

Proposed Wind Energy Facility and Associated  
Infrastructure on Wolf Wind Farm (Pty) Ltd, near  
Wolwefontein in the Eastern Cape

22 July 2020

Revision: 1

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Final EA Amendment Report

**juwi Renewable Energies (Pty) Ltd**

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# 1 INTRODUCTION

The Applicant, Wolf Wind Farm (Pty) Ltd, a subsidiary of juwi Renewable Energies (Pty) Ltd (hereafter referred to as juwi) has been authorised to construct a 90MW Wind Energy Facility (WEF) referred to as the Wolf Wind Farm on the border of the Sundays River Valley Local Municipality and Ikwezi Local Municipality, situated approximately 5km north of Wolwefontein, 35km north-west of Kirkwood and 36km south-east of Jansenville, atop the Klein Winterhoek Mountain range in the Eastern Cape. The project was originally authorised on the 14 September 2015, via Environmental Authorisation (EA) ref no. 14/12/16/3/3/2/599, as amended by 14/12/16/3/3/2/599/AM1, 14/12/16/3/3/2/599/AM3 and 14/12/16/3/3/2/599/AM4<sup>1</sup>.

Since the issuing of the authorisation and subsequent amendments, the wind energy market has continued to evolve and adapt and as a result of a changing marketplace, the applicant would like to undertake a further amendment to the EA to enable them to consider the newer wind turbine models that were not previously available or not considered due to technical, environmental and financial reasons at the time of the original Environmental Impact Assessment (EIA) or the subsequent amendments. Some of these turbine models will better serve the project on technical and financial grounds, most notably their ability to harvest a greater amount of wind and thus generating larger amounts of energy per unit, improving the project efficiency and viability. This is important as it ensures the project can bid competitively with other wind projects competing for approval. The current proposed amendments would include the following:

1. **Tower height:** Increase turbine tower height from  $\leq 110\text{m}$  to  $\leq 135\text{m}$
2. **Rotor diameter:** Increase the maximum Rotor diameter from  $\leq 160\text{m}$  to  $\leq 186\text{m}$
3. **Turbine numbers:** Decrease turbine positions from  $\leq 24$  to  $\leq 21$ <sup>2</sup> (dropping turbines No. 1, 2 and 16)
4. **Layout revision:** Micrositing of 8 turbine positions to avoid revised/expanded bat buffers (See turbines 7, 8, 14, 15, 17, 19, 24 and 27) changes in turbine location and size precipitated the need for a minor revisions to the draft layout for associated infrastructure (including roads (wider bends, revised truck turning areas), cabling, temporary laydown areas and the substation).
5. **Update of Applicant address** – The applicant has moved offices and these details will be amended
6. **Update Condition 13.17:** Condition 13.17 should remove the referral to the amended EIR dated 26 June 2015 and replace this with the details of the current amendment

All other aspects of the project, i.e. the total power nameplate capacity of 90MW and the general location of the wind turbines and all associated infrastructure would remain unchanged from the currently authorised project. This modified turbine envelope may result in a change in scope of the EA and, in terms of section 31 of Government Notice Regulation 982 of 4 December 2014 (GN R.982) and previous amendments, a change to the nature or scope of the associated impacts requires an EA amendment process to be undertaken in accordance with Section 32 of GN R.982.

This approach is supported by similar amendment processes for the same project. This report is therefore compiled in fulfilment of the legal requirements for a Part 2 Amendment in terms of Regulation 32 of GN R 982. It provides a description and motivation for the proposed changes, as well as an evaluation of the advantages and disadvantages of the proposed changes, and, if required, introduces new mitigation measures in respect of any impacts resulting from the change. The nature of the changes and sensitivities on the site has required a review from the following specialists: noise, socioeconomic, heritage, Bats, Birds, botanical, and visual. The amendment changes will not significantly impact the construction and decommissioning phase activities and will not significantly impact on the other specialist fields included in the original EIA which have been excluded from this Environmental Authorisation (EA) Amendment Report.

This report was subjected to a 30-day comment period and all comments have been considered and responded to in a Comments and Responses Report to be appended in this final EA Amendment Report for submission to the Competent Authority (CA) for decision making. All Registered I&APs will be notified of the Competent Authority's Decision and provided with an opportunity to appeal any decision. The public comment period was due to close on 30 May 2020 but the COVID-19 National Lockdown came into effect on the 27<sup>th</sup> May 2020, cutting the public comment period short by 4 days. The public comment period was extended in accordance with Government Notice 650<sup>3</sup> of 5 June 2020 by the number of days of lockdown, plus 21 days, plus the remaining four days which brings PPP closure to 30 June 2020. The revised deadline for submission of the final EA Amendment report is 23 July 2020.

<sup>1</sup> Please note there is no 14/12/16/3/3/2/599/AM2 because the application for EA lapsed and was restarted as 14/12/16/3/3/2/599/AM3.

<sup>2</sup> Note: the larger the turbine generators the fewer actual turbines will be needed to achieve the 90MW nameplate capacity, while 21 positions area being retained it is likely (particularly at the larger scales) that fewer turbines will be required to meet the 90MW project objective.

<sup>3</sup> See Government Notice 650 of 5 June 2020: Directions regarding measures to address, prevent and combat the spread of COVID -19 relating to national environmental management permits and licences.

## 2 PROJECT DESCRIPTION

### 2.1 Overview and location

An area with suitable wind characteristics was identified by juwi for the purposes of the Wolf Wind Farm. The site is located on the border of the Sundays River Valley Local Municipality and Ikwezi Local Municipality approximately 5km north of Wolwefontein, 35km north-west of Kirkwood and 36km south-east of Jansenville on the Klein Winterhoek Mountain range in the Eastern Cape, as seen in Figure 2-1. The site can be accessed from the R75 and an existing gravel road leading east towards the proposed site. The farms comprising the site amount to approximately 6,902ha in extent while the project footprint or disturbance would constitute up to 1% of the total site area (i.e. 69ha/6,902ha). The project received its original authorisation on 14 September 2015 (see Annexure A.1 for the copy of Application form with the original EA and all amendments appended) and the Name of the EA holder was amended on 11 November 2016 (AM1). The wind turbine rotor diameter (126m to 137m) and project capacity (84MW to 90MW) was amended on 14 September 2017 (AM3). Most recently, the Turbine envelope including max rotor diameter (137m to 160m) and the max tower height (100m to 110m) was amended on 26 November 2018 (AM4).

### 2.2 Project components as currently authorised

The authorised facility (a “90MW Wind Energy Facility”) and associated infrastructure includes the following major components as listed in the EA:

- A site access road;
- Security fencing and access gate;
- New and upgraded site service roads;
- Stormwater control measures associated with all roads;
- 24 wind turbines;
- A new on-site substation;
- Underground electrical cabling, between turbines and onsite substation; and
- A new 132kV overhead transmission line connecting to the existing Eskom Distribution Wolf Substation.



**Figure 2-1 | Location and layout of the proposed Wolf Wind Farm near Wolwefontein in the Eastern Cape**

The properties affected by the approved project have been listed in Table 2-1 and are represented spatially with the project components in Figure 2-2 on the overleaf. Note however that during the investigations phase it became evident that new subdivisions were and still are in process and may be registered with the Deeds Office at any time. Also, as an added



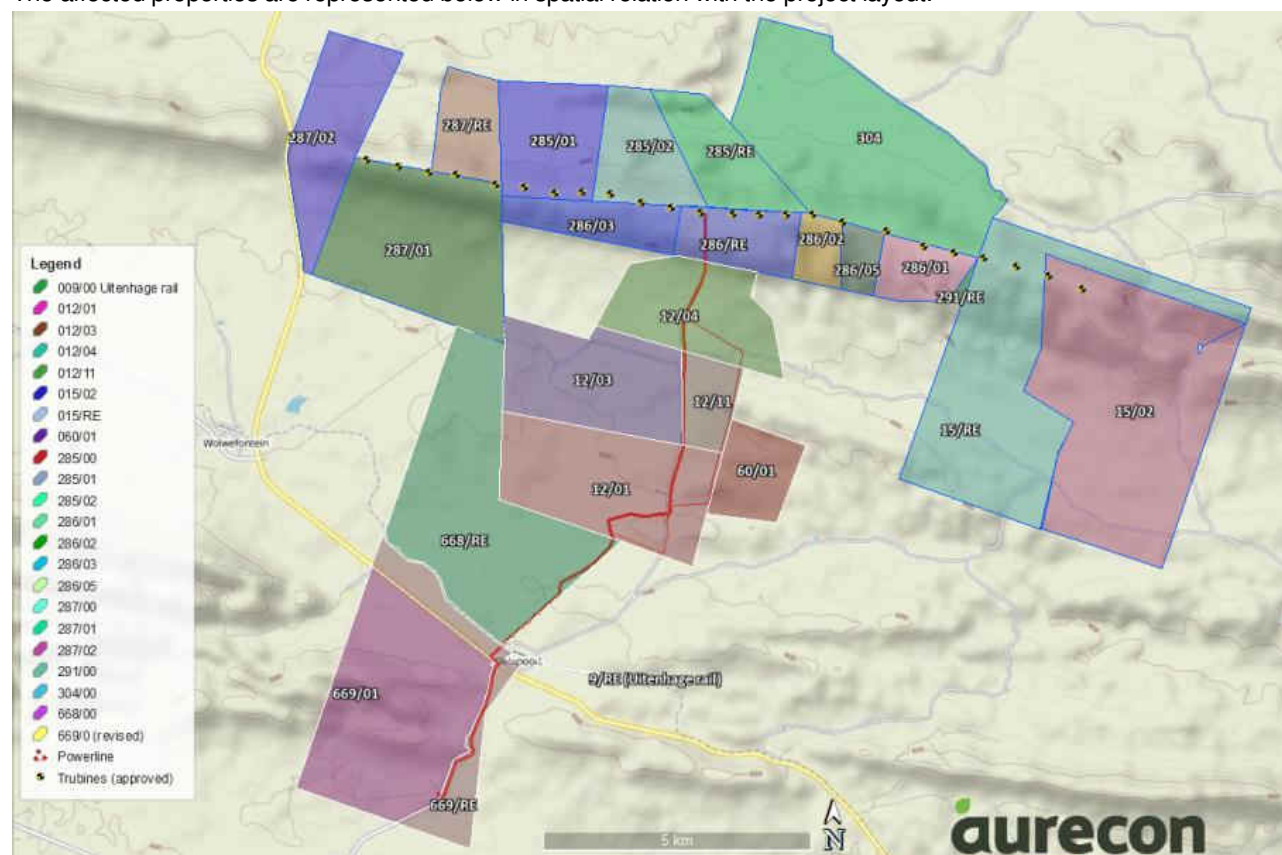
measure, the Applicant sourced landowner consent letters, which are included in Annexure D.2.

The following properties are directly affected by the project.

