Mulilo De Aar PV: 9.99 MW Auxiliary Generator

Draft Motivational Report in support of a Part 2 Environmental Amendment Application

DEFF Ref Nr: 12/12/20/2499

February 2021

Applicant

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LANDSCAPE DYNAMICS

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CHAPTER 1: PROJECT INFORMATION

1.1 Background and Locality

An Environmental Authorisation (EA) was issued for the construction of the **100 MW Mulilo De Aar Photovoltaic Energy Plant** ("The solar PV project") on the farm Badenhorst Dam on the Remainder of Portion 1 of the Farm De Aar No 180 in the Emthanjeni Municipality in De Aar, Northern Cape province. The approved site is 225 hectares in extent.

The EA was issued to Mulilo De Aar PV (Pty) Ltd on 9 July 2012 with reference number 12/12/20/2499. The EA was subsequently amended as follows:

- 12/12/20/2499AM1 on 28 September 2012
- 12/12/20/2499AM2 on 8 March 2013
- 12/12/20/2499AM3 on 15 April 2015
- 12/12/20/2499AM4 on 6 April 2017
- 12/12/20/2499AM5 on 9 July 2020

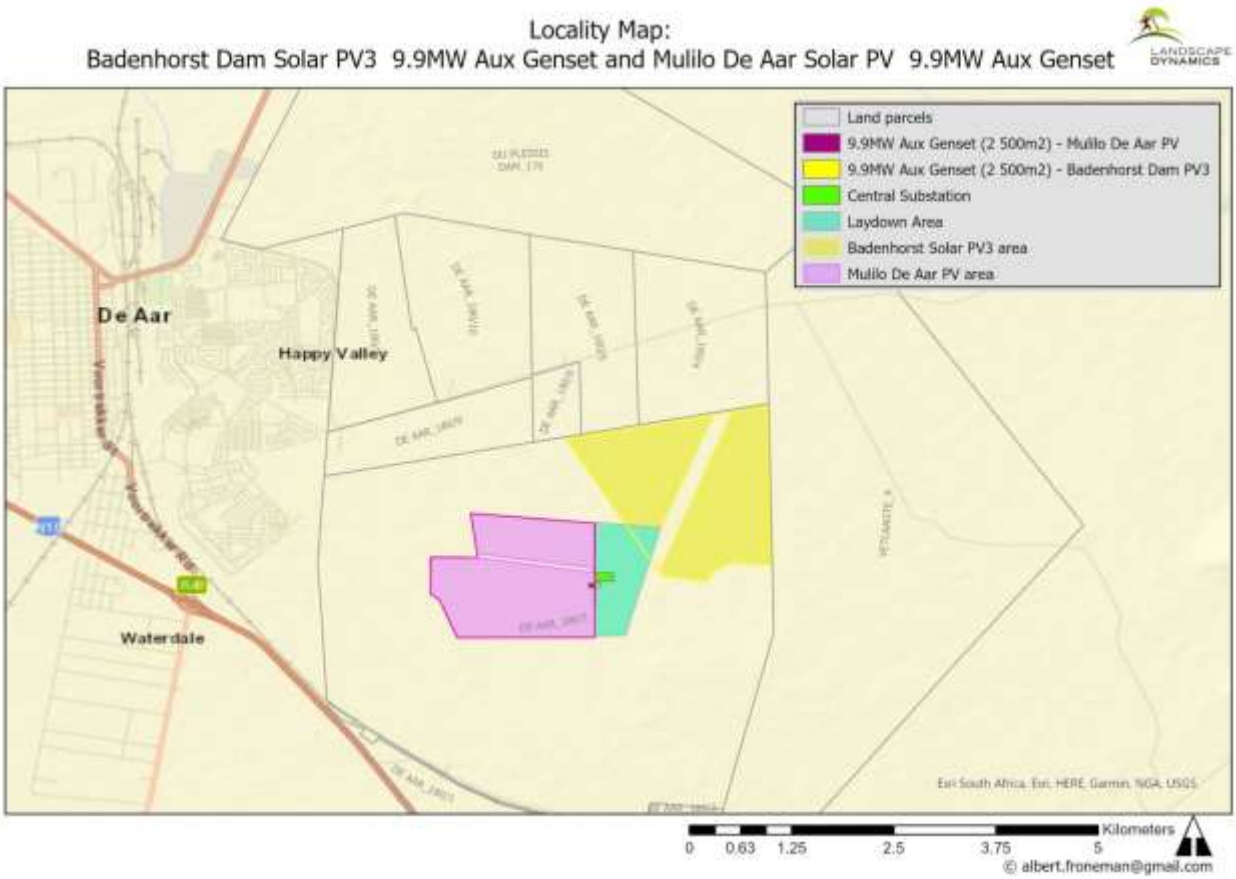
The EA is valid until 9 July 2022.

The PV site was recently bid in the Department of Mineral Resources and Energy's (DMRE) Risk Mitigation Independent Power Producer Procurement (RMIPPP) programme as one of the facilities making up a larger, multi-facility project called "Mulilo Total Hydra Storage". The applicant and EA holder, proposes to change the details of the EA holder from Mulilo De Aar PV (Pty) Ltd, to Mulilo Total Hydra Storage (Pty) Ltd , because it is a requirement of the RMIPP that ultimately all EA's are in the name of the bidding project company. It is also proposed to amend the project description by adding an **Auxiliary Generator Set ("GenSet")** with a maximum output of 9.99MW to the approved solar photovoltaic energy plant and this application is therefore for a **Part 2 EA Amendment**. This Motivational Report is in support of the EA Amendment Application Form.

The Department of Environment, Forestry & Fisheries (DEFF) was the Competent Authority (CA) which issued the above-mentioned EA and is therefore also the CA for this application.

The 9.99MW Aux GenSet will be situated within the approved footprint of the solar PV project that was assessed and approved as part of the Environmental Impact Assessment (EIA) process and authorised by the current EA. A similar separate Part 2 application process is being run for the Badenhorst Dam Solar PV3 project (adjacent to and on the same property as the Mulilo De Aar PV project), however two separate EA Amendment Applications are being submitted and this application and motivational report refers only to the **75 MW Mulilo De Aar Photovoltaic Energy Plant.**

The position of the sites in relation to each other and the town of De Aar can be seen on the map below.



1.2 Legal requirement

National Environmental Management Act (Act 107 of 1998)

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No R982, December 2014, as amended.

Applicable to this EA Amendment application is Section 31 of NEMA, which states that an Environmental Authorisation may be amended if the amendment will result in a change to the scope of a valid environmental authorisation where such change will result in *an increased level or change in the nature of impact* where such level or change in nature of impact was not

(a) assessed and included in the initial application for environmental authorisation; or

(b) taken into consideration in the initial environmental authorisation;

and the change does not, on its own, constitute a listed or specified activity.

NEMA Listed Activities

An EA can only be amended if the proposed development does not trigger any new listed activities, in other words if all applicable NEMA listed activities has been appropriately assessed.

In the case of this project, the following applies:

The EIA commenced under the 2010 Environmental Impact Assessment Regulations but the EA was issued in 2015, in other words after the Regulations were amended in 2014. The following listed activities were authorised:

2010 EIA REGULATIONS

Government Notice R544: Listing Notice 1

- Activity Nr 10: Construction of infrastructure for the distribution of electricity with a capacity of 33kV and less than 275kV
- Activity 11: Construction of infrastructure within 32m from a watercourse
- Activity 13: Storage and handling of dangerous goods

Government Notice R545: Listing Notice 2

- Activity 1: The construction of infrastructure for the generation of electricity where the electricity output is 20MW or more

Government Notice R546: Listing Notice 3

- Activity 14: Clearance of 5 hectares or more vegetation where 75% or more of vegetation constitutes indigenous vegetation outside urban areas

2014 EIA REGULATIONS

Similar listed activities under the 2014 Regulations are:

Government Notice R983: Listing Notice 1

- Activity 11: Construction of infrastructure for the distribution of electricity with a capacity of 33kV and less than 275kV
- Activity 12: Construction of infrastructure of $100m^2$ or more within 32m from a watercourse
- Activity 14: Storage and handling of dangerous goods

Government Notice R984: Listing Notice 2

- Activity 1: The construction of infrastructure for the generation of electricity where the electricity output is 20MW or more

Government Notice R985: Listing Notice 3

- Activity 14: Development of infrastructure of $10m^2$ or more within 32m from a watercourse

2017 EIA REGULATIONS

The 2014 EIA Regulations were amended in April 2017 and the following activities *could possibly be applicable* to the proposed **9.99MW Aux Genset** development:

Government Notice R327: Listing Notice 1

- Activity 2:
  The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where—
  (i) the electricity output is **more** than 10 megawatts but less than 20 megawatts;
  or
  (ii) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.
  (*Note: the electricity output will be maximum 9.99MW within an area of no more than 2 500m^2, in other words less than 10MW in an area smaller than 1 hectare and this activity is therefore* ***not applicable***)

- Activity 12: Development of infrastructure within 32m from a watercourse
  (Note: the Genset site will not be situated close to any watercourses – this activity is therefore ***not applicable****)*

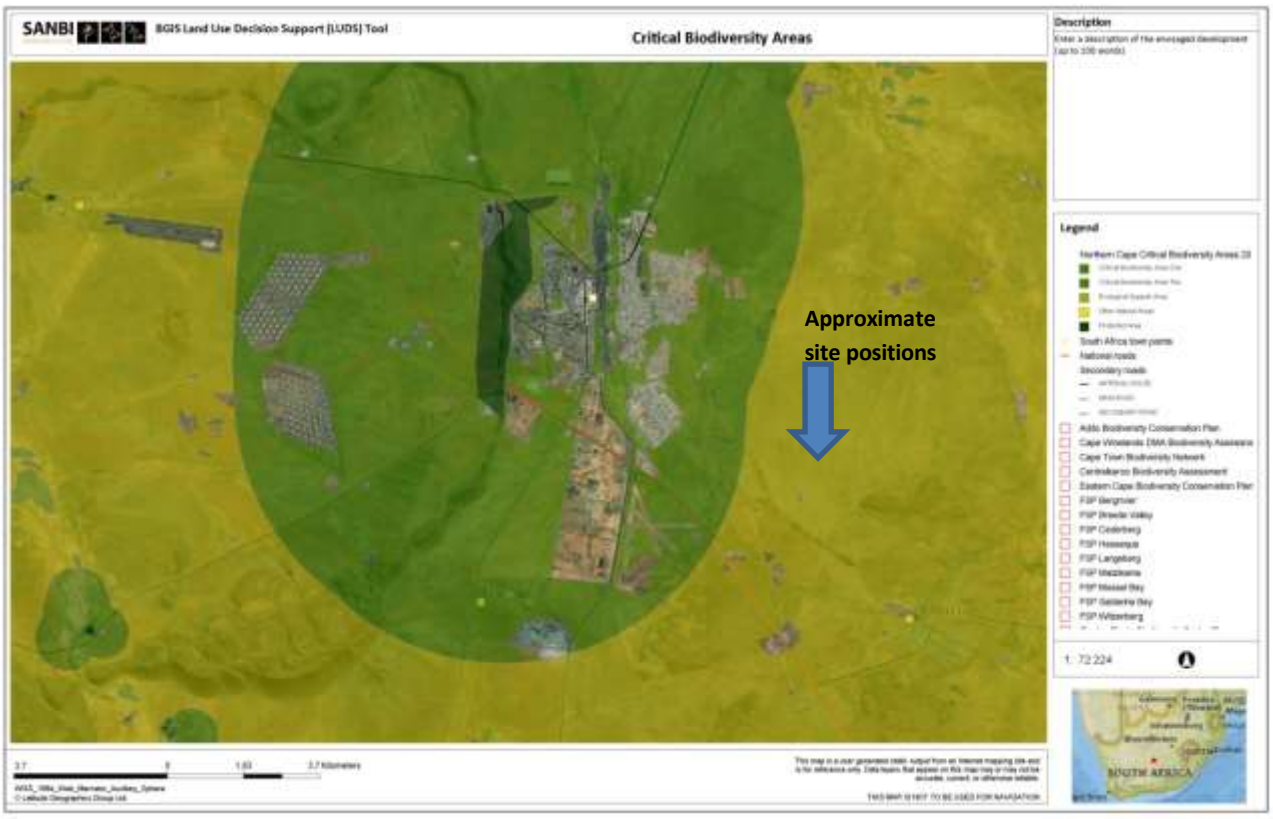
- Activity 14: Storage and handling of dangerous goods in containers of less than 500m^3
  (Note: The generators will use diesel that is stored on the PV site, but that storage is already authorised under the Mulilo De Aar PV EA. This activity was therefore assessed during the original EIA process, in other words authorisation was previously granted for GNR 327 Listing Notice 1 Activity 14 and it therefore does not form part of the EA amendment application).

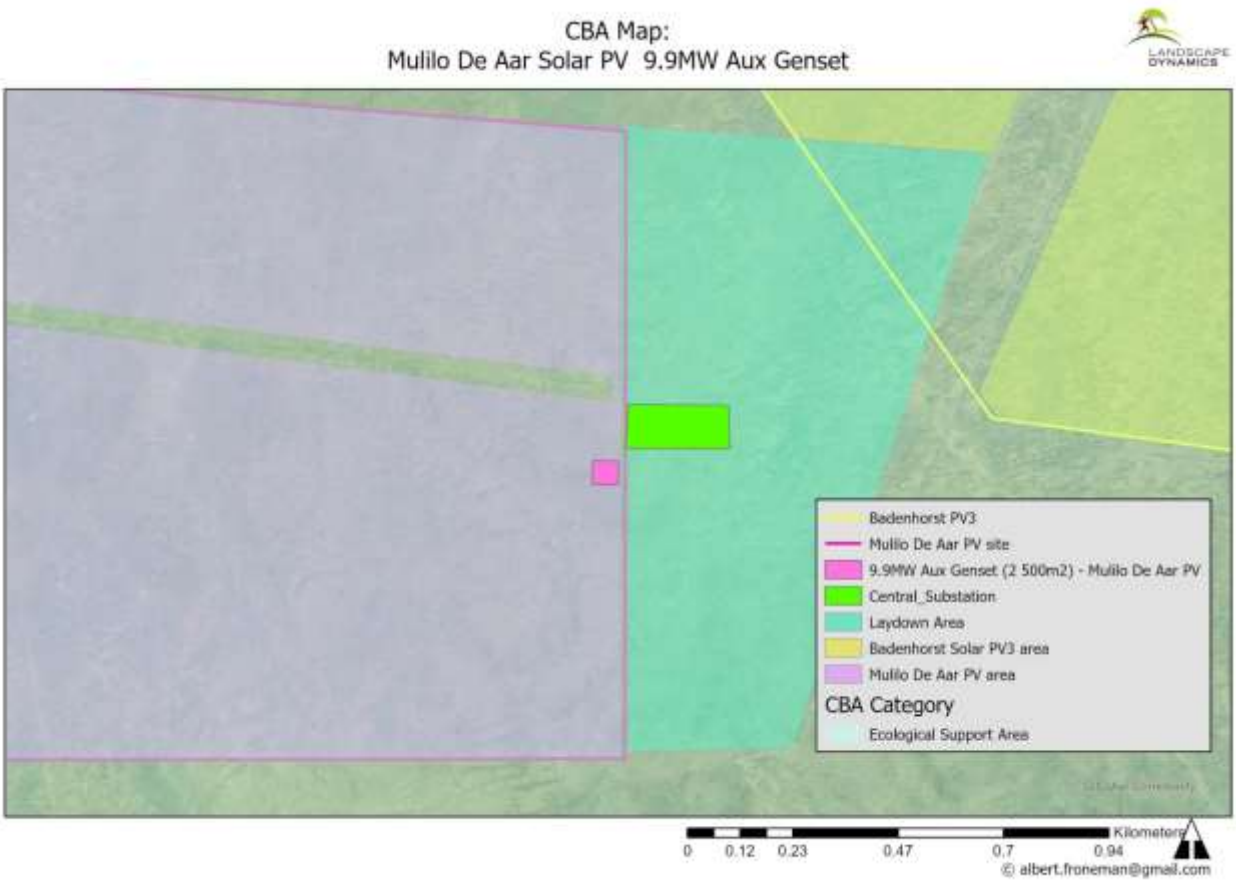
Government Notice R325: Listing Notice 2

- None

Government Notice R324: Listing Notice 3

- None
  The site does not fall within a CBA or endangered/critically endangered ecosystem or any other geographical area as per stipulations in Listing Notice 3. Also refer to the SANBI CBA map below (also attached under Appendix A). The site falls within an Ecological Support Area.





