY VERIFICATION WAS UNDERTAKEN

The site sensitivity verification was done considering:

1. Available aerial images (Google Earth ®), with images dated between 2022 and 2024;
2. Information gained during the site visit in November 2024; and
3. Discussions with the project applicant.

3.3 OUTCOME OF THE SITE SENSITIVITY VERIFICATION

Areas with a “Very High” Sensitivity to noise are indicated on **Figure 3-1**. The online screening tool identified a number of areas with a “very high” sensitivity to noise in the vicinity of the proposed development.

There are also numerous permanent or temporary residential activities within the project area. These residential activities are considered to be noise-sensitive and the areas are considered to have a “Very High” sensitivity to noise. This report agrees with this finding of the online screening tool.

Because a number of these structures are used for residential purposes and considered to be noise-sensitive, the potential impact from noise from the project should be assessed in a Noise Specialist Study.

3.4 POTENTIAL NOISE SENSITIVE RECEPTORS

Figure 3-2 illustrates generalized 500 m, 1,000 m and 2,000 m buffer zones around the area where wind turbines may be erected. Generally, noises from wind turbines³:

- could be significant within 500 m from a wind turbine, with receptors staying within 500 m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing. The significance from noise from a wind turbine located within this zone may be high and the development of wind turbines in this area is not recommended. This is recommended to be a No-Go area in terms of noise, though it should be noted that this could be as high as 800m for WTG with higher SPL;
- are normally clearly audible when between 500 and 1000m from an NSR. Depending on the layout and the sound power emission levels, the significance of the noise impact could be low to high. The wind farm layout should be carefully planned when locating wind turbines in this area, as the turbines cumulatively contribute to noise levels at the NSR. This however can only be assessed once a layout is available, together with the SPL of the selected wind turbine model. For an initial layout, it is not recommended that more than two (2) wind turbines be located closer than 1,000m from any NSR;
- may be just audible or significant, again depending on the number of wind turbines located within 2,000m from an NSR (as well as the SPL of the selected wind turbine). The significance of the noise impact could be low to medium. The wind farm layout should be carefully planned when locating wind turbines in this area, as the turbines cumulatively contribute to noise levels at the NSR. This however can only be assessed once a layout is available, together with the SPL of the selected wind turbine model. For an initial layout, it is not recommended that more than eight (8) wind turbines be located closer than 2,000m from any NSR (inclusive of those located closer than 1,000m)); and,
- Are generally of a low significance at distanced greater than 2,000m, although this again would depend on the layout, the SPL of the wind turbine as well as local meteorological conditions. There are a number of new wind turbines with sound power emission levels exceeding 110 dBA (re 1 pW) that does impact on the extent of noise impact (see also **Figure 3-4**).

³ This is subject to the design of the wind farm, as well as the sound power emission levels (re 1 pW) of the particular wind turbine used at the project

3.5 POTENTIAL NO-GO AREAS

In terms of acoustics, it is difficult to identify and recommend no-go areas or fixed buffers. This is because the potential noise levels at a specific location depend on two factors, namely:

- The project layout (as WTG within 2,500m would cumulatively increase noise levels at a conceptual receiver); and
- The SPL of the selected WTG (a quieter WTG will allow a smaller buffer than the minimum buffer required for a noisier WTG).

The combination of these two factors would determine potential noise levels at a specific point. For the screening phase it is recommended that the applicant do not locate WTG within 500m from any verified NSR. It should however be noted in cases where there are a number of WTG within 2,500m, or when using a noisier WTG, this no-go area will increase.

These preliminary no-go areas are illustrated in **Figure 3-3**.

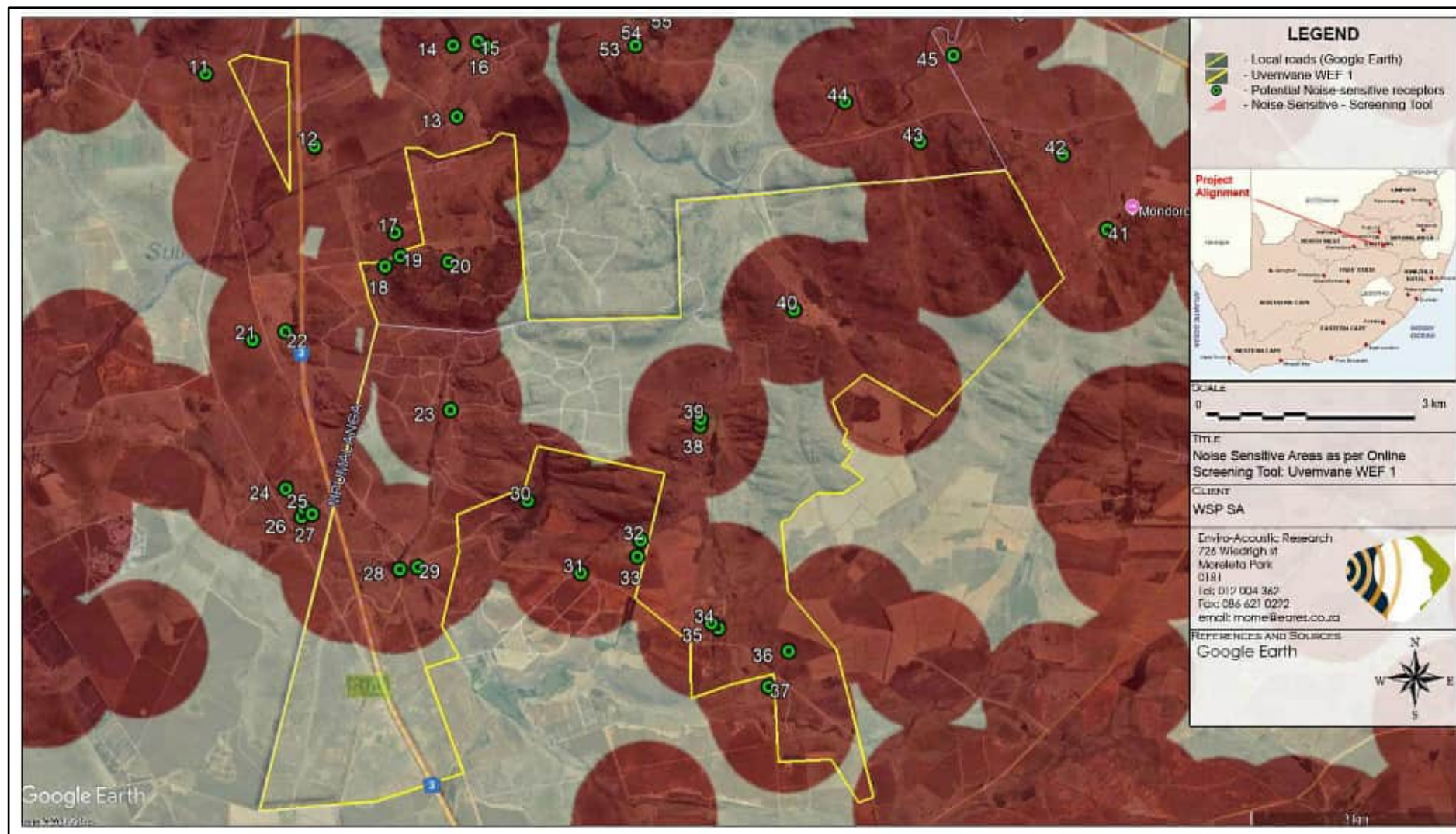


Figure 3-1: Areas identified by the online screening tool to have a “Very High” sensitivity to noise

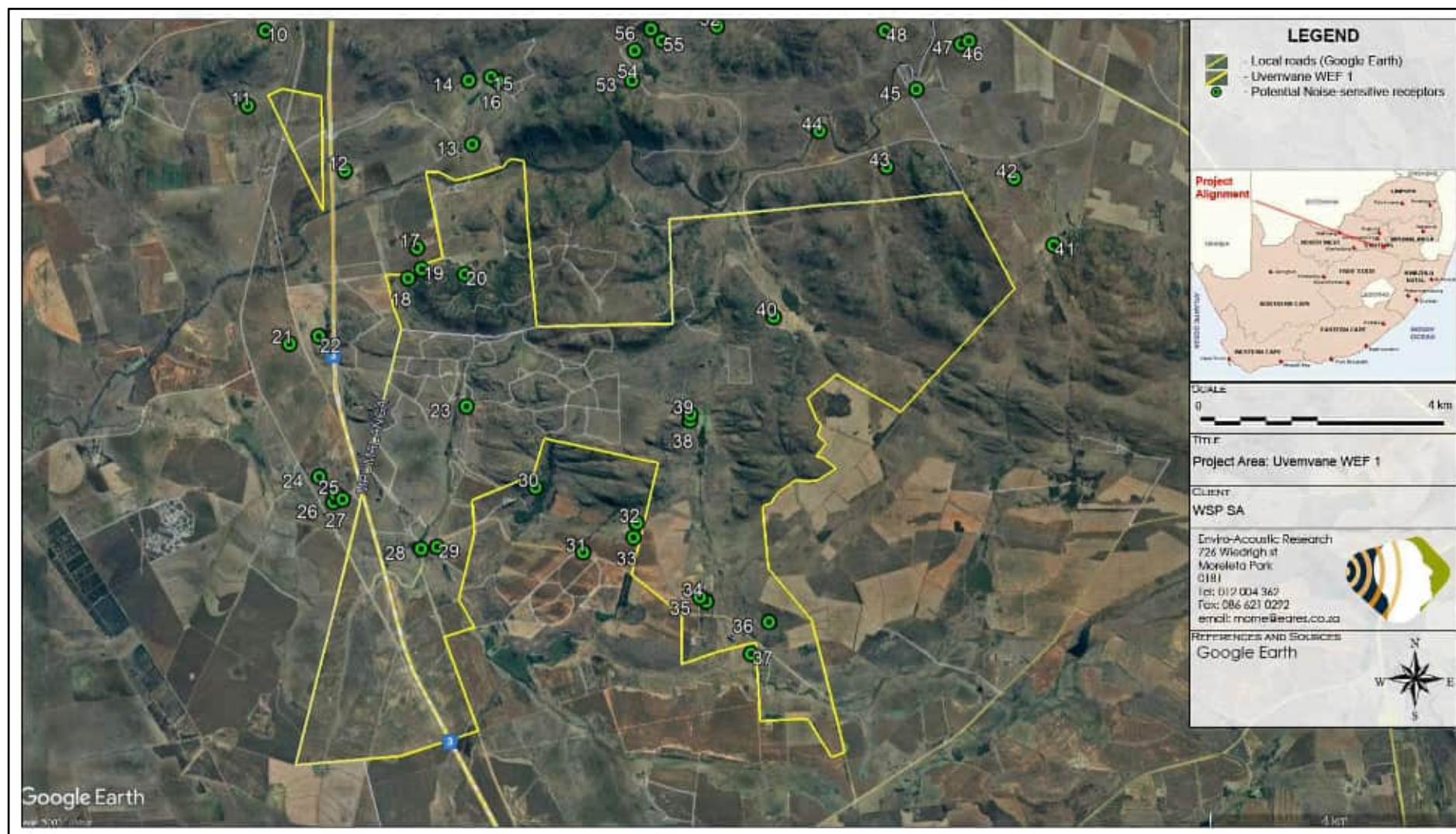


Figure 3-2: Aerial Image indicating closest Noise-sensitive developments to the Uvemvane 1 WEF project

