

BASIC ASSESSMENT (BA) FOR THE PROPOSED CONSTRUCTION OF THE BEAUFORT WEST WIND FARM 33kV/132kV SUBSTATION AND ASSOCIATED INFRASTRUCTURE, WESTERN CAPE PROVINCE

**Beaufort West Wind Farm 33kV/132kV Substation & Associated
Infrastructure**

Prepared for: Beaufort West Wind Farm (Pty) Ltd

Authority References:

DFFE: To be Allocated



SLR 

SLR Project No.: 720.13010.00018
Report No.: 01
Revision No.: 1
November 2021

DOCUMENT INFORMATION

Title	Basic Assessment (BA) for the proposed Construction of the Beaufort West Wind Farm 33kV/132kV Substation and Associated Infrastructure, Western Cape Province
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Keywords	Substation, BESS, Wind Farm, Renewables
Status	Draft
Report No.	1
SLR Company	SLR Consulting (South Africa) (Pty) Ltd
DFFE	To be Allocated

DOCUMENT REVISION RECORD

Rev No.	Issue Date	Description	Issued By
A	30 November 2021	Draft Basic Assessment Report	SJ

REPORT SIGN OFF AND APPROVALS



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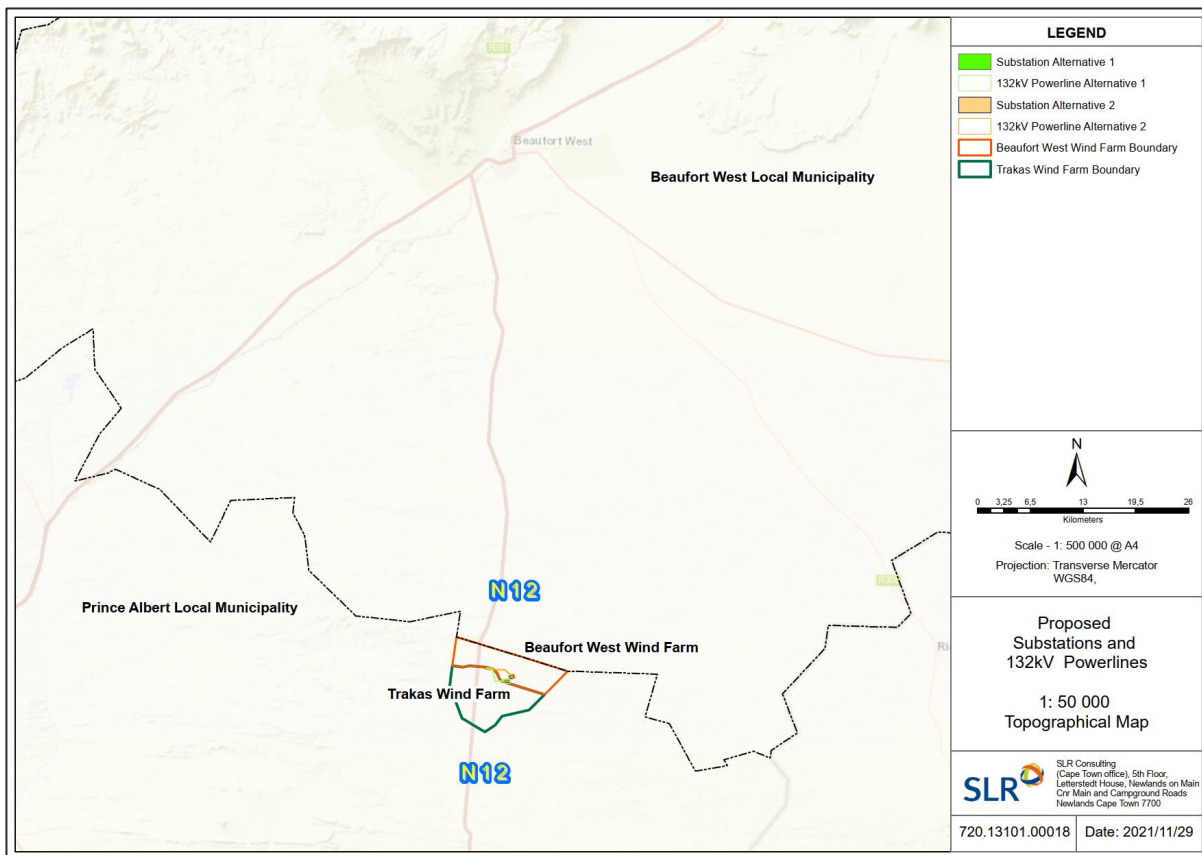
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EXECUTIVE SUMMARY

Introduction and Project Description

Beaufort West Wind Farm (Pty) Ltd¹ ('Beaufort West Wind Farm') is proposing to construct one (1) 33/132 kilovolt (kV) onsite Substation², one (1) Battery Energy Storage System (BESS), one (1) laydown area and one (1) Operations & Maintenance (O&M) Building which will be added to the authorised Beaufort West Cluster of wind developments³, near the town of Beaufort West in the Western Cape Province (the 'proposed development'). The proposed development area is located approximately 60km south of the town of Beaufort West in the Prince Albert Local Municipality, within the Central Karoo District Municipality of the Western Cape Province (Figure i).



¹ Beaufort West Wind Farm (Pty) Ltd is a Special Purpose Vehicle (SPV), a subsidiary created by the parent company South Africa Mainstream Renewable Power Developments (Pty) Ltd, which was created specifically to own and operate the authorised Beaufort West Wind Farm ([12-12-20-1784-1-AM2](#)).

² Onsite substation will consist of 33/132kV yard which will be owned and operated by Applicant, as well as 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within substation owned by Applicant, with 132kV line that will cross to Eskom's 132kV switching substation. **33/132kV yard of onsite substation (including associated BESS, laydown area and O&M building) forms part of this proposed application for EA. 132kV switching station yard of onsite substation forms part of separate application for EA, along with 132kV overhead powerline.** DFFE reference number for separate application for EA for 132kV yard of onsite switching substation and 132kV powerline will be provided once allocated.

³ Beaufort West ([12-12-20-1784-1-AM2](#)) and Trakas Wind Farms ([12-12-20-1784-2-AM2](#)) and their supporting powerline and substation infrastructure (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – [14-12-16-3-3-2-925-1](#) & Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – [14-12-16-3-3-2-925-2](#)), collectively referred to as "the Beaufort West Cluster".

Figure i: Regional Context Map

It should be noted that the onsite substation will consist of a 33/132kV yard which will be owned and operated by Beaufort West Wind Farm, as well as a 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within the substation owned by Beaufort West Wind Farm, with a 132kV line that will cross to Eskom’s 132kV switching substation. As the proposed switching station yard will be owned by Eskom, it has been included in a separate application for Environmental Authorisation (EA) and is subject to a separate Basic Assessment (BA) process, along with a 132kV overhead powerline (DFFE reference number to be allocated still) (i.e., 132kV switching station yard will also form part of EA for 132kV powerline). The 132kV overhead powerline is being proposed to feed electricity into the national grid.

Two (2) applications for EA will thus be lodged for two (2) separate projects (i.e., separate BA processes). One (1) application will be lodged for the 33/132kV yard of the onsite substation, BESS, laydown area and O&M Building (Figure ii), while another application will be lodged for the 132kV switching station yard of the onsite substation and associated 132kV powerline (Figure iii). **The 33/132kV yard² of the onsite substation and associated infrastructure form part of this proposed application for EA and BA process.**

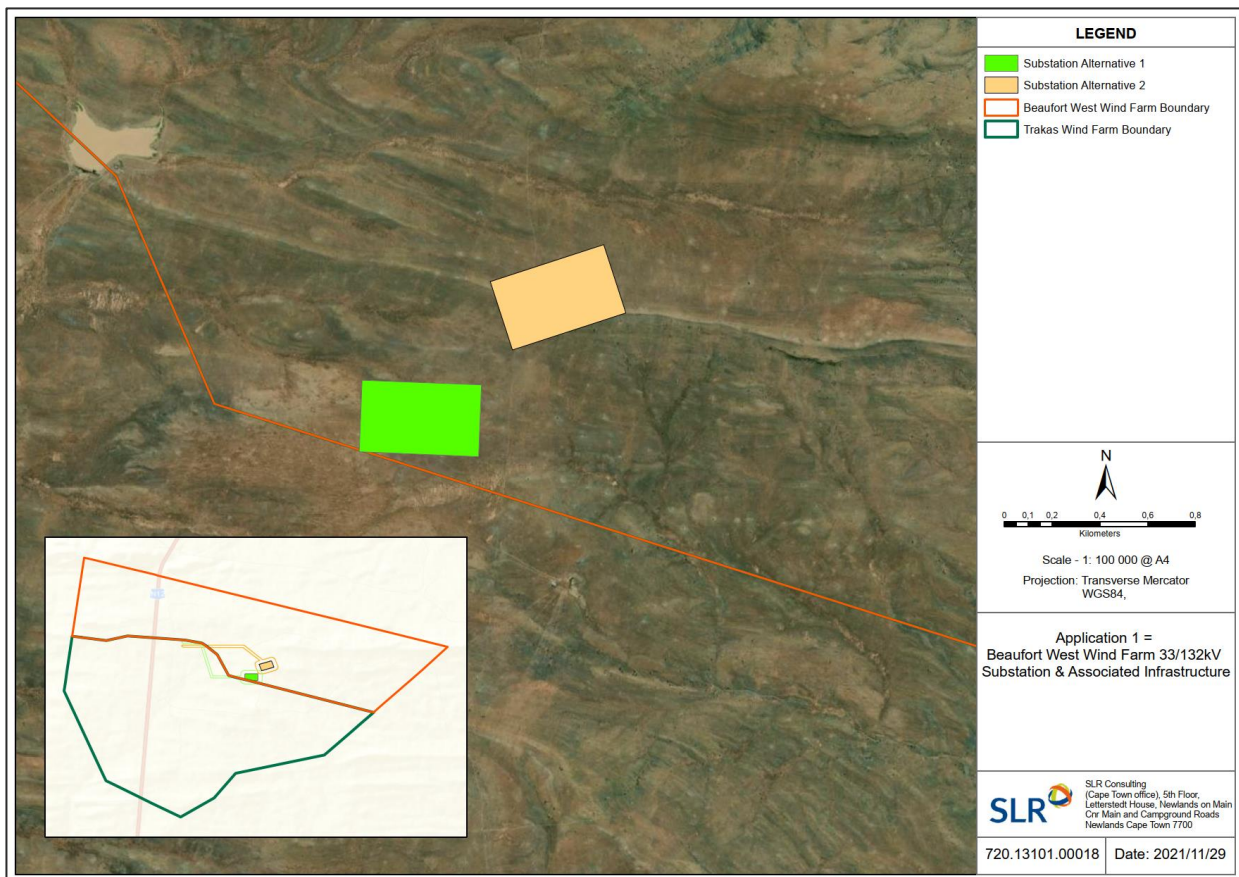


Figure ii: Map showing areas (including project alternatives) under consideration for application for 33/132kV substation & associated infrastructure (this application).

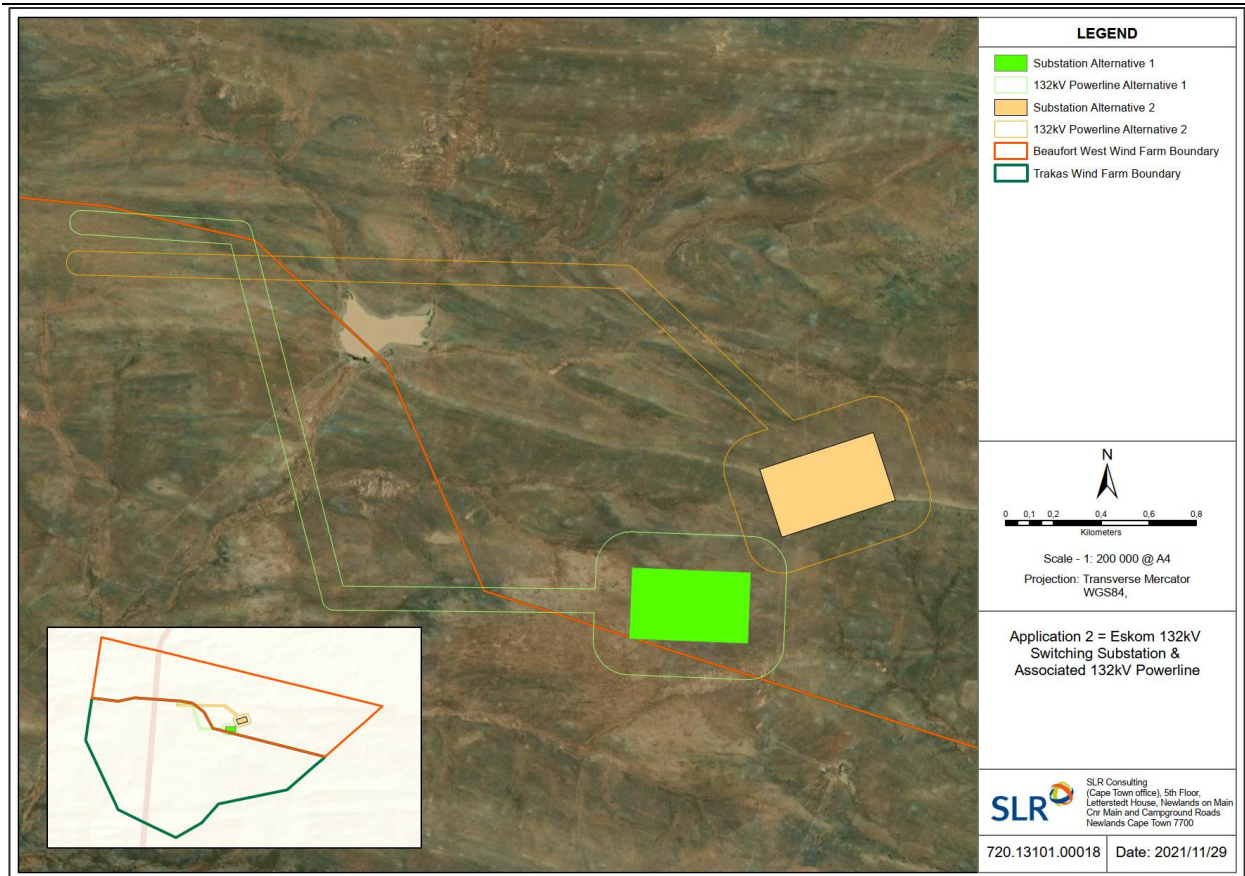


Figure iii: Map showing areas (including project alternatives) under consideration for application for 132kV Eskom switching substation & powerline (part of separate application for EA & BA process).

The proposed project requires EA from the Department of Forestry, Fisheries and the Environment (DFFE) and as such is subject to a BA process in terms of the National Environmental Management Act (NEMA): Environmental Impact Assessment (EIA) Regulations of 2014, as amended. SLR Consulting (South Africa) (Pty) Ltd ('SLR') has been appointed by Beaufort West Wind Farm as the independent Environmental Assessment Practitioner (EAP) to undertake the required BA and public participation processes for the proposed application project.

Needs and desirability

The EIA Regulations of 2014, as amended, require that the need and desirability of a proposed project are considered and evaluated against the principles of sustainability. This requires investigation of the effect of the project on social, economic and ecological systems, and places emphasis on consideration of a project's justification. Various means for assessing the needs have been investigated in assessing the proposed project's need and desirability in the context of both the greater community, as well in the context of the proponent.

The EAP and specialists, through the interrogation of planning documents (Section 2 and Section 4) and, where these planning documents are not available - using best judgment, have considered the anticipated needs and interests of the broader community. In summary, supporting grid connection infrastructure for wind energy facilities (such as this application) is desirable as it:

-
- Creates a more **sustainable economy** by promoting South Africa's energy policy towards energy diversification.
 - **Reduces the demand on scarce resources** such as water by promoting energy generating facilities which are less resource intensive.
 - **Assists in meeting international commitments to carbon emission targets** in line with global climate change commitments.
 - **Reduces pollution** by using 'cleaner' energy generating mechanisms and reducing the demand on carbon-based fuels.
 - **Promotes local economic development** by creating jobs and promoting skills development.
 - **Enhances energy security** by assisting in diversifying generation (since the project will service authorised wind energy facilities).

The proposed project is viewed in a positive context due to the potential for employment creation within the local community. It should also be noted that the cumulative effect of the proposed project and other developments in the area has the potential to result in positive socio-economic opportunities for the region. The proposed project, in conjunction with the authorised Beaufort West cluster of wind developments, will also address electricity constraints within both the local and district Municipalities by generating, distributing and evacuation a continued realisable source of electricity. Improved electrification, increased electricity supply to houses and businesses and investment in renewable energy developments are strategic objectives of both the District and Local Municipality.

It is also important to note that the IRP 2019 indicates that there is a short-term electricity supply gap of approximately 2 000MW and battery storage technologies will improve energy security by optimizing energy supply and demand, reducing the need to import electricity and reducing the need to continuously adjust generation unit output. In addition, a substation with associated BESS can provide system security by supplying energy during electricity outages, minimizing the disruption and costs associated with power cuts, amongst other benefits, such as reduction in greenhouse gas emissions, utilisation of cleaner, renewable energy alternatives and overall financial benefits.

It should further be noted that on 28 October 2021, the Minister of Mineral Resources and Energy announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (see Section 2.2.10 for explanation on the REIPPPP) and both the Beaufort West ([12-12-20-1784-1-AM2](#)) and Trakas ([12-12-20-1784-2-AM2](#)) Wind Farm projects (which form part of the Beaufort West Cluster of wind developments³) received Preferred Bidder status. These wind energy facilities have now become Strategic Infrastructure Projects (SIPs) (i.e., SIPs 8 and 10) and therefore a reduced 57-day decision-making timeframe for the competent authority is now applicable, instead of the usual 107 days. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

NEMA EIA Regulations

In terms of the EIA Regulations, 2014 (as amended), promulgated in terms of the NEMA, certain Listed Activities are specified for which a BA (GN R983 and R985) is required. As the proposed project triggers activities listed in Listing Notices 1 and 3 (see table below), it is necessary that a full BA process is undertaken for the DFFE to consider the application in terms of the NEMA.

The following Listed Activities in Government Notice (GN) R983 (Listing Notice 1) and GN R985 (listing Notice 3) requiring a BA Process are applicable to the proposed development and its alternatives (Table i):

Table i: NEMA Listed Activities applied for as part of the proposed project

No.	Activity description	Description of activity in relation to the proposed project
GN R983 (Listing Notice 1)		
11 (i)	<i>The development of facilities or infrastructure for the transmission and distribution of electricity – outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</i>	<i>The proposed site is zoned as Agricultural land which falls outside of an urban area.</i> <i>The infrastructure will include one (1) 33/132kV on-site substation (including control, operation, workshop, storage buildings / areas), one (1) Battery Energy Storage System (BESS), one (1) laydown area, one (1) Operations & Maintenance (O&M) Building and medium voltage (maximum 33kV) underground and overhead cables.</i>
12 (ii)(a)(c)	<i>The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more, where such development occurs (a) within a watercourse; and (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</i>	<i>The proposed project will require the placement of infrastructure with a combined physical footprint of more than 100m².</i> <i>As the site consists of a number drainage lines and watercourses, some of the infrastructure will be within 32m of these watercourses or drainage lines.</i>
19	<i>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.</i>	<i>The proposed project will involve the laying of underground cables within the project area, which will require the removal and/or infilling of soil from a watercourse in excess of 10m³.</i>
24 (ii)	<i>The development of road with (ii) a road reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8m.</i>	<i>A temporary road corridor up to 8m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4m wide road surface with side drains on one (1) or both sides, where necessary.</i>
27	<i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</i> <i>(i) the undertaking of a linear activity; or</i> <i>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i>	<i>The construction of the proposed onsite substation, BESS, laydown area and O&M Building will require the clearance of an area of up to approximately 14.2 hectare (ha) of indigenous vegetation.</i>
28 (ii)	<i>Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes, or afforestation on or after 01 April 1998 and where such development will (ii) occur</i>	<i>The proposed project site is zoned as agricultural land and will continue to be used for agricultural purposes should the proposed project receive environmental authorisation. Substations, O&M buildings and an associated battery facility (i.e.,</i>

No.	Activity description	Description of activity in relation to the proposed project
	<i>outside an urban area, where the total land to be developed is bigger than 1 hectare.</i>	<i>BESS), covering an area of up to approx. 14.2ha, would form part of the application.</i>
56 (i)(ii)	<i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (i) where the existing reserve is wider than 13,5 metres; or (ii) where no road reserve exists, where the existing road is wider than 8 metres.</i>	<i>Existing roads will be upgraded where possible. A temporary road corridor up to 8m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4m wide road surface with side drains on one (1) or both sides, where necessary. The development will also involve the lengthening of these existing roads (where required) in excess of 1km.</i>
GN R985 (Listing Notice 3)		
4 (i) (ii)(aa)	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (i) Western Cape (ii) within areas outside urban areas and within (aa) areas containing indigenous vegetation.</i>	<i>The site is located outside urban areas, while most of the site constitutes indigenous vegetation in the Western Cape Province. In addition, Critical Biodiversity Areas (CBAs) can be found within parts of the project site. The proposed road is expected to traverse parts of the CBAs.</i>
12 (i) (ii)	<i>The clearance of an area of 300 square metres or more of indigenous vegetation in the (i) Western Cape (ii) within critical biodiversity areas identified in bioregional plans.</i>	<i>In some areas, development of infrastructure will require the clearance of more than 300m² of indigenous vegetation. The project site is located within the Western Cape Province and part of the project site contain Critical Biodiversity Areas (CBAs).</i>
14 (a)(c)(i)(i)(ff)	<i>The development of infrastructure or structures with (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs (a) within a watercourse; and (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse in the (i) Western Cape (i) outside urban areas within (ff) critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</i>	<i>The development of the substation, internal roads and associated infrastructure will have a physical footprint in excess of 10m² and will be located within the Western Cape Province, outside urban areas. In addition, proposed development will be required within and adjacent to watercourses and will also traverse CBAs in certain places.</i>
18 (i)(ii)(aa)	<i>The widening of a road by more than 4 metres and the lengthening of a road by more than 1 kilometre in the (i) Western Cape (ii) all areas outside urban areas (aa) areas containing indigenous vegetation.</i>	<i>Existing roads may require widening of up to 8m (i.e., up to 8m during construction) and/or lengthening by more than 1km, to accommodate the movement of vehicles, in areas containing indigenous vegetation. The widening of the roads will take place within the Western Cape Province, outside urban areas, and will require the clearance of indigenous vegetation.</i>

Details of alternatives

Location Alternatives

The proposed development area will be located on the Remainder of the Farm Trakaskuilen No. 15, approximately 60km south of the town of Beaufort West in the Prince Albert Local Municipality, within the Central Karoo District Municipality of the Western Cape Province (Figure i).

No other locations are being considered for the placement of the substation and associated infrastructure, as this is dependent on the location of the authorised Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) Wind Farm projects. As mentioned, the proposed project will service the above-mentioned authorised wind farm projects (including their associated electrical infrastructure). If the project does not receive EA, then the existing electricity supply to the area as well as future economic development will be limited and compromised.

Activity Alternatives

No other activity is being considered or assessed for the proposed project. The proposed project will connect the authorised Beaufort West and Trakas Wind Farm projects to the grid. As a result, no other activity alternatives could be considered for the proposed project.

Layout Alternatives

A comprehensive design process has been undertaken to inform the layout alternatives for the proposed project. As part of the proposed project / BA process, two (2) site area alternatives of up to approximately 200 000m² (i.e., 500m x 400m or 20ha) each have been assessed for the onsite substation, BESS, laydown area and O&M building. As mentioned, the proposed site area alternatives will be located within the site for the authorised Beaufort West and Trakas Wind Farms respectively. As such, the location of the proposed onsite substation, BESS, laydown area and O&M building has previously been assessed as part of the development footprint for the authorised Beaufort West and Trakas Wind Farm projects.

Based on the findings of the comparative assessment of site area alternatives undertaken by the respective specialists, **Site Area Alternative 2** is slightly preferred from an environmental perspective. However, all specialists confirmed that both site area alternatives are considered acceptable, as no fatal flaws were identified, and therefore **both alternatives are acceptable for authorisation**.

Technology Alternatives

No technology alternatives exist to date for the transmission of electricity from renewable energy sources to grid networks. Thus, no technology alternatives will be considered or assessed for the substation in this BAR. Three (3) technology types were however considered for the proposed BESS, namely Lithium Ion (Li-Ion), Vanadium Redox Flow and Zinc-hybrid (Zinc-Bromine - ZNBR) Flow. A battery is a device that can store electrical energy in the form of chemical energy and convert that energy into electricity. **Beaufort West Wind Farm has chosen the Solid-State Li-ion battery technology as the preferred technology for the BESS, based on the risk assessment undertaken.** A concise Risk Assessment of both technologies (Solid State and Flow Batteries) over three (3) battery types (Lithium-Ion, Vanadium Redox Flow and Zinc Hybrid Flow) is included in Section 8 of the BAR.

No-go alternative

The 'No-Go' alternative is the option of not constructing the substation and associated infrastructure in support of the authorised Beaufort West and Trakas Wind Farm projects and where the *status quo* of the current status and/or activities on the site would prevail.

Should the 'No-Go' alternative be considered, there would be no impact on the existing environmental baseline and no benefits to the local economy and affected communities. The authorised Beaufort West and Trakas Wind Farm projects would still be able to connect to the grid for the evacuation of electricity as two (2) separate substations (one for each wind farm) have been authorised, however, it would have significant cost implications to build two (2) substations instead of one (1) central substation. In addition, this is also anticipated to result in substantial environmental impacts as two (2) sites would need to be cleared and constructed on, instead of just one (1).

Public Participation Process undertaken

A newspaper advertisement announcing the commencement of the BA process, the availability of the BAR and inviting I&APs / key stakeholders to register on the project database was placed in "*Die Courier*" newspaper on 12 November 2021 (see Appendix 6.1). In addition to the advertisement, site notices in English and Afrikaans (as per regulations) were placed / erected at conspicuous locations at the affected property during the week of 11–15 October 2021. Posters were also erected at the Beaufort West Local Municipality Offices & Public Library as well as the Central Karoo District Municipality Offices the week of 15-19 November 2021 (Appendix 6.1). These site notices and posters contain the same details as the newspaper advertisement as well as the contact details of the consultant (see Appendix 6.1).

A register of I&APs was compiled, as per Section 42 of the EIA Regulations, 2014 (as amended). This includes all relevant authorities, Government Departments, the Local Municipality, District Municipality, Organs of State (OoS), relevant conservation bodies and non-governmental organisations (NGOs), as well as affected and neighbouring landowners. A copy of the I&AP Register is included as Appendix 6.4 of this report.

All registered I&APs, authorities (including the Local and District Municipality), Government Departments, relevant conservation bodies and NGOs have been notified about the proposed project. The landowner and/or occupant(s) of the affected property / farm portion, on which the proposed substation and associated infrastructure are proposed, have also been notified. Directly adjacent landowners were also notified. A notification letter for the BA Process was compiled and circulated the week of 15-19 November 2021, as well as 22-26 November 2021. The purpose of the notification letter was to notify I&APs and key stakeholders (including affected and directly adjacent landowners) of the BA process and invite them to participate in the BA process.

This BA Report is available for review and comment for a period of 30 days, **from 30 November 2021 to 21 January 2022 (excluding public holidays and the DFFE's December shutdown period⁴)**, to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process to date. Hard copies (in the form of digital tablets) of the full BA report (including appendices) have been

⁴ DFFE shuts down from 15 December 2021 to 5 January 2022 and no public participation related activities may take place during this period. Legislated timeframes (including comment periods for public participation) also do not include this period.

placed at the following public venues, for review during the relevant 30-day public review and comment period.

Name of Location	Contact Details	Address
Beaufort West Public Library & Local Municipality Offices	083 408 3781 (Librarian)	112 Donkin Street, Beaufort West, 6925 Open Monday – Friday, 10:00 am - 4:00 pm
Central Karoo District Municipality Offices	081 587 9376 (Rene van Tonder)	63 Donkin Street, Beaufort West, 6925 Open Monday – Friday, 8:00 am - 4:00 pm

The digital tablets will be made available for the entire 30-day public review and comment period and I&APs will thus be given an opportunity to review and comment on the full report. A copy of the BA Report (including appendices) has also been made available on the SLR website (at <http://slrconsulting.com/public-documents/BWest-sub-ba>). The report can also be downloaded without any data charges using internet-capable mobile phones from the corresponding data free website (slrpublicdocs.datafree.co/public-documents/BWest-sub-ba). I&APs can use this to access and download the draft report and the associated appendices.

Comments should be forwarded to the SLR at the address, telephone or email address shown below. For comments to be included in the Final BA Report (BAR), **comments should reach SLR no later than 21 January 2022.**

SLR Consulting (South Africa) (Pty) Ltd
 Attention: **Stephan Jacobs**
 PO Box 1596, Cramerview 2060 (*if using post please call SLR to notify us of your submission*)
 Tel: 072 737 2114
 E-mail: sjacobs@slrconsulting.com

Numerous stakeholder engagement methods are thus being employed as part of the BA process and comments are being requested from registered I&APs and key stakeholders. See section 3.6 for details regarding the public participation process undertaken as part of the BA process.

Impact Assessment Methodology

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment.

Based on the results of the impact assessment undertaken by the respective specialists, the impacts associated with the proposed project can be kept to acceptable levels (i.e., either Medium Negative, Low Negative and/or Very Low Negative significance) after the implementation of the appropriate mitigation measures. The Avifauna and Aquatic specialists have also identified several impacts associated with the proposed project which have Very Low Positive significance, while the Aquatic specialist found that the loss of aquatic species of special concern would have an Insignificant significance after the implementation of mitigation measures. The visual impact on sensitive receptors during the construction, operational and decommissioning phases will also have an Insignificant significance before and after mitigation. In addition,

no fatal flaws have been identified by any of the specialists. The identified impacts associated with the proposed project are therefore deemed to be acceptable.

With regards to cumulative impacts, based on the rating of impacts undertaken by the specialists, the cumulative impacts associated with the proposed project can be kept to acceptable levels (i.e., either Medium, Low or Very Low Negative significance) after the implementation of mitigation measures. The cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, however, no fatal flaws have been identified by the visual specialist or any of the other specialists. In addition, the impact of the 132kV powerline and substation would be dwarfed by the cumulative impact of the other renewable energy developments in the area. It should also be noted that several impacts with Very Low Positive significance have been identified by the Avifauna specialist. The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

While there are several negative impacts on the receiving environment associated with the proposed project, the cumulative positive effect of the proposed development and other developments in the area has the potential to result in positive socio-economic opportunities for the region.

In addition to the above, none of the specialists identified any fatal flaws and recommended that the proposed project should be authorised.

A summary of the findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social) is provided in Table ii below (this includes impact significance).

Table ii: Summary of findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social)

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
Agriculture	<p>Although an Agricultural Compliance Statement is not required to formally rate agricultural impacts, it is hereby confirmed that the agricultural impact of the proposed development is negligible. The proposed project has a negligible agricultural impact for the following reasons:</p> <ul style="list-style-type: none"> The direct, permanent, physical footprint of the respective developments that has any potential to interfere with agriculture is of very limited extent and therefore, entirely insignificant within this agricultural environment of large farms utilised only for low density grazing. The affected land has very low agricultural potential. <p>The only potential source of impact is minimal disturbance to the land during construction and decommissioning of the project. This impact can be completely mitigated. There is likely to be some nuisance disturbance to agricultural activities during construction. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.</p> <p>The cumulative impact of loss of agricultural land use can confidently be assessed as not having an unacceptable negative impact on the agricultural production capability of the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.</p>			<p>The assessed site area alternatives are entirely on land that has only ever had grazing as an agricultural land use. The land's predominantly low agricultural sensitivity, with a maximum of medium sensitivity, is confirmed by this assessment.</p> <p>Conclusion The proposed development will have negligible agricultural impact significance and will be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the facts that the amount of agricultural land loss resulting from the development is totally insignificant, and that the land is of very low agricultural potential.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved. The conclusion of the assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.</p>
Aquatic	Construction & Decommissioning Phases			<p>A variety of aquatic features, mostly ephemeral in nature, were observed within the study area and were mapped and buffered as necessary for their protection. The current layout has, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and risk to Aquatic resources, if Site Area Alternative 2 is selected.</p> <p>Overall, the catchment areas and subsequent rivers / watercourses are largely in a natural state with localised</p>
	Loss of aquatic species of special concern	Low -	Insignificant	
	Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase	Medium -	Very Low +	
	Potential impact on localised surface water quality	Medium -	Very Low +	
	Operational Phase			
Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.	Medium -	Very Low +		

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	Cumulative Impacts			
	Cumulative Impacts on Aquatic Environment	Low -	Very Low -	<p>impacts in some areas. The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the study area. The DFFE ratings were based on the presence of Aquatic Critical Biodiversity Areas (CBAs), Rivers and Freshwater Ecosystem Priority Area quinary catchments (NFEPAs). The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 of specialist report for Verification Statement), but also extended to include additional areas.</p> <p>The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area and did not contain any wetland clusters or listed Threatened Ecosystems.</p> <p>The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-).</p> <p>Noteworthy areas, that should be avoided, include the Very High Sensitivity areas.</p> <p>Conclusion Based on the findings of the study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. A key recommendation is also that that during the later design process, that the temporary construction</p>

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				camps and/or substations (as required) be located outside of the water courses (including the 10m buffer).
Terrestrial Ecology	Pre-Construction & Construction Phase			<p>In general, the vegetation of the site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards, which can be ascribed to the homogeneity and aridity of the site. Although the site falls within the broad distribution of the Riverine Rabbit, the site was previously extensively camera trapped by the consultant to evaluate the potential presence of this species and as it was not detected, it is concluded that this species is not likely to be present. In addition, the typical habitat for this species is not present within the site with the result that no impact on this species is anticipated.</p> <p>Conclusion</p> <p>There are no impacts associated with the proposed Substation and associated infrastructure (BESS, laydown area and O&M building) project that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the substation and associated infrastructure on the local environment can be reduced to a low and acceptable magnitude. The contribution of the development to cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the substation and associated infrastructure that cannot be reduced to a low significance. As such, there are no fatal flaws associated with</p>
	Impacts on vegetation and protected plant species	Medium -	Medium -	
	Impacts on fauna due to construction activities	Medium -	Medium -	
	Operational Phase			
	Impacts on fauna due to operational activities	Very Low -	Very Low -	
	Impacts on CBAs and ESAs due to the presence and operation of the facility	Low -	Very Low -	
	Habitat degradation due to erosion and alien plant invasion	Medium -	Low -	
	Decommissioning Phase			
	Impacts on fauna due to construction activities	Medium -	Medium -	
	Habitat degradation due to erosion and alien plant invasion due to decommissioning	Medium -	Low -	
	Cumulative Impacts			
Cumulative impact on ecological processes	Low -	Low -		

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				the development and no terrestrial ecological considerations that should prevent it from proceeding.
Avifauna	Construction Phase			<p>The Southern African Bird Atlas Project 2 (SABAP2) data indicates that a total of 152 bird species could potentially occur within the broader area. Of these, 36 species are classified as priority species and ten (10) of these are South African Red List species. Of the priority species, 18 are likely to occur regularly at the study area and immediate surrounding area, and another 18 could occur sporadically.</p> <p>In terms of environmental sensitivities, no specific ‘No-Go’ areas were identified, as mitigation can be applied for most species. The impact of displacement is low due to the relatively small size of the footprint, and the availability of similar suitable habitat in the broader area further reduces the impact.</p> <p>Conclusion The expected impacts of the proposed project were rated to be Low to Medium negative pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of all the identified impacts should be reduced to Low or Very low negative. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Tables and Section 8 of the specialist report, and the EMPr (Appendix 5 of specialist report), are strictly implemented.</p>
	Displacement due to disturbance associated with the construction of the substation and associated infrastructure.	Low -	Very Low +	
	Displacement due to habitat transformation associated with the construction of the associated infrastructure.	Low -	Low -	
	Operational Phase			
	Electrocutions within the substation yard.	Low -	Very Low +	
	Decommissioning Phase			
	Displacement due to disturbance associated with the decommissioning of the substation and associated infrastructure.	Low -	Very Low +	
	Cumulative Impacts			
	Displacement of priority species due to disturbance associated with construction of on-site substations and associated infrastructure	Low -	Very Low +	
	Displacement of priority species due to habitat transformation associated with construction of on-site substations and associated infrastructure	Low -	Low -	
Electrocution mortality associated with substations	Low -	Very Low -		
Displacement of priority species due to disturbance associated with decommissioning of on-site substations and associated infrastructure	Low -	Very Low +		
Heritage & Archaeology	Construction Phase			In terms of the heritage assessment, no constraints were identified. The alternative substation locations will not have
	Destruction of Pre-Colonial and Colonial Archaeological sites and Graves.	Low -	Low -	

Specialist	Impacts	Impact Rating		Key Findings & Conclusion	
		Without Mitigation	With Mitigation		
	Negative impact on the Cultural Landscape	Medium -	Medium -	<p>significant impact on heritage resources, which are considered to be of Low significance.</p> <p>There are no significant heritage resources within the development footprint and no direct impacts are expected. With the exception of the Cultural Landscape, all impacts are expected to occur during the Construction Phase. Impacts to the Cultural Landscape will occur during the Construction, Operational and Decommissioning Phases of the project. The impacts during the Decommissioning Phase are generally positive as the removal of the infrastructure associated with the project will allow the landscape to return to its former rural condition. The anticipated impact significance on heritage resources in general is expected to be Low, with exception of the Cultural Landscape which is expected to be Medium.</p> <p>Conclusion No fatal flaws were identified and there are no permits required of the developer. The final comment from the heritage authority will act as the approval (with conditions). Should there be a need to conduct archaeological or palaeontological mitigation, this would need to be done under a permit applied for and issued in the name of the person doing the mitigation work.</p>	
	Operational Phase				
	Negative impacts on the Cultural Landscape	Medium -	Medium -		
	Decommissioning Phase				
	Impacts to the Cultural Landscape	Very Low -	Very Low -		
	Cumulative Impacts				
	Construction activities may destroy or damage surface or sub-surface archaeological pre-colonial or colonial era remains or unmarked graves	Low -	Low -		
Construction and Operational activities may have a negative impact on the Cultural Landscape	Medium -	Medium -			
Palaeontology	Construction Phase				
	Impacts to fossil resources as a result of the construction of any infrastructure that requires excavation into bedrock or is located at sites of surface exposures of bedrock	Very Low -	Very Low -		
	Cumulative Impacts				
				<p>The provisional Very High palaeosensitivity for the substation project area shown by the DFFE screening tool is <i>contested</i>. Based on desktop studies - including palaeontological data from several proposed WEF developments in the vicinity, as well as the previous and recent palaeontological surveys of</p>	

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	Construction activities may destroy or damage palaeontological fossils	Very Low -	Very Low -	<p>the Beaufort West WEF and Trakas WEF project areas (Almond 2018, 2021), the palaeontological sensitivity of the entire new substation and associated infrastructure project area – including all layout options under consideration - is rated as Low. However, the potential for isolated fossil sites of palaeontological interest cannot be entirely discounted. These conclusions support those previously reached in the desktop- and field-based PIA report for the combined Beaufort West Cluster project area, including the present on-site substation and associated infrastructure study area by Almond (2018).</p> <p>The impact significance of the proposed development in terms of potential impacts of fossils of scientific or conservation value is rated as Very Low, both before and after mitigation of chance fossil finds.</p> <p>Conclusion The project is not fatally flawed, and there are no objections on palaeontological heritage grounds to its authorisation.</p>
Visual	Construction, Operational and Decommissioning Phases			<p>Although the proposed development will be visible from the N12 national route which traverses the study area, the section of the route within the study area is not considered to be of scenic value. In addition, the level of contrast is significantly reduced by the presence of existing powerlines and associated infrastructure as well as the N12 road, which are prominent features in an open and relatively flat landscape.</p> <p>The study area only includes five (5) potentially sensitive receptors, however, these receptors have vested interest in</p>
	Visual impact on sensitive receptors during construction, operational and decommissioning phases	Insignificant	Insignificant	
	Cumulative Impacts			
		High -	Medium-High -	

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				<p>the project and therefore not considered in the assessment. Travellers along the N12, who are tourists, were also considered as potentially sensitive receptors.</p> <p>The significance of impact, without mitigation and based on the worst-case scenario, for the sensitive receptors during the construction, operational and decommissioning phases, is neutral i.e., where the impact would not have any effect on the visual environment (over and above the authorised 132kV powerline and associated infrastructure developments), nor will it have a direct influence on the decision to develop the area.</p> <p>In terms of cumulative impacts, it was determined that the other renewable energy developments identified within a 30km radius of the proposed development would have a significant impact on the landscape and receptors within the visual assessment zone. It is anticipated that the concentration of WEFs will alter the inherent sense of place of the study area and introduce an increasingly industrial character into a largely natural landscape, resulting in some form of cumulative impacts. Although, it is anticipated that these impacts could be mitigated with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists (Oberholzer, 2010). In addition, impacts would be reduced to some degree with the presence of the existing 400kV powerline infrastructure and the N12 national route in the vicinity of the WEFs, which have already partly transformed the visual character</p>

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				<p>Conclusion</p> <p>It is the opinion of the specialist that the visual effects associated with the proposed development are of neutral significance. Given the low level of human habitation and the absence of sensitive receptors, the spatial extent of the zone of potential influence is reduced and the impact of the development would be dwarfed by the cumulative effect of the other renewable energy developments. The project is thus deemed acceptable from a visual perspective, and should each be approved, provided that the mitigation/management measures are effectively implemented, managed, and monitored in the long term.</p>
<p>Reptile (specifically Karoo Dwarf Tortoise)</p>	<p>According to the DFFE's Online Screening Tool Reports generated (Appendix 8.3), <i>Chersobius boulengeri</i> (Karoo Dwarf Tortoise) was listed as being a species of Medium sensitivity within the Animal Species Theme. This species is currently listing under IUCN as Endangered. However, based on the findings of the site sensitivity verification, the rating of Medium sensitivity has been adjusted to being Low. Considering this, a Terrestrial Animal Species Compliance Statement (TASCS) has been compiled (Appendix 5.2), with specific focus on Karoo Dwarf Tortoise.</p> <p>The general distribution pattern of the Karoo Dwarf Tortoise as per the map of all known records plotted shows that the proposed development area falls within the distribution of this species. The nearest records to the proposed development areas are located about 20 to 40km away. The general impression gained from these distribution records is thus that the species may possibly occur within the proposed development area, which is why the screening tool report lists as a species of potential occurrence that requires site sensitivity verification.</p> <p>No evidence of live specimens or shell fragments of Karoo Dwarf Tortoise was detected during the half-day site visit that was conducted during the September 2021 survey. However, observations of two (2) other tortoise species were made during this period, i.e., that of Leopard Tortoises (<i>Stigmochelys pardalis</i>) and Tent</p>			<p>Although the Karoo Dwarf Tortoise is known to occur in the general region, it seems unlikely that it is present within the proposed development areas. No specific mitigation measures are proposed in terms of safeguarding Karoo Dwarf Tortoises.</p> <p>Conclusion</p> <p>The Karoo Dwarf Tortoise does not occur within either of the proposed development nodes of the Beaufort West Cluster of Wind Farms. This conclusion is based primarily on 1) the absence of suitable or optimal habitat for this species, 2) the absence of evidence of live or dead specimens during the field survey, 3) the absence of observations by two (2) tortoise experts that have worked in the general region, and 4) the absence of observations by the landowner.</p>

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	<p>Tortoises (<i>Psammobates tentorius</i>). The IUCN conservation status of these two (2) tortoise species are both <i>Least Concern</i>.</p> <p>Due to the issue of low detectability, the absence of Karoo Dwarf Tortoise observations during the survey should not summarily be taken as proof that the species does not occur within the study area. However, judging by the general lack of suitable habitat within the proposed development units, it would appear as though this species is indeed absent from this particular area.</p>			<p>Although real absence cannot in fact be stated with absolute certainty, the confidence of this being the case is 90+%. As such, this species is not deemed to be a relevant constraint in the context of the proposed development here.</p> <p>Based on the findings of the Site Sensitivity Verification Report, the Screening Tool Report Animal Species Theme rating of MEDIUM sensitivity is herewith adjusted to being LOW. In this scenario it is no longer required to compile a Specialist Impact Assessment Report, and thus a Terrestrial Animal Species Compliance Statement is presented instead.</p>

As mentioned, the impacts (including cumulative impacts) associated with the proposed project can be kept to acceptable levels after the implementation of the appropriate mitigation measures. Several impacts with a Very Low Positive significance have also been identified by some of the specialists, along with several impacts with an Insignificant significance after the implementation of mitigation measures. Even though the cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, no fatal flaws have been identified by the visual specialist.

The identified impacts associated with the proposed project (including cumulative impacts) are therefore deemed to be acceptable.

In addition, the summary of the findings emanating from the specialist studies discussed above have concluded that no fatal flaws were identified, and any impacts can be mitigated to levels allowing for the development to be authorised.

The proposed site layout map which incorporates sensitive areas identified by the respective specialists (where applicable) is provided in Figure iv below.