Since the up to 9.99MW Aux Genset development is added to the project description of an already approved site, all listed activities have been assessed during the original EIA studies and no new activities are being triggered, an amendment to the existing EA application can be made.

1.3 Proposed 9.9MW Auxiliary GenSet Project Description

Site position

The 9.99MW generator set ("GenSet") facility would be located in very close proximity (almost adjacent) to the central substation and within the previously assessed and authorised PV site. Also refer to Appendix A for maps of the site area.

Description

The project will entail the following:

GenSet Footprint of development site	2 500m^2
Containers	Each generator is housed in a pre-assembled 20ft ISO container, with dimensions: ○ Length (6.06m) ○ Width (2.44m) ○ Height (2.6m)
Number of containers	○ Based on the current design, up to 11x diesel/gas GenSet containers of 20ft each are required along with a 40ft container for supporting services. ○ The LV MV switchgear and MV transformer will also be containerised ○ There will be a maximum of 16 containers on site

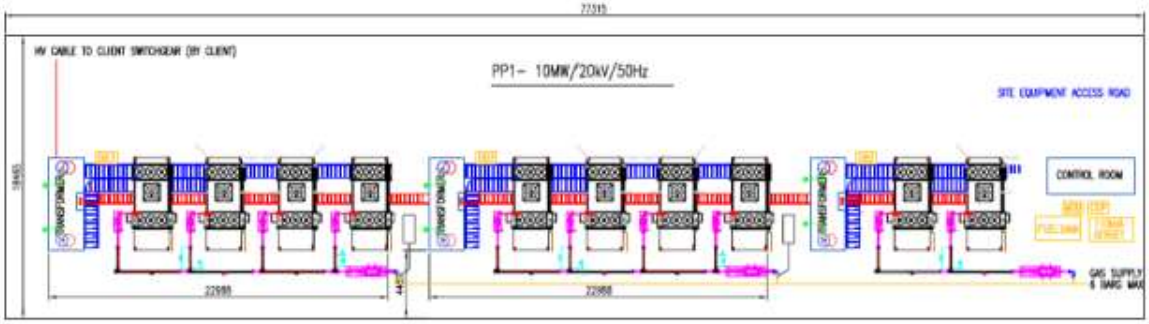
Stacking of containers	Containers will not be stacked on top of each other
Electrical output per container	The individual generator containers are between 0.8 MW -2.5 MW electrical output each, depending on the specific model and number of containers that will eventually be chosen.
Type of fuel	Fuel will most likely be diesel but Liquefied Natural Gas (LNG) or Liquified Petroleum Gas (LPG) would be preferable if a supply source can be secured, and are therefore also considered as options.

Facility layout and visual presentations

The layout plans below are indicative designs and cannot be used as a final layout. The final layout will depend on the specific generator model that will be chosen and will be determined at a later stage (in other words after the EA has been amended).

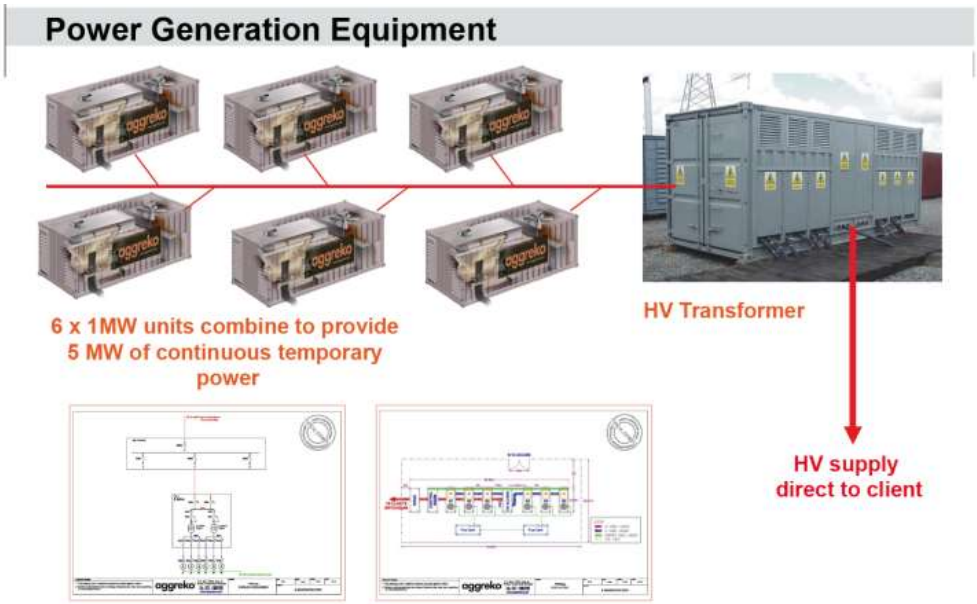
Visual presentation of a typical container type unit in a yard configuration

[1]Examples of a 10MW GenSet layout



Example of 10 MW plant layout

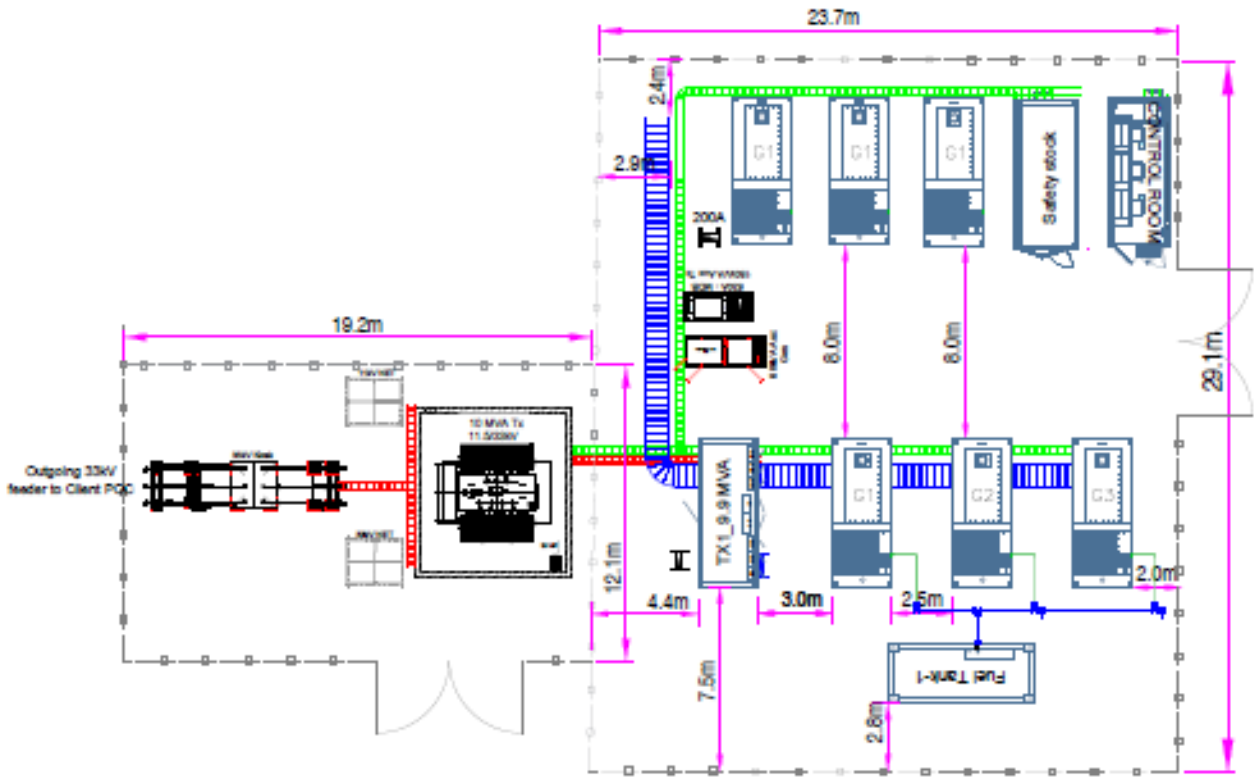
Containers of a 5MW generator facility



10MW GenSet facility in Mosselbay

Typical site layout plan with technical details

[1]The output of the proposed GenSets will be a maximum of 9.99MW



Technology

A technical data sheet for the ETCG1375 GenSet is attached under Appendix B.

1.4 Site Selection Process

Selecting the best site for a development forms an integral part of all EIA processes. In the case of this project, the following is applicable:

Authorised areas

The GenSet facility will be situated within the authorised PV area which was assessed and authorised as part of the Mulilo De Aar PV project EIA application. An extensive site selection process for the authorised Mulilo De Aar PV project was conducted during the EIA process and the best alternative site was authorised. It is logical to place the GenSet facility within the already assessed and approved footprint of the PV project.

The GenSet facility has to be in close proximity to the central substation because of the following:

- The diesel GenSets must connect to the main medium voltage busbar (33KV) in order to inject power into the battery systems for charging.
- The close proximity to the main IPP Substation minimises long MV cable runs which reduces losses and fuel usage.

- The Diesel Generator will require regular maintenance and testing to ensure its availability when needed, this is easier to perform and manage due to the close proximity to the substation control buildings.
- The co-ordination of protection and SCADA systems are easier to design and implemented due to the co-use of the substation control infrastructure.
- The location is central in the solar clusters and away from any built up or sensitive environment to ensure noise is minimised.
- The GenSet site is situated directly adjacent to the laydown area which was assessed as part of the original EIA.

GenSet Site Selection

The selected GenSet site is an obvious area to use because:

- it is already authorised and therefore the site already underwent a thorough site selection process;
- it is already authorised and therefore the site already underwent thorough specialist assessment;
- it will not impact on the generation capacity of the PV plant; and
- it is situated in close proximity (almost adjacent) to the already authorised substation site; thereby addressing the technical requirement in the most effective manner.

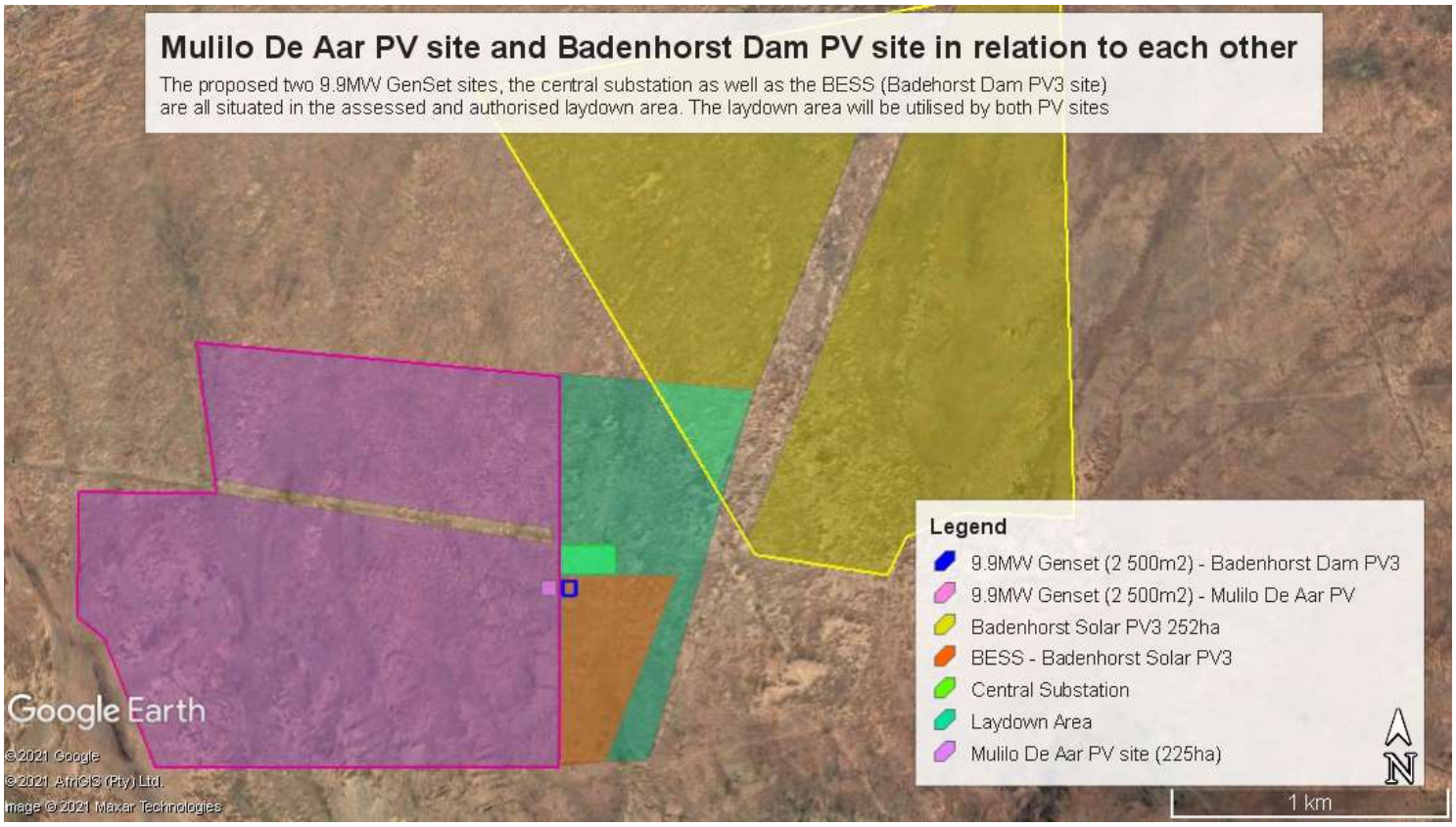
The additional specialist studies (air- and noise quality) conducted for this EA amendment application further guided the site selection process. The specialists confirmed that the proposed GenSet site will not cause significant additional impact when situated within the laydown area as proposed. Where required, additional mitigation measures were provided by the noise and air quality specialist and included in the EMPr (no other specialists' mitigation measures were added to the EMPr).