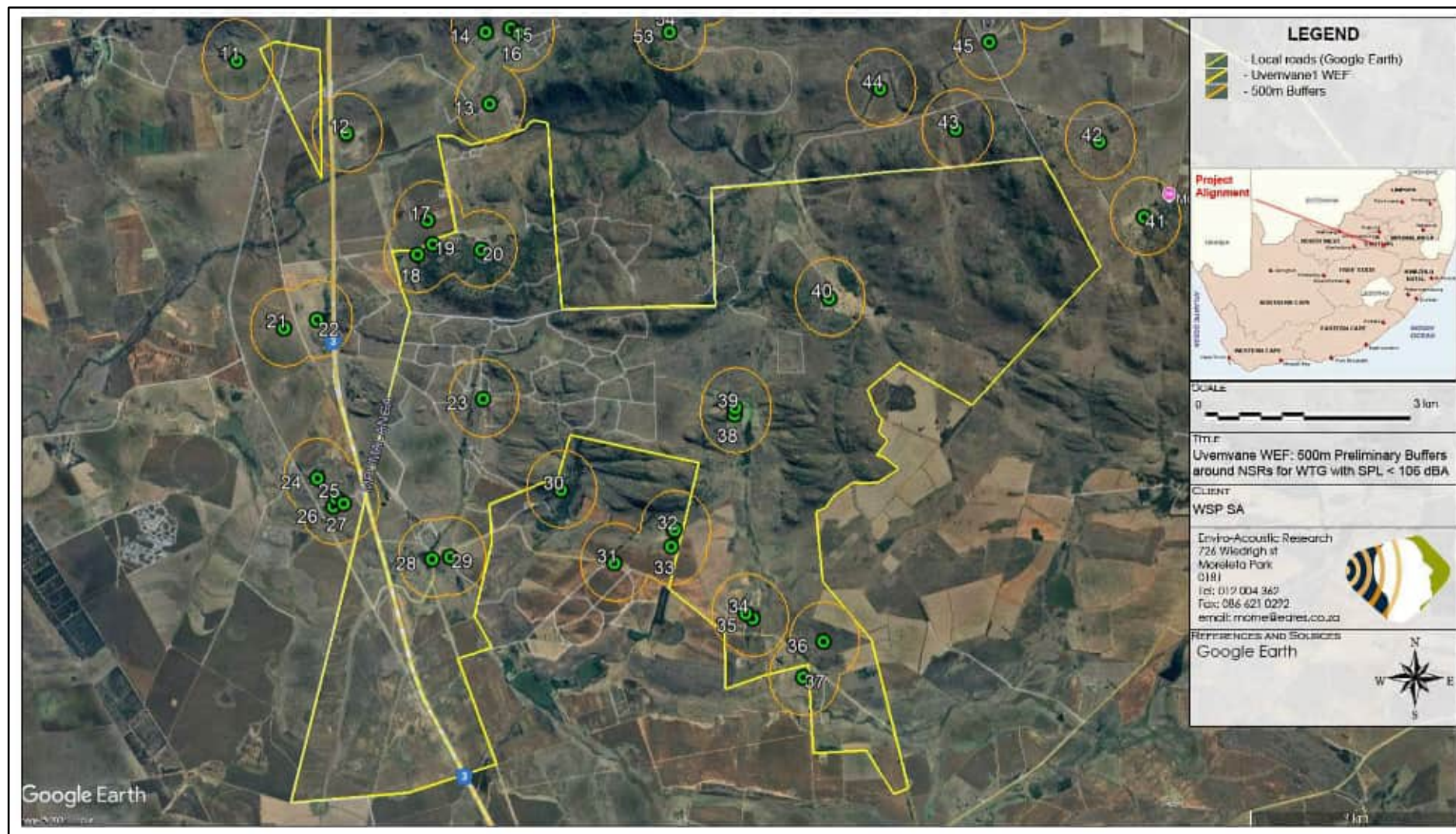


Figure 3-3: Preliminary 500m no-go Buffer

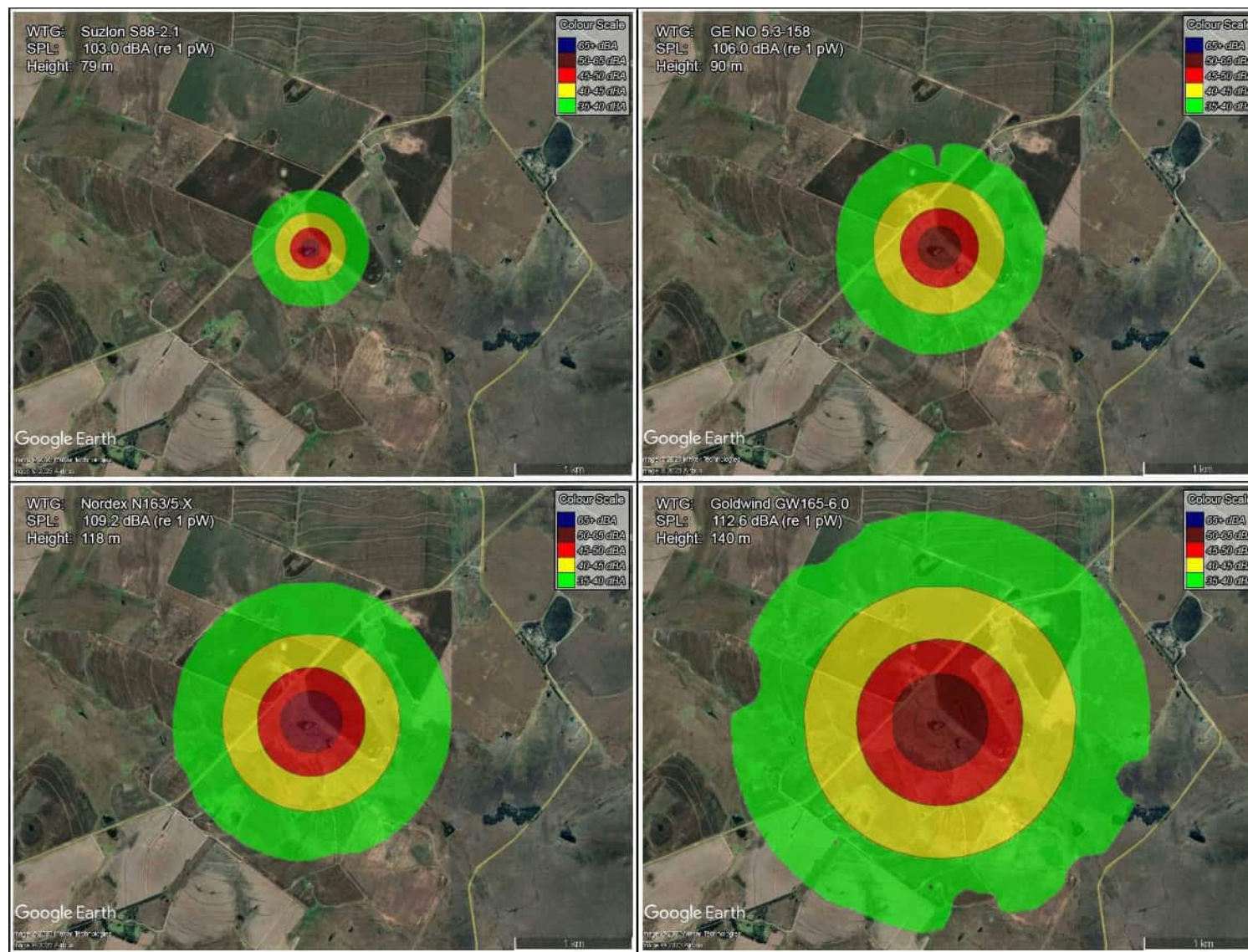


Figure 3-4: Extent of noises from different wind turbines (unmitigated, worst-case parameters)

4 TERMS OF REFERENCE FOR THE ENVIRONMENTAL NOISE IMPACT PHASE

Work that will take place during the ENIA phase is defined in section 8 of SANS 10328:2008.

4.1 PURPOSE OF THE ENVIRONMENTAL NOISE IMPACT ASSESSMENT

The purpose of an environmental noise impact investigation and assessment is to determine and quantify the acoustical impact of, or on a proposed development.

4.2 PLAN OF STUDY FOR ENVIRONMENTAL NOISE IMPACT INVESTIGATION AND ASSESSMENT

In this regard the following will be included to assist the EAP in the compilation of the Plan of Study (PoS) for the EIA:

- Data (layout and SPL of selected WTG) as received from the applicant/developer will be used to model the potential noise impact. The following information will be considered:
 - The Sound Power Emission details of a WTG that may be used at this cluster;
 - The latest WEF layouts to be assessed for the cluster;
 - The surface contours of the project focus area;
 - Surface and meteorological constants;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations.

4.3 ENVIRONMENTAL NOISE IMPACT INVESTIGATION

4.3.1 Sound emission from the identified noise sources

Sound emission data as warranted by the wind turbine manufacturer would be used to calculate the potential noise emissions from the wind turbines. In the instance that this data is unavailable, sound emission data as measured and calculated in accordance with

IEC 61400-11 (*Wind turbine generator systems – Part 11: Acoustic noise measurements techniques*) or IEC 61400-14 (*Wind turbines – Part 14: Declaration of apparent sound power levels and tonality values*) could be used.

The operating cycle and nature of the sound emission (impulsiveness, tonal character or potential low frequencies) would, where relevant, be considered when the expected rating level in the target area is calculated.

4.3.2 Determination of Rating levels

The sound propagation model defined by ISO 9613-2:1996 for both the construction and operational phases to calculate projected equivalent noise levels. Other input parameters used would include:

- Air temperature of 10 °C;
- Relative humidity of 70%;
- Appropriate ambient sound levels associated with a selected wind speed;
- Layout of the proposed facility as provided by the developer;
- Topography details;
- Height of turbine above sea level as well as height of wind turbine above surface level;
- Projected outside equivalent noise levels at Potentially Sensitive Receptors at height above sea-level (plus 4 meters for the operational phase; plus 2 m for the construction phase);
- 75% hard ground surface for the operational phase (medium ground surface for the construction phase).

4.3.3 Assessment of the noise impact: No mitigation

The significance will be determined considering the defined magnitude of the noise level, the extent as well as the duration of the projected noise impact, as well as the probability that this impact may take place.

The magnitude of the noise impact will be assessed by considering:

- The total projected cumulative noise level compared to the appropriate acceptable rating levels as defined in Table 2 of SANS 10103:2008;
- The potential community response from Table 5 of SANS 10103:2008. In addition, other relevant and suitable literature may be consulted as defined in the scoping report. In particular the likely ambient sound levels due to wind induced noises will be estimated at the wind speed under investigation and considered; and
- The likely and projected ambient sound levels.

Likely ambient sound levels associated with wind speeds as well as the projected change in ambient sound levels would also be considered when estimating the probability that a NSR may be impacted by increased noise levels.

4.3.4 Assessment of the noise impact: With Implementation of Mitigation

Should the significance of the impact be medium or high, the potential significance will be estimated considering that the developer would be implementing reasonable mitigation measures. Potential viable mitigation measures will be included.

4.4 ENVIRONMENTAL NOISE IMPACT REPORT

The Environmental Noise Impact Report will cover the following points:

- the purpose of the investigation;
- a brief description of the planned development or the changes that are being considered;
- a brief description of the existing environment including, where relevant, the topography, surface conditions and meteorological conditions during measurements;
- 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;
- the identified noise sources that were not taken into account and the reasons as to why they were not investigated;
- the identified Potentially Sensitive Receptors and the noise impact on them;
- where applicable, any assumptions, with references, made with regard to any calculations or determination of source and propagation characteristics;
- 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;
- 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;
- the location of measuring or calculating points in a sketch or on a map;

- quantification of the noise impact with, where relevant, reference to the literature consulted and the assumptions made;
- alternatives that were considered and the results of those that were investigated;
- a list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation (if comments are received);
- 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 (if comments are received);
- conclusions that were reached;
- proposed recommendations including potential mitigation measures;
- 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.

5 CONCLUSIONS AND RECOMMENDATIONS

This report is a site sensitivity verification for the proposed Uvemvane WEF 1 near Balfour, specifically focusing on noise.

This assessment confirms that there are numerous areas that can be considered to have a “very high” sensitivity to noise within, and close to the project boundary. This site sensitivity verification therefore agrees with the findings of the online screening tool.

Due to the “very high” sensitivity of the area to noise, further study is required and it is recommended that a full Environmental Noise Impact Assessment study be conducted for the Uvemvane 1 WEF.

A handwritten signature in black ink, appearing to read 'Francois de Vries'.

Francois de Vries

Enviro-Acoustic Research cc

APPENDIX A

Resume of Author

Author:

Francois started his career at M² Environmental Connections (Pty) Ltd (Menco) as part of his work integrated learning subject that forms part of the curriculum at Tshwane University of Technology. Initially he worked mainly in the water monitoring unit at Menco mainly doing fieldwork to collect water samples and writing water monitoring reports.

An opportunity presented itself at Enviro-Acoustic Research cc to start training in acoustics and the measurement of ambient sound and noise levels. Since 2018 he has conducted the fieldwork to do ambient noise/sound level measurements for various projects in the mining, industrial, business and renewable energy sectors as well as the writing of acoustical measurement reports for the mentioned sectors. He has been involved in the planning of the site visits to ensure compliance to the applicable regulations. As part of the groundwork to conduct noise impact assessments he has completed several site sensitivity verification reports based on information obtained from physical site visits.

He has been involved in several noise complaint investigations which include developing a suitable approach, obtaining the data and writing the associated report. He is currently being trained to conduct full Noise Impact Assessments.

Fieldwork Wind Energy Facilities

Gouda (Aurecon SA), De Aar (Mulilo), Karee (ARCUS), Kap Vley (CSIR), Kuruman (CSIR), Beaufort West (SiVest), Koup 1 (SiVEST), Koup 2 (SiVEST), Hendrina North (Cabanga), Hendrina South (Cabanga), Jessa M, S and Z cluster of Wind Farms (SLR), Heuweltjies (SiVEST), Kraaltjies (SiVEST), Ngxwabangu (CESNET), Taaibos North (CESNET), Taaibos South (CESNET), Soutrivier North (CESNET), Soutrivier South (CESNET), Soutrivier Central (CESNET), Soyuz 1 (AEP/CESNET), Soyuz 2 (AEP/CESNET), Soyuz 3 (AEP/CESNET), Soyuz 4 (AEP/CESNET), Soyuz 5 (AEP/CESNET), Soyuz 6 (AEP/CESNET), Kaladokhwe 1 (AEP/CSIR), FE Red Sands North East (Enviro-Insight), FE Red Sands South West (Enviro-Insight), FE Red Sands North West (Enviro-Insight), FE Red Sands South East (Enviro-Insight), FE De Rust North (Enviro-Insight), FE De Rust South (Enviro-Insight), Aberdene 1 (AEP/SE), Aberdene 2 (AEP/SE), Aberdene 3 (AEP/SE), Ezelsjacht (SLR)

Fieldwork Mining and Industry	<i>TwEEfontein Colliery (Cleanstream Environmental), Hammanskraal Billeting Plant 1 and 2 (Unica), Doornhoek Fluorspar Project (Exigo), Lehlabile Colliery (Jaco-K Consulting), Waltloo Power Generation Project (EScience), Zandheuvél (Exigo), Dunbar (Enviro-Insight), Eland Platinum Mine (JEMS), Salene Manganese (Prescali), Baberton Gas to Power (Rayten), SISHEN Expansion (Shangoni), Goedgevonden EMP Amendment (Jacana), Rietkol Amendment (Jacana), Vlakfontein Bunker Project (Gudani), Vlakfontein West Project (Gudani), Vygenhoek Platinum (EMAssistance), Lesego Amendment (OMI Solutions), Mpenyisi Gas to Power (Nsovo), Basani Gas to Power (Nsovo), Newlands Gas to Power (Savannah), Sudor Coal (JacoK), Ermelo Project (Zyntha), (Schurvekop Coal (Cabanga), Vlakfontein Coal (EMAssistance), Zandheuvél (Jacana), Zondagsvlei Coal (Zyntha), Sereti Witbank South (Zyntha), Bright Alloys (Phakani), Gold One (Prime Resources), Consol Nigel (Zitholele), Hendrina Green Hydrogen and Ammonia project (Enertrag/WSP)</i>
Urban, Roads and Railway	<i>Brackenfell project (Linspace), Isando (Linspace), Samrand (Linspace), Highbury Depot (AGES Limpopo), Mokopane project (AGES Limpopo)</i>
Noise Monitoring and Acoustic Reports	<i>Sephaku Delmas (AGES & Exigo), Sephaku Aganang (Exigo), Rappa Resources (Rayten), Mamba Cement (Exigo), Nokeng Fluorspar (Exigo), Twisdraai Colliery (Lefatshe Minerals), South32 Klipspruit (Rayten), Sibanye Stillwater Kroondal (Rayten), Rooiberg Asphalt (Rooiberg Asphalt), SASOL Shondoni (Lefatshe), SASOL Twisdraai (Lefatshe), Glencore Impunzi (Cleanstream), Black Chrome Mine (Prescali) Rietvlei Colliery (Jaco-K Consulting), TCTA – MCWAP-2 Project (GIBB), Various (Linspace), Sulzer Hydromining (Sulzer), Great Kei (EDF-Renewables), Elands Platinum (JEMS), Hartebeest WEF (juwi), Mamba Cement (TMCC), Booyens (MDTE), West Rand (MDTE), Devland (MDTE)</i>

Reviewer:

The reviewer started his career in the mining industry as a bursar Learner Official (JCI, Randfontein), working in the mining industry, doing various mining related courses (Rock Mechanics, Surveying, Sampling, Safety and Health [Ventilation, noise, illumination etc.] and Metallurgy. He did work in both underground (Coal, Gold and Platinum) as well as opencast (Coal) for 4 years. He changed course from Mining Engineering to Chemical Engineering after his second year of his studies at the University of Pretoria.