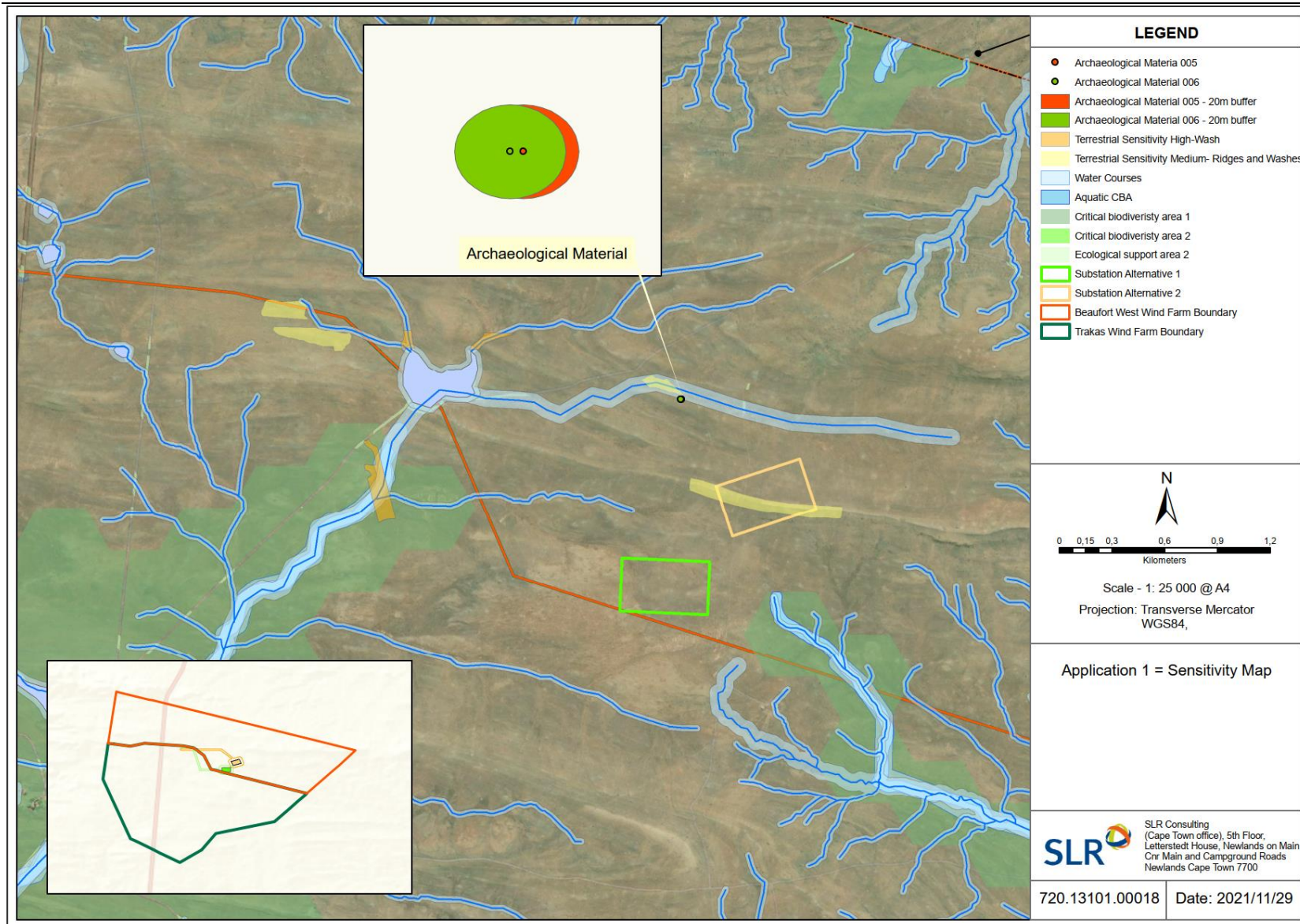


Figure iv: Site Sensitivity map based on specialist findings

Environmental Impact Statement

This BAR has identified and assessed the potential biophysical and social impacts associated with the proposed project. Based on the findings of the BA process, no fatal flaws were identified, and any impacts identified can be mitigated to acceptable levels, allowing for the proposed project to be authorised. SLR, as the EAP, is therefore of the view that the site location and project description can be authorised based on the findings of the suite of specialist assessments.

Based on the findings of the comparative assessment of site area alternatives undertaken by the respective specialists, Site Area Alternative 2 is slightly preferred alternative from an environmental perspective. However, **no fatal flaws are associated with any of the project alternatives and therefore both site area alternatives are deemed to be acceptable for authorisation.** Overall, Solid State Lithium-Ion and Redox Flow technology for the proposed BESS have both been identified as environmentally acceptable alternatives with inconsequential differences in overall impact significance. **However, Beaufort West Wind Farm (as the Applicant) have opted for Solid State Lithium-Ion technology for the proposed BESS.**

A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on the results of the cumulative impact assessment (Section 7.3), the cumulative impacts associated with the proposed project can be mitigated to acceptable levels after the implementation of mitigation measures. Even though the cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, no fatal flaws have been identified by the visual specialist or any of the other specialists. In addition, the impact would be dwarfed by the cumulative impact of the other renewable energy developments in the area. It should also be noted that several impacts with Very Low Positive significance have been identified by the Avifauna specialist. The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by an appointed independent Environmental Control Officer (ECO) and the Competent Authority, the potential detrimental impacts associated with the proposed project can be mitigated to acceptable levels.

In terms of Section 31(n) of the NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured, and in this regard SLR believes that sufficient information is available for the DFFE (as the competent authority) to take a decision.

It is the reasoned opinion of SLR (as the independent EAP) that, based on the findings of the BA, the proposed development of the substation, laydown area, O&M building (**both site area alternatives**) and **solid state Lithium-Ion BESS technology alternative** should be granted a positive decision on EA and be allowed to proceed to construction phase. It is, however, important that all feasible and practical mitigation measures recommended by the various specialists are incorporated into the Environmental Management Programme (EMPr) and implemented, where applicable. In addition, where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists. The final layout must also be submitted to the DFFE for review and approval, prior to commencing with the activity.

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
AC	- Alternating Current
BA	- Basic Assessment
BAR	- Basic Assessment Report
BESS	- Battery Energy Storage System
BID	- Background Information Document
CARA	- Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA	- Critical Biodiversity Area
CKDM	- Central Karoo District Municipality
DBAR	- Draft Basic Assessment Report
DC	- Direct Current
DFFE	- Department of Forestry, Fisheries and the Environment
DM	- District Municipality
DoE	- Department of Energy
DWS	- Department of Water and Sanitation
EA	- Environmental Authorisation
EAP	- Environmental Assessment Practitioner
ECA	- Environmental Conservation Act (ECA) (Act No. 73 of 1989)
ECO	- Environmental Control Officer
EHS	- Environmental, Health, and Safety
EIA	- Environmental Impact Assessment
EMPr	- Environmental Management Programme
EP	- Equator Principles
ERA	- The Electricity Regulation Act No. 4 of 2006
ESA	- Ecological Support Area
FBAR	- Final Basic Assessment Report
GA	- General Authorisation
GDP	- Gross Domestic Product
GHG	- Green House Gases
GIS	- Geographic Information System
GW	- Gigawatts
GWh	- Gigawatt Hours
Ha	- Hectares
HIA	- Heritage Impact Assessment
HV	- High Voltage
I&AP(s)	- Interested and/or Affected Party/Party(ies)
IBA(s)	- Important Bird Area(s)
IDP	- Integrated Development Plan

Acronym / Abbreviation	Definition
IEP	- Integrated Energy Plan
IFC	- International Finance Corporation
IPP(s)	- Independent Power Producer(s)
IRP	- Integrated Resource Plan
IUCN	- International Union for the Conservation of Nature and Natural Resources
kV	- Kilo Volt
LM	- Local Municipality
LED	- Local Economic Development
MSL	- Mean Sea Level
MW	- Megawatt
NEA	- The National Energy Act (Act No. 34 of 2008)
NEMA	- National Environmental Management Act (Act No. 107 of 1998) as amended
NEM:AQA	- National Environmental Management: Air Quality Act (Act No. of 2004) as amended
NEM:BA	- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) as amended
NEM:PAA	- National Environmental Management: Protected Areas Act (Act No. 57 of 2003) as amended
NFA	- The National Forest Act (Act No. 84 of 1998) as amended
NFEPA	- National Freshwater Ecosystem Priority Areas
NHRA	- National Heritage Resources Act (Act No. 25 of 1999) as amended
NPAES	- National Protected Area Expansion Strategy
NRTA	- National Road Traffic Act (Act No. 93 of 1996) as amended
NWA	- National Water Act (Act No. 36 of 1998) as amended
OHSA	- Occupational Health and Safety Act (Act No. 85 of 1993) as amended
O&M	- Operations and Maintenance
OoS	- Organs of State
PDP	- Provincial Development Plan
PES	- Present Ecological Status
PoS	- Plan of Study
PM	- Public Meeting
PPA	- Power Purchase Agreement
PPP	- Public Participation Process
PP Plan	- Public Participation Plan
PV	- Photovoltaic
RDP	- Rural Development Plan
REDZ	- Renewable Energy Development Zone
REIPPP	-Renewable Energy Independent Power Producer Procurement Programme
RE	- Renewable Energy

Acronym / Abbreviation	Definition
SA	- South Africa
SABAP2	- Southern African Bird Atlas Project 2
SACAA	- South African Civil Aviation Authority
SAHRA	- South African Heritage Resources Agency
SAHRIS	- South African Heritage Resources Information System
SALA	- Subdivision of Agricultural Land Act (Act No. 70 of 1970)
SANBI	- South African National Biodiversity Institute
SDF	- Spatial Development Framework
SEF	- Solar Energy Facility
SKA	- Square Kilometre Array
STP	- Screening Tool Report
SWMP	- Storm Water Management Plan
TASCS	- Terrestrial Animal Species Compliance Statement
VIA	- Visual Impact Assessment
VU	- Vulnerable
WC	- Western Cape
WMA	- Water Management Area
WUL	- Water Use License
WULA	- Water Use License Application

GLOSSARY OF TERMS

Alluvial: Resulting from the action of rivers, whereby sedimentary deposits are laid down in river channels, floodplains, lakes, depressions etc.

Archaeological resources: This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Basic Assessment Report: An assessment report compiled in accordance with Appendix A of the NEMA: EIA Regulations of 2014, as amended, to relay the information gathered and assessments undertaken during the Environmental Impact Assessment phase of a project.

Battery Energy Storage System: A technology developed for storing electric charge by using specially developed batteries. These systems complement intermittent sources of energy such as wind, tidal and solar power in an attempt to balance energy production and consumption.

Biodiversity: The diversity of genes, species and ecosystems, and the ecological and evolutionary processes that maintain that diversity.

Construction Phase: The stage of project development involving site preparation as well as all construction activities associated with the development of the project.

Cultural landscape: A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992).

Cultural Significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Endemic: Restricted or exclusive to a particular geographic area and occurring nowhere else. Endemism refers to the occurrence of endemic species.

Environmental Assessment Practitioner: An independent individual with the appropriate qualifications and experience who is appointed by the Applicant to manage the Environmental Impact Assessment process.

Environmental Authorisation: An approval granted by the Competent Authority allowing the Applicant to undertake listed activities in terms of the NEMA: EIA Regulations 2014, as amended.

Environmental Impact Assessment: In relation to an application, means the process of collecting, organising, analysing, interpreting, assessing and communicating environmental and socio-economic information that is relevant to the consideration of the application.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

"Equator Principles": A financial industry benchmark for determining, assessing and managing social & environmental risk in project financing.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Habitat: The area of an environment occupied by a species or group of species, due to the particular set of environmental conditions that prevail there.

Heritage: That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage Resources: This means any place or object of cultural significance, such as the caves with archaeological deposits identified close to both development sites for this study.

Impact: A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Kilovolt (kV): a unit of electric potential equal to a thousand volts (a volt being the standard unit of electric potential. It is defined as the amount of electrical potential between two points on a conductor carrying a current of one ampere while one watt of power is dissipated between the two points).

Mitigate: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action. Design or management mitigation measures are those that are intended to minimise or enhance an impact, depending on the desired effect.

"No-Go" option: The "no-go" development alternative option assumes the site remains in its current state, i.e. there is no construction of a facility and associated infrastructure in the proposed project area.

Operational Phase: The project phase following the Construction Phase, during which the development will function or be used as per the design.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

PV Development Area: Area for the potential erection of PV panels within the application site

Red Data Species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Red List: A publication that provides information on the conservation and threat status of species, based on scientific conservation assessments.

Rehabilitation: Less than full restoration of an ecosystem to its pre-disturbance condition.

Restoration: To return a site to an approximation of its condition before alteration.

Riparian: The area of land adjacent to a river or stream that is, at least periodically, influenced by flooding.

Sense of place: The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

Specialist study: A study into a particular aspect of the project, undertaken by a suitably qualified expert in that discipline.

Species of Special / Conservation Concern: Species that have particular ecological, economic or cultural significance, including but not limited to threatened species.

Stakeholders: All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development: Sustainable development is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Threatened Ecosystems: An ecosystem that has been classified as Critically Endangered, Endangered or Vulnerable, based on analysis of ecosystem threat status. A threatened ecosystem has lost, or is losing, vital aspects of its structure, composition or function. The Biodiversity Act makes provision for the Minister or Environmental Affairs, or a provincial MEC of Environmental Affairs, to publish a list of threatened ecosystems.

Threatened Species: A species that has been classified as Critically Endangered, Endangered or Vulnerable, based on a conservation assessment using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.

Visual Assessment Zone: The visual assessment zone or study area is assumed to encompass a zone of 10km from the outer boundary of the proposed application site.

Basic Assessment (BA) for the Proposed Construction of the Beaufort West Wind Farm 33kV/132kV Substation and Associated Infrastructure, Western Cape Province

1. INTRODUCTION

1.1 PROJECT BACKGROUND

Beaufort West Wind Farm (Pty) Ltd⁵ ('Beaufort West Wind Farm') is proposing to construct one (1) 33/132 kilovolt (kV) onsite Substation⁶, one (1) Battery Energy Storage System (BESS), one (1) laydown area and one (1) Operations & Maintenance (O&M) Building which will be added to the authorised Beaufort West Cluster of wind developments⁷, near the town of Beaufort West in the Western Cape Province (the 'proposed development'). The proposed development area is located approximately 60km south of the town of Beaufort West in the Prince Albert Local Municipality, within the Central Karoo District Municipality of the Western Cape Province (Figure 1-1).

It should be noted that the onsite substation will consist of 33/132kV yard which will be owned and operated by Beaufort West Wind Farm, as well as a 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within the substation owned by Beaufort West Wind Farm, with a 132kV line that will cross to Eskom's 132kV switching substation. As the proposed switching station yard will be owned by Eskom, it has been included in a separate application for Environmental Authorisation (EA) and is subject to a separate Basic Assessment (BA) process, along with a 132kV overhead powerline (DFFE reference number to be allocated still) (i.e., 132kV switching station yard will also form part of EA for 132kV powerline). The 132kV overhead powerline is being proposed to feed electricity into the national grid.

Two (2) applications for EA will thus be lodged for two (2) separate projects (i.e., separate BA processes). One (1) application will be lodged for the 33/132kV yard of the onsite substation, BESS, laydown area and O&M Building, while another application will be lodged for the 132kV switching station yard of the onsite substation and associated 132kV powerline. **The 33/132kV yard⁶ of the onsite substation and associated infrastructure form part of this proposed application for EA and BA process.**

The authorised Beaufort West Cluster⁷ consists of two (2) wind farm projects with associated electrical infrastructure, which include a 132kV / 400kV Linking Substation, two (2) 33kV / 132kV onsite substations [one (1) per wind farm] and 132kV powerlines. The two (2) wind farms which form part of the Beaufort

⁵ Beaufort West Wind Farm (Pty) Ltd is a Special Purpose Vehicle (SPV), a subsidiary created by the parent company South Africa Mainstream Renewable Power Developments (Pty) Ltd, which was created specifically to own and operate the authorised Beaufort West Wind Farm (12-12-20-1784-1-AM2).

⁶ Onsite substation will consist of 33/132kV yard which will be owned and operated by Applicant, as well as 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within substation owned by Applicant, with 132kV line that will cross to Eskom's 132kV switching substation. **33/132kV yard of onsite substation (including associated BESS, laydown area and O&M building) forms part of this proposed application. 132kV switching station yard of onsite substation forms part of separate application, along with 132kV overhead powerline.** DFFE reference number for separate application for 132kV yard of onsite switching substation and 132kV powerline will be provided once allocated.

⁷ Beaufort West (12-12-20-1784-1-AM2) and Trakas Wind Farms (12-12-20-1784-2-AM2) and their supporting powerline and substation infrastructure (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-1 & Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-2), collectively referred to as "the Beaufort West Cluster"

West Cluster were first authorised as one (1) larger wind farm (namely the Beaufort West Wind Farm) in March 2012 (12-12-20-1784). Thereafter, in February 2017, the authorised Beaufort West Wind Farm was split into the Beaufort West (12-12-20-1784-1) and Trakas (12-12-20-1784-2) Wind Farms respectively.

Both above-mentioned Wind Farm EAs were amended in 2020 to increase the turbine hub heights and increase the rotor diameters (Beaufort West Wind Farm – March 2020: 12-12-20-1784-1-AM5 and Trakas Wind Farm – February 2020: 12-12-20-1784-1-AM1). Further administrative amendments were granted to both respective Wind Farms in 2020 (Beaufort West Wind Farm – March 2020: 12-12-20-1784-1-AM2 and Trakas Wind Farm – February 2020: 12-12-20-1784-2-AM2) that included changing the holder of the EAs, adding Battery Energy Storage Facilities and amending project descriptions.

The supporting powerlines, linking station and onsite substation infrastructure were authorised for both respective wind farms in January 2017 (14-12-16-3-3-2-925). This authorisation was subsequently amended to split and assign each substation and powerline to each respective wind farm in August 2021 (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-1 and Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-2).

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (see Section 2.2.10 for explanation on the REIPPPP) and both above-mentioned wind energy facilities (Beaufort West Wind Farm – 12-12-20-1784-1-AM2 and Trakas Wind Farm - 12-12-20-1784-2-AM2) received Preferred Bidder status. These wind energy facilities have now become Strategic Infrastructure Projects (SIPs) (i.e., SIPs 8 and 10) and therefore a reduced 57-day decision-making timeframe for the competent authority is now applicable, instead of the usual 107 days. SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

The proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) Wind Farms and associated electrical infrastructure (14-12-16-3-3-2-925-1 & 14-12-16-3-3-2-925-2).

The proposed onsite substation, BESS, laydown area and O&M building will therefore be located within the site proposed for the authorised Beaufort West Cluster⁷, which is proposed on Portion 1 and Remainder of the Farm Trakaskuilen No. 15.

Considering the above, it is important to note that location of the proposed onsite substation, BESS, laydown area and O&M building has previously been assessed as part of the development footprint for the authorised Beaufort West Cluster.

The proposed development does not fall within any of the eleven (11) Renewable Energy Development Zones (REDZs) which were formally gazetted by the Minister of Environmental Affairs on 16 February 2018 (Government Notice 114) and 26 February 2021 (Government Notice 144) respectively. In addition, the proposed development does not fall within any of the Strategic Transmission Corridors as defined and in

terms of the procedures laid out in Government Notice No. 113 and No. 145, which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

Taking the above application requirements into consideration, Beaufort West Wind Farm has appointed SLR Consulting (South Africa) (Pty) Ltd ('SLR') as the Independent Environmental Assessment Practitioner (EAP) to undertake the required BA process for the proposed project.

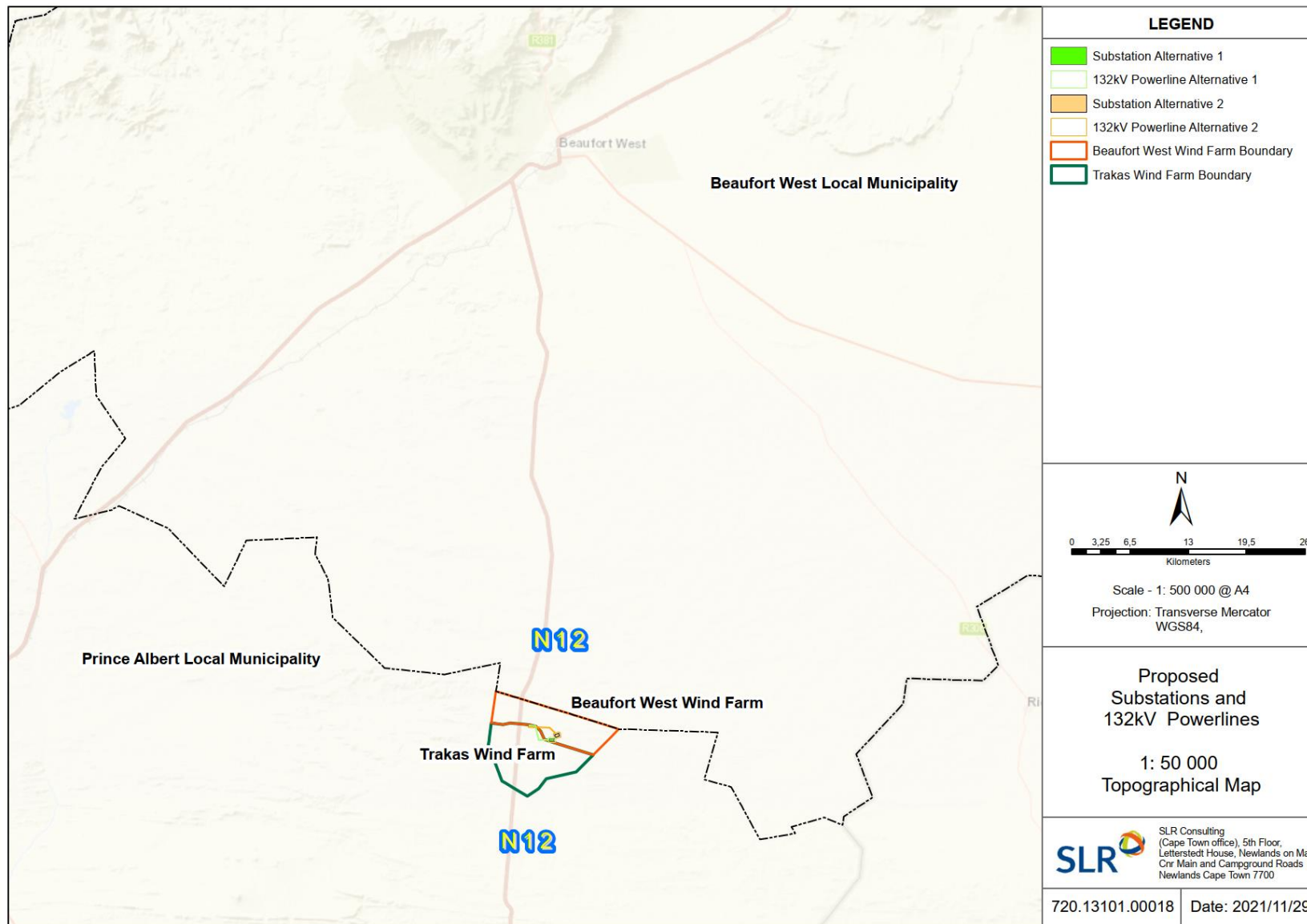


Figure 1-1: Regional Context Map for the Proposed Onsite Substation and Associated Infrastructure

1.2 PURPOSE OF THIS REPORT

This BA Report presents the process followed and the findings of the BA process undertaken for the proposed construction and operation of the 33/132kV Onsite Substation and associated infrastructure. The Report has been compiled in accordance with Appendix 1 ('*BASIC ASSESSMENT REPORT*') of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), and is now being distributed for review and comment as part of the BA process, in accordance with the requirements of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) (as amended) and Regulations thereto.

This BA Report is available for a 30-day review and comment period, **from 30 November to 21 January 2022 (excluding public holidays and the DFFE's December shutdown period⁸)**, to provide Interested and/or Affected Parties (I&APs) with an opportunity to comment on any aspect of the proposed project and the findings of the BA process to date. A copy of the BA Report (including appendices) has been made available on the SLR website (at <http://slrconsulting.com/public-documents/BWest-sub-ba>). The report can also be downloaded without any data charges using internet-capable mobile phones from the corresponding data free website (slrpublicdocs.datafree.co/public-documents/BWest-sub-ba). Hard copies of the full report (in the form of digital tablets containing a full copy of the report and appendices) have also been placed at the following locations / venues which are accessible by the public:

Name of Location	Contact Details
Beaufort West Public Library & Local Municipality Offices	112 Donkin Street, Beaufort West, 6925 083 408 3781 (Librarian) Open Monday – Friday, 10:00 am - 4:00 pm
Central Karoo District Municipality Offices	63 Donkin Street, Beaufort West, 6925 081 587 9376 (Rene van Tonder) Open Monday – Friday, 8:00 am - 4:00 pm

Comments should be forwarded to the SLR at the address, telephone or email address shown below. For comments to be included in the Final Basic Assessment Report (FBAR), comments should reach SLR **no later than 21 January 2022**.

SLR Consulting (South Africa) (Pty) Ltd

Attention: Stephan Jacobs

PO Box 1596, Cramerview, 2060 (*if using post please call SLR to notify us of your submission*)

Tel: (011) 467 0945

E-mail: sjacobs@slrconsulting.com

1.3 ASSUMPTIONS AND LIMITATIONS

The assumptions pertaining to this BA are listed below:

- It is assumed that SLR has been provided with all relevant project information and that it was correct and valid at the time it was provided;

⁸ DFFE shuts down from 15 December 2021 to 5 January 2022 and no public participation related activities may take place during this period. Legislated timeframes (including comment periods for public participation) also do not include this period.

-
- It is assumed that the site identified for construction of the substation and associated infrastructure by Beaufort West Wind Farm is technically feasible based on the design and prefeasibility studies undertaken by technical consultants on the project;
 - There will be no significant changes to the project description or surrounding environment between the completion of the BA process and implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management, etc.; and
 - Should any future infrastructure being proposed within the study area trigger additional listed activities not included in this BA process, a separate application for EA process would need to be undertaken and submitted to the relevant competent authority.

The assumptions and/or limitations provided by the various specialists are provided below.

Terrestrial Ecology:

- The current study is based on a site visit as well as an associated desktop study. The conditions at the time of the site visit are considered adequate for the field assessment. Although there had been some rainfall preceding the site visit, the vegetation was generally very dry as the area had been experiencing a prolonged drought. As such, annuals and forbs were not abundant, and the assessment is therefore largely restricted to the perennial component of the vegetation. However, as there are very few species of annuals or forbs of concern that potentially occur in the area, this is not seen as a significant limitation.
- In terms of fauna, the presence of some fauna is difficult to verify in the field as these may be shy or rare and their potential presence at the site must be evaluated based on the literature and available databases. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. In addition, many remote areas have not been well sampled with the result that the species lists derived for the area do not always adequately reflect the actual fauna and flora present at the site. In order to reduce this limitation, and ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study site. In addition, the Trakas and Beaufort West wind energy facilities were extensively camera trapped in 2016 in order to assess the potential presence of the Riverine Rabbit at the site. This information/data obtained during the 2016 study was used to inform the current development application. It should be noted that no Riverine Rabbits were recorded to occur within the study area during the 23-week sampling period from June 2016 to November 2016.

Avifauna:

- It is assumed that the sources of information used in this report are reliable. In this respect, the following must be noted:
 - The focus of the study was primarily on the potential impacts of substations on priority species. Priority species are defined as species which could potentially be impacted by electrocutions, based on specific morphological and/or behavioural characteristics.
 - The assessment of impacts is based on the baseline environment as it currently exists in the study area.
 - Conclusions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will be valid under all circumstances.

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- The study area was defined as a 2km zone around the proposed on-site substation and associated infrastructure.

Surface Water / Aquatic:

- To obtain a comprehensive understanding of the dynamics of both the flora and fauna of communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints, these long-term studies are not feasible and are thus mostly based on instantaneous sampling. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making support regarding project acceptability, unless otherwise stated.
- Therefore, due to the scope of the work presented in this report, a long-term investigation of the proposed site was not possible and as such not perceived as part of the Terms of Reference. However, a concerted effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography.
- It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

Agriculture:

- There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of the study.

Visual:

- The description of project components is limited to what has been supplied to the author by SLR Consulting before the date of completion of this report.
- The visual sensitivity to the project is assumed to be moderate to low, due to the site being located within approved wind farm sites.

Heritage and Archaeology:

- A number of archaeological studies have been undertaken within the boundaries of the Beaufort West and Trakas wind energy facilities, as well as the previous iteration of the Beaufort West grid infrastructure between 2010 and 2019. Although no archaeological study can claim to be comprehensive, this study area has been extensively surveyed and assessed. It is assumed that a large percentage of heritage resources has been identified and recorded during these surveys.
 - As with all palaeontological and archaeological studies, the most significant limitation is that sub-surface resources can only be identified when construction commences.
 - Isolated unmarked graves may be difficult to locate during surface surveys but can occur particularly in proximity to settlements.
 - There is a lack of published archaeological information on the study area. Although most of the HIA reports from the area have been located and reviewed for this report, it is acknowledged that recent reports (post 2009) in the Western Cape do not appear on the South African Heritage Resources Information System (SAHRIS) database, and this can mean that some reports were not identified for review.

- Limited previous research has been undertaken in the area in terms of cultural landscape assessment. Although a range of Cultural Resource Management (CRM) studies have been conducted in the immediate vicinity of the study area, these reports are not publicly accessible as heritage Western Cape (HWC) does not have a database for reports.

Reptiles (specifically Karoo Dwarf Tortoise):

- **Site Visits Limitations** - Surveys of the Karoo Dwarf Tortoise is hampered by the fact that the species has low detectability in the field, and it is thus difficult to determine its occurrence or actual absence at a particular site. To selectively quote from Loehr and Keswick (in prep): *“Inconspicuous, secretive, or sparsely distributed species receive relatively little research attention, potentially leading to uncertainty about their status and lack of efforts to conserve them. Karoo dwarf tortoises spend most of the time in retreats at remote arid locations, and are seldom seen.”*

1.4 STRUCTURE OF THE BASIC ASSESSMENT REPORT

This BA Report has been prepared in compliance with Appendix 1 of the EIA Regulations, 2014 (as amended), and is divided into various chapters and appendices, the contents of which are outlined below.

Section	Contents
Executive Summary	Provides a comprehensive synopsis of the BA Report
Section 1	Introduction Provides a background of the project; describes the purpose of the BA Report; outlines the structure of the report and provides information to I&APs on the opportunity to provide comments on the BA Report.
Section 2	Legislative requirements Outlines the key legislative requirements applicable to the proposed project.
Section 3	BA Process Approach and Process (including public participation process) Outlines the approach and process for the assessment and consultation process undertaken for the BA process. It also includes a summary of the public participation process undertaken to date and the results thereof.
Section 4	Project Details & Need and Desirability Provides general project information and presents a description of the proposed project. Provides an overview of the need and desirability for the proposed project.
Section 5	Alternatives Provides an overview of the alternatives considered for the proposed project, including the ‘No-go’ Alternative (where applicable).
Section 6	Description of the affected environment Describes the existing biophysical and social environment that could potentially be affected by the proposed project.
Section 7	Impact Assessment (including Cumulative Impact Assessment) Describes key issues and impacts associated with the proposed project and provides mitigation thereto. Also describes key cumulative issues and impacts associated with the proposed project.
Section 8	Risk assessment for BESS technology alternatives Provides a concise risk assessment of BESS technologies (Solid State and Flow Batteries) under consideration
Section 9	Conclusion Compares the environmental impacts and risks of the project alternatives.
Section 10	References Provides a list of the references used in compiling this report.

Section	Contents
<p>Appendices</p>	<p>Appendix 1: CVs of Project Team</p> <p>Appendix 2: EAP Declaration & Undertaking and Specialist Declarations</p> <p>Appendix 3: Authority (DFFE) Consultation</p> <p>Appendix 4: Maps</p> <p>Appendix 5: Specialist Studies</p> <ul style="list-style-type: none"> Appendix 5.1: Terrestrial Ecology Impact Assessment Appendix 5.2: Reptile Site Sensitivity Verification & Compliance Statement Appendix 5.3: Aquatic / Surface Water Impact Assessment Appendix 5.4: Avifauna Impact Assessment Appendix 5.5: Soils, Agriculture Potential and Land Capability Compliance Statement Appendix 5.6: Heritage & Archaeology Impact Assessment (incl Cultural Landscape) Appendix 5.7: Palaeontological Site Sensitivity Verification Appendix 5.8: Visual Impact Assessment <p>Appendix 6: Public Participation Process</p> <ul style="list-style-type: none"> Appendix 6.1: Advertisements & Site Notice Proof Appendix 6.2: Proof of Notifications & Digital Tablets Appendix 6.3: Correspondence Appendix 6.4: I&AP & Landowner Databases Appendix 6.5: Public Participation Plan (incl approval) Appendix 6.6: Comments & Response Report (C&RR) – to be added to Final BA Report <p>Appendix 7: Environmental Management Programme (EMPr)</p> <ul style="list-style-type: none"> Appendix 7.1: Generic Substation EMPr <p>Appendix 8: Additional Information</p> <ul style="list-style-type: none"> Appendix 8.1: Coordinates Appendix 8.2: Specialist ToR Appendix 8.3: DFFE Screening Tool Reports Appendix 8.4: Landowner Consent Form Appendix 8.5: NID Confirmation from HWC Appendix 8.6: SIP Confirmation Letter

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

The subsections below provide a list of all the applicable legislation, policies and/or guidelines that are relevant to the application.

2.1 ADMINISTRATIVE AND LEGAL FRAMEWORK

2.1.1 National Environmental Management Act (Act 107 of 1998, As amended) (NEMA)

The NEMA, as amended, establishes principles and provides a regulatory framework for decision-making on matters affecting the environment. Section 2 of the NEMA sets out a range of environmental principles that are to be applied by all Organs of State (OoS) when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests fairly. The participation of I&APs is stipulated, as is that decisions must consider the interests, needs and values of all I&APs.

Chapter 5 of the NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed, and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management, and communication of the potential impacts.

2.1.2 Environmental Impact Assessment (EIA) Regulations, 2014 (as amended)

The EIA Regulations, 2014 (as amended), which were promulgated in terms of Chapter 5 of the NEMA and published in Government Notice (GN) R982 (as amended by GN No. 326 of 7 April 2017), control certain listed activities. These activities are listed in GN R983 (Listing Notice 1; as amended by GN R327 of 7 April 2017), R984 (Listing Notice 2; as amended by GN R325 of 7 April 2017) and R985 (Listing Notice 3; as amended by GN R324 of 7 April 2017) and are prohibited until an EA has been obtained from the Competent Authority. Such an EA, which may be granted subject to certain conditions, will only be considered once there has been compliance with GN R982 (as amended).

The EIA Regulations set out the procedures and documentation that need to be complied with when applying for an EA. A BA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3, and a Scoping and EIA (SEIA) process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2. As the proposed project triggers activities listed in Listing Notices 1 and 3 (GN R983 and R985) (see Table 2-1 below), it is necessary that a full BA process is undertaken for the Department of Forestry, Fisheries, and the Environment (DFFE) to consider the application in terms of the NEMA.

Table 2-1: NEMA Listed Activities applied for as part of the proposed project

No.	Activity description	Description of activity in relation to the proposed project
GN R983 (Listing Notice 1)		
11 (i)	<i>The development of facilities or infrastructure for the transmission and distribution of electricity – outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</i>	<i>The proposed site is zoned as Agricultural land which falls outside of an urban area. The infrastructure will include one (1) 33/132kV on-site substation (including control, operation, workshop, storage buildings / areas), one (1) Battery Energy Storage System (BESS), one (1) laydown area, one (1) Operations & Maintenance (O&M) Building and medium voltage (maximum 33kV) underground and overhead cables.</i>
12 (ii)(a)(c)	<i>The development of – (ii) infrastructure or structures with a physical footprint of 100 square metres or more, where such development occurs (a) within a watercourse; and (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</i>	<i>The proposed project will require the placement of infrastructure with a combined physical footprint of more than 100m². As the site consists of a number drainage lines and watercourses, some of the infrastructure will be within 32m of these watercourses or drainage lines.</i>
19	<i>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.</i>	<i>The proposed project will involve the laying of underground cables within the project area, which will require the removal and/or infilling of soil from a watercourse in excess of 10m³.</i>
24 (ii)	<i>The development of road with (ii) a road reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8m.</i>	<i>A temporary road corridor up to 8m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4m wide road surface with side drains on one (1) or both sides, where necessary.</i>
27	<i>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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.</i>	<i>The construction of the proposed onsite substation, BESS, laydown area and O&M Building will require the clearance of an area of up to approximately 14.2 hectare (ha) of indigenous vegetation.</i>
28 (ii)	<i>Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game</i>	<i>The proposed project site is zoned as agricultural land and will continue to be used</i>

No.	Activity description	Description of activity in relation to the proposed project
	<i>farming, equestrian purposes, or afforestation on or after 01 April 1998 and where such development will (ii) occur outside an urban area, where the total land to be developed is bigger than 1 hectare.</i>	<i>for agricultural purposes should the proposed project receive environmental authorisation. Substations, O&M buildings and an associated battery facility (i.e., BESS), covering an area of up to approx. 14.2ha, would form part of the application.</i>
56 (i)(ii)	<i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre (i) where the existing reserve is wider than 13, 5 meters; or (ii) where no road reserve exists, where the existing road is wider than 8 metres.</i>	<i>Existing roads will be upgraded where possible. A temporary road corridor up to 8m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 4m wide road surface with side drains on one (1) or both sides, where necessary. The development will also involve the lengthening of these existing roads (where required) in excess of 1km.</i>
GN R985 (Listing Notice 3)		
4 (i) (ii)(aa)	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres in the (i) Western Cape (ii) within areas outside urban areas and within (aa) areas containing indigenous vegetation.</i>	<i>The site is located outside urban areas, while most of the site constitutes indigenous vegetation in the Western Cape Province. In addition, Critical Biodiversity Areas (CBAs) can be found within parts of the project site. The proposed road is expected to traverse parts of the CBAs.</i>
12 (i) (ii)	<i>The clearance of an area of 300 square metres or more of indigenous vegetation in the (i) Western Cape (ii) within critical biodiversity areas identified in bioregional plans.</i>	<i>In some areas, development of infrastructure will require the clearance of more than 300m² of indigenous vegetation.</i> <i>The project site is located within the Western Cape Province and part of the project site contain Critical Biodiversity Areas (CBAs).</i>
14 (a)(c)(i)(i)(ff)	<i>The development of infrastructure or structures with (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs (a) within a watercourse; and (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse in the (i) Western Cape (i) outside urban areas within (ff) critical biodiversity areas or ecosystem service areas as identified in systematic</i>	<i>The development of the substation, internal roads and associated infrastructure will have a physical footprint in excess of 10m² and will be located within the Western Cape Province, outside urban areas. In addition, proposed development will be required within and adjacent to watercourses and will also traverse CBAs in certain places.</i>

No.	Activity description	Description of activity in relation to the proposed project
	<i>biodiversity plans adopted by the competent authority or in bioregional plans.</i>	
18 (i)(ii)(aa)	<i>The widening of a road by more than 4 metres and the lengthening of a road by more than 1 kilometre in the (i) Western Cape (ii) all areas outside urban areas (aa) areas containing indigenous vegetation.</i>	<i>Existing roads may require widening of up to 8m (i.e., up to 8m during construction) and/or lengthening by more than 1km, to accommodate the movement of vehicles, in areas containing indigenous vegetation. The widening of the roads will take place within the Western Cape Province, outside urban areas, and will require the clearance of indigenous vegetation.</i>

2.1.3 National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA)

The Minister of Environmental Affairs may, by notice, publish a list of waste management activities in the Gazette that have, or are likely to have, a detrimental effect on the environment. Any person who stores waste must at least take steps to ensure that the containers in which any waste is stored, are intact and not corroded or in, any other way rendered unfit for the safe storage of waste, adequate measures are taken to prevent accidental spillage or leaking.

There are no listed activities that are triggered by the proposed project and therefore a waste management license is not required. General and hazardous waste handling, storage and disposal will, however, be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926), published under Section 7(1)(c) of the NEM:WA, will need to be considered in this regard.

2.1.4 National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM:AQA)

This Act regulates all aspects of air quality, including prevention of pollution and environmental degradation; providing for national norms and standards regulating air quality monitoring, management and control; and licencing of activities that result in atmospheric emissions and have or may have a significant detrimental effect on the environment. The National Environmental Management: Air Quality Act (Act 39 of 2004) (NEM:AQA) has established a National Framework for Air Quality Management with various standards being implemented. The updated Listed Activities and Minimum National Emission Standards (MES) were published in 2013 (GN 893, in Government Gazette No. 37054) as amended by GN 551, 12 June 2015; GN 1207, 18 October 2018; GN 687, 22 May 2019 and GN 421, 27 March 2020).

No listed activities in terms of the NEM:AQA are triggered by the establishment of the proposed project, therefore, no air emissions licence is required. However, the proposed stockpiling activities, including earthworks, may result in the temporary exposure to, dust. Appropriate dust control methods will need to be applied.

2.1.5 National Water Act (Act 36 of 1998) (NWA)

Chapter 4 of the National Water Act (Act No 36 of 1998, as amended) (NWA) requires proponents to proposed developments to submit applications to the competent authority, namely the Regional Office of the Department of Water and Sanitation (DWS), where a water use listed under Section 21 of the Act is triggered.

Water Use is defined broadly by the Act and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), alteration of a watercourse, removing water underground for certain purposes and recreation.

Possible water uses that could triggered by the proposed project are outlined in Table 2-2 below. An application for a Water Use Licence (WUL) or General Authorisation (GA) must be undertaken in accordance with the regulations of GN R267 of 2017, prior to the construction phase of the proposed project.

Table 2-2: List of potential Section 21 water uses applicable to the proposed project

No.	Water Use	Description of activity in relation to the proposed project
c	<i>Impeding or diverting the flow of water in a watercourse</i>	The proposed substation and associated infrastructure assessed in this BAR fall within the Zone of Regulation (i.e., 500m radius) of a watercourse. The Surface Water specialist, however, confirmed that no wetlands were found within the proposed development area, only the riverine features such as alluvial watercourses and with limited riparian vegetation (Appendix 5.3). As a result, is it possible that the construction and operation of the substation and associated infrastructure may potentially lead to an impediment or alteration of beds, banks or course of the freshwater resources present within the study area. Beaufort West Wind Farm, as the proponent, will be required to submit an application for a Water Use Licence (WUL) or General Authorisation (GA) Registration to the Regional Head of the DWS in the Western Cape Province prior to the construction phase of the proposed project. It should be noted that the relevant WUL / GA applications have been submitted to the DWS, while the following references numbers have been allocated:
i	<i>Altering the bed, banks, course, or characteristics of a watercourse</i>	<ul style="list-style-type: none"> • Beaufort West Wind Farm: WU20820 • Trakas Wind Farm: WU20821

Based on an assessment of the proposed activities and past engagement with the DWS, the Surface Water specialist has indicated that the following Water Use Authorisations may be required based on the following thresholds as listed in the following Government Notices. The DWS must however ultimately determine if a GA or full WULA will be required during the pre-application process as it relates to the following, bearing in mind that this will only be conducted once a final project scope is known:

- **DWS Notice 538 of 2016, 2 September in GG 40243** – Section 21a water uses relating to the Abstraction of water.
- **Government Notice 509 in GG 40229 of 26 August 2016** – Section 21c & 21i water uses relating to the Impeding or diverting the flow of water in a watercourse and or altering the bed, banks, course or characteristics of a watercourse (see Table 2-2 above).
- **Government Notice 665, 6 September 2013 in GG 36820** - Section 21g relating to disposing of waste in a manner that may detrimentally impact on a water source which includes temporary storage of domestic wastewater i.e. conservancy tanks under Section 37 of the notice.

2.1.6 National Heritage Resources Act (Act 25 of 1999) (NHRA)

The National Heritage Resources Act, 1999 (Act No 25 of 1999) (NHRA) provides for the identification, assessment and management of the heritage resources of South Africa. The NHRA protects a range of heritage resources, while Section 38(1) of the NHRA lists development activities that would require authorisation by

the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

*“(c) Any development or other activity which will change the character of a site;
(i) exceeding 5 000m² in extent”.*

According to S7(1) of the NHRA, heritage resources are graded into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are managed by the national and provincial heritage resources authorities. Heritage Western Cape (2016) uses a system in which heritage resources of local significance are divided into Grade IIIA, IIIB and IIIC. These equate to high, medium and low local significance, while sites of very low or no significance are referred to as Not Conservation Worthy (NCW).

In terms of Cultural Landscapes, Section 3(3) of the NHRA describes the types of cultural significance that a place or object might have to be considered part of the National Estate. They are:

- a) Its importance in the community, or pattern of South Africa’s history
- b) Its possession of uncommon, rare or endangered aspects of South Africa’s natural or cultural heritage
- c) Its potential to yield information that will contribute to an understanding of South Africa’s natural or cultural heritage
- d) Its importance in demonstrating the principal characteristics of a particular class of South Africa’s natural or cultural places or objects
- e) Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group
- f) Its importance in demonstrating a high degree of creative or technical achievement at a particular period
- g) Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- h) Its strong or special association with the life or work of a person, group or organization of importance in the history of South Africa, and
- i) Sites of significance relating to the history of slavery in South Africa.

While landscapes of cultural significance do not have a dedicated section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list *“historical settlements and townscapes”* and *“landscapes of cultural significance”* as part of the National Estate. Scenic Routes, although not directly stipulated in the NHRA, are considered as a category of heritage resource in the Western Cape Department of Environmental Affairs and Development (DEA&DP) Guidelines for involving heritage specialists in the EIA process, and Baumann and Winter (2005) comment that the visual intrusion of development on a scenic route should be considered a heritage issue. A Heritage Impact Assessment (HIA) (Appendix 5.6) has been undertaken and includes an assessment of the cultural landscape.