A Part 2 application for the amendment of the EA to include a Battery Energy Storage System (BESS) to the project description for the adjacent Badenhorst Dam Solar PV3 project was submitted to DEFF in October 2020. It was proposed that the BESS development takes place within the authorised laydown area which will be **used for both the Mulilo De Aar PV site as well as the Badenhorst Dam PV3 site**. Also refer to the map below for more clarity.

Specialist studies conducted for this BESS EA amendment application concluded that the laydown area is suitable for the BESS development of approximately 20 hectares in size. The BESS development has a much larger footprint than the proposed GenSet development (approximately 20 hectares vs 0.25 hectares) with similar containerised type electrical power generation equipment. Findings of the 2020 specialist studies are therefore also applicable to the 9.99MW GenSet development.

The Mulilo De Aar GenSet development is *directly adjacent* to the laydown area and BESS site as discussed above and is situated within a habitat with a homogenous nature (refer to the Ecological Impact Assessment attached as Appendix C5). It is the professional opinion of the EAP that all

information as contained in the BESS studies will therefore also be applicable to the GenSet site as proposed in this application. Conclusions made by the specialists in the BESS application for the adjacent Badenhorst Dam Solar PV3 site will therefore be utilised in this EA amendment application for the Mulilo De Aar PV site.



Conclusion of Site Selection Process

There are no site specific attributes that should specifically be avoided and no additional mitigation measures are proposed that could influence the position of the proposed site.

CHAPTER 2: NEED AND DESIRABILITY

2.1 Need and Desirability

2.1.1 Need

The need for a backup thermal generation plant is due to the strict qualification and energy availability rules set by the DMRE and Eskom in the Risk Mitigation Independent Power Procurement Program (RMIPPP). As a backup energy supply, the generator would only be called upon to operate during rare periods of extended low irradiance or during annual maintenance and reliability tests prescribed by Eskom. Solar PV would continue to be the dominant source of energy exported from the project.

The need for the project can further be explained by means of the South African **Integrated Resource Plan (IRP)**. The IRP is an electricity roadmap that aims to accurately forecast the country's electricity demand and how this demand will be met in a cost-effective, environmentally sustainable manner whilst facilitating poverty alleviation.

The IRP was gazetted by the Minister of Mineral Resources and Energy, Mr Gwede Mantashe, on 18 October 2019, updating the energy forecast for South Africa from the current period to the year 2030.

In summary, it is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. The IRP 2019 further states the following on renewables and energy storage:

- "South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. The extent of decommissioning of the existing coal fleet due to end of design life, could provide space for a completely different energy mix relative to the current mix. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity. "
- "Renewable Energy: Solar PV, and wind present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain. "

The PV site was recently bid in the DMRE's Risk Mitigation Independent Power Producer Procurement (RMIPPP) programme as one of the facilities making up a larger, multi-facility project

called “Mulilo Total Hydra Storage”. The applicant requires approval of the amendment to add the GenSets, to meet the requirements of the RMIPPP bid that was submitted, to provide emergency energy greatly needed by Eskom.

2.1.2 Desirability

The following tables address further issues as highlighted in the DEFF Need & Desirability Guidelines (2014).

Is this project part of a **national programme** to address an issue of national concern or importance?
The development was initially planned to be tendered into the REIPPP but has now been bid in the Risk Mitigation Independent Power Producer Program RMIPPP which has been declared a Strategic Infrastructure Project (SIP).
Do location factors favour this land use (associated with the development proposal) at this place? (This relates to the contextualisation of the proposed land use on the proposed site within its broader context.)
The proposed 9.99MW GenSet development is perfectly situated because: • *It is directly adjacent to the central substation and* • *The site was thoroughly assessed by applicable specialists during the EIA process for the solar PV farm*
Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?
The specialists (air- and noise quality) confirmed that the proposed GenSet site will not cause significant additional impact when situated within the laydown area as proposed. Where required, additional mitigation measures were provided by them. *Specialist studies conducted during the 2014/2015 EIA process assessed the site and concluded that the laydown area is suitable for development and no new mitigation measures are proposed.* *It was concluded that all impacts can be mitigated to acceptable levels and that the project could go ahead on condition that the Environmental Management Programme (EMPr) (attached as Appendix E) should be implemented at all times.*

Will the development impact on people's health and well-being (*e.g.,* in terms of noise, odours, visual character and 'sense of place', *etc.*)?
Dust and noise will be created during the construction phase but mitigation measures are in place to minimise these temporary impacts. The development is situated on rural farm land which lowers the significance of impact associated with noise and dust. *The proposed GenSet facility will alter the visual character and sense of place in a negative way, but when seen in context with the, directly adjacent, authorised 75MW PV plant the additional visual impact of the GenSet facility will be negligible in terms of visual impact.*
Is the development the best practicable environmental option for this land/site?
The, 'environment' should be seen as the sum total of one's surroundings, which include the natural, social and economic environments. Taking all constraints into account, the development as proposed underlines the principles as advocated by the term 'triple bottom line' (people, planet, profit) and this development proposal is in support of the goals of economic, social and ecological integration and sustainability.
What will the benefits be to society in general and to the local communities?
The GenSet project will contribute to, amongst others, energy security and blackout relief, benefiting the entire South Africa. Temporary and permanent employment opportunities will be created and the work force will as far as possible be sourced from the local communities.
Will the benefits of the proposed land use/development outweigh the negative impacts of it?
Negative impacts associated with the proposed development could be mitigated to levels that will be acceptable within the receiving environment. The positive impact of energy security, blackout relief, increase capacity, reduction in the need to use diesel and other fossil fuels for peaking and baseload power far outweighs the negative impact that this project could have.
Describe how the **general objectives of Integrated Environmental Management** as set out in Section 23 of the NEMA have been taken into account:
Current procedures and/or organisational structures are not necessarily achieving integrated decision-making and/or co-operative governance and, as a result, there is a failure to properly achieve the objectives of IEM as set out in Section 23 of NEMA. EIA's however often focus on the immediate harm a project will cause rather than any benefits it might create in the long term to sustainable development. *The stated objectives of Section 23 are to ensure integrated decision-making and co-operative governance so that NEMA's principles and the general objectives for integrated environmental*

management of activities can be achieved. The goals are to

a) promote the integration of the principles of environmental management set out in section 2 into the making of all decisions which may have a significant effect on the environment;
b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;
c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment;
e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and
f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.

For this project the following actions were taken to reach the general objectives of Integrated Environmental Management as set out in Section 23 of NEMA:

a) Applicable environmental, economic and social aspects have been assessed, thereby ensuring an integrated approach in order to balance the needs of all whom would be affected by this development.
b) Mitigation measures have been supplied in the EMPr in order to ensure that all identified impacts are mitigated to acceptable levels.
c) The EA amendment proposal has to be evaluated and approved by DEFF and no construction may commence prior to the issuing of the Environmental Authorisation.
d) The procedures which are followed during the public participation programme are based on the NEMA EIA Regulations 2014, as amended.
e) DEFF will take all information as represented in this report into consideration and may request further information should they feel that further studies/information is required before an informed decision can be made.
f) The project team (inclusive of the specialists) is confident that the mitigation measures as supplied in the EMPr are reasonable and will be the best way to manage anticipated impacts.

Describe how the principles of environmental management as set out in Section 2 of the NEMA have been taken into account
Chapter 2 of NEMA provides a number of principles that decision-makers have to consider when making decisions that may affect the environment, therefore, when a Competent Authority considers granting or refusing environmental authorisation based on an Environmental Impact Assessment, these principles must be taken into account.

The NEMA principles with which this application conforms are described as follows —

1. *Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.*
2. *Development must be socially, environmentally and economically sustainable.*
3. *Sustainable development requires the consideration of all relevant factors.*

The social, economic and environmental impacts of activities, including disadvantages and benefits, were considered, assessed and evaluated, and informed decision-making by the authority is hereby made possible.

CHAPTER 3: ADVANTAGES AND DISADVANTAGES

3.1 Advantages associated with the 9.99MW GenSet Facility

A backup thermal generation plant is required because of the strict qualification and energy availability rules set by the DMRE and Eskom in the Risk Mitigation Independent Power Procurement Program (RMIPPP). It is imperative that a constant energy supply be generated by this project and, as a backup energy supply, **the generator would only be called upon to operate during rare periods of extended low irradiance or during annual maintenance and reliability tests prescribed by Eskom**.

The generator will therefore ensure that the Mulilo De Aar PV project can comply with the rules as set out in the RMIPPP and will therefore make this project able to participate in this programme. As a result, the project will support the country by reducing tariff increases and in pursuing a cleaner energy mix.

3.2 Disadvantages / risks associated with the 9.99MW GenSet Facility

Specialist studies

From an environmental perspective, the proposed amendment to include the 9.99MW GenSet facility in the project description of the already authorised PV plant will have very few disadvantages/risks. The additional specialists' studies (air and noise quality) that were commissioned have shown that the GenSet facility will not result in any new impacts that cannot be mitigated to acceptable levels.

A Part 2 application for the amendment of the EA to include a Battery Energy Storage System (BESS) to the project description was submitted in October 2020 for the *directly adjacent* Badenhorst Dam PV3 site. Input and mitigation measures (where applicable) obtained for the BESS development will now be included in the EMPr for the Mulilo De Aar PV project to ensure that all impacts resulting from the addition of the 9.99MW GenSet development are mitigated to acceptable levels. The following specialists were involved:

- Ornithologist
- Aquatic specialist
- Ecologist
- Heritage consultant
- Stormwater engineer
- Visual impact specialist

The BESS development has a much larger footprint with more significant impact than the 9.99MW GenSet development (approximately 20 hectares vs 0.25 hectares). It can therefore be concluded that there would be no additional impact due to the GenSet development that has not been addressed and assessed in the above-mentioned studies.

<500m^3 Fuel Storage Tanks

The use of <500m^3 fuel storage tanks will pose minimal risk because the design and placement of the above ground storage tanks will be in accordance with industry standards.

Note from EAP: The generators will use diesel that is stored on the PV site, but that storage is already authorised under the Mulilo De Aar PV EA. This activity was therefore assessed during the original EIA process, in other words authorisation was previously granted for GNR 327 Listing Notice 1 Activity 14. Additional mitigation measures are however supplied in Chapter 6 for inclusion in the EMPr.

CHAPTER 4: SPECIALIST INPUT

4.1 Specialist studies: Air and Noise

9.99MW generators could cause air and noise pollution and air and noise specialists were therefore appointed to undertake an impact assessment in their respective fields of expertise. The following Terms of Reference was applicable:

- Compile a statement / impact assessment confirming what air impact the 9.99MW generator would have (if any) and if so, provide impact rating tables (if required) and mitigation measures for inclusion in the EMPr.
- Determine the cumulative impact and provide mitigation measures (if required)

4.1.1 Noise Impact Assessment

An Environmental Noise Impact Assessment was undertaken by dbAcoustics (Mr Barend van der Merwe) and is attached as Appendix C1. A summary thereof follows below.

MAIN NOISE SOURCES

The main noise sources within and beyond the boundaries of the backup thermal generator/s are:

- Seasonal agricultural activities;
- Traffic noise which can be continuous and/or intermittent at times;
- Railway noise - intermittent;
- Aircraft type noise - intermittent;
- Animal and bird noises; and
- Wind noise.

The topography, ground conditions, prevailing noise sources and prevailing wind direction will be key aspects on the propagation of sound towards the noise receptors in the vicinity of the proposed back up thermal generation plant.

Receptor	Latitude	Longitude	Distance from the GenSet facility in meters	Land use type
A	30°39.280'S	24°1.908'E	4 347	Residential
B	30°38.796'S	24°2.484'E	4 317	Rural
C	30°39.214'S	24°3.682'E	2 894	Rural
D	30°40.345'S	24°6.152'E	3 490	Rural
E	30°42.474'S	24°4.630'E	3 319	Rural
F	30°41.928'S	24°2.927'E	2 763	Rural
G	30°41.436'S	24°1.100'E	4 611	Residential
H	30°39.429'S	24°0.153'E	5 970	Central Business District
I	30°40.164'S	24°1.683'E	3 517	Residential

BACKGROUND TO NOISE

Effects produced by sound

There are certain effects produced by sound which, if it is not controlled by approved acoustic mitigatory measures, seem to be construed as undesirable by most people and they are:

- Long exposure to high levels of sound, which may damage the hearing or create a temporary threshold shift – in industry or at areas where music is played louder than 95dBA. This will seldom happen in far-field conditions;
- Interference with speech where important information by the receiver cannot be analysed due to loud noises;

- Excessive loudness;
- Annoyance.

The effect of noise (except for long duration, high level noise) on humans is limited to disturbance and/or annoyance and the accompanying emotional reaction. This reaction is very difficult to predict and is influenced by the emotional state of the complainant, his attitude towards the noisemaker, the time of day or night and the day of the week.

Types of noise exposure

Types of noise exposure can be described as follows:

- Continuous exposure to noise – The level is constant and does not vary with time e.g., traffic on freeway and an extractor fan;
- Intermittent exposure to noise – The noise level is not constant and occurs at times e.g., car alarms and sirens;
- Exposure to impact noise – A sharp burst of sound at intermittent intervals e.g., explosions and low frequency sound.

Recommended noise levels for different types of districts

Type of district	Equivalent continuous rating level $L_{Req.T}$ for ambient noise					
	Outdoors			Indoors, with open windows		
	Day-night	**Daytime**	**Night-time**	***Day-night***	**Daytime**	**Night-time**
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with some workshops, with business premises and with main roads	60	60	50	50	50	40
e) Central business district	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

The study area falls within an (a) to (b) type districts because of the type of activities such as main roads, gravel roads, little traffic and major traffic which all have an influence on the prevailing ambient noise level for a specific area.

There is therefore a mixture of activities and higher noise levels as per the above recommended continuous rating levels within i.e., residential, agricultural activities (seasonal) and feeder roads in proximity of each other or to a farmhouse. A farmhouse next to the R63 road will experience higher noise levels than the farmhouse/s some distance from roads. The ambient noise level will therefore differ throughout the study area, depending on the location and the measuring position in relation to areas with existing noise sources such as roads.