After graduation he worked as a Water Pollution Control Officer at the Department of Water Affairs and Forestry for two years (first year seconded from Wates, Meiring and Barnard), where duties included the perusal (evaluation, commenting and recommendation) of various regulatory required documents (such as EMPR's, Water Use License Applications and EIA's), auditing of license conditions as well as the compilation of Technical Documents.

Since leaving the Department of Water Affairs, Morné has been in private consulting for the last 20 years, managing various projects for the mining and industrial sector, private developers, business, other environmental consulting firms as well as the Department of Water Affairs. During that period he has been involved in various projects, either as specialist, consultant, trainer or project manager, successfully completing these projects within budget and timeframe. During that period he gradually moved towards environmental acoustics, focusing on this field exclusively since 2007.

He has been interested in acoustics as from school days, doing projects mainly related to loudspeaker design. Interest in the matter brought him into the field of Environmental Noise Measurement, Prediction and Control as well as blasting impacts. Since 2007 he has completed more than 300 Environmental Noise Impact Assessments, numerous Noise Monitoring Reports as well as various acoustic consulting services, including amongst others:

Wind Energy Facilities	<p><i>Full Environmental Noise Impact Assessments for - Bannf (Vidigenix), iNca Gouda (Aurecon SA), Isivunguvungu (Aurecon), De Aar (Aurecon), Kokerboom 1 (Aurecon), Kokerboom 2 (Aurecon), Kokerboom 3 (Aurecon), Kangnas (Aurecon), Plateau East and West (Aurecon), Wolf (Aurecon), Outeniqua (Aurecon), Umsinde Emoyeni (ARCUS), Komsberg (ARCUS), Karee (ARCUS), Kolkies (ARCUS), San Kraal (ARCUS), Phezukomoya (ARCUS), Canyon Springs (Canyon Springs), Perdekraal (ERM), Scarlet Ibis (CESNET), Albany (CESNET), Sutherland (CSIR), Kap Vley (CSIR), Kuruman (CSIR), Rietrug (CSIR), Sutherland 2 (CSIR), Perdekraal (ERM), Teekloof (Mainstream), Eskom Aberdene (SE), Dorper (SE), Spreeukloof (SE), Loperberg (SE), Penhoek Pass (SE), Amakhala Emoyeni (SE), Zen (Savannah Environmental – SE), Goereesoe (SE), Springfontein (SE), Garob (SE), Project Blue (SE), ESKOM Kleinzee (SE), Namas (SE), Zonnequa (SE), Walker Bay (SE), Oyster Bay (SE), Hidden Valley (SE), Deep River (SE), Tsitsikamma (SE), AB (SE), West Coast One (SE), Hopefield II (SE), Namakwa Sands (SE), VentuSA Gouda (SE), Dorper (SE), Klipheuvel (SE), INCA Swellendam (SE), Cookhouse (SE), Iziduli (SE), Msenge (SE), Cookhouse II (SE), Rhebokfontein (SE), Suurplaat (SE), Karoo Renewables (SE), Koningaas (SE), Spitskop (SE), Castle (SE), Khai Ma (SE), Poortjies (SE), Korana (SE),</i></p>
-------------------------------	--

	<i>IE Moorreesburg (SE), Gunstfontein (SE), Boulders (SE), Vredenburg (Terramanzi), Loeriesfontein (SiVEST), Rhenosterberg (SiVEST), Noupoot (SiVEST), Prieska (SiVEST), Dwarsrug (SiVEST), Graskoppies (SiVEST), Philco (SiVEST), Hartebeest Leegte (SiVEST), Ithemba (SiVEST), !Xha Boom (SiVEST), Spitskop West (Terramanzi), Haga Haga (Terramanzi), Vredenburg (Terramanzi), Msenge Emoyeni (Windlab), Wobben (IWP), Trakas (SiVest), Beaufort West (SiVest)</i>
Mining and Industry	<i>Full Environmental Noise Impact Assessments for – Delft Sand (AGES), BECSA – Middelburg (Golder Associates), Kromkrans Colliery (Geovicon Environmental), SASOL Borrow Pits Project (JMA Consulting), Lesego Platinum (AGES), Tweefontein Colliery (Cleanstream Environmental), Evraz Vametco Mine and Plant (JMA), Goedeheop Colliery (Geovicon), Hacra Project (Prescali Environmental), Der Brochen Platinum Project (J9 Environment), Brandbach Sand (AGES), Verkeerdepan Extension (CleanStream Environmental), Dwaalboom Limestone (AGES), Jagdlust Chrome (MENCO), WPB Coal (MENCO), Landau Expansion (CleanStream Environmental), Otjikoto Gold (AurexGold), Klipfontein Colliery (MENCO), Imbabala Coal (MENCO), ATCOM East Expansion (Jones and Wagner), IPP Waterberg Power Station (SE), Kangra Coal (ERM), Schoongesicht (CleanStream Environmental), EastPlats (CleanStream Environmental), Chapudi Coal (Jacana Environmental), Generaal Coal (JE), Mopane Coal (JE), Glencore Boshoe Chrome (JMA), Langpan Chrome (PE), Vlakpoort Chrome (PE), Sekoko Coal (SE), Frankford Power (REMIG), Strahrae Coal (Ferret Mining), Transalloys Power Station (Savannah), Pan Palladium Smelter, Iron and PGM Complex (Prescali Environmental), Fumani Gold (AGES), Leiden Coal (EIMS), Colenso Coal and Power Station (SiVEST/EcoPartners), Klippoortjie Coal (Gudani), Rietspruit Crushers (MENCO), Assen Iron (Tshikovha), Transalloys (SE), ESKOM Ankerlig (SE), Nooitgedacht Titano Project (EcoPartners), Algoa Oil Well (EIMS), Spitskop Chrome (EMAssistance), Vlakfontein South (Gudani), Leandra Coal (Jacana), Grazvalley and Zoetveld (Prescali), Tjate Chrome (Prescali), Langpan Chromite (Prescali), Vereeniging Recycling (Pro Roof), Meyerton Recycling (Pro Roof), Hammanskraal Billeting Plant 1 and 2 (Unica), Development of Altona Furnace, Limpopo Province (Prescali Environmental), Haakdoorndrift Opencast at Amandelbult Platinum (Aurecon), Landau Dragline relocation (Aurecon), Stuart Coal Opencast (CleanStream Environmental), Tetra4 Gas Field Development (EIMS), Kao Diamonds – Tipping Village Relocation (EIMS), Kao Diamonds – West Valley Tailings Deposit (EIMS), Upington Special Economic Zone (EOH), Arcellor Mittal CCGT Project near Saldanha (ERM), Malawi Sugar Mill Project (ERM), Proposed Mooifontein Colliery (Geovicon Environmental), Goedeheop North Residue Deposit Expansion (Geovicon Environmental), Mutsho 600MW Coal-Fired Power Plant (Jacana Environmentals), Tshivhaso Coal-Fired Power Plant (Savannah Environmental), Doornhoek Fluorspar Project (Exigo), Royal Sheba Project (Cabanga Environmental), Rietkol Silica (Jacana), Gruisfontein Colliery (Jacana), Lehlabile Colliery (Jaco-K Consulting), Bloemendal Colliery (Enviro-Insight), Rondevly Colliery (REC), Welgedacht Colliery (REC), Kalabasfontein Extension (EIMS), Waltloo Power Generation Project (EScience), Buffalo Colliery (Marang), Balgarthen Colliery (Rayten), Kusipongo Block C (Rayten), Zandheuvel (Exigo), NamPower Walvis Bay (GPT), Eloff Phase 3 (EIMS), Dunbar (Enviro-Insight), Smokey Hills (Prescali), Bierspruit (Aurecon)</i>
Road and Railway	<i>K220 Road Extension (Urbansmart), Boskop Road (MTO), Sekoko Mining (AGES), Davel-Swaziland-Richards Bay Rail Link (Aurecon), Moloto Transport Corridor Status Quo Report and Pre-Feasibility (SiVEST), Postmasburg Housing Development (SE), Tshwane Rapid Transport Project, Phase 1 and 2 (NRM Consulting/City of Tshwane), Transnet Apies-river Bridge Upgrade (Transnet), Gautrain Due-diligence (SiVest), N2 Piet Retief (SANRAL), Atterbury Extension, CoT (Bokomoso Environmental), Riverfarm Development (Terramanzi), Conakry to Kindia Toll Road (Rayten)</i>
Airport	<i>Oudtshoorn Noise Monitoring (AGES), Sandton Heliport (Alpine Aviation), Tete Airport Scoping (Aurecon)</i>
Noise monitoring and Audit Reports	<i>Peerboom Colliery (EcoPartners), Thabametsi (Digby Wells), Doxa Deo (Doxa Deo), Harties Dredging (Rand Water), Xstrata Coal – Witbank Regional (Xstrata), Sephaku Delmas (AGES), Amakhala Emoyeni WEF (Windlab Developments), Oyster Bay WEF (Renewable Energy Systems), Tsitsikamma WEF Ambient Sound Level study (Cennerg and SE), Hopefield WEF (Umoya), Wesley WEF (Innowind), Ncora WEF (Innowind), Boschmanspoort (Jones and Wagner), Nqamakwe WEF (Innowind), Hopefield WEF Noise Analysis (Umoya), Dassiesfontein WEF Noise Analysis (BioTherm), Transnet Noise Analysis (Aurecon), Jeffries Bay Wind Farm (Globeleq), Sephaku Aganang (Exigo), Sephaku Delmas (Exigo), Beira Audit (BP/GPT), Nacala Audit (BP/GPT), NATREF (Nemai), Rappa Resources (Rayten), Measurement Report for Sephaku Delmas (Ages), Measurement Report for Sephaku Aganang (Ages), Bank of Botswana measurements (Linnspace), Skukuza Noise Measurements (Concor), Development noise measurement protocol for Mamba Cement (Exigo),</i>

	Measurement Report for Mamba Cement (Exigo), Measurement Report for Nokeng Fluorspar (Exigo), Tsitsikamma Community Wind Farm Pre-operation sound measurements (Cennergi), Waainek WEF Operational Noise Measurements (Innowind), Sedibeng Brewery Noise Measurements (MENCO), Tsitsikamma Community Wind Farm Operational noise measurements (Cennergi), Noupoot Wind Farm Operational noise measurements (Mainstream), Twisdraai Colliery (Lefatshe Minerals), SASOL Prospecting (Lefatshe Minerals), South32 Klipspruit (Rayten), Sibanye Stillwater Kroondal (Rayten), Rooiberg Asphalt (Rooiberg Asphalt), SASOL Shondoni (Lefatshe), SASOL Twisdraai (Lefatshe), Anglo Mototolo (Exigo), Heineken Inyaniga (AECOM), Glencore Izimbiwa (Cleanstream) Glencore Impunzi (Cleanstream), Black Chrome Mine (Prescali) Sibanye Stillwater Ezulwini (Aurecon), Sibanye Stillwater Beatrix (Aurecon), Bank of Botswana (Linspace), Lakeside (Linspace), Skukuza (SiVEST), Rietvlei Colliery (Jaco-K Consulting)
Small Noise Impact Assessments	TCTA AMD Project Baseline (AECOM), NATREF (Nemai Consulting), Christian Life Church (UrbanSmart), Kosmosdale (UrbanSmart), Louwlandia K220 (UrbanSmart), Richards Bay Port Expansion (AECOM), Babalegi Steel Recycling (AGES), Safika Slag Milling Plant (AGES), Arcelor Mittal WEF (Aurecon), RVM Hydroplant (Aurecon), Grootvlei PS Oil Storage (SiVEST), Rhenosterberg WEF, (SiVEST), Concerto Estate (BPTrust), Ekuseni Youth Centre (MENCO), Kranskop Industrial Park (Cape South Developments), Pretoria Central Mosque (Noman Shaikh), Soshanguve Development (Maluleke Investments), Seshogo-D Waste Disposal (Enviroxcellence), Zambesi Safari Equipment (Owner), Noise Annoyance Assessment due to the Operation of the Gautrain (Thornhill and Lakeside Residential Estate), Upington Solar (SE), Ilangaletu Solar (SE), Pofadder Solar (SE), Flagging Trees WEF (SE), Uyekraal WEF (SE), Ruuki Power Station (SE), Richards Bay Port Expansion 2 (AECOM), Babalegi Steel Recycling (AGES), Safika Ladium (AGES), Safika Cement Isando (AGES), RareCo (SE), Struisbaai WEF (SE), Perdekraal WEF (ERM), Kotula Tsatsi Energy (SE), Olievenhoutbosch Township (Nali), , HDMS Project (AECOM), Quarry extensions near Ermelo (Rietspruit Crushers), Proposed uMzimkhulu Landfill in KZN (nZingwe Consultancy), Linksfield Residential Development (Bokomoso Environmental), Rooihuiskraal Ext. Residential Development, CoT (Plandev Town Planners), Floating Power Plant and LNG Import Facility, Richards Bay (ERM), Floating Power Plant project, Saldanha (ERM), Vopak Growth 4 project (ERM), Elandspoort Ext 3 Residential Development (Gibb Engineering), Tiegerpoort Wedding Venue (Henwood Environmental), Monavoni Development (Marindzini), Rezoning of Portion 1 (Primo Properties), Tswaing Mega City (Makole), Mabopane Church (EP Architects), ERGO Soweto Cluster (Kongiwe), Fabio Chains (Marang), GIDZ JMP (Marang), Temple Complex (KWP Create), Germiston Metals (Dorean), Sebenza Metals (Dorean)
Project reviews and amendment reports	Loperberg (Savannah), Dorper (Savannah), Penhoek Pass (Savannah), Oyster Bay (RES), Tsitsikamma Community Wind Farm Noise Simulation project (Cennergi), Amakhala Emoyeni (Windlab), Spreeukloof (Savannah), Spinning Head (SE), Kangra Coal (ERM), West Coast One (Moyeng Energy), Rheboksfontein (Moyeng Energy), De Aar WEF (Holland), Quarterly Measurement Reports – Dangote Delmas (Exigo), Quarterly Measurement Reports – Dangote Lichtenburg (Exigo), Quarterly Measurement Reports – Mamba Cement (Exigo), Quarterly Measurement Reports – Dangote Delmas (Exigo) Quarterly Measurement Reports – Nokeng Fluorspar (Exigo), Proton Energy Limited Nigeria (ERM), Hartebeest WEF Update (Moorreesburg) (Savannah Environmental), Modderfontein WEF Opinion (Terramanzi), IPD Vredenburg WEF (IPD Power Vredenburg), Paul Puts WEF (ARCUS), Juno WEF (ARCUS), etc.