**Table 2-1 | Affected properties**

	Farm	Portions
Wind Farm – affected land portions	Hartebeestfontein (Farm No. 15) portions:	<ul style="list-style-type: none"> <li>– 15/RE (and potentially 15/4 and a revised 15/RE which are unregistered subdivisions that can be registered at the Deeds Office at any time);</li> <li>– 15/2 (and potentially 15/3 which is an unregistered consolidation of 15/2 and 15/1 that can be registered at the Deeds Office at any time);</li> </ul>
	Paardeberg North (Farm No. 285) portions:	<ul style="list-style-type: none"> <li>– 285/RE;</li> <li>– 285/1;</li> <li>– 285/2;</li> </ul>
	Paardeberg South (Farm No. 286) portions:	<ul style="list-style-type: none"> <li>– 286/RE (and potentially 286/4 and a revised 286/RE which are unregistered subdivisions that can be registered at the Deeds Office at any time);</li> <li>– 286/1;</li> <li>– 286/2;</li> <li>– 286/3;</li> <li>– 286/5</li> </ul>
	Salt Pan's Neck (Farm No. 287) portions:	<ul style="list-style-type: none"> <li>– 287/RE;</li> <li>– 287/1;</li> <li>– 287/2;</li> </ul>
	Annex Dassie Kloof Farm (Farm No. 291) portions:	– 291/RE
	Koffylaagte (Farm No. 304)	– 304
Servitude (Transmission line)	Vaalefontein (Farm No. 12) portions:	<ul style="list-style-type: none"> <li>– 12/1;</li> <li>– 12/3;</li> <li>– 12/4 (and potentially 12/10 and a revised 12/4 which are unregistered subdivisions that can be registered at the Deeds Office at any time);</li> <li>– 12/11</li> </ul>
	Cauchafskie (60) portions:	– 60/1
	Ouplaas Poort (Farm No. 668) portions:	– 668/RE
	Blaauwbosch Kuil (Farm No. 669) portions:	<ul style="list-style-type: none"> <li>– 669/RE; (and potentially 669/5, 669/9, 699/10 and a revised 669/RE which are unregistered subdivisions that can be registered at the Deeds Office at any time)</li> <li>– 669/1;</li> </ul>
	Uitenhage rail (9/RE)	– 9/RE

The affected properties are represented below in spatial relation with the project layout.



**Figure 2-2 | Affected properties and project layout**



## 2.3 NEMA Activities authorised

In terms of the National Environmental Management Act (NEMA) EIA regulations, the activities listed in Table 2-2 were authorised. It is important to note that the proposed amendment will not affect these activities nor are any activities added or removed as a result of the proposed amendment.

**Table 2-2 | Listed activities authorised in terms of NEMA GN No. 544, 545 and 546**

No.	Listed Activity (2010 original EA)	Similar activities (2014 onwards)	ASPECT OF PROJECT
	<i>GN No. R544, 18 June 2010</i>	<i>GN No. R983, 4 December 2014 as Amended</i>	<i>Project activity</i>
10	The construction of facilities or infrastructure for the transmission and distribution of electricity - i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	11 - The construction of facilities or infrastructure for the transmission and distribution of electricity - i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	A 132kV transmission line is proposed to evacuate electricity generated by the Wolf Wind Farm and will run from the onsite substation to the Wolf substation which forms part of the national grid. The transmission line will be situated in a rural area.
11	The construction of: – canals; – channels; – bridges; – dams; – weirs; – bulk storm water outlet structures; – marinas; – jetties exceeding 50 square metres in size; – slipways exceeding 50 square metres in size; – buildings exceeding 50 square metres in size; – or – infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	12 - The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -	Drainage lines occur on the proposed site and one or more roads are likely to cross these watercourses. The access roads will likely follow the watersheds, for ease and robustness of design, and thus impacts to surface water resources should be minimal.
18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: – a watercourse; – the sea; – the seashore; – the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater- but excluding where such infilling, depositing, dredging, excavation, removal or moving;	19 - The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	The infilling or depositing of any material of more than 10m <sup>3</sup> into a watercourse will be triggered with the construction of internal service roads where these roads cross drainage lines or watercourses.

No.	Listed Activity (2010 original EA)	Similar activities (2014 onwards)	ASPECT OF PROJECT
	(a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (b) occurs behind the development setback line.		
22	The construction of a road, outside urban areas, with a reserve wider than 13,5 meters or, where no reserve exists where the road is wider than 8 metres, or for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	<b>24</b> - The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;	Although site roads are planned to be 7m wide for the most part at certain road sections the verges (or cut-to-fill) might increase the actual width to over 8m and thus this activity is applied for.
<b>GN No. R545, 18 June 2010</b>		<b>GN No 984, 4 December 2014 as amended</b>	<b>Project activity</b>
1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.	<b>1</b> - The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more	The proposed Wind Farm would have a generation capacity of up to 90MW in total.
15	Physical alteration of undeveloped, vacant or derelict land for residential retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: linear development activities; or agriculture or afforestation where activity 16 in this Schedule will apply.	<b>15</b> - The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The approximate extent of the undeveloped land that would be physically altered is estimated at 69ha disturbed (21ha permanent footprint).
<b>GN No. R546, 18 June 2010</b>		<b>GN No 985, 4 December 2014 as amended</b>	<b>Project activity</b>
4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres. a) In Eastern Cape province: ii. Outside urban areas, in: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;	<b>4</b> - The development of a road wider than 4 metres with a reserve less than 13,5 metres. a. Eastern Cape i. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas;	The construction of a road wider than 4m with a reserve less than 13,5m (no reserve). The roads associated with the turbine layout will trigger this activity as construction and operation roads would be 7m wide and located outside urban areas in CBAs as identified in the systematic biodiversity plans (Eastern Cape Biodiversity Conservation Plan Technical Report, 2007). Nearest proposed wind turbine is situated 7.5km from the Addo Park Elephant National Park (Addo Park) Addo Park boundary and thus the road leading to the site will trigger this activity.
12	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (b) Within critical biodiversity areas identified in bioregional plans;	<b>12</b> - The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. Eastern Cape ii. Within critical biodiversity areas identified in bioregional plans;	The turbine and associated infrastructure including 7m wide access roads will trigger this activity because the area to be cleared would exceed 300m <sup>2</sup> of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation within a CBA as identified in the Eastern Cape Biodiversity Conservation Plan Technical Report (2007).

No.	Listed Activity (2010 original EA)	Similar activities (2014 onwards)	ASPECT OF PROJECT
13	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <p>(1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list.</p> <p>(2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010.</p> <p>(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>(c) In Eastern Cape</p> <p>ii. Outside urban areas, the following:</p> <p>(ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	See 12 above	<p>The turbine and associated infrastructure including 7m wide access roads will trigger this activity because the area to be cleared would exceed 1 hectare where 75% or more of the vegetative cover constitutes indigenous vegetation and is outside urban areas and within a CBA as identified in the Eastern Cape Biodiversity Conservation Plan Technical Report (2007)</p> <p>Nearest proposed wind turbine is situated 7.5km from the Addo boundary (within 10 kilometres from national parks).</p>
14	<p>The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation</p> <p>(a) In the Eastern Cape</p> <p>(i) All areas outside urban areas.</p>	See 12 above	A vegetated area estimated at 69ha would be disturbed (with a 21ha permanent footprint).or more would be cleared for the proposed project, which is located in a rural area. The vegetation comprises of 75% or more indigenous vegetation.
16	<p>The construction of:</p> <p>(iv) infrastructure covering 10 square metres or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>In Eastern Cape</p> <p>ii. Outside urban areas, in:</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	See 18, below	<p>The infrastructure (including 7m wide access roads) associated with the turbine layout will trigger this activity.</p> <p>The infilling or depositing of any material of more than 10m<sup>2</sup> into a watercourse may be triggered with the construction of internal service roads where these roads cross drainage lines or watercourses. The roads are located in a rural area in the Eastern Cape in CBA or ecosystem service areas as identified in systematic biodiversity plans (Eastern Cape Biodiversity Conservation Plan Technical Report, 2007)</p>
19	<p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>In Eastern Cape</p> <p>ii. Outside urban areas, in:</p>	<p>18 - The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p> <p>a. Eastern Cape</p> <p>i. Outside urban areas:</p>	Widening existing farm roads to 7m or more in a CBA as identified in Eastern Cape Biodiversity Conservation Plan Technical Report (2007). The road upgrades will occur within 10kms of the Addo Park.

No.	Listed Activity (2010 original EA)	Similar activities (2014 onwards)	ASPECT OF PROJECT
	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; (kk) A watercourse;	

## 2.4 Original Impact assessment findings

The following table provides a summary of the impact assessment as authorised in the original application. Impacts denoted by the luminous **yellow highlights** pertain to impacts where the EAP was of the opinion that the proposed amendments may result in a change to impact significance ratings and which have been studied further in this EA Amendment Report. Note that no changes to impacts in the construction or decommissioning phases are foreseen.

**Table 2-3 | Original EIA impact significance ratings – Construction Phase**

Aspect	Impact	Unmitigated impact significance	Mitigated impact significance
Botanical	Disturbance of natural vegetation and associated ecological processes due to turbine construction (including lay-down areas)	High (-)	Medium (-)
	Disturbance of natural vegetation and associated ecological processes due to the construction of internal access roads	Medium (-)	Low (-)
	Disturbance of natural vegetation and associated ecological processes due to the construction of on-site sub-station	Medium (-)	Low (-)
	Disturbance of natural vegetation and associated ecological processes due to the construction of 132kV transmission line	High (-)	High (-)
Avifauna	Destruction or alteration of bird habitat	Medium (-)	Medium (-)
Bats	Disturbance and/or reduction of habitat	Low (-)	Very low (-)
Agriculture	Loss of agricultural resources/ production associated with the Wind Farm	Very low (-)	Very low (-)
	Loss of agricultural resources/ production associated with the 123kV transmission line	Very low (-)	Very low (-)
Palaeontology	Construction activities (excavations) may result in a negative direct impact on the fossil content of the affected subsurface	Very low (-)	Very low (-)
Heritage	Physical destruction of heritage resources, particularly archaeological artefacts associated with the construction of the Wind Farm	Very low (-)	Very low (-)
	Physical destruction of heritage resources, particularly archaeological artefacts associated with the construction of the access road	Very low (-)	Very low (-)
	Physical destruction of heritage resources, particularly archaeological artefacts associated with the construction of the transmission line	Very low (-)	Very low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of the wind turbines	Medium (-)	Medium (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of the access road	Very Low (-)	Very Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of the transmission line	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of wind turbines	High (-)	High (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of the access road	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the construction of the Transmission line	Medium (-)	Medium (-)
Visual	Potential visual impact of construction on visual receptors in close proximity to the proposed Wind Farm	Medium (-)	Medium (-)
Socio-economic	Impact on the Economy	Medium (+)	Medium (+)
	Impact on investment	High (+)	High (+)
	Impact on employment and skills transfer	Medium (+)	High (+)
	Impact on tourism and game farming	High (-)	Medium (-)
	Consistency with Development Planning	Medium (+)	Medium (+)
	Impact on In-migration	Medium (-)	Low (-)
	Impact on household income	Medium (+)	High (+)

Aspect	Impact	Unmitigated impact significance	Mitigated impact significance
	Impact on economic & social infrastructure	High (-)	Medium (-)
Noise	Numerous simultaneous construction activities that could impact on receptors.	Low (-)	Low (-)
	Water quality impairment	Low (-)	Neutral
Freshwater	Loss of riparian habitat and bed/bank modification as well as associated loss of aquatic biota	Low (-)	Low (-)
	Hydraulic and flow modification	Low (-)	Neutral
Dust	Dust created by construction activities	Low (-)	Very low (-)
Traffic	Accidents and or traffic congestion	Medium (-)	Low (-)