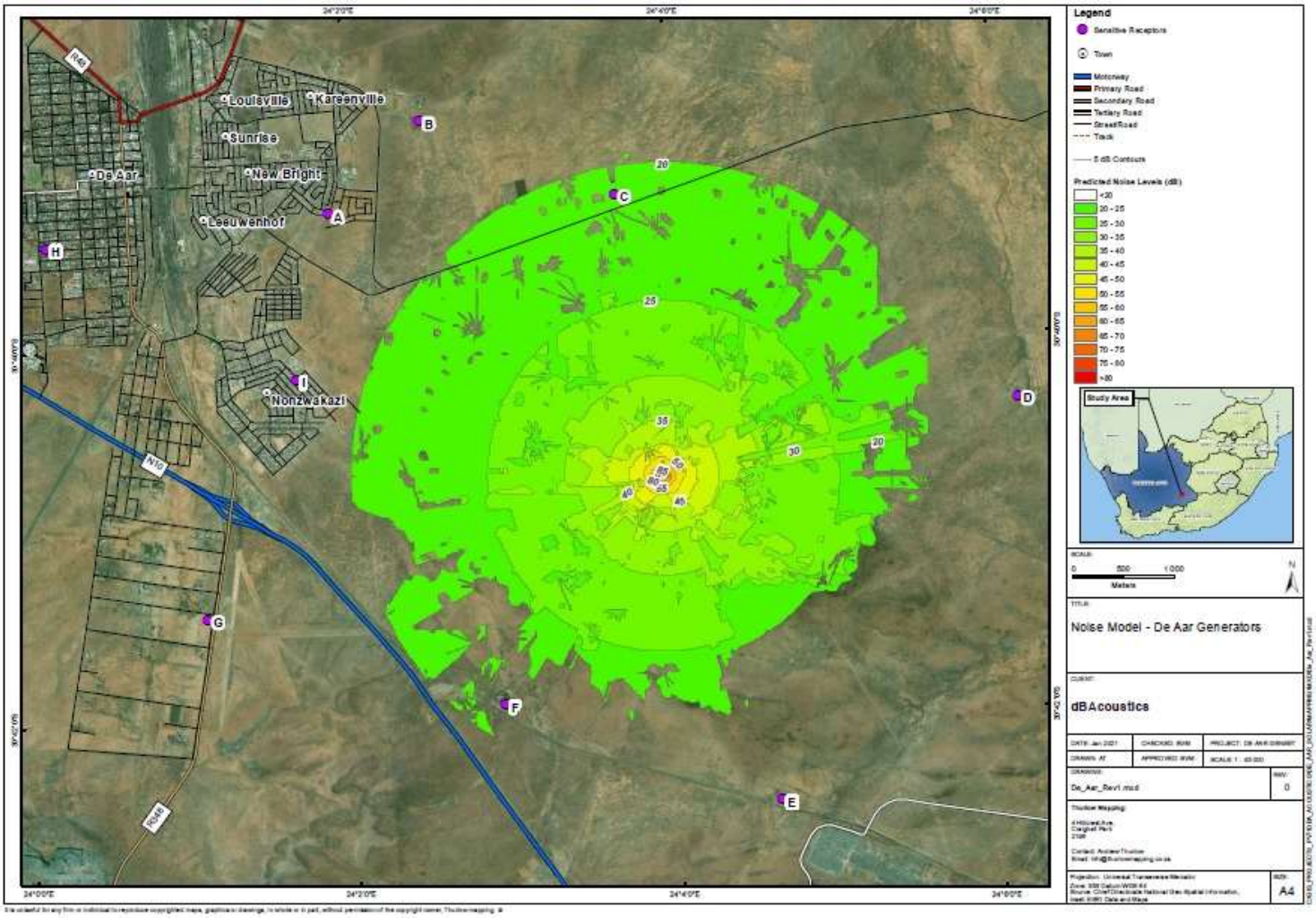
NOISE MAPPING

The cumulative noise projections were done with a Noise Map software program where the height of the container (2 591mm), height of the exhaust outlet (3 251mm) noise level at the generator, octave band, wind speed, humidity, topography, ground conditions and temperature forms part of the data input.

The predominant average hourly wind direction in De Aar varies throughout the year. The wind is most often from the north for 4.1 months, from April 20 to August 22, with a peak percentage of 45% on July 4.

The projected noise contours and the subsequent noise levels at the noise receptors at the different residential areas (A to G) are given in the map above and the calculated noise levels at the abutting noise receptors in the table below the map.

Noise contour map



Noise intrusion levels at the different noise receptors - projected

NSA	Projected noise level at noise receptor - dBA	Recommended ambient noise level – daytime according to Table 2 of SANS 10103 of 2008	Recommended ambient noise level – night time according to Table 2 of SANS 10103 of 2008	Noise intrusion levels – daytime	Noise intrusion levels –night-time
A	18.0	55.0	45.0	No intrusion	No intrusion
B	14.0	45.0	35.0	No intrusion	No intrusion
C	22.0	45.0	35.0	No intrusion	No intrusion
D	15.0	45.0	35.0	No intrusion	No intrusion
E	15.0	45.0	35.0	No intrusion	No intrusion
F	17.0	45.0	35.0	No intrusion	No intrusion
G	0	55.0	45.0	No intrusion	No intrusion
H	0	65.0	55.0	No intrusion	No intrusion
I	18.0	55.0	45.0	No intrusion	No intrusion

IMPACT ASSESSMENT AND MITIGATION

The impact assessment and mitigation are discussed in Chapter 6 of this report.

CONCLUSION ON NOISE

The noise level from the proposed backup thermal generators will be 106.4dBA at a height of 119m. The threshold value of 7.0dBA will not be exceeded during the day and/or night- time periods.

There will be a shift in the prevailing ambient noise level in the immediate vicinity of the backup thermal generators but **at a distance exceeding 500m from the backup thermal generator/s the intrusion level will be minimal and in line with the Northern Cape Noise Control Regulations**. The wind noise (when blowing) will create the predominant ambient noise level in the vicinity of the noise receptors which will mask the noise from the backup thermal generators. People who may work or visit the backup thermal generator/s will experience an increase in the prevailing ambient noise level in the vicinity of the backup thermal generators. **The noise increase at the residential properties will be insignificant.**

The large variations in the meteorological conditions and the geographical relations between the backup thermal generator/s positions and the noise sensitive receptors allow for the decrease in the noise as it propagates from the backup thermal generators.

The potential noise impact from the backup thermal power plants will be low and authorisation for the development of the Badenhorst PV backup thermal plant may be granted from an environmental noise point of view.

4.1.2 Air Quality Technical Comment

A **Technical Comment on the Air Quality** was undertaken by uMoya-NILU Consulting (Pty) Ltd (Dr Mark Zunckel) and is attached as Appendix C2. A summary thereof follows below.

REGULATORY CONSIDERATIONS

Stationery reciprocating engines using gas or liquid fuels for electricity generation are classed as a Listed Activity in terms of the NEM: AQA if the design capacity is greater than or equal to 10MW heat input per unit1. The proposed installation is less than this threshold and is therefore *not* a Listed activity and *does not* require an Atmospheric Emission License (AEL) as part of the Environmental Authorisation (EA).

The storage and handling of petroleum products in permanent storage tanks at a facility is classed as a Listed Activity in terms of the NEM: AQA where the cumulative storage capacity is more than 1 000m^3. The planned storage of diesel at the Mulilo De Aar PV site is less than 500m^3. The planned storage capacity is less than the Listed Activity threshold and therefore *does not* require an Atmospheric Emission License (AEL) as part of the Environmental Authorisation (EA).

PREVAILING METEOROLOGY

Solar radiation and wind are the two meteorological parameters that play a key role in the dispersion potential of an area, i.e. how well pollutants disperse in the atmosphere. The clear skies and solar radiation experienced at De Aar result in intense heating of the earth's surface and strong thermal convection and good vertical dispersion.

There is a relatively high frequency of moderate winds which implies that the horizontal dispersion potential is good. Collectively, the dispersion potential of the area is good.

GENERATOR EMISSIONS

It is proposed to use diesel for the generator, but LPG or LNG is preferred depending on availability. The combustion of these fuels in reciprocating engines results in emissions of air

pollutants, including sulphur dioxide (SO_2), oxides of nitrogen (NO_X) and particulate matter. SO_2 is produced from the combustion of sulphur that is bound in fuel. NO_X is produced from thermal fixation of atmospheric nitrogen in the combustion flame and from oxidation of nitrogen bound in the fuel. The quantity of NO_X produced is directly proportional to the temperature of combustion and indirectly proportional to the engine speed. PM arises from incomplete combustion of the fuel. The emission is therefore a function of the fuel.

Diesel is a liquid fuel that is refined from crude oil. It consists primarily of hydrocarbons with smaller amounts of hydrogen, nitrogen, sulphur, and volatile organic compounds. It is refined to have a sulphur content of 500 ppm or less. The combustion of diesel results in emissions of NO_X and particulates and some SO_2.

LPG gas comes from oil and gas wells or it may be manufactured in natural gas processing and from crude oil. It comprises a mixture of flammable hydrocarbon gases that include propane, butane, isobutane, and mixtures of the three gases. Natural gas used for energy generation is primarily methane, with low concentrations of other hydrocarbons, water, carbon dioxide, nitrogen, oxygen and some sulphur compounds. Liquefied Natural Gas (LNG) is natural gas which has been cooled below its boiling point of minus 161 °C in a process known as liquefaction. The process of liquefaction involves extracting most of the impurities in raw natural gas. The remaining natural gas is primarily methane with only small amounts of other hydrocarbons and consequently is widely considered a clean fossil fuel.

LPG and LNG are clean fuels. The SO_2 *and particulate emissions are negligible and* NO_X *emissions are relatively small.*

As a backup energy supply, the generators will operate during periods of extended low irradiance or during annual maintenance and reliability tests prescribed by Eskom. Hourly emissions rates of SO_2, NO_X and particulates from the generators may be estimated by assuming the output of the generator and using emission factors for diesel.

With uncertainty on the generators the total generation capacity of 9.9MW is assumed when estimating the emissions. A diesel consumption rate of 100 litres per hour under full load is assumed and emission factors provided by the US-EPA2 for 500 ppm diesel are applied to estimate the emission rates for the 9.9MW generator set.

Estimated Uncontrolled and Controlled emission rates for 9.9 MW diesel generators (kg/hr)

	SO_2	NO_X		PM
		Unmitigated	Mitigated	
Generator set (9.9 MW)	0.24	14.9	8.9	0.47

IMPACT ASSESSMENT AND MITIGATION

The impact assessment and mitigation are discussed in Chapter 6 of this report.

CONCLUSION

The 9.99MW generator is not Listed Activities in terms of the NEM: AQA and do not require an AEL as part of the environmental authorisation.

Air quality impacts associated with emissions of SO_2, NO_X and particulate matter from the two PV sites will be limited to the sites, will have a very low magnitude and a very low probability of occurrence considering their use for back-up power only. They are therefore insignificant, and the cumulative effects are deemed to be insignificant.

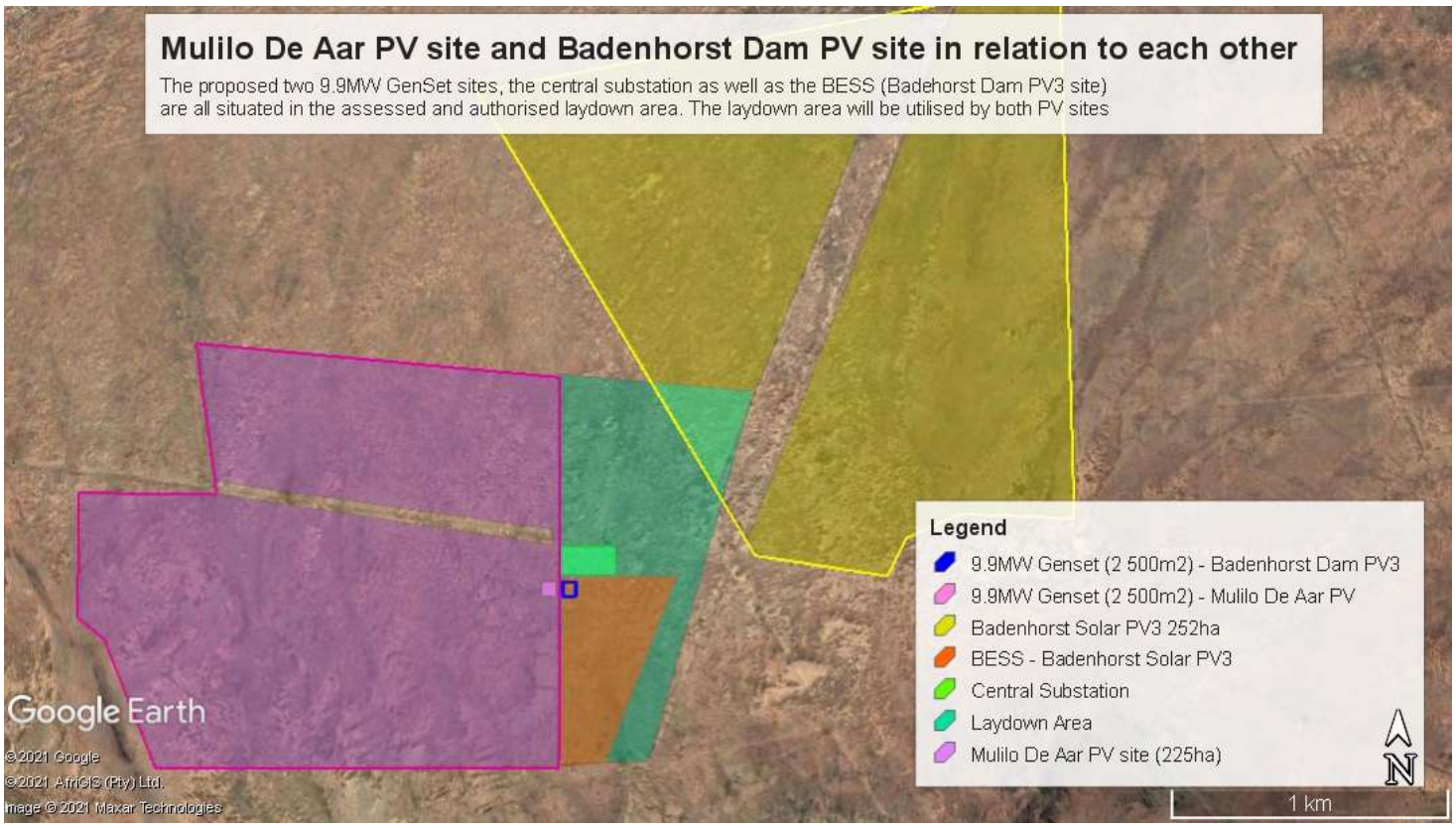
4.2 Specialist studies previously conducted

A Part 2 application for the amendment of the EA to include a Battery Energy Storage System (BESS) to the project description of the directly adjacent Badenhorst Dam PV3 site was submitted in October 2020. Since the proposed BESS site falls within the authorised laydown area the specialists were requested to compile amendment letters in order to determine if the status quo changed since their studies were conducted during the 2013/2014 EIA process for the solar PV plant. They were also instructed to determine impacts that the BESS could have on the environment and to provide mitigation measures where applicable to minimise those impacts.

The BESS would be housed in shipping containers on a site of approximately 20 hectares. The impact this development may have on the environment would therefore be greater than the proposed 9.99MW GenSet development in an area of 0.25 hectares (2 500m^2) only.

Please refer to the map on the following page indicating the Mulilo De Aar PV site, Badenhorst Dam PV3 site as well as the shared laydown area, BESS and GenSet sites in relation to each other.

Since the proposed GenSet site for the Mulilo De Aar PV project is directly adjacent to the laydown area and is situated within a habitat with a homogenous nature (refer to the Ecological Impact Assessment attached as Appendix C5), the information provided in these studies is deemed sufficient to determine the impact that the 9.99MW GenSet could have on the different environmental components for the EA amendment application for the Mulilo De Aar PV site. Please refer to the map below for the positions of the 2x PV sites, 2x GenSet sites, laydown area, central substation and BESS site.



4.2.1 Avifauna

An amendment letter for the adjacent BESS EA amendment application was compiled by Mr Andrew Jenkins from Avisense Consulting and is attached as Appendix C3. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A concise summary of the findings follows below.