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ABO Uvemvane Wind Energy Facility 2 (Pty) Ltd

NOISE REPORT FOR SITE SENSITIVITY VERIFICATION

**for the
proposed Uvemvane Wind Energy Facility 2
near Heidelberg, Gauteng Province**



Study done for:



Prepared by:



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This Report should be sited as:

De Vries, SF. 2024: "Noise Report for Site Sensitivity Verification for the proposed Uvemvane Wind Energy Facility 2 near Heidelberg, Gauteng Province". Enviro-Acoustic Research, Pretoria

Client:

WSP SA for
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WSP-UWEF2/SSV/202412-Rev 0

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December 2024

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APPENDICES

Appendix A Curriculum Vitae

ABBREVIATIONS

ADT	Articulated Dump Trucks
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BA	Basic Assessment
BESS	Battery Energy Storage System
dB/dBA	Decibel (expression of the relative loudness of the A-weighted sound level)
DFFE	Department of Forestry, Fisheries and the Environment
EARES	Enviro Acoustic Research cc
ECA	Environment Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EHS	Environmental Health and Safety
ENIA	Environmental Noise Impact Assessment
ENPAT	Environmental Potential Atlas for South Africa
ETSU	Energy Technology Support Unit
EPs	Equator Principles
EPC	Engineering, Procurement and Construction
EPFIs	Equator Principles Financial Institutions
GN	Government Notice
GNR	Government Notice Regulation
I&APs	Interested and Affected Parties

IEC	International Electrotechnical Commission
IFC	International Finance Corporation
ISO	International Organization for Standardization
METI	Ministry of Economy, Trade, and Industry
NASA	National Aeronautical and Space Administration
NEMA	National Environmental Management Act
NCR	Noise Control Regulations
NSD	Noise-sensitive Development
NSR	Noise-sensitive Receptors
PPP	Public Participation Process
PWL	Sound Power Level
SABS	South African Bureau of Standards
SANS	South African National Standards
SPL	Sound Power Level
SR	Significance Rating
UTM	Universal Transverse Mercator
WHO	World Health Organization
WEF	Wind Energy Facility

1 INTRODUCTION

1.1 INTRODUCTION AND PURPOSE

Enviro-Acoustic Research cc was commissioned by ABO Uvemvane Wind Energy Facility 2 (Pty) Ltd to undertake a specialist study to determine the potential noise impact on the surrounding environment due to the proposed establishment of the Uvemvane Wind Energy Facility 2 between Heidelberg and Balfour, Gauteng Province.

This report is the result of a site visit conducted as part of the Site Sensitivity Verification process as per GNR320, dated 20 March 2020 as published in Government Gazette No. 43110. The Environmental Impact Assessment process will be facilitated by WSP SA, the appointed Environmental Assessment Practitioner ("EAP") for this project.

1.2 BRIEF PROJECT DESCRIPTION

The project applicant is proposing the development of a commercial Wind Energy Facility ("WEF") and associated infrastructure near between Heidelberg and Balfour (location illustrated in **Figure 1-1**). The project will be assessed by way of an impact assessment process contained in the 2014 Environmental Impact Assessment Regulations (GN No. R982, as amended) for listed activities contained in Listing Notices 1, 2 and 3 (GN R983, R984 and R985, as amended).

This WEF (and associated infrastructure) could include the following components:

- A number of wind turbine generators ("WTGs");
- Temporary laydown, hardstands and storage areas;
- Temporary construction camps and batching plants;
- Medium voltage cabling connecting the WTGs;
- A Battery Energy Storage System ("BESS");
- Internal roads (existing roads will be upgraded wherever possible);
- A 33/132kV on-site Independent Power Producer ("IPP") substation;
- Medium voltage collector system to connect the turbines to the on-site IPP;
- Operation and maintenance ("O&M") buildings; and
- Other supporting infrastructure.

1.3 POTENTIAL NOISE SOURCES

Noises will be associated with the construction and operational phases, though the main and potentially the most significant noise source from this project would be the WTGs and

BESS during the operational phase. Low noise levels are associated with the the substation(s).

The sound power emission levels ("SPL") of the WTG are normally provided by the manufacturer, either as the apparent SPL, maximum warranted SPL, a calculated SPL (for new WTG where the noise levels were not previously measured) or measured sound power levels as reported in terms of IEC 61400-11 or IEC 61400-14. It is unique for each make and model and the sound power levels already include the effect of the hub height, rotor diameter and abatement technologies.

Minor factors in the calculated noise (rating) levels are:

- The spectral characteristics of the WTG;
- Temperature and Humidity;
- Noise abatement technologies implemented by the manufacturer;
- Topography and wind shear effects;
- The hub height of the WTG nacelle (the declared SPL level already include this factor, modelling using different hub height than the level specified by the manufacturer does have a slight influence on the calculated noise levels at a receptor location);
- Ground surface characteristics.

Factors that do influence SPL are:

- The rotor diameter of the WTG (the declared SPL level already include this factor);
- The manufacture of the WTG, the model name or number (the declared SPL level already include this factor).

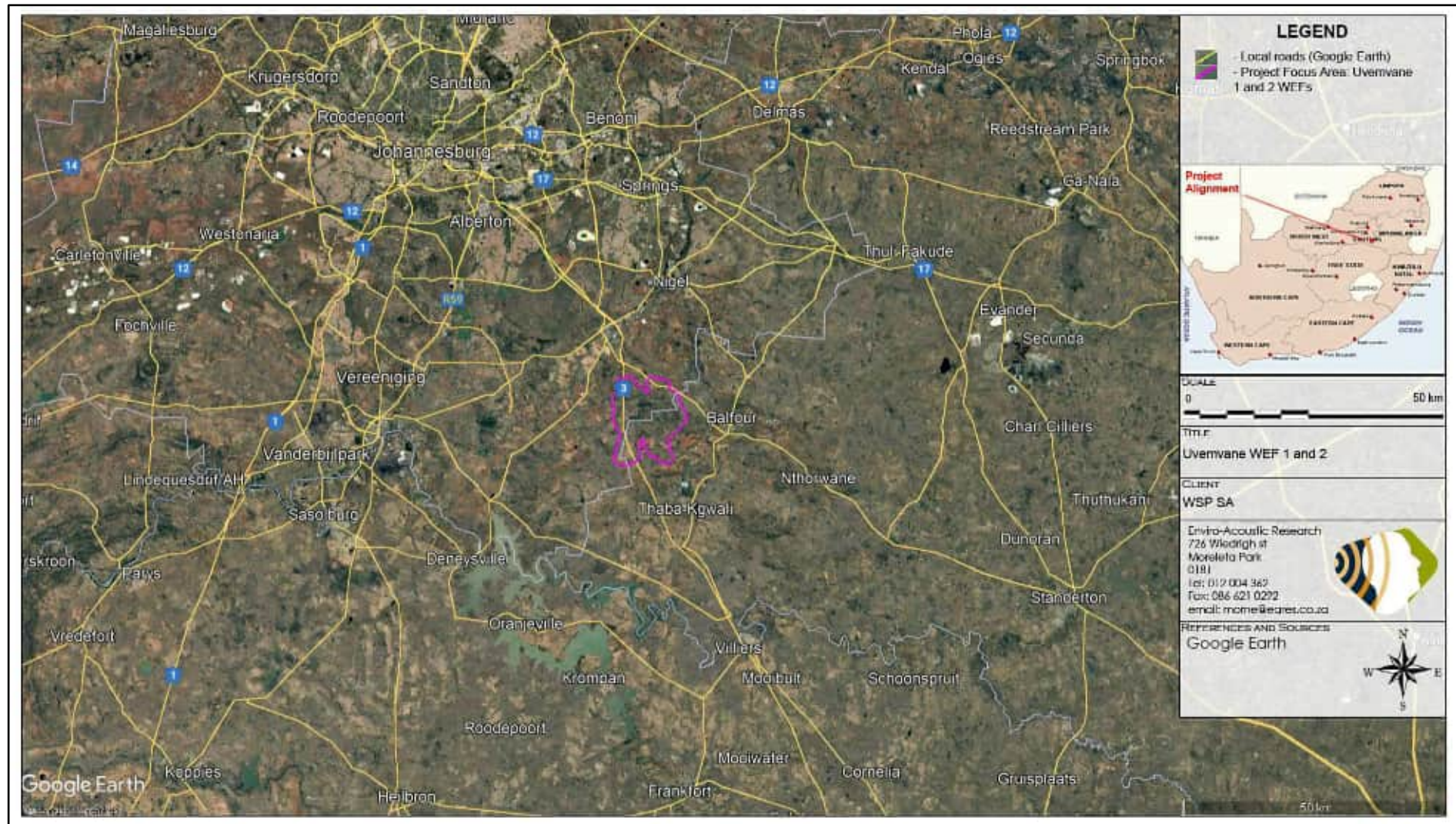


Figure 1-1: Regional Location of the proposed Uvemvane WEFs

2 STUDY AREA

The proposed WEF will be located in the Gauteng Province, approximately 1km south-east of the town of Heidelberg. The project focus area ("PFA") is an area selected to enclose all potential project infrastructure up to 1,000 m from activities or equipment that may generate significant noise. The regional location of the PFA is illustrated in **Figure 1-1**. The PFA is further described in terms of environmental components that may contribute to or change the sound character in the area.

2.1 TOPOGRAPHY

The topography of the Uvemvane WEF 2 can be described as slightly undulating plains in the west with hills and lowlands covering the eastern part of the WEF. Due to the mountaineous nature of certain parts of the study area it is possible that topography could have an effect on the propagation of noise for the WTGs.

2.2 ROADS AND RAIL ROADS

The N3 passes the PFA to the west. While traffic noises may be audible up to 2,000m during quiet periods at night, noise from vehicular traffic will not be considered in this Site Sensitivity Verification or the future reports. There are also a number of small roads exiting from these roads, used by the local communities and farmers.

2.3 LAND USE AND UNRELATED NOISE SOURCES

Based on available aerial images, land use within the PFA is agriculture and wilderness (including ecotourism).

Residential structures are scarcely scattered in a heterogeneous manner within the PFA. Minor noise sources are associated with agricultural and typical household activities. Noise from these sources will not be investigated in this scoping, or the future ENIA.

2.4 RESIDENTIAL AREAS

There are no formal residential areas located within the PFA.

2.5 GROUND CONDITIONS AND VEGETATION

Most of the area falls within the Grassland biome. Agriculture and other anthropogenic activities did impact on the ground surface, though most of the area is well covered by trees, grasses, sedges and shrubs.

Medium (construction phase) to 75% hard (operational phase) ground surface conditions will be used for modelling purposes in the future Environmental Noise Impact Assessment ("ENIA"). It should be noted that this factor is only relevant for air-borne waves being reflected from the ground surface, with certain frequencies slightly absorbed by the vegetation.

2.6 DESIRED RATING LEVELS

Construction activities will impact on the ambient sound levels, and the desired rating levels (recommended noise limits) would be recommended during the future ENIA phase.

The development of the WEF will result in changes in the ambient sound levels during the operational phase. Considering the result of the ambient sound level expected for the area, the fact that the WTG will only operate (and generate noise) during periods with increased winds as well as the noise limits recommended by the International Finance Corporation ("IFC"), desired rating levels will be 45 dBA for the night-time period.

2.7 COMMENTS RECEIVED TO DATE

The author is not aware of any comments raised by the authorities or interested and affected parties at the date this noise scoping report was compiled. It should however be noted that the scoping phase is the start of the Public Participation Process ("PPP") as part of the EIA. Comments regarding noise may only be available during the EIA and PPP process.

2.8 POTENTIAL PROJECT ALTERNATIVES

The decision to develop the WEF at this location is the result of a number of feasibility studies, considering a number of factors, including (amongst others):

- the availability of a viable wind resource;
- the availability of land to develop the WEF;
- grid capacity and the viability to connect the WEF to the national grid or to supply the electrical power to an end-user (potential off-take agreement(s));
- topography and site access;
- land use and suitability;

- landowner support;
- Limited environmental constraints;
- viable alternative options (Photo-voltaic versus concentrated solar versus other power generation technologies).

As a WEF was selected as the most feasible option, secondary alternatives include (amongst others):

- the total electrical power generation capacity;
- the WTG layout of the WEF (to be advised by the various findings of the specialists during the scoping phase); and
- the type and size of the WTG (that will only be decided at a much later stage in the project).

2.9 ENVIRONMENTAL SENSITIVITY – NOISE THEME

The project site was assessed in terms of the Noise Sensitivity Theme using the National Web-based Environmental Screening Tool¹. The output of the Screening Tool is presented on **Figure 3-1**, highlighting a number of areas identified to have a “very high” noise sensitivity. This site sensitivity verification report follows the completion of a site visit to verify the status of areas identified to have a “very high” sensitivity to noise.

2.10 LEGISLATIVE REQUIREMENTS AND TERMS OF REFERENCE

2.10.1 Requirements as per GG 43110 (GNR 320 of March 2020)

The Department of Forestry, Fisheries and Environment (“DFFE”) promulgated Government Notice Regulation (GNR) 320, dated 20 March 2020 as published in Government Gazette No. 43110. The Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in Terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation would be applicable to this project.

This regulation defines the requirements for undertaking a site sensitivity verification, specialist assessment and the minimum report content requirements for environmental impact where a specialist assessment is required but no protocol has been prescribed. It requires that the current land use be considered using the national web based environmental screening tool to confirm the site sensitivity available at: <https://screening.environment.gov.za>.