**Table 2-4 | Original EIA impact significance ratings – Operations Phase**

Aspect	Impact	Unmitigated impact significance	Mitigated impact significance
Botany	Disturbance of natural vegetation and associated ecological processes due to turbine construction (including lay-down areas)	Low (-)	Low (-)
	Use of internal access roads	Low (-)	Low (-)
	Operation of on-site substation	Low (-)	Low (-)
	Maintenance of transmission line	Low (-)	Low (-)
Avifauna	Disturbance of birds, particularly whilst breeding	Medium (-)	Medium (-)
	Displacement of birds from the site	Medium (-)	Medium (-)
	Collision of birds with the turbine blades	Medium (-)	Medium (-)
	Collision and electrocution of birds on overhead transmission lines	High (-)	Low (-)
Bats	Impact on bat populations in the larger area	Very low (-)	Very low (-)
Fauna	Disturbance and/or reduction of habitat	Low (-)	Low (-)
Agriculture	Loss of agricultural resources/ production associated with the operation of the Wind Farm	Low (-)	Very low (-)
	Loss of agricultural resources/ production associated with the operation of the transmission line	Very low (-)	Very low (-)
Heritage	Physical destruction of heritage resources, particularly archaeological artefacts.	Very Low (-)	Very Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the Wind Farm	Medium (-)	Medium (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resource associated with the Access road	Very Low (-)	Very Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the transmission line	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources. Associated with the Wind Farm	High (-)	High (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources. Associated with the access road	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources. Associated with the transmission line	Medium (-)	Medium (-)
	Potential visual impact of internal access roads on observers in close proximity to the proposed Wind Farm	Low (-)	Low (-)
Visual	Potential visual impact of the on-site substation on observers in close proximity to the proposed Wind Farm	Low (-)	Low (-)
	Potential visual impact of the overhead power line on observers in close proximity thereto	Medium (-)	Medium (-)
	Potential visual impact on of lighting at night on visual receptors in close proximity to the proposed Wind Farm	Medium (-)	Medium (-)
	Potential visual impact on of shadow flicker on visual receptors in close proximity to the proposed Wind Farm	Low (-)	Neutral
	Potential visual impact on the visual character of the landscape and sense of place of the region	Medium (-)	Medium (-)
	Potential visual impact on the visual character of the landscape and sense of place of the region	Low (-)	Low (-)
	Potential visual impact of the proposed facility on tourist access routes and tourist destinations within the region.	Low (-)	Low (-)
	Potential visual impact of the proposed facility on conservation areas within the region	High (-)	High (-)
	Potential visual impact on sensitive visual receptors and users of major roads in close proximity to the Wind Farm	High (-)	High (-)
	Potential visual impact on sensitive visual receptors and users of major roads within a 5 – 10km radius of Wind Farm	Very low (-)	Very low (-)
Socio-economic	Visibility and potential visual impact beyond a radius of 20km	Very low (-)	Very low (-)
	Impact on the Economy	High (+)	High (+)
	Impact on investment	Medium (+)	Medium (+)
	Impact on employment and skills transfer	Medium (+)	High (+)
	Impact on tourism and game farming	Medium (-)	Medium (-)

Aspect	Impact	Unmitigated impact significance	Mitigated impact significance
	Consistency with Development Planning	High (+)	High (+)
	Impact on In-migration	Medium (-)	Low (-)
	Impact on household income	Low (+)	Medium (+)
	Impact on economic & social infrastructure	High (+)	High (+)
Noise	Numerous wind turbines operating simultaneously during a period when a quiet environment is desirable.	Low (-)	Low (-)
Freshwater	Water quality impairment	Neutral	Neutral
	Hydraulic and flow modification	Low (-)	Low (-)
Electrical production for the national grid	Contribution of renewable energy to the national grid	Low (+)	Low (+)
Traffic	Accidents and or traffic congestion	Very low (-)	Very low (-)
GHG & Climate change	Reduce the future volume of greenhouse gases emitted to the atmosphere, reducing the greenhouse effect on a regional, national and international scale.	Low (+)	Low (+)
	Reduce the future volume of greenhouse gases emitted to the atmosphere, reducing the greenhouse effect on a regional, national and international scale.	Low (+)	Low (+)

**Table 2-5 | Original EIA impact significance ratings – Decommissioning Phase**

Aspect	Impact	Unmitigated impact significance	Mitigated impact significance
Flora	Disturbance of natural vegetation and associated ecological processes due to removal of turbines	Medium (-)	Low (-)
	Closure of internal access roads and restoration of natural vegetation	Medium (-)	Low (-)
	Closure of on-site sub-station	Medium (-)	Low (-)
	Removal of 132 kV transmission line	Medium (-)	Low (-)
Fauna	Disturbance and/or reduction of habitat	Low (-)	Very low (-)
Heritage	Physical destruction of heritage resources, particularly archaeological artefacts.	Very low (-)	Very low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the Wind Farm.	Medium (-)	Medium (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the Access road	Medium (-)	Very low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the transmission line.	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the Wind Farm.	Medium (-)	Medium (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the access road.	Low (-)	Low (-)
	Visual intrusion into the cultural landscape and context of surrounding heritage resources associated with the transmission line.	Medium (-)	Medium (-)
Traffic	Accidents and or traffic congestion	Medium (-)	Low (-)

\* Note that the direct impact on heritage resources for the operation phase is rated as low (-) and the high (-) impact rating shown here relates to visual impacts to landscape, setting and character (generally referred to as “sense of place”).



### 3 PROPOSED AMENDMENT

#### 3.1 Context and description of the proposed amendment

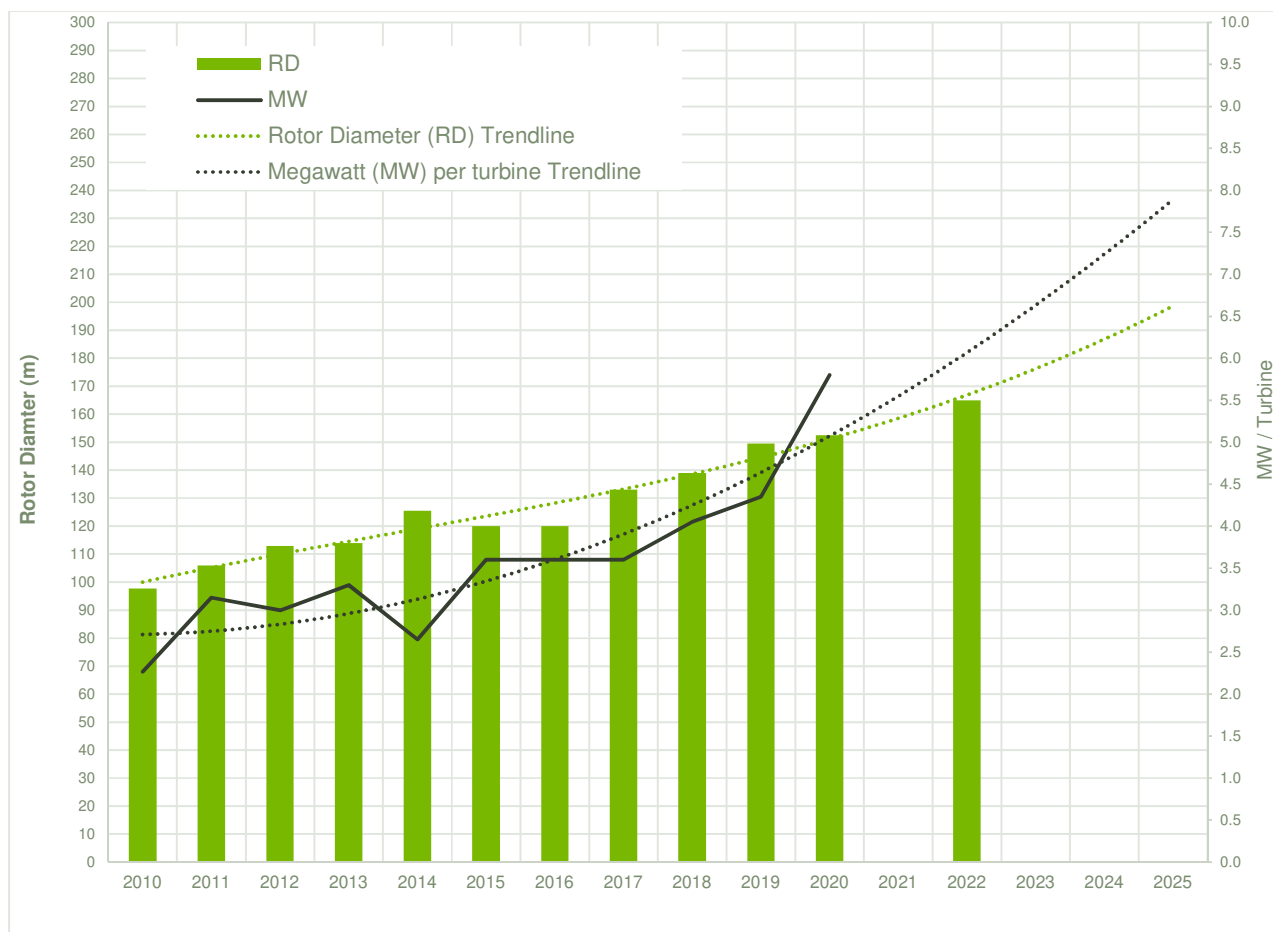
The applicant, Wolf Wind Farm (Pty) Ltd, a subsidiary of juwi Renewable Energies (Pty) Ltd, has been authorised to construct a 90MW Wind Energy Facility (WEF) referred to as the Wolf Wind Farm on the border of the Sundays River Valley Local Municipality and Ikwezi Local Municipality, situated approximately 5km north of Wolwefontein, 35km north-west of Kirkwood and 36km south-east of Jansenville, atop the Klein Winterhoek Mountain range in the Eastern Cape. The project was originally authorised on the 14 September 2015.

Since issuing of the Environmental Authorisation (EA), the wind energy market has evolved quickly, with larger and more efficient wind turbine models becoming available all the time. To remain competitive and have a reasonable chance of bidding a winning project in the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REI4P), the project must keep pace with the technology and efficiencies to remain viable and competitive with the marketplace. In this regard the Applicant has already amended the turbine envelope for this project on two previous occasions and the fast-moving market has again prompted the applicant to increase the turbine size envelope. The following table provides the key turbine specifications as originally approved plus both amendments and the proposed new amendments.

Aspect	Original EA	Revision 1 (AM3)	Revision 2 (AM4)	Now proposed (AM5)
Total generation	84MW	≤90MW	≤90MW	≤90MW
No Turbines	24	24	≤24	≤21
Max Hub height	100m	100m	≤110m	≤135m
Rotor diameter	126m	≤137m	≤160m	≤186m
Blade bottom tip height	NA	Not less than 31.5m	Not less than 30m	Not less than 30m
Blade top tip height	≤163m	≤168.5m	≤190m	≤228m
Turbine positions	Original preliminary layout	Original preliminary layout	Original preliminary layout	Micrositing of 8 turbines and revised preliminary layout * -, and the refinement of roads, cable routes, laydown areas, substation and building locations.

\* Note that the layout would still need to be finalised following the pre-construction walkthrough, thus it retains its "preliminary" status.

With the increased turbine size and efficiencies, the project can reduce the maximum number of turbine positions from 24 to 21 and still have confidence that it can generate the approved 90MW. The amendment has also kept the minimum blade tip height above ground unchanged, at 30m (avoiding the high bat and bird traffic zone found at lower altitudes). By extrapolating the turbine market trajectory for onshore turbines, it is foreseeable that there may be larger wind turbine generators (i.e. in the 6MW or 8MW each range) available in the market by the time the project is implemented, which may mean even fewer turbines would be constructed (i.e. 12-15 turbines needed to reach the 90MW). This market trajectory is illustrated in the following graph of actual industry Rotor Diameter (RD) versus per turbine generator size in the past and extrapolating into the future.



**Figure 3-1 | Growth in wind turbine rotor and electrical generator<sup>4</sup>**

During the initial engagements with specialists regarding the current proposed amendments it came to light that the increased rotor diameter would bring some turbine blades into proximity with the bat sensitive areas. The larger rotor diameters brought the swept area closer to these areas that had been previously identified and buffered for the protection of bats. As a result, the applicant has agreed to microsite a number of turbines as part of this amendment to ensure safe setback distances are observed. Further to this, the three sacrificial turbine positions, were selected as those that impinged most on the sensitive bat zones (i.e. turbine positions 1, 2 and 16).