The inclusion of the BESS equipment will increase the destructive footprint by about 8% and may add marginally to the disturbance impacts associated with both construction and operation of the plant. However, noting that the final approved development area covered by the existing authorisation is about 35% smaller than the area assessed in the corresponding bird impact study, any changes in the impact profiles of the two developments are effectively rendered negligible.

Note that post-construction monitoring of birds should be done to complement the pre-construction avifauna work already completed, to fully document the actual impact of the two developments and to improve our general understanding of the impacts of solar PV plant construction and operation on local bird populations. *Note from EAP: Post-construction bird monitoring stipulations are included in the existing EMPr.*

In conclusion, there is no need to amend the currently applicable bird impact ratings because of the proposed BESS *(and therefore the adjacent, much smaller 9.99MW GenSet development)* and there are no additional mitigation requirements to add to the existing EMPr.

4.2.2 Aquatic

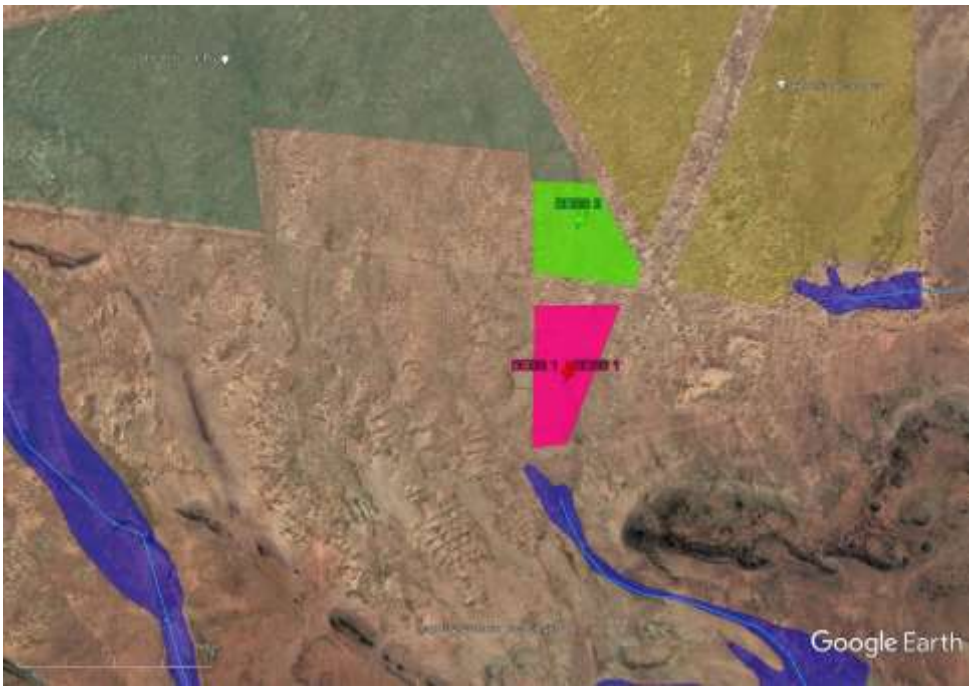
An amendment letter for the adjacent BESS EA amendment application was compiled by Ms Toni Belcher from BlueScience (Pty) Ltd and is attached as Appendix C4. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A concise summary of the findings follows below.

Aquatic Biodiversity Combined Sensitivity

The wider area in which the site is located is considered of 'Very High Aquatic Biodiversity Combined Sensitivity'. This is due to the fact that the area is considered a Strategic Water Source Area for groundwater (De Aar Region). There are no Freshwater Ecosystem Priority Area Rivers or Wetlands or Critical Biodiversity Areas mapped at the site.

There are also no aquatic features associated occurring within or adjacent to the sites. The closest ephemeral drainage channel is more than 200 m to the south of the BESS site and unlikely to be impacted by the proposed activity as runoff at the site is slight and in a northward direction, away from the aquatic features.

The proposed development will be situated within the previously authorised laydown area which has patches that are devoid of vegetation. Some of these areas have pan-like features but they are too small to be of significance from an aquatic ecosystem point of view. It is however recommended that the final proposed footprints of the development site be ground-truthed before the final layout is being determined to ensure that there are no aquatic features of significance within the final footprint. *Note from EAP: Ground-truthing of the proposed 9.99MW GenSet site has been included in the updated EMPr.*



The site applicable to the Badenhorst Dam PV3 BESS project is indicated in pink
Please note that the proposed GenSet site is directly adjacent to the north-western corner of the BESS site

Findings of previous studies

Below are the findings of the previous freshwater impact assessment:

The Brak River tributaries within the study area were considered to be in a moderately modified ecological state, with a low ecological importance and sensitivity. The expected impacts of the then proposed activities were:

- *Solar energy facility* is outside of all identified freshwater features/drainage lines on the site therefore the impact on freshwater features is very low for this component.
- ***Laydown areas* are outside of any identified freshwater features/drainage lines therefore the impact on freshwater features is very low for this component.**
- *Overhead transmission lines/corridors* do not cross any freshwater features/drainage lines therefore the impact on freshwater features is very low for this component.
- *Substations* are not placed in or near any freshwater features/drainage lines therefore the impact on freshwater features is very low for this component.
- *Access route and water pipeline* cross the lower reach of the Sandsloot tributary, however it is below the larger instream dam and just upstream of the Nonzwakazi township where there is no discernible river/drainage channel. The impact on freshwater features for this component is expected to be low to very low.

Impact Assessment

Refer to Chapter 6 of this report for an impact assessment and proposed mitigation measures for inclusion in the EMPr.

Conclusions and Recommendations

The proposed development site, due to the fact that it is located within the footprint of the original proposed development area assessed and approved, are not likely to result in any increase in impact (incremental or cumulative) to the adjacent aquatic ecosystems to that already assessed for the original approved Photovoltaic (Solar) Energy Facilities on Badenhorst Dam Farm (deemed to be very low). The closest aquatic feature is a minor ephemeral drainage feature more than 200m to the south of the site. Drainage from the site is northwards and away from this ephemeral watercourse.

The activities are not likely to pose a risk to adjacent aquatic ecosystems and therefore should not require a water use authorisation.

From an aquatic ecosystem perspective there is no reason why the proposed BESS *(and therefore the adjacent, much smaller 9.99MW GenSet development)* should not be approved in terms of NEMA. Mitigation measures for inclusion in the updated EMPr are discussed in Chapter 6 of this report.

4.2.3 Ecological Assessment

An Ecological Assessment for the adjacent BESS development was undertaken by *Botaneek (Mr Nick Helme)* and is attached as Appendix C5. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A concise summary of the findings follows below.

Study area and regional context

The study area lies within the Nama Karoo bioregion and the vegetation type throughout the area is Northern Upper Karoo, which covers vast parts of the central Karoo region. The Nama Karoo bioregion has a moderately distinct but rather species poor flora, with few regionally endemic plant species, and relatively very few plant Species of Conservation Concern, thanks partly to very low levels of habitat loss to agriculture, mining and urban development.

No Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) or Other Natural Areas (ONAs) are mapped in or close to the study area. *Note from EAP: the newest SANBI maps indicate the area as being an Ecological Support Area. This however does not change the outcome of the Ecological Assessment in any way.*

Sensitivity and overview of the vegetation

The Northern Upper Karoo vegetation type is classified as a **Least Threatened** habitat on a national basis. This vegetation type is one of the most widespread vegetation types in the country and is relatively homogenous throughout its vast range, with a low number of vegetation type endemics and very few plant Species of Conservation Concern. The vegetation unit is thus not considered to be a national conservation priority.

No plant Species of Conservation Concern (SoCC) nor Protected species were recorded on site, and none are likely to be present.

The entire site is deemed to be of **Medium Botanical Sensitivity**. Key informants of this assessment include the Least Threatened nature of the vegetation unit, its widespread extent, the intact nature of the vegetation, and the lack of any plant SoCC.

Terrestrial fauna

Based on the habitat on site it can be concluded that the vertebrates present on site are likely to be representative of the region in general. Given the relatively small site and the homogenous nature of the habitat few vertebrates are likely to be resident, but various species may cross the site or use it for foraging. There are no permanent wetlands or rocky outcrops – habitats which would notably increase the vertebrate diversity and sensitivity. Two possible threatened mammals may cross the site on occasion – Cape Fox and Black Footed Cat, but these are very unlikely to be resident, and even less likely to be impacted by the proposed BESS as both are highly mobile and will move off when disturbance commences.

Overall terrestrial faunal sensitivity is likely to be **Medium**.

Impact Assessment
Refer to Chapter 6 of this report for an impact assessment and proposed mitigation measures.

Conclusion
The proposed BESS development (and therefore the adjacent, much smaller 9.99MW GenSet development) would have a Low negative botanical and faunal impact before and after mitigation. There are no additional mitigation requirements to add to the existing EMPr.

4.2.4 Heritage

An Amendment Letter for the adjacent BESS EA amendment application was compiled by Mr John Gribble from ACO Associates and is attached as Appendix C6. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A concise summary of the findings follows below.

The integrated Heritage Impact Assessment (HIA) considered archaeological heritage resources, the historical built environment, cultural landscapes, scenic routes, sense of place and graves.

The sites on the rocky ridge in the north-eastern corner of the farm lie within the area authorized for the construction of Badenhorst Dam PV3, but **no heritage resources identified by the HIA are located within the laydown area proposed for the installation of the BESS.**

The development will occasion no changes to the identified impacts on heritage resources, provided the mitigation measures recommended in the original HIA are implemented. *Note from EAP: These mitigation measures are included in the original EMPr.*

With regard to cultural landscape, scenic routes and sense of place, the BESS will be installed at least 3km from the eastern edge of De Aar and a similar distance from the N10 at its closest point to their locations. The installation site is in a flat and largely featureless open area of the landscape, with hills behind them in the distance. Although their distance from the N10 and from De Aar will, to some extent mitigate the impact of the containerised BESS units, they nevertheless have the potential to be visually intrusive in the surrounding rural landscape, from both De Aar and the N10.

The impact significance of the installation of the BESS on cultural landscape, scenic routes and sense of place is <u>medium (negative)</u>, as assessed by the HIA. It is recommended that to reduce intrusion in the cultural landscape as far as possible the BESS units are installed without stacking. *Note from EAP: The units of the 9.9MW GenSet will not be stacked*

From a heritage resources perspective, the proposed BESS amendments development (and therefore the adjacent, much smaller 9.99MW GenSet development) to the environmental authorisation are considered acceptable. No further mitigation measures are recommended for inclusion in the EMPr.

4.2.5 Palaeontology

An Amendment Letter for the adjacent BESS development was compiled by Mr John Almond from Natura Viva and is attached as Appendix C7. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. The report concluded as follows:

In view of (1) the generally LOW palaeontological heritage sensitivity of the PV facilities near De Aar, as assessed by Almond (2013a, 2013b), and of (2) the small additional footprint of the proposed BESS, it is concluded that:

- the inclusion of a BESS within each of the authorised laydown areas will not change the nature or significance of any of the impacts assessed in the original PIA studies;
- the proposed BESS installations are unlikely to result in any additional direct, indirect or cumulative impacts that were not previously assessed; and
- there are no additional management outcomes or mitigation measures in terms of palaeontological heritage that would be applicable to the proposed BESS.

There are no objections on palaeontological heritage grounds to the proposed BESS amendment (and therefore the adjacent, much smaller 9.99MW GenSet development) for the solar PV energy facility near De Aar. There are no additional mitigation requirements to add to the existing EMPr.

4.2.6 Stormwater Management Plan

An Amendment Letter for the adjacent BESS development was compiled by *Zutari (previously Aurecon) (Mr Martin Kleynhans)* and is attached as Appendix C8. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A concise summary of the findings follows below.

The original study indicated that there would be increases in runoff due to the proposed solar development. The increased runoff and erosion potential can be mitigated by using multiple stormwater outlets, energy dissipaters and attenuation (detention) ponds if necessary. However, it should be noted that once a detailed survey and design of the stormwater infrastructure has been undertaken there may be a need for on-site attenuation of the flood peak for the volume

that exceeds the predevelopment flow especially where increased runoff in the downstream watercourse could cause excessive erosion, impact downstream dwellings, sensitive ecological areas, road and railway crossings and other infrastructure.

Presumably the BESS platforms will be gravelled or paved with an appropriate storm water drainage system included, so that the batteries can be housed and maintained in an orderly fashion. Hence the permeability of the BESS platforms will be lower, and the runoff higher, than that of the equivalent solar PV area which would have been constructed on the in-situ soil.

The previous study estimated that the runoff coefficient (Rational Method C-value, which defines the proportion of the rainfall that will runoff during the design storm causing the flood downstream) for the 1:5 year return interval event, would be 0.14 for the predevelopment state while the runoff coefficient for the sites developed with solar panels would be 0.23. For the 1:20 year return interval, the C- value for the predevelopment state of the sites was estimated to be 0.16 and for the development with PV panels the C-value varied to a value as high as 0.33.

If the BESS platform area is surfaced with compacted gravel or paved, then the runoff coefficient is expected to increase to a value of the order of 0.75. This suggests an increase in the runoff peaks by a factor of about five over the predevelopment state, and by a factor of between two and three for the alternative development state with PV panels. Thus, a significant increase in runoff peaks compared to the predevelopment state can be expected; an increase which will also be larger than if the same area had been developed with solar PV panels.

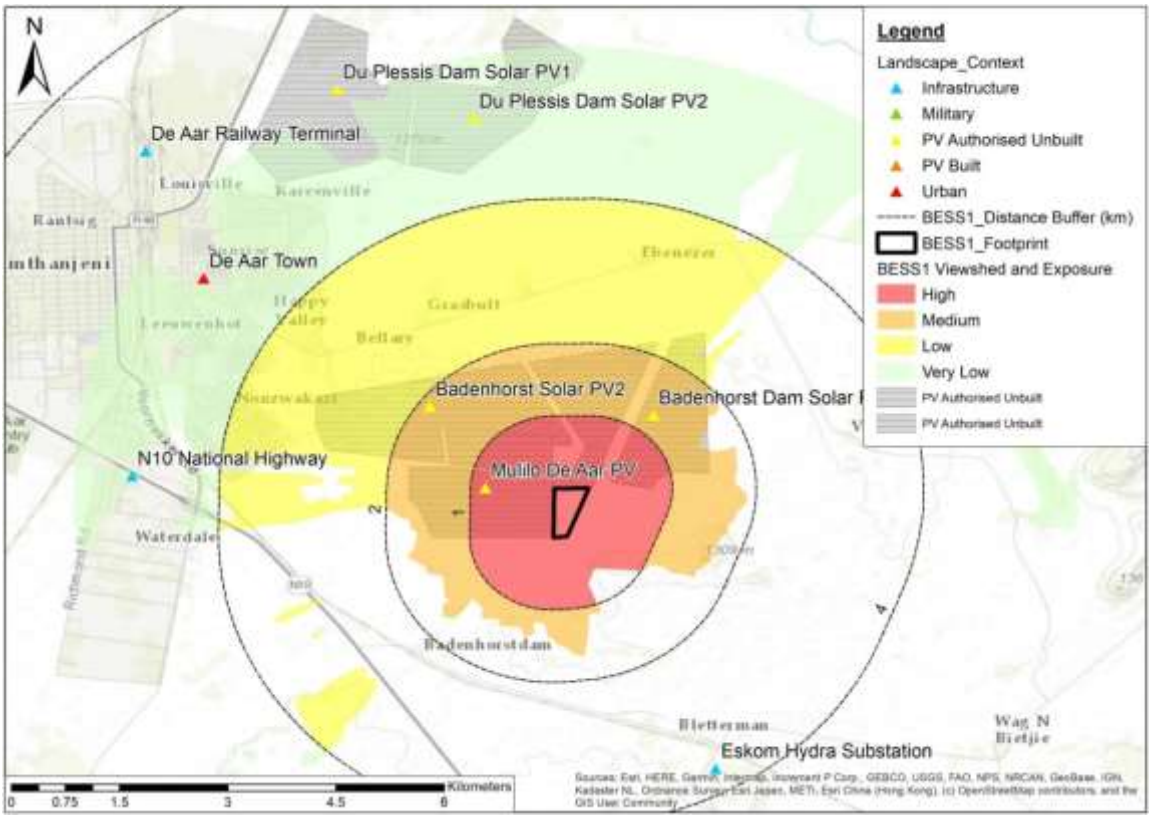
The increased peak runoff could cause erosion, impact dwellings, sensitive ecological areas, road and railway crossings and other infrastructure downstream. But this impact can be fully mitigated to any desired return interval through the inclusion of the measures detailed in the original hydrology reports including attenuation (detention) ponds, the design of which can be undertaken during the detailed design phase and which can be used to reduce the peak runoffs back to the predevelopment levels at the desired flood return interval before they exit the site.