¹ <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

If an applicant intending to undertake an activity identified in the scope of this protocol for which a specialist assessment has been identified on the screening tool on a site identified as being of:

- "very high" sensitivity for noise, must submit a Noise Specialist Assessment; or
- "low" sensitivity for noise, must submit a Noise Compliance Statement.

On a site where the information gathered from the site sensitivity verification differs from the designation of "very high" sensitivity on the screening tool and it is found to be of a "low" sensitivity, a Noise Compliance Statement must be submitted. On a site where the information gathered from the initial site sensitivity verification differs from the designation of "low" sensitivity on the screening tool and it is found to be of a "very high" sensitivity, a Noise Specialist Assessment must be submitted.

If any part of the proposed development footprint falls within an area of "very high" sensitivity, the assessment and reporting requirements prescribed for the "very high" sensitivity apply to the entire footprint excluding linear activities for which noise impacts are associated with construction activities only and the noise levels return to the current levels after the completion of construction activities, in which case a compliance statement applies. In the context of this protocol, development footprint means the area on which the proposed development will take place and includes any area that will be disturbed.

In terms of GNR320 (of 20 March 2020), the Site Sensitivity Verification should be undertaken prior to the commencement of the Specialist assessment. The protocol states:

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a noise specialist, where the noise specialist means someone with relevant academic qualifications and with experience in the domain of acoustic assessments and noise management.
2. The site sensitivity verification must be undertaken through the use of:
 - a) a desktop analysis, using satellite imagery;
 - b) a preliminary onsite inspection; and
 - c) any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure etc.;
 - b) contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and

- c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web based Environmental Screening Tool² was used to screen the proposed site for the noise environmental sensitivity as per the requirements of Government Notice Regulation ("GNR") 320 (of 20 March 2020), considering the site location illustrated in **Figure 3-1**.

A screening report generated by the Online Screening Tool highlighted that a Noise Impact Assessment must be completed and appended to the Environmental Impact Assessment ("EIA") documentation for the project. This screening report was developed for Utilities Infrastructure => Electricity => Generation => Renewable => Wind category, with the noise sensitive areas illustrated on **Figure 3-1**. The areas defined to have a potential "**very high**" sensitivity to noise were downloaded as a layer from the online screening tool.

² <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

3 SITE SENSITIVITY VERIFICATION

A site sensitivity verification has been undertaken in accordance with GNR320 of March 2020, in order to confirm the current land use and environmental sensitivity within the potential PFA.

3.1 OUTPUT FROM NATIONAL ENVIRONMENTAL SCREENING TOOL

The site was initially assessed using the National Environmental Screening tool, available at, <https://screening.environment.gov.za>. The output from the National Online Screening tool indicates a number of areas within and up to 1,000 m from the project boundary to be considered to be of a “very high” sensitivity to noise. These potentially “very high” sensitive areas (in terms of noise) are indicated on **Figure 3-1**.

It was reported that some of the structures identified are used on a permanent or temporary basis and these locations are considered noise sensitive.

3.2 DESCRIPTION ON HOW THE SITE SENSITIVITY VERIFICATION WAS UNDERTAKEN

The site sensitivity verification was done considering:

1. Available aerial images (Google Earth ®), with images dated between 2022 and 2024;
2. Information gained during the site visit in November 2024; and
3. Discussions with the project applicant.

3.3 OUTCOME OF THE SITE SENSITIVITY VERIFICATION

Areas with a “Very High” Sensitivity to noise are indicated on **Figure 3-1**. The online screening tool identified a number of areas with a “very high” sensitivity to noise in the vicinity of the proposed development.

There are also numerous permanent or temporary residential activities within the project area. These residential activities are considered to be noise-sensitive and the areas are considered to have a “Very High” sensitivity to noise. This report agrees with this finding of the online screening tool.

Because a number of these structures are used for residential purposes and considered to be noise-sensitive, the potential impact from noise from the project should be assessed in a Noise Specialist Study.

3.4 POTENTIAL NOISE SENSITIVE RECEPTORS

Figure 3-2 illustrates generalized 500 m, 1,000 m and 2,000 m buffer zones around the area where wind turbines may be erected. Generally, noises from wind turbines³:

- could be significant within 500 m from a wind turbine, with receptors staying within 500 m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing. The significance from noise from a wind turbine located within this zone may be high and the development of wind turbines in this area is not recommended. This is recommended to be a No-Go area in terms of noise, though it should be noted that this could be as high as 800m for WTG with higher SPL;
- are normally clearly audible when between 500 and 1000m from an NSR. Depending on the layout and the sound power emission levels, the significance of the noise impact could be low to high. The wind farm layout should be carefully planned when locating wind turbines in this area, as the turbines cumulatively contribute to noise levels at the NSR. This however can only be assessed once a layout is available, together with the SPL of the selected wind turbine model. For an initial layout, it is not recommended that more than two (2) wind turbines be located closer than 1,000m from any NSR;
- may be just audible or significant, again depending on the number of wind turbines located within 2,000m from an NSR (as well as the SPL of the selected wind turbine). The significance of the noise impact could be low to medium. The wind farm layout should be carefully planned when locating wind turbines in this area, as the turbines cumulatively contribute to noise levels at the NSR. This however can only be assessed once a layout is available, together with the SPL of the selected wind turbine model. For an initial layout, it is not recommended that more than eight (8) wind turbines be located closer than 2,000m from any NSR (inclusive of those located closer than 1,000m)); and,
- Are generally of a low significance at distanced greater than 2,000m, although this again would depend on the layout, the SPL of the wind turbine as well as local meteorological conditions. There are a number of new wind turbines with sound power emission levels exceeding 110 dBA (re 1 pW) that does impact on the extent of noise impact (see also **Figure 3-4**).

³ This is subject to the design of the wind farm, as well as the sound power emission levels (re 1 pW) of the particular wind turbine used at the project

3.5 POTENTIAL NO-GO AREAS

In terms of acoustics, it is difficult to identify and recommend no-go areas or fixed buffers. This is because the potential noise levels at a specific location depend on two factors, namely:

- The project layout (as WTG within 2,500m would cumulatively increase noise levels at a conceptual receiver); and
- The SPL of the selected WTG (a quieter WTG will allow a smaller buffer than the minimum buffer required for a noisier WTG).

The combination of these two factors would determine potential noise levels at a specific point. For the screening phase it is recommended that the applicant do not locate WTG within 500m from any verified NSR. It should however be noted in cases where there are a number of WTG within 2,500m, or when using a noisier WTG, this no-go area will increase.

These preliminary no-go areas are illustrated in **Figure 3-3**.

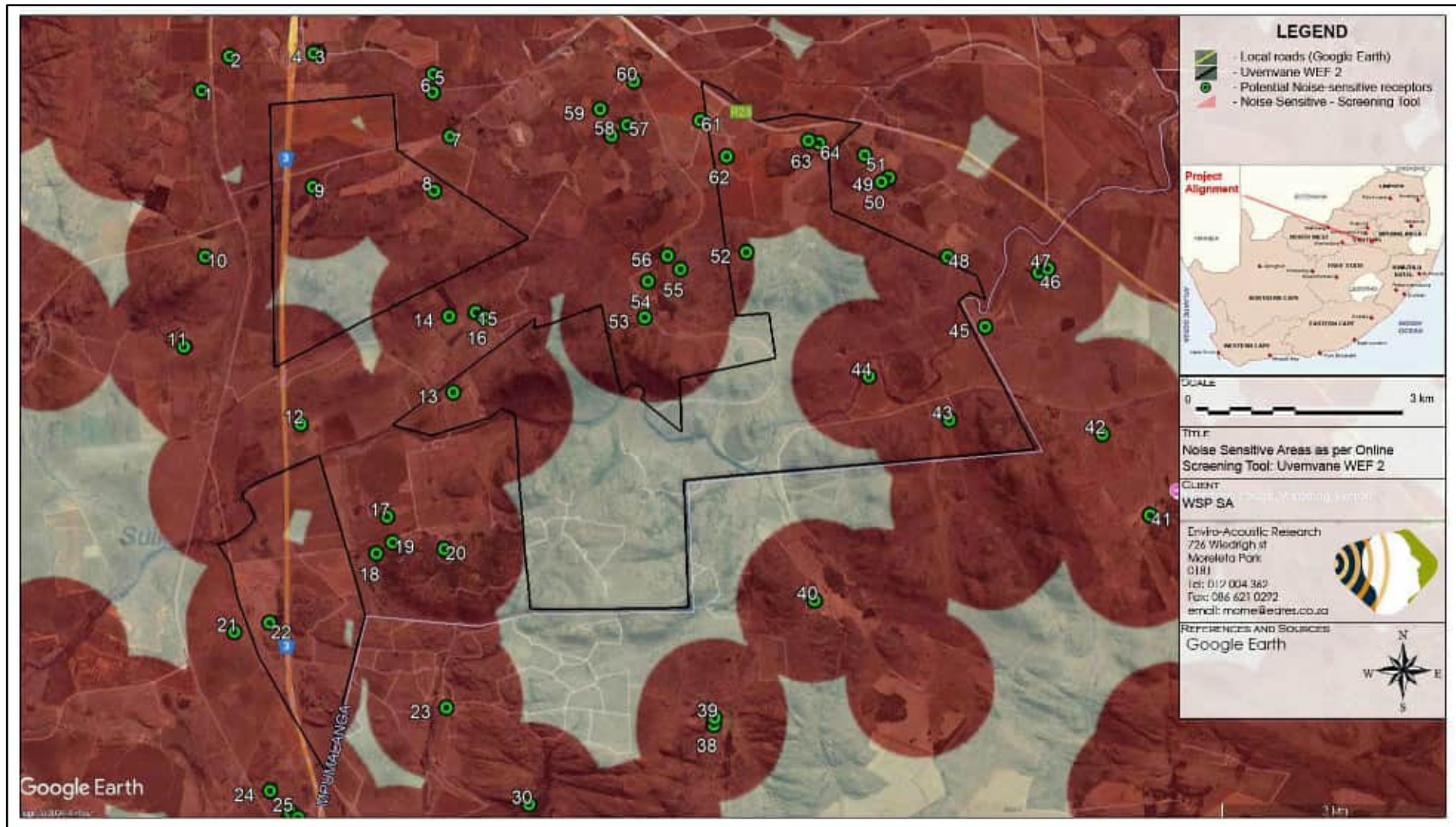


Figure 3-1: Areas identified by the online screening tool to have a “Very High” sensitivity to noise

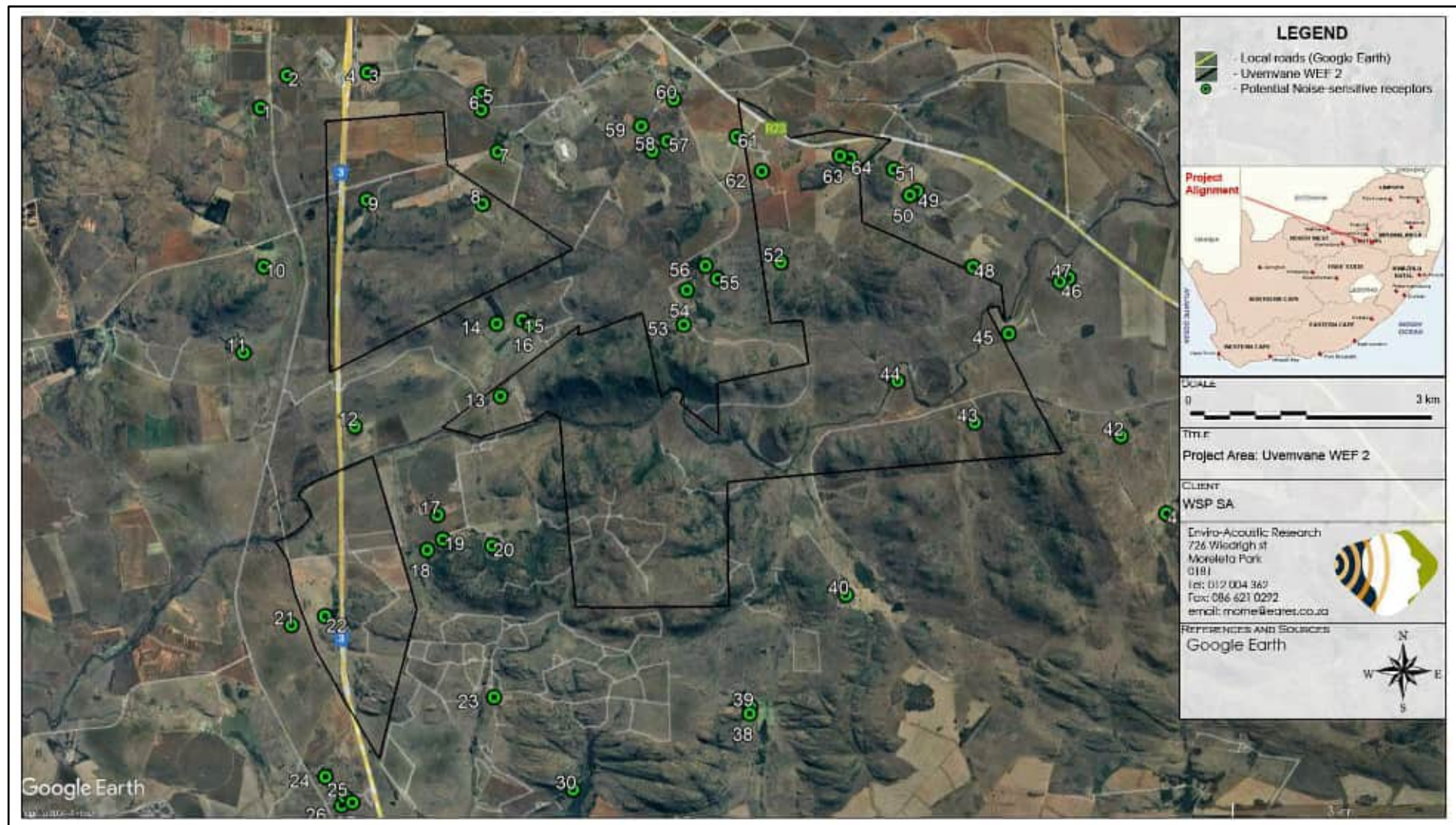


Figure 3-2: Aerial Image indicating closest Noise-sensitive developments to the Uvemvane 2 WEF project