In terms of permitting requirements, a permit is required from Heritage Western Cape (HWC) (S.35) to:

- a) Destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- b) Destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

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- c) Trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological material or object or meteorite
 - d) Bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

In addition, a permit is also required from HWC (S.36) to:

- a) Destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict or any burial ground or part thereof which contains such graves
- b) Destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority, or
- c) Bring onto or use at a burial ground or grave referred to in paragraph a) or b) any excavation equipment or any equipment which assists in the detection or recovery of materials
- d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial found or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA, then it must include a heritage component that satisfies the requirements of S38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the NEMA, as amended, the project is subject to a BA process. The HIA Report (Appendix 5.6) provides the specialist archaeological study which is a component of the heritage report. HWC is required to provide comment on the respective proposed project in order to facilitate final decision making by the DFFE).

The NHRA further requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then, in turn, notify the person whether a HIA should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act (ECA) (Act No 73 of 1989) (now replaced by the NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account in its decision-making any comments and recommendations made by the relevant heritage resources authority.

It should be noted that relevant decision-making heritage resources authority is Heritage Western Cape (HWC), since the entire project footprint falls within the Western Cape Province. HWC were notified about the proposed development by the appointed Heritage specialist via email on 06 October 2021. It was confirmed by HWC that a new Notice of Intent to Develop (NID), in terms of section 38(8) of the NHRA, would not be required and that a reviewed HIA which includes the Archaeological Impact Assessment (AIA) can be submitted. This is since the AIA (and HIA) have already been submitted and approved (March 2019) by HWC as part of the authorised Beaufort West ([12-12-20-1784-1-AM2](#)) and Trakas ([12-12-20-1784-2-AM2](#)) Wind Farms and associated electrical infrastructure ([14-12-16-3-3-2-925-1](#) & [14-12-16-3-3-2-925-2](#)). The email

correspondence notifying HWC about the proposed development, including the confirmation that a NID is not required, is attached in Appendix 8.5.

HWC were therefore notified about the proposed development via email at the earliest phase, as a NID document is not applicable. HWC have also been included as part of the public participation process. The South African Heritage Resources Agency (SAHRA) confirmed that they do not have the jurisdiction to provide comments on development applications located within the Western Cape Province and that HWC must be contacted for comments in this regard. It was also confirmed that SAHRA do not need to be registered as an I&AP (Appendix 6.3). As mentioned, a HIA has been undertaken (Appendix 5.3) and provides the specialist archaeological and palaeontological studies which are a component of the heritage report.

2.1.7 Additional Relevant Legislation

In accordance with the EIA Regulations, 2014 (as amended), all legislation and guidelines that have been considered in the BA process must be documented. In addition, Table 2-3 below provides a summary of other applicable legislation.

Table 2-3: Additional applicable legislation

Applicable legislation	Relevance
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMA:BA)	<p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA), as amended, aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources. The Act places severe restrictions on activities that could have adverse effects on threatened or protected species. The purpose of the Act includes the following:</p> <ul style="list-style-type: none"> • The management and conservation of South Africa's biodiversity within the framework of the NEMA; • The protection of species and ecosystems that warrant national protection; and • The sustainable use of indigenous resources and the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. <p>The Act makes provision for the protection of threatened or protected ecosystems and species as well as provisions guarding against the introduction of alien and invasive species. The Act identifies restricted activities involving listed threatened, protected or alien species. These activities include picking parts of, or cutting, chopping off, uprooting, damaging, or destroying, any specimen of a listed threatened or protected species. As stipulated in Section 57 of the Act, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7. Threatened or Protected Species (TOPS) permits for the carrying out of restricted activities in terms of the NEM:BA may be required.</p>

Applicable legislation	Relevance
	<p>A permit will be required to engage in restricted activities for the proposed project, in accordance with Section 88 of the Act. CapeNature will be the Competent Authority for the application (should this be required). The most recent lists of tops species and associated legislation is available in the NEM:BA, Threatened or Protected Species Regulations Notice 255 of 2015. In terms of these lists, species that this might be required for, would include the Aardvark, Bat-eared Fox and Cape Fox. There are also some plant species likely to be present at the site that would require a TOPS permit such as <i>Pachypodium succulentum</i> and <i>Sceletium tortuosum</i>.</p> <p>In addition to these species, SANBI maintains a national list of the IUCN conservation status of all plant species in South Africa. Any endangered (VU, EN, CR) species under this list are also subject to the TOPS regulations.</p>
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)	<p>This Act provides for the control over the utilization of the natural agricultural resources of the country in order to promote the conservation of the soil, the water sources and the vegetation, as well as the combating of weeds and invader plants. Section 5 of the Act prohibits the spread of weeds through the prohibition of their sale. GN R1084 (published under CARA) provides categories for the classification of the various weeds and invader plants, and restrictions where these species may occur. Regulation 15E of GN R1084 provides methods to be implemented for the control of weeds and invader species. The CARA finds application throughout the project lifecycle of the proposed project. As a result, soil conservation and erosion prevention management and mitigation measures need to be implemented. Thus, a Weed Control and Management Plan must be developed and implemented for the duration of the project life cycle of the proposed project.</p>
Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970, as amended) (SALA)	<p>The Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970, as amended) (SALA) provides for the subdivision of all agricultural land within the Republic, thereby prohibiting certain activities from being undertaken without consent from relevant authority, namely the Minister of the Department of Agriculture, Land Reform and Rural Development. This Act finds relevance to the proposed project as any portion of land that is zoned for agriculture and will need to be leased for a period exceeding ten (10) years is regulated by the Act.</p>
National Forests Act, 1998 (Act No. 84 of 1998) (NFA)	<p>The National Forest Act (Act No. 84 of 1998) (NFA) empowers the Minister of the DFFE to declare and list a tree, group of trees, woodland, or a species of trees as protected. A list of protected tree species is included in GN R908, published in November 2014. Section 7 of the Act prohibits the cutting and disturbance of NFA-listed trees. A permit is required for the removal of NFA-listed tree species, in terms of Section 4 of the Act. Prior to the submission of the permit application to the competent authority, a survey of the project footprint is required in order to ascertain the presence and distribution of NFA-listed tree species. No protected tree species were observed present within the site (including powerline corridors) by the Terrestrial Biodiversity Specialist and as such, no tree clearing permit would be required (refer to Appendix 5.1).</p>

Applicable legislation	Relevance
National Veld and Forest Fire Act, 1998 (Act No. 10 of 1998) (NVFA)	<p>Chapter 4 of the National Veld and Forest Fire Act (Act No. 10 of 1998) (NVFA) requires landowners to prepare and maintain firebreaks and discusses the role of adjoining landowners and the fire protection association in an area.</p> <p>The Act, through Chapter 5, requires all landowners to acquire firefighting equipment and have available personnel for firefighting. Landowners with land where a veldfire may start or burn, or from whose land it may spread, must have firefighting equipment and personnel available.</p> <p>There are no permitting requirements for the proposed project in accordance with the NVFA. However, it must be ensured that firebreaks within the boundaries of the study area are prepared and maintained and that firefighting equipment and personnel is made available for the duration of the project life cycle of the proposed project.</p>
Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations	<p>This Act provides for the health and safety of persons at work and the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.</p> <p>The construction and operation of the proposed project will include activities that are deemed as hazards and/or risks to the health and safety of the employees employed on the project. Such hazards/risks should be managed in accordance with the relevant requirements of the Act.</p>
Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HSA)	<p>The Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HSA) was promulgated to provide for the control of substances which may cause injury, ill-health or death. Substances are defined as hazardous if their inherent nature is toxic, corrosive, irritant, strongly sensitising, flammable and pressure (under certain circumstances) which may injure ill-health, or death in humans.</p> <p>The Act provides for the division hazardous substances or products into four (4) groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application, and disposal of such substances.</p> <ul style="list-style-type: none"> • Group 1: includes all hazardous substances defined in the Act; • Group 2: substances include mixtures of Group 1 substances; • Group 3: substances include substances found in certain electronic products (i.e., product with an electronic circuit); and • Group 4: substances include all radioactive substances. <p>The use or sale of Group I, II and III hazardous substances is prohibited. Should the use of these substances be required for the proposed project, a permit application should be submitted to the Department of Health (DoH) in terms of Section of the Act.</p>

Applicable legislation	Relevance
<p>Municipal Systems Act, 2000 (Act No. 32 of 2000)</p>	<p>The Municipal Systems Act, 2000 (Act NO. 32 of 2000) was promulgated for the administration of municipalities. The Act requires that the Constitution and other legislation, i.e., NEMA be incorporated into strategic plans at local government level. The Act regulates municipal service delivery and provides a comprehensive range of service delivery mechanisms through which municipalities may provide municipal services. The Act explains the process to be applied and the criteria to be considered in reviewing and selecting municipal service delivery mechanisms.</p> <p>The Act provides that each municipal council must adopt a single, inclusive, and strategic Integrated Development Plan (IDP) for the development of the municipality. At a municipal level, IDPs may require the implementation of renewable energy projects. As a result, Independent Power Producers (IPPs) should consult with the relevant structures of the municipality within which a development is located.</p>
<p>The Spatial Planning and Land Use Management Act, 2013 (Act No. 6 of 2013) (SPLUMA)</p>	<p>The Spatial Planning and Land Use Management Act, 2013 (Act No. 6 of 2013) (SPLUMA) aims to confirm and regulate the role of municipalities in land use planning and management. Objectives of the Act relevant to the proposed project ensure that the system of spatial planning and land use management promotes social and economic inclusion and to provide for the sustainable and efficient use of land.</p> <p>The project site was originally zoned as agricultural, however, Consent Use to change the zoning of the site from agriculture to special purpose has been approved / granted. This can be provided upon request.</p>
<p>Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA)</p>	<p>The Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA), governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).</p> <p>The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must be assessed by SACCAA in terms of the CARs and the South African Civil Aviation Technical Standards (SA CATs), in order to ensure civil aviation safety.</p> <p>The SACAA and Air Traffic Navigation Services (ATNS) will receive project related information and/or notifications and be provided with the BAR for the proposed project for review and commenting purposes during the 30-day review and comment period.</p>

Applicable legislation	Relevance
National Road Traffic Act, 1996 (Act No. 93 of 1996), and National Traffic Regulations, 2000	<p>The National Road Traffic Act, 1996 (Act No. 93 of 1996), and National Traffic Regulations, 2000, provide certain limitations on vehicle dimensions as well as axle and vehicle masses that a vehicle using a public road at any given time must comply with. Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed. Where such a vehicle or load cannot be dismantled, without disproportionate effort, expense, risk, or damage, into units that can travel or be transported legally. Such load is classified as an abnormal load and is permitted to be transported on public roads under an exemption permit issued in terms of Section 81 of the Act.</p> <p>A permit application in terms of Section 81 of the Act will be required for the transportation of key infrastructure components (i.e., transformers, etc.) and machinery (i.e., tractor-loader backhoes, etc.) to the project site during the construction phase of the proposed project. It should however be noted that the Applicant have all the required permits for the transportation of key infrastructure components in place. In addition, the proposed BESS is stored in containers, which would not require a special permit to transfer.</p>
Western Cape Nature Conservation Laws Amendment Act, 2000 (Act No. 3 of 2000)	<p>This Act provides for the amendment of various laws on nature conservation in order to transfer the administration of the provisions of those laws to the Western Cape Nature Conservation Board. The Act was also promulgated to amend the Western Cape Nature Conservation Board Act, 1998.</p> <p>The Act provides lists of protected fauna that should not be harmed without a permit. Usually, important faunal features within the development footprint can be avoided through micro-siting of roads and turbine positions. However, sometimes it is not possible to avoid burrows of protected species and it is necessary to trap and translocate the affected species. In such cases, a permit is also required from CapeNature for the capture and translocation of such protected species. Captured individuals of species should not be relocated to other areas, but released on the same property as they were captured. As with protected plant permits, faunal permits are usually issued within 30 days of submitting the permit of CapeNature.</p> <p>Should the proposed development go ahead, and protected plants species have been identified for removal, the necessary permits for such removal must be obtained from CapeNature. This permit must list the number and location of all individuals of protected plants as well as those plants listed as being of conservation concern by the Red List of South African Plants (http://redlist.sanbi.org/index.php). This permit requires a full walk-through of the final approved development footprint, following which the number of individuals of protected species that would be affected by the development can be quantified and used to populate the permit application. Depending on the identity of the species concerned, some would be destroyed, while other species would need to be translocated within the site to a safe site outside the development footprint, based on the recommendations of the walk-through study.</p>

Applicable legislation	Relevance
	<p>The Act also provides measures for the establishment of provincial and private nature reserves, as well as the establishment of local nature reserves by local authority. The nearest nature reserve to the project site is the Roam Private Nature Reserve, which is situated adjacent to the N12, within the authorised Beaufort West Wind Farm Site. It should be noted that the Roam Private Nature Reserve have been added to the project database as an I&AP and have received project related information and/or notifications. The reserve will also be provided with the BAR for the proposed project (to be sent to relevant contact person) for review and commenting purposes during the 30-day review and comment period.</p>
<p>Western Cape Land Use Planning Act (Act No. 3 of 2014) (LUPA)</p>	<p>The Western Cape Land Use Planning Act, 2014 (Act No. 3 of 2014) (LUPA), was enacted in terms of SPLUMA and consolidates legislation in the Province pertaining to provincial planning, regional planning and development, urban and rural development, regulation, support and monitoring of municipal planning and regulation of public places and municipal roads arising from subdivisions. The Act also makes provision for provincial spatial development frameworks and provides for minimum standards for, and the efficient coordination of, spatial development frameworks. In addition, the Act provides for minimum norms and standards for effective municipal development management, regulates provincial development management, regulate the effect of land development on agriculture and provides for land use planning principles. The Act effectively enables municipalities in the Western Cape to implement their own land use planning bylaws.</p> <p>Should the proposed development go ahead, the appropriate subdivision, rezoning or consent use applications in terms of LUPA must be submitted. However, as mentioned, Consent Use to change the zoning of the site from agriculture to special purpose has been approved / granted.</p>

2.2 KEY INTERNATIONAL, NATIONAL, REGIONAL AND LOCAL LEGISLATURE, POLICY, STRATEGIES AND PLANNING FRAMEWORKS

2.2.1 United Nations Framework Convention on Climate Change and Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC, 1992) is an international environmental treaty aimed at addressing climate change, which was negotiated and signed by 154 countries at the United Nations Conference on Environment and Development (UNCED), informally known as the 'Earth Summit', held in Rio de Janeiro (Brazil) from 3 to 14 June 1992. The primary objective of this international environmental treaty is to stabilize greenhouse gas emissions in the atmosphere to a level that prevents harmful / dangerous human-induced interference with the earth's climate system. The treaty places an obligation on signatory countries such as South Africa to adopt national policies and take measures to mitigate the impacts of climate change by limiting their anthropogenic (i.e., man-made) emissions of greenhouse gases, as well as to report on the steps undertaken to return their emissions to pre-1990 levels. The treaty called for on-going scientific research and regular meetings, negotiations and future policy agreements designed to allow ecosystems to adapt naturally to climate change, in order to enable economic development to proceed in a sustainable manner. In addition, the treaty requires more developed economies (such as the United States of

America) to provide financial resources to meet the costs incurred by developing nations (such as South Africa) in complying with their obligations to produce national inventories of their emissions.

The UNFCCC (1992) laid the foundation for the implementation of the Kyoto Protocol, which was signed by Parties in 1997 and enforced in 2005. In 2016, the UNFCCC was superseded by the 2016 Paris Agreement, which is a legally binding international treaty on climate change.

The Kyoto Protocol (1998) marked the implementation of the first measures of the UNFCCC and applies to six (6) greenhouse gases, namely Carbon Dioxide (CO₂); Methane (CH₄); Nitrous Oxide (N₂O); Hydrofluorocarbons (HFCs); Perfluorinated Compounds (PFCs) and Sulfur Hexafluoride (SF₆). The protocol primarily puts into operation the aims of the UNFCCC (1992) by committing industrialised countries and economies in transition to limit and reduce their greenhouse gas emissions, in accordance with the agreed individual targets. The protocol requires signatories to adopt policies, measures on mitigation and to report greenhouse gas emissions periodically⁹. South Africa is the world's 14th largest emitter of greenhouse gases and accounts for the highest emissions of CO₂ in Africa¹⁰. South Africa's emissions are a result of its reliance on the combustion of fossil fuels (such as coal) for the generation of electricity. In 2019, South Africa emitted approximately 478.61 million tonnes of CO₂ annually, with 279.9 million tonnes of this as a result of electricity generation¹¹.

In order to fulfil the requirements of the UNFCCC (1992) and the Kyoto Protocol (1998), the South African government has developed legislation and policy to provide the framework for indicating how commitments to reduce greenhouse gas emissions will be met. These policies include the National Climate Change Response Policy (2011), Draft Climate Change Bill (2018) and the Carbon Tax Act (Act No. 15 of 2019).

As mentioned, the proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments¹². Taking the above into consideration, the integration of the approved Beaufort West Cluster of wind developments (which this proposed project will service) into the grid will contribute at least 280MW_{ac} of electricity from renewable energy (namely wind energy), thereby reducing government reliance on electricity generation from the combustion of fossil fuels, which leads to the inevitable release of greenhouse gases such as CO₂ into the atmosphere. From this perspective, taking the information above into consideration, the proposed substation and associated infrastructure will support the development of the authorised Beaufort West Cluster of wind developments, and is thus in alignment with the obligations placed on South Africa in response to climate change through the UNFCCC (1992) and the Kyoto Protocol (1998).

2.2.2 Paris Agreement

The Paris Agreement is an international agreement / treaty, in terms of the UNFCCC, on climate change, which was adopted in 2015. It addresses mitigation, adaptation and finance and was adopted at the 2015 United Nations Climate Change Conference (COP21), which was held in Le Bourget near Paris, France. The Paris

⁹ What is the Kyoto Protocol? | UNFCCC. Accessed on 7 April 2021

¹⁰ The Carbon Brief Profile: South Africa | Carbon Brief. Accessed on 7 April 2021

¹¹ <https://ourworldindata.org/co2/country/south-africa>. Accessed on 7 April 2021

¹² Beaufort West (12-12-20-1784-1-AM2) and Trakas Wind Farms (12-12-20-1784-2-AM2) and their supporting powerline and substation infrastructure (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-1 & Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-2), collectively referred to as “the Beaufort West Cluster”.

Agreement was opened for signature on 22 April 2016. The agreement aims to improve upon and replace the Kyoto Protocol by committing countries to keeping the long-term rise of global temperatures below 2°C, above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C, thereby recognizing that this would substantially reduce the risks and impacts of climate change.

South Africa signed the Paris Agreement and submitted its pledge in 2016. The pledge is also known as the 'Nationally Determined Contribution' or NDC. According to the pledge, South Africa adopted a 'peak, plateau and decline' approach, whereby it is anticipated the greenhouse gas emissions will peak by 2025, plateau for a decade and then start to decline. By signing the agreement, countries are required to adopt the conditions of the agreement into their own legal systems through ratification, acceptance, approval, or accession. The agreement will become enforceable when ratified / approved by at least 55 countries, which together account for at least 55 % of the global greenhouse gas emissions.

By prioritising the procurement of electricity from renewable energy technologies through the Integrated Resources Plan (IRP) and the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), government has begun acting on the obligations of the Paris Agreement. Authorising the development of the substation and associated infrastructure, will allow the integration of the approved Beaufort West Cluster of wind developments¹² into the grid which will contribute at least 280MW_{ac} of electricity from renewable energy (namely wind energy), thus aiding the South African government in reaching its target to peak with greenhouse gas emissions by 2025. As mentioned, the proposed substation (more specifically the 33kV/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments. From this perspective, the proposed project aligns with the Paris Agreement, as well as any subsequent updates thereto.

The following policies take into consideration, the integration of the approved renewable energy (namely wind energy) projects (namely the Beaufort West Cluster of wind developments) which require the proposed substation and associated infrastructure to be authorised in order to be considered for development. The development of several renewable energy facilities will reduce government reliance on electricity generation from the combustion of fossil fuels, which leads to the inevitable release of greenhouse gases such as CO₂ into the atmosphere.

2.2.3 Constitution of South Africa

The Constitution of South Africa (No. 108 of 1996) provides environmental rights and includes implications for environmental management. Section 24 of the Constitution states that:

'Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
 - *Prevent pollution and ecological degradation;*
 - *Promote conservation; and*
 - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.'*

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

2.2.4 White Paper on the Energy Policy of the Republic of South Africa (December 1998)

The 1998 White Paper on the Energy Policy of the Republic of South Africa is the primary policy document which guides all subsequent policies, strategies and legislation within the energy sector. It provides specific policy statements on what government intends for the energy system as a whole and sets out five (5) key objectives. These objectives have subsequently formed the foundation and informed the development of energy policy in South Africa and remain relevant. Various other energy policies have been developed and are in different stages of implementation. Some of the key policies developed following the 1998 White Paper on Energy Policy include:

- The White Paper on Renewable Energy, 2003;
- The National Energy Efficiency Strategy of the Republic of South Africa, 2008; and
- The Integrated Resources Plan (IRP), 2010.

The White Paper (national energy policy) set out to ensure that national energy resources will be efficiently used and developed to provide for the needs of the South African people. It was formulated to address the supply and consumption of energy over the following ten (10) years, however, it remains in place today. The policy laid out a set of Energy Sector Policy Objectives which included: increasing access to affordable energy services, improving energy governance, stimulating economic development, managing energy-related environmental and health impacts and securing supply through diversity. These objectives were formulated to help with the transformation of certain industries and governance systems. Energy policy priorities were also developed to help in achieving these policy objectives. The document identifies the significance of the medium and long-term potential of renewable energy, with the advantages of minimal environmental impacts and higher labour intensities than conventional energy generation technology.

2.2.5 Renewable Energy White Paper (2003)

The Department of Energy (DoE) gazetted its White Paper on Renewable Energy in 2003 and introduced it as a *'policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.'* At that time, the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the national utility Eskom, to embark upon an intensive build programme to secure South Africa's longer-term energy needs, together with an adequate reserve margin.

2.2.6 National Climate Change Response Policy White Paper (2011)

This White Paper presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa's response to climate change has two (2) objectives:

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- Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.
 - Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

2.2.7 Integrated Energy Plan (IEP) (2016)

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998, and in terms of the National Energy Act, 2008 (Act No. 34 of 2008) which places an obligation on the Minister of the DMRE to publish the IEP in the Government Gazette. The intention of the IEP is to provide a roadmap of the future of the energy landscape for South Africa which guides future energy infrastructure investments and policy development. The National Energy Act, 2008 (No. 34 of 2008), requires the IEP to have a planning horizon of no less than 20 years. The development of the IEP is therefore a continuous process as it needs to be reviewed periodically to consider changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives.

As a fast-emerging economy, South Africa needs to balance the competing need for continued growth with its social needs and the protection of the natural environment. South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. From the myriad of factors which had to be considered and addressed during the Integrated Planning Process, eight (8) key objectives were identified:

- Objective 1: Ensure security of supply;
- Objective 2: Minimise the cost of energy;
- Objective 3: Promote the creation of jobs and localisation;
- Objective 4: Minimise negative environmental impacts from the energy sector;
- Objective 5: Promote the conservation of water;
- Objective 6: Diversify energy supply sources and primary sources of energy;
- Objective 7: Promote energy efficiency in the economy; and
- Objective 8: Increase access to modern energy.

2.2.8 Integrated Resources Plan (IRP) (2019)

The IRP (2019) is an electricity capacity plan which is a subset of the IEP and aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. Section 1 of the IRP, 2019 (Department of Energy, 2019), sets out targets for energy generation from renewable sources. The recent IRP (2019) supports a diverse energy mix and presents policy interventions to ensure energy security for South Africa's electricity supply. Most of the energy targets set by the IRP will be from renewable sources, of which wind energy makes up the bulk. As mentioned, the proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments. The IRP envisions an additional 14 400MW of power being produced from wind, 6 000 MW from photovoltaic (PV) solar plants, 3 000MW from gas, 2 500MW from hydropower and an additional 1 500MW from coal by 2030. This translates to approximately 15-18% of the country's energy needs being serviced through wind energy by 2030. The renewable energy targets are

procured through a competitive tendering process called the REIPPPP run by DoE. The success of this programme has been internationally recognised, with the United Nations Environmental Programme (UNEP) 2014 Report placing South Africa among the top ten (10) countries in respect to renewable energy investment.

Through the IRP (2019), government recognises that coal will continue to play a significant role in electricity generation given the abundance of coal reserves. However, the existing ESKOM fleet of coal-fired power stations will be decommissioned until 2030 and only then will 1 500MW be procured from coal-fired power sources.

2.2.9 National Infrastructure Plan (2012)

The National Infrastructure Plan (2012) supports green energy initiatives on a national scale through a diverse range of clean energy options as outlined in the IRP, 2019, through the Strategic Integrated Project (SIP 8). Electricity transmission and distribution for all is supported by SIP 10, which seeks to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. As such, the proposed development falls in line with the National Infrastructure Plan.

2.2.10 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

The renewable energy targets set out in the IRP are procured through a competitive tendering process called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) run by the DoE. The REIPPPP was launched to facilitate private sector investment into grid-connected renewable energy generation. The DoE gazetted the Electricity Regulations (GN R 399 of 4 May 2011) on New Generation Capacity under the Electricity Regulation Act, 2006 (Act No. 4 of 2006) (ERA). The New Generation Regulations establish rules and guidelines that are applicable to the undertaking of an IPP Bid Programme and the procurement of an IPP for new generation capacity. In terms of the New Generation Regulations, the IRP developed by the DoE sets out the new generation capacity requirement per technology, taking energy efficiency and the demand-side management projects into account. This required, new generation capacity must be met through the technologies and projects listed in the IRP and all IPP procurement programmes will be executed in accordance with the specified capacities and technologies listed in the IRP.

A decision that additional capacity be provided by an IPP must be made with the concurrence of the Minister of Finance. Once such a decision is made, a procurement process needs to be embarked upon to procure that capacity in a fair, equitable and transparent process.

The New Generation Regulations set out the procurement process. The stages within a bid programme are prescribed as follows:

- i. Request for Qualifications
- ii. Request for Proposals
- iii. Negotiation with the preferred bidder(s).

A successful bidder will be awarded a Power Purchase Agreement (PPA) subject to signature by the Regulator, namely Eskom. The programme has effectively implemented five (5) bid windows.

The REIPPPP has determined that 6 800MW of capacity is to be generated from renewable energy sources (PV and Wind), 513MW from storage, 3 000MW from gas and 1 500MW from coal. This will enable the development of an additional 11 813MW of power in total from the year 2022. This is in addition to the 2

000MW already being procured under the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) (Gazetted on the 7th of July 2020) (as per media statement released 10 September 2020). The DMRE launched a RMIPPPP on the 23rd of August 2020. The objective of the RMIPPPP is to fill the current short-term supply gap, alleviate the current electricity supply constraints and reduce the extensive utilisation of diesel-based peaking electrical generators.

Through the REIPPPP, government intends to enhance its power generation capacity, reduce reliance on the combustion of fossil fuels for the generation of electricity, stimulate an indigenous renewable energy industry and contribute to socio-economic development and environmentally sustainable growth. The programme supports the implementation of the National Development Plan and is centred on the procurement of electricity produced by the private sector through IPPs. Technologies such as wind energy (including BESS), amongst others, are currently considered under the programme as the IRP (2019) envisions an additional 14 400MW of power being produced from wind, as well as 513MW from storage.

The programme evaluates projects through various criterion which include job creation, local content, enterprise development and socio-economic development. The requirement from each criterion is summarised below:

(i) Job Creation

Under the REIPPPP, this criterion requires IPPs to disclose the percentage of the project's total jobs that will be awarded to South African citizens, especially historically disadvantaged community members within communities where projects are located (Eberhard, 2015). As such, the construction of the substation will make use of contractors who appoint labourers from the local community and therefore create numerous employment opportunities and encourage socio-economic development at a local scale.

(ii) Local Content

This criterion requires IPPs to spend a certain percentage of the total value project value in South Africa to ensure that the country derives positive economic benefits from the implementation of these projects. To date, REIPPPP projects have attracted at least USD 20.5 billion in investment into the South African economy.

(iii) Enterprise Development

This criterion intends to direct investment from IPPs towards Exempted Micro Enterprises and Qualifying Small Enterprises that are owned by historically disadvantaged women. Since its inception, the REIPPPP has directed at least R6 billion towards enterprise development (Eberhard and Naude, 2015).

(iv) Socio-economic Development

This criterion aims to direct funding to socio-economic initiatives in such a way that a project has a positive socio-economic impact on an area by funding initiatives and projects related to improvements in healthcare, infrastructure and education. This criterion requires that this funding be directed towards initiatives within the project area. IPPs are required to spend a threshold of 1% of the project revenue towards these initiatives with a target of up to 1.5%. According to Eberhard and Naude (2015), R9.3 billion was pledged to socio-economic developments in Bidding Round 4.

Taking the above into consideration, socio-economic initiatives with focus on improving healthcare, infrastructure and education within the proposed project area will derive positive economic benefits

from the implementation of the project through this criterion that IPPs are required to meet under the REIPPPP.

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy (namely Gwede Mantashe) announced the Preferred Bidders of the Round 5 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) (see Section 2.2.10 for explanation on the REIPPPP) and both the Beaufort West Wind Farm ([12-12-20-1784-1-AM2](#)) and Trakas Wind Farm ([12-12-20-1784-2-AM2](#)) received Preferred Bidder status. These wind energy facilities have now become Strategic Infrastructure Projects (SIPs) (i.e., SIPs 8 and 10). SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

- SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2019) and support bio-fuel production facilities.
- SIP 10 aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. It also aims to align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

2.2.11 Transmission Development Plan (2021 – 2030)

The purpose of the Transmission Development Plan (2021 – 2030) is to assess network requirements and propose plans to meet the load demand and generation integration forecasted in the subsequent ten (10)-year period. With Eskom fully supporting the IRP (2019), which signalled an important move to a wider range of fuel options for power generation in the country and supports a diverse energy mix to ensure the security of South Africa's electricity supply, Government has an important role to play in the implementation of the plan. This includes repowering older power stations with cleaner fuel technologies and renewables and developing renewable projects on available land around each of the power plants. In this way, South Africa will be taking advantage of existing transmission infrastructure, networks and connections to continue extending economic opportunities to communities (Transmission Development Plan, 2021 - 2030).

According to the Transmission Development Plan (2021 – 2030), transmission remains one (1) of the key components in the electricity value chain. However, the transmission system requires periodic augmentation and reinforcement to connect new loads and sources of generation to the grid and meet customers' changing needs in both load and generation. Accordingly, the plans outlined in the Transmission Development Plan highlight the critical transmission infrastructure development requirements in South Africa over the next ten (10) years in anticipation of demand growth and the future generation mix.

The Transmission Development Plan (2021 – 2030) aims to increase the transmission infrastructure by approximately 8 250km of high-voltage lines and 52 125 Megavolt amperes (MVA) of transformer capacity in the next ten (10) years. A significant amount of investment is required to strengthen the grid to accommodate the new generation capacity, in accordance with the IRP (2019). 30 gigawatts (GW) of new generation capacity are expected mainly from renewable energy sources in areas with limited network infrastructure.

According to the Transmission Development Plan (2021 – 2030), the Western Cape region of South Africa is valued for its abundance of wind resources, making it one (1) of South Africa's ideal locations for wind energy projects, a number of which are already in operation. To date, 550MW of renewable energy plants have been integrated into the Western Cape. The Western Cape transmission network consists mostly of 400kV lines. It

stretches over 550km from Gamma Substation (near Victoria West) to Philippi Substation (near Mitchells Plain).

Generation

Koeberg Power Station is the only base load power station situated locally in the Western Cape. There are also four (4) Eskom peaking plants in the Western Cape, consisting of pumped-storage and gas turbine generation, which help to meet the demand in the Western Cape and the national grid during generation shortages (Palmiet Pumped-Storage Station, Ankerlig, and Gourikwa OCGT stations and the Acacia Gas Turbine Station). There are also three (3) City of Cape Town (CoCT)-owned peaking plants in Cape Town, which help to manage the CoCT demand (Steenbras Pumped-Storage Station, Athlone and Roggebaai Gas Turbine Stations). The Western Cape has also benefited from renewable energy generation due to its climate and proximity to the coastal line.

Renewable Energy Independent Power Producers

The REIPPPP has resulted in over 1 000MW of wind and PV generation being procured in the Western Cape. Projects from Round 1 to 3 amounting to 450MW are already in commercial operation. The integration of the projects for Rounds 4 and 4B will lead to additional Transmission infrastructure. As mentioned, the Beaufort West and Trakas Wind Farm projects have both received Preferred Bidder status and have now become SIPs (i.e., SIPs 8 and 10) which target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

Load Forecast

The Western Cape GDP is the third-highest contribution to the country's total at around 15% and has one (1) of the fastest growing economies in the country. The provincial load peaked at around 3 900MW in 2019, and it is expected to increase to about 4 500MW by 2030. The Western Cape comprises three (3) CLNs, namely Peninsula, Outeniqua and West Coast. The Peninsula CLN is the main load centre in the province, consuming approximately 67% of the load. Outeniqua and West Coast CLNs make up the remaining 33% of the demand in the province. The past strong residential, commercial and light industrial load growths in the Peninsula area are expected to continue for a number of years. The load is forecasted to grow from ~4 000MW in 2021 to ~4 500MW in 2030. This translates to ~500MW (11%) over the next ten (10) years, with a compound annual growth rate (CAGR) of 1.21%.

Planned Projects

Several projects and schemes that aim to address the long-term requirements of the province have been initiated to accommodate the forecasted load and generation. Local strengthening is planned across the province, mainly comprising new 400/132kV substations. Additional 400kV line infrastructure is also required, primarily to integrate these substations and assist with power evacuation from the existing power stations. Further strengthening of the recently completed 765kV Cape Corridor is also envisaged.

Of the planned projects, most notably is the projects planned for IPPs, which includes two (2) designated renewable energy development zones in the Western Cape (namely Overberg and Komsberg). The Western Cape is, therefore, a prime location for wind generation as well as for some PV generation. As a result of this, it is assumed that ~7 000MW of renewable energy generation (in addition to what has already been

commissioned or given preferred bidder status) and 400MW of battery storage is envisaged in the Western Cape by 2030. This results in the Western Cape becoming a net exporter of generation, with as much as 7GW of excess generation during peak load.

The Transmission infrastructure is required to integrate this renewable generation in the Western Cape and includes additional 400/132kV transformers at existing and planned substations (Droërvier, Juno, Kappa and Komsberg), the establishment of Koring Substation between Droërvier and Komsberg substations by turning in the Droërvier-Komsberg 1 400kV line and the establishment of a new substation 60km south of Droërvier Substation by turning in the Droërvier-Proteus 1 400kV line. Additional infrastructure over and above this will be required to evacuate the excess power from the Western Cape. This will be in the form of 765kV and 400kV lines to deliver the power to the load centres in the central and eastern parts of the country. A third and fourth 765kV line to the Western Cape originating from Mercury Substation to Sterrekus Substation will also need to be established and will involve backbone strengthening.

2.2.12 Western Cape Provincial Spatial Development Framework (SDF) (2014)

In terms of the Western Cape Provincial Spatial Development Framework (WCSDf, 2014), Policy R4 (recycle and recover waste, deliver clean sources of energy to urban consumers, shift from private to public transport, and adapt to and mitigate against climate change) highlights the need support of IPPs, and sustainable energy producers to assist in a reducing the power shortage and mitigating against climate change. One (1) of many economic sectors targeted for growth is renewable energy. Further to this, regional economic infrastructure targeted by the Western Cape, includes the Development of the renewable sector (including associated grid connection infrastructure, such as this project). Western Cape's Green Economy Strategic Framework is centered on investment in new and expanding market opportunities that support a low carbon, resource efficient and socially inclusive economic pathway, revolving around (amongst others), expanding the renewable sector through off grid investments, Power Purchase Agreements (PPAs) and lobbying.

As mentioned, the proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments. As such, the proposed project falls in line with the WCSDf.

2.2.13 The Western Cape Climate Change Municipal Support Programme (2012)

The effective implementation of the National Climate Change Response White Paper (NCCRWP) and the Disaster Management Amendment Act (Act No. 16 of 2015) (DMAA) is dependent on the efforts of provincial and local governments. In fulfilment of this, the Western Cape Government reviewed and revised its original Climate Change Response Strategy (2008) in 2014 to be in line with the NCCRWP (Central Karoo District Municipality IDP, 2021-2022). As part of this, and as the result of an expressed need from municipalities in the Western Cape for support on climate change, the Climate Change Municipal Support Programme was initiated in 2012 to support municipalities with the development of Climate Change Response Plans / Frameworks. Initially there was a call for interest to all municipalities, and the Western Cape Provincial Government worked with the municipalities who answered the call in developing first generation Sustainable Energy Plans (in 4 municipalities) and Adaptation Plans (2 local municipalities and 1 district municipality). In 2013/14, the approach was modified to focus on developing high level responses at a District level, to subsequently then be rolled out to the local level. The approach has also shifted to an integrated climate change response (combining mitigation and adaptation), which is now international best practice particularly at the local level. West Coast

District was the first to follow this integrated climate change response approach, and the Central Karoo District framework follows suite.

These strategies, plans or frameworks should be adopted by the municipal Council with all elements mainstreamed and fully integrated into municipal master plans [Integrated Development Plan (IDP), Spatial Development Framework (SDF)], the Disaster Management Plans (as per DMAA 2015) and sector plans, as well as into cooperative government sector plans and implementation budgets [e.g. Municipal Infrastructure Grants (MIGs), Environmental Protection and Infrastructure Programmes (EPIPs) etc.].

The intention is that this framework is the initial phase of much more ongoing work to be undertaken and should be an enabling launching platform of more comprehensive climate change engagements for the district, in collaboration between different tiers of government and by including all stakeholders in the region (farming communities, NGOs, CBOs, etc.) to provide landscape wide climate change responses.

Climate change response is about reducing vulnerability to climate change, developing adaptive capacity to cope with what can't be avoided, and reducing GHG emissions. Climate risk is relatively high in the Central Karoo as it is an arid area that has always been prone to drought situations.

Climate related disasters have substantial financial implications, and climate change in general could have far reaching long term economic consequences for the viability of the region. Climate-related impacts such as drought, flooding, snowfall, wind, fires and extreme heat are not new to the Central Karoo District but they are likely to be exacerbated, as well as increasing in frequency and severity (Central Karoo District Municipality IDP, 2021-2022).

During the first stakeholder workshop undertaken in the development of the Central Karoo District Municipality (CKDM) IDP (2021-2022), the CKDM and local municipal officials identified sectors and local government line functions that would be affected by climate change. It was found that essentially all sectors and spheres of government are either vulnerable or at risk to climate change or can contribute towards reducing energy use and greenhouse gas emissions.

2.2.14 Western Cape Climate Change Mitigation Scenarios for the Energy Sector Report (2015)

This study is a first representation of the climate mitigation potential of the energy sector in the Western Cape and is founded on an analysis of energy use in the Province using a set of models which allow for energy demand to be projected into the future. On the energy supply side, the analysis includes electricity and fuel supply options. The energy demand and supply analysis then lead to an assessment of energy-related greenhouse gas emissions. Starting from a base position (Reference) the study has then applied a set of mitigation measures (final list of 100 measures) aimed at reducing these emissions. The study also identified measures over which the Province and municipalities within the Province have influence, with the associated ability of these organisations to influence emissions.

The primary conclusion from this study is that, with all possible measures applied, other than fuel switching, there is the potential to reduce emissions substantially from a rate of increase of 2.3% per annum under the Reference case scenario to an average annual increase in emissions of 1.1% per annum over the period up to 2040. Further, should the province simultaneously implement all possible measure with fuel switching, there is an even greater opportunity to reduce emissions, with the average annual increase in emissions reduced to

0.9% per annum. To achieve the desired emission reductions, energy suppliers and energy users in each sector will need to undertake major improvements in the way they provide or use energy.

In terms of power generation, the analysis shows the largest gains in terms of mitigation to be in the power generation sector, where the measures are associated with replacing coal fired power plants with renewable energy plants and natural gas fired plants. The largest mitigation impact is anticipated to be from applying onshore wind for power generation, followed by natural gas with closed cycle gas turbines, solar photovoltaics and concentrated solar power. It is notable that the results are based on a non-nuclear energy mix with the emphasis being on renewables and natural gas. However, nuclear power was considered in the analysis and has been scored, with it coming out as one (1) of the least favourable options, this is particularly due to the implementation requirements and costs associated with nuclear energy. With regard to the implementation of the mitigation measures, they are all aimed at generating power into the national grid and therefore are primarily under the influence of national government, the Department of Energy (DoE) specifically. However, the province does have influence over the natural gas measure through promoting the import of natural gas in the province. This is not meant to imply that the Province should not continue to lobby for greater use of renewable energy as well.

In summary, the Province can affect a notable change in the energy supply (namely 37%) sector. While effort should be made to pursue the measures which present the greatest abatement potential, there is equal motivation to pursue those which the province has the greatest power to influence or implement. Even though the study shows that much of this influence rests in the buildings, passenger transport and agricultural sectors of the province, the largest mitigation impact is anticipated to be from applying onshore wind for power generation. As mentioned, the proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments.

2.2.15 Central Karoo District Municipality (CKDM) Integrated Development Plan (IDP) (2021-2022)

The Municipal Systems Act (Act No. 32 of 2000) requires municipalities to develop IDPs, which should be single, inclusive and strategic in nature. In addition, the Act requires municipalities in South Africa to review their IDP's on an annual basis to remain relevant to the changing needs and dynamics in communities. The IDP of a municipality will guide development within the council's area of jurisdiction once adopted. The Central Karoo District Municipality (CKDM) has adopted its 4th Generation IDP for 2017-2022 and serves as the fourth review of the five (5)-year plan for the 2020/2021 financial year. The priorities and actions identified in the IDP will inform the structure of the municipality, the service delivery standards, all financial planning and budgeting as well as performance reporting processes.

The Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis done during a strategic planning session between Council and the administration on 13 October 2016 identified wind and solar energy as an opportunity. In addition, the economy in the Central Karoo municipal area is characterised by the potential and impact of renewable energy resource generation, while the favourable conditions for renewable energy generation give the District Municipality a comparative advantage towards economic development potential within the direct boundaries of the Municipality. The IDP also states that the only noticeable and prominent economic feature in the Central Karoo area, apart from the Karoo National Park, is renewable energy generation. Therefore, at a District Municipal level, the CKDM IDP (2021-2022) recognises investment in wind energy facilities as an opportunity through which significant economic and social benefits can be derived.

According to the IDP, the proportion of people with access to the electricity grid should rise to at least 90% by 2030. This is seen as one (1) of the objectives impacting on local government and to which the Municipality can contribute. In terms of related actions to meet this objective, it is proposed to move to less carbon-intensive electricity production through procuring at least 20 000MW of renewable energy (amongst others). Another objective includes the contracting of at least 20 000MW of renewable energy by 2030. Carbon price, building standards, vehicle emission standards and municipal regulations to achieve scale in stimulating renewable energy, waste recycling and in retrofitting buildings is provided as an appropriate related action. In terms of investment opportunities / catalytic projects identified in the district, the Development of Alternative Energy Projects is listed as one (1) of the opportunities identified within the CKDM IDP (2021-2022) for all three (3) of the local municipalities (namely the Beaufort West, Laingsburg and Prince Albert Local Municipality). In addition, the Development of an Alternative Energy Strategy for Central Karoo (Project 5.1 of Municipal Priority 5 in JDA regional support plan) has been listed as one (1) of the projects which form part of the Joint District Approach (JDA) regional support plan for the Central Karoo District Municipality, as well as all three (3) of its local municipalities.

The CKDM IDP (2021-2022) also states that climate change is already a measurable reality in South Africa and considered to be one (1) of the greatest economic and environmental challenges of our time. Climate change is undermining development gains and will continue to place pressure on critical resources throughout South Africa. The only way to effectively respond to this threat is to include climate change into all activities at all levels of government to ensure that communities are provided with access to services and opportunities that are appropriate in a new climate regime and that will increase social and economic resilience. Whilst the Central Karoo can to some extent contribute to a decrease in emissions¹³ they can contribute most by providing opportunities to other parts of the country through ample wind and solar potential, and by undertaking urgent and proactive long-term adaptation that will increase their own resilience.

Since the proposed substation (more specifically the 33/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West Cluster of wind developments, it is aligned with the objectives of the CKDM IDP.

2.2.16 Central Karoo District Municipality SDF (2020)

At a District Municipal level, the 2019 Draft Central Karoo District Municipality CKDM SDF recognised the Karoo region's potential in terms of wind energy generation and states *"The Karoo should leverage this asset to encourage Independent Power Producers to locate in the region, also making the Central Karoo a well-managed and desirable place to locate, if one is connected to this industry."* The 2020 Central Karoo SDF was developed between 2018 and 2020 and was guided by the Central Karoo Municipal Council and an intergovernmental steering committee. The intention behind developing a new SDF, which resulted in the need for an IDP amendment, was to update the SDF with the latest intelligence, information and policies applicable to the Central Karoo.

Chapter 3 of the SDF (2020) provides a brief overview of the existing state of development of the Central Karoo District Municipality. The section provides an overview of the key biophysical, natural, socio-economic and built environment sectors, as well as their individual strengths, weaknesses, opportunities and constraints.

¹³ The Central Karoo District contributes 1% to the total CO2 emissions (from the energy sector) in the Western Cape.