The increase in size and micrositing of 8 turbines also resulted in the need to revisit and revise / refine the other project infrastructure which support the turbines. Thus, minor changes to the infrastructure shape (i.e. road curves, turning areas), and the location has been adjusted to provide a clearer view of a potential final layout. The layout remains in draft format and will only be finalised in the pre-construction phase following a walkthrough and additional specialist inputs before being submitted for approval in accordance with Condition 12 of the EA. Noting this and the following condition 13 which stipulates what needs to be included in the final layout including Condition 13.17, which states – “A map of the final layout plan superimposed (overlain) on the environmental sensitivity map. The map must reflect the proposed location of turbines as stated in the amended EIR dated 26 June 2015 and this authorisation.” Naturally the underlined portion of this Condition would need to be updated to refer to the current layout (if approved) and not that of the 2015 EIR. A revised application form showing this additional amendment was prepared and submitted with the Draft EA Amendment Report at the start of the comment period (A copy is provided in Annexure A.3).

All other aspects of the project, i.e. the total power nameplate capacity of 90MW and the general location of the wind turbines and all associated infrastructure would remain unchanged from the currently authorised project.

<sup>4</sup> Source: juwi renewable energies (Pty) Ltd

### 3.2 Proposed changes to the project

The proposed amendments would include the following:

1. **Tower height:** Increase turbine tower height from  $\leq 110\text{m}$  to  $\leq 135\text{m}$
2. **Rotor diameter:** Increase max Rotor diameter from  $\leq 160\text{m}$  to  $\leq 186\text{m}$
3. **Turbine numbers:** Decrease turbine positions from  $\leq 24$  to  $\leq 21^5$  (dropping turbines No. 1, 2 and 16)
4. **Layout revision:** Micrositing of 8 turbine positions to avoid revised/expanded bat buffers (See turbines 7, 8, 14, 15, 17, 19, 24 and 27) changes in turbine location and size precipitated the need for a minor revisions to the draft layout for associated infrastructure (including roads (wider bends, revised truck turning areas), cabling, temporary laydown areas and the substation).
5. **Update of Applicant address** – The applicant has moved offices and these details will be amended.
6. **Update Condition 13.17:** Condition 13.17 should remove the referral to the amended EIR dated 26 June 2015 and replace this with the details of the current amendment

Note that the proposed amendments, listed above, were refined following the submission of the original application form (Annexure A.1) and thus a copy of the revised application form reflecting these amendments has also been included in Annexure A.3. The original revised application form was submitted to the DEA together with the draft EA Amendment Report at the start of the comment period.

The following maps provide a comparison of the proposed amended layout (shown in red) versus the current approved layout (shown in blue), which underpin the impact review provided in this EA amendment report. In line with the DEAs request on the draft EA Amendment Report, kindly also find a revised Layout map showing the 21-turbine position layout map which has been appended hereto as Annexure D.1.

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<sup>5</sup> Note: the larger the turbine generators the fewer actual turbines will be needed to achieve the 90MW nameplate capacity, while 21 positions area being retained it is likely (particularly at the larger scales) that fewer turbines will be required to meet the 90MW project objective.



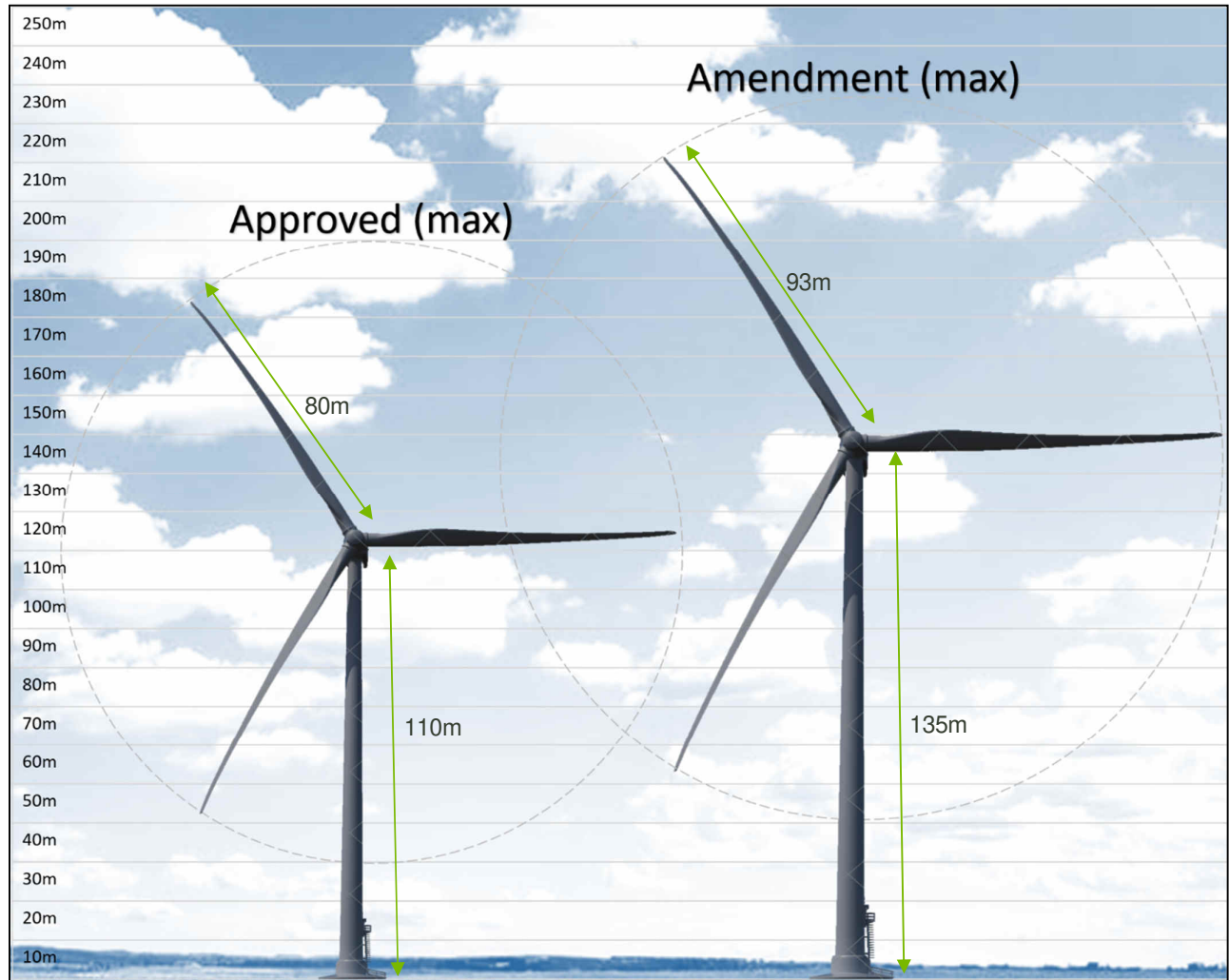
**Figure 3-2 | Proposed amendment (in red) vs approved layout (in blue)**

A closer view of this layout is provided in the three zoom sections provided on the overleaf and show the provisional refinements to the project layout (please note that a final layout must still be produced and submitted for approval in the pre-construction phase).





The following image provides an illustration and scaled comparison between the approved and proposed turbines



**Figure 3-3 | Comparison between approved vs proposed changes to the turbine envelope.**

### 3.3 Motivation for the proposed change

Since issuing of the Environmental Authorisation (EA), the wind energy market has evolved quickly, with larger and more efficient wind turbine models becoming available all the time. To remain competitive and have a reasonable chance of bidding a winning project in the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the project must keep pace with the technology and efficiencies to remain viable and competitive with the marketplace. In this regard the Applicant has already amended the turbine envelope for this project on two previous occasions and the fast-moving market has again prompted the applicant to increase the turbine size envelope.

The motivation for the amendment is due mainly to market constraints and opportunities, and can be summarised as follows:

1. Market supply constraints for certain turbines including older technology (older turbines, like those originally authorised, may not be available);
2. Improved technology certified and available only after original Environmental Approval and the subsequent amendments;
3. Unforeseen delays in REIPPPP, which calls for technology update;
4. Better fit for purpose technology is available today to suite the wind resource of the site and the applicant would like to increase the wind turbine envelope to allow them to consider a broader range of manufacturers and wind turbine models which can enhance the environmental, technical and financial feasibility of the project and avoid potential implementation delays;
5. The project must be updated according to the latest technology if it is to remain feasible and competitive against other projects being bid as part of the REIPPPP.



### 3.4 Advantages and disadvantages of the proposed change

In accordance with Section 32(1)(a)(ii) of the 2014 EIA Regulations, the report for amendment should present the advantages and disadvantages of the proposed changes, which are provided here:

**Table 3-1 | Advantages and disadvantages of the proposed change**

<b>Advantages</b>
To utilise a more technically advanced and/or financially suited wind turbine model leading to improved project efficiency and feasibility.
Greater energy production from sustainable local resources means less reliance on fuel imports, greater national resilience to fluctuations of the Rand contributing to an improved local economy.
The use of larger blades and hub height will increase the CAPEX of the project, resulting in greater investment into the region and increased local job creation associated with the wind farm construction. This is however offset by the reduction in numbers of turbines positions
A revised turbine envelope equates to greater turbine options which will improve the likelihood of timeous implementation of the project by avoiding turbine manufacturers or models that are currently suffering from a manufacturing backlog because of the high global demand at present.
Potentially improve operational performance by selecting a more technically suitable turbine model leading to an improved electrical generating performance for the national grid.
Renewable energy procurement processes call for technology updates, to ensure that South Africa's renewable energy infrastructure is exposed to and can benefit from global Best Available Technology (BAT).
Newer turbine models, although larger, are often quieter too due to advances in turbine technologies.
At the larger end of the envelope the lower tip lifts away from the ground and thus out of the highest traffic bat and bird zones found at lower altitudes and reducing collision risk on aggregate (i.e. all species).
The revised turbine layout (including those turbine positions that were sacrificed in this amendment) responds to the latest guidelines for bats and should marginally reduce the impact on bats.
<b>Disadvantages</b>
While the overall additional effect on project visual impact is assessed to be minimal. The larger rotor diameter and tower height on the turbines will increase the stature of individual turbines. One should however note that this is within the context that wind farms have high (-) visual impact due to the size of the turbines and even though the changes will be notable they will not drive the impact rating any higher.
Micrositing of turbines and associated infrastructure was required with the purpose of complying to ecological sensitivity buffers and wind farm constructability and safety requirements

## 4 AMENDMENT RELATED IMPACTS

Of the environmental impacts identified and assessed during the original EIA, the proposed amendment has the potential to affect six of these speciality fields, namely, Noise; Socioeconomic, Heritage (sense of place); Visual; Avifauna; and Bats.

The following key specialists, who undertook the original EIA assessments, were asked to review the proposed project amendments and indicate if a review their impact assessments were required. The following fields of study were approached:

- **Botanical** (Bergwind) - Found that a detailed review is not required (see Annexure B.1)
- **Noise** (EAR) – Found that a review is not required (see Annexure B.2)
- **Socioeconomic** (UrbanEcon) – Found that a review is not required (see Annexure B.3)
- **Heritage** (ACO Associates) – Found that a review is not required (see Annexure B.4)
- **Visual** (LOGIS) – determined that a review should be undertaken (see Annexure C.1) -
- **Bats** (Animalia) – determined that a review should be undertaken (see Annexure C.2)
- **Birds** (Jon Smallie) – determined that a review should be undertaken (see Annexure C.3)

The following section provides a summary of their findings in relation to proposed amendment, as described under Section 3. It should be noted that the proposed amendments would have no bearing on the impacts recorded and assessed for the construction phase, as the same level of construction would be required, methodologies and materials would remain unchanged and thus only exert influence in the operations phase.