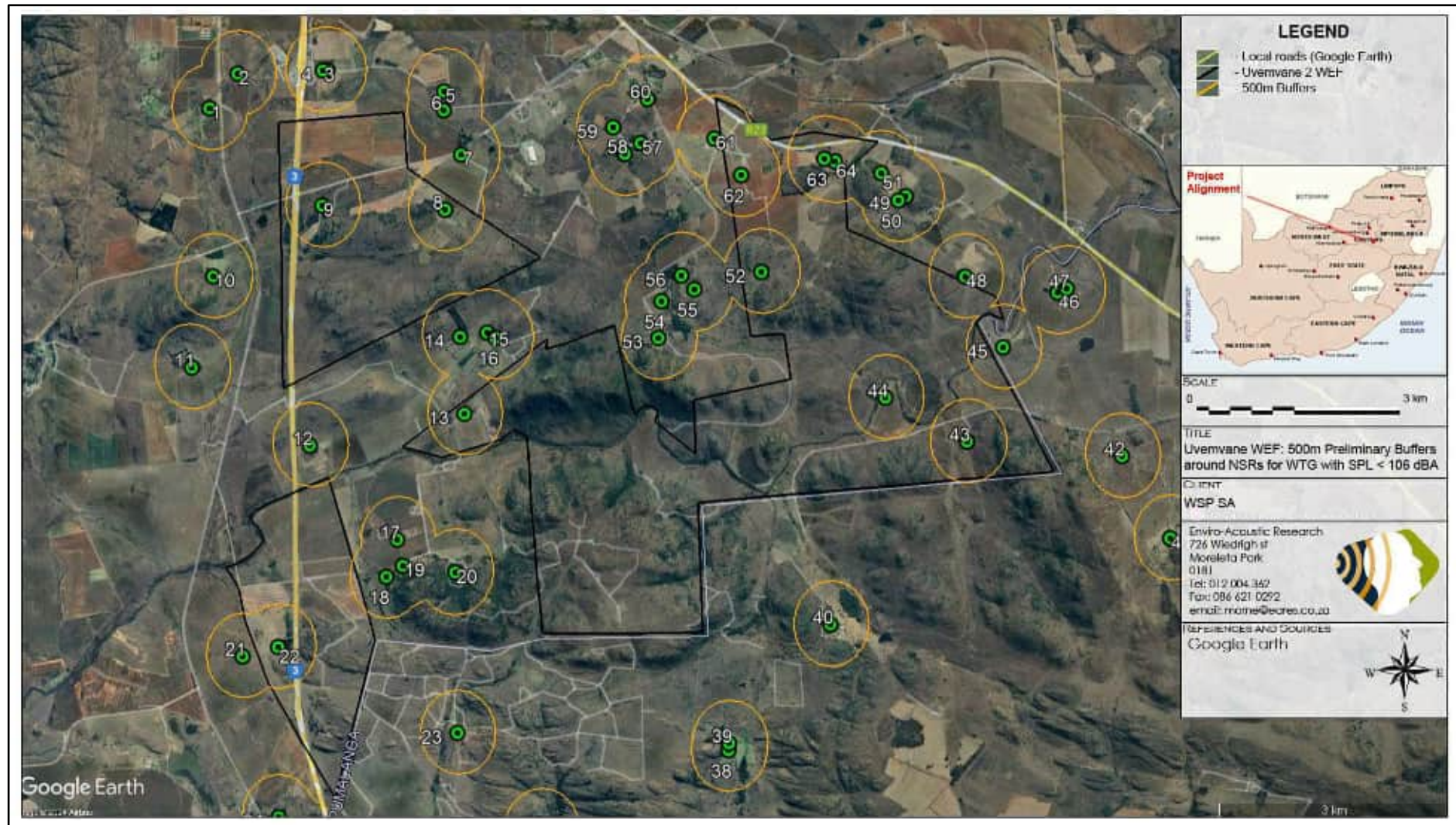


Figure 3-3: Preliminary 500m no-go Buffer

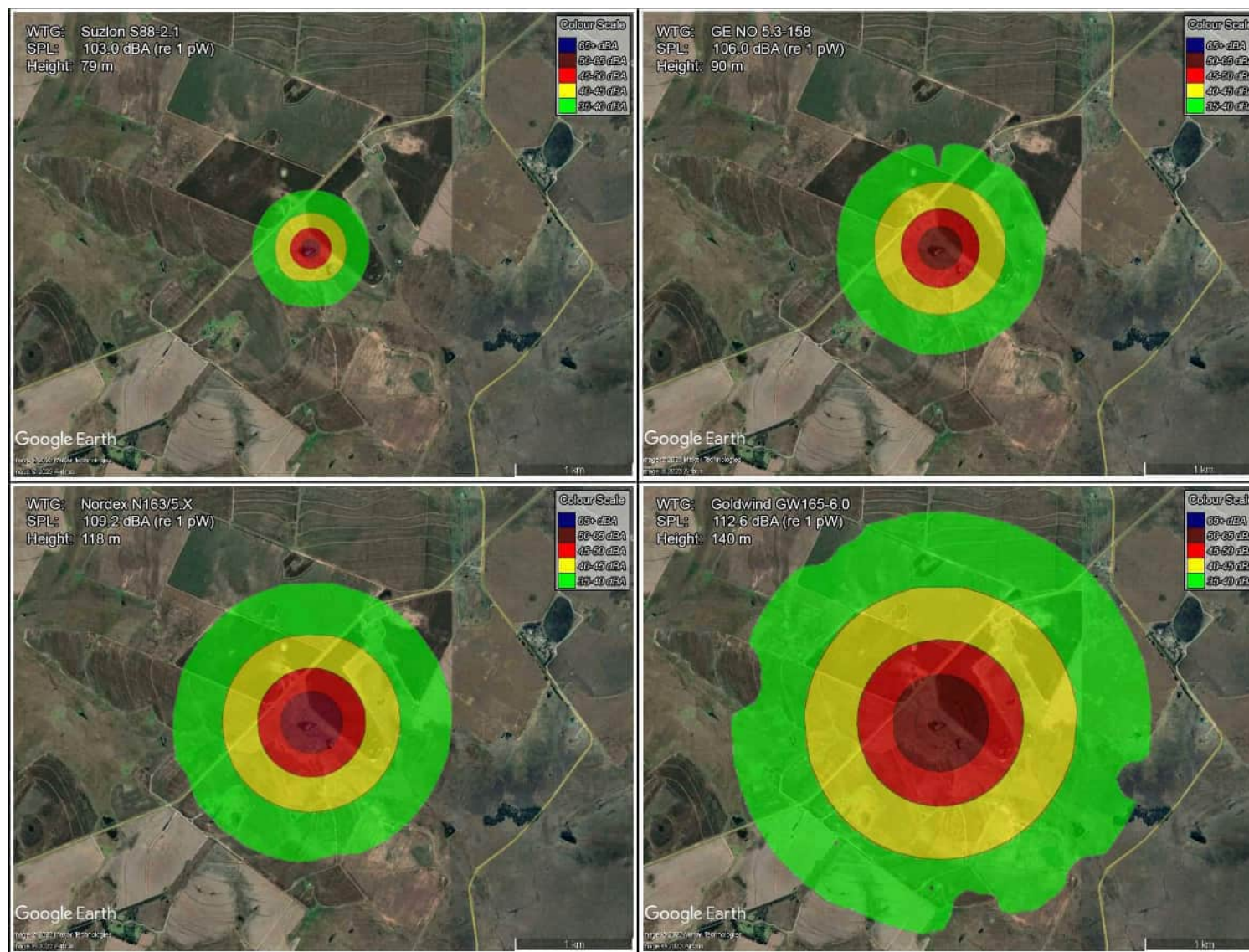


Figure 3-4: Extent of noises from different wind turbines (unmitigated, worst-case parameters)

4 TERMS OF REFERENCE FOR THE ENVIRONMENTAL NOISE IMPACT PHASE

Work that will take place during the ENIA phase is defined in section 8 of SANS 10328:2008.

4.1 PURPOSE OF THE ENVIRONMENTAL NOISE IMPACT ASSESSMENT

The purpose of an environmental noise impact investigation and assessment is to determine and quantify the acoustical impact of, or on a proposed development.

4.2 PLAN OF STUDY FOR ENVIRONMENTAL NOISE IMPACT INVESTIGATION AND ASSESSMENT

In this regard the following will be included to assist the EAP in the compilation of the Plan of Study (PoS) for the EIA:

- Data (layout and SPL of selected WTG) as received from the applicant/developer will be used to model the potential noise impact. The following information will be considered:
 - The Sound Power Emission details of a WTG that may be used at this cluster;
 - The latest WEF layouts to be assessed for the cluster;
 - The surface contours of the project focus area;
 - Surface and meteorological constants;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations.

4.3 ENVIRONMENTAL NOISE IMPACT INVESTIGATION

4.3.1 Sound emission from the identified noise sources

Sound emission data as warranted by the wind turbine manufacturer would be used to calculate the potential noise emissions from the wind turbines. In the instance that this data is unavailable, sound emission data as measured and calculated in accordance with

IEC 61400-11 (*Wind turbine generator systems – Part 11: Acoustic noise measurements techniques*) or IEC 61400-14 (*Wind turbines – Part 14: Declaration of apparent sound power levels and tonality values*) could be used.

The operating cycle and nature of the sound emission (impulsiveness, tonal character or potential low frequencies) would, where relevant, be considered when the expected rating level in the target area is calculated.

4.3.2 Determination of Rating levels

The sound propagation model defined by ISO 9613-2:1996 for both the construction and operational phases to calculate projected equivalent noise levels. Other input parameters used would include:

- Air temperature of 10 °C;
- Relative humidity of 70%;
- Appropriate ambient sound levels associated with a selected wind speed;
- Layout of the proposed facility as provided by the developer;
- Topography details;
- Height of turbine above sea level as well as height of wind turbine above surface level;
- Projected outside equivalent noise levels at Potentially Sensitive Receptors at height above sea-level (plus 4 meters for the operational phase; plus 2 m for the construction phase);
- 75% hard ground surface for the operational phase (medium ground surface for the construction phase).

4.3.3 Assessment of the noise impact: No mitigation

The significance will be determined considering the defined magnitude of the noise level, the extent as well as the duration of the projected noise impact, as well as the probability that this impact may take place.

The magnitude of the noise impact will be assessed by considering:

- The total projected cumulative noise level compared to the appropriate acceptable rating levels as defined in Table 2 of SANS 10103:2008;
- The potential community response from Table 5 of SANS 10103:2008. In addition, other relevant and suitable literature may be consulted as defined in the scoping report. In particular the likely ambient sound levels due to wind induced noises will be estimated at the wind speed under investigation and considered; and
- The likely and projected ambient sound levels.

Likely ambient sound levels associated with wind speeds as well as the projected change in ambient sound levels would also be considered when estimating the probability that a NSR may be impacted by increased noise levels.

4.3.4 Assessment of the noise impact: With Implementation of Mitigation

Should the significance of the impact be medium or high, the potential significance will be estimated considering that the developer would be implementing reasonable mitigation measures. Potential viable mitigation measures will be included.

4.4 ENVIRONMENTAL NOISE IMPACT REPORT

The Environmental Noise Impact Report will cover the following points:

- the purpose of the investigation;
- a brief description of the planned development or the changes that are being considered;
- a brief description of the existing environment including, where relevant, the topography, surface conditions and meteorological conditions during measurements;
- 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;
- the identified noise sources that were not taken into account and the reasons as to why they were not investigated;
- the identified Potentially Sensitive Receptors and the noise impact on them;
- where applicable, any assumptions, with references, made with regard to any calculations or determination of source and propagation characteristics;
- 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;
- 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;
- the location of measuring or calculating points in a sketch or on a map;

- quantification of the noise impact with, where relevant, reference to the literature consulted and the assumptions made;
- alternatives that were considered and the results of those that were investigated;
- a list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation (if comments are received);
- 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 (if comments are received);
- conclusions that were reached;
- proposed recommendations including potential mitigation measures;
- 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.

5 CONCLUSIONS AND RECOMMENDATIONS

This report is a site sensitivity verification for the proposed Uvemvane 2 WEF near Balfour, specifically focusing on noise.

This assessment confirms that there are numerous areas that can be considered to have a “very high” sensitivity to noise within, and close to the project boundary. This site sensitivity verification therefore agrees with the findings of the online screening tool.

Due to the “very high” sensitivity of the area to noise, further study is required and it is recommended that a full Environmental Noise Impact Assessment study be conducted for the Uvemvane 2 WEF.



Francois de Vries

Enviro-Acoustic Research cc

APPENDIX A

Resume of Author

Author:

Francois started his career at M² Environmental Connections (Pty) Ltd (Menco) as part of his work integrated learning subject that forms part of the curriculum at Tshwane University of Technology. Initially he worked mainly in the water monitoring unit at Menco mainly doing fieldwork to collect water samples and writing water monitoring reports.

An opportunity presented itself at Enviro-Acoustic Research cc to start training in acoustics and the measurement of ambient sound and noise levels. Since 2018 he has conducted the fieldwork to do ambient noise/sound level measurements for various projects in the mining, industrial, business and renewable energy sectors as well as the writing of acoustical measurement reports for the mentioned sectors. He has been involved in the planning of the site visits to ensure compliance to the applicable regulations. As part of the groundwork to conduct noise impact assessments he has completed several site sensitivity verification reports based on information obtained from physical site visits.

He has been involved in several noise complaint investigations which include developing a suitable approach, obtaining the data and writing the associated report. He is currently being trained to conduct full Noise Impact Assessments.