This provides valuable insight into the current state of the municipality. A synthesis was undertaken, identifying the key issues to be taken forward in the SDF. One (1) of the key issues identified include the up-scaling of renewable energy production in the region and the creation of downstream opportunities. In addition, the SDF states that the town of Beaufort West needs to focus on infrastructure maintenance, appropriate infrastructure expansion and gearing the settlements to experience a degree of population and economic growth, leveraging their economic assets. Chapter 4 of the SDF provides the overarching spatial vision for the Central Karoo, determines the future growth needs, frames the spatial concept and sets out the spatial policies for the Central Karoo. In support of realising the vision of the 2017 – 2022 Central Karoo IDP, the SDF focuses on three (3) spatial strategies and one (1) underpinning governance strategy, which also informs the spatial concept. The four (4) municipal-wide strategies have been unpacked into spatial policies and policy guidelines, one (1) of which includes support and promote the renewable energy economy. More detail around these policies can be found in the CK SDF (2020).

Considering the above, the proposed project is aligned with the policies and/or policy guidelines outlined in the SDF.

2.2.17 Prince Albert Local Municipality Draft Spatial Development Framework (SDF) (2021)

According to the Prince Albert Local Municipality Draft SDF (2021), climate-related impacts are not new in the Central Karoo District but are likely to be exacerbated, as well as increase in frequency and severity. The IDP states that Prince Albert should seek to become a resilient municipality that can adapt to and mitigate against the negative effects of climate change, increasing temperatures, reduced rainfall and the host of downstream impacts on the economy and society at large.

In addition, the existing load on the Prince Albert network is in the order of 2.5MW and is expected to grow to between 3.5 and 5.5 MW by 2030. With the expected load growth in the future, the deficiencies will be more prominent. The proportion of households with access to electricity in Prince Albert was 96.8% in 2016. Alternative energy sources within the municipality include gas, paraffin, wood, coal, animal dung and solar. Climate conditions within the municipality present an opportunity for solar energy generation projects and the use of renewable energy sources should be explored and encouraged by the municipality. The SDF (2021) also identifies renewable energy as one (1) of the regional opportunities from the SDF *status quo* and states that renewable energy production can be up-scaled in the region and create downstream opportunities.

To achieve the vision statement and spatial concept, four (4) Spatial Development Strategies (A, B, C and D) for the Prince Albert Municipality have been developed. In addition to combatting the effects of Climate Change through policies A1 and A3 of Strategy A, several policies dealing with adaptation and mitigation have been proposed. One (1) of these include the promotion of renewable energy generation and use (xi of Policy A4 Guidelines for Adaptation and Mitigation). The proposed project therefore aligns with the policies dealing with adaptation and mitigation of Climate Change as set out in Strategy A. In addition, Strategy D states that Prince Albert, as part of the Central Karoo, must seek partnership driven solutions. It is therefore required that a range of partnerships be explored to find a shared service solution within the Central Karoo that ensures shared financial viability, administrative and logistical burdens associated with servicing a sparse region. Focus areas of potential partnership between all spheres of government and civil society pertaining to the Prince Albert Municipality include water, gas, energy, rural mobility and tourism. The proposed project therefore also potentially aligns with one (1) of the focus areas of potential partnership as set out in Strategy D.

2.2.18 Prince Albert Local Municipality Draft Integrated Development Plan (IDP) (2017-2022)

The Prince Albert Local Municipality IDP (2017-2022) is the fourth round of strategic plans since the inception of the IDP as a planning mechanism to synchronise planning and fiscal spending across all spheres of government. A number of Strategic objectives and outcomes have been developed as part of the IDP to address the challenges identified during the IDP development process. The strategic objectives agreed are linked to service areas and departmental objectives. In terms of the municipality's strategy, the following "Development Strategies" have been identified (Prince Albert Local Municipality IDP, 2017-2022):

- To harness social, technical, economic and environmental innovation to the benefit of Prince Albert
- To establish partnerships with stakeholders in the municipal space, including the community and ward representatives, sector departments and private sector.

In addition, Strategic Objective (SO) 4 includes providing quality, affordable and sustainable services on an equitable basis and states that one (1) of the challenges is that climate change will have an impact on the likelihood of disasters and the levels of readiness for man-made disasters. To date, the implementation of climate change responses to this changed climate has been slow. The consideration of alternative energy supply opportunities, which this project forms part of, has been listed as a Development Objective in response to this challenge.

The proposed project is considered to align with the strategies listed above as the renewable energy development will be to the benefit of the Prince Albert Local Municipality. The project will also allow the municipality to establish a partnership with an IPP involved in the private energy sector.

The IDP further states that the electricity network requires a further upgrade to cater for the expected demand. The future population will impact on the available Notified Maximum Demand (NMD) from Eskom for each of the towns in the municipal area. According to the IDP (2017-2022), the Prince Albert Municipality will be required to amend their current electricity supply by-law to accommodate renewable energy additions to the electricity network. The council should implement the SSEG by-law regulations to guide their consumers on how to safely and effectively employ renewable energy technologies on domestic and commercial level. The proposed amended by-law must provide for the supply of electricity to the residents within the area of jurisdiction of the municipality and provide for procedures, methods and practices to regulate such provision of electricity.

Alignment to National and Provincial government policies and plans is crucial in the strategic planning of the municipality. In terms of national and provincial government policies and plans, the IDP highlights the "Green Cape" programme which was established to promote the development of the green economy in the Western Cape Province. The aim is to help unlock the investment and employment potential of green business, technologies and manufacturing and put the province on course to become the green economy hub for Sub-Saharan Africa. The programmatic focus areas include energy (renewable energy, energy efficiency and green building), waste and resources. With a focus on the technologies identified in the REIPPP, the Green Cape's Renewable Energy Sector Desk works closely with Green Cape's Energy Efficiency Sector desk and communicates with entities such as the DOE, DTI, National Treasury, and remains current with the REIPP and legislation relevant to the industry. Green Cape's Renewable Energy Sector Desk acts as an interface between industry and government on renewable energy matters. The proposed project is thus aligned with National and Provincial government policies and plans such as the "Green Cape" programme.

The relevant municipal planning documents outlined in the sections above have been taken into consideration to inform the need and desirability of the proposed project (Section 4.2) and were used to provide detailed responses with regards to the project specific questions raised in the Need and Desirability guidelines of DEA (2017) and the Western Cape Government: Department of Environmental Affairs and Development Planning (DEA&DP) (DEA&DP, 2013).

2.3 GUIDELINES

The guidelines listed in Table 2-4 below have been considered during the BA process.

Table 2-4: Guidelines considered in the BA process

Guideline	Governing Body	Relevance
Mitigating biodiversity impacts associated with solar and wind energy development (2021)	International Union of Conservation of Nature	Provides guidelines for mitigating biodiversity impact associated with the development of grid connection infrastructure for wind energy facilities.
Public Participation in terms of NEMA, EIA Regulations (2017)	DFFE	The purpose of this guideline is to ensure that an adequate public participation process is undertaken for the BA process.
Guideline on need and desirability in terms of the EIA Regulations (2014)	DFFE	These guidelines inform the consideration of the need and desirability aspects of the proposed project.

3. BA PROCESS APPROACH

3.1 DETAILS OF THE APPLICANT

The applicant for the project is Beaufort West Wind Farm (Pty) Ltd⁵. Details are provided in Table 3-1 below.

Table 3-1: Details of the Applicant

Component	Description
Company Name:	Beaufort West Wind Farm (Pty) Ltd
Address:	4 th Floor Mariendahl House Newlands on Main Corners Main & Campground Roads Claremont 7800
Responsible person:	Rebecca Thomas
Tel:	021 657 4045
Fax:	N/A
E-mail:	rebecca.thomas@mainstreamrp.com

3.2 DETAILS OF THE PROJECT TEAM FOR A BA PROCESS

The details of the BA process project team that were involved in the preparation of this BAR are provided in Table 3-2. It should be noted that SLR has no vested interest in the proposed project, other than fair payment for consulting services rendered as part of the BA process, and has declared its independence as required by the EIA Regulations, 2104 as amended (see Appendix 1).

Table 3-2: Details of the Project Team

General				
Organisation	SLR Consulting (South Africa) (Pty) Ltd			
Postal address	PO Box 798 RONDEBOSCH 7701			
Tel No.	+27 (0)21 461 1118 / 9			
Fax No.	+27 (0)21 461 1120			
Name	Qualifications	Professional registrations /memberships	Experience (Years)	Tasks and roles
Stuart-Heather Clark	B.Sc. (Hons) Civil Engineering M.Sc. Environmental Management	IAIA EAPASA	24	Report and process review
Liandra Scott-Shaw	B.Sc. (Hons) Ecological Science B.Sc. Biological Science	SACANASP (<i>Pri.Sci. Nat</i>) SAWEA	7	Management of the EIA process, including process review, specialist study review, management of the public participation process and report compilation

Stephan Jacobs	B.Sc. (Hons) Environmental Management & Analysis B.Sc. Environmental Sciences	IAIA	6	Project administration, undertaking of public participation process activities and report compilation
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3.3 QUALIFICATIONS AND EXPERIENCE OF THE EAP

Stuart Heather-Clark is a Technical Director in SLR's Environmental Management Planning and Approvals (EMPA) team in Africa. He holds a B.Sc. (Honours) in Civil Engineering and a Master's degree in Environmental Science and has 24 years of relevant experience. He has expertise in a wide range of environmental disciplines, including Environmental Impact Assessments (EIAs), Environmental Management Plans/Programmes (EMPs), environmental planning and review and public consultation and is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

Liandra Scott-Shaw is an Environmental Assessment Practitioner (EAP) within SLR's EMPA Team in Africa. She holds a BSc. (Hons) Ecological Science and has seven (7) years' experience in managing South African renewable energy projects. She has led many EIAs and Basic Assessments for wind, solar, battery energy storage, and transmission projects.

Stephan Jacobs is an Environmental Consultant within SLR's EMPA Team in Africa. He holds a BSc. (Hons) Environmental Management & Analysis degree and has six (6) years' experience assisting with the management of renewable energy projects in South Africa, as well as facilitating public participation processes for such projects. He has led assisted with the undertaking of several EIA and BA processes (including public participation) for wind, solar, battery energy storage, and transmission projects.

3.4 DETAILS OF THE INDEPENDENT SPECIALIST TEAM

In accordance with Regulation 2 of the EIA Regulations, 2014 (as amended), the assessment of potential environmental and social impacts and benefits associated with any proposed activity that requires EA dictates that specialist, where relevant, depending on the nature and scale of the activity be appointed. As a result, several specialists have been appointed to adequately identify and assess the potential impacts and benefits associated with the proposed project. Table 3-3 below includes the details of the specialists that provided input into this BAR.

Table 3-3: Details of the Independent Specialist Team

Discipline	Company	Name
Terrestrial Ecology	3Foxes Biodiversity Solutions	Simon Todd
Herpetology	Sungazer Faunal Surveys	Marius Burger
Aquatic Ecology	Envirosoci (Pty) Ltd	Brian Colloty
Avifauna	Afrimage Photography CC / Chris van Rooyen Consulting	Chris van Rooyen and Albert Froneman
Soils, Agriculture and Land Potential	Johann Lanz (independent consultant)	Johann Lanz
Heritage	Dr Lita Webley (independent consultant)	Dr Lita Webley

Discipline	Company	Name
Palaeontology	Natura Viva	Dr John Almond
Visual	Graham A Young Landscape Architect (GYLA)	Graham Young

3.5 BA PROCESS

In terms of the EIA Regulations, 2014 (as amended), various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the DFFE, prior to the commencement thereof. Since the proposed substation will consist of 33/132kV yard which will be owned and operated by the Applicant as well as a 132kV switching station yard which will be owned and operated by Eskom, two (2) applications for EA will be lodged for two (2) separate projects (i.e., separate BA processes). One (1) application for EA for the proposed 33/132kV yard of the substation and associated infrastructure development is being submitted to the DFFE (**the subject of this BAR**), in the form of a BA process, in terms of the EIA Regulations, 2014 (as amended), while another separate application for EA will be lodged for the 132kV yard of the onsite switching substation and associated 132kV powerline (**the subject of a separate standalone BAR**).

3.5.1 Objectives

In accordance with Appendix 1 of the EIA Regulations, 2014 (as amended), the objectives of the BA process are to:

- Determine the policies and legislation relevant to the activity and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity in the context of the study area;
- Identify feasible alternatives related to the project proposal;
- Ensure that all potential key environmental issues and impacts that would result from the proposed project are identified;
- Assess potential impacts of the proposed project alternatives during the different phases of project development;
- Identify the most ideal location of the activity within the affected property based on the lowest level of environmental sensitivity identified during the assessment;
- Present appropriate mitigation or optimisation measures to avoid, manage or mitigate potential impacts or enhance potential benefits, respectively;
- Identify residual risks that need to be managed and monitored; and
- Provide a reasonable opportunity for I&APs to be involved in the BA process.

The undertaking of the above-mentioned activities as part of the BA process ensures an informed, transparent and accountable decision-making process by the Competent Authority. The BA process consists of a series of steps to ensure compliance with these objectives and the EIA Regulations, 2014, as set out in GN R982 (as amended by GN R326). The process involves an open, participatory approach to ensure that all impacts are identified, and that decision-making takes place in an informed, transparent and accountable manner. A flowchart indicating the generic BA process is presented in Figure 3-1.

3.5.2 Pre-Application Authority Consultation and Notification

SLR submitted a pre-application request form, containing a copy of the Public Participation Plan (PP Plan) and request for review and approval thereof, to the DFFE on 07 October 2021¹⁴. The form provided the DFFE with an overview and the legislative requirements and approach to BA process of the proposed project. The DFFE provided a response to the pre-application meeting request on Friday 08 October 2021, allocated the pre-application meeting to a case officer (namely Mr Thando Booï) and subsequently assigned the following reference number: **2021-10-0014**.

It should be noted that a pre-application meeting with the DFFE was, however, not deemed necessary, since SLR did not require clarity from the DFFE. SLR rather wished to clarify the DFFE's agreement with the proposed public participation process, as outlined in the PP Plan, as well as to submit the PP Plan for review and approval. The PP plan detailed the public participation process proposed as part of the BA process for the proposed development. The PP Plan was attached to the pre-application meeting request which was sent to the DFFE on 07 October 2021.

SLR received comments on the PP Plan which needed to be addressed prior approval from Mr Mahlatse Shubane on 08 October 2021. The DFFE's comments were addressed, and the PP Plan updated and re-submitted on 15 October 2021 accordingly. The DFFE subsequently approved the PP Plan on 16 October 2021. The correspondence from the DFFE with regards to the pre-application meeting request and request for review and approval of the PP Plan (including approval thereof) is included in Appendix 6.5.

3.5.3 Application for Environmental Authorisation

An 'Application Form for Environmental Authorisation' was submitted to the DFFE on **30 November 2021**, at the same time as making this draft version of the BAR available for review and comment. Public Participation activities completed to date in support of the application for EA for the proposed project are outlined in Section 3.6 of the BAR. The timeline associated with a BA process and a general summary of the activities which will be undertaken as part of the BA process are provided in the image below:

¹⁴ Reference number: **2021-10-0014**

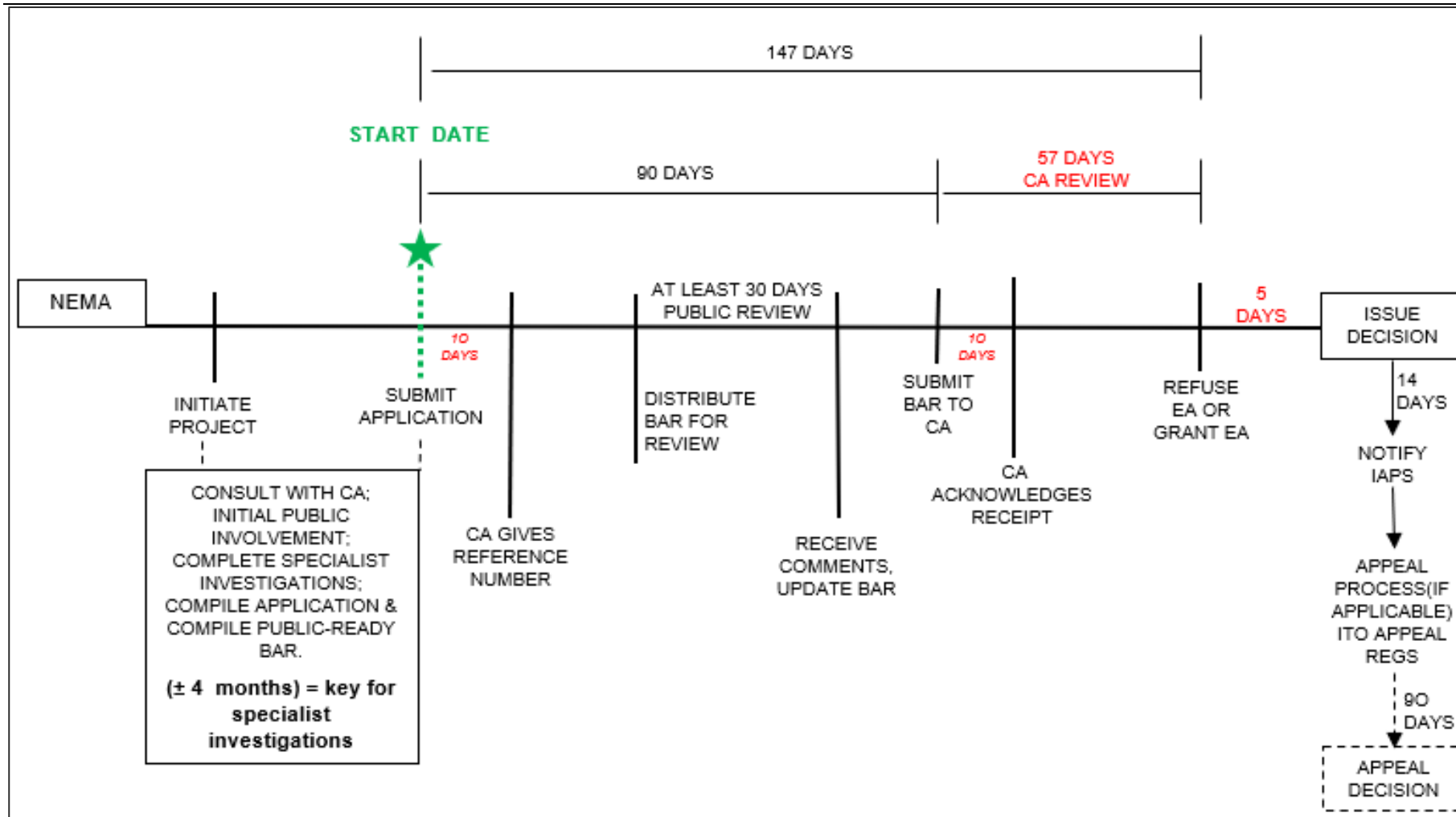


Figure 3-1: Generic Basic Assessment Process with reduced decision-making timeframe due to SIPs¹⁵

¹⁵ Authorised Beaufort West and Trakas Wind Farm projects have become Strategic Infrastructure Projects (SIPs) (i.e., SIPs 8 and 10) which target development of green energy in support of South African economy and provision of electricity transmission and distribution respectively. As such, reduced 57-day decision-making timeframe is now applicable, instead of 107 days.

3.5.4 Compilation of the BAR

This BAR has been prepared in compliance with Appendix 1 of the EIA Regulations, 2014 (as amended) (see Table 3-4). This report aims to present all information in a clear and understandable format suitable for easy interpretation by I&APs, State Departments / Organs of State (OoS), the competent and commenting authorities and provides an opportunity for I&APs to comment on the proposed project.

Table 3-4: Requirements of a BAR in terms of the EIA Regulations 2014 (as amended)

Appendix 1	Content of Basic Assessment Report	Completed (Y/N or N/A)	Location in report
2(a)	<i>(i & ii) Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report, including a CV.</i>	Y	Section 3.1 – Section 3.4. CVs of the EAP and project team who prepared the report are provided in Appendix 1.
(b)	<i>The location of the activity, including:</i>	Y	Section 5. This includes a plan which locates the proposed activity or activities applied for at an appropriate scale. All SLR maps provided in this DBAR are also provided in Appendix 4.
	<i>(i) (i) the 21-digit Surveyor General code of each cadastral land parcel; or</i>		
	<i>(ii) (ii) where available, the physical address and farm name</i>		
	<i>(iii) (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</i>		
(c)	<i>A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is:</i>		
	<i>(i) a linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken;</i>		
(d)	<i>A description of the scope of the proposed activity, including all the listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;</i>	Y	Section 2 includes all the listed and specified activities triggered and being applied for. Section 4 outlines how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools or frameworks and instruments.
	<i>(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and</i>		
	<i>(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools or frameworks, and instruments;</i>		
(e)	<i>A description of the policy and legislative context within which the development is proposed including -</i>		
	<i>(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the preparation of the report;</i>		
	<i>(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools or frameworks, and instruments;</i>		

Appendix 1	Content of Basic Assessment Report	Completed (Y/N or N/A)	Location in report
(f)	<i>A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;</i>	Y	Section 4.
(g)	<i>A motivation for the preferred site, activity, and technology alternative;</i>	Y	Section 5. A full description of the process followed to reach the proposed preferred site area alternative is provided in Section 5.3.
(h)	<i>A full description of the process followed to reach the proposed preferred activity, site, and location within the site, including:</i>		
	<i>(i) details of all the alternatives considered;</i>		
	<i>(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;</i>	Y	Section 3.6.
	<i>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</i>	N/A. No issues raised by I&APs and/or stakeholders to date. All correspondence to and from I&APs and key stakeholders is provided in Appendix 6.3.	
	<i>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>	Y	Section 6.
	<i>(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts</i> <i>(aa) can be reversed;</i> <i>(bb) may cause irreplaceable loss of resources; and</i> <i>(cc) can be avoided, managed, or mitigated.</i>	Y	The impacts and risks identified for each alternative are provided in Section 7. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives is provided in Section 3.5.6.
	<i>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</i>		
	<i>(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>		
	<i>(viii) the possible mitigation measures that could be applied and level of residual risk;</i>	Y	Section 7.
	<i>(ix) the outcome of the site selection matrix;</i>	Y	Section 5.3.
	<i>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</i>	Y	Section 5.
	<i>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.</i>	Y	Section 5.3 and Section 9.

Appendix 1	Content of Basic Assessment Report	Completed (Y/N or N/A)	Location in report
(i)	<p><i>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including -</i></p> <p><i>(i) a description of all the environmental issues and risks that were identified during the environmental impact assessment process; and</i></p> <p><i>(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adaptation of mitigation measures;</i></p>	Y	Sections 3, 6 and 7.
(j)	<p><i>An assessment of each identified potentially significant impact and risk, including -</i></p> <p><i>(i) cumulative impacts;</i></p> <p><i>(ii) the nature, significance and consequences of the impact and risk;</i></p> <p><i>(iii) the extent and duration of the impact and risk;</i></p> <p><i>(iv) the probability of the impact and risk;</i></p> <p><i>(v) the degree to which the impact and risk can be reversed;</i></p> <p><i>(vi) the degree to which the impact and risk can be avoided, managed, or mitigated;</i></p> <p><i>(vii) the degree to which the impact and risk can be avoided, managed, or mitigated;</i></p>	Y	Section 7.1. Cumulative impacts are discussed and assessed in Section 7.3.
(k)	<p><i>Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final report;</i></p>	Y	<p>All relevant specialist findings are included in Section 6 and Section 7 and are tabulated as part of a summary in Section 9.</p> <p>All recommended mitigation measures / impact management measures are provided and detailed (where required) in Section 7. The relevant mitigation measures have also been incorporated into the EMPr, which is contained in Appendix 7.</p>
(l)	<p><i>An environmental impact statement which contains -</i></p> <p><i>(i) a summary of the key findings of the environmental impact assessment;</i></p>	Y	

Appendix 1	Content of Basic Assessment Report	Completed (Y/N or N/A)	Location in report
	<p>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</p> <p>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</p>		<p>Section 9. This includes a summary of key findings of the environmental impact assessment.</p> <p>Section 7 also provides a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p>
(m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Y	Section 7. The measures provided Have been incorporated into the EMPr which can be found in Appendix 7.
(n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Y	Executive Summary and Section 9.
(o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Y	Section 1.3
(p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Y	Section 9.1.
(q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Y	Executive Summary and Section 9.
(r)	<p>An undertaking under oath or affirmation by the EAP in relation to:</p> <p>(i) the correctness of the information provided in the report;</p> <p>(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and</p> <p>(iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;</p>	Y	An undertaking under oath or affirmation by the EAP is provided in Appendix 2.
(t)	Any specific information required by the competent authority; and	N/A	no specific information has been requested by the competent authority at this stage

Appendix 1	Content of Basic Assessment Report	Completed (Y/N or N/A)	Location in report
(u)	Any other matter required in terms of Section 24(4)(a) and (b) of the Act.	All requirements in terms of section 24(4)(a) and (b) of the Act have been met in this report.	
(2)	2) Where a government notice by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	The BA process has been based on the findings of the Site Sensitivity Verification which was undertaken by the specialists. In addition, all specialist assessments which have been undertaken as part of the BA process comply with Appendix 6 of the EIA Regulations, 2014 (as amended), promulgated under sections 24(5) and 44 of the NEMA. A summary of the specialist findings is provided in Section 9 as well as the Executive Summary.	

3.5.5 Screening Tool and Specialist Studies

In accordance with GN R960 of 5 July 2019 and Regulation 16(1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the DFFE's national web-based screening tool is considered compulsory for the submission of applications for EA (in terms of Regulations 19 and 20 of the EIA Regulations, 2014, as amended). The requirement of the submission of a Screening Report is triggered by the application for EA for the proposed project as the application falls within the ambit of Regulation 19 of the EIA Regulations, 2014 (as amended). The specialist assessments / theme, sensitivity ratings identified by the Screening Tool and, in accordance with GN R320 of 20 March 2020 and GN R1150 of 20 October 2020, the outputs of the screening tool are summarised in Table 3-5 below. The detailed findings of the specialists, relating to the outcome of the Site Sensitivity Verification, is set out in Appendix 5). Where required, the specialist studies were undertaken with the requirements of GN R320 and GN R1150 (including any updates thereto). Where no protocols have been provided, the specialist assessment was undertaken in accordance with Appendix 6 of the EIA Regulations, 2014 (as amended).

Table 3-5: Specialist Assessments and Sensitivity Ratings identified by the DFFE's web-based Screening Tool

Report	Site Sensitivity Verification Report	Level of impact assessment and relevant legislation		
		Compliance Statement in terms of GN 320 / GN 1150 of 20 March 2020	Specialist Assessment Report in terms of GN 320 March 2020 / GN 1150 of Oct 2020	Appendix 6 of NEMA 2014
Terrestrial				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x	x		
Plant theme				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x		x	
Aquatic				

Report	Site Sensitivity Verification Report	Level of impact assessment and relevant legislation		
		Compliance Statement in terms of GN 320 / GN 1150 of 20 March 2020	Specialist Assessment Report in terms of GN 320 March 2020 / GN 1150 of Oct 2020	Appendix 6 of NEMA 2014
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x	x		
Animal theme				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x		x	
Reptiles				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x		x	
Agriculture				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x	x		
Heritage (incl. Palaeo)				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x			x
Palaeontology				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x			x
Visual				
ONSITE SUBSTATION & ASSOCIATED INFRASTRUCTURE	x			x

Appendix 5 of this BAR includes the Specialist Studies undertaken for the proposed project. All Specialist Studies undertaken involved the gathering of data (desktop and site verification, where required) relevant to ground-truthing and assessing environmental impacts that may occur as a result of the proposed project. The identified environmental impacts have been assessed in accordance with the SLR Impact Assessment Methodology (see Section 3.5.6 and Section 7). Specialists have also recommended appropriate mitigation or optimisation measures to minimise potential impacts or enhance potential benefits associated with the proposed project. Figure 3-2 below shows the site sensitivity map produced from the outcomes of the specialist studies undertaken.

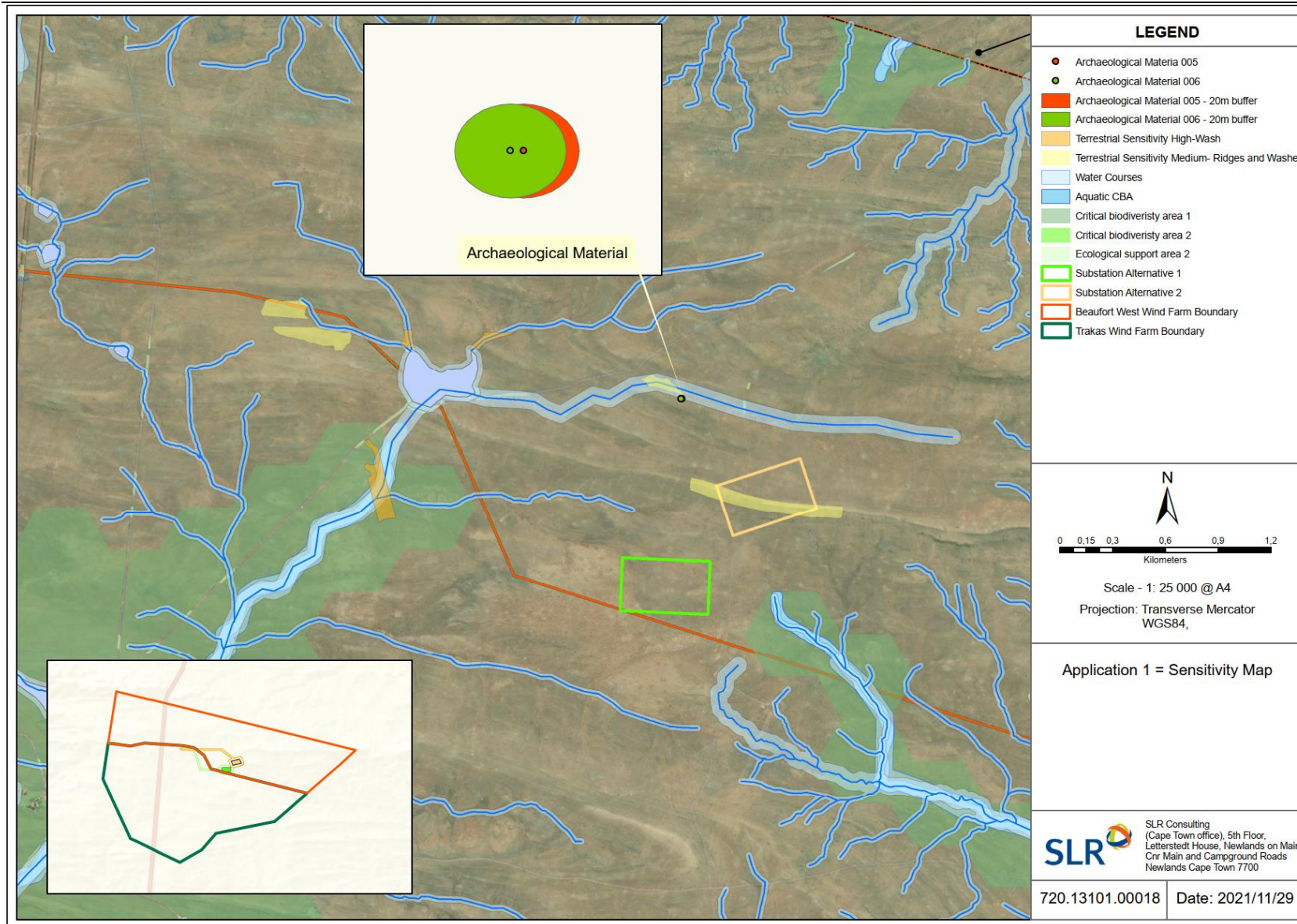


Figure 3-2: Site Sensitivity Map based on Specialist findings

3.5.6 Assessment Methodology

The impacts of the proposed development (during the Construction, Operation and Decommissioning phases) have been assessed and rated according to the methodology described below and which was developed by SLR to align with the requirements of Appendix 3 of the EIA Regulations, 2104 (as amended) (GN 654 of 2010). The criteria used to assess both the impacts and the method of determining the significance of the impacts is outlined in Table 3-6 below. This method complies with the method provided in the EIA guideline document (GN 654 of 2010). Part A provides the definitions of the criteria and the approach for determining impact consequence (combining intensity, extent and duration). In Part B, a matrix is applied to determine this impact consequence. In Part C, the consequence rating is considered, together with the probability of occurrence in order to determine the overall significance of each impact. Lastly, the interpretation of the impact significance is provided in Part D.

Table 3-6: Impact Assessment Methodology

PART A: DEFINITIONS AND CRITERIA		
Determination of CONSEQUENCE		Consequence is a function of intensity, spatial extent and duration
Determination of SIGNIFICANCE		Significance is a function of consequence and probability
Criteria for ranking of the INTENSITY of environmental impacts	Very High	Severe change, disturbance or degradation caused to receptors. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required.
	High	Prominent change, or large degree of modification, disturbance or degradation caused to receptors or which may affect a large proportion of receptors, possibly entire species or community.
	Medium	Moderate change, disturbance or discomfort caused to receptors and/or which may affect a moderate proportion of receptors.
	Low	Minor (slight) change, disturbance or nuisance caused to receptors which is easily tolerated without intervention, or which may affect a small proportion of receptors.
	Very Low	Negligible change, disturbance or nuisance caused to receptors which is barely noticeable or may have minimal effect on receptors or affect a limited proportion of the receptors.
Criteria for ranking the DURATION of impacts	Very Short-term	The duration of the impact will be < 1 year or may be intermittent.
	Short-term	The duration of the impact will be between 1 - 5 years
	Medium-term	The duration of the impact will be Medium-term between, 5 to 10 years.
	Long-term	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	Permanent	The duration of the impact will be permanent
Criteria for ranking the EXTENT of impacts	Site	Impact is limited to the immediate footprint of the activity and immediate surrounds within a confined area.
	Local	Impact is confined to within the project site / area and its nearby surroundings.
	Regional	Impact is confined to the region, e.g. coast, basin, catchment, municipal region, district, etc.
	National	Impact may extend beyond district or regional boundaries with national implications.
	International	Impact extends beyond the national scale or may be transboundary.
PART B: DETERMINING CONSEQUENCE		

		EXTENT				
		Site	Local	Regional	National	International
Intensity- Very Low						
DURATION	Permanent	Low	Low	Medium	Medium	High
	Long-term	Low	Low	Low	Medium	Medium
	Medium-term	Very Low	Low	Low	Low	Medium
	Short-term	Very low	Very Low	Low	Low	Low
	Very Short-term	Very low	Very Low	Very Low	Low	Low
Intensity -Low						
DURATION	Permanent	Medium	Medium	Medium	High	High
	Long-term	Low	Medium	Medium	Medium	High
	Medium-term	Low	Low	Medium	Medium	Medium
	Short-term	Low	Low	Low	Medium	Medium
	Very Short-term	Very low	Low	Low	Low	Medium
Intensity- Medium						
DURATION	Permanent	Medium	High	High	High	Very High
	Long-term	Medium	Medium	Medium	High	High
	Medium-term	Medium	Medium	Medium	High	High
	Short-term	Low	Medium	Medium	Medium	High
	Very Short-term	Low	Low	Low	Medium	Medium
Intensity -High						
DURATION	Permanent	High	High	High	Very High	Very High
	Long-term	Medium	High	High	High	Very High
	Medium-term	Medium	Medium	High	High	High
	Short-term	Medium	Medium	Medium	High	High
	Very Short-term	Low	Medium	Medium	Medium	High
Intensity - Very High						
DURATION	Permanent	High	High	Very High	Very High	Very High
	Long-term	High	High	High	Very High	Very High
	Medium-term	Medium	High	High	High	Very High
	Short-term	Medium	Medium	High	High	High
	Very Short-term	Low	Medium	Medium	High	High
		Site	Local	Regional	National	International
EXTENT						
PART C: DETERMINING SIGNIFICANCE						
PROBABILITY (to exposure of events)	Definite / Continuous	Very Low	Low	Medium	High	Very High
	Probable	Very Low	Low	Medium	High	Very High

	Possible / frequent	Very Low	Very Low	Low	Medium	High
	Conceivable	Insignificant	Very Low	Low	Medium	High
	Unlikely / improbable	Insignificant	Insignificant	Very Low	Low	Medium
		Very Low	Low	Medium	High	Very High
CONSEQUENCE						
PART D: INTERPRETATION OF SIGNIFICANCE						
Very High -	Very High +	Represents a key factor in decision-making. In the case of adverse effects, the impact would be considered a fatal flaw unless mitigated to lower significance.				
High -	High +	These beneficial or adverse effects are considered to be very important considerations and are likely to be material for the decision-making process. In the case of negative impacts, substantial mitigation will be required.				
Medium -	Medium +	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor. In the case of negative impacts, mitigation will be required.				
Low -	Low +	These beneficial or adverse effects may be raised as localised issues. They are unlikely to be critical in the decision-making process but could be important in the subsequent design of the project. In the case of negative impacts, some mitigation is likely to be required.				
Very Low -	Very Low +	These beneficial or adverse effects will not have an influence on the decision, neither will they need to be taken into account in the design of the project. In the case of negative impacts, mitigation is not necessarily required.				
Insignificant		Any effects are beneath the levels of perception and inconsequential, therefore not requiring any consideration.				

3.5.7 Cumulative Assessment Methodology

In relation to an activity, cumulative impact means *“the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities”* (NEMA EIA Reg GN R982 of 2014).

The South African Renewable Energy EIA Application Database (REEA) available at the time (namely “REEA_OR_2021_Q2”) shows that there are no operational renewable energy developments situated within a 30km radius of the proposed project site. In addition, only a few renewable energy projects (wind) are authorised within close proximity to the town of Beaufort West. This includes the Beaufort West Cluster which consists of two (2) authorised wind farm projects (namely the Beaufort West Wind Farm – [12-12-20-1784-1-AM2](#) and Trakas Wind Farm - [12-12-20-1784-2-AM2](#)) and associated electrical infrastructure ([14-12-16-3-3-2-925-1](#) & [14-12-16-3-3-2-925-2](#)).

In addition to the above, ABO Wind Renewable Energies (Pty) Ltd is proposing the construction of three (3) WEF's and their associated infrastructure on properties immediately east of the authorised Beaufort West Wind Farm site (CSIR, May 2021).

The application for EA for the Leeu Gamka Solar Power Plant (12/12/20/2296), which was identified within a 30km radius of the proposed project site, has been withdrawn and/or lapsed.

The cumulative impact assessed will therefore be the collective impact of the proposed project along with the authorised Beaufort West Wind Farm (12-12-20-1784-1-AM2) and Trakas Wind Farm (12-12-20-1784-2-AM2) (including the associated electrical infrastructure - 14-12-16-3-3-2-925-1 & 14-12-16-3-3-2-925-2), as well as the three (3) WEFs and their associated infrastructure on properties immediately east of the authorised Beaufort West Wind Farm site, which are located within a 30km radius of the project site.

The renewable energy developments (either approved or being proposed) within a 30km radius of the project site are shown in Figure 3-3 below.

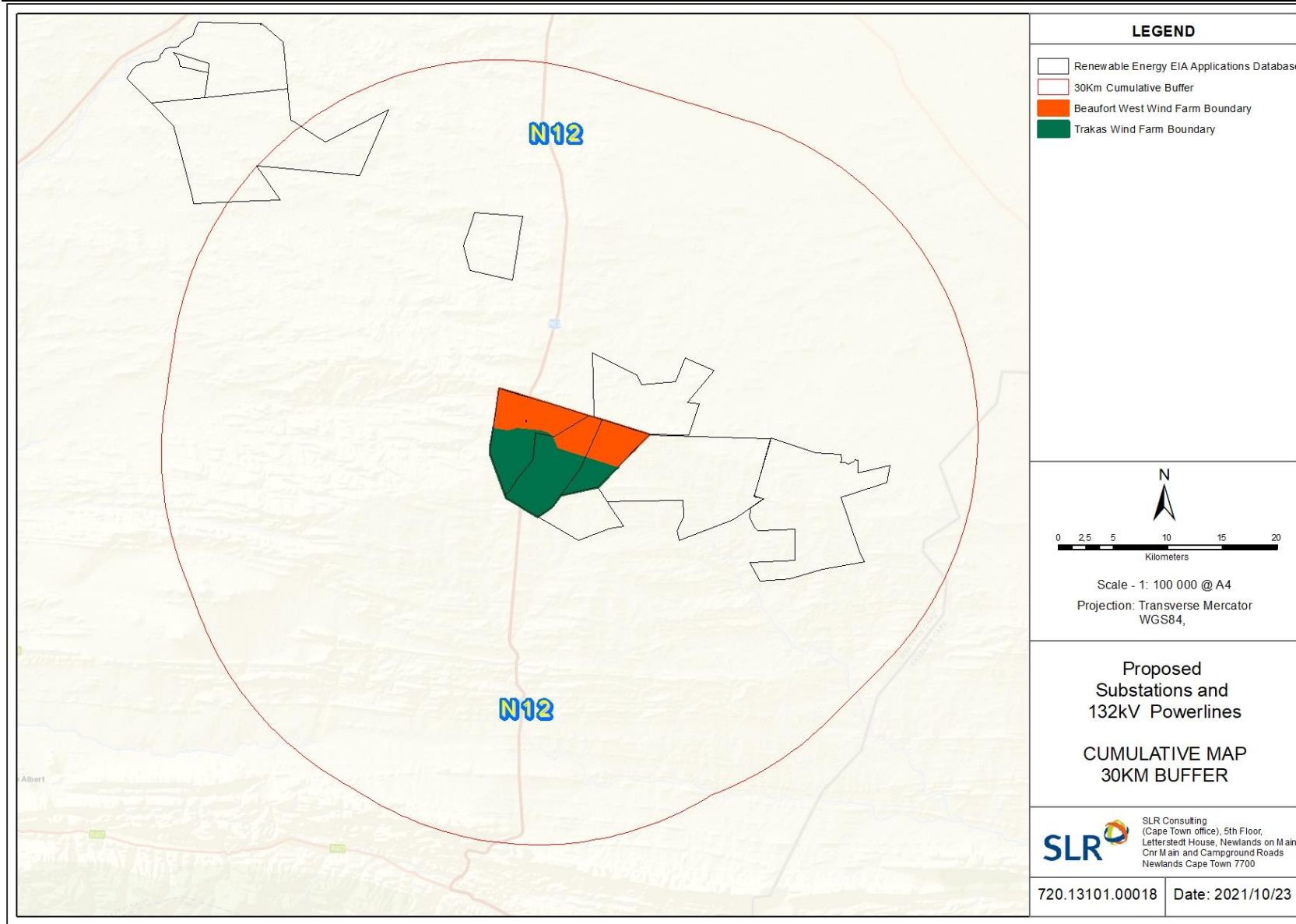


Figure 3-3: Map showing Renewable Energy applications within 30km of the proposed project.

3.6 PUBLIC PARTICIPATION PROCESS

Public participation is the cornerstone of any BA process. The principles of the NEMA and EIA Regulations, 2014 (as amended), govern the BA process, including public participation. These include provision of sufficient and transparent information on an on-going basis to I&APs and key stakeholders, such as OoS, to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. To fulfil the necessary public participation required as part of the BA Process, a public participation process which is in accordance with the EIA Regulations, 2014 (as amended), as well as the DFFE's Public Participation Guideline, in terms of the NEMA EIA Regulations, 2014 (as amended), is being undertaken.

The following methods of stakeholder engagement were undertaken by SLR, as outlined in the sections below. The details regarding the Public Participation Process are also detailed in the Public Participation Plan (PP Plan) (Appendix 6.5), which was approved by the DFFE. The key steps in the Public Participation Process are tabulated below:

Table 3-7: Public Participation Process

Process	Description
Stakeholder Identification and registration of I&APs	<ul style="list-style-type: none"> Register as an I&AP via SMS, email or telephonically State interest in the project All project information will be shared in preferred medium
Public Involvement and Consultation	<ul style="list-style-type: none"> Submissions of questions / queries or information requests to SLR via email, SMS or telephonically Availability of DBAR on online platform Availability of DBAR (in form of digital table) at Beaufort West Municipal Offices & Library as well as Central Karoo District Municipality Offices
Advert and Notifications	<ul style="list-style-type: none"> Site Notices placed at conspicuous locations at affected property week of 11 – 15 October 2021 Posters also erected at Beaufort West Local Municipality Offices & Public Library as well as Central Karoo District Municipality Offices week of 15-19 November 2021 Advert placed in “Die Courier” newspaper on 12 November 2021 Notifications regarding BA process and details how to register or contact SLR sent via email week of 15-19 November 2021, as well as 22-26 November 2021 Notification regarding availability of project report for public review to be sent via email or SMS notifications (if required)
Comment on the BA Report	<ul style="list-style-type: none"> Availability of the BA Report for a 30-day comment period from the day email and/or SMS (if required) notifications were sent (excluding 15 December 2021- 5 January 2022) Submission of comments on the BA Report via email, SMS or via telephone
Identification and recording of comments received	<ul style="list-style-type: none"> Comments and Response Report (C&RR), including all comments received, to be included within the Final BA Report for decision making

3.6.1 Public Participation Methodology

In light of the country wide restrictions enforced in terms of the gazetted Alert Level 1 regulations (Gazette 43725 of 18 September 2021) limiting the movement and gathering of people in an effort to curb the spread of CoVID-19, the public participation process has been amended and adjusted and as a result, alternative

means of undertaking the required stakeholder engagement for the BA process have been designed and implemented by SLR to ensure that all potential I&APs are afforded reasonable opportunity to engage meaningfully. As such, SLR proposed amendments to the public participation process, described in more detail below. Various tools are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

A PP Plan has been compiled for consideration by the DFFE as part of the application for EA. The PP Plan was attached to the pre-application meeting request which was sent to the DFFE on 07 October 2021. The DFFE subsequently approved the PP Plan on 16 October 2021 (Appendix 6.5). This PP Plan summarises the proposed methods that SLR will use to ensure that information containing all relevant facts in respect of the application is made available to potential I&APs, as well as to ensure that all registered I&APs are provided with a reasonable opportunity to comment on the BA Report. Furthermore, the PP Plan considers the effectiveness of the regulatory requirements to bring the proposed project and application to the attention of I&APs under the relevant alert Level COVID-19-related restrictions and identifies additional measures which will be undertaken in this regard.