### 4.1 Botanical impact

Dr Dave McDonald of Bergwind Botanical Tours was requested to assess of the botanical impacts associated with the proposed amendment. He determined that the amendment would not result in a change to the impact significance rating and as the proposed amendment and refined layout would not:

- • result in any new impacts on the vegetation and flora,
- • change the nature or scope of the impacts already assessed, or
- • materially change the impact significance rating or associated mitigation recommendations originally presented.

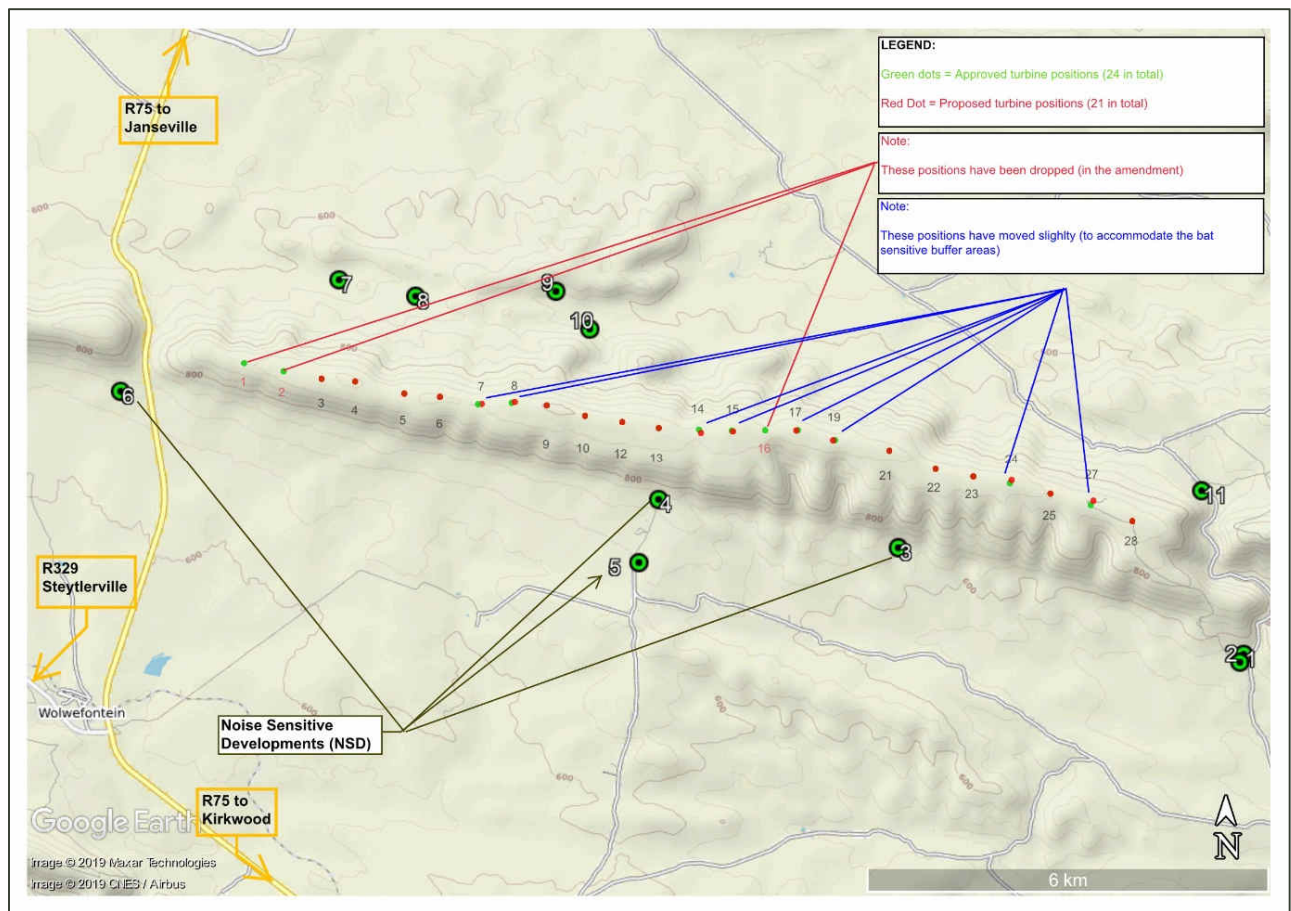
**Therefore, the proposed amendment would have no significant effect on the impact profile from a botanical perspective and a review of the assessment is neither required and nor would it materially change a decision.** His statement is found in Annexure B.1.

### 4.2 Noise impacts

Morné de Jager of Enviro-Acoustic Research cc (EAR) was requested to undertake a review of the proposed amendment and determine if the impact assessment required review. The report is attached here as Annexure B.2 and an overview is provided here.

EAR was commissioned to undertake a specialist study to determine the potential noise impact on the surrounding sound environment due to the establishment of the Wolf Wind Farm. The facility initially proposed to accommodate up to 28 turbines appropriately spaced wind turbines (of which 24 were approved). The noise study used the sound power emission levels of a wind turbine with a high sound power emission level of 109 dBA (which is at the high end of the noise spectrum for commercial turbines and was used as it would represent the worst-case-scenario, at the time).

Wolf Wind Farm (Pty) Ltd is seeking approval to increase the rotor diameter from the approved 160m to ≤186m (proposed amendment) and the turbine tower height from 110m to ≤135m. With larger turbines the number of turbines positions being applied for decreases from 24 to 21 (max), although even fewer are likely to be constructed— layout depicted in Figure 4-1. Turbine positions 1, 2 and 16 have been ceded in this amendment. Also, to better avoid bat buffers with the larger turbine blades, eight turbines have been moved slightly or micro sited (see map on overleaf).



**Figure 4-1 | Proposed changes to layout vs NSDs**

These changes are unlikely to affect the noise impact profile and the findings of the original Environmental Noise Impact Report since the distance between the various NSDs and the nearest turbines are not affected by the changes, with the exception of NSD06 who is now further away, but was originally assessed to receive a “very low (-)” noise impact, and the changes are unlikely to affect this finding or the overall impact profile.

While newer turbines are trending toward larger rotor diameters they are also trending toward lower noise levels. This is because, as wind turbines evolve, manufacturers are addressing the noise emission levels in the newest wind turbine models and it is possible that the latest wind turbine models will be quieter than the wind turbine model considered for the Environmental Noise Impact Assessment. It is therefore likely that proposed amendment will result in a lower noise level than that used as the basis for the impact assessment in the Original EIA, but the difference is negligible.

In conclusion, provided that the selected wind turbine model has a sound power emission level equal or less than 110dBA, the changes will not alter the impact profile and findings of the Environmental Noise Impact Report. **The results, findings, any mitigation measures, recommendations and conclusions would remain the same. The significance of the noise impact would remain as originally assessed and it will not be necessary to review the report, findings, recommendations and conclusions. The original noise impact assessment would still be valid and no additional noise studies will be required.**

In the unlikely event that a wind turbine model with a sound power emission level higher than 110dBA is selected, then a noise specialist must be commissioned to revise the noise model and advice on turbine micro-siting to ensure that noise at the nearest sensitive receptors are kept within specified limits (i.e. 110dBA). This should be included as a condition in the amended authorisation.<sup>6</sup>

#### 4.3 Socioeconomic impact

Marcel Theron of Urban-Econ was requested to undertake a reassessment of the socioeconomic impacts as described in the original EIA and amended EAs. The review is attached here as Annexure B.3 and an overview is provided here.

In the initial development concept, juwi proposed to construct a Wind Energy Facility and associated infrastructure with a

<sup>6</sup> Note: A noise specialist will be included in the pre-construction walkthrough phase to remodel the noise impacts if needed.

generation capacity of 84MW on farms near Wolwefontein (This was amended to 90MW in the first amendment). The proposed wind energy facility would comprise of 28 turbines, a hub height of up to 100m with three 60m long blades<sup>7</sup>. However, in 2019, due to ongoing developments in the turbine market, juwi decided to amend their EA application to allow for an increased wind turbine envelope and to allow for larger wind turbines at the Wolf Energy Facility, in line with the marketplace.

The generation capacity for the Wolf Energy Facility would remain the same (i.e. at 90MW) but an increase in the turbine size (physical specs and generation capacity per turbine) is proposed. With larger turbines the number of turbines required has been reduced from 24 to 21 and it is expected that even fewer would ultimately be installed. The 21 turbines would only be installed in the event the smaller turbines are used.

The initial Socio-Economic Impact Assessment conducted in 2013 identified and assessed the following impacts

Positive impacts	Negative impacts
Impact on the Economy	Impact on In-migration
Impact on Investment	impact on Economic & Social Infrastructure
Impact on Employment & Skills Transfer	Impact on Tourism and Game Farming
Consistency with development planning	
Increase in household earnings	

**It was determined that the proposed changes envisioned by juwi would not result in any significant change in any of the socio-economic impacts identified in the table above and assessed previously.** If resultant change were to occur it would be marginal and would not impede the impact assessment ratings and mitigation measures would remain unchanged

#### 4.4 Heritage impact

Tim Hart of ACO Associates was asked to undertake a review of the potential heritage impacts as a result of the proposed amendments. This is closely linked with visual impacts as it relates to the potential impact on sense of place. The statement is attached here as Annexure B.4 but concluded that the proposed amendments would **not** result in any new impacts, change the nature or scope of the impacts already assessed, or materially change the impact significance rating or associated mitigation recommendations originally presented. **Therefore, the proposed amendment would have no significant effect on the impact profile from a Heritage perspective and a detailed review of the assessment is neither required and nor would it materially change a decision.**

#### 4.5 Visual impacts

Lourens du Plessis of LOGIS was commissioned to undertake a reassessment of the visual impacts described in the original EIA. The report is attached here as Annexure C.1 and an overview is provided here.

Juwi Renewable Energies (Pty) Ltd wishes to amend the dimensions of their wind turbine generators (WTG) for the proposed Wolf WEF. The intended amendment includes an increased rotor diameter from 160m to a maximum of 186m diameter (an increase of 26m) and maximum tower hub-height from 110m to 135m. The primary relevance of this proposed increase in dimensions, from a visual impact perspective, is that the total maximum vertical dimension (tip height) of the wind turbine increases from approximately 190m to 228m above ground level or 38m per WTG.

A comparative viewshed was compiled which shows the affected areas of the approved project in green and the additional affected areas, due to the proposed amendment, in red. This reveals the amendment will have a marginal increase of viewshed.

<sup>7</sup> Note that original...