Therefore, the proposed BESS amendment ((and therefore the adjacent, much smaller 9.99MW GenSet development) would have a marginal effect on the impact profile from a stormwater runoff perspective, a review of the assessment is deemed to not be required and the proposed amendment would not materially change the impact rating for the development. No new mitigation measures for inclusion in the EMPr are required.

4.2.7 Visual Impact Assessment

A Visual Impact Assessment (VIA) was undertaken by *VRM Africa (Mr Steven Stead)* for the adjacent BESS and is attached as Appendix C6. As explained in paragraph 4.2 above, the findings in this study are also applicable to the Mulilo De Aar PV 9.99MW GenSet development as proposed in this EA amendment application. A short summary thereof follows below.

Project Zone of Visual Influence



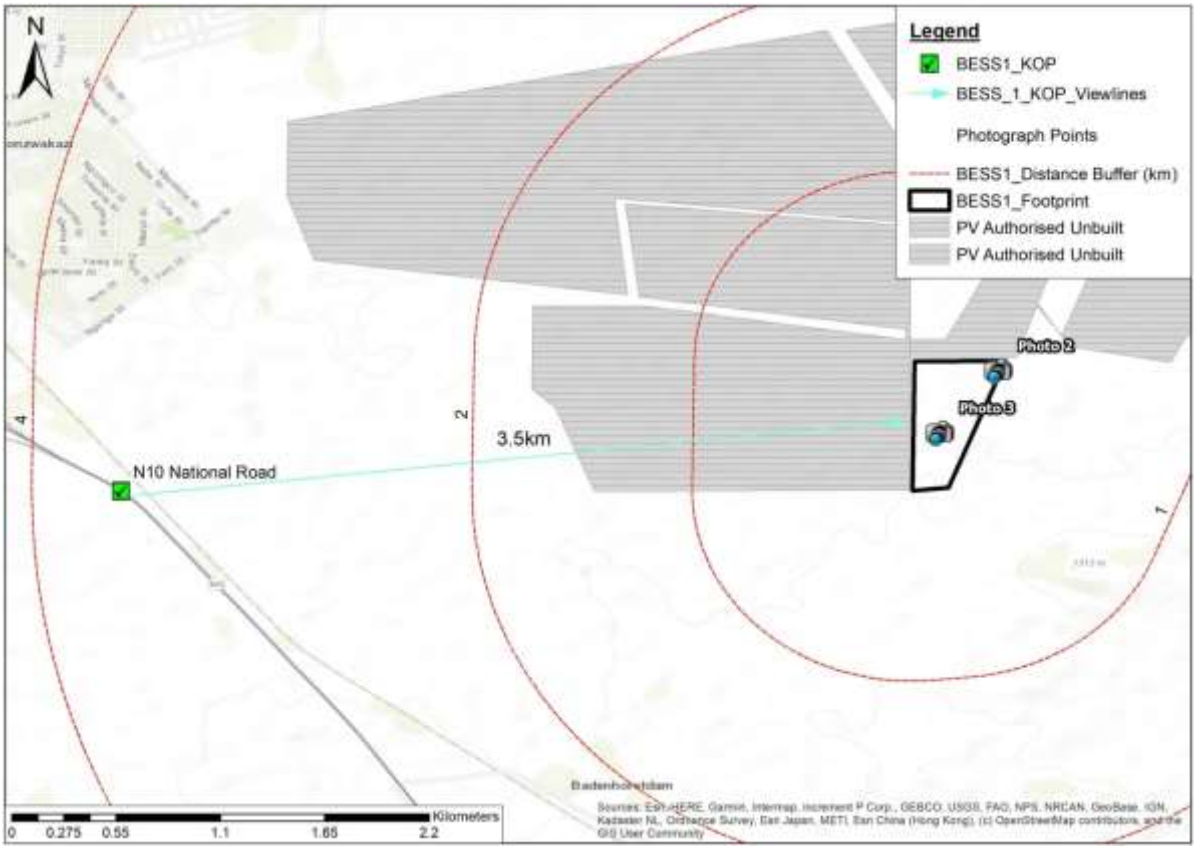
The map above reflects the extent of the viewshed, divided up into categories that indicate the **visual exposure** to the property. Due to the flat terrain surrounding the site, the High Exposure area affords clear visibility from all portions of land surrounding the site. This area is most likely to experience some change to the landscape character, where clear views of the landscape change will take place at a size and scale that will dominate the attention of the casual observer. The landuse in this area is farming and has no receptors. The Medium Exposure area also extends around the site due to the flat terrain, but with the higher ground to the southeast starting to reduce visibility. This area is also rural agricultural and affords no receptors. The yellow area in the map depicts the viewshed with Low Exposure. This area is shaped to the north due to higher terrain restricting views to the south. Receptors within this area would include residents of Nonzwakazi to the west and Bellary to Ebenezer to the north, as well as the N10 National Highway.

The **Zone of Visual** Influence is defined as Medium as some expansion of the visibility will be created by the flat terrain in the wide valley. The **visual absorption capacity (VAC)** is currently low due to the lack of development of the property and the agricultural landuses. However, the site is

surrounded by an authorised PV project and once constructed, will result in a significant change to the surrounding landscape context and as such the VAC is rated as High (i.e. the receiving landscape is able to visually absorb the proposed BESS landscape change in the near future).

Receptors and Key Observation Points (KOPs)

KOPs are defined as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed.



Name	Km	Zone	Exposure	KOP	Motivation
N10	3km	Middle ground	Medium	Yes	Receptors making use of the N10 are approximately 3.5 km from the site and will have Medium exposure to the landscape modifications, potentially influencing the local sense of place.
Nonzwakazi informal settlement	3km	Middle ground	Medium	No	The project is located approximately 3.5km from the Nonzwakazi informal settlement. The built nature of the local urban sense of place is likely to limit receptor sensitivity to landscape change.

Scenic Quality Assessment

The dominant landscape was rated for Scenic Quality and was rated Medium-Low as a visual resource. The grasslands do add to the rural agricultural sense of place, but the adjacent power line corridor detracts from the local sense of place.

Receptor Sensitivity Assessment

The site is remote with no close proximity receptors. The urban nature of the De Aar receptors located 3km to the west is likely to reduce their sensitivity to landscape change.

Visual Resources Management Classes

The Visual Inventory for this BESS project is rated Class IV. This means that best practice in visual design should be incorporated into the landscape change to ensure that the new landscape change does not detract from the (currently) surrounding rural agricultural landscape context.

Conclusion

The visual impact of this proposed development must be assessed in the context with the other renewable energy projects within the De Aar area that are in various stages of approval. De Aar has some of the highest renewable energy resource levels in the world, with good existing road infrastructure and accessible to the national grid. **The Visual Impact Study for the BESS development (and therefore the adjacent, much smaller 9.99MW GenSet development) found that impacts are likely to be 'Medium' without mitigation and 'Low' with mitigation. Mitigation measures for inclusion in the updated EMPr are discussed in Chapter 6 of this report.**

4.3 Conclusion

Mitigation measures as proposed by the air- and noise specialist studies conducted for this proposed GenSet development have been included in the updated EMPr. The air- and noise specialist studies concluded that all potential air and noise impacts have low significance.

Other specialist studies conducted for the directly adjacent BESS EA amendment application all concluded that the impact that the proposed BESS development (approximately 20 hectares in extent) could have on the environment can be mitigated to acceptable levels.

The 9.99MW GenSet development has a much smaller footprint with far less impact than the BESS development (approximately 0.25 hectares vs 20 hectares), is directly adjacent to the assessed laydown area, is within the previously authorised PV site and is situated within a habitat with a homogenous nature. It can therefore be concluded that mitigation applicable to the BESS is also applicable to the 9.99MW GenSet development. Mitigation proposed for the BESS site which is not already included in the original EMPr has therefore been included in the updated EMPr for the Mulilo De Aar PV project.

CHAPTER 5: PUBLIC PARTICIPATION

5.1 Objectives of the Public Participation Programme

The main aim of public participation is to ensure transparency throughout the environmental process. The objectives of public participation are the following:

- To identify all potentially directly and indirectly affected stakeholders, government departments, municipalities and landowners;
- To communicate the proposed project in an objective manner with the aim to obtain informed input;
- To assist the Interested & Affected Parties (IAPs) with the identification of issues of concern, and providing suggestions for enhanced benefits and alternatives;
- To obtain the local knowledge and experience of IAPs;
- To ensure that all reasonable alternatives are identified for assessment.
- To communicate the proceedings and findings of the specialist studies;
- To ensure that informed comment is possible;
- To ensure that all concerns, comment and objections raised are appropriately and satisfactorily documented and addressed.

5.2 Public Participation Process Followed

Interested & Affected Parties Register

Significant measures were taken to ensure that all stakeholders that could have been affected or have an interest in this project were identified. The IAP Register (attached as Appendix D5) consists of directly and indirectly affected landowners, stakeholders and government departments.

Newspaper advertisement

A combined newspaper advertisement advertising the 2x sites as explained in Chapter 1 will be placed in the local newspaper, The Echo/Midland News, advertising the availability of the Draft Motivational Report with a request for public comment. Proof thereof will be provided in the Final Motivational Report.

Onsite notices

One notice was placed on the N10 highway in close proximity to the site and another notice was placed at the entrance to the post office. A combined notice had been prepared for both the Badenhorst Dam PV3 and Mulilo De Aar PV projects, because they are situated in close proximity of each other on the same property. Photographs thereof follow on the next page.

N10 highway in close proximity to the site

Entrance to the post office

Distribution of the Draft Motivational Report

The Draft Motivational Report (this document) will now be distributed to everybody on the IAP Register. Proof thereof will be submitted in the Final Motivational Report.

The EA Amendment Application Form and Motivational Report will be submitted to DEFF for registration of the project and their comment on the project.

Final Motivational Report

Comment received on the Draft Motivational Report will be included in the Final Report and submitted to DEFF for their approval and amendment of the Environmental Authorisation. The IAPs will be informed of their right to appeal DEFF's decision.

CHAPTER 6: IMPACT ASSESSMENT

6.1 Specialist studies: additional mitigation not required

It is confirmed that the following specialists' studies (refer to Chapter 4) did not result in additional mitigation requirements that are not already included in the original EMPr.

Avifauna
There is no need to amend the currently applicable bird impact ratings and there are no additional mitigation requirements to add to the existing EMPr.

Ecological Assessment
The proposed development would have a Low negative botanical and faunal impact before and after mitigation.

Heritage
The development will occasion no changes to the identified impacts of on heritage resources, provided the mitigation measures recommended in the HIA conducted during the EIA process are implemented.

Palaeontology
There are no specific requirements in terms of palaeontological heritage.

Storm Water
Therefore, the proposed amendment would have a marginal effect on the impact profile from a stormwater runoff perspective, a review of the assessment is deemed to not be required and the proposed amendment would not materially change the impact rating for the development.

Mitigation as proposed in the following studies has been included in the EMPr (refer to paragraph 6.2 below):

- Noise
- Air quality
- Visual impact
- Aquatic impact

6.2 Specialist studies: new mitigation for inclusion in the EMPr

The Noise Impact Assessment and Air Quality study provided impact assessment tables from new studies which had not previously been undertaken. The proposed mitigation measures as detailed below are included in the updated EMPr.

6.2.1 Noise Impact Assessment

IDENTIFICATION OF IMPACTS

Two aspects are important when considering potential noise impacts of a project namely:

- The increase in the noise level because of the construction and operational phases, and;
- The overall noise level produced by the generators.

The prevailing ambient noise level may change according to the season of the year when farming activities or wind becomes the pre-dominant contributor to the higher ambient noise levels.

Construction Phase

- Grading and building of new roads and trenches
  Noise may be generated by the construction activities and the use of construction equipment such as Graders, TLB's and Front-end loaders. The use of this equipment will create an increase in noise levels in the immediate vicinity of the construction activities and in some cases at some distance from the activities.

- Preparation of the footprint, digging of trenches, earthworks, and construction of the base of the backup thermal generator/s.
  Noise could be generated by the following activities: earth drilling, generator noise, civil construction and in extreme cases localised blasting.

- Construction of the backup thermal generation plant
  The construction of the backup thermal generation plant could generate localised noise increase the use of cranes and generators during the assembly stage of the infra structure.

- Construction traffic
  Construction traffic to and from the site would create a temporary linear noise source.

Operational Phase

- Noise generated by the backup thermal generators.
  The exhaust and noise breaks may cause an increased noise level in the vicinity of the generators.

- Backup thermal generators - normal wear and tear, and the lack of preventative maintenance. Noise could be generated through the lack of a cyclic maintenance programme to identify normal wear and tear.

- Traffic
  Traffic noise is created by vehicle movement where mechanical noise, rattles, and road surface play an important role on the noise levels along roads or some distance from roads.

- Sub-station and overhead power lines
  A sub-station can generate noise from the blowers and transformers, and corona noise from the overhead power lines. These noise levels are site specific.

- Maintenance activities
  The regular maintenance activities may give rise to site-specific increase in the noise levels.