Fieldwork Wind Energy Facilities

Gouda (Aurecon SA), De Aar (Mulilo), Karee (ARCUS), Kap Vley (CSIR), Kuruman (CSIR), Beaufort West (SiVest), Koup 1 (SiVEST), Koup 2 (SiVEST), Hendrina North (Cabanga), Hendrina South (Cabanga), Jessa M, S and Z cluster of Wind Farms (SLR), Heuweltjies (SiVEST), Kraaltjies (SiVEST), Ngxwabangu (CESNET), Taaibos North (CESNET), Taaibos South (CESNET), Soutrivier North (CESNET), Soutrivier South (CESNET), Soutrivier Central (CESNET), Soyuz 1 (AEP/CESNET), Soyuz 2 (AEP/CESNET), Soyuz 3 (AEP/CESNET), Soyuz 4 (AEP/CESNET), Soyuz 5 (AEP/CESNET), Soyuz 6 (AEP/CESNET), Kaladokhwe 1 (AEP/CSIR), FE Red Sands North East (Enviro-Insight), FE Red Sands South West (Enviro-Insight), FE Red Sands North West (Enviro-Insight), FE Red Sands South East (Enviro-Insight), FE De Rust North (Enviro-Insight), FE De Rust South (Enviro-Insight), Aberdene 1 (AEP/SE), Aberdene 2 (AEP/SE), Aberdene 3 (AEP/SE), Ezelsjacht (SLR)

Fieldwork Mining and Industry	<i>TwEEfontein Colliery (Cleanstream Environmental), Hammanskraal Billeting Plant 1 and 2 (Unica), Doornhoek Fluorspar Project (Exigo), Lehlabile Colliery (Jaco-K Consulting), Waltloo Power Generation Project (EScience), Zandheuvél (Exigo), Dunbar (Enviro-Insight), Eland Platinum Mine (JEMS), Salene Manganese (Prescali), Baberton Gas to Power (Rayten), SISHEN Expansion (Shangoni), Goedgevonden EMP Amendment (Jacana), Rietkol Amendment (Jacana), Vlakfontein Bunker Project (Gudani), Vlakfontein West Project (Gudani), Vygenhoek Platinum (EMAssistance), Lesego Amendment (OMI Solutions), Mpenyisi Gas to Power (Nsovo), Basani Gas to Power (Nsovo), Newlands Gas to Power (Savannah), Sudor Coal (JacoK), Ermelo Project (Zyntha), (Schurvekop Coal (Cabanga), Vlakfontein Coal (EMAssistance), Zandheuvél (Jacana), Zondagsvlei Coal (Zyntha), Sereti Witbank South (Zyntha), Bright Alloys (Phakani), Gold One (Prime Resources), Consol Nigel (Zitholele), Hendrina Green Hydrogen and Ammonia project (Enertrag/WSP)</i>
Urban, Roads and Railway	<i>Brackenfell project (Linspace), Isando (Linspace), Samrand (Linspace), Highbury Depot (AGES Limpopo), Mokopane project (AGES Limpopo)</i>
Noise Monitoring and Acoustic Reports	<i>Sephaku Delmas (AGES & Exigo), Sephaku Aganang (Exigo), Rappa Resources (Rayten), Mamba Cement (Exigo), Nokeng Fluorspar (Exigo), Twisdraai Colliery (Lefatshe Minerals), South32 Klipspruit (Rayten), Sibanye Stillwater Kroondal (Rayten), Rooiberg Asphalt (Rooiberg Asphalt), SASOL Shondoni (Lefatshe), SASOL Twisdraai (Lefatshe), Glencore Impunzi (Cleanstream), Black Chrome Mine (Prescali) Rietvlei Colliery (Jaco-K Consulting), TCTA – MCWAP-2 Project (GIBB), Various (Linspace), Sulzer Hydromining (Sulzer), Great Kei (EDF-Renewables), Elands Platinum (JEMS), Hartebeest WEF (juwi), Mamba Cement (TMCC), Booyens (MDTE), West Rand (MDTE), Devland (MDTE)</i>

Reviewer:

The reviewer started his career in the mining industry as a bursar Learner Official (JCI, Randfontein), working in the mining industry, doing various mining related courses (Rock Mechanics, Surveying, Sampling, Safety and Health [Ventilation, noise, illumination etc.] and Metallurgy. He did work in both underground (Coal, Gold and Platinum) as well as opencast (Coal) for 4 years. He changed course from Mining Engineering to Chemical Engineering after his second year of his studies at the University of Pretoria.

After graduation he worked as a Water Pollution Control Officer at the Department of Water Affairs and Forestry for two years (first year seconded from Wates, Meiring and Barnard), where duties included the perusal (evaluation, commenting and recommendation) of various regulatory required documents (such as EMPR's, Water Use License Applications and EIA's), auditing of license conditions as well as the compilation of Technical Documents.

Since leaving the Department of Water Affairs, Morné has been in private consulting for the last 20 years, managing various projects for the mining and industrial sector, private developers, business, other environmental consulting firms as well as the Department of Water Affairs. During that period he has been involved in various projects, either as specialist, consultant, trainer or project manager, successfully completing these projects within budget and timeframe. During that period he gradually moved towards environmental acoustics, focusing on this field exclusively since 2007.

He has been interested in acoustics as from school days, doing projects mainly related to loudspeaker design. Interest in the matter brought him into the field of Environmental Noise Measurement, Prediction and Control as well as blasting impacts. Since 2007 he has completed more than 300 Environmental Noise Impact Assessments, numerous Noise Monitoring Reports as well as various acoustic consulting services, including amongst others:

Wind Energy Facilities	<p><i>Full Environmental Noise Impact Assessments for - Bannf (Vidigenix), iNca Gouda (Aurecon SA), Isivunguvungu (Aurecon), De Aar (Aurecon), Kokerboom 1 (Aurecon), Kokerboom 2 (Aurecon), Kokerboom 3 (Aurecon), Kangnas (Aurecon), Plateau East and West (Aurecon), Wolf (Aurecon), Outeniqua (Aurecon), Umsinde Emoyeni (ARCUS), Komsberg (ARCUS), Karee (ARCUS), Kolkies (ARCUS), San Kraal (ARCUS), Phezukomoya (ARCUS), Canyon Springs (Canyon Springs), Perdekraal (ERM), Scarlet Ibis (CESNET), Albany (CESNET), Sutherland (CSIR), Kap Vley (CSIR), Kuruman (CSIR), Rietrug (CSIR), Sutherland 2 (CSIR), Perdekraal (ERM), Teekloof (Mainstream), Eskom Aberdene (SE), Dorper (SE), Spreeukloof (SE), Loperberg (SE), Penhoek Pass (SE), Amakhala Emoyeni (SE), Zen (Savannah Environmental – SE), Goereesoe (SE), Springfontein (SE), Garob (SE), Project Blue (SE), ESKOM Kleinzee (SE), Namas (SE), Zonnequa (SE), Walker Bay (SE), Oyster Bay (SE), Hidden Valley (SE), Deep River (SE), Tsitsikamma (SE), AB (SE), West Coast One (SE), Hopefield II (SE), Namakwa Sands (SE), VentuSA Gouda (SE), Dorper (SE), Klipheuvel (SE), INCA Swellendam (SE), Cookhouse (SE), Iziduli (SE), Msenge (SE), Cookhouse II (SE), Rheboksfontein (SE), Suurplaat (SE), Karoo Renewables (SE), Koningaas (SE), Spitskop (SE), Castle (SE), Khai Ma (SE), Poortjies (SE), Korana (SE),</i></p>
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	<i>IE Moorreesburg (SE), Gunstfontein (SE), Boulders (SE), Vredenburg (Terramanzi), Loeriesfontein (SiVEST), Rhenosterberg (SiVEST), Noupoot (SiVEST), Prieska (SiVEST), Dwarsrug (SiVEST), Graskoppies (SiVEST), Philco (SiVEST), Hartebeest Leegte (SiVEST), Ithemba (SiVEST), !Xha Boom (SiVEST), Spitskop West (Terramanzi), Haga Haga (Terramanzi), Vredenburg (Terramanzi), Msenge Emoyeni (Windlab), Wobben (IWP), Trakas (SiVest), Beaufort West (SiVest)</i>
Mining and Industry	<i>Full Environmental Noise Impact Assessments for – Delft Sand (AGES), BECSA – Middelburg (Golder Associates), Kromkrans Colliery (Geovicon Environmental), SASOL Borrow Pits Project (JMA Consulting), Lesego Platinum (AGES), Tweefontein Colliery (Cleanstream Environmental), Evraz Vametco Mine and Plant (JMA), Goedeheop Colliery (Geovicon), Hacra Project (Prescali Environmental), Der Brochen Platinum Project (J9 Environment), Brandbach Sand (AGES), Verkeerdepan Extension (CleanStream Environmental), Dwaalboom Limestone (AGES), Jagdlust Chrome (MENCO), WPB Coal (MENCO), Landau Expansion (CleanStream Environmental), Otjikoto Gold (AurexGold), Klipfontein Colliery (MENCO), Imbabala Coal (MENCO), ATCOM East Expansion (Jones and Wagner), IPP Waterberg Power Station (SE), Kangra Coal (ERM), Schoongesicht (CleanStream Environmental), EastPlats (CleanStream Environmental), Chapudi Coal (Jacana Environmental), Generaal Coal (JE), Mopane Coal (JE), Glencore Boshoeck Chrome (JMA), Langpan Chrome (PE), Vlakpoort Chrome (PE), Sekoko Coal (SE), Frankford Power (REMIG), Strahrae Coal (Ferret Mining), Transalloys Power Station (Savannah), Pan Palladum Smelter, Iron and PGM Complex (Prescali Environmental), Fumani Gold (AGES), Leiden Coal (EIMS), Colenso Coal and Power Station (SiVEST/EcoPartners), Klippoortjie Coal (Gudani), Rietspruit Crushers (MENCO), Assen Iron (Tshikovha), Transalloys (SE), ESKOM Ankerlig (SE), Nooitgedacht Titano Project (EcoPartners), Algoa Oil Well (EIMS), Spitskop Chrome (EMAssistance), Vlakfontein South (Gudani), Leandra Coal (Jacana), Grazvalley and Zoetveld (Prescali), Tjate Chrome (Prescali), Langpan Chromite (Prescali), Vereeniging Recycling (Pro Roof), Meyerton Recycling (Pro Roof), Hammanskraal Billeting Plant 1 and 2 (Unica), Development of Altona Furnace, Limpopo Province (Prescali Environmental), Haakdoornrdrift Opencast at Amandelbult Platinum (Aurecon), Landau Dragline relocation (Aurecon), Stuart Coal Opencast (CleanStream Environmental), Tetra4 Gas Field Development (EIMS), Kao Diamonds – Tipping Village Relocation (EIMS), Kao Diamonds – West Valley Tailings Deposit (EIMS), Upington Special Economic Zone (EOH), Arcellor Mittal CCGT Project near Saldanha (ERM), Malawi Sugar Mill Project (ERM), Proposed Mooifontein Colliery (Geovicon Environmental), Goedeheop North Residue Deposit Expansion (Geovicon Environmental), Mutsho 600MW Coal-Fired Power Plant (Jacana Environmentals), Tshivhaso Coal-Fired Power Plant (Savannah Environmental), Doornhoek Fluorspar Project (Exigo), Royal Sheba Project (Cabanga Environmental), Rietkol Silica (Jacana), Gruisfontein Colliery (Jacana), Lehlabile Colliery (Jaco-K Consulting), Bloemendal Colliery (Enviro-Insight), Rondevly Colliery (REC), Welgedacht Colliery (REC), Kalabasfontein Extension (EIMS), Waltloo Power Generation Project (EScience), Buffalo Colliery (Marang), Balgarthen Colliery (Rayten), Kusipongo Block C (Rayten), Zandheuvel (Exigo), NamPower Walvis Bay (GPT), Eloff Phase 3 (EIMS), Dunbar (Enviro-Insight), Smokey Hills (Prescali), Bierspruit (Aurecon)</i>
Road and Railway	<i>K220 Road Extension (Urbansmart), Boskop Road (MTO), Sekoko Mining (AGES), Davel-Swaziland-Richards Bay Rail Link (Aurecon), Moloto Transport Corridor Status Quo Report and Pre-Feasibility (SiVEST), Postmasburg Housing Development (SE), Tshwane Rapid Transport Project, Phase 1 and 2 (NRM Consulting/City of Tshwane), Transnet Apies-river Bridge Upgrade (Transnet), Gautrain Due-diligence (SiVest), N2 Piet Retief (SANRAL), Atterbury Extension, CoT (Bokomoso Environmental), Riverfarm Development (Terramanzi), Conakry to Kindia Toll Road (Rayten)</i>
Airport	<i>Oudtshoorn Noise Monitoring (AGES), Sandton Heliport (Alpine Aviation), Tete Airport Scoping (Aurecon)</i>
Noise monitoring and Audit Reports	<i>Peerboom Colliery (EcoPartners), Thabametsi (Digby Wells), Doxa Deo (Doxa Deo), Harties Dredging (Rand Water), Xstrata Coal – Witbank Regional (Xstrata), Sephaku Delmas (AGES), Amakhala Emoyeni WEF (Windlab Developments), Oyster Bay WEF (Renewable Energy Systems), Tsitsikamma WEF Ambient Sound Level study (Cennerg and SE), Hopefield WEF (Umoya), Wesley WEF (Innowind), Ncora WEF (Innowind), Boschmanspoort (Jones and Wagner), Nqamakwe WEF (Innowind), Hopefield WEF Noise Analysis (Umoya), Dassiesfontein WEF Noise Analysis (BioTherm), Transnet Noise Analysis (Aurecon), Jeffries Bay Wind Farm (Globeleq), Sephaku Aganang (Exigo), Sephaku Delmas (Exigo), Beira Audit (BP/GPT), Nacala Audit (BP/GPT), NATREF (Nemai), Rappa Resources (Rayten), Measurement Report for Sephaku Delmas (Ages), Measurement Report for Sephaku Aganang (Ages), Bank of Botswana measurements (Linnospace), Skukuza Noise Measurements (Concor), Development noise measurement protocol for Mamba Cement (Exigo),</i>