The Protection of Personal Information Act (POPIA) (Act No. 4 of 2013) introduces minimum requirements for the processing of personal information and aims to promote the protection of personal information processed by public and private bodies. Enforcement of the POPIA commenced on 01 July 2021. The NEMA provides for a Public Participation Process (*“a process by which potential interested and affected parties are given opportunity to comment on, or raise issues relevant to, the application”*) to be conducted for any application for an EA. To fulfil the legal requirement, the EAP must collect personal information; name and contact details (e.g., telephone number, email address, postal / street address) of potential I&APs to notify them of the project details and provide them with an opportunity to comment on the BA process and outputs. I&APs provide their personal details on a voluntary basis, except where information is available publicly and can be sourced by the EAP indirectly (e.g., when an organisation is identified as a potential I&AP, and the organisation’s email address is available from their website).

I&APs have been made aware of the type of personal information that is sourced, the purpose of the data collection, how the data will be used, and any other relevant information stipulated in Section 18 of the POPIA. All personal information will be collected and processed in accordance with the requirements of the POPIA and will be safeguarded by the EAP.

3.6.1.1 Database

As mentioned, to fulfil the legal requirement of the NEMA, the EAP must collect personal information of potential I&APs to notify them of the project details and to provide them with an opportunity to comment on the BA process and outputs. I&APs provide their personal details on a voluntary basis, except where information is available publicly and can be sourced by the EAP indirectly.

An I&AP database has been compiled which consists of potentially interested and/or affected members of the public; landowners (including affected and directly adjacent landowners); ward councillors; authorities (local, regional and national, as applicable); Organs of State (OoS); Non-Government Organisations (NGOs); Community-Based Organisations and other key stakeholders.

As part of the Public Participation Process, site notices / posters (Section 3.6.1.2) containing project related information and details on how to register as an I&AP were erected in certain locations, while adverts containing this information (Section 3.6.1.2) were also published in an appropriate newspaper on 12 November 2021. The site notices / posters and newspaper adverts are being used to register potential I&APs on the project database (i.e., being used to inform project database). The project database will be continually updated throughout the BA process. Additional I&APs will be added to the database should additional requests be made to register after the placement of the site notices / posters and newspaper adverts. A copy of the I&AP Database (excluding contact details, in light of the POPIA) is included as Appendix 6.4 of this report.

3.6.1.2 Newspaper Advertisement and Site Notices

Site notices (written in English and Afrikaans) were placed at conspicuous locations at the affected properties of the proposed project the week of 11 – 15 October 2021. Posters were also erected at the Beaufort West Local Municipality Offices & Public Library as well as the Central Karoo District Municipality Offices the week of 15-19 November 2021. The site notices and posters contain project related information as well as details on how to register as an I&AP. The site notices thus provide an opportunity for potential I&APs to register on the project database, including registration prior to the distribution of the report for the required 30-day review and comment period.

A single newspaper advert (in English and Afrikaans) advertising the project was placed in “*The Courier*” (or “*Die Courier*”) on 12 November 2021, after notifying the public of the planned BA process for the proposed project. The newspaper advert contains project related information and details on how to register as an I&AP and will be used to register potential I&APs on the project database (i.e., used to inform project database).

It should be noted that the Site Notices and Newspaper Advert state that all personal information submitted to SLR will be used to contact an individual regarding the project and/or other Social and Environmental Impact or Basic Assessment processes, in accordance with the POPIA.

See Appendix 6.1 for a copy of the site notices and newspaper adverts, including proof thereof.

3.6.1.3 Written Notification to I&APs, Authorities and Landowners

As mentioned, an I&AP database has been compiled which consists of potentially interested and/or affected members of the public; landowners (including affected and directly adjacent landowners); ward councillors; authorities (local, regional and national, as applicable); OoS; NGOs; Community-Based Organisations and other key stakeholders (as per Section 42 of the EIA Regulations, 2014, as amended).

A notification letter containing project information was sent to all I&APs registered on the project database (including affected and directly adjacent landowners). The notification letter was sent via e-mail the week of 15-19 November 2021. Additional notifications were also sent the week of 22-26 November 2021 (Appendix 6.2). The purpose of the notification letter was to notify I&APs and landowners of the BA process and invite them to participate. Where e-mail addresses and/or physical / postal addresses for I&APs might not be available, an SMS will be sent (assuming a mobile number is available) requesting that an email address or physical / postal address be provided (if available) or to contact SLR to obtain project related information.

A Notification Letter was also sent via email to all commenting authorities on the project database the week of 15-19 November 2021 to inform them about the proposed project (Appendix 6.2). A notification letter will also be sent to all commenting authorities to inform them of the availability of the draft report for the 30-day review and comment period (see Section 3.6.1.4 below). DBAR notification letters will be couriered / hand delivered, if required (where e-mail addresses are not available). Proof of the notification of the submission of the DBAR will be included in the Final BA Report.

A copy of the I&AP Database (excluding contact details, in light of the POPIA) is included as Appendix 6.4 of this report.

3.6.1.4 Landowner Consent and Notification

Regulation 39 (1) of the EIA Regulations, 2014 (as amended), states that *“if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land”*.

Regulation 39 (2) of the 2014 NEMA EIA Regulations (as amended) further states that *“sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014”*.

The proposed Substation, BESS, laydown area and O&M building components of the project constitutes a non-linear activity, and landowner consent is therefore required for the following land portion:

Table 3-8: Land portion where consents for the BA process to occur was obtained.

FARM PORTION	21-DIGIT SG CODE
Remainder of the Farm Trakaskuilen No. 15	C061000000000015000010

A Landowner Consent Form has been obtained for the landowner of the above-mentioned farm portion affected by the Substation, BESS, laydown area and O&M building components of the project. In addition, affected and adjacent landowners and/or occupants were notified of the proposed development the week of 15-19 November 2021, as well as 22-26 November 2021. The Landowner consent forms have been included in Appendix 8.4. Please see the Table in Appendix 6.4 for details regarding the landowners / occupiers (affected and directly adjacent) who have been contacted and/or notified with regards to the BA process, as well as the method in which the landowners / occupiers were contacted.

3.6.1.5 Public Review and Comment of Draft BA Report (DBAR)

Due to the fact there is allowance for gathering of people under the most recent Alert Level 1, hard copies (in the form of digital tablets) of the full BA report (including appendices) have been placed at suitable venues which are accessible by the public for review during the relevant 30-day public review and comment period. The digital tablets will be made available for the entire 30-day public review and comment period at the following public locations / venues, **from 30 November 2021 to 21 January 2022 (excluding public**

holidays and the DFFE's December shutdown period¹⁶), and contain a full copy of the BA report (including all appendices).

Name of Location	Contact Details	Address
Beaufort West Public Library & Local Municipality Offices	083 408 3781 (Librarian)	112 Donkin Street, Beaufort West, 6925 Open Monday – Friday, 10:00 am - 4:00 pm
Central Karoo District Municipality Offices	081 587 9376 (Rene van Tonder)	63 Donkin Street, Beaufort West, 6925 Open Monday – Friday, 8:00 am - 4:00 pm

I&APs will thus be given an opportunity to review and comment on the full report and all I&APs and key stakeholders registered on the project database have been notified about the venues accordingly. A copy of the BA Report (including appendices) has also been made available on the SLR website (at <http://slrconsulting.com/public-documents/BWest-sub-ba>), while the report can also be downloaded without any data charges using internet-capable mobile phones from the corresponding data free website (slrpublicdocs.datafree.co/public-documents/BWest-sub-ba). I&APs can use this to access and download the draft report and the associated appendices.

Comments should be forwarded to the SLR at the address, telephone or email address shown below. For comments to be included in the Final Basic Assessment Report (FBAR), comments should reach SLR **no later than 21 January 2022**.

SLR Consulting (South Africa) (Pty) Ltd
 Attention: Stephan Jacobs
 PO Box 1596, Cramerview, 2060 (*if using post please call SLR to notify us of your submission*)
 Tel: (011) 467 0945
 E-mail: sjacobs@slrconsulting.com

A notification letter containing project information has been sent to all I&APs and key stakeholders registered on the project database to inform them of the availability of the draft report for the 30-day public review and comment period. The notification letter was sent via e-mail and will be posted, if required (where e-mail addresses are not available). The notification letter also contains a link to the SLR website and corresponding zero-rated website (which is accessible from an internet-capable mobile phone without data charges), which I&APs can use to access and download the report and associated appendices (Appendix 6.2). Should e-mail addresses and/or physical / postal addresses for I&APs not be available, an SMS will be sent (assuming a mobile number is available) requesting that an email address or physical / postal address be provided (if available) or to contact SLR to obtain project related information.

As mentioned, hard copies of the full BA report will remain at the venues / locations in the table above for the entire 30-day public review and comment period and will not be moved from these venues. In addition, should any I&AP contact SLR to indicate that they are not able to access any of the online project documentation due to lack of internet connectivity, SLR will implement suitable alternative means of

¹⁶ DFFE shuts down from 15 December 2021 to 5 January 2022 and no public participation related activities may take place during this time. The legislated timeframes also do not include this period.

providing the I&AP with the requested project information. Proof of this will be provided, should it be required.

All comments received during the 30-day review and comment period in response to the draft report (this report) will be collated and responded to in the Comments and Response Report (C&RR), which is to be submitted to the DFFE for decision-making with the final report (namely the FBAR). The comments will also be taken into consideration as part of the process of updating the draft report (this report). A notification will be sent to all I&APs registered on the project database to inform them of the submission of the final report for decision-making. The notification will also contain a link to the SLR website that I&APs can use to access the final report. Once the DFFE has reached a decision regarding the application for EA, a notification letter will be sent to the registered I&APs to inform them of the Department's decision.

3.6.1.6 Review of the Draft BA Report (DBAR) by Organs of State (OoS) / Key Stakeholders

In terms of section 40 (2) of the EIA Regulations, 2014 (as amended), public participation must include consultation with all OoS which have jurisdiction in respect of the activity to which the application relates. Please see the table in Appendix 6.4 which provides details including all the OoS who were e-mailed the DBAR and sent electronic copies of the full report (including all appendices), as well as the method in which they were notified. Email reminders will be sent throughout the 30-day DBAR comment and review period and further follow-up undertaken (if required) in order to provide them with ample opportunity to comment on the application.

3.6.1.7 Meetings

Public and/or Focus Group Meetings may be held with I&APs, should these be requested or deemed necessary. This is since there is allowance for gathering of people under the most recent Alert Level 1 COVID-19 restrictions. Should meetings be required or deemed necessary, the format of the meeting(s) (i.e., physical or virtual) will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements. However, at this stage it is proposed that a video presentation which has been voiced over can potentially be prepared and distributed on request, should a meeting be required. This will allow any I&APs and/or stakeholders to watch the pre-recorded presentation and then meet with SLR and the Applicant to address any questions and/or concerns. It should be noted that all I&APs registered on the project database will be notified about all potential meetings and be provided details regarding the format, date(s), time(s) and/or venue(s).

Should physical meetings not be possible due to COVID-19 restrictions, alternative methods for undertaking the meeting(s) (e.g., virtual meetings via Teams) will be agreed to and implemented accordingly. This will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements for the meeting(s). As mentioned above, it is proposed that a video presentation which has been voiced over can potentially be prepared and distributed on request, should a meeting be required. In addition, all I&APs and stakeholders registered on the project database will be notified about all potential meetings and be provided details regarding the format, date(s), time(s) and venue(s).

Should any meetings be requested and undertaken as part of the BA process, Minutes of these meetings will be compiled, and the proof included as part of the Final BA Report which will be submitted to the DFFE for decision-making.

4. PROJECT DESCRIPTION

4.1 BACKGROUND

Beaufort West Wind Farm¹⁷ is proposing to construct one (1) 33kV onsite Substation¹⁸, one (1) BESS, one (1) laydown area and one (1) O&M Building which will be added to their authorised Beaufort West Cluster of wind developments¹⁹.

It should be noted that the onsite substation will consist of a 33/132kV yard which will be owned and operated by Beaufort West Wind Farm, as well as a 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within the substation owned by Beaufort West Wind Farm, with a 132kV line that will cross to Eskom's 132kV switching substation. As mentioned earlier in the BA, the 132kV switching station yard of the proposed onsite substation is included in a separate application for EA and is subject to a separate BA process, along with a 132kV overhead powerline (DFFE reference number to be allocated still) (i.e., 132kV switching station yard will also form part of EA for 132kV powerline). The 132kV overhead powerline is being proposed to feed electricity into the national grid.

Two (2) applications for EA will thus be lodged for two (2) separate projects (i.e., separate BA processes). One (1) application will be lodged for the 33/132kV yard of the onsite substation, BESS, laydown area and O&M Building, while another application will be lodged for the 132kV switching station yard of the onsite substation and associated 132kV powerline. **The 33/132kV yard of the onsite substation and associated infrastructure form part of this proposed application for EA and BA process.**

Layout maps showing the various project areas (including alternatives) for each respective application / project (as discussed above) are provided in Figure 4-1 and Figure 4-2 below.

¹⁷ Beaufort West Wind Farm (Pty) Ltd is a Special Purpose Vehicle (SPV), a subsidiary created by the parent company South Africa Mainstream Renewable Power Developments (Pty) Ltd, which was created specifically to own and operate the authorised Beaufort West Wind Farm (12-12-20-1784-1-AM2).

¹⁸ Onsite substation will consist of 33/132kV yard which will be owned and operated by Applicant, as well as 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within substation owned by Applicant, with 132kV line that will cross to Eskom's 132kV switching substation. **33/132kV yard of onsite substation (including associated BESS, laydown area and O&M building) forms part of this proposed application. 132kV switching station yard of onsite substation forms part of separate application, along with 132kV overhead powerline.** DFFE reference number for separate application for 132kV yard of onsite switching substation and 132kV powerline will be provided once allocated.

¹⁹ Beaufort West (12-12-20-1784-1-AM2) and Trakas Wind Farms (12-12-20-1784-2-AM2) and their supporting powerline and substation infrastructure (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-1 & Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – 14-12-16-3-3-2-925-2), collectively referred to as *"the Beaufort West Cluster"*.

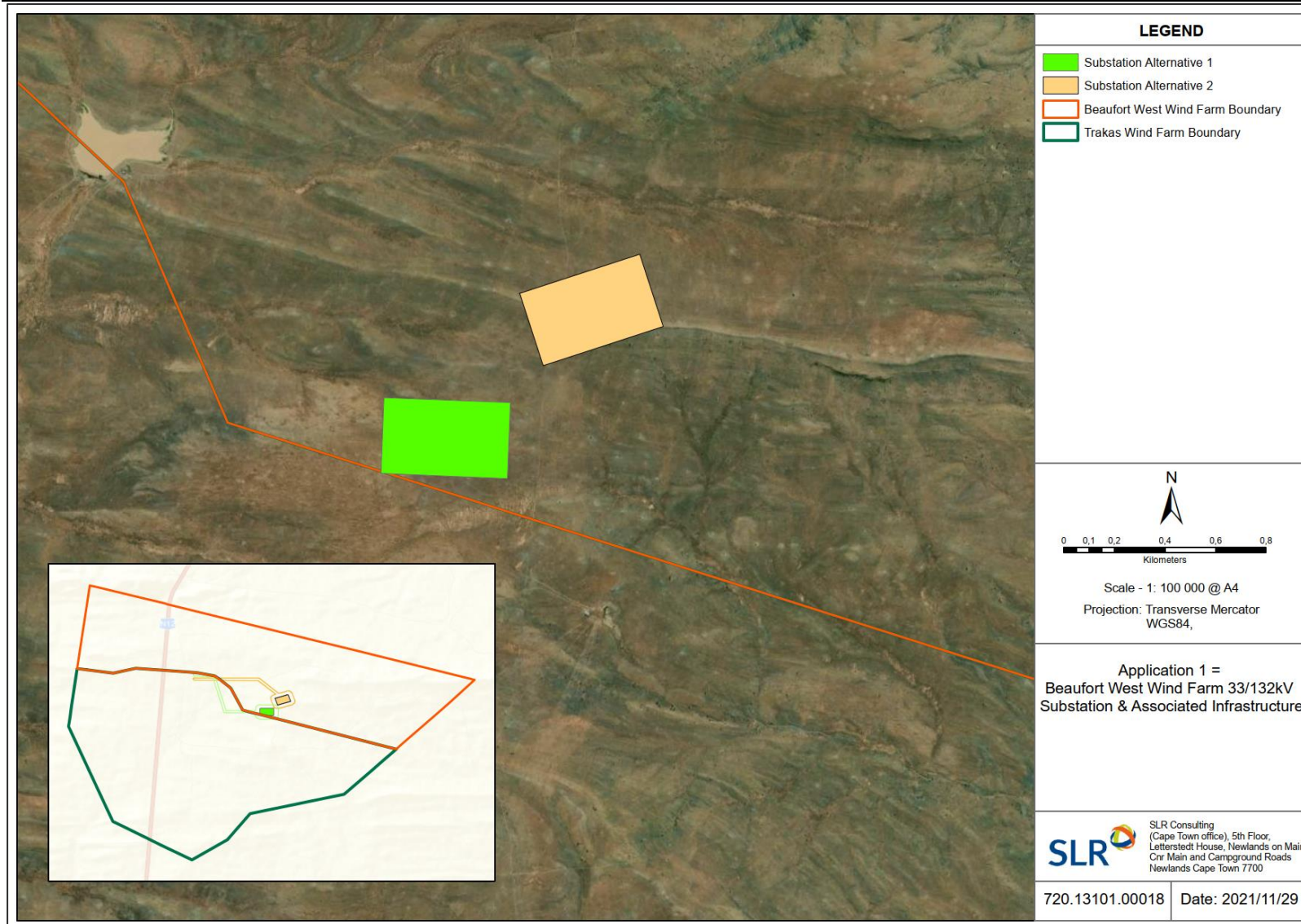


Figure 4-1: Map showing areas (including project alternatives) under consideration for application for 33/132kV substation & associated infrastructure.

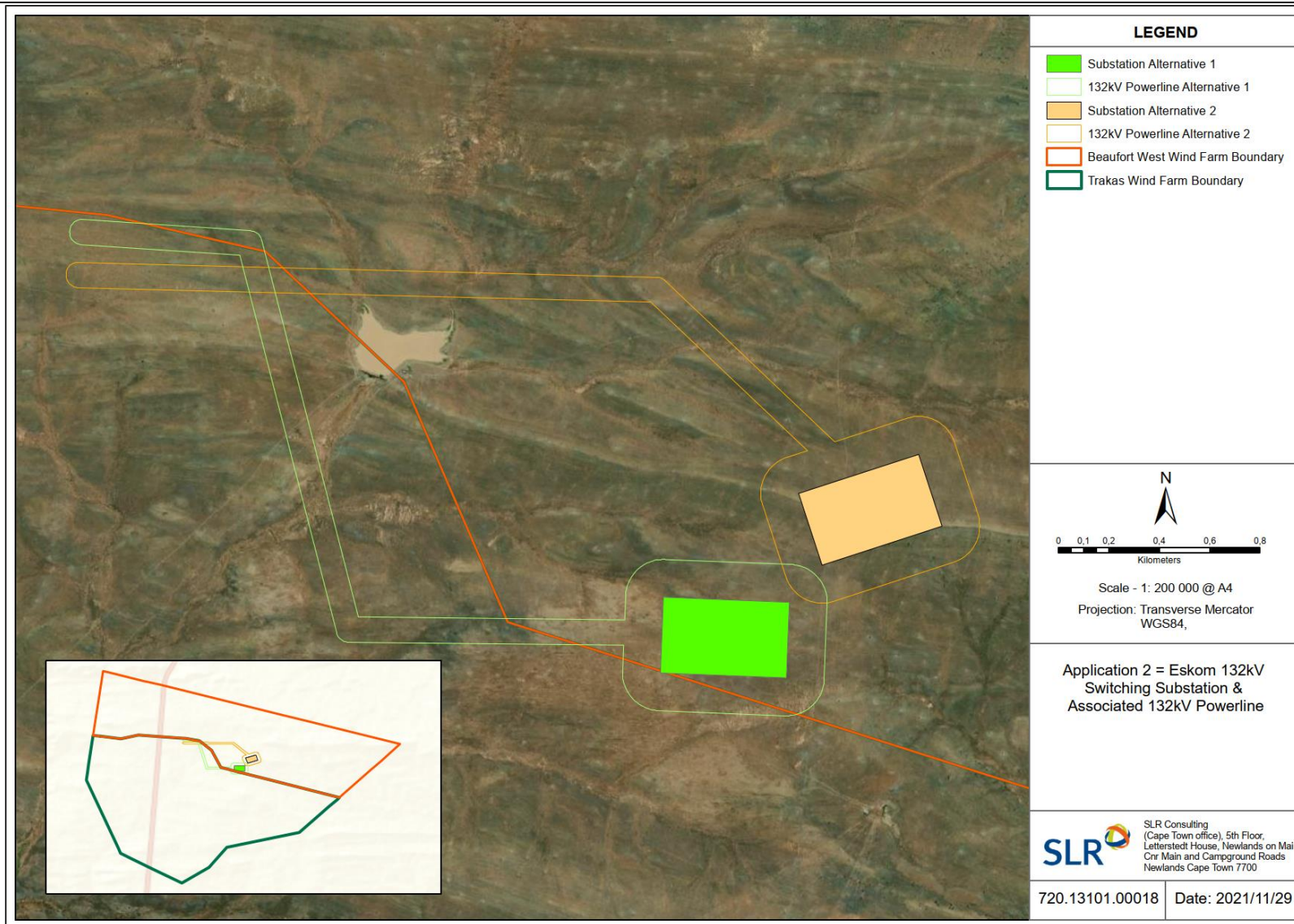


Figure 4-2: Map showing areas (including project alternatives) under consideration for application for 132kV Eskom switching substation & powerline (part of separate application for EA & BA process).

The authorised Beaufort West Cluster¹⁹ consists of two (2) wind farm projects with associated electrical infrastructure, which include a 132kV / 400kV Linking Substation, two (2) 33kV / 132kV onsite substations [one (1) per wind farm] and 132kV powerlines. The two (2) wind farms which form part of the Beaufort West Cluster were first authorised as one (1) larger wind farm (namely the Beaufort West Wind Farm) in March 2012 ([12-12-20-1784](#)). Thereafter, in February 2017, the authorised Beaufort West Wind Farm was split into the Beaufort West ([12-12-20-1784-1](#)) and Trakas ([12-12-20-1784-2](#)) Wind Farms respectively.

Both above-mentioned Wind Farm EAs were amended in 2020 to increase the turbine hub heights and increase the rotor diameters (Beaufort West Wind Farm – March 2020: [12-12-20-1784-1-AM5](#) and Trakas Wind Farm – February 2020: [12-12-20-1784-1-AM1](#)). Further administrative amendments were granted to both respective Wind Farms in 2020 (Beaufort West Wind Farm – March 2020: [12-12-20-1784-1-AM2](#) and Trakas Wind Farm – February 2020: [12-12-20-1784-2-AM2](#)) that included changing the holder of the Environmental Authorisations (EAs), adding Battery Energy Storage Facilities and amending project descriptions.

The supporting powerlines, linking station and onsite substation infrastructure were authorised for both respective wind farms in January 2017 ([14-12-16-3-3-2-925](#)). This authorisation was subsequently amended to split and assign each substation and powerline to each respective wind farm in August 2021 (Beaufort West 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – [14-12-16-3-3-2-925-1](#) and Trakas 132KV-400KV Linking Station, 132KV Power Line and onsite 132KV Substation – [14-12-16-3-3-2-925-2](#)).

It should be noted that on 28 October 2021, the Minister of Mineral Resources and Energy announced the Preferred Bidders of the Round 5 REIPPPP (see Section 2.2.10 for explanation on the REIPPPP) and both the Beaufort West Wind Farm ([12-12-20-1784-1-AM2](#)) and Trakas Wind Farm ([12-12-20-1784-2-AM2](#)) received Preferred Bidder status. These wind energy facilities have now become SIPs (i.e., SIPs 8 and 10). SIPs 8 and 10 target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively. SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2019) and support bio-fuel production facilities. SIP 10 aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. It also aims to align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The proposed substation (more specifically the 33kV/132kV yard), BESS, laydown area and O&M building (which form part of this new application and BA process) will service the authorised Beaufort West and Trakas Wind Farms and associated electrical infrastructure. The proposed onsite substation, BESS, laydown area and O&M building will thus be located within the site proposed for the authorised Beaufort West Cluster¹⁹, which is proposed on Portion 1 and Remainder of the Farm Trakaskuilen No. 15. Considering this, it is important to note that location of the proposed onsite substation, BESS, laydown area and O&M building has previously been assessed as part of the development footprint for the authorised Beaufort West Cluster.

The proposed development does not fall within any of the eleven (11) REDZs which were formally gazetted by the Minister of Environmental Affairs on 16 February 2018 (Government Notice 114) and 26 February 2021 (Government Notice 144) respectively. In addition, the proposed development does not fall within any of the Strategic Transmission Corridors as defined and in terms of the procedures laid out in Government Notice No. 113 and No. 145, which were formally gazetted on 16 February 2018 and 26 February 2021 respectively.

4.2 NEED & DESIRABILITY

The 'need and desirability' of the project should be evaluated against the strategic context of the development proposal, along with the broader societal needs and public interest. The DFFE [known then as the Department of Environmental Affairs (DEA)] Guideline on Need and Desirability (GN R891, 2017) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of South Africa's ecosystem services. Thus, the over-arching framework for considering the need and desirability of development in general is taken at the policy level, through the identification and promotion of activities / industries / developments required by civil society as a whole. The DFFE guideline further notes that at a project level (i.e., as part of a BA process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks, and strategies.

According to the DEA Guideline on Need and Desirability (DEA, 2017), the concept of 'need and desirability' relates to the "*nature, scale and location of the development being proposed, as well as the wise use of land*". The concept of 'need and desirability' can be explained in terms of the broader meaning of its two (2) components, need primarily referring to 'time', and desirability to 'place'. It is acknowledged that 'need and desirability' are interrelated and the two (2) components should be considered in an integrated and holistic manner. The DEA Guideline (DEA, 2017) further states that the need and desirability of an activity should be evaluated against the principles of "*promoting justifiable economic and social development*" as well as the principles of "*securing ecological sustainable development and use of natural resources*" as set out set out in the bill of rights in the Constitution.

Taking the above into consideration, this section of the report aims to provide an overview of the need and desirability for the proposed project, by highlighting how the proposed project is aligned with the strategic context of international, national, regional, and local development policy and planning, as well as broader societal needs (as appropriate).

The overall need and desirability of the proposed project, in the context of developing renewable energy generation in South Africa and globally, is considered and described below.

4.2.1 Motivation

In summary, supporting grid connection infrastructure for wind energy facilities (such as this application) is desirable as it:

- Creates a more **sustainable economy** by promoting South Africa's energy policy towards energy diversification.

- **Reduces the demand on scarce resources** such as water by promoting energy generating facilities which are less resource intensive.
- **Assists in meeting international commitments to carbon emission targets** in line with global climate change commitments.
- **Reduces pollution** by using ‘cleaner’ energy generating mechanisms and reducing the demand on carbon-based fuels.
- **Promotes local economic development** by creating jobs and promoting skills development.
- **Enhances energy security** by assisting in diversifying generation (since the project will service authorised wind energy facilities).

The proposed project, along with the Beaufort West Cluster of wind developments¹⁹, is viewed in a positive context due to the potential for employment creation within the local community. Despite the fact that the proposed project is not located within any of the Strategic Transmission Corridors, a current requirement of the REIPPPP is that in the development of any renewable project and associated infrastructure must benefit the community through the creation of employment, skills development, training opportunities, the creation of downstream business opportunities and the enhancement of community infrastructure.

It should also be noted that the cumulative effect of the proposed project and other developments in the area has the potential to result in positive socio-economic opportunities for the region. The proposed project, in conjunction with the authorised Beaufort West cluster of wind developments, will also address electricity constraints within both the local and district Municipalities by generating, distributing and evacuation a continued realisable source of electricity. Improved electrification, increased electricity supply to houses and businesses and investment in renewable energy developments are strategic objectives of both the District and Local Municipality.

As mentioned, the Minister of Mineral Resources and Energy announced the Preferred Bidders of the Round 5 REIPPPP on 28 October 2021 and both the Beaufort West Wind Farm (12-12-20-1784-1-AM2) and Trakas Wind Farm (12-12-20-1784-2-AM2) received Preferred Bidder status. These wind energy facilities have now become SIPs (i.e., SIPs 8 and 10), which target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively. SIP 8 supports sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP, 2019) and support bio-fuel production facilities. SIP 10 aims to expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. It also aims to align the ten (10)-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

The table below aims to provide more detailed responses with regards to the project specific questions raised in the Need and Desirability guidelines of DEA (2017) and the Western Cape Government: Department of Environmental Affairs and Development Planning (DEA&DP) (DEA&DP, 2013). The responses below take into consideration relevant municipal planning documents as well as the outcome of the BA process, which identified ‘No-Go’ areas and/or potential fatal flaws based on environmental and socio-economic considerations.

Table 4-1: Need (timing) of the proposed project (based on the 2017 DEA and 2013 DEA&DP Guidelines).

NEED	
Consideration	Response / Motivation
<p>Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority i.e., is the proposed development in line with the projects and programmes identified as priorities within the Integrated Development Plan (IDP)?</p>	<p>Yes. Renewable energy projects have been prioritised in strategies at various municipal scales in the area. As mentioned, the proposed project will service the authorised Beaufort West Cluster of wind developments¹⁹ which have been awarded preferred bidder status in the latest REIPPPP bid round (namely Bid Window 5).</p> <p>At a provincial level, the Western Cape Provincial Spatial Development Framework (DEA&DP, Western Cape Provincial Spatial Development Framework, 2014) identifies the development of wind energy facilities (which this project will service) as one (1) of the focus areas for mitigating climate change impacts. The PSDF recognises the potential positive economic impact, but also mentions that wind farms could have negative impacts on scenic resources and that the possible impact needs to be investigated. A Visual Impact Assessment which investigated and assessed the impact on scenic resources has been undertaken as part of the BA process (Appendix 5.8). It is the opinion of the Visual specialists that the visual effects associated with the proposed project are of neutral significance. Given the low level of human habitation and the absence of sensitive receptors, the spatial extent of the zone of potential influence is reduced and the impact of the proposed project would be dwarfed by the cumulative effect of the other renewable energy developments. The project is thus deemed acceptable from a visual perspective, and should each be approved, provided that the mitigation / management measures are effectively implemented, managed, and monitored in the long term.</p> <p>At a District Municipal level, the 2019 Draft CKDM SDF recognises the Karoo region’s potential in terms of wind energy generation and states <i>“The Karoo should leverage this asset to encourage Independent Power Producers to locate in the region, also making the Central Karoo a well-managed and desirable place to locate, if one (1) is connected to this industry.”</i> The CKDM IDP Revision 2021/2022 also recognises investment in wind energy facilities as an opportunity through which significant economic and social benefits can be derived. One (1) of the objectives of the IDP includes the contracting of at least 20 000MW of renewable energy by 2030. The CKDM IDP (2021-2022) also states that climate change is one (1) of the greatest economic and environmental challenges of our time. Whilst the Central Karoo can to some extent contribute to a decrease in emissions, they can contribute most by providing opportunities to other parts of the country through ample wind and solar potential.</p> <p>Within the Prince Albert Local Municipality, renewable energy has been identified as a strategy which can contribute to the adaptation and mitigation of Climate Change. Renewable energy is also seen as a regional opportunity for the municipality, and it is suggested that renewable energy production can be up-scaled in the region and create downstream opportunities. Renewable energy thus has the potential to be a key contributor to the economy of each municipality. The relevant SDF and IDP for the</p>

NEED	
Consideration	Response / Motivation
	<p>municipality supports the development of renewable energy generation facilities as they are major infrastructure projects that would contribute to the economic development of the municipality and would assist in addressing the issue of climate change.</p>
<p>Should development, or if applicable, expansion of the town/ area concerned in terms of this land use (associated with the activity being applied for) occur at this point in time?</p>	<p>Yes. The 2019 IRP supports a diverse energy mix and has indicated significant growth targets in terms of wind energy developments, which this proposed project will service (namely the Beaufort West and Trakas Wind Farms).</p> <p>The proposed project is in line with the District and Local Municipalities strategic frameworks, that focus on investment in renewable energy sources, that will stimulate secondary opportunities for economic growth and assist in addressing the issue of climate change.</p> <p>The proposed project aligns with national policy direction as well as contributing to South Africa being able to meet some of its international climate change obligations, by aligning domestic policy with internationally agreed strategies and standards as those set by the United Nations Framework Convention on Climate Change.</p> <p>At present, South Africa’s power supply is highly constrained. Any downtime (breakdowns or maintenance) may lead to the need for load shedding which has significant adverse effects for the South African economy and the safety and wellbeing of its citizens. There is an urgent need for new, low carbon energy generation capacity that can be quickly deployed and linked into the national grid (with wind and solar being suitable options). This strategy is evident in the 2019 IRP, whereby the largest portion share of new generation capacity between now and 2030 will be wind energy. As mentioned, the Beaufort West and Trakas Wind Farms, which this proposed project will service, have been awarded preferred bidder status in the latest REIPPPP bid round (namely Bid Window 5).</p>

NEED	
Consideration	Response / Motivation
<p>Does the community / area need the activity and the associated land use concerned (is it a societal priority)?</p>	<p>Yes. The CKDM 2019 Draft SDF notes that such investments are likely to have significant economic spinoffs for the region. Other District and Local Municipal planning documents (i.e., SDFs and IDPs) note the economic growth and community benefits of renewable energy developments.</p> <p>The proposed project will service two (2) authorised wind farms, which would also directly benefit the local community. Firstly, the proposed projects, in combination with the authorised wind farms, would be a source of income to the landowners of the properties on which the wind turbines and other related infrastructure (such as the substation, BESS, laydown area and O&M building) are located and would improve the economic viability of the landowners' current farming operations (i.e., mainly low-density grazing). Secondly, it would also create direct and indirect job opportunities (with associated skills development and transfer) for the community (local, district / regional and provincial).</p> <p>Secondary economic benefits may include an increase in service amenities through an increase in contractors and associated demand for accommodation and other services.</p> <p>A percentage of the operational revenue of the project will be utilised to support local socio-economic development initiatives, due to the requirements in this regard of the REIPPPP. As mentioned, IPPs are required to spend a threshold of 1% of the project revenue towards these initiatives with a target of up to 1.5%. The local municipality will play a strong role in guiding how the funds are utilised, thus ensuring that relevant and pressing needs in the community will be addressed.</p> <p>The proposed development will contribute to the diversification of South Africa's energy generation sources and will provide energy delivery with increased reliability and sustainability, contributing to a provincial and national need, as it will service two (2) authorised wind farms which have been awarded preferred bidder status in the REIPPPP Bid Window 5.</p>
<p>Are there necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?</p>	<p>Access to the site will be from existing roads in the area, with a road (approx. 4-8m wide) in the servitude under the proposed powerline (part of separate application for EA and BA process) also running from the proposed onsite substation to the authorised linking station (14-12-16-3-3-2-925-1). In addition, the access roads authorised as part of the Beaufort West and Trakas Wind Farm projects will also be utilised as part of the proposed project.</p>

NEED	
Consideration	Response / Motivation
	<p>No municipal services (apart from the disposal of waste-to-waste sites and sewerage from conservancy tanks to wastewater plants) will be required at the site, as the project contractor or appointed sub-contractor(s) will be responsible for providing the necessary services to the site during the construction and decommissioning phases.</p> <p>Electricity will be supplied to the site via existing Eskom lines in the area, generators and/or on-site renewable energy installations (e.g., solar panels).</p> <p>Waste produced at the site will be collected and taken to an appropriate facility with sufficient capacity to accept the waste, for recycling, re-use, treatment or disposal (as appropriate). This will be done by the contractor in the construction phase and owner’s team in operations phase, and thus no municipal waste collection will be required at the site.</p> <p>Should any need for other services arise the relevant authority will be communicated with, and the necessary approvals / agreements obtained before proceeding.</p>
<p>Is this development provided for in the infrastructure planning of the municipality, and if not, what will the implication be on the infrastructure planning of the municipality (priority and placements of services)?</p>	<p>Yes. Although the proposed project is not specifically mentioned in the relevant District and Local municipal planning documents, reference is made to renewable energy generation projects and growing this sector within the CKDM’s jurisdiction.</p> <p>The CKDM recognises that national and provincial governments have prioritised renewable energy developments to supplement the national grid. The economic and social benefits associated with employment of renewable energy development is also noted in both District and Local Municipal planning documents and forms part of the Municipal strategies and policies to create a sustainable municipal area.</p> <p>The proposed development will have little bearing on the infrastructure planning of the municipality. Water will be sourced from licenced boreholes and electrical services required for the construction of the project will be via existing Eskom lines in the area, generators and/or on-site renewable energy installations (e.g., solar panels), and apart from trucking waste to licenced waste sites and sewerage from conservancy tanks to municipal wastewater plants, no additional municipal services are required for the proposed development. Should any other municipal services be required, these will be confirmed and agreed with the municipality prior to commencing. Should the municipality be unable to provide the necessary services, then the applicant (or their appointed contractor) will be responsible for providing the necessary services to the site via use of private service providers.</p>

NEED	
Consideration	Response / Motivation
<p>Is this project part of a national programme to address an issue of national concern or importance?</p>	<p>Yes. The establishment of the proposed project would maintain the national DoE mandate to ensure efficient supply of electricity to service the South African economy and society by augmenting electrical supply. As mentioned, the proposed project will service two (2) wind farm projects (namely the Beaufort West and Trakas Wind Farm) that have been selected as ‘preferred bidders’ in the REIPPP Bid Window 5. Since 2015, South Africa has experienced serious energy constraints which act as a barrier to economic growth. The proposed development, which will service authorised wind farms that have been selected as ‘preferred bidders’ in the REIPPP Bid Window 5, will promote the delivery of reliable and sustainable energy to the national grid and therefore contribute to resolving an issue of national concern.</p> <p>Moreover, the project would contribute towards meeting the national energy targets as set by the DoE, of which a share of all new power generation being derived from IPPs.</p> <p>The 2019 IRP developed by the DoE for the 2010 to 2030 period aims to achieve a <i>“balance between an affordable electricity price to support a globally competitive economy, a more sustainable and efficient economy, the creation of local jobs, the demand on scarce resources such as water and the need to meet nationally appropriate emission targets in line with global commitments”</i>. The final IRP provides for an additional 20,409 MW of renewable energy in the electricity mix in South Africa by 2030.</p> <p>Furthermore, the NDP proposes to create 11 million jobs and grow the economy at an average rate of 5.4% per annum by 2030. In respect of renewable energy, the NDP seeks to ensure that half of the new future generation capacity comes from renewable energy sources. It also recognises the importance of the transition to a low carbon economy. As such, the NDP suggests the following modified from (Greening the South African Economy: Scoping the issues, challenges and opportunities, 2016, p. 199):</p> <ul style="list-style-type: none"> • Supporting carbon budgeting. • Establishing an economy wide price for carbon by 2030 complemented by energy efficiency and demand management interventions. • Support a target of 5 million solar water heaters by 2030. • Implementing zero emission building standards that promote energy efficacy. • Simplifying regulatory regime to encourage renewable energy, regional hydroelectric initiatives and IPPs. • The project will also contribute toward South Africa’s transition to low carbon economy and its commitments to under the Paris Agreement.

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Consideration	Response / Motivation
<p>Do location factors favour this land use (associated with the activity applied for) at this place?</p>	<p>Yes. The site is very favourable due to reliable wind sources. As mentioned, the proposed project will service the authorised Beaufort West and Trakas Wind Farm projects, which have been selected as ‘preferred bidders’ in the REIPPP Bid Window 5.</p> <p>The location of the project favours this land use and is based on the ability of wind energy facilities and associated infrastructure (such as substations, BESS, laydown areas and O&M buildings) to operate in conjunction with farming (mainly natural grazing), which is the current main land use on site. The support of the landowners concerned and being situated away from the Karoo National Park and its proposed expansion plans, as well as various economic considerations which include the feasibility of the project in terms of financial and technical perspectives, also makes the location of the project site favourable.</p> <p>However, the changes in the visual (scenic) environment could also impact the local tourism industry which is an important contributor to the economy in this area. A Visual specialist assessment has considered the impact to the tourism industry (refer to Section 7.1.4) and has found that the visual effects associated with the proposed project is of neutral significance.</p> <p>The ecological sensitivity of the site has been considered in detail through the iterative design process detailed in Section 5 of this report as well as the various site assessments undertaken by the specialists. The BA process investigated the environmental sensitivities of the site and the possible impact on the receiving environment because of the proposed development. This allowed for the design of an optimised, site specific, substation and associated infrastructure layout which avoids highly sensitive and/or ‘no-go’ areas (where required). Unacceptable locations within the site have been identified through these assessments and the layout determined have been informed by the findings.</p> <p>Refer to Section 6 for a description of the baseline environment. Section 7 includes a description and assessment of potential impacts, as identified by the various specialists.</p>
<p>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements / aspects), and specifically also on the socio-economic objectives of the area? Will the development complement the local socio-economic initiatives (such as</p>	<p>Yes. The proposed project is expected to have positive impacts related to GDP growth, limited local and preferential procurement (BBBEE, etc.), enterprise development, the creation of employment and skills development opportunities. This is compatible with the economic development vision of the District and Local municipalities.</p> <p>Renewable energy developments, which this proposed project will service, would create direct and indirect job opportunities (with associated skills development and transfer) for the community (local, district / regional and provincial). The proposed development would thus create employment (temporary and full-time) and business opportunities in addition to skills development and on-site training.</p>

NEED	
Consideration	Response / Motivation
local economic development (LED) initiatives), or skills development programmes?	
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	<p>The potential for the proposed development to negatively impact on the natural, social and economic environments have been recognised and a number of investigative steps have been identified to ensure a good understanding of these potential impacts throughout the project's life cycle. This involved a BA process where the project site was screened by various specialists (where required), which has resulted in an environmentally acceptable proposed layout which minimises impact to sensitive receptors, as far as possible.</p> <p>The outcome of the BA process will culminate in an EMPr (Appendix 7) that will be applicable to the pre-construction, construction, operational and decommissioning phases of the proposed project, to ensure that an environmentally and socio-economically sustainable approach is implemented. The EMPr will be managed and implemented as a living document, to allow the development project to adapt to and accommodate unforeseen environmental / social / political / economic changes and needs. For more information on the identified impacts, please refer to Section 7.</p>
What measures were taken to ensure the participation of all interested and affected parties? What measures were taken to ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge?	<p>The regulated BA process is stringently bound by legislative timeframes, in terms of the NEMA, and thus provide limited opportunity to incorporate and respond to issues raised by I&APs and key stakeholders. To identify possible community issues and concerns early in the process, I&APs and key stakeholders were identified and engaged (authorities, organs of state and/or affected and adjacent landowners). The approach to stakeholder engagement is detailed / discussed in Section 3.6. All stakeholder engagement related documents and proofs is included in Appendix 6.</p> <p>As mentioned, a pre-application meeting with the DFFE was not deemed necessary. SLR (as the independent EAP) rather wished to clarify the DFFE's agreement with the proposed public participation process, as outlined in the PP Plan, as well as to submit the PP Plan for review and approval. The PP plan detailed the public participation process proposed as part of the BA process for the proposed development. The PP Plan was attached to the pre-application meeting request which was sent to the DFFE on 07 October 2021 (2021-10-0014). The DFFE subsequently approved the PP Plan on 16 October 2021. The correspondence from the DFFE with regards to the pre-application meeting request and request for review and approval of the PP Plan (including approval thereof) is included in Appendix 6.5.</p> <p>It is important to note that the Applicant have followed the same process for their authorised Beaufort West and Trakas Wind Farm projects, and as such many of the stakeholders for this proposed project were involved in the stakeholder engagement</p>

NEED	
Consideration	Response / Motivation
	process for the authorised Beaufort West and Trakas Wind Farm applications and are familiar with the Applicant’s approach and process.
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area.	<p>Please refer to Section 7.3 for information on anticipated cumulative impacts, which was assessed in accordance with the methodology outlined in Section 3.5.7. The project is situated away from highly populated areas so direct impacts are minimal. Employing labourers / staff / individuals in the construction and operational phase of the project is likely to have a moderate (positive) impact on the local socioeconomic environment. The following socio-economic impacts are anticipated as a result of the proposed project, based on similar and/or related developments in the study area:</p> <ul style="list-style-type: none"> • Positive impacts on regional employment and household income associated with project activities and expenditure • Negative impacts on surrounding landowners and communities arising from construction and issues such as increased crime, damage to infrastructure, litter, fire risk, dust, noise, safety concerns etc. • Negative impacts on local communities associated with the influx of job seekers in the construction phase • Negative impacts on tourism associated with visual impacts of the project and increased traffic and disturbance
Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e., what are the opportunity costs of using these resources for the proposed development alternative?)	<p>Yes. As described above, the provincial, district and local strategic planning documents have identified the socio-economic and environmental benefits of the renewable energy developments, which this proposed project will service, and promotes investment in these projects for growth and development. The proposed use of the natural resources of the area is therefore in line with these planning documents.</p> <p>Project infrastructure will be located on land that has only ever had grazing as an agricultural land use and according to the agricultural specialist, the proposed development will have negligible agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the project site. This is substantiated by the facts that the amount of agricultural land loss resulting from the development is totally insignificant, and that the land is of very low agricultural potential. The only potential source of impact is minimal disturbance to the land during construction and decommissioning. This impact can however be completely mitigated.</p> <p>It is also anticipated that the wind farm infrastructure would have an added benefit to the local farmer(s) / landowner(s) by providing an alternative income source that would improve the economic viability of existing farming operations.</p> <p>Please also refer to Section 7.1.5 for further detail on potential impacts and recommendations with regards to anticipated agricultural impacts.</p>

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Consideration	Response / Motivation
<p>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?</p>	<p>Stakeholder engagement is as an important aspect of sustainable development to ensure that adverse environmental impacts are appropriately addressed and not result in discriminating distribution of these impacts. For this reason, the public participation process has been undertaken in line with legal requirements, to enable the project team to incorporate and communicate the views of the I&APs and key stakeholders into the proposed development. Please refer to Appendix 6 and Section 3.6 for details regarding the public participation / engagement process undertaken.</p> <p>National government places significant emphasis on the local economic development initiatives which renewable energy project developers must commit to in their bids. The authorised Beaufort West and Trakas Wind Farm projects, which this proposed project will service, will be such projects. This should ensure that only projects which have made significant commitments to this aspect will be selected as preferred bidders in the REIPPPP. As mentioned, the authorised Beaufort West and Trakas Wind Farm projects have been selected as ‘preferred bidders’ as part of the REIPPP Bid Window 5. The DoE scorecard includes aspects such as job creation, local content, ownership, management control, preferential procurement, enterprise development and socio-economic development. Among other things, the scorecard should ensure that project developers pay attention to:</p> <p>(1) Setting targets for how much local labour should be used based on the needs of the applicant and the availability of existing skills and people that are willing to undergo training. Opportunities for the training of unskilled and skilled workers from local communities should be maximized.</p> <p>(2) Using local sub-contractors where possible and requiring that contractors from outside the local area that tender also meet targets for how many locals are given employment.</p> <p>(3) Exploring ways to enhance local community benefits with a focus on broad-based BEE and preferential procurement.</p> <p>The following provisional mitigations are proposed in this regard:</p> <ul style="list-style-type: none"> • The project must comply with the requirements of the REIPPPP bidding process, which will have stringent requirements with regard to socio-economic development, enterprise development, BBEEE shareholding etc. • The applicant must establish a communications committee early on in the project to ensure regular feedback from stakeholders. • Community development should be guided by a community needs analysis, drawn up by a third party and based on local socio-economic conditions, a review of planning documents (such as the IDP), and discussions with local government and community representatives. Interventions should be planned in collaboration with other energy developers in the area where relevant.