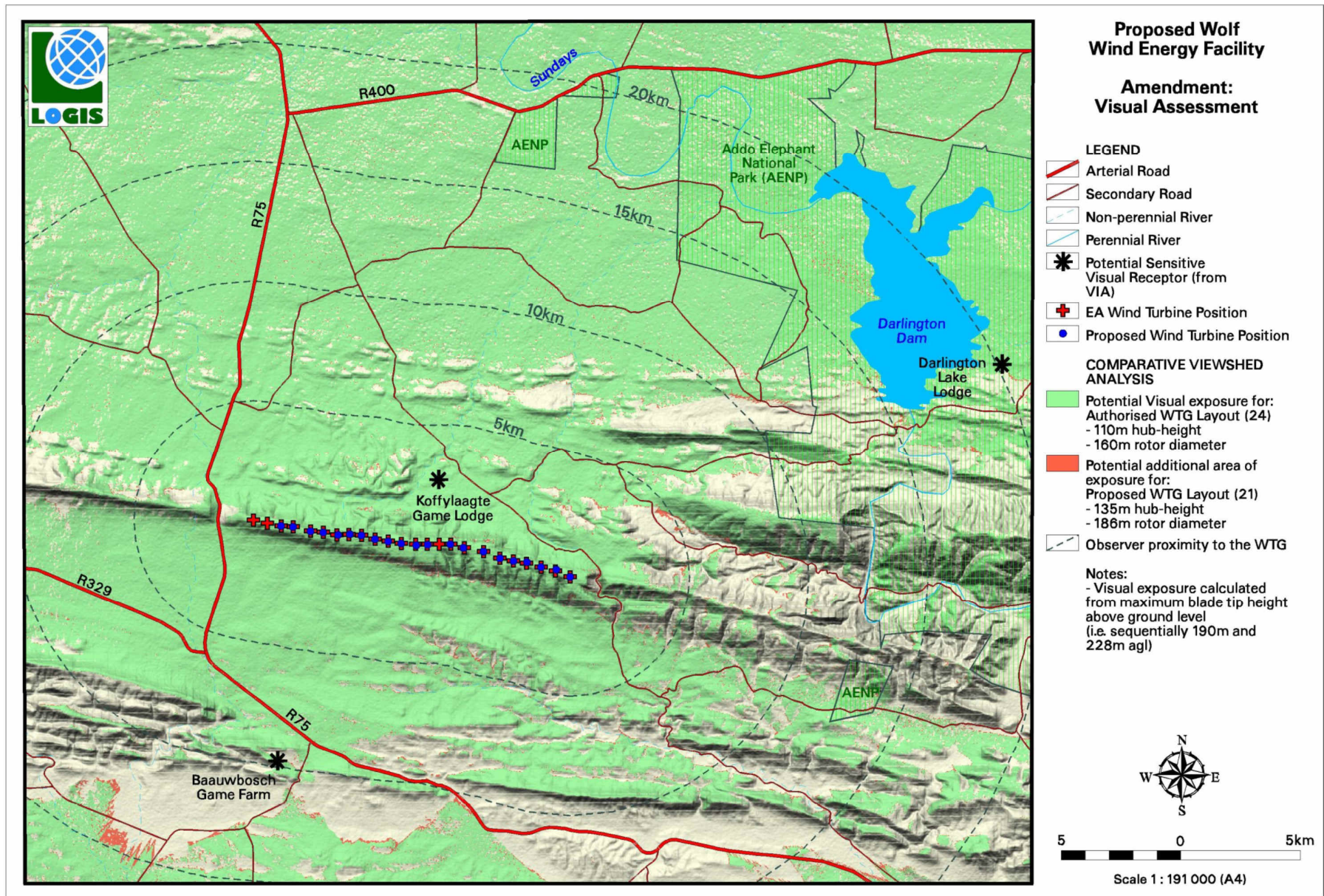


Figure 4-2 | Viewshed increase due to proposed amendments



The ~17% increase in total turbine dimensions results in a ~2% increase in visual exposure. Within the 2% there are no additional sensitive visual receptors located within a 20km radius of the turbines that would be affected. Nor are there any additional major roads affected by the amendment.

It is expected that both the original and larger dimensions would be equally visible and noticeable from all exposed roads and sensitive locations identified in the original EIA, therefore signifying a negligible change to the potential visual impact as originally assessed. Sensitive visual receptors within a 20km radius (identified during the EIA phase) include:

- Addo Elephant National Park (AENP - especially the Darlington Lake Lodge and surrounds)
- The Koffyalaagte Game Lodge
- Blaauwbosch Game Reserve
- AENP 4x4 Wilderness Trail
- Observers travelling along the R400, R75, R329 arterial roads and secondary roads

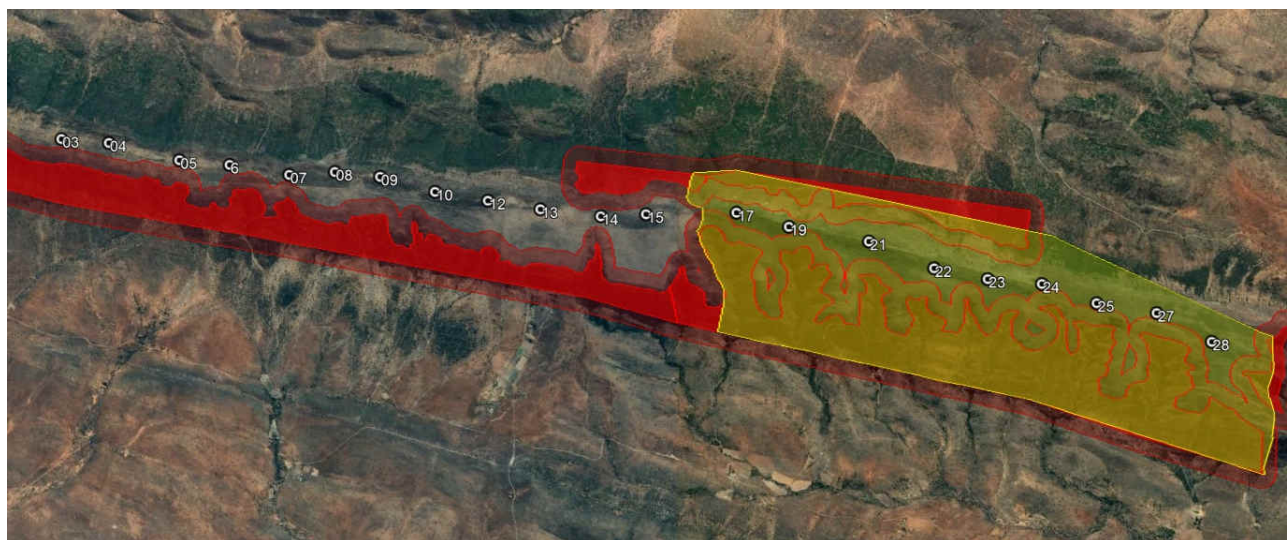
**From a visual perspective, the proposed changes to the turbine dimensions and turbine layout will not alter the nature or scope of the visual impacts and therefore require no (zero) change to the significance rating within the original Visual Impact Assessment Report that was used to inform the approved EIA and the subsequent amendments thereafter. In addition to this, no new mitigation measures are required.** Consequently, the visual impact (significance rating and profile), as stated in the original VIA report, remains unaffected by the proposed amendments and no additional impacts, mitigation measures or alterations to the EMP are required.

#### 4.6 Impact on Bats

Werner Marais of Animalia was commissioned to undertake a review of the potential impacts on bats undertaken in the original EIA. The review is attached here as Annexure C.2 and an overview is provided here.

Animalia Consultants (Pty) Ltd completed the bat EIA impact assessment and preconstruction monitoring in 2014 for the Wolf WEF, in addition provided input to EA Amendments in 2016 and 2018 to accommodate turbine dimensions changes. Due to market forces, the applicant wishes to apply for another EA amendment to increase the approved turbine dimensions, and, this time, reduce the number of turbines and microsite certain turbines.

Due to recent insights regarding necessary buffer distances for high bat sensitivities, the buffer distances of the bat sensitivity map were revised upwards from 150m to 200m, to align with the latest South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments - Pre-construction: Edition 4.1. (Sowler, et al., 2017). The reduction of the number of turbines as well as micrositing of turbine positions by the applicant respects and accommodates the updated bat sensitivity map. Figure 4-3, illustrates the updated high bat sensitivity buffers, in relation to the proposed amended turbine layout.



**Figure 4-3 | Bat sensitivity map with increased high sensitivity buffers. White dots = proposed 21 turbine layout base locations; Solid red = high bat sensitivities; Opaque red = 200m high bat sensitivity buffer; Yellow = moderate bat sensitivities.<sup>8</sup>**

<sup>8</sup> Please note that Turbine position 1, 2 and 16 have been sacrificed in this amendment and thus the map starts at turbine position 3. But does cover the full site area.



When considering the lower elevations of the high bat sensitivities in relation to turbine base positions, apart from turbines 27 and 28, all of the turbine rotor swept zones will be outside of the required 200m setback from the sensitive zones. Turbines 27 and 28 will intrude by 3.4m and 2.5m and is considered negligible (and can even be resolved through further minor micro-siting in the final layout).

During the long-term preconstruction monitoring study, bat activity was measured to be significantly higher at 10m than at 50m, indicating a clear reduction in activity with an increasing height above ground. Therefore, even though the total rotor swept airspace is greater with the proposed amendments, the increased maximum rotor tip height is not expected to increase risks of impacts to bats. The minimum authorised rotor swept height of 30m remains unchanged and acceptable, although it's likely that the larger turbine models within the envelope would in fact increase minimum rotor swept height, which can reduce the risks of impact to bats.

The micro-siting of 8 turbines in the proposed layout, as well as the reduction in the number of turbines (from 24 to 21), respects the revised bat sensitivity map and may further decrease the risk of impacts on bats. It's also likely that larger and more efficient turbine models may be available in future, further reducing the number of turbines installed. In such event, from a bat perspective only, the turbine positions that should be sacrificed from the layout in order of preference are as follows: Turbines 27, 28, 24, 05, 07, 14 and lastly 19 (thereafter, from, east to west).

Animalia has reviewed the proposed amendment, and all the assessment of impacts as well as the mitigation measures specified in the EIA phase bat assessment and preconstruction study remain unchanged by the proposed amendment. Even though in a broader spectrum, the proposed amendments may reduce the risk of impacts on bats, which is seen as generally positive, however the reduced risks are **not sufficient enough to change the impact significance ratings or recommended mitigations determined of the original study**. The proposed amendments are acceptable from a bat sensitivity perspective.

#### 4.7 Impact on Birds

Jon Smallie of Wild Skies was commissioned to undertake a review of the avifauna impacts as described in the original EIA. The report is attached here as Annexure C.3 and an overview is provided here.

WildSkies Ecological Services (Pty) Ltd (hereafter WildSkies) was contracted by juwi to conduct 12 months of pre-construction bird monitoring for the Wolf Wind Energy Facility (in 2013-2014), and subsequently contracted by Aurecon to conduct the avifaunal impact assessment study as part of the EIA (in 2014). Two further amendments to the turbine envelope were assessed in May 2016 and May 2018 (WildSkies 2016, WildSkies 2018). Juwi now propose to make a fourth amendment to further change to the planned turbine envelope. The rotor swept area for the entire wind farm is currently 482 549m<sup>2</sup> (24 x 160m rotor diameter) and under the current application it would increase to 570 604m<sup>2</sup> (21 x 186m rotor diameter). This is a worst-case scenario increase of 18% in combined swept area for the proposed amendment.

The proposed changes to the facility are discussed in more detail below but essentially there are two aspects of this change in turbine model that are relevant to assessing bird turbine collision risk:

- A. The possible change in height above ground at which the rotor will be; and
- B. The change in overall size of rotor.

##### 4.7.1 Change in height above ground

Smallie (2014) identified 5 bird species as being at most risk of collision with turbine blades at the Wolf WEF site, based on flight activity data collected on site over four seasons of pre-construction bird monitoring. These are presented in the Table to follow, with an indication of the implications of the current amendment per species.

**Table 4-1 | Top priority bird species identified by Smallie 2014. (n= number of records)**

Species	EIA finding – Smallie, 2014	Implications of proposed amendment (change in height of rotor zone only)
Rock Kestrel	The Rock Kestrel was found to fly at an average height above ground of 28m (n=14).	<u>No change</u> The new proposed turbine does not change at the lower blade tip of 30m above ground.
Jackal Buzzard	Jackal Buzzard flew at an average height of 80m (n=14), and was adjudged to be at risk of collision with turbine blades.	<u>No change</u> The average flight height is contained within both the original and proposed rotor zones.
Booted Eagle	Booted Eagle flew at an average height of 51m (n=9), and was adjudged to be at risk of collision with turbine blades.	<u>No change</u> The average flight height is contained within both the original and proposed rotor zones.
Verreaux's Eagle	Verreaux's Eagle flew at an average height above ground of 75m (n=9) and was judged to be at risk of collision.	<u>No change</u> The average flight height is contained within both the original and proposed rotor zones.
Pale Chanting Goshawk	Pale Chanting Goshawk flew at an average height above ground of 74m (n=4) and was judged to be at risk of collision.	<u>No change</u> The average flight height is contained within both the original and proposed rotor zones.
All target bird species combined (14 species)	Average flight height above ground of 52m.	<u>No change</u> The average flight height is contained within both the original and proposed rotor zones.