	Measurement Report for Mamba Cement (Exigo), Measurement Report for Nokeng Fluorspar (Exigo), Tsitsikamma Community Wind Farm Pre-operation sound measurements (Cennergi), Waainek WEF Operational Noise Measurements (Innowind), Sedibeng Brewery Noise Measurements (MENCO), Tsitsikamma Community Wind Farm Operational noise measurements (Cennergi), Noupoot Wind Farm Operational noise measurements (Mainstream), Twisdraai Colliery (Lefatshe Minerals), SASOL Prospecting (Lefatshe Minerals), South32 Klipspruit (Rayten), Sibanye Stillwater Kroondal (Rayten), Rooiberg Asphalt (Rooiberg Asphalt), SASOL Shondoni (Lefatshe), SASOL Twisdraai (Lefatshe), Anglo Mototolo (Exigo), Heineken Inyaniga (AECOM), Glencore Izimbiwa (Cleanstream) Glencore Impunzi (Cleanstream), Black Chrome Mine (Prescali) Sibanye Stillwater Ezulwini (Aurecon), Sibanye Stillwater Beatrix (Aurecon), Bank of Botswana (Linspace), Lakeside (Linspace), Skukuza (SiVest), Rietvlei Colliery (Jaco-K Consulting)
Small Noise Impact Assessments	TCTA AMD Project Baseline (AECOM), NATREF (Nemai Consulting), Christian Life Church (UrbanSmart), Kosmosdale (UrbanSmart), Louwardia K220 (UrbanSmart), Richards Bay Port Expansion (AECOM), Babalegi Steel Recycling (AGES), Safika Slag Milling Plant (AGES), Arcelor Mittal WEF (Aurecon), RVM Hydroplant (Aurecon), Grootvlei PS Oil Storage (SiVEST), Rhenosterberg WEF, (SiVEST), Concerto Estate (BPTrust), Ekuseni Youth Centre (MENCO), Kranskop Industrial Park (Cape South Developments), Pretoria Central Mosque (Noman Shaikh), Soshanguve Development (Maluleke Investments), Seshogo-D Waste Disposal (Enviroxcellence), Zambesi Safari Equipment (Owner), Noise Annoyance Assessment due to the Operation of the Gautrain (Thornhill and Lakeside Residential Estate), Upington Solar (SE), Ilangaletu Solar (SE), Pofadder Solar (SE), Flagging Trees WEF (SE), Uyekraal WEF (SE), Ruuki Power Station (SE), Richards Bay Port Expansion 2 (AECOM), Babalegi Steel Recycling (AGES), Safika Ladium (AGES), Safika Cement Isando (AGES), RareCo (SE), Struisbaai WEF (SE), Perdekraal WEF (ERM), Kotula Tsatsi Energy (SE), Olievenhoutbosch Township (Nali), , HDMS Project (AECOM), Quarry extensions near Ermelo (Rietspruit Crushers), Proposed uMzimkhulu Landfill in KZN (nZingwe Consultancy), Linksfield Residential Development (Bokomoso Environmental), Rooihuiskraal Ext. Residential Development, CoT (Plandev Town Planners), Floating Power Plant and LNG Import Facility, Richards Bay (ERM), Floating Power Plant project, Saldanha (ERM), Vopak Growth 4 project (ERM), Elandspoort Ext 3 Residential Development (Gibb Engineering), Tiegerpoort Wedding Venue (Henwood Environmental), Monavoni Development (Marindzini), Rezoning of Portion 1 (Primo Properties), Tswaing Mega City (Makole), Mabopane Church (EP Architects), ERGO Soweto Cluster (Kongiwe), Fabio Chains (Marang), GIDZ JMP (Marang), Temple Complex (KWP Create), Germiston Metals (Dorean), Sebenza Metals (Dorean)
Project reviews and amendment reports	Loperberg (Savannah), Dorper (Savannah), Penhoek Pass (Savannah), Oyster Bay (RES), Tsitsikamma Community Wind Farm Noise Simulation project (Cennergi), Amakhala Emoyeni (Windlab), Spreeukloof (Savannah), Spinning Head (SE), Kangra Coal (ERM), West Coast One (Moyeng Energy), Rheboksfontein (Moyeng Energy), De Aar WEF (Holland), Quarterly Measurement Reports – Dangote Delmas (Exigo), Quarterly Measurement Reports – Dangote Lichtenburg (Exigo), Quarterly Measurement Reports – Mamba Cement (Exigo), Quarterly Measurement Reports – Dangote Delmas (Exigo) Quarterly Measurement Reports – Nokeng Fluorspar (Exigo), Proton Energy Limited Nigeria (ERM), Hartebeest WEF Update (Moorreesburg) (Savannah Environmental), Modderfontein WEF Opinion (Terramanzi), IPD Vredenburg WEF (IPD Power Vredenburg), Paul Puts WEF (ARCUS), Juno WEF (ARCUS), etc.

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Appendix C.9

TRAFFIC SSVR



PROPOSED ABO UVEMVANE WIND ENERGY FACILITY 1

MPUMALANGA PROVINCE

Traffic Impact Assessment

October 2025
Draft 02

Prepared by:

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ANNEXURES

Annexure A: Specialist Expertise

Annexure B: Specialist Statement of Independence

Annexure C: Impact Assessment Methodology

LIST OF ACRONYMS

Acronym	Definition
BESS	Battery Energy Storage System
CBD	Central Business District
COTO	Committee of Transport Officials
CPD	Continued Professional Development
DFFE	Department of Forestry, Fisheries and the Environment
EAP	Environmental Assessment Practitioner
ECSA	Engineering Council of South Africa
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GNR	Government Notice Regulation
ha	Hectare(s)
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
km	Kilometer
km/h	Kilometers per Hour
kV	Kilovolt
LDV	Light Differential Vehicle
Li-ion	Lithium Ion
LILO	Loop in Loop out
LPS	Lightning Protection System
LV	Low Voltage
m	Meters
MTS	Main Transmission Substation
MW	Megawatts
MV	Medium Voltage
MWh	Megawatts Hour
NaS	Sodium Sulphur
NLTA	National Land Transport Act
NMT	Non-Motorised Transportation
O&M	Operations and Maintenance
OHL	Overhead Line
PV	Photovoltaic
RAMS	Road Asset Management System
RISFSA	Road Infrastructure Strategic Framework for South Africa
SANRAL	South African National Road Agency
SANS	South African National Standards
SARTSM	South African Road Traffic Signs Manual
SIP	Strategic Integrated Project
SS	Substation
TMH	Technical Methods for Highways
TRH	Technical Recommendations for Highways
WEF	Wind Energy Facility



EXECUTIVE SUMMARY

This report serves as the Traffic Impact Assessment (TIA) aimed at determining the traffic impact of the proposed up to 240 MWac Uvemvane Wind Energy Facility 1 ('Uvemvane WEF 1') and its associated grid infrastructure.

The Uvemvane WEF 1 will include associated infrastructure, i.e., grid and battery energy storage system (BESS) and be located across land parcels between the towns of Balfour and Heidelberg in the Mpumalanga Province. It is planned to accommodate up to 30 wind turbines including the associated support structures and facilities to allow for the generation and evacuation of electricity.

Feasible accessibility of the site was investigated in line with required sight lines, access spacing and gradients. Where sight line issues have been noted, it is recommended that the sight lines be improved to improve road safety (i.e., allowing for a setback distance that will remain clear of vegetation and obstructions).

It is expected that non-motorised transportation (NMT) is an important mode of transportation in the environment of the site, together with private cars and minibus/taxis. Typically, the appointed contractor of a renewable energy project will provide shuttle buses or similar for workers to be picked up at pre-arranged pick up points during the construction phase.

The highest trip generator for the site is expected to be the construction phase. The exact construction stage peak hour trips are dependent on the construction period, construction programming, material availability, component delivery, abnormal load permitting etc. The decommissioning phase is expected to generate similar, if not slightly less, trips as the construction phase.

For the construction and decommissioning phases, the impacts expected to be generated by the vehicle trips are an increase in traffic and related possible delays and safety issues and the associated noise and dust pollution, as well as potential damage to road surfaces caused by construction vehicles. Based on the high-level screening of impacts and including mitigation measures, the site is expected to have a low impact during the construction and decommissioning stage.

The traffic impact during the operational phase is considered low.

1 INTRODUCTION

1.1 Project Description

ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd proposes the development of the ABO Uvemvane Wind Energy Facility 1 (WEF 1), a commercial wind energy generation facility comprising up to 30 turbines and with a total generation capacity of up to 240 MWac in capacity, as well as associated infrastructure.

The project site is located approximately 9km west of the town of Balfour in the Mpumalanga Province in the Dipaleseng Local Municipality within the Gert Sibande District Municipality and approximately 14km south-east of the town Heidelberg in the Gauteng Province in the Lesedi Local Municipality within the Sedibeng District Municipality (see **Figure 1-1**).

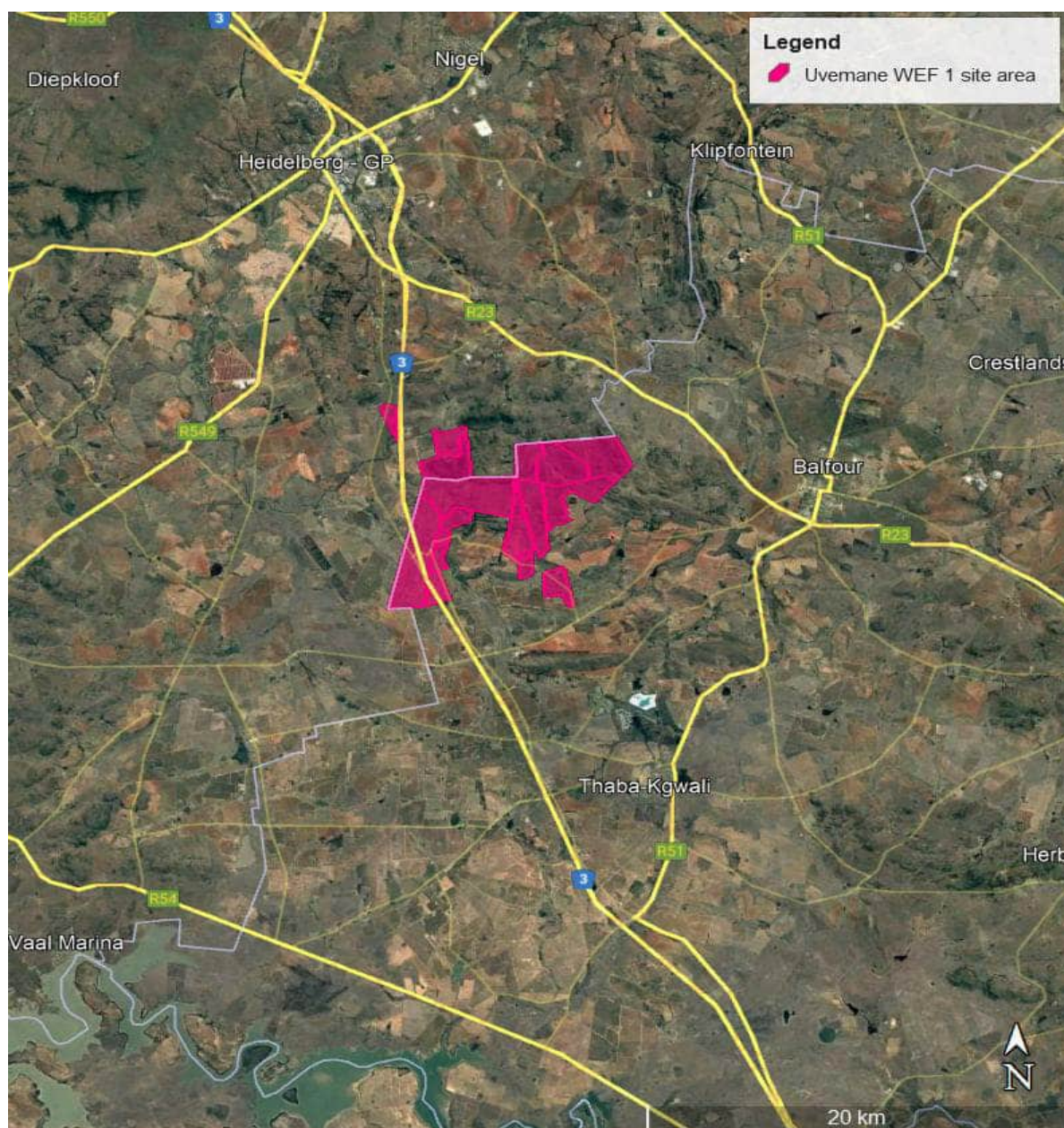


Figure 1-1: Aerial View of the Uvemvane WEF 1 project site

The project site extent will cover the following affected farm properties:

- Remaining Extent of Portion 4 of the Farm De Hoek 411
- The Farm Orion No 413
- Portion 7 of the Farm Driefontein 405
- Remaining Extent of Portion 1 of the Farm Driefontein 405
- Portion 5 (a Portion of Portion 1) of the Farm Driefontein 405
- Remaining Extent of Portion 9 of the Farm Malanskraal No 407
- Remaining Extent of Portion 2 of the Farm Malanskraal Number 407
- Portion 12 (a Portion of Portion 2) of the Farm Malanskraal Number 407
- Remaining Extent of Portion 2 of the Farm Driefontein Number 405
- Remaining Extent of the Farm Driefontein 405
- Remainder of Portion 6 (Kingsmead) of the Farm Malanskraal 407
- Portion 17 (a Portion of Portion 8) of the Farm Malanskraal No 407
- Portion 16 (a Portion of Portion 4) of the Farm Malanskraal No 407
- Remainder of Portion 18 (a Portion of Portion 3) of the Farm Malanskraal 407
- Portion 20 (a Portion of Portion 13) of the Farm Malanskraal 407
- Remaining Extent of Portion 13 (a Portion of Portion 2) of the Farm Malanskraal 407
- Portion 1 of the Farm Weltevreden No 449
- Farm Bothas Spruit Nr. 404
- The Remaining Extent of Portion 2 of the Farm Lagerspoort Number 406
- Portion 17 of the Farm Lagerspoort Number 406
- Portion 24 (a portion of Portion 23) of the Farm Steynskraal 399
- Remaining Extent of Portion 4 of the Farm Steynskraal 399
- Remaining Extent of Portion 2 of the Farm Modderfontein 410
- Portion 7 of the Farm Lagerspoort Number 406
- Portion 35 of the Farm Lagerspoort 406
- Portion 15 of the Farm Lagerspoort 406
- Remaining Extent of Portion 5 of the Farm Lagerspoort 406
- Portion 32 (a Portion of Portion 5) of the Farm Lagerspoort Nr 406
- Remaining Extent of Portion 1 of the Farm Steynskraal 399
- Portion 25 (a Portion of Portion 11) of the Farm Steynskraal 399
- Remaining Extent of Portion 11 (a Portion of Portion 1) of the Farm Steynskraal 399

The project details for the Uvemvane WEF 1 and associated infrastructure are summarized in **Table 1-1**.

Table 1-1: Project information

Facility Name:	ABO Uvemvane Wind Energy Facility 1 (Uvemvane WEF 1)
Applicant:	ABO Uvemvane Wind Energy Facility 1 (Pty) Ltd
Location:	Between Balfour and Heidelberg (Mpumalanga Province)
Affected Farms:	See above
Site Extent:	~8 200 ha
Development Footprint:	~128 ha