NEED	
Consideration	Response / Motivation
	<ul style="list-style-type: none"> Close liaison with local municipal managers, local councillors and other stakeholders involved in socio-economic development is required to ensure that any projects are integrated into wider socio-economic development strategies and plans.
What measures were taken to ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge?	<p>The public participation process required, in terms of the NEMA, has been undertaken in line with the requirements prescribed by the NEMA. Refer to Section 3.6 and Appendix 6 which details the Public Participation Process undertaken to date.</p> <p>A preliminary I&AP database was compiled which consists of potentially interested and/or affected members of the public; landowners (including affected and directly adjacent landowners); ward councillors; authorities (local, regional and national, as applicable); OoS; NGOs; Community-Based Organisations and other key stakeholders. As part of the Public Participation Process, site notices and posters containing project related information and details on how to register were erected in certain locations, while adverts (single newspaper advert in English and Afrikaans) containing this information were also published in an appropriate newspaper ("<i>Die Courier</i>"). The site notices / posters and newspaper adverts are being used to register potential I&APs on the project database (i.e., being used to inform project database). The project database will be continually updated throughout the BA process. Additional I&APs will be added to the database, should additional requests be made to register.</p> <p>Public and/or Focus Group Meetings may be held with I&APs, should these be requested or deemed necessary. Should meetings be required or deemed necessary, the format of the meeting(s) (i.e., physical or virtual) will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements. As mentioned, at this stage it is proposed that a video presentation which has been voiced over can potentially be prepared and distributed on request, should a meeting be required, to allow any I&APs and/or stakeholders to watch the pre-recorded presentation and then meet with SLR and the Applicant to address and questions and/or concerns. Should physical meetings not be possible due to COVID-19 restrictions, alternative methods for undertaking the meeting(s) (e.g., virtual meetings via Teams) will be agreed to and implemented accordingly. This will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements for the meeting(s). All I&APs registered on the project database will be notified about all potential meetings and be provided details regarding the format, date(s), time(s) and/or venue(s). Proof of meeting will be provided in the Final BA Report, should Public and/or Focus Group Meetings be required.</p>
How was a risk-averse and cautious approach applied in terms of socio-economic impacts?	A screening of the project site (including ground-truthing, where required) was undertaken as part of the BA process, to allow environmental and social impacts to be considered and evaluated. The screening process involved the identification and mapping of sensitive and/or 'no-go' areas of the site to avoid all environmental, social and technical sensitive areas, and considered impacts

NEED	
Consideration	Response / Motivation
	from project related infrastructure (Section 7). The results of the BA process showed that there are no fatal flaws associated with the proposed project that should prevent the project moving forward and that the project should subsequently be authorised.

Table 4-2: Desirability (placing) of the proposed project (based on the 2017 DEA guideline and 2013 DEA&DP Guideline).

DESIRABILITY	
CONSIDERATIONS	RESPONSE / MOTIVATION
Is the development the best practicable environmental option (BPEO) for this land/ site?	<p>The assessed footprint alternatives are entirely on land that has only ever had grazing as an agricultural land use. The land's predominantly low agricultural sensitivity, with a maximum of medium sensitivity, has been confirmed by the Agricultural assessment (Appendix 5.5). The conclusion of the assessment is that the proposed development will have negligible agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the project site. This is substantiated by the facts that the amount of agricultural land loss resulting from the development is totally insignificant, and that the land is of very low agricultural potential. The only potential source of impact is minimal disturbance to the land during construction and decommissioning of the project. This impact can however be completely mitigated.</p> <p>During the BA process, a screening exercise of the project site with the project specialists was undertaken and sensitive and/or 'no-go' areas were mapped and incorporated in the proposed layout (where required). Refer to Section 6 for further details regarding Sensitivity Mapping and identified 'no-go' areas. All identified 'no-go' areas and/or highly sensitive sites have been avoided accordingly, as the project seeks to avoid and minimise impacts to any highly sensitive habitats. This has also been factored into the relevant mitigations.</p>
How will this development use and/or impact on non-renewable and renewable natural resources and the ecosystem of which they are part?	The BA process was undertaken in support of the mitigation hierarchy advocated in the NEMA, to avoid and minimise impacts as the most preferred approach to mitigation. This process and the outputs were collaborative and involved a large multi-disciplinary team of environmental specialists, the EAP, the project engineers and Beaufort West Wind Farm as the Applicant, most of which have extensive knowledge of the area and experience in renewable energy (such as wind farms and associated infrastructure) assessments generally. The results from this exercise (i.e., the preferred project layout as documented in Section 5, Section 6 and Section 9) have guided the development of the layout assessed within this report to further the effect of potential negative impacts and enhance positive impacts to ensure an environmentally sensitive and sustainable project is taken forward.
Would the approval of this application compromise the integrity of the existing approved Municipal IDP and	No. The proposed development aligns with the District and Local Municipal IDPs and SDFs, which recognises the need for development of renewable energy and pursues economic development through renewable alternatives and promotion of energy efficiency. The District and Local Municipality planning documents also aim to address the issue of climate change, with the

DESIRABILITY	
CONSIDERATIONS	RESPONSE / MOTIVATION
SDF as agreed to by the relevant authorities?	<p>development of renewable energy projects (which this proposed project will service) having been identified one (1) of the potential solutions.</p> <p>As mentioned, Public and/or Focus Group Meetings may be held with I&APs and key stakeholders, should these be requested or deemed necessary. This will be done to involve them with the planning process and to better incorporate and communicate the stakeholders' views into the proposed development. Should meetings be required or deemed necessary, the format of the meeting(s) (i.e., physical or virtual) will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements. All I&APs registered on the project database will be notified about all potential meetings and be provided details regarding the format, date(s), time(s) and venue(s). Should physical meetings not be possible due to COVID-19 restrictions, alternative methods for undertaking the meeting(s) (e.g., virtual meetings via Teams or voiced-over presentation, as discussed above) will be agreed to and implemented accordingly. This will be agreed to and confirmed with all meeting attendees prior to making the necessary arrangements for the meeting(s). Proof of meeting will be provided in the Final BA Report, should Public and/or Focus Group Meetings be required.</p> <p>No fatal flaws or issues compromising IDPs and SDFs have been raised to date.</p>
Would the approval of this application compromise the integrity of the existing environmental management priorities for the area [e.g., as defined in Environmental Management Framework (EMF)], and if so, can it be justified in terms of sustainability considerations?	No. Currently there is no EMF adopted by the area. However, the Western Cape Biodiversity Spatial Plan (WCBDP), which sets out the land use objectives spatially, has been considered as part of the proposed project. Detailed specialist assessments have also been undertaken to identify environmentally sensitive areas and exclude identified highly sensitive and/or 'no-go' areas from the proposed development footprint (where required) (Section 5.3, Section 6 and Section 9).
How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/ natural environment)?	A BA process with detailed specialist assessments has been undertaken to identify highly sensitive and/or 'no-go' areas and avoid and/or minimise development (within acceptable limits) within these areas. Information on potential impacts related to natural and cultural areas are available in Section 7 and have been assessed according to the methodology contained in Section 3.5.5.

DESIRABILITY	
CONSIDERATIONS	RESPONSE / MOTIVATION
<p>How will the development impact on people’s health and wellbeing (e.g., in terms of noise, odours, visual character and sense of place, etc.)?</p>	<p>Impacts related to the proposed project have been identified and the results have been incorporated in the current proposed layout plan. The current proposed layout avoids placement of project infrastructure in environmental, visual, cultural (incl. sense of place) and noise ‘no-go’ and/or highly sensitive areas. The direct impacts associated with the proposed project are not deemed to be significant as the project is sited in a remote rural area with a very low and dispersed population.</p> <p>Social impacts related to the proposed project are anticipated and include the influx of workers into surrounding towns and communities during the construction phase and the risks for local communities, including increases in drug and alcohol use, unwanted pregnancies, prostitution, crime, HIV and TB risks etc. It is recommended that the Applicant implement various strategies / plans / initiatives aimed at addressing these issues. The specialist is however of the opinion that these will be of minor (negative) significance.</p> <p>Baseline environmental information and anticipated impacts are included in Section 6 and Section 7 respectively. The impacts associated with the proposed project and the related mitigation measures have been discussed and assessed, in accordance with the methodology proposed in Section 3.5.6 and Section 3.5.7.</p>
<p>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?</p>	<p>A Visual specialist, Palaeontologist and Archaeologist were appointed to undertake specialist investigations that would contribute towards the BA process being undertaken as part of the proposed project. Sensitive and/or ‘no-go’ areas were identified as part of the BA process and have been avoided or minimised (within acceptable limits) in the layout of the proposed infrastructure (where required). All recommended buffers have been implemented and will be adhered to accordingly.</p> <p>The site has been investigated by these specialists and sensitive and/or ‘no-go’ areas for avoidance or mitigation have been identified. The aspects considered in the heritage impact assessment includes archaeology, palaeontology, graves, built environment and the cultural landscape.</p> <p>For more detail on potential impacts related to archaeological, palaeontological and heritage resources (including cultural landscape), please refer to Section 7.1.6.</p>
<p>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in</p>	<p>Terrestrial Ecology and Aquatic / Surface Water assessments have been completed and are appended as Appendix 5.1 and Appendix 5.3 respectively. These assessments are also summarised in Section 6.2.3, Section 6.2.6, Section 7.1.1, Section 7.1.3, Section 7.3.1.1 and Section 7.3.1.3 respectively. In terms of impact to Terrestrial and Aquatic Ecology, none of the impacts have been found to be unacceptable or considered to be a fatal flaw to the proposed development.</p>

DESIRABILITY	
CONSIDERATIONS	RESPONSE / MOTIVATION
<p>relation to its location and other planned developments in the area</p> <p>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area</p>	<p>The approach developed for this project is based on the precautionary principles of the NEMA and have aimed to avoid and minimise impacts as the preferred form of mitigation, as identified through spatial plans, specialist desktop and site-based research and stakeholder engagement. However, all impacts cannot be avoided, and these were therefore assessed as part of the BA process undertaken for the project, with the support of specialist assessments. To minimise, manage and remedy the potential negative residual impacts, and enhance the positive impacts, identified mitigation measures are proposed by specialists have been included in an Environmental Management Programme (EMPr) (Appendix 7).</p> <p>The project area is largely an open rural setting with low levels of human impact. The assessed site area alternatives are entirely on land that has only ever had grazing as an agricultural land use. The land's predominantly low agricultural sensitivity, with a maximum of medium sensitivity, is confirmed by this assessment. The proposed development will have negligible agricultural impact and will be acceptable in terms of its impact on the agricultural production capability of the project site. This is substantiated by the facts that the amount of agricultural land loss resulting from the development is totally insignificant, and that the land is of very low agricultural potential.</p> <p>In terms of Terrestrial Ecology, the vegetation of the site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards, which can be ascribed to the homogeneity and aridity of the site. Although the site falls within the broad distribution of the Riverine Rabbit, the site was previously extensively camera trapped (from June 2016 to November 2016) by the consultant to evaluate the potential presence of this species and as it was not detected. It is thus concluded as part of the Terrestrial Ecology Impact Assessment that this species is not likely to be present. In addition, the typical habitat for this species is not present within the site with the result that no impact on this species is anticipated (see Appendix 5.1 for a copy of the results of the camera trapping).</p> <p>With regards to the project alternatives, it is largely the presence of the CBA along Site Are Alternative 1 that drives the preference for Site Area Alternative 2 as the preferred alternative for the development.</p> <p>There are no impacts associated with the project that cannot be mitigated to an acceptable level. The contribution of the current development to cumulative impacts can also be mitigated to an acceptable level, and as such is acceptable. Overall, there are no</p>

DESIRABILITY	
CONSIDERATIONS	RESPONSE / MOTIVATION
	<p>specific long-term impacts likely to be associated with the development of the substation and associated infrastructure that cannot be reduced to an acceptably low level. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding. Refer to the Terrestrial Ecology specialist report in Appendix 5.1 for full details. A summary of the results is included in Section 6.2.3, Section 7.1.1 and Section 7.3.1.1.</p> <p>The other ecological aspect relates to Avifauna (birds) and particularly the presence of bird species (in particular Martial and Verreaux's eagles) who may be susceptible to the harm by the project infrastructure. The SABAP2 data indicates that a total of 152 bird species could potentially occur within the broader area. Of these, 36 species are classified as priority species and ten (10) of these are South African Red List species. Of the priority species, 18 are likely to occur regularly at the study area and immediate surrounding area, and another 18 could occur sporadically. No specific 'no-go' areas were identified, as mitigation can be applied for most species (mitigation measures are provided as part of the Impact Assessment undertaken in Section 7.1.2 of the BA Report).</p> <p>The impact of displacement is low due to the relatively small size of the footprint, and the availability of similar suitable habitat in the broader area further reduces the impact. The expected impacts of the proposed project can be reduced to Low or Very low negative with appropriate mitigation. The contribution of the project to the cumulative impact of all the planned and existing HV lines is thus low. It was thus recommended by the avifauna specialist that the activity is authorised, on condition that the proposed mitigation measures are strictly implemented.</p> <p>Refer to the Avifauna specialist report in Appendix 5.4 for full details. A summary of the results is included in Section 6.2.5, Section 7.1.2 and Section 7.3.1.2.</p>

4.2.2 General Description of the Project Area and Surrounding Land Uses

4.2.2.1 Site Suitability

The identification and selection of the site as a suitable area for the development of the proposed infrastructure was based on the location of the authorised Beaufort West Cluster of wind developments¹⁹. As previously mentioned, the proposed project will service the authorised Beaufort West Cluster of wind developments. In addition, the topography, extent of land available for the development and the surrounding land uses were also found to be favourable when undertaking the site selection for the development of the Beaufort West Cluster of wind developments. From a technical perspective, the study area identified is considered to be feasible for development. The site-specific characteristics for the study area that support the development are described below:

i. Extent of the area available for development

The site provides sufficient space for the optimal placement of the substation and associated infrastructure. The site affected by the proposed development has not been considered for alternative land uses (i.e., crop production or urban development, etc.). Furthermore, the substation site (inclusive of associated infrastructure) does not infringe on areas earmarked for mining development (i.e., there is no conflict of surface rights).

ii. Terrain

The study is generally flat, and the terrain provides suitable conditions for the optimal placement of a substation and associated infrastructure.

iii. Environmental Sensitivities

Site area alternatives have been identified and have been assessed through this BA process. Through the assessment of site area alternatives of up to 20ha in size, any identified sensitive environmental features present can be avoided and the development optimally placed in the area. The assessment of a wider site area alternative is in line with the mitigation hierarchy – avoid, minimise, and mitigate.

With regards to ecological sustainability, the proposed project is not expected to cause highly significant irreversible damage to any ecological processes or systems. The NEMA defines “*best practicable environmental option*” as the option that provides the most benefit and causes the least damage to the environment, at a cost that is acceptable to society not only short term but also in the long term. It should be noted that the sensitivity of the proposed project site in general is considered to be Medium to Low.

The environmental impacts of the proposed activities identified as part of the BA process can be managed and mitigated to acceptable levels should the proposed mitigation measures be implemented and monitored. Considering this, it can thus be stated that the proposed project provides for a practicable and acceptable environmental solution.

A summary of provincial and local planning policies in the Western Cape Province aligned to the proposed project, as well the suitability of the study area for the development of wind energy facilities and grid connection infrastructure, are described in Section 2 of this report. The proposed construction and operation of the proposed project is in alignment with provincial and local planning policies of the Western

Cape Province, although the contributions to planning objectives from the proposed project will be negligible.

4.3 LOCATION OF THE ACTIVITY

The proposed development area is located approximately 60km south of the town of Beaufort West in the Prince Albert Local Municipality, within the Central Karoo District Municipality of the Western Cape Province. The proposed project (including site area alternatives) will be located on the following property / farm portion:

Project Alternative		Farm Name	SG Code
Site Area Alternative 1	33/132kV portion of the Substation and associated infrastructure	Remainder of the Farm Trakaskuilen No. 15	C06100000000015000010
Site Area Alternative 2	33/132kV portion of the Substation and associated infrastructure	Remainder of the Farm Trakaskuilen No. 15	C06100000000015000010

As mentioned, the proposed project will be located within the site proposed for the authorised Beaufort West Cluster of wind developments¹⁹, which is authorised on Portion 1 and the Remainder of the Farm Trakaskuilen No. 15.

4.4 PROJECT OVERVIEW

As mentioned above, the proposed project will service the authorised Beaufort West and Trakas Wind Farms (including associated electrical infrastructure). The proposed project requires several key components to facilitate the transmission and distribution of electricity at a large scale. This includes:

- One (1) 33/132kV on-site substation;
- One (1) solid state (Lithium-ion) BESS within the proposed substation footprint;
- One (1) temporary Assembly & Storage Area within site area for the assembly and storage of precast turbine structures; and
- One (1) permanent O&M Building.

The key components of the proposed project are described in more detail in the sections below.

4.4.1 On-site Substation

As mentioned, the substation area will consist of two (2) separate sections, one (1) section which will be owned by the IPP Beaufort West Wind Farm and one (1) section which will be owned by Eskom. The section of the substation area owned by Beaufort Wind Farm (**part of this application for EA and BA Report**) will contain transformers for voltage step up from low voltage (32kV) to medium voltage (132kV). Direct Current (DC) power from the authorised Beaufort West Wind Farm (12-12-20-1784-1-AM2) and Trakas Wind Farm (12-12-20-1784-2-AM2) will be converted into Alternating Current (AC) power in the inverters and the voltage will be stepped up to medium voltage in the inverter transformers. 132kV cables will be used to transfer the electricity from Beaufort West Wind Farm's substation to the adjacent Eskom owned 132kV switching substation (**part of separate application for EA and BA Report**), from where the electricity will be transferred via the Eskom owned 132kV cables to the linking station (approx. 2-3km to the W/NW of the proposed substation).

The substation will occupy a footprint of up to approximately 2ha, however, site area alternatives of up to approximately 20ha each have been assessed for the onsite substation, BESS, laydown area and O&M building. This area allows for items such as oil traps, as well as the possibility of future expansion in response to an increased demand for electrical power. As mentioned, the substation will be located within the site proposed for the authorised Beaufort West Cluster of wind developments.

4.4.2 Battery Energy Storage System (BESS)

The proposed project includes the development of a Battery Energy Storage System (BESS), which will subsequently be used to store 'energy' and will allow for a more continuous source of electricity to the grid, as battery facilities can help to smooth out the fluctuations in energy generation from the renewable energy sources and allow them to be closer to conventional generation systems in this regard.

A solid state (namely Lithium-ion) BESS will be required and will occupy an area of up to 4ha within the proposed substation footprint. Two (2) technologies (namely Li-ion and Redox Flow) have, however, been assessed (Section 8). As mentioned, the batteries will subsequently be used to store 'energy'. The BESS will be fenced off and will be linked to the substation via up to 33kV cables. The batteries are already assembled prior to delivery and come as 'plug and play' modular units. The BESS will also not have any additional office / operation / maintenance infrastructure to those of the substation. The BESS will be compliant with all local laws and regulations as well as health and safety requirements governing battery facilities. The physical footprint, regardless of technology type and grid connection, will be approximately 4ha within the substation footprint, with a peak discharge value of 140MWac.

A brief description of each technology is provided below.

Lithium-Ion (Li-Ion):

Charged lithium ions are carried via electrolytes between anode (negative electrode) and cathode (positive electrode) within each Lithium-Ion battery cell. There are a number of different battery chemistries that are available. These cells are combined into battery modules, which are housed in battery racks, a number of which are collectively enclosed in sealed containers. These are all assembled in factories and no electrolytic liquid is handled on site. In addition to the battery racks, other components within the containers includes a HVAC or air conditioning system, a fire detection and suppression system (that normally uses inert gas), battery management system and other electrical components required to manage the batteries. The containers are normally a standard size of approximately 12m long x 2.5m wide x 2.7-3m high. The BESS on the wind farm site will comprise of multiple containers (e.g., approximately 240, with an extra 3-5 containers for electrical connections and controls) (refer to Figure 4-3 for an example of an installation). The main risk to health and the environment relating to Lithium-Ion BESS is overheating that leads to spontaneous ignition and subsequent explosion (i.e., fire). Since the batteries arrive on site sealed and kept in racks inside sealed containers, the risk of chemical spills is extremely low.



Figure 4-3: Example of a Lithium-Ion BESS installation

Redox Flow:

Redox flow batteries are charged and discharged by means of the oxidation–reduction reaction of a chemical, whereby ions are transferred from one (1) element to another. Redox flow batteries therefore comprise an electrochemical battery cell and a flowable electrolyte which is pumped through the cell for charging or discharging electricity and is stored in electrolyte tanks (one tank acting as a cathode and one as an anode). The most common Flow battery electrolytes are based on a water solution including vanadium, zinc or iron salts. Electrolyte storage tanks and cells are typically installed in specially designed steel containers providing secondary and tertiary containment measures (double wall). The containers are filled with electrolyte on site during project installation. Adjacent to this is another container housing the conversion systems and auxiliary systems necessary for the operation of the system (these include HVAC, fire detection and suppression, leak detection and suppression, BESS management) (refer to Figure 4-4). The height of the installation will not exceed 3m. The main environmental risk specific to Flow batteries during construction and operation is the accidental leak or spillage to the environment of the liquid electrolyte. The risk of fire and explosion is low.

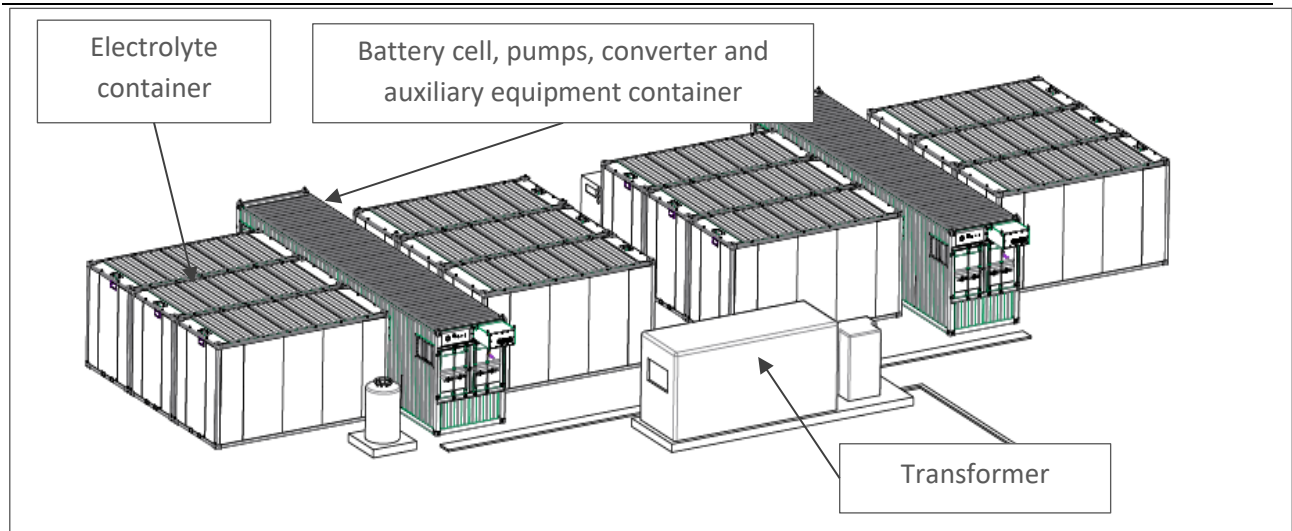


Figure 4-4: Indicative layout of a Flow battery of approximately 0.1 ha

4.4.3 Additional Associated Infrastructure

Additional associated infrastructure includes a temporary area (of up to 7ha) within the site area for the assembly and storage of the precast turbine structures. A permanent Operations & Maintenance (O&M) building will also be required and will occupy a footprint of up to approximately 1.2ha.

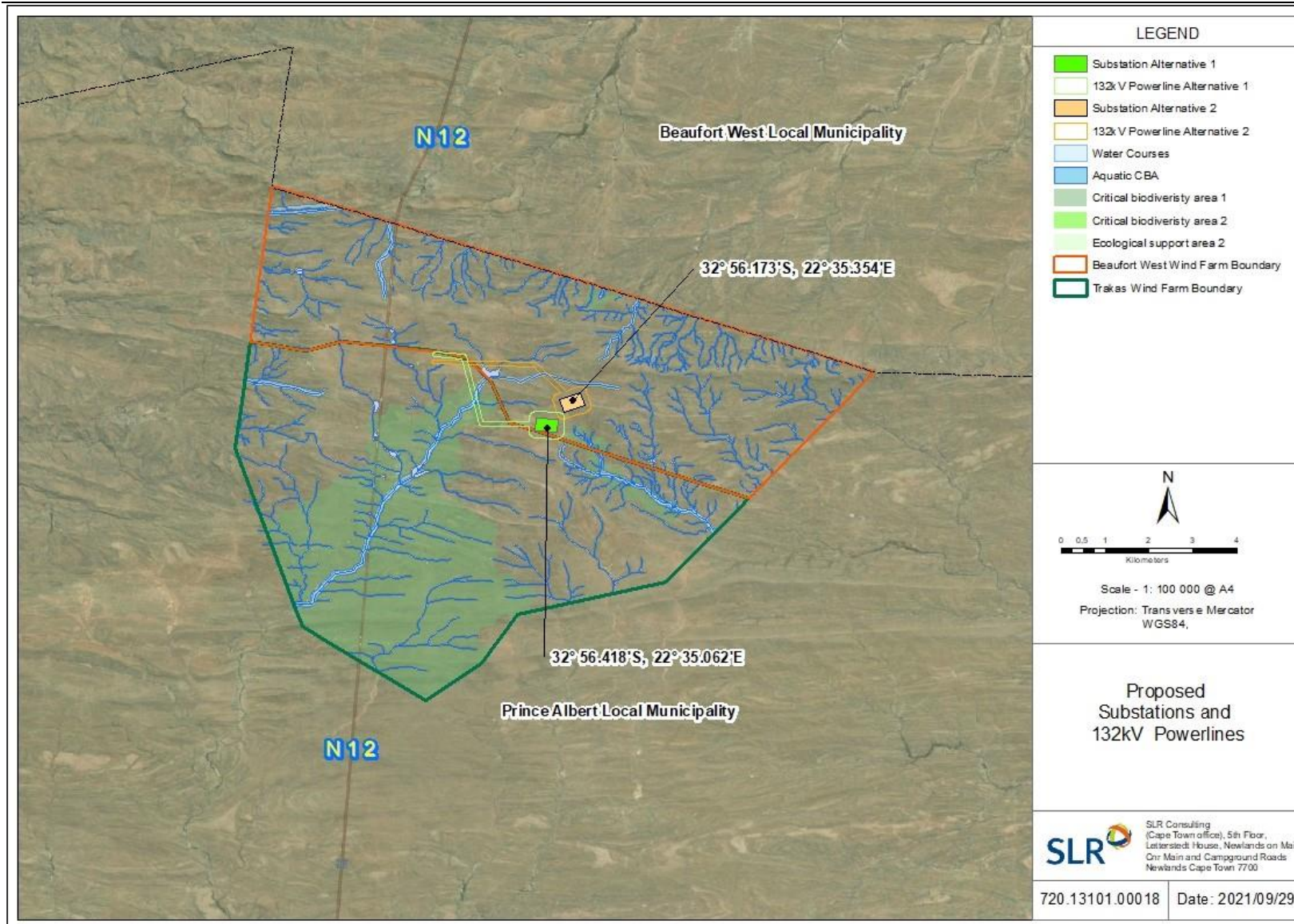


Figure 4-5: Site Locality Map

4.4.4 Service Provision

4.4.4.1 Water Demand

During the construction phase of the proposed project, water will be sourced either from a registered service provider, existing boreholes within the study area or through surface water abstraction. The anticipated water usage for the project for the duration of the construction phase includes the following:

- Drinking;
- Ablution facilities;
- Access Road construction;
- Dust suppression;
- Fire-fighting reserve;
- Cleaning of facilities; and
- Construction of foundations for the grid connection infrastructure, i.e., substation, etc.

During the operation phase, negligible water will be required for the operation of the grid connection infrastructure and will mainly be for domestic use within the footprint of the substation (inclusive of associated infrastructure).

4.4.4.2 Waste Management

Wastewater: Effluent will be generated during the construction and operation phase of the proposed project. It is estimated that wastewater volume will be approximately 30m³ per day. This will, however, be confirmed during the detailed design phase, prior to construction commencing. A Service Level Agreement will be reached with a registered service provider for the collection of sewage from site using a “honeysucker” truck and would be disposed of at the near Wastewater Treatment Works (WWTWs) during the construction phase. A new Claris fusion system will be deployed during the construction phase of the proposed project which will utilise a chemical process to recycle water from the O&M Building. The recycled water will be used for domestic applications within the site, i.e., watering vegetation, etc.

Solid Waste: Solid waste will be generated for the duration of the proposed project and will comprise of hazardous and non-hazardous waste components. During the construction and operation phase of the proposed project, non-hazardous solid waste components will comprise spoil from construction-related activities, general domestic waste (i.e., wooden pallets, cardboards, etc.) and concrete.

Hazardous materials used on site during operations will include fuels, oils, lubricants, cleaning products and specialised gases (for use in switchgear etc.). Minimal waste is expected to be generated during the operation phase. For certain types of transformers or backup generators, oil that needs to be replaced will be recycled, if possible, or safely stored and removed from the site and correctly disposed of.

All solid wastes generated (hazardous and non-hazardous) will be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company. This will be the responsibility of the Engineering Procurement Construction (EPC) Contractor during the construction phase of the proposed project and will have overall oversight to verify that the collection, transport, handling and disposal of these wastes is being undertaken in a suitable manner.

Waste during the decommissioning phase will be similar to that produced during the construction phase; this includes wooden and plastic packaging, cable off cuts, disused transformers, office, and domestic waste. All solid wastes generated will be disposed of at appropriately licenced landfill sites for general, and/or hazardous waste streams.

4.4.4.3 Air and Noise Emissions

Air emissions: Temporary air emissions will occur during the construction phase due to the use of construction machinery and the clearing of vegetation which may result in wind-blown dust and fugitive dust emissions. Little to no emissions are anticipated during the operation phase through management of on-site vehicle speed and vegetation and soil landscaping.

Noise emissions: The key temporary noise sources during the construction phase will be from the mobile machinery, vehicles, workers and plant construction activities (including high speed ramming using percussion hammers). Some construction activities may be required afterhours.

4.4.4.4 Traffic

A traffic study was not identified in the DFFE Screening Tool output, however, small volumes of traffic will be generated during the construction phase of the proposed project for the delivery of project components, machinery and labour. The transportation route will be from Port of Saldanha to the project site via Beaufort West. A route assessment / survey and feasibility assessment were carried out by the Applicant in 2019. In addition, all relevant permits to transport the required components / infrastructure has been obtained. It should however be noted that for this application, all the required components / infrastructure might be locally sourced. This will be confirmed at a later stage, prior to construction commencing.

Transport routes for the proposed project will be determined prior to construction. Traffic volumes are anticipated to diminish during the construction phase of the proposed project, and only a limited number of vehicles will travel to and from the project site for operation and maintenance purposes.

4.4.4.5 Schedule and Life of Project

It is anticipated that after construction, Beaufort West Wind Farm will own and operate the 33/132kV substation and associated infrastructure until the IPP requires the substation and powerline infrastructure to be decommissioned. The substation and associated infrastructure will however be required to service the authorised Beaufort West and Trakas Wind Farms and associated electrical infrastructure, which are anticipated to have a project life of approximately 20-25 years. Should the project need to be decommissioned at the end of the 20–25-year period, this will be the responsibility of Beaufort West Wind Farm.

4.5 PROJECT DEVELOPMENT PHASES

The proposed project will be carried out in the following phases:

- Pre-construction phase (i.e., development / planning and site preparation);
- Construction phase;
- Operational phase; and
- Decommissioning phase.

4.5.1 Pre-construction Phase

During the development and planning phase of the proposed project, Beaufort West Wind Farm will assess the key parameters required for the construction and operation of the grid connection infrastructure. This will include:

- Enviro-legal and other permitting (including the undertaking of Search & Rescue operations, if required);
- Survey of the substation site (inclusive of associated infrastructure);
- Servitude negotiations with the affected landowner(s);
- Detailed geotechnical investigations of the servitude and substation footprint area (inclusive of associated infrastructure);
- Compilation of a detailed layout of the grid connection infrastructure that meets ESKOM grid connection requirements;
- Installation of new access gates within the servitude, where required; and
- Foundation nominations for the erection of the pylon and anchors / stays where required.

During the development and planning phase of the proposed project, the project will be adapted to meet regulatory requirements, time schedules and expectations of all relevant parties.

Should the proposed project be granted a positive decision by the DFFE, site preparation activities will commence. This phase would include the clearance of vegetation, installation of perimeter fencing around the substation (inclusive of associated infrastructure) and levelling of the site and preliminary earthworks. Thereafter the site will be marked out and a construction camp set up and the access road to the site be constructed. The clearance of vegetation is not anticipated to be site wide and will be limited to the road(s) and footprint of the on-site substation and associated infrastructure. The extent of vegetation clearance within the substation and associated infrastructure footprint will depend on the outcomes of the detailed layout of the substation and associated infrastructure.

4.5.2 Construction Phase

The construction phase of the proposed project will be initiated following the completion of the site preparation activities. The construction phase will include the following:

- Establishment of a site camp for the temporary storage of construction equipment and machinery;
- Clearance of the substation footprint;
- Excavation of busbar foundations;
- Foundation steelwork (reinforcing);
- Concrete pouring within all foundations;
- Rehabilitation of disturbed areas;
- Testing and commissioning of grid connection infrastructure; and
- Removal of equipment and disassembly of site camp.

Where possible, materials, plant and equipment will be sourced from suppliers within the vicinity of the study area. The bulk of the specialist equipment (i.e., distribution transformers, busbars, circuit breakers, etc.) will be imported (should no supply be available in South Africa) from China, Europe or the United States of America and be shipped to South Africa.

4.5.3 Operations Phase

The proposed substation and associated infrastructure will be operated on a 24 hour, seven (7) days a week basis – when the authorised Beaufort West and Trakas Wind Farms are also operational. The operation of the proposed project will comprise of maintenance of the grid connection infrastructure (substation and associated infrastructure).

4.5.4 Decommissioning Phase

The project is expected to operate for at least 20 years. If decommissioned, all components will be removed, and the site rehabilitated. Where possible, all materials will be recycled, otherwise they will be disposed of in accordance with local regulations and international best practice.

4.6 SUMMARY OF THE PROJECT AND TECHNICAL INFORMATION

Table 4-3 below includes technical and project-specific details of the key infrastructure components and support services that will be required to support the operations of the substation and associated infrastructure. See Figure 4-1 and Figure 4-5 for the proposed layout which has been assessed in this BAR for the construction of the substation and associated infrastructure.

Table 4-3: Technical details of the proposed project

Component	Details		
On-site Substation			
Corner point coordinates	Site Area Alternative 1		
		Latitude	Longitude
	A	32°56'22.12"S	22°34'56.76"E
	B	32°56'22.46"S	22°35'16.00"E
	C	32°56'31.78"S	22°34'56.47"E
	D	32°56'32.18"S	22°35'15.71"E
Corner point coordinates	Site Area Alternative 2		
		Latitude	Longitude
	A	32°56'8.42"S	22°35'17.17"E
	B	32°56'3.15"S	22°35'35.37"E
	C	32°56'17.63"S	22°35'20.90"E
	D	32°56'12.37"S	22°35'39.11"E
Centre point coordinates	Site Area Alternative 1		
		Latitude	Longitude
	A	32°56'26.99"S	22°35'6.25"E

Component		Details
Centre point coordinates		Site Area Alternative 2
	Latitude	Longitude
A	32°56'10.40"S	22°35'27.70"E
Capacity:		33/132 kilovolt (kV) ²⁰
Footprint:		Approximately 2 hectares (ha)
		Site area alternatives of up to approximately 20ha each have been assessed for the onsite substation and associated infrastructure (BESS, laydown area and O&M building).
Supporting Infrastructure		
Permanent Operations and Maintenance (O&M) Building		O&M Building will be located within the footprint of the substation and will occupy an area of up to approx. 1.2ha in extent.
Temporary Assembly & Storage Area		One (1) temporary area of up to approx. 7ha within the site area.
		Will be used for the assembly and storage of the precast turbine structures
Battery Energy Storage System (BESS)		One (1) solid state, Lithium-ion (preferred technology type) BESS with total footprint of up to approx. 4ha
		Batteries to be used are already assembled prior to delivery and come as 'plug and play' modular units
Water Demand	Construction	Water for Roads – approx. 0.25ℓ per m ² Water for Civil Works – approx. 50 000m ³ to build project Water for Domestic Use – approx. 30m ³ per day
	Operation	Water for Domestic Use – approx. 2m ³ per day Water for Dust Suppression – approx. 15ℓ/m ³
Waste Generation	Construction	General Waste would be managed on site in accordance with the principles of the waste management hierarchy. Non-hazardous solid waste components will comprise spoil from construction-related activities, general domestic waste (i.e., wooden pallets, cardboards, etc.) and concrete. Hazardous waste will be disposed of at a registered facility. Effluent would be managed by means of conservancy tanks (cleaned once a month and disposed of at the nearest municipal facility). It is assumed that wastewater for this project will be up to approximately 30m ³ per day.
	Operation	Effluent would be managed using septic Tanks (16 000ℓ in capacity, which are cleaned 2 / 3 times a week) or a Clarus Fusion System (16

²⁰ Onsite substation will consist of 33kV/132kV yard which will be owned and operated by Applicant, as well as 132kV switching station yard which will be owned and operated by Eskom. A step-up transformer to 132kV will be situated within substation owned by Applicant, with 132kV line that will cross to Eskom's 132kV switching substation. **33/132kV yard of onsite substation (including associated BESS, laydown area and O&M building) forms part of this proposed application for EA. 132kV switching station yard of onsite substation forms part of separate application for EA, along with 132kV overhead powerline.** DFFE reference number for separate application for EA for 132kV yard of onsite switching substation and 132kV powerline will be provided once allocated.

Component	Details
	000ℓ capacity which are cleaned once every 6 months), or similar, which utilises a chemical process to recycle water from the O&M Building as well as the substation control room(s). This treated water can then be used to water vegetation.
Traffic	It is expected that there will be approximately 2 000 trucks in total over the construction phase, and approximately 10 - 20 trucks per day.
Employment Opportunities	
Construction	Several people will be employed for the project, the number of which will be confirmed at a later stage. However, the number of people employed at one (1) time may vary as different contracts and subcontracts on the project are completed at a time onsite.
Operation	Several people will be employed for the project, the number of which will be confirmed at a later stage, however, this will be far less than during construction. This is due to the fact that the staff will mainly be responsible for the daily operations and maintenance activities of the project.
Recruitment for the duration of the project lifecycle will be undertaken in collaboration with local authorities, community leadership structures and agencies and no labourers will be hired onsite. Beaufort West Wind Farm will therefore implement mitigation and management measures to ensure that no employee or job applicant is discriminated against on the basis of race, gender, nationality, age, religion or sexual orientation.	

5. ALTERNATIVES

5.1 LOCATION ALTERNATIVES

No other locations are being considered for the placement of the substation and associated infrastructure, as this placement is dependent on the location of the authorised Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) Wind Farm projects. As mentioned, the proposed project will service the authorised Beaufort West and Trakas Wind Farms and associated electrical infrastructure. If the project does not receive EA, then the existing electricity supply to the area as well as future economic development will be limited and compromised.

5.2 TYPE OF ACTIVITY ALTERNATIVES

No other activity is being considered or assessed for the proposed project. The proposed project will connect the authorised Beaufort West and Trakas Wind Farm projects to the grid. As a result, no other activity alternatives could be considered for the proposed project.

5.3 DESIGN AND LAYOUT ALTERNATIVES

One (1) of the aims of the BA process was to identify alternatives for detailed assessment. The selection of alternatives helped to focus investigations, both in terms of the environmental investigations required and the scope of the public participation process. A comprehensive design process has thus been undertaken to inform the layout alternatives for the proposed project.

As part of the proposed project / BA process, two (2) site area alternatives of up to approximately 200 000m² (i.e., 500m x 400m or 20ha) each have been assessed for the onsite substation, BESS, laydown area and O&M building. As mentioned, the proposed site area alternatives will be located within the site for the authorised Beaufort West and Trakas Wind Farms respectively. As such, the location of the proposed onsite substation, BESS, laydown area and O&M building has previously been assessed as part of the development footprint for the authorised Beaufort West and Trakas Wind Farm projects.

Various environmental specialists assessed the site during their respective field investigations. Their assessments focussed on the entire application site as well as specific impacts of the proposed development area and project infrastructure in detail. Based on the specialist assessments and ground truthing undertaken (where required), a few potentially sensitive and/or 'no-go' areas were identified within the application site. The identified sensitive and 'no-go' areas were used to perform a comparison of site area alternatives. Based on the findings of the specialist assessments, **Site Area Alternative 2** was found to be slightly preferred from an environmental perspective. The reasons for this are summarised in the table below.

Table 5-1: Summary of assessment of project alternatives

SITE AREA ALTERNATIVES (SUBSTATION, BESS, LAYDOWN AREA AND O&M BUILDING)	
Specialists	Reason(s) for preference
Aquatic	Site Area Alternative 1 would have the greatest impact (HIGH) on the observed systems, due to either physical disturbance or broad areas that are difficult to span. For this purpose, Alternative 2 should be selected .

Ecology	It is largely the presence of the CBA along Alternative 1 that drives the preference for Alternative 2 as the preferred alternative for the development.
Heritage (including Archaeology and Cultural Landscapes)	No impacts to archaeological resources are anticipated with respect the construction of the Site Area Alternative 1. Only a few isolated stone artefacts were recorded in the footprint for this layout. With respect to Site Area Alternative 2, a number of scatters of LSA material were recorded along the tuffite ridge which crosses Alternative 2. These scatters were all considered to be of Low significance (NCW). With mitigation, either alternative is acceptable. The integrated HIA report thus does not express a preference for Site Area Alternative 1 or Site Area Alternative 2. The latter has a potentially slightly higher degree of impact on archaeology than the former, but this is mitigatable.
Palaeontology	The impact significance of the proposed developments in terms of potential impacts of fossils of scientific or conservation value is rated as VERY LOW, both before and after mitigation of chance fossil finds. This assessment applies equally to both site area alternatives for the on-site substation and associated infrastructure under consideration. There is therefore no preference in terms of palaeontological heritage for any specific project layout.
Visual	Either of the two (2) site area alternatives can be considered , as the potential impact of any one (1) alternative is neutral, when compared to the authorised development option. Both site area alternatives would be viewed within the matrix of turbines, which would command visual attention.
Agricultural	Because of the negligible agricultural impact, there would be no material difference between the agricultural impacts of any site area alternative, or any technology alternatives. All possible site area alternatives are considered acceptable in terms of agricultural impact.
Avifauna	No preferred site area alternative was determined as both were considered acceptable and optimal as their impacts were determined identical in terms of significance and nature.
Reptiles (specifically Karoo Dwarf Tortoise)	Since the terrain of Site Area Alternative 1 is somewhat less optimal for the Karoo Dwarf Tortoise than the terrain of Site Area Alternative 2, the precautionary recommendation in this regard would be that Site Area Alternative 1 is the preferred alternative. This distinction is however not significant, and thus the specific choice of alternatives as based on Karoo Dwarf Tortoise considerations is not absolutely the one (1) or the other. As such, both site area alternatives are acceptable for authorisation.

Considering the information above, Site Area Alternative 2 is slightly preferred from an environmental perspective. It should, however, be noted that Site Area Alternative 1 is also considered acceptable as all specialists confirmed that no fatal flaws were identified for this alternative. **Both site area alternatives are thus acceptable for authorisation and therefore it is requested that both site area alternatives be authorised by the DFFE (if possible).**

The assessment of two (2) 20ha site area alternatives will provide sufficient extent for the placement of the substation (including associated BESS, laydown area and O&M building), whilst avoiding sensitive environmental features present within the study area. The layout of the proposed site area alternatives has been based on both environmental constraints and design factors.

5.4 TECHNOLOGY ALTERNATIVES

No technology alternatives exist to date for the transmission of electricity from renewable energy sources to grid networks. Thus, no technology alternatives will be considered or assessed in this BAR. Two (2) technology types (namely Solid State and Flow Batteries) over three (3) battery types were, however, considered for the proposed BESS. These included Solid-State Lithium Ion (Li-Ion), Vanadium Redox Flow and Zinc-hybrid (Zinc-Bromine - ZNBR) Flow. A concise Risk Assessment of both technologies (Solid State and Flow Batteries) over three (3) battery types (namely Lithium-Ion, Vanadium Redox Flow and Zinc Hybrid Flow) has been undertaken (see Section 8 of the BAR) and based on the results, Beaufort West Wind Farm has chosen the Solid-State Li-Ion battery technology as the preferred technology for the BESS. Additional information about the Li-Ion BESS technology is provided in the table below.

	Lithium Ion
Thermal conditions	Operates in temperature ranging from -30°C to 50°C and does not release excess heat due to the thermal cooling system.
Performance Efficiency	Higher efficiency (90% plus) when compared to most other BESS technology types.
Safety and Storage	Low safety concern. Li-Ion batteries do not need water, which decreases maintenance. Consists of closed dry cooling system.
Space	Requires less space to erect large capacity storages compared to other BESS technology types.
Lifetime and Cycling	Longer lifetime with more depth of discharge (DoD) (99%) when compared to most other BESS technology types. A higher DoD means better performance.

Based on the information above, Li-Ion is regarded as a preferred BESS technology type when compared to other technology types, as BESS using the Li-Ion technology is not limited to a 6h duration. Other BESS technologies are also deemed to have too many energy shortfalls in comparison to the Li-Ion technology type. The underlying battery cells of most other BESS technology types degrade too fast, requiring full replacement much earlier than the 20-year lifetime of the plant. Hence, in addition to the results of the risk assessment undertaken (Section 8), the Applicant chooses to utilise Li-Ion BESS technology as part of the proposed project.

5.5 'NO-GO' ALTERNATIVE

The 'No-Go' alternative is the option of not constructing and operating the substation and associated infrastructure in support of the authorised Beaufort West and Trakas Wind Farm projects and where the *status quo* of the current status and/or activities on the site would prevail.

Should the 'No-Go' alternative be considered, there would be no impact on the existing environmental baseline and no benefits to the local economy and affected communities. The authorised Beaufort West and Trakas Wind Farm projects would still be able to connect to the grid for the evacuation of electricity as two (2) separate substations [one (1) for each wind farm] have been authorised, however, it would have significant cost implications to build two (2) substations instead of one (1) central substation. In addition, this is also anticipated to result in substantial environmental impacts as two (2) sites would need to be cleared and constructed on, instead of just one (1).

The impacts associated with the consideration of the 'No-Go' alternative for the proposed project have been addressed as part of each respective specialist study (where applicable) and are discussed in the sections below.

5.5.1 Avifauna

From an avifaunal perspective, the 'no-go' option will result in no additional impacts on avifauna and will result in the ecological *status quo* being maintained, which will be to the advantage of the avifauna. However, no fatal flaws were identified during the investigations.

5.5.2 Terrestrial Ecology

Under the 'no-go' alternative, the current land use consisting of extensive livestock grazing would continue. When applied correctly, such livestock grazing is considered to be largely compatible with long-term biodiversity conservation, although in practice there are some negative effects associated with such land use such as predator control and negative impacts on habitat availability for the larger ungulates that would historically have utilised the area. Under the current circumstances, the 'no-go' alternative is considered to represent a low long-term negative impact on the environment. The development is however not an alternative land use for the site, but rather represents an additional stressor that would additively and cumulatively contribute to ecological impacts on the site.

5.5.3 Aquatic / Surface Water

The current *status quo* of the aquatic environment would remain unchanged should the 'No-Go' option occur, as little currently impacts on the aquatic environment other those activities previously mentioned.

5.5.4 Visual

The alternatives have been assessed against the 'no-go' alternative. The 'no-go' alternative is the option of not constructing the project, where the *status quo* of the current farming activities on the site would prevail.

5.5.5 Agriculture

The 'no-go' alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There is no agricultural impact of the 'no-go' option. Therefore, the extent to which the development and the 'no-go' alternative will impact agricultural production are more or less equal, which results in there being, from an agricultural impact perspective only, no preferred alternative between the development and the 'no-go' alternative. However, the 'no-go' option would prevent the proposed project from contributing to the environmental, social and economic benefits associated with the development of renewable energy.

5.5.6 Heritage, Archaeology and Palaeontology

The 'no-go' alternative means that the proposed project would not be able to connect the energy development in the area (Beaufort West and Trakas Wind Farm projects) to the national grid. This alternative would result in no environmental impacts from the proposed project on the site or surrounding area. It provides the baseline against which other alternatives are compared. Implementing the 'no-go' option would entail no development. There would also be no socio-economic benefits related to an increase in energy generation of renewable energy sources. The HIA did not identify any heritage hot spots and did not identify any 'no-go' areas during the survey.

6. DESCRIPTION OF THE BASELINE ENVIRONMENT

6.1 CLIMATE

The study area is located in Gamka Karoo, which is one (1) of most arid vegetation units of the Nama Karoo biome. This region is in the rain shadow of the Cape Fold Belt mountains in the south, with mean annual precipitation ranging from 100 – 240mm, mostly between December and April (see Figure 6-1). Mean maximum and minimum monthly temperatures in Beaufort West are 38.7°C and -3.2°C for January (summer) and July (winter) respectively (Mucina & Rutherford, 2006) (see Figure 6-1). Strong north-westerly winds occur in winter (Mucina & Rutherford, 2006).

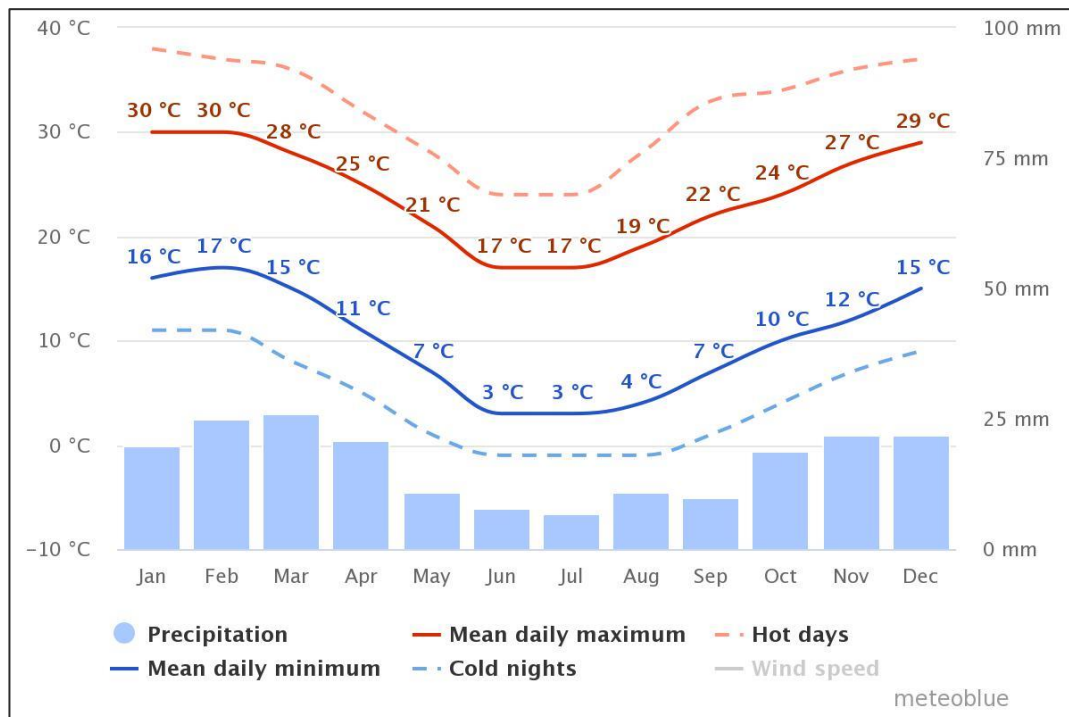


Figure 6-1: Average temperatures and precipitation (rainfall) for Beaufort West²¹

6.2 BIOPHYSICAL ENVIRONMENT

6.2.1 Topography and Geology

The landscape typically consists of extremely irregular to slightly undulating plains covered with dwarf spiny shrubland dominated by Karoo dwarf shrubs with rare low trees. According to the Heritage Impact Assessment (Appendix 5.6), the landscape is situated on a generally flat and featureless plain called “Die Vlakte”, characterized by low relief, gently rolling to hilly terrain between 1 000 to 1 100m above mean sea level (amsl). The highest points lie along a low, rock ridge trending west-east towards the northern edge of the study area.

Geology is primarily mudstones and sandstones of the Beaufort Group (Adelaide Subgroup) with some Ecca (Fort Brown Formation) shales supporting very shallow and stony soils of the Glenrosa and/or Mispah forms.

²¹ https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/beaufort-west_republic-of-south-africa_1020641

According to the Heritage Impact Assessment (Appendix 5.6), the geology of the area is underlain by continental (fluvial/lacustrine) sediments of the Abrahamskraal Formation (Lower Beaufort Group).

6.2.2 Agricultural Land Use

The site area alternatives are entirely on land that has only ever had grazing as an agricultural land use.

Site Sensitivity Verification

The land capability of the project footprint is predominantly 5, but includes 4 and 7. Values of 4 to 5 translate to a low agricultural sensitivity and values of 7 translate to medium agricultural sensitivity. There are only a few, isolated pixels of medium sensitivity within the project footprint. The small-scale differences in land capability (pixels) across the project area is not very significant and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground.

A map of the proposed footprints of the two (2) site area alternatives, overlaid on the screening tool sensitivity, is given in the figure below.

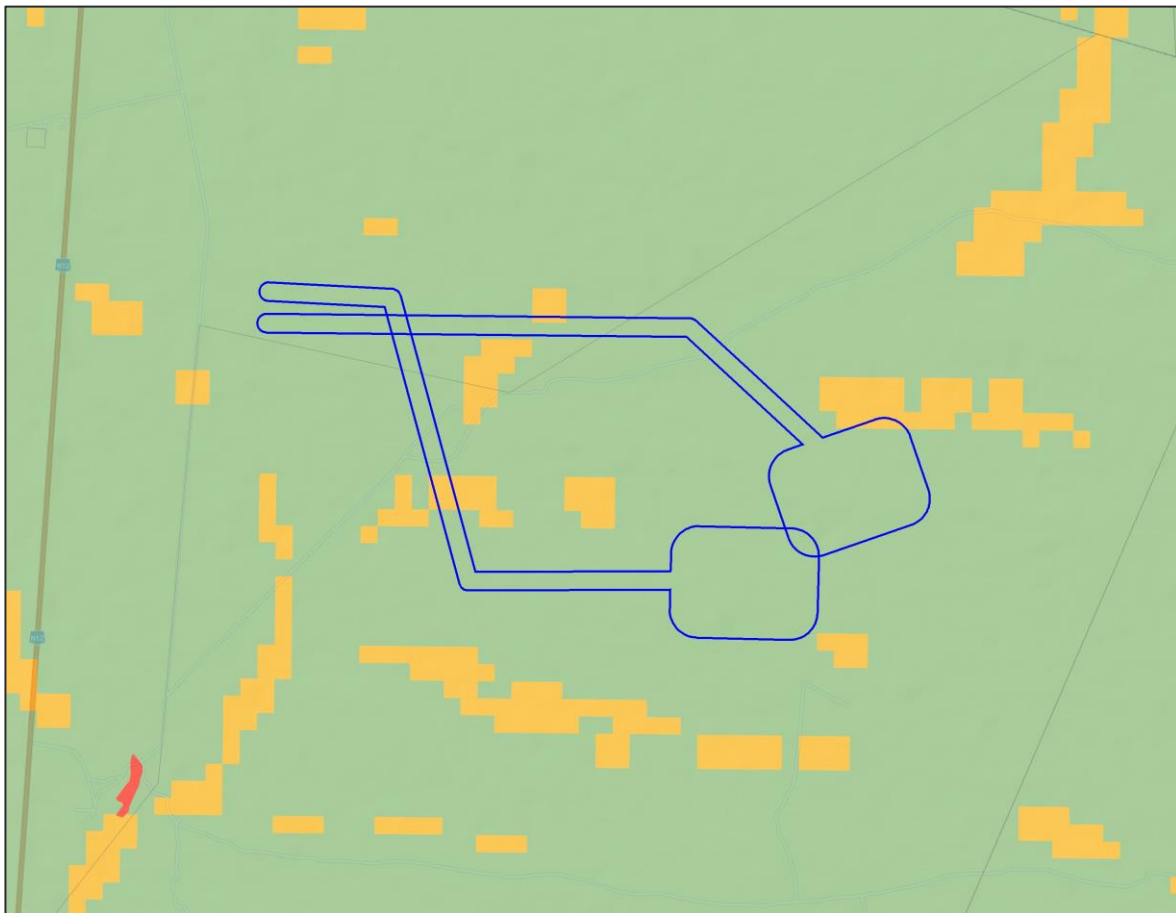


Figure 6-2: The proposed project footprint alternatives (blue outlines) overlaid on agricultural sensitivity, as given by the screening tool (green= low; yellow= medium; red= high).

The mostly low agricultural sensitivity, as identified by the screening tool, is confirmed by the Agricultural assessment. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 140mm per annum and high evaporation of approximately 1 340mm per annum)

proves the study area to be arid, and therefore of very limited land capability and entirely unsuitable as arable land for the production of cultivated crops.

This site sensitivity verification verifies the entire site as being of less than high agricultural sensitivity and predominantly of low agricultural sensitivity. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement.

6.2.3 Terrestrial Ecology

The site falls entirely within the Gamka Karoo vegetation type, with no other vegetation types for some distance from the site (see Figure 6-3 below).

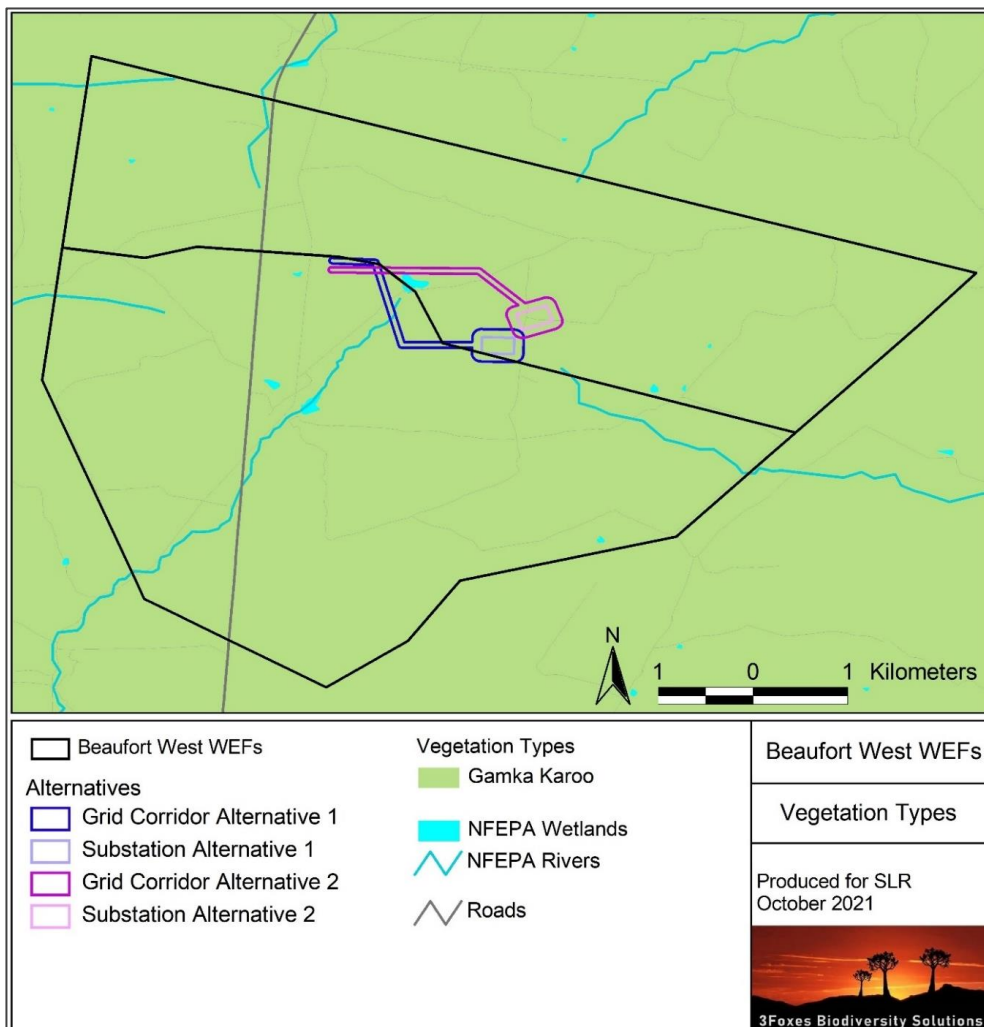


Figure 6-3: Vegetation map of study area, illustrating that the site falls entirely within the Gamka Karoo vegetation type.

6.2.3.1 Vegetation

Gamka Karoo occurs in the Western Cape and Eastern Cape Provinces and marginally into the Northern Cape Province. It occupies the large basin between the Great Escarpment (Nuweveld Mountains) in the north and northwest and Cape Fold Belt Mountains (mostly Swartberg Mountains) in the south. From approximately the edge of the Gamka basin catchment area (i.e., of the Dwyka River tributary) in the west to about the Kariega River in the east.

The landscape typically consists of extremely irregular to slightly undulating plains covered with dwarf spiny shrubland dominated by Karoo dwarf shrubs with rare low trees. Geology is primarily mudstones and sandstones of the Beaufort Group (Adelaide Subgroup) with some Ecca (Fort Brown Formation) shales supporting very shallow and stony soils of the Glenrosa and/or Mispah forms.

Mucina *et al.* (1996) list *Chasmatophyllum stanleyi*, *Hereroa incurva*, *Hoodia dregei*, *Ruschia beaufortensis*, *Jamesbrittenia tenuifolia*, *Manulea karrooica* and *Piarranthus comptus* as species endemic to this vegetation type. Gamka Karoo is classified as Least Threatened and less than 1% has been lost to transformation.



Figure 6-4: View of Site Area Alternative 1 area with typical Gamka Karoo plains vegetation²².

²² Characteristic and dominant species include *Euphorbia stellispina*, *Pentzia incana*, *Hirpicium alienatum*, *Ruschia beaufortensis*, *Lycium cinereum*, *Stipagrostis ciliata*, *S.obtusa*, *Aristida adscensionis*, *Thesium lineatum*, *Enneapogon desvauxii*, *Asparagus capensis* and *Asparagus glauca*.



Figure 6-5: View over Site Area Alternative 2 area, with typical Gamka Karoo vegetation on stony soils²³.

6.2.3.2 Faunal Communities

Mammals:

The study area and broad surroundings have not been well-sampled historically for mammals, with the result that the records from the existing databases do not provide a comprehensive picture of the mammalian community of the area. Fortunately, the site was extensively camera trapped over a 23-week period in 2016 (namely June 2016 to November 2016), which provides a reliable picture of the mammalian community of the site. The camera trapping returned the following species, in order of decreasing abundance:

- Cape Hare
- Steenbok, Common Duiker
- Bat-eared Fox
- Aardwolf
- Striped Polecat
- Suricate/Meerkat
- Cape Fox
- African Wild Cat
- Kudu
- Common Genet
- Cape Porcupine
- Caracal
- Grey Mongoose
- Aardvark

²³ Characteristic and dominant species include *Pentzia incana*, *Euphorbia stellispina*, *Thesium lineatum*, *Hermannia cueneifolia*, *Eriocephalus microcephalus*, *Pteronia incanum*, *Pegolettia retrofracta*, *Trichodiadema barbatum*, *Asparagus striatus* and *Pteronia adenocarpa*.

-
- Black-backed jackal
 - Yellow mongoose

Other species observed in the area which were not captured on the camera traps, but which may be present on the site at least occasionally, include Vervet Monkey, Chacma Baboon and Ground Squirrel. This represents a typical mammalian community for the study area and the lower Nama Karoo in general.

The only species of conservation concern that would potentially be present on the site is the Riverine Rabbit (*Bunolagus monticularis*), which is listed as Critically Endangered. However, the above camera trapping was specifically designed to establish the presence or absence of the Riverine Rabbit at the site and **since this species was not detected during 23 weeks of camera trapping from June to November 2016, it can be confirmed that this species is highly unlikely to be present.** In addition, the development footprint within drainage lines that represent the potential habitat of this species in the area would be minimal and an impact on this species is not expected to occur.

Reptiles:

Reptile diversity in the study area is expected to be low, which can be ascribed to the homogeneity of the habitats present and the lack of moist, well-vegetated environments or significant rocky outcrop habitats. Based on the ReptileMap database, approximately 25 species are known from the area (Annexure 4 of Terrestrial Ecology Report – Appendix 5.1). The only species of potential concern known from the area is the Karoo Padloper (EN). This species is specifically dealt with elsewhere in an independent reptile study and is not covered here further. Species observed on the site or nearby include the following:

- Common Sand Lizard
- Namaqua Lizard
- Angulate Tortoise
- Karoo Tent Tortoise
- Purcell's Gecko
- Cape Cobra
- Puffadder

Amphibians:

The diversity of amphibians in the study area is relatively low with only six species having been recorded in the area (Annexure 3 of Terrestrial Ecology Report – Appendix 5.1). Species observed in the larger drainage lines of the area include the Karoo Toad and Poynton's River Frog. There are no listed amphibian species known from the area, although the Giant Bull Frog (*Pyxicephalus adspersus*) was previously listed as Near Threatened but has revised to Least Concern (Annexure 3 of Terrestrial Ecology Report – Appendix 5.1). This species is associated with temporary pans in the Karoo, Grassland and Savannah Biomes, but is not commonly recorded in the study area and its presence at the site is considered unlikely as there is no suitable breeding habitat present within the site. Although there is no natural permanent water within the site, there are a few larger drainage lines present or small earth dams that would have temporary pools that can be used by toads and frogs for seasonal breeding purposes. The impact of the development on these breeding sites would be very low and a direct impact on these habitats is unlikely. Given the localised nature of important amphibian habitats at the site as well as the generally arid nature of the site and the low overall abundance of amphibians, a significant long-term impact on amphibians is unlikely.

6.2.3.3 Critical Biodiversity Areas & Broad-Scale Processes

In terms of the 2017 Western Cape Biodiversity Spatial Plan, there is a Critical Biodiversity Area (CBA) 1 within the proposed project site. In addition, there are several small Ecological Support Areas (ESAs) along the minor washes of the site. The reasons layer for the CBA indicates that underlying features driving the CBA include habitat for the Cape Mountain Zebra, the presence of a FEPA River Corridor, the Gamka Karoo vegetation type, Shale Gas Very High Sensitivity Dry Rivers, Shale Gas Very High Sensitivity Terrestrial areas and Watercourse Protection – Great Karoo. In terms of these features, the presence of the substation through the CBA would result in very little habitat loss and as such would not be likely to compromise any of the above underlying features of the CBA to a significant degree. However, since Site Area Alternative 1 and Site Area Alternative 2 would avoid the CBA, they would both be an acceptable alternative in terms of impacts on CBAs. The impact of the substation on CBAs and ESAs is thus concluded to be minor and is therefore considered acceptable.

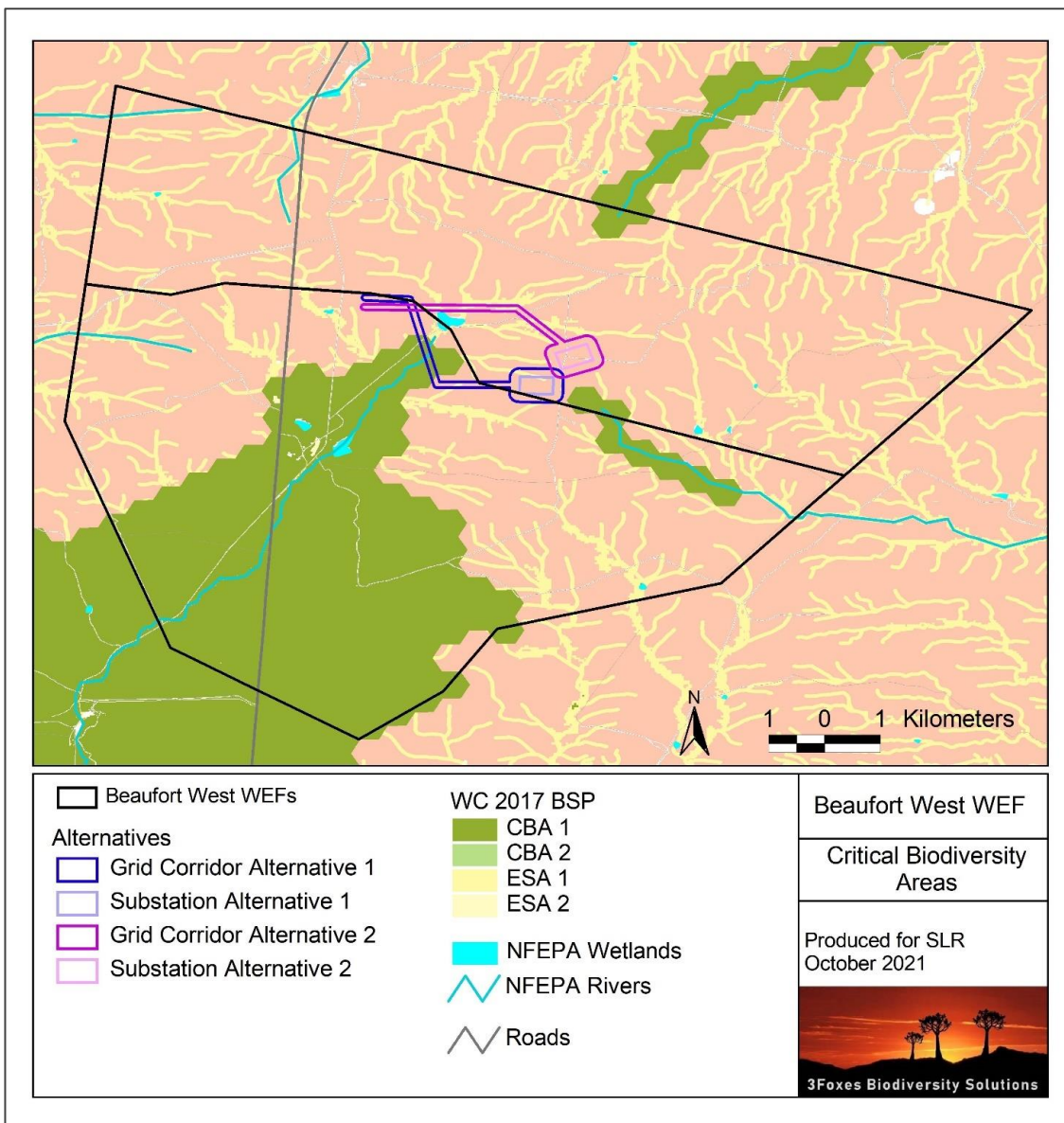


Figure 6-6: Critical Biodiversity Areas map for study area.

6.2.3.4 Sensitivity Mapping

The sensitivity map of the substation and associated infrastructure areas is illustrated below. There are some ridges and minor washes present within Site Area Alternative 2 that are considered medium sensitivity. The larger washes present are considered high sensitivity. There are no ‘no-go’ areas or areas of very high sensitivity within the affected area. The majority of the study area consists of typical Gamka Karoo low shrubland with few species of concern present considered to be low sensitivity. Although there is little overall difference between the site area alternatives in terms of ecological features present, the CBA status of parts of Alternative 1 indicates that Site Area Alternative 2 is preferable. However, from an ecological perspective, both are considered acceptable.

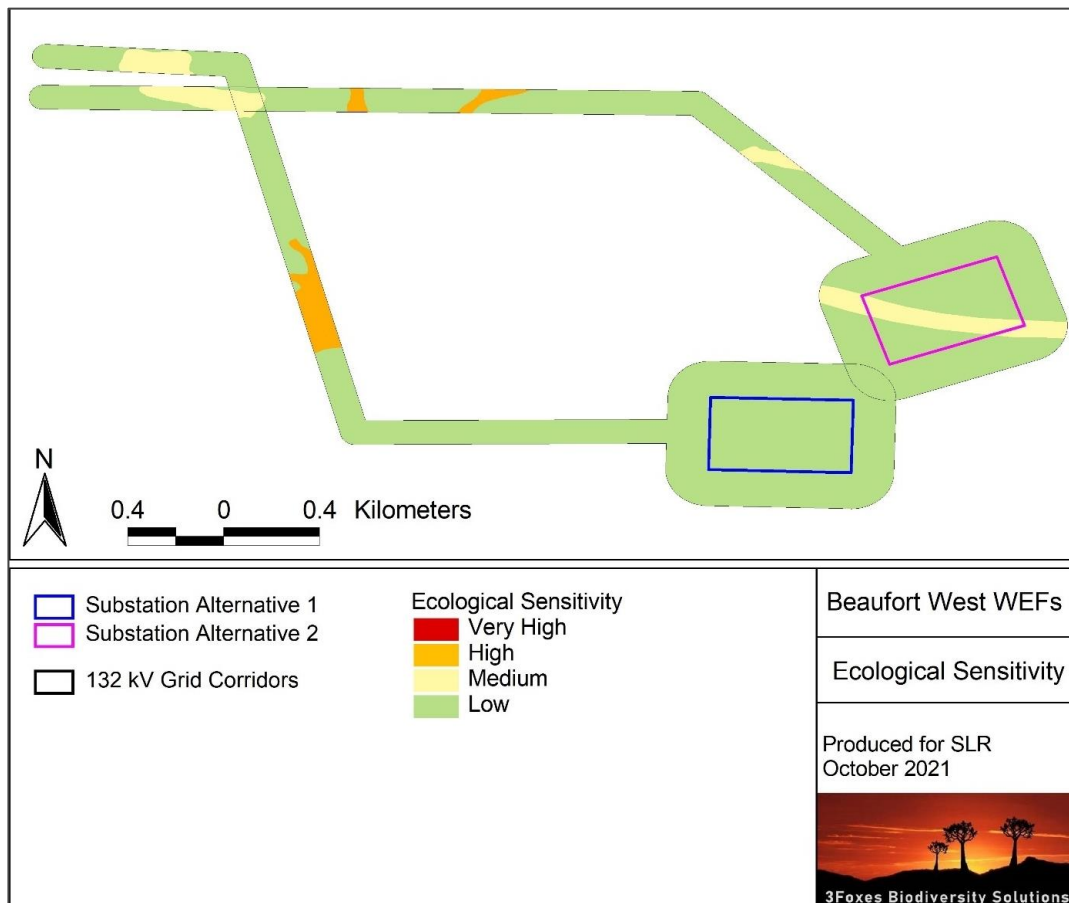


Figure 6-7: Ecological sensitivity map of the study area, showing the two (2) site area alternative locations.

6.2.4 Reptiles (specifically Karoo Dwarf Tortoise)

According to the DFFE’s Online Screening Tool Reports generated (Appendix 8.3), *Chersobius boulengeri* was listed as being a species of Medium sensitivity within the Animal Species Theme. This species is commonly referred to as the Karoo Dwarf Tortoise, or by the older names of Karoo Padloper or Boulenger’s Padloper, and is currently listing under IUCN as *Endangered*. However, based on the findings of the site sensitivity verification, the rating of Medium sensitivity has been adjusted to being Low. Considering this, a Terrestrial Animal Species Compliance Statement (TASCS) has been compiled (Appendix 5.2), with specific focus on Karoo Dwarf Tortoise.

A half-day site visit was conducted by the herpetofaunal specialist on 27 September 2021, with the main aim being to explore the various areas under review to 1) specifically search for evidence of the actual

occurrence of the Karoo Dwarf Tortoises by means of observations of live specimens or shell remains, and to 2) assess the suitability (or not) of the terrain as habitat for this species. The timing of the site visit (i.e., early summer) was appropriate for the surveying of Karoo Dwarf Tortoises.

6.2.4.1 Outcome of Site Sensitivity Verification

Distribution Records:

The general distribution pattern of the Karoo Dwarf Tortoise as per the map of all known records plotted (Figure 6-8 and Figure 6-9) shows that the proposed development areas fall within the distribution of this species. The nearest records to the proposed development areas are located about 20 to 40km away²⁴. The general impression gained from these distribution records is thus that the species may possibly occur within the proposed development area, which is why the STR lists as a species of potential occurrence that requires site sensitivity verification.

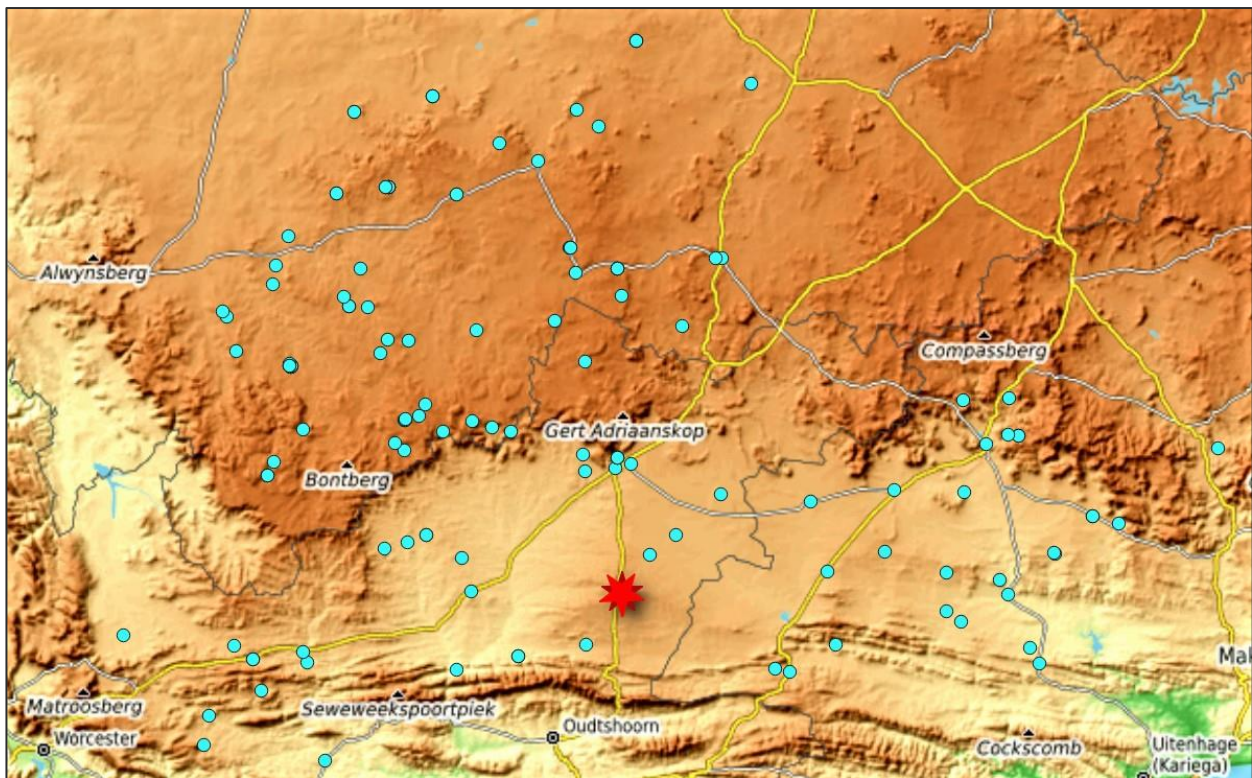


Figure 6-8: All known distribution records of the Karoo Dwarf Tortoise (blue dots), plotted in relation to the proposed development areas (red star).

²⁴ https://vmus.adu.org.za/vm_view_record.php?vm=ReptileMAP-5388
https://vmus.adu.org.za/vm_view_record.php?vm=ReptileMAP-158678
https://vmus.adu.org.za/vm_view_record.php?vm=ReptileMAP-94879

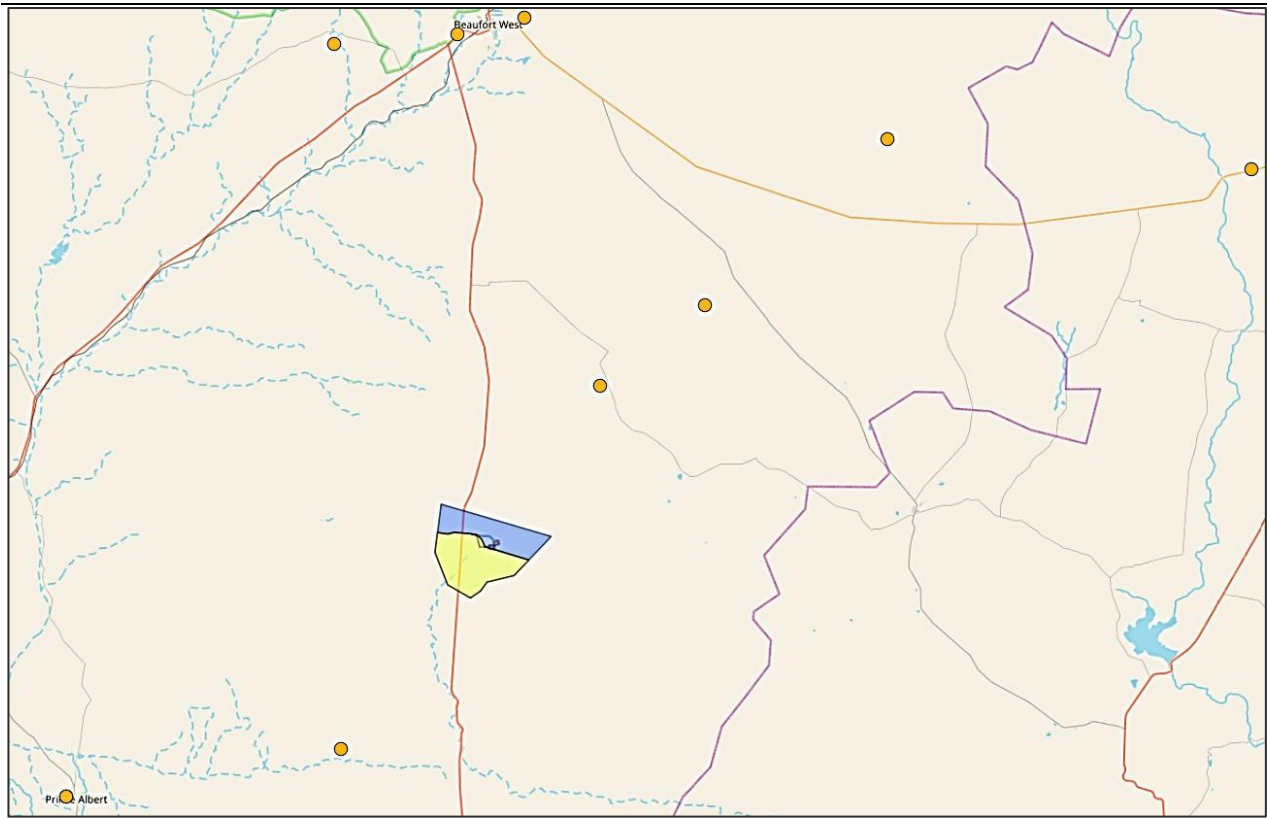


Figure 6-9: The nearest recorded distribution records of the Karoo Dwarf Tortoise (orange dots) in relation to the proposed development areas (blue and yellow polygons).

Site Visit (Specimen Observation):

No evidence of live specimens or shell fragments of Karoo Dwarf Tortoise was detected during the half-day site visit that was conducted during the September 2021 survey. However, observations of two (2) other tortoise species were made during this period, i.e., that of Leopard Tortoises (*Stigmochelys pardalis*) (<https://www.inaturalist.org/observations/96623939>) and Tent Tortoises (*Psammobates tentorius*) (<https://www.inaturalist.org/observations/96623940>). The IUCN conservation status of these two (2) tortoise species are both *Least Concern*.

Due to the issue of low detectability, the absence of Karoo Dwarf Tortoise observations during the survey should not summarily be taken as proof that the species does not occur within the study area. **However, judging by the general lack of suitable habitat within the proposed development units, it would appear as though this species is indeed absent from this particular area.**

Site Visit (Habitat Suitability):

In the absence of actual recent observations or historic records that can confirm the occurrence of the Karoo Dwarf Tortoise within the proposed development areas, the alternative approach is to assess the habitat suitability of the site in terms of its potential to be inhabited by species. The half-day site visit that was conducted included the various components of the proposed development areas as well as other habitat units in the general area.

The Karoo Dwarf Tortoise has a strong affinity with dolerite ridges and other types (e.g., sandstone) rocky outcrops within the southern Succulent and Nama Karoo biomes (and peripherally in the Albany Thicket biome). Here they utilise holes or cavities under rocks as shelter, and this is in many instances is one (1) of the most important components of essential habitat that determines the likelihood of presence or absence in a specific area. They feed on shrubs and geophytes.

Although some of the sections of rocky terrain within Site Area Alternative 2 (Plate A and B) contain fairly large rocks, these are not of the type that provide suitable shelter to Karoo Dwarf Tortoises. This habitat is rated to be mostly unsuitable or only semi-suitable at best. The terrain within Site Area Alternative 1 (Plate C and D) is generally devoid of rocky elements and is even less suitable as Karoo Dwarf Tortoise habitat compared to the habitat of Site Area Alternative 2. Habitat conditions about 1.5km to the north-east of Site Area Alternative 2 are rockier with small ridge formations (Plate E). Although this terrain is seemingly more suitable as Karoo Dwarf Tortoise habitat, it is still not rated as being good habitat for this species because the rocks do not provide good options for shelter. Of all the nodes that were investigated during the half-day site visit, the rocky ridges (Plate F) that are situated about 1km to the east of Site Area Alternative 2 are seemingly the closest to being suitable as Karoo Dwarf Tortoise habitat.



Plate A: Rocky terrain within Site Area Alternative 2 is generally unsuitable as shelter for Karoo Dwarf Tortoises.



Plate B: Rocky terrain within Site Area Alternative 2 is generally unsuitable as shelter for Karoo Dwarf Tortoises.



Plate C: The terrain of Site Area Alternative 1 is generally devoid of rocky elements.



Plate D: The terrain of Site Area Alternative 1 is generally devoid of rocky elements.



Plate E: Terrain with rocky ridges about 1.5km to the north-east of Site Area Alternative 2.



Plate F: Rocky terrain 1km to the east of Site Area Alternative 2.

Consulting other Experts:

The feedback obtained from two (2) tortoise experts that have conducted field work in the general region is that 1) they have not observed any Karoo Dwarf Tortoises from here, and 2) most of the habitat is suboptimal for this species. Likewise, the interviewed landowner of Trakaskuilen is familiar with Leopard Tortoises and Tent Tortoises, however, has never encountered tortoises that fit the description of Karoo Dwarf Tortoise.

Collectively, these findings point to the probable absence of the Karoo Dwarf Tortoise within the proposed development areas.

6.2.5 Avifauna

6.2.5.1 Natural Environment

The study area is located in Gamka Karoo, which is one (1) of most arid vegetation units of the Nama Karoo biome. The study area contains ephemeral drainage lines which are characterised by sandy channels with *Vachellia karroo* shrubs and small trees growing on the edges. The only longer-term surface water in the study area consists of a couple of earth dams and boreholes with water troughs. Drainage lines flow only briefly after good rains. There are large trees present in the study area. The Droërvier - Proteus 400kV high voltage line runs to the west of the study area, parallel to the N12 national road, which is located approximately 4km from the proposed substation site area alternatives.

6.2.5.2 Modified Environment

Whilst the distribution and abundance of the bird species in the broader area are mostly associated with natural vegetation, as this comprises virtually all the habitat, it is also necessary to examine the few external modifications to the environment that have relevance for birds. The following avifaunal-relevant anthropogenic habitat modifications were recorded within the broader area:

- **Water points:** The land use in the broader area is mostly small stock farming. The entire area is divided into grazing camps, with associated boreholes and drinking troughs. In this arid environment, open water is a big draw card for birds which use the open water troughs to bath and drink.