We conclude that the possible change in turbine blade height above ground does not materially change the collision risk posed to birds, and hence would not affect our original findings.

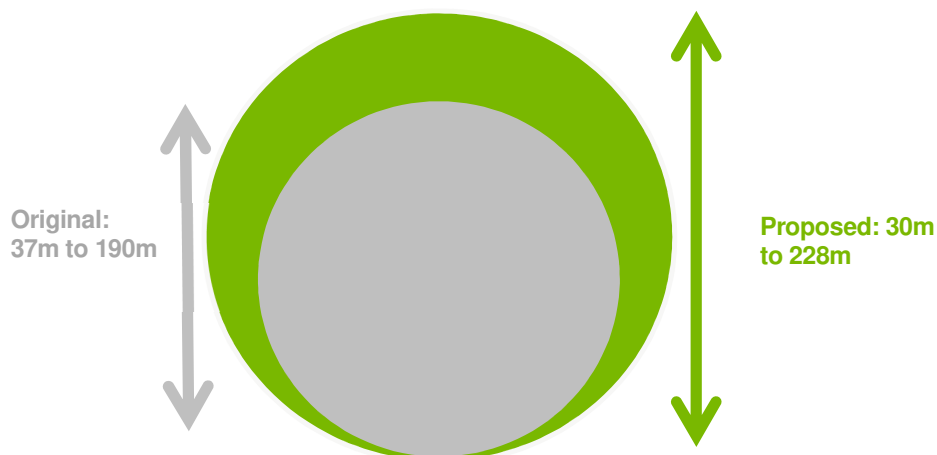
However, the conservation status of priority species identified by the original assessment have changed and mostly for the worse. Seven of the nine species have seen their conservation statuses be upgraded, that is they are now at risk of extinction. This increases the significance of any impacts on the species and has had to be considered in the reassessment of the impacts.

Subsequent to the original assessment, the 'Best Practice Guidelines for Birds and Wind Energy' have been written (2011) and updated (Jenkins *et al*, 2015). There are no new implications for the Wolf WEF project in these guidelines.

#### 4.7.2 Change in rotor size

The combined effect of original authorisation (i.e. minus four turbines) and multiple amendments to the turbine model over recent years means an overall facility increase, from an assessed collision risk window of 349,131m<sup>2</sup> to 570,604m<sup>2</sup>. This is a cumulative increase of up to 63% as explained below. If all things were equal this would imply a 63% increase in bird collision risk at the Wolf WEF site.

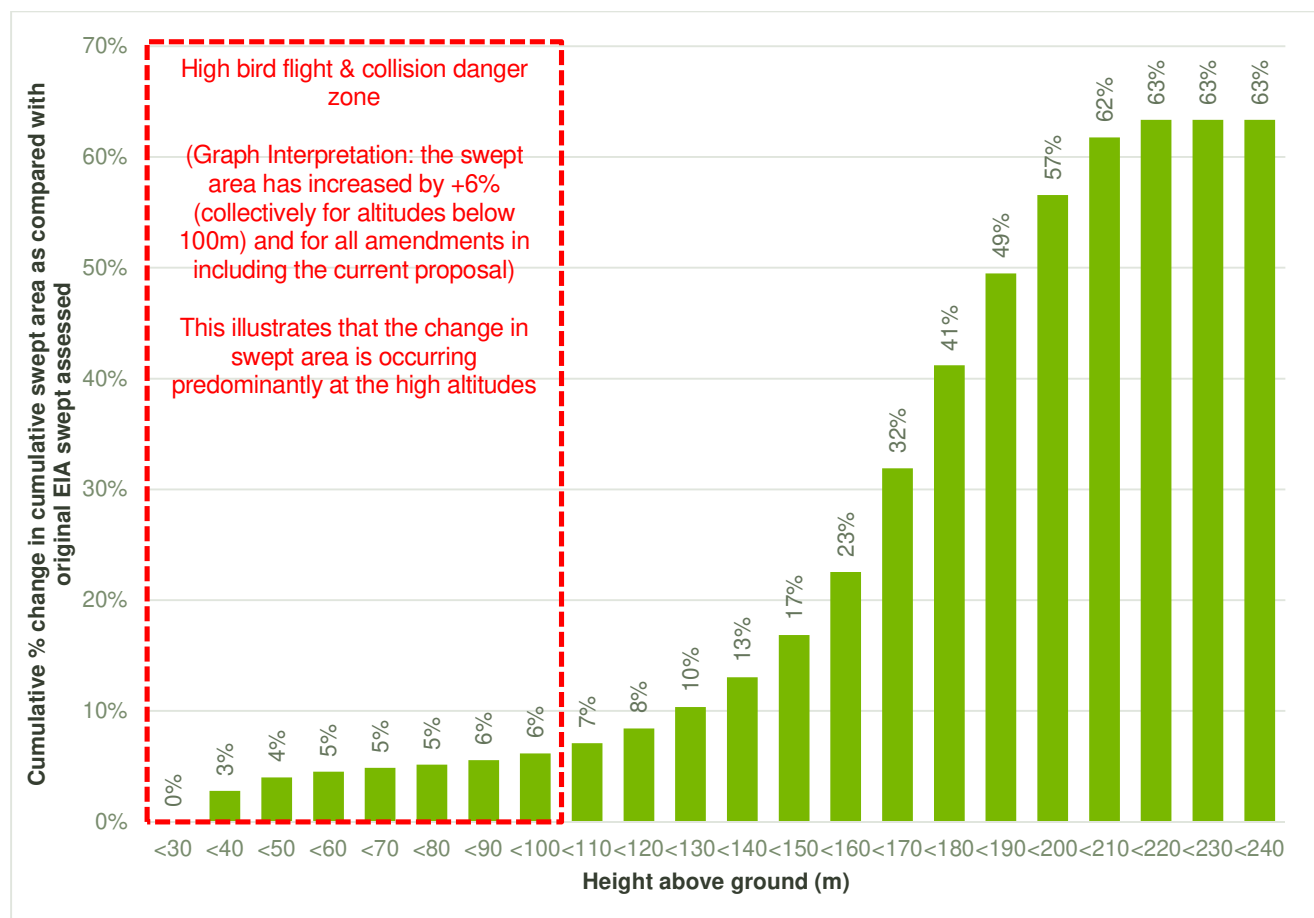
However not all factors are equal. As illustrated in Figure 4-4 below, since the lower tip height of the proposed new rotor remains relatively unchanged, most of the change in rotor swept area comes at the upper blade tip, which is above the height at which we record most bird flights. None of the priority species recorded flying on site had average flight height anywhere near the upper blade tip height of 190 to 228m (See Table 4-1). Thus, increases at the upper altitudes will not increase the collision risk.



**Figure 4-4 |Indicative diagram of the original and proposed rotor swept areas (not to scale).**

To further illustrate this point, we calculated the cumulative increase in rotor swept area at and below a given altitude (in

10m increments) as shown in Figure 4-5. This figure can be interpreted as follows: below 80m (where most recorded bird flights took place) the total change in swept area has increased by 5% (for all amendments) as compared with the assessed original. Below 150m, the total cumulative increase would amount to 17%. In other words, at the heights that we recorded relevant bird species flying, the increase in rotor swept area is fairly low when compared to the assessed original. To illustrate this, the area below 100m altitude (or 80m plus a precautionary 20m) has been marked as the high collision zone, and here we only see a cumulative 6% increase in swept area in this zone over the assessed original, despite there being a cumulative 63% increase overall.



**Figure 4-5 | Cumulative change in rotor swept area (WCS).**

We conclude then that the actual realised increase in collision risk to the relevant bird species flying on the Wolf site as a result of the current proposed amendment, considered together with the previous amendments, will not be sufficient enough to increase the significance rating from Medium (-) when considering the Worst-Case Scenario.

We have assessed a worst-case scenario with respect to turbine numbers and size. The number of turbines will most likely reduce further by the time of construction, in order to stay within the authorised 90MW for the facility. A reduction in the number of turbines would likely reduce the total swept area in the high bird collision risk altitudes, reducing the risk of bird collision. Larger turbine models could also result in the lower turbine blade tip being higher above ground than is currently proposed (30m) which would also reduce bird collision risk, as most bird flight is concentrated at the lower altitudes.

Should the number of turbines required to meet the 90 MW generation capacity be reduced to less than 21 turbines, we request that the following turbines (in order of priority) be dropped from the layout: 17; 19; 21; 22; 25; 24; 23; 27; and 28.

#### 4.7.3 Effect of Changes on Impact Significance Ratings

The original impact assessment ratings are compared against the May 2018 changes and our new assessment in the far-right hand column. It was found that the current amendments did not change any of the previous significance ratings of the original assessment.

**Table 4-2 | Comparative impact significance ratings for birds**

Impact	Original Assessment (Smallie, 2014)	Amendment II – May 2018	Current Amendment –
Habitat destruction	MEDIUM	Unchanged by proposed amendment	Unchanged by proposed amendment
Disturbance of birds	LOW	Unchanged by proposed amendment	Unchanged by proposed amendment
Displacement of birds	LOW	Unchanged by proposed amendment	Unchanged by proposed amendment
Collision of birds with turbine blades	MEDIUM	Unchanged by proposed amendment	Unchanged by proposed amendment
Collision and electrocution of birds with and on the grid connection power line	HIGH	Unchanged by proposed amendment.	Unchanged by proposed amendment.

We conclude that:

- The significance of all rated impacts remains unchanged for all assessed impacts, including bird collision risk which remains as Medium (-).
- We confirm that the revised layout does not significantly impinge the previously identified sensitive areas on site. Two turbines are slightly within the Medium sensitivity area but are for practical intents and purposes, within acceptable tolerances.