IMPACT ASSESSMENT TABLES

Construction phase

Impact	*Nature*	*Extent*	*Duration*	*Intensity*	*Reversibility*	*Impact on Irreplaceable Resources*	*Consequence*	*Probability*	*Significance*	*Confidence*
Impact 1: Grading and building of new roads and trenches:										
Impact Description: Noise generated by construction and earth moving equipment.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Construction equipment to comply with the IFCs Health and safety requirements. Safe blasting techniques to be used.										
With Mitigation	Negative	Medium	Low	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 2: Preparation of the footprint, earthworks, and construction of the backup thermal generation sites										
Impact Description: Noise from activities such as earth drilling, generator noise, civil construction.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Construction equipment to comply with the IFCs Health and safety requirements. Safe blasting techniques to be used.										
With Mitigation	Negative	Medium	Low	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 3: Construction of the generators and infrastructure										
Impact Description: Noise from the construction of the generators and infra-structure because of construction activities such as cranes, people, and generators.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Construction equipment to comply with the IFCs Health and safety requirements. Construction of backup thermal generators to take place during permitted hours only.										
With Mitigation	Negative	Medium	Low	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 4: Construction vehicles										
Impact Description: Noise from traffic to and from the specific sites during the assembling process. Traffic to remain on the roads and at a speed of 40km/h.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Internal roads to be kept in a good condition and all potholes to be repaired.										
With Mitigation	Negative	Medium	Low	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Operational phase

Impact	*Nature*	*Extent*	*Duration*	*Intensity*	*Reversibility*	*Impact on Irreplaceable Resources*	*Consequence*	*Probability*	*Significance*	*Confidence*
Impact 1: Noise generated by the backup thermal generators										
Impact Description: Noise breaks and exhaust outlet may create an increased noise level.										
Without Mitigation	Negative	Medium	High	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Noise surveys to be carried out.										
With Mitigation	Negative	Low	High	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 2: Backup thermal generators - normal wear and tear, and the lack of preventative maintenance										
Impact Description: Mechanical noise generated by the lack of maintenance and noise break.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Cyclic maintenance programme to be in place to prevent increased noise levels because of wear and tear and to identify high noise levels on a pro-active manner.										
With Mitigation	Negative	Low	High	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 3: Traffic										
Impact Description: Traffic noise is created by vehicle movement where mechanical noise, rattles, and road surface play an important role on the noise levels along roads or some distance from roads.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: Roads to be kept in good order at all times..										
With Mitigation	Negative	Low	High	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 4: Sub-station and overhead powerlines										
Impact Description: Sub-station can generate noise from the blowers and transformers, and corona noise from the overhead power lines. These noise levels are site specific.										
Without Mitigation	Negative	Medium	High	Medium	Medium	Low	Medium	High	Medium	High
Mitigation Description: Routine inspections and noise assessments on a regular basis.										
With Mitigation	Negative	Low	High	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Impact 5: Maintenance activities										
Impact Description: Noise from regular maintenance activities.										
Without Mitigation	Negative	Medium	Low	Medium	Low	Low	Medium	High	Medium	High
Mitigation Description: All equipment to be in good working order and maintenance activities should only be undertaken during permitted hours.										
With Mitigation	Negative	Medium	Low	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

Cumulative impacts

Impact	***Nature***	***Extent***	***Duration***	***Intensity***	***Reversibility***	***Impact on Irreplaceable Resources***	***Consequence***	***Probability***	***Significance***	***Confidence***
Impact 1: Cumulative impact from abutting PV plant										
Impact Description: Noise from generators and the PV Plant.										
Without Mitigation	Negative	Medium	High	Medium	Low	Low	Medium	Low	Medium	High
Mitigation Description: Pro-active identification of noise issues.										
With Mitigation	Neutral	Low	High	Low	Low	Low	Low	Low	Low	High
Cumulative Impact: Low										

MITIGATION MEASURES

Aspect	Mitigation	Responsible person	Activity
Construction phase			
Grading and building of new internal roads	Construction equipment to comply with the standards for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.	Site engineer	Environmental audits during the construction phase.
Preparation of the footprint area, earthworks & construction	Construction equipment to comply with the standards for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.	Site engineer	Environmental audits during the construction phase.
Construction of the backup thermal generator sites	Construction of back up thermal generators to take place during permitted times only. Construction equipment to comply with the standards for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.	Site engineer	Environmental audits during the construction phase.
Additional traffic	Roads to be always kept in a good state of repair and all potholes to be repaired.	Site engineer	Environmental audits during the construction phase.

Operational phase			
Noise generated by the backup thermal generators	Acoustic screening measures to be always in place (if required to achieve the sound levels stated in the datasheet)	Site engineer	Site establishment at the time of the site preparation by the site engineer.
Backup thermal generator/s - mechanical noise	Acoustic insulation and/or screening to be in place *(if required to achieve the sound levels stated in the datasheet)*	Design phase of the turbine – Design engineers	Engineering drawings to be provided and acoustic compliance certificate to be issued.
Backup thermal generator/s – Normal wear and tear, poor component design, lack of preventative maintenance	Cyclic maintenance programme of the backup thermal generators; Withdraw from services should a backup thermal generator/s create excessive noise due to wear and tear or poor maintenance.	Site Engineer; Acoustic noise specialist	Regular noise monitoring to take place to identify noisy backup thermal generators.

Traffic	Vehicles to maintain the speed limit always; Roads to be maintained and pot-holes to be removed.	Site engineer	Environmental audits.
Maintenance of the backup thermal generators and sub-station	Maintenance Equipment to comply with the IFCs Health and safety requirements.	Site engineer	Environmental audits.

Decommissioning phase			
Removal of infra-structure	Construction equipment to comply with the standards as for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.	Site engineer	Noise monitoring.
Rehabilitation of backup thermal generator/s areas	Construction equipment to comply with the standards as for construction vehicles as explained in the IFC's Environmental Health & Safety Regulations.	Site engineer	Noise monitoring.

Cumulative impact			
Cumulative impact of PV Plant and the backup generation sites.	Environmental noise audit to be carried out once the plant is commissioned**.**	Site engineer	Environmental audits.

Noise monitoring programme

The noise monitoring programme will need to be a pro-active programme to manage the noise levels within the boundaries of the backup thermal generator/s boundaries. The monitoring programme must consist out of the following phases:

Pre-construction phase – A noise survey will be required to be done along the footprint boundaries and at the complainant's property when a complaint is received.

Construction phase – A winter and summer period noise survey must be done.

Operational phase – Noise surveys must be done monthly to start off with and as soon as the results are stable a quarterly noise survey to be carried out.

The following noise results must be kept on record:

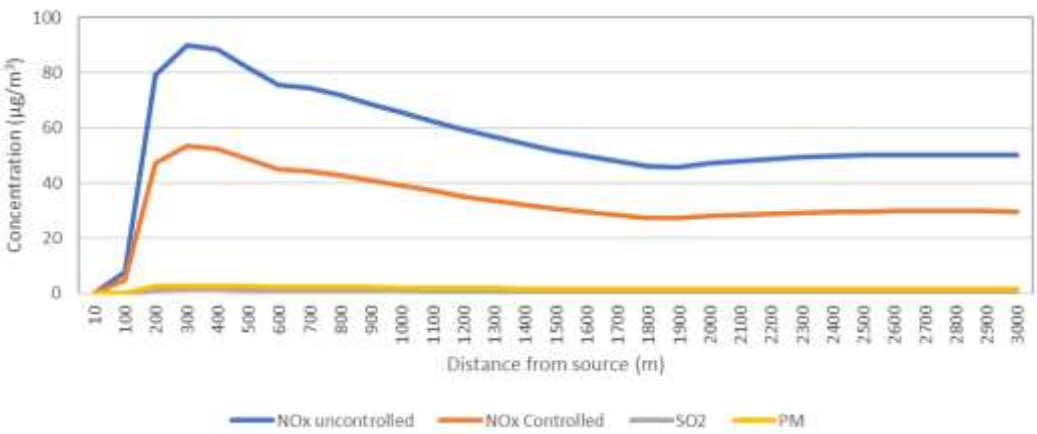
- Leq – values of each measuring point in dBA;
- Spectrum analysis of the results;
- Any physical characteristics in and next to the measuring points which may change the noise regime of the area;
- Any other details such as the instrument, competent person etc. will be compiled and made available.

Note from EAP: These mitigation measures have been included in the Updated EMPr.

6.2.2 Air Quality Technical Comment

PREDICTED AMBIENT CONCENTRATIONS (IMPACTS)

The predicted maximum ambient SO_2, NO_X and PM10 concentrations from the source to 3000m downwind are shown in the graph below. For all three pollutants, the maximum predicted ambient concentration occurs 300m downwind of the source. It is well below the limit value of the 1-hour NAAQS. The NAAQS are health-based which implies that *it is unlikely that adverse health effects will occur in the event of exposure to ambient concentrations below the limit value*.



Predicted maximum ambient concentrations in µg/m3

	SO_2	NO_X		PM_{10}
		Uncontrolled	Controlled	
Max concentration	1.5	90.0	53.5	2.8
NAAQS limit value	350	200	200	75*

***24-hour limit value**

DISCUSSION ON IMPACTS

The predicted emission rates (refer to the table above) are **very low**. These will however increase ambient concentration of SO_2, NO_2 and PM_{10} downwind of the generators while they are in operation. Due to the very low emission rate and the generally good dispersion potential, the increase is shown to be very low and **the resultant ambient concentrations are highly unlikely to exceed the National Ambient Air Quality Standards** (NAAQS).

The ambient concentrations resulting from the generator emission will be highest, albeit low relative to the NAAQS, 300m from the generators, and will decrease with increasing distance. **The magnitude of any impact is likely to be very low**.

The PV site is relatively remote with the closest residences in De Aar. It is therefore highly unlikely that individuals will be exposed to harmful ambient concentrations resulting from the generator emissions. The probability of exposure in the ambient environment is further reduced considering that the generator operate in back-up mode only.

Considering the limited extent, the short duration, the very low magnitude and the very low probability of exposure, air quality impacts are deemed to be insignificant.

Cumulative effects can be considered as

(i) the generators at both sites (Badenhorst Dam Solar PV3 and the Mulilo De Aar PV site) operating together, and

(ii) the added effects of the generator emissions on existing ambient air (i.e. from other sources).

The scenario of generators at both sites operating at the same time is feasible considering they may be used in period of weak irradiance. In this case, **the cumulative impact from the two PV sites will also be insignificant**.

There are no significant sources of SO_2 and NO_X in the general area, so the current ambient concentrations will be very low. They will remain low with the addition from the generators at the two PV sites. The cumulative impact will therefore be insignificant. Background ambient concentrations of PM_{10} may be high relative to the NAAQS because of the arid nature of the area and entrainment of dust into the atmosphere by wind. The added effect of PM_{10} from the generator emissions will be insignificant by comparison.

Impact criteria	Badenhorst PV Site	Mulilo De Aar PV site	Cumulative assessment
Extent	Site only	Site only	Site only
Duration	Short periods	Short periods	Short periods
Magnitude	Very low	Very low	Very low
Probability	Low	Low	Low
Significance	Insignificant	Insignificant	Insignificant

NO_X mitigation

For the control of NOx, consideration must be to the engine type, i.e. whether they are rich-burn or lean-burn engines. Rich-burn engines have an air-to-fuel ratio operating range that is near stoichiometric resulting in exhaust gas with little or no excess oxygen. A lean-burn engine has an air-to-fuel operating range that is fuel-lean of stoichiometric, therefore the exhaust has medium to high levels of oxygen.

The most common NOx control technique for diesel and dual fuel engines focuses on modifying the combustion process. Selective catalytic reduction (SCR) is a post-combustion technique. Combustion modifications include injection timing retard (ITR), preignition chamber combustion (PCC), air-to-fuel ratio, and derating. SCR is an add-on NOx control placed in the exhaust stream following the engine and involves injecting ammonia (NH_3) into the flue gas. The NH_3 reacts with the NOx in the presence of a catalyst to form water and nitrogen.

	SO_2	NO_X		PM_{10}
		Uncontrolled	Controlled	
Max concentration	1.5	90.0	53.5	2.8
NAAQS limit value	350	200	200	75*

***24-hour limit value**

Note from EAP: Please note that the NOx emissions are way below acceptable thresholds with or without above-mentioned mitigation (Uncontrolled and Controlled in the tables above). The recommended mitigation measures (although not required to be implemented) have however been added to the Updated EMPr.

EMPr

Routine servicing of the generators to the manufacturer's specifications is recommended for inclusion in the EMPr.

6.3 Fuel Storage Tanks: Mitigation

Fuel storage tanks of less than 500m^3 in volume will be constructed to store the fuel for the GenSet development.

Note from EAP: Fuel storage is already authorised under the Mulilo De Aar PV EA. This activity was therefore assessed during the original EIA process, in other words authorisation was previously granted for GNR 327 Listing Notice 1 Activity 14. Additional mitigation measures are however supplied for inclusion in the EMPr.

The following in terms of impact and mitigation are applicable:

Potential negative impact to be avoided

- *Risk for surface and groundwater pollution*

  During construction impact is associated with:
  - Potential for spillages from construction vehicles and their onsite maintenance

  During operation, impact is associated with:
  - Spillages resulting from petroleum transfer operations, overflow, etc. could occur).
  - Failure of structures (i.e. tanks, etc.) because of substandard materials and poor construction methods

- *Health considerations*, i.e. in terms of vapour. It is important to ensure protection of personnel involved with filling of tanks, etc.

Mitigation

DESIGN OF ABOVE GROUND STORAGE TANKS

- The design and placement of tanks will be in accordance with industry standards.
- The latest updated South African National Standards (SANS) pertaining to the design and installation of storage tanks must implemented.
  This can be obtained from the following:
  - Standards of South Africa (A Division of the SABS)
  - Tel 012 428 7911 / www.stansa.co.za

  The standards should include the latest version of the South African National Standard SANS 10089-1 – The Petroleum Industry:
  - SANS 10089-1: Storage and Distribution of Petroleum Products in above-ground bulk installations;
  - SANS 10089-2: Electrical and other installations in the distribution and marketing sector;
  - SANS 10089-3: The installation, modification, and decommissioning of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations.
- Incorporation of applicable guidelines or equivalent international recognised codes of good design and practice into the designs must take place.
- All tanks, seals, pipes and fittings are required to
  - be chemically compatible with the hazardous substance being stored in it,
  - be protected from, or resistant to, all forms of internal and external wear, vibration, shock and corrosion;
  - have a stable foundation or support structure suitable for all operating conditions;

    - be protected from fire, heat, vacuum and pressure, which might cause tank failure;
    - be sized to suit process and storage requirements.
- No pooling of material under a road tanker may occur, thereby preventing the possibility of fire and explosions.
- Fuel storage tanks should be located on an impermeable surface that is protected from the ingress of storm water.

- Transfer of petroleum product from road tanker to the storage tanks :- Provide for a 200mm thick reinforced concrete spillage containment slab with a slope towards a catch pit connected to an oil/grease separator.

CONSTRUCTION OF ABOVE GROUND STORAGE TANKS

- The installation of the above-ground storage tanks must take place in accordance with industry standards.
- To ensure the system is installed as required by the regulatory authorities, on-site works must be supervised at all times by an experienced person.
- It is essential that any protective coating applied to the tanks and pipework is not damaged during installation. The coating must be inspected during and after installation and any damage must be repaired immediately prior to any filling of the tanks.
- Records must be kept of how the tank and pipe system was installed for future reference in case of expansion and/or decommissioning with removal of the equipment. These records must include record and certificates of the suppliers, as well as technical drawings of the installation of the tanks and pipework, their dimensions and the materials used. It is recommended that all records are dated and maintained during the life of the tanks and are kept on-site for future reference (for example, in the event of a leaks or spillage) in a place from where they can be retrieved quickly.