- **Dams:** The study area contains a few ground dams located in drainage lines. When these dams fill up after high rainfall, they contain standing surface water for several months, which attracts birds to bath and drink.
- **Transmission lines:** The Droërivier - Proteus 400kV high voltage line runs to the west of the study area, parallel to the N12 national road. A Martial Eagle nest is present on Tower 162. The nest is located approximately 12km from the closest site area alternative.

Appendix 2 of the Avifauna Impact Assessment Report (Appendix 5.4) provides a photographic record of the habitat at the study area.

6.2.5.3 Important Bird Areas (IBAs)

The Swartberg Mountains Important Bird Area (IBA) SA106 is the closest IBA and is located approximately 37km south of the study area (Marnewick *et al.*, 2015). **The development is not expected to have any impact on the avifauna in this IBA, due to the distance from the project site.**

6.2.5.4 National Protected Areas and National Protected Areas Expansion Strategy (NPEAS) focus areas

The closest protected areas to the study area are the Cape Floral Region Protected Areas. The avifauna in these protected areas is not expected to be impacted by the proposed development due to the distance from the project site (37+ km).

South Africa's protected area network currently falls far short of representing all ecosystems and maintaining ecological processes. In this context, the goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for improved ecosystem representation, ecological sustainability and resilience to climate change. It sets protected area targets, maps priority areas for protected area expansion, and makes recommendations on mechanisms to achieve this (National Protected Area Expansion Strategy, 2016). The study area is located close to the Lower Karoo focus area, but it does not overlap with it.

6.2.5.5 DFFE National Screening Tool

The study area and immediate environment is classified as Medium to High sensitivity for avifauna, according to the DFFE online screening tool. The development site contains confirmed habitat for species of conservation concern (SCC), as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020), namely listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable. The occurrence of SCC was confirmed during the surveys i.e., Ludwig's Bustard (Globally and Regionally Endangered) was recorded in the study area.

This classification is assessed to be accurate as far as the impact of the proposed infrastructure is concerned, based on actual conditions recorded on the ground during the site visit in October 2021, and the 12-months of pre-construction monitoring in 2015 – 2016 (see Appendix 3 of Avifauna Impact Assessment Report for the Site Sensitivity Verification report – Appendix 5.4).

6.2.5.6 Avifauna within Study Area

The Southern African Bird Atlas Project 2 (SABAP2) data indicates that a total of 152 bird species could potentially occur within the broader area. Appendix 4 Avifauna Impact Assessment Report (Appendix 5.4) provides a comprehensive list of all the species.

Of these, 36 species are classified as priority species (species which could potentially be impacted by electrocutions, based on specific morphological and/or behavioural characteristics) and ten (10) of these are South African Red List species. Of the priority species, 18 are likely to occur regularly at the study area and immediate surrounding area, and another 18 could occur sporadically.

Table 6-1 below lists all the priority species and the possible impact on the respective species by the proposed on-site substation and associated infrastructure.

Table 6-1: Priority species and the potential impact

Species name	Scientific name	SABAP 2 Full protocol reporting rate	SABAP2 Ad hoc protocol reporting rate	Red Data status global IUCN	Red Data status Regional SA	Recorded during surveys	Likelihood of occurrence	Electrocution Substation	Displacement-disturbance	Displacement-habitat transformation
Secretarybird	<i>Sagittarius serpentarius</i>	4.0	0.0	EN	VU	x	l		x	x
Kori Bustard	<i>Ardeotis kori</i>	0.0	0.8	NT	NT		l			x
Ludwig's Bustard	<i>Neotis ludwigii</i>	8.0	2.4	EN	EN	x	l			x
Common Buzzard	<i>Buteo buteo</i>	2.0	0.0	-	-		l	x		
Jackal Buzzard	<i>Buteo rufofuscus</i>	2.0	0.0	-	-	x	m	x		
Red-knobbed Coot	<i>Fulica cristata</i>	4.0	0.8	-	-		l			
Blue Crane	<i>Grus paradisea</i>	2.0	0.0	VU	NT	x	l		x	x
Cape Crow	<i>Corvus capensis</i>	40.0	25.2	-	-	x	m	x		
Pied Crow	<i>Corvus albus</i>	70.0	26.8	-	-	x	h	x		
African Black Duck	<i>Anas sparsa</i>	2.0	0.0	-	-		l			
Yellow-billed Duck	<i>Anas undulata</i>	2.0	0.0	-	-		l			
Booted Eagle	<i>Hieraetus pennatus</i>	4.0	0.0	-	-	x	l	x		
Martial Eagle	<i>Polemaetus bellicosus</i>	8.0	0.0	EN	EN	x	m	x		
Verreaux's Eagle	<i>Aquila verreauxii</i>	2.0	1.6	-	VU		h	x		
Spotted Eagle-Owl	<i>Bubo africanus</i>	10.0	2.4	-	-	x	m	x		
Lanner Falcon	<i>Falco biarmicus</i>	2.0	0.0	-	VU	x	m	x	x	
Egyptian Goose	<i>Alopochen aegyptiaca</i>	40.0	13.8	-	-	x	l	x		
Pale Chanting Goshawk	<i>Melierax canorus</i>	56.0	16.3	-	-	x	h	x	x	
Little Grebe	<i>Tachybaptus ruficollis</i>	6.0	2.4	-	-		l		x	
Helmeted Guineafowl	<i>Numida meleagris</i>	14.0	5.7	-	-		l	x		
Black Harrier	<i>Circus maurus</i>	2.0	0.0	EN	EN	x	l	x		
Black-headed Heron	<i>Ardea melanocephala</i>	6.0	0.0	-	-	x	h	x	x	
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	2.0	0.0	-	-	x	h	x		
Hadada Ibis	<i>Bostrychia hagedash</i>	12.0	1.6	-	-	x	h	x		
Greater Kestrel	<i>Falco rupicoloides</i>	14.0	10.6	-	-	x	h	x		

Species name	Scientific name	SABAP 2 Full protocol reporting rate	SABAP2 Ad hoc protocol reporting rate	Red Data status global IUCN	Red Data status Regional SA	Recorded during surveys	Likelihood of occurrence	Electrocution Substation	Displacement-disturbance	Displacement-habitat transformation
Rock Kestrel	<i>Falco rupicolus</i>	12.0	7.3	-	-	x	l	x		
Black-winged Kite	<i>Elanus caeruleus</i>	0.0	0.8	-	-	x	m	x		
Yellow-billed Kite	<i>Milvus aegyptius</i>	2.0	0.0	-	-		m	x		
Karoo Korhaan	<i>Eupodotis vigorsii</i>	72.0	21.1	-	NT	x	m			x
Southern Black Korhaan	<i>Afrotis afra</i>	0.0	0.8	VU	VU		h			x
White-necked Raven	<i>Corvus albicollis</i>	14.0	4.1	-	-	x	l	x	x	
South African Shelduck	<i>Tadorna cana</i>	34.0	9.8	-	-	x	m			
Cape Shoveler	<i>Spatula smithii</i>	2.0	0.0	-	-		l			
African Spoonbill	<i>Platalea alba</i>	6.0	0.0	-	-		h			
Cape Teal	<i>Anas capensis</i>	2.0	0.8	-	-		l			
Red-billed Teal	<i>Anas erythrorhyncha</i>	6.0	2.4	-	-		l			
NT = Near threatened VU = Vulnerable EN = Endangered h = High m = Medium l - Low										

6.2.5.7 Sensitivity Mapping

No specific 'No-Go' areas were identified, as mitigation can be applied for most species. The impact of displacement is **low** due to the relatively small size of the footprint, and the availability of similar suitable habitat in the broader area further reduces the impact.

6.2.6 Aquatic / Surface Water

The study area (Beaufort West and Trakas Wind Farm boundaries) contained a variety of aquatic features associated with the mainstem rivers indicated in Figure 6-10 below, and were characterised as follows:

- Non perennial rivers (alluvial channels) with or without riparian vegetation (Figure 6-11 & Figure 6-12). These ranged from narrow channels to broad flood plain areas in the lower valleys. However, broad riparian zones were only found within the lower valley areas, dominated by a small number of trees, while obligate instream vegetation is limited to a small number of sedges (nut grasses). None of these were located within the proposed development footprint area.
- Minor drainage lines (Figure 6-13), with no obligate aquatic vegetation and were mostly 2 – 8m in width
- Dams or weirs (Figure 6-13) with no wetland or aquatic features, although not many of these were located within the study area.

With regard the proposed infrastructure (substation and associated infrastructure sites), except for the vegetated riparian areas, all the features listed above were observed. These drain the development area in a south westerly region, forming part of a tributary of the Trakas River (J32A) Quinary Catchment of the Great Karoo Ecoregion in the Breede-Gouritz Catchment Management Agency (George Regional Office) (Figure 6-10). The Trakas River in turn drains into the Gouritz River, via the Oliphant River.

No wetlands were found within the proposed development area, only the riverine features such as alluvial watercourses and with limited riparian vegetation dominated by *Vachellia karroo*, *Searsia lancea*, *Euclea undulata*, *Gymnosporia buxifolia*, *Erianthus capensis*, *Sporobolus fimbriatus*, *Cynodon incompletes*, *Eragrostis curvula*, *Erharta calcynia*, *Merxmuellera disticha*, and *Cynodon dactylon* are found near any of the proposed infrastructure.

For purposes of this assessment, it has been assumed that the substation/BESS footprints will avoid any of the delineated systems.

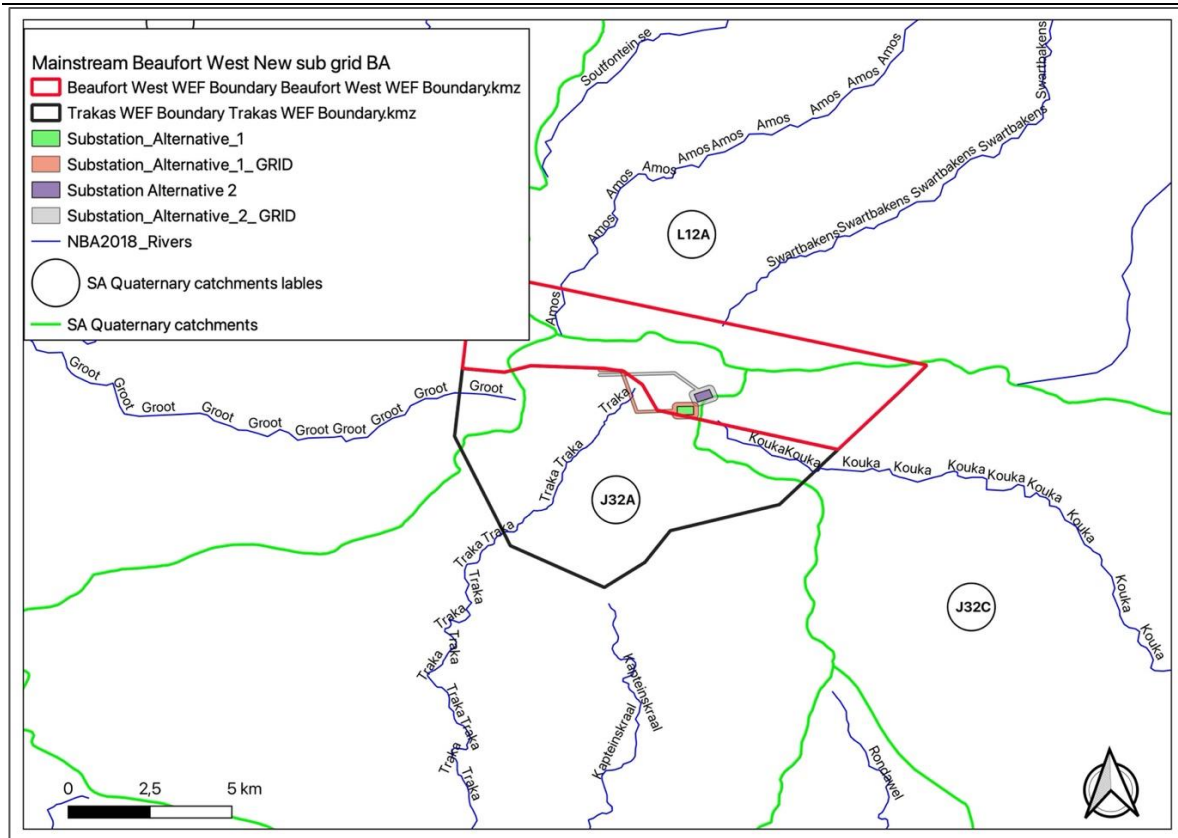


Figure 6-10: Project locality map indicating the various quaternary catchments and mainstem rivers (Source DWS and NGI) within the project boundary



Figure 6-11: A broad alluvial watercourse with defined riparian zone located well outside of the proposed footprint areas



Figure 6-12: Alluvial watercourse (red arrow) with undefined channel and or riparian zone



Figure 6-13: A view of a minor drainage (red arrow) that has developed from an alluvial system and then flows into a dam

Figure 6-14 indicates the available spatial data with regard potential wetlands and or riverine systems within the study area (van Deventer *et al.*, 2020). During the field work, the project site was then ground-truthed as well as compared to 1: 50 000 topocadastral surveys mapping data and that which was observed on site (Figure 6-15). A baseline map was then refined using the 2021 survey data, noting that due to the complex

nature of the topography and geology, the features were digitised at a scale of 1:10 000 to provide greater accuracy when near the proposed infrastructure (Figure 6-16).

Site Area Alternative 1 would have the greatest impact on the observed systems due to either physical disturbance or broad areas that are difficult to span (Figure 6-16).

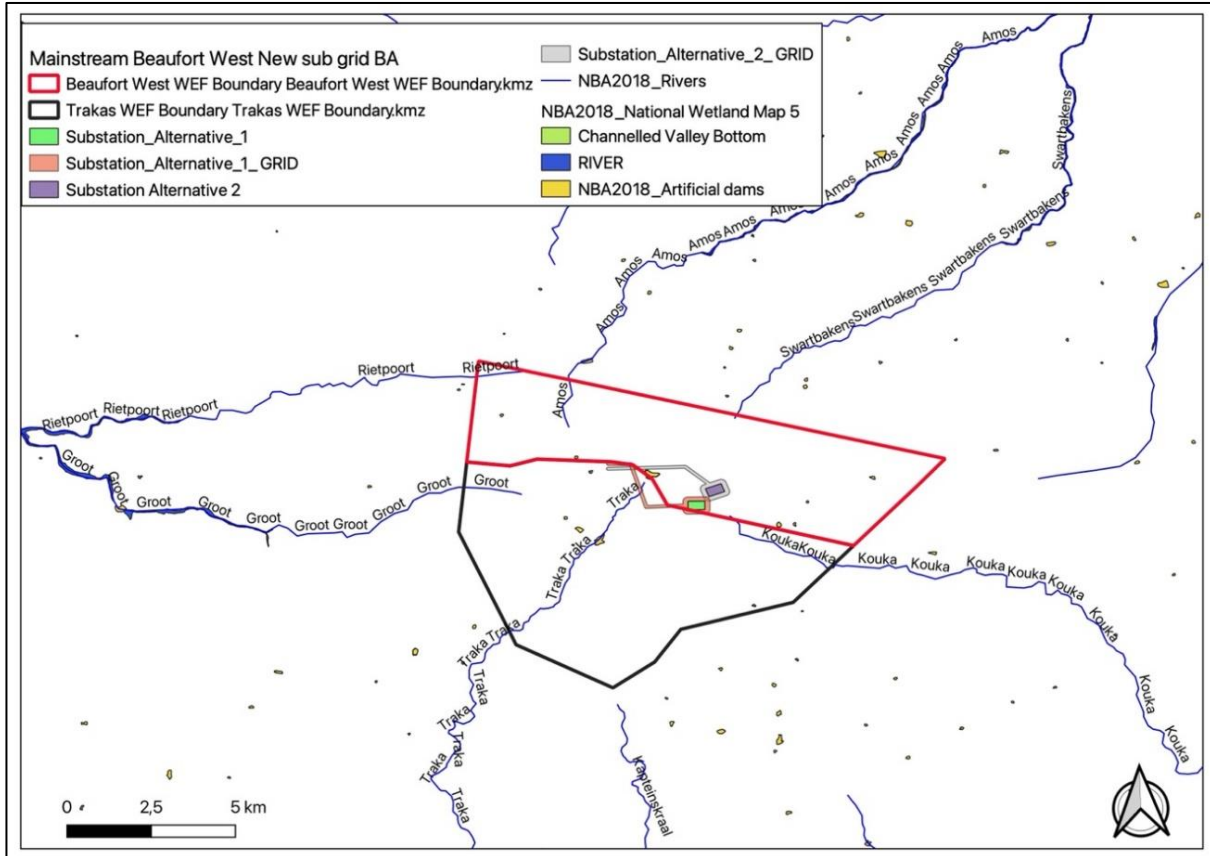


Figure 6-14: National Wetland Inventory wetlands and waterbodies (van Deventer et al., 2020)

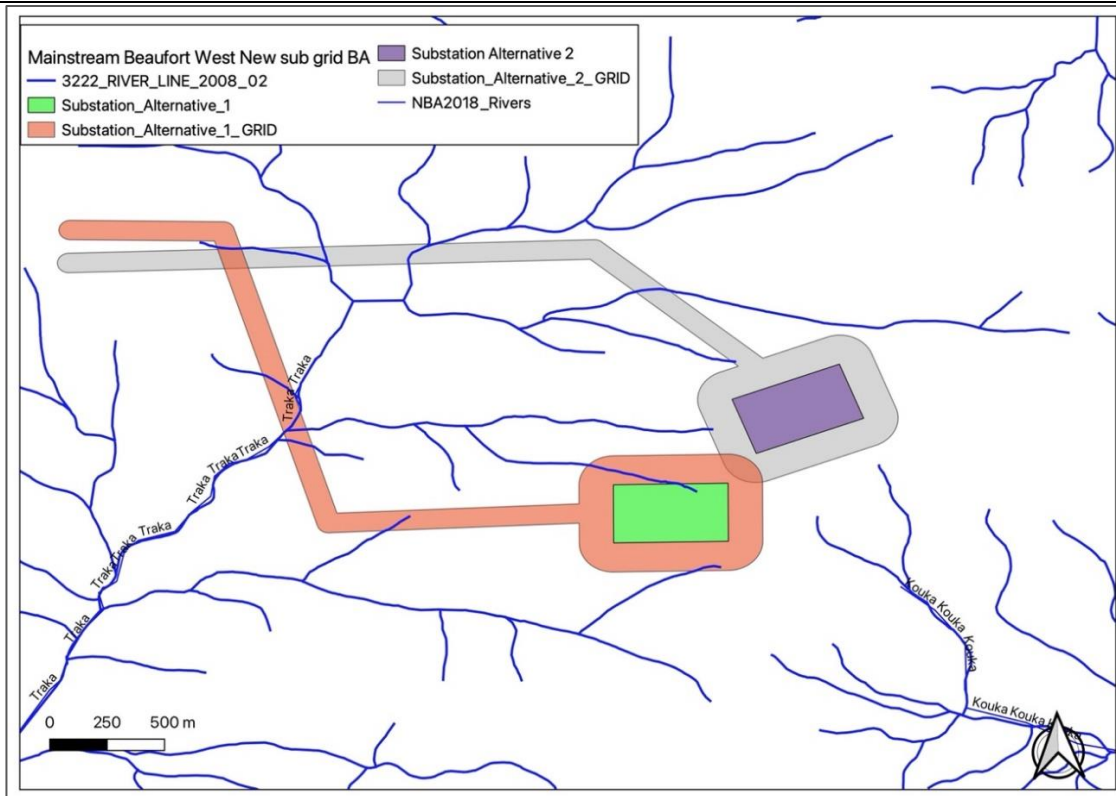


Figure 6-15: Watercourses indicated by the 1:50 000 topocadastral NGI data

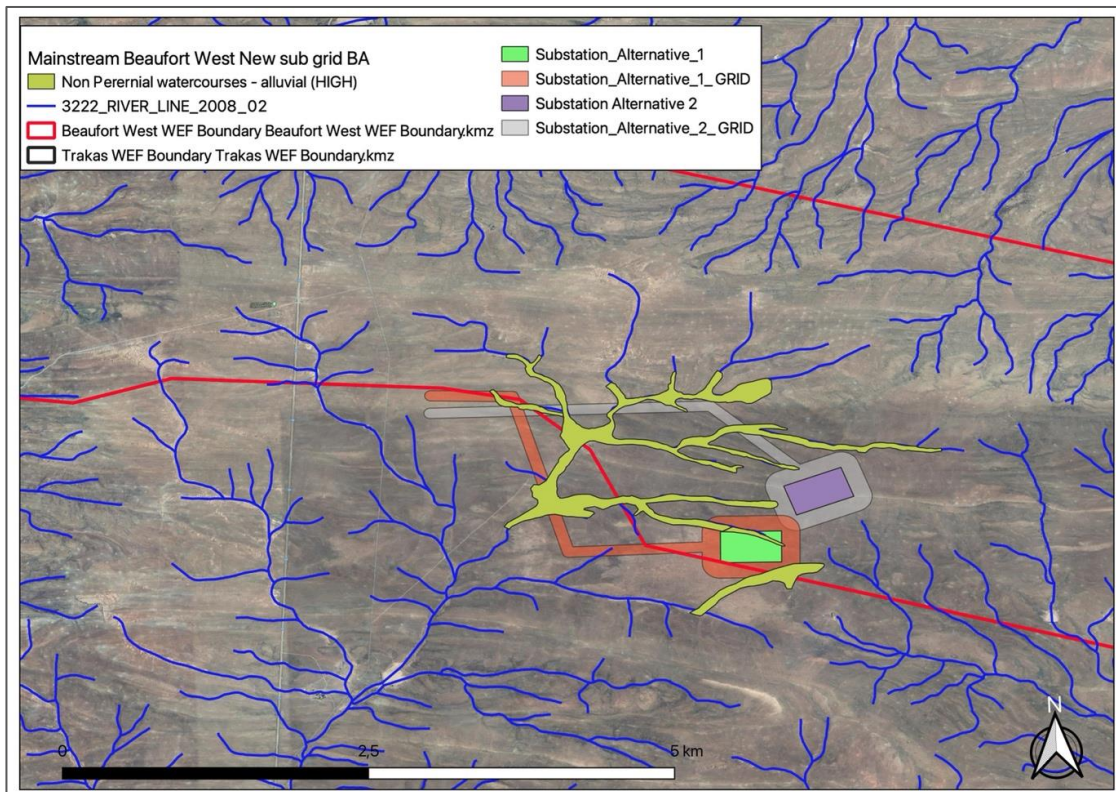


Figure 6-16: Confirmed and delineated waterbodies in relation to the proposed infrastructure.

The Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

All the systems assessed by DWS (2014) on a Sub-quaternary level within the study area were rated as Present Ecological State (PES) = B or Largely Natural within the greater study area (wind farm boundaries). While these were also rated as High in terms of Ecological Sensitivity and High in terms of Ecological Importance respectively. Based on the information collected during the field investigations, these ratings are verified and upheld for the riverine systems. The High Ecological Sensitivity rating for the natural water sources, is further substantiated by the fact that the affected catchments are included in both the National Freshwater Priority Atlas (Important Upstream Areas) and the provincial Biodiversity Spatial Plan Critical Biodiversity Area (CBA) spatial layers (Figure 6-17 and Figure 6-18). Noting that the aquatic systems associated with the study area have been rated as Critical Biodiversity Areas (Type 1) and Ecological Support Areas (Type 1), due to the importance of the Trakas River system and its tributaries.

Overall, these catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with existing road crossings; and
- Impeded water flow due to several in channel farm dams or weirs.

The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the study area. The DFFE ratings were based on the presence of Aquatic CBAs, Rivers, and Freshwater Ecosystem Priority Area quinary catchments (NFEPAs). The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 of Aquatic Impact Assessment Report for Verification Statement – Appendix 5.3), but also extended to include additional areas as delineated in Figure 6-16.

The study area is also not located within an IBA or a Strategic Water Resource Area and did not contain any wetland clusters or listed Threatened Ecosystems.

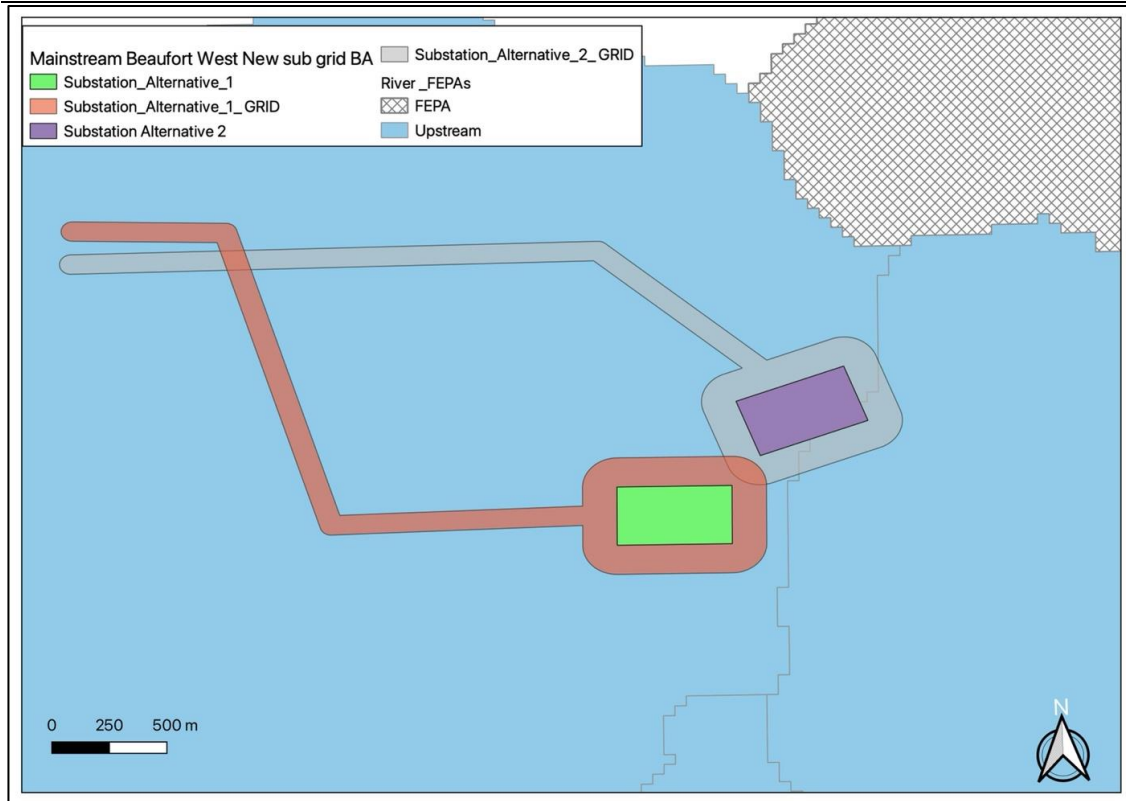


Figure 6-17: The Freshwater Ecosystem Priority Areas for the study site (Nel et al., 2011)

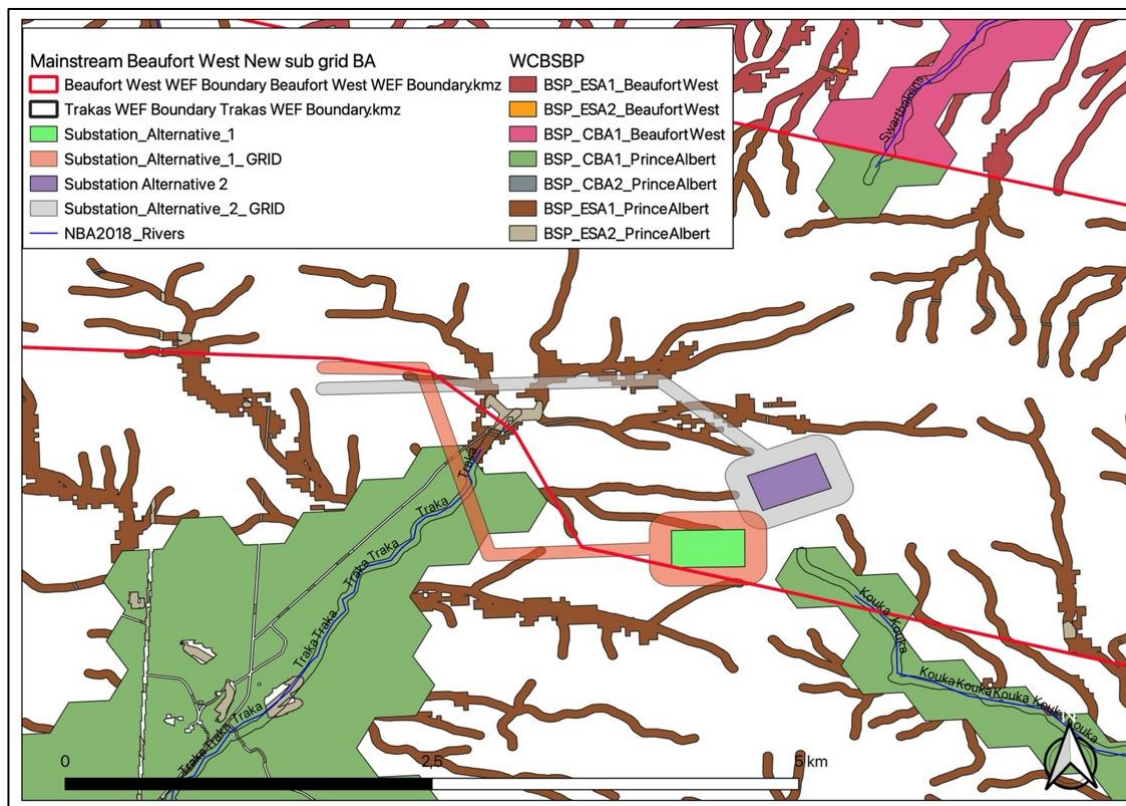


Figure 6-18: The Critical Biodiversity Areas (CBAs) as per the Western Cape Biodiversity Spatial Plan (2017)

6.2.6.1 Sensitivity Mapping

Using the baseline description and field data, while considering the current disturbances and site characteristics, the following features were identified, then categorized into one (1) of a number pre-determined sensitivity categories to provide, protect and/or guide the layout planning and design processes of the substation and associated infrastructure. Aquatic sensitivity mapping categorises features or areas (with their buffers) into the following categories:

'No-Go'	Legislated 'no-go' areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile
High	Areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity
Low	Areas of low sensitivity or constraints
Neutral	Unconstrained areas (left blank in mapping)

Currently there are no formalised riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane & Bredin (2017) for wetlands, rivers and estuaries was used. These buffer models are based on the condition of the waterbody, the state of the remainder of the site, coupled to the type of development, as well as the proposed alteration of hydrological flows.

Based then on the information known for the site, the buffer model provided the following (Figure 6-19):

- Construction period = 10m
- Operation period = 8m
- Final = 10m

Artificial dams were not buffered.

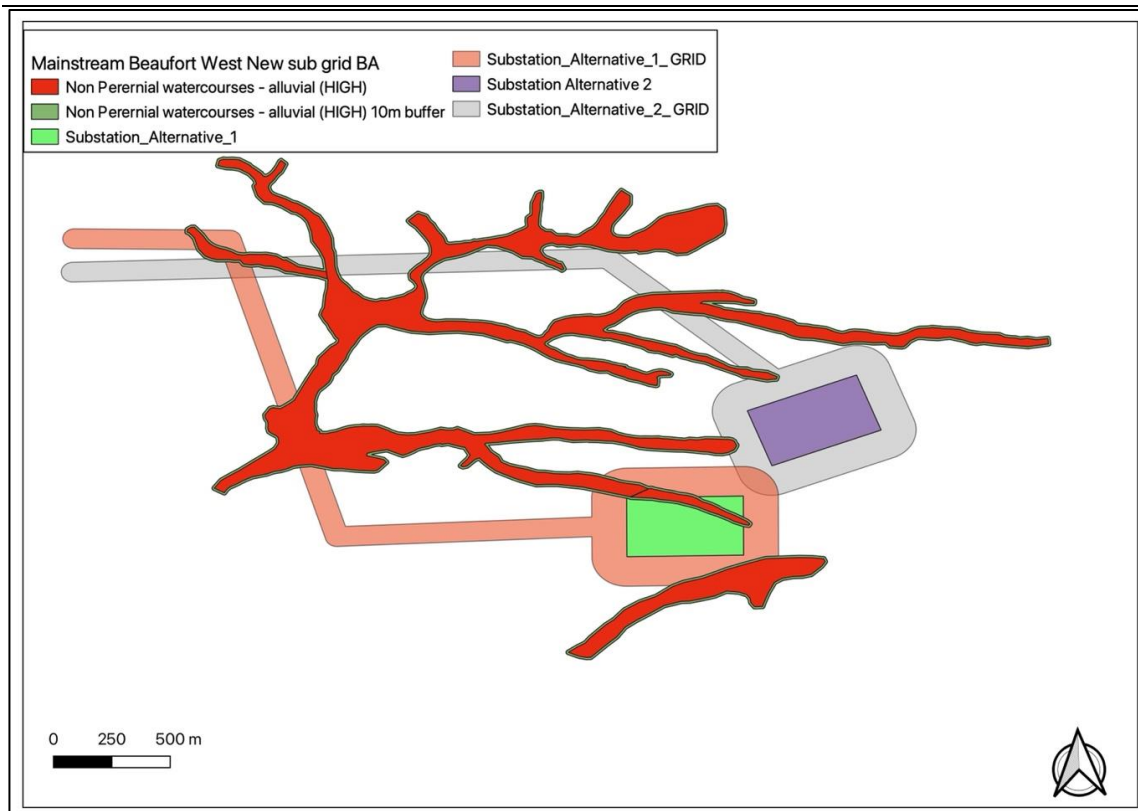


Figure 6-19: Results of the sensitivity analysis

6.3 SOCIO-ECONOMIC PROFILE

6.3.1 District and Local Municipality

The proposed project falls within the Central Karoo District Municipality (CKDM) in the Western Cape Province. The CKDM is a Category C municipality situated in the north-eastern part of the Western Cape Province. Central Karoo is a land-locked district and the largest district in the province, making up a third of its geographical area. According to the CKDM IDP (2021-2022), the CKDM is one (1) of five (5) Category C District municipalities in the Western Cape Province. The N1 (National road) and main railway cuts through the District in a northeast – southwest direction, connecting it to Cape Town (500km south west of the District) and Johannesburg (1000km north east of the district). The CKDM covers a total area of 38 852km², making it the largest district municipality in the province. It stretches approximately 400km from its furthest south east point to its furthest north west point, and includes the towns of Beaufort West, Laingsburg and Prince Albert (also the names of the 3 local municipalities within the district). The District Municipality is divided into three (3) local municipalities, namely the Beaufort West Municipality, Laingsburg Municipality and Prince Albert Municipality.

The proposed project is located within the Prince Albert Local Municipality. The Prince Albert Local Municipality is a Category B municipality located within the CKDM in the Western Cape Province. This municipal area lies between the other two (2) category B municipalities and borders on the Northern Cape province to the north, and the Eastern Cape province to the east. Prince Albert is the main town and home to the head office of the municipality. The area does have a major link road to the southerly located municipalities in the Eden district. The land size of the municipal area is about 8 200km². The Prince Albert Local Municipality borders Beaufort West Municipality, Laingsburg and the Eden District. The Prince Albert

Municipal area covers a total of 8 800 km² with vast parts of these being in the rural areas where vast hectares are under agricultural production, mainly fruit and sheep farming. District roads radiate out of Prince Albert connecting it to its satellite towns of Prince Albert Road on the N1, Klaarstroom on the R329 and Leeu–Gamka on the N1. In recent years Prince Albert, has seen the biggest economic growth in the region due to the demand in high-income property being bought especially by Europeans. It is known as a little town with Victorian and Karoo style architecture, art and décor shops, sidewalk coffee shops, the breathtakingly beautiful Swartberg Valley, Meiringspoort and the annual Olive Festival which attracts hundreds of tourists each year (CKDM IDP, 2021-2022).

6.3.2 Population and Household Sizes

According to the Community Survey 2016, the population of South Africa is approximately 55,7 million and has shown an increase of about 7.5% since 2011. In 2016 the country had approximately 16,9 million households, representing an increase of about 17.12% since 2011. The household density for the country is estimated on approximately 3.29 people per household, indicating an average household size of 3-4 people (leaning towards 3) for most households, which is down from the 2011 average household size of 3.58 people per household. Smaller household sizes are in general associated with higher levels of urbanisation. The TLM experienced a 0.1% growth in population since 2011.

According to the forecasts of the 2017 Socio-Economic Profile for the Central Karoo (WCG, 2017), the Central Karoo's population is estimated to be 75 688 in 2018, compared to 71 011 in 2011. This represents an annual average growth rate of approximately 0.91% per annum or 6.59% within this 7-year period, which is lower than the growth rate that the Central Karoo experienced between 2001 and 2011 which was an annual average growth rate of 1.46%. The population of the Central Karoo is expected to grow to 80 584 by 2025 and 84 335 by 2030, assuming the annual average growth rate of 0.91% persists. This trend of slowing growth rates is both a nationwide phenomenon and indicative of a stabilising population figure (Central Karoo SEP-LG, 2018).

The Prince Albert Local Municipality has a total population of approximately 13 136 residents and borders Beaufort West Municipality, Laingsburg and the Eden District. Prince Albert Municipal area covers a total of 8 800 km² with vast parts of these being in the rural areas where vast hectares are under agricultural production, mainly fruit and sheep farming. District roads radiate out of Prince Albert connecting it to its satellite towns of Prince Albert Road on the N1, Klaarstroom on the R329 and Leeu–Gamka on the N1. In recent years Prince Albert, has seen the biggest economic growth in the region due to the demand in high-income property being bought especially by Europeans. It is known as a little town with Victorian and Karoo style architecture, art and décor shops, sidewalk coffee shops, the breathtakingly beautiful Swartberg Valley, Meiringspoort and the annual Olive Festival which attracts hundreds of tourists each year (CKDM IDP, 2021-2022).

6.3.3 Economic Profile

The economy in the Central Karoo municipal area is characterised by the following:

- High levels of poverty and low levels of education,
- It is a small to medium-town sub-region with a low level of development despite the strategic location in terms of the national transport corridor,

- Sparsely populated towns with a number of larger towns serving as “agricultural service centres”; spread evenly throughout the district as central places,
- High rate of unemployment, poverty and social grant dependence,
- Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts),
- Geographic similarity in economic sectors, growth factors and settlement patterns,
- Economies of scale not easily achieved owing to the relatively small size of towns,
- A diverse road network with national, trunk, main and divisional roads of varying quality,
- Potential and impact of renewable energy resource generation, and
- Potential and impact of ‘fracking’, i.e., the possible exploration for shale gas and uranium mining.

Two (2) key structuring elements of the economy are the national road and the railway line that bisects the area in a northern and southern segment of equal proportion. These transport corridors are regarded as the conduit of activity to and from the municipal area.

6.3.4 Education

According to the CKDM IDP (2021-2022), the literacy rate in the Central Karoo was recorded at 60% in 2011. The learner to teach ratio in the Central Karoo in 2016 was extremely high, sitting at about 51 learners per teacher. Dropout rates are also very high in the Central Karoo, specifically in Laingsburg where the dropout rate was 72.3% in 2016 (this is the % of learners that enrol in grade 10 but do not complete grade 12). In addition, approximately a quarter of the adult population in the CKDM have not completed primary education. Most the adult population without any form of schooling in the CKDM resides in Beaufort West. Laingsburg contains the least number of individuals without any form of schooling, but given the municipality’s relatively small population, it has the largest proportion of individuals without any form of schooling compared to Prince Albert and Beaufort West. The largest proportion of people without schooling are found in Laingsburg having the highest proportion (14.1%) followed by Beaufort West (12.4%) and Prince Albert (12.0%). Beaufort West has the largest proportion of people with a Grade 12 qualification (17.8%) followed by Prince Albert (13.2%). High educational achievements indicate the availability of a skilled and qualified workforce which augurs well for economic growth.

The CKDM IDP (2021-2022) states that Laingsburg had the highest Matric pass rate in 2016 (90.3%) followed by Beaufort West (76.6%), while Prince Albert had the lowest pass rate in the District at 69.2%. In addition, learner enrolment in 2016 was highest in Beaufort West (10 943) followed by Prince Albert (2 143) and Laingsburg (1 247). Grade 12 dropout rates were highest in Laingsburg (72.3%), followed by Prince Albert (48.1%) and Beaufort West (38.0%). The Grade 12 dropout rates in 2016 were high across the District. Overall learner enrolment in the CKDM only increased at an average annual rate of 0.6% between 2014 and 2016. Lower than all districts in the Western Cape. This rate is mostly influenced by the low enrolment rate in Beaufort West.

6.3.5 Employment Status

The overall results regarding the employment status of the workforce / potentially economically active group in the municipal area have improved from the 2001 figure of 63.8% employed and 36.2% unemployed. In 2011, the number of unemployed individuals was about 13% below what it was in 2001. Owing to the still relatively high numbers of unemployed persons, other main sources of income such as pension / welfare payments are critical to ensure livelihoods of households.

Based on the results of the labour force by district and sex as per the Census 2011, the Central Karoo District had the lowest employed rate for both males and females and the highest discouraged work seekers and female unemployment rate in the Western Cape.

6.3.6 Access to Basic Services

According to the CKDM IDP (2021-2022), In 2011, approximately 97% of households in the District had access to a formal dwelling. By 2016, 97.8% of households had access to a formal dwelling. This indicates that housing delivery across the District takes place at a faster rate than the growth in the total number of households. With regards to potable water, in 2011 approximately 99.4% of households had access to piped water inside the dwelling or yard, or within 200 metres from the yard. By 2016, this figure had decreased to 95.1%. This indicates that the growth in the number of households is outpacing the delivery of water services. In 2011, 89.5% had access to a flush or chemical toilet connected to the municipal sewage system. By 2016, this figure had increased to 97.1%. In terms of electricity as a primary source of lighting, in 2011 89.4% of the District's households had access to this form of energy. And by 2016, this figure had increased to 95.4%. Lastly, in 2011 78.7% of households had their refuse collected by local authorities once a week, and by 2016 this number had increased to 90.8%.

6.4 VISUAL PROFILE

6.4.1 Visual Character and Sensitivity of the Study Area

Defining the visual character of an area is an important part of assessing visual impacts, as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with or conform to the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, the inherent cultural value of the area and the presence of visual receptors. Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area. (SiVEST, 2021:27).

Landscape and Land Use Characteristics²⁵

The study area is largely characterised by open plains interspersed with dry river courses and low ridges. Slopes are predominantly less than 2%, although there are some steeper slopes associated with low ridges. The consequence of this open, flat landscape is that generally wide-ranging vistas are experienced throughout the study area. The most prominent feature in the landscape is the Groot Swartberg range located approximately 45km south of the project site, as indicated in View 2 of Figure 7-2.

Adding to the openness of the landscape, and hence wide-ranging vistas, is the low and sparse Gamka Karoo vegetation type (Mucina and Rutherford, 2006) that covers the entire study area. Much of the vegetation has been retained across the study area, with only a few instances of low-growing tree species.

A significant portion of the study area is 'bare (none vegetated)', and while some of these 'bare' areas are representative of transformation due to human activity, in many cases these patches of land are

²⁵ Derived from SiVEST (2018).

undisturbed areas with very sparse vegetation cover. Agricultural activity in the area is severely restricted by the arid nature of the local climate and shallow soils. As such, the natural vegetation has been retained across much of the study area. Sheep farming is the dominant activity, although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence. Figure 7-1 in Section 7.1.4 indicates the location of farmsteads within the study area. Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills.

The N12 national route is a dominant man-made feature in the landscape, bisecting the study area in a north-south direction, linking Beaufort West with De Rust and Oudtshoorn in the south. Other roads in the study area are mostly localized gravel access roads.

Existing powerlines in this area are also significant man-made features in an otherwise undeveloped landscape. High voltage (400kV) powerlines bisect the study in a north-south alignment, while lower voltage lines (22kV) are aligned directly adjacent to the N12 National Route. In addition, the Trakaskuilen substation is situated close to the N12, in the Beaufort West Wind Farm ([12-12-20-1784-1-AM2](#)) application site. Although it is unclear whether this substation is operational, it is a substantial structure that has resulted in a degree of transformation in the landscape.

As stated above, the sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with rural elements. In addition, there are no towns or settlements in the visual assessment zone and thus, in general, there are very low levels of human transformation and visual degradation within the study area. There are however significant elements of human transformation, which are considered to have degraded the visual character to some degree. These elements include existing 400kV and 22kV powerlines, the Trakaskuilen substation and the N12 National route. The influence of the level of human transformation on the visual character of the area is described in more detail below.

Visual Character and Sense of Place²⁵

According to Lynch (1992), a sense of place is the extent to which a person can recognize or recall a place as being distinct from other places - as having a vivid, or unique, or at least particular, character of its own. The sense of place for the study area derives from a combination of the local landscape types described above, and their impact on the senses. The activities and land-uses in the study area are common within the sub-region and typical of an expanding (residential/industrial) urban area i.e., a mixture of uses and activities.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to have the typical Karoo or "platteland" landscape sense of place, which would characteristically be encountered across the high-lying dry western and central interior of South Africa. Over the last couple of decades, an increasing number of tourism routes have been established in the Karoo and within a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway. The typical