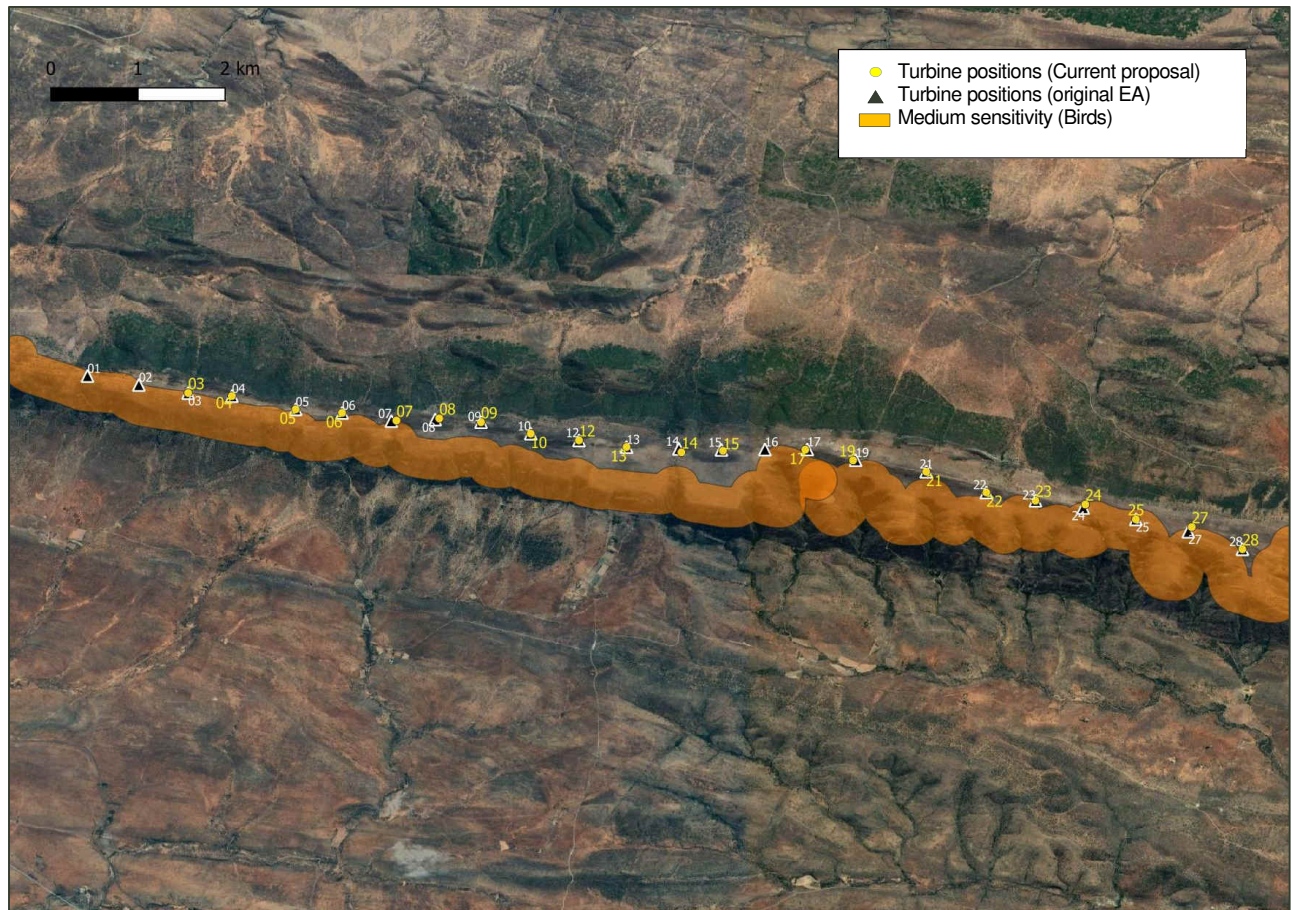
We recommend mitigation measures include:

- No turbines, other than numbers 24 and 25, should impinge the MEDIUM sensitivity areas identified by this study (these are shown in Figure 4-6 to follow). Where necessary this can be discussed further with the specialist and agreement reached.
- All electrical cables between turbines and linking turbine to the on-site substation should be placed underground.
- The power line linking the site to the Eskom grid will be above ground by necessity. The line will need to conform to all Eskom standards in terms of bird friendly pole monopole structures with Bird Perches on every pole top (to mitigate for bird electrocution), and anti-bird collision line marking devices (to mitigate for bird collision) on the earth wires of high risk sections. These sections must be identified by a suitably qualified avifaunal specialist once the final route for the line is determined. It is particularly important that the collision mitigation devices used are durable and remain in place on the line for the full lifespan of the power line. Devices must alternate between light and dark colours (to provide contrast with dark and light backgrounds) and must be installed on the full length of each span, not only the middle two-thirds as previously believed. It will be Eskom and/or Wolf WEF's responsibility to maintain these devices in effective condition for this period. Systematic patrols of this power line should be conducted during post construction bird monitoring for the wind energy facility, in order to monitor the impacts, the effectiveness of mitigation, and the durability of the mitigation measures.
- A final avifaunal walk through should be conducted prior to construction to ensure that all the above aspects have been adequately managed and to ground truth the final layout of all infrastructure. This will most likely be done as part of the site specific Environmental Management Plan. This will also allow the development of specific management actions for the Environmental Control Officer during construction, and training for relevant on-site personnel if necessary.
- The post-construction bird monitoring programme outlined by this report should be implemented by a suitably qualified and accredited avifaunal specialist. Post construction monitoring of live bird abundance and movement should be conducted for at least 1 year and carcass searches for at least 2 -3 years and repeated every 5 years thereafter. This monitoring should be done in accordance with the latest version of the best practice guidelines available at the time (Jenkins et al, 2012). This monitoring should include the grid connection power line.
- The findings of post-construction monitoring should be used to measure the effects of this facility on birds. If significant impacts are identified the wind farm operator will have to identify and implement suitable mitigation measures.
- At other operational wind farms, it has been suspected that ground burrowing small mammals such as Ground Squirrel found more favourable burrowing conditions along new road and hard stand verges on site after construction, which resulted in an inflated prey base for eagles close to turbines, and consequent higher turbine collision risk. Also – rock piles left after civil works are believed in some cases to have provided habitat for rock hyrax (dassie) close to turbines, thereby increasing collision risk for raptors. It is essential that the Wolf Wind Farm does not create favourable conditions for such mammals in high risk areas. We recommend that no rock piles be allowed to remain on the site and that all road verges, drains, and other impacted areas be sufficiently compacted to ensure that ground burrowing animals do not colonise these areas. We recommend that an avifaunal specialist conduct an inspection of these aspects at a suitable stage during construction and at the outset of operational phase bird monitoring, and that any concerns are identified and addressed timeously by the wind farm.
- Given that the impact of bird collision with turbines could occur once the wind farm is operational and require mitigation, we recommend strongly that an appropriate mitigation budget be provided for by the developer. At this stage it is not



possible to determine what mitigation may be appropriate, and in the time between writing this report and the mitigation need arising (likely several years) new mitigation methods may be developed. However, if such a need arises and suitable mitigation is identified it cannot be argued by the wind farm operator that mitigation was not budgeted for. Mitigation could cost the operator either in the form of additional costs or lost productivity as a result of changes to turbine operations. It is also important that the developer be aware that mitigation measures may require the installation of equipment on turbines, or possibly the painting of blades. Potential technical and warranty challenges should be noted throughout the planning process so that they do not prevent the implementation of mitigation if required.

- Any significant impacts detected by the operational phase bird monitoring must be mitigated where judged necessary by the avifaunal specialist. The onus is on the wind farm operator to have planned ahead for such an eventuality, particularly in respect of financial budgeting. We recommend that within the first six months of operations the site develop a 'mitigation policy' document which identifies relevant species, outlines fatality or flight activity thresholds to trigger mitigation, and potential mitigation measures.



**Figure 4-6 | Bird sensitive areas vs approved vs planned turbine layout**

## 5 SUMMARY AND CONCLUSIONS

This assessment considered the following amendments:

1. **Tower height:** Increase turbine tower height from  $\leq 110\text{m}$  to  $\leq 135\text{m}$
2. **Rotor diameter:** Increase max Rotor diameter from  $\leq 160\text{m}$  to  $\leq 186\text{m}$
3. **Turbine numbers:** Decrease turbine positions from  $\leq 24$  to  $\leq 21^9$  (dropping turbines No. 1,2 and 16)
4. **Layout revision:** Micrositing of 8 turbine positions to avoid revised/expanded bat buffers (See turbines 7, 8, 14, 15, 17, 19, 24 and 27) changes in turbine location and size precipitated the need for minor revisions to the draft layout for associated infrastructure (including roads (wider bends, revised truck turning areas), cabling, temporary laydown areas and the substation).
5. **Update of Applicant address** – The applicant has moved offices and these details will be amended.
6. **Update Condition 13.17:** Condition 13.17 should remove the referral to the amended EIR dated 26 June 2015 and replace this with the details of the current amendment.

Together with the key specialist inputs, we found that the impact significance ratings for all the impacts, as compared with the original EIA, remain unchanged. Further, the assessment suggests that in this case having “fewer, larger turbines”, while having limited additional impact from a visual impact perspective, may serve to lower environmental risks to bats and birds.

The bat specialist took the opportunity to review and update the project in line with the current best practice guidelines. This resulted in expanded buffer areas (from 150m to 200m) for the identified bat sensitive areas and drove the applicant to revise the layout (micrositing 8 turbines) to limit the impingement of these areas and improving the situation from a bat impact perspective.

**The EAP finds no reason to withhold the proposed amendments and, given that amendments may provide for a new environmental best-case scenario (i.e. fewer larger turbines and an elevated average swept area) and also updates the project to current best practice protections for bats, the EAP advocates the proposed amendments.**

Since there is no change to the impact significance ratings there is no need to revise the EMPr at this time. However, since specialists had provided updated information and recommendations that should be considered in the final EMPr and layout still to be submitted for approval (as provided for under Items 12 – 16 of the original EA), we recommend the EA amendment include a condition stating that: “This authorisation amendment is subject to the inclusion, submission and approval of additional information and key recommendations provided by specialists during this amendment process that have bearing on the final EMPr and project layout.” The DEA’s attention is also drawn to the comment submitted by SANParks, which requests additional detail, in terms of the mitigation measures and Applicants’ commitments, to be included in the EA.

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<sup>9</sup> Note: the larger the turbine generators the fewer actual turbines will be needed to achieve the 90MW nameplate capacity, while 21 positions are being retained it is likely (particularly at the larger scales) that fewer turbines will be required to meet the 90MW project objective.



## 6 PUBLIC PARTICIPATION PROCESS

As a Part 2 amendment in terms of the NEMA EIA regulations of 2014, this report is subject to a 30-day public participation process (PPP) to comply with Regulation 32 of the EIA Regulations (GN R 982). The aim of the PPP is to inform all potential and registered Interested and Affected Parties (I&APs) (including organs of state, which have any jurisdiction in respect of any aspect of the relevant activity and the competent authority) of the proposed amendment and associated changes in impacts and allow opportunity to comment on the application for amendment. The Registered I&APs are listed in Annexure E.1 and proof of the measures described below have been included as (Annexure F). The PPP includes the implementation of the 2014 EIA Regulations 39, 40 41, 42, 43 and 44 of the EIA Regulations 2014 and specifically the following -

- English and Afrikaans advertisement in the Graaff Reinet Newspaper notifying the public of the proposed amendments and opportunity to participate
- Notice boards erected on the site to inform immediate locals of the proposed amendment and opportunity to participate, placed at the R74 and R329 intersection, where cars travel the slowest and are most likely to see the signs;
- Copies of the report available at the Kirkwood and Jansenville Public Libraries
- Written notifications sent by email, registered and normal mail to all registered I&APs,
- Download links for the report provided in all correspondence. Download here: <https://tinyurl.com/ryyckyg>
- I&APs can request a digital copy via email from [patrick.killick@aurecongroup.com](mailto:patrick.killick@aurecongroup.com).

The public comment period was due to close on 30 March 2020 but the COVID-19 National Lockdown came into effect on the 27<sup>th</sup> March 2020, cutting the public comment period short by 4 days. The public comment period was extended in accordance with Government Notice 650<sup>10</sup> of 5 June 2020 by the number of days of lockdown, plus 21 days, plus the remaining four days which brings PPP closure to 30 June 2020. The revised deadline for submission of the final EA report is therefore calculated 23 July 2020.

All comments received (See Annexure E.4) have been recorded, and responses provided where required. This final EA Amendment Report and will be submitted to the CA for decision making on the proposed amendments. The comments and responses report (CRR) has been added as Annexure E.3. No substantive comments were received but the Department's attention is drawn to the comment provided by SANParks' which motivates for the inclusion of additional detail in the EA with regard to mitigation measures and Applicant commitments. Also, in response to the Department's request, a revised layout map has been included as Annexure D.1.

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<sup>10</sup> See Government Notice 650 of 5 June 2020: Directions regarding measures to address, prevent and combat the spread of COVID -19 relating to national environmental management permits and licences.