OPERATION: MONITORING AND RECTIFICATION

- As part of routine maintenance, the Applicant must undertake regular engineering inspections of the tanks, tank valves and pumps to ensure that there are no leaks.
- The written record that was compiled during the installation of the tank and system that includes the technical drawings of the installation showing the tanks and pipeworks, their dimensions and the materials used (refer to the heading "CONSTRUCTION OF THE ABOVE GROUND STORAGE TANKS") must be kept on-site for reference in the event of a leak or spillage in a place from where it can be retrieved quickly.
- Any incidents resulting from the storage structure and/or operation that could have a detrimental impact on the environment must immediately be investigated and rectification measures must be implemented and monitored accordingly.

- Measures such as spill kits to contain spills must at all times be available on site.
- All incidents must be reported to the Department of Human Settlement, Water and Sanitation within 24 hours of the occurrence who will advise on emergency procedures to follow.

OPERATION: HEALTH AND SAFETY

- All staff engaged in operational maintenance duties shall be fully acquainted with the requirements of the safety regulations in terms of the OHS Act, 1993.
- The Applicant must at all times ensure at all times that the safety and operation of the storage tank complies with the requirements for health and safety as prescribed in the Occupational Health and Safety Act (OHS), 1993 (Act Nr 181 of 1993), as amended.
- The following specific safety and protection measures shall be provided (and sufficient training given) in accordance with the OHS :-
    - First aid treatment
    - Medical assistance
    - Emergency treatment
    - Prevention of inhalation of fumes
    - Protective equipment, clothing and footwear
    - Safety goggles and eye shields
- Maintenance and inspection work shall be planned and supervised by responsible members of staff who shall ensure that all relevant precautions are taken.
- Safety signs must be placed in visible areas all over the site.

Note from EAP: Above-mentioned stipulations have been included in the amended EMPr.

6.4 Impact assessments of specialist studies previously conducted

6.4.1 Aquatic Impact Assessment

The significance of the potential aquatic ecosystem impacts of the original proposed activities were expected to be very low, with implementation of recommended mitigation measures. Recommended mitigation measures for the BESS (and therefor for the adjacent GenSet development) are as follows:

- Construction should preferably take place during the low rainfall period to minimise the risk of contaminated runoff from the site. Invasive alien plants should be removed from the disturbed areas adjacent to the site.
- All materials on the construction site should be properly stored and contained.
- Disposal of waste from the site should also be properly managed.
- Construction workers should be given ablution facilities at the construction sites that are

located at least 100m away from any aquatic features and regularly serviced.

- During operation, adequate stormwater management measures should be in place at the new site to prevent any stormwater runoff intensity or water quality impacts to the adjacent drainage feature.
- The proposed development will be situated within the previously authorised laydown area which has patches that are devoid of vegetation. Some of these areas have pan-like features but they are too small to be of significance from an aquatic ecosystem point of view. It is however recommended that the final proposed footprints of the development site be ground-truthed before the final layout is being determined to ensure that there are no aquatic features of significance within the final footprint.

Note from EAP: Mitigation mentioned above that is not included in the original EMPr was included in the updated EMPr.

Conclusion

From an aquatic ecosystem perspective there is no reason why the proposed BESS *(and therefore the adjacent, much smaller 9.99MW GenSet development)* should not be approved in terms of NEMA.

6.4.2 Ecological Impact Assessment

Construction phase impact

- Permanent loss of all natural vegetation within the site development footprint
- Temporary disturbance (<5 yrs) of natural vegetation adjacent to the building footprints

- Minor populations of certain animals (termites, ants) may be lost within the development footprint, but no vertebrates are likely to be permanently lost within the development footprint.
- Significance of this loss is Low negative before and after mitigation.
- No plant or terrestrial animal Species of Conservation Concern are likely to be impacted or lost.
- No loss of mapped CBAs will occur.
- The extent of the ecological impact is deemed to be local and regional.

Primary operational phase botanical impact

- Habitat fragmentation
- Disruption and minor loss of current ecological connectivity across the development footprint areas.
- A secondary operational phase impact is the spread of alien invasive vegetation, facilitated by the soil disturbance caused by construction.

- Loss of ecological connectivity in the study area and associated habitat fragmentation as a

result of the proposed development will occur, but is unlikely to be a major ecological issue in the region, as the development footprint is relatively small and very large areas of similar habitat will remain undisturbed in the region and nearby. This impact is likely to be Low negative before and after mitigation.

- The soil disturbance caused by construction is likely to facilitate the spread of alien invasive vegetation in and around the development areas, but the significance of this is Low negative before mitigation and Very Low negative after mitigation, as the magnitude of the invasion is likely to be low.
- On balance the likely operational phase impacts of the proposed development are Low negative before and after mitigation.

Mitigation

The only required mitigation is removal alien invasive vegetation as per NEMBA schedules and notably *Prosopis* species – mesquite.

The proposed development does not require any other specific ecological mitigation, on account of the Medium sensitivity of the site, the Least Threatened nature of the vegetation type, the absence of any mapped CBAs, and the absence of any plant or vertebrate Species of Conservation Concern.

Note from EAP: The mitigation proposed in this ecological assessment, namely the removal of alien invasive species has been included in the EMPr during the original EIA process.

Conclusion

The proposed BESS development (and therefore the adjacent, much smaller 9.99MW GenSet development) would have a Low negative botanical and faunal impact before and after mitigation.

6.4.3 Visual Impact Assessment

The nature of the visual impact associated with a BESS landscape change is rated ***Negative***. *Note from EAP: please note that the GenSet development will only consist of 16 containers which is a much smaller number than for the BESS development. Impacts discussed below will therefore be less for the GenSet development as anticipated for the BESS development.*

The following visual impacts could take place during the lifetime of the proposed project:

Construction Phase

- Loss of site landscape character due to the removal of vegetation and the construction of the BESS structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.

- Possible soil erosion from temporary roads crossing drainage lines.
- Windblown litter from the laydown and construction sites.

Operation Phase

- Massing effect in the landscape from a large-scale modification.
- On-going soil erosion.
- On-going windblown dust.

Decommissioning Phase

- Movement of vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative Effects

- A long term change in landuse setting a precedent for other similar types of solar energy projects.
- Change to local sense of place from cumulative inter-visibility of multiple PV projects.

Reversibility

- Due to the limited necessity for major earthworks in the construction of the BESS project, impacts associated with the proposed project are defined as *Reversible*. The existing agricultural landscape could be re-established to some degree with the removal of all the structures.

Impact Rating Criteria

The following impact rating criteria were used when the visual impacts were assessed.

Extent	Geographical area of influence. **Site Related (S):** extending only as far as the activity **Local (L):** limited to i*mmediate surroundings.* **Regional (R):** affecting a larger metropolitan or regional area **National (N):** affecting large parts of the country **International (I):** affecting areas across international boundaries
Duration	Predicted lifespan **Short term (S):** duration of the construction phase. **Medium term (M):** duration for screening vegetation to mature. **Long term (L):** lifespan of the project. **Permanent (P):** where time will not mitigate the visual impact.
Magnitude	Magnitude of impact on views, scenic or cultural resources **Low (L):** where visual and scenic resources are not affected. **Moderate (M)**: where visual and scenic resources are affected **High (H)**: where scenic and cultural resources are significantly affected.
Probability	Degree of possible visual impact: **Improbable (I):** possibility of the impact occurring is very low. **Probable (P):** distinct possibility that the impact will occur.

	Highly probable (HP): most likely that the impact will occur. **Definite (D):** impact will occur regardless of any prevention measures.
Significance	A synthesis of nature, duration, intensity, extent and probability **Low (L):** will not have an influence on the decision. **Moderate (M):** should have an influence on the decision unless it is mitigated. **High (H):** would influence the decision regardless of any possible mitigation.
Confidence	Key uncertainties and risks in the VIA process, which may influence the accuracy of, and confidence in, the VIA process.

Impact Activity	**Phase**	**Mitigation**	**Nature**	**Extent**	**Duration**	**Severity**	**Probability**	**Significance without**	**Significance with**
BESS	Cons.	W/Out	-ve	Local	Short	Med	P	Med	
		With	-ve	Local	Short	Low	P		Low
	Ops.	W/Out	-ve	Local	Long	Med	P	Med	
		With	-ve	Local	Long	Low	P		Low
	Close	W/Out	-ve	Local	Short	Med	P	Med	
		With	-ve	Local	Short	Low	P		Low
	Cuml. Risk	W/Out	-ve	Local	Long	Med	P	Low	
		With	-ve	Local	Long	Low	P		Low

Mitigation

Construction Phase

- Topsoil should be dealt with in accordance with the EMPr.
- The buildings should be painted a mid-grey, or grey-brown colour.
- To reduce colour contrast, if permitted by the Original Equipment Manufacturer, the BESS structure should preferably be painted a light-brown colour so as to blend with the surrounding arid region landscapes. *Note from EAP: The containers cannot be painted a colour that absorbs heat as this will void warrantees.*
- Fencing should be simple, diamond shaped (to catch wind-blown litter) and appear transparent from a distance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.
- Signage on the N10 should be moderated.
- Lights at night have the potential to significantly increase the visual exposure of the proposed project, therefore it is recommended that general mitigation be implemented to reduce light spillage.

Operation Phase

- Control of lights at night to allow only local disturbance to the current semi-rural night sky landscape context.
- Light spillage management to ensure that security lighting at night is not visually intrusive. Lighting for security should be downward and inward facing and not include overhead

security lighting options.

- Continued erosion control and management of dust.

Closure Phase

- All structures should be removed and where recycled in terms of National best practice guidelines.
- Building structures should be broken down (including foundations).
- The rubble should be managed according to NEM:WA and deposited at a registered landfill if it cannot be recycled or reused.

Conclusion of the VIA

Visual impact summary table

Action	Description
Reviewing the Legal Framework	In terms of the spatial planning defined for the area, the proposed project has a good policy fit. The project will contribute to economic growth and diversification, social development projects, economic development in the region, sustainable development and affordable energy without detracting from significant natural or cultural landscapes. The project has a good policy fit in terms of landscape planning as the area has been identified as a renewable energy development area.
Site Survey	The topography of the area is relatively flat; although there are a few ridge-shaped hills and larger flatter plateaus receiving landscape is likely to extend the visibility of the proposed development. The current land use is grassland agriculture and other than the Eskom powerline adjacent to the site, no other man-made modifications were identified on the site. The current grasslands landscape reduces the visual absorption capacity, but the site is surrounded by an authorised/ unbuilt PV project, which will increase the ability of the receiving landscape to visually absorb the proposed BESS landscape change.
Determining the Zone of Visual Influence and Key Receptors Locations	The Zone of Visual Influence is defined as *Medium* as some expansion of the visibility will be created by the flat terrain in the wide valley. As the area is rural, no high exposure receptors were identified in the viewshed. The only sensitive receptor identified is the N10 National Highway which I located approximately 3,5km to the west of the site. As the N10 is an important tourist view corridor, this receptors was identified as a Key Observation Point.
Site Scenic Quality and Receptor Sensitivity to Landscape Change	The Scenic Quality of the area is *Medium to Low* as the adjacent power line corridor detracts from the local rural agricultural sense of place. Receptor Sensitivity is rated *Low* as the site is remote with no close proximity receptors. The urban nature of the De Aar receptors located 3km to the west is likely to reduce their sensitivity to landscape change. Due to the lower scenic quality and low receptor sensitivity to landscape change, a Class IV Visual Objective as assigned to the site. This allows for large scale landscape modifications, but aligned with best practice in landscape planning that would require recognition of the rural landscape zoning of the site and surrounds that would need to

	inform design to some degree.
Assessing Potential Visual Impacts	A contrast rating from the N10 National Highway found that the expected Degree of Contrast created by the proposed landscape change is likely to be *Medium to Low* (once the PV project has been established). **As such, the assessment of the proposed development found that Visual Impacts are likely to be Medium without mitigation, and Low with mitigation.**

The visual impact of this proposed development must also be assessed in the context of the other renewable energy projects within the De Aar area that are in various stages of approval. De Aar has some of the highest renewable energy resource levels in the world, with good existing road infrastructure and accessible to the national grid. The area where the development is proposed is remote and no significant visual resources fall within the high exposure zone of visual influence. As such, the visual impact of the proposed development found that impacts are likely to be Medium without mitigation, and **Low with mitigation. Given the low impacts, it is recommended that, from a visual perspective, the project should be authorised, with or without colour mitigation.**

6.5 Conclusion

It is concluded that the additional identified impact that the 9.99MW Auxiliary Generator may have on the environment is **either low, very low, site-specific or insignificant and that all impacts can be mitigated to acceptable levels**. Mitigation measures as proposed by the air and noise specialists, who were specifically appointed for this 9.99MW GenSet development, as well as the mitigation proposed by the aquatic and visual impact specialists appointed for the adjacent BESS development, have been included in the updated EMPr.

CHAPTER 7: CONCLUSION

7.1 Assumptions, Uncertainties, and Gaps in Knowledge

Assumptions
It is assumed that all documentation and information obtained from the different stakeholders, professional team members and specialists are accurate, unbiased and valid.

Uncertainties
The development proposal in relation to its environment was thoroughly investigated by various specialists and professionals and there are therefore no uncertainties with regards to the development as proposed.

Gaps in knowledge
Relevant specialist and engineering studies were undertaken for this project and it is highly unlikely that any missing information could influence the outcome of this project.

7.2 Environmental Impact Statement

A Final Environmental Impact Statement will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

At this stage, the following however applies:

- Air quality and noise impact studies were undertaken and mitigation measures were provided. Both studies concluded that all potential impacts would be Low / Very Low after mitigation has been applied.

- Input, and mitigation measures where applicable, were obtained from studies conducted for the directly adjacent BESS development from the following specialists:
    - Ornithologist
    - Aquatic specialist
    - Ecologist
    - Heritage consultant
    - Paleontological consultant
    - Storm water engineer
    - Visual impact specialist

The 9.99MW GenSet development

- has a much smaller footprint with far less impact than the BESS development (approximately 0.25 hectares vs 20 hectares);
- is directly adjacent to the assessed laydown area, and
- is situated within a habitat with a homogenous nature.

It can therefore be concluded that mitigation applicable to the BESS is also applicable to the 9.99MW GenSet development. Mitigation proposed for the BESS site which is not already included in the original EMPr has therefore been included in the updated EMPr for the Mulilo De Aar PV project.

It is concluded that the additional identified impact that **the 9.99MW Auxiliary Generator may have on the environment is either low, very low, site-specific or insignificant and that all impacts can be mitigated to acceptable levels.**

7.3 Why the Amendment Should, or Should Not be Authorised

Reasons for authorisation will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

7.4 Recommendation by the Environmental Assessment Practitioner

Recommendations that should be included in the amended EA will be provided after the completion of the Public Participation Programme and will be included in the Final Motivational Report.

7.5 Affirmation by the Environmental Assessment Practitioner

We, Susanna Nel & Annelize Grobler, herewith affirm the following:

- The information contained in this report is to the best of our knowledge and experience correct.
- All relevant comment and input provided by the stakeholders and IAPs will be included and addressed in the Final Motivation Report.
- Input and recommendations from the specialist reports are provided in and integrated with the Motivation Report.
- All information made available by the EAP to IAPs and any responses thereto as well as comment and input from IAPs will be provided in the Motivation Report.

Susanna Nel
DATE: 18 February 2020

Annelize Grobler
DATE: 18 February 2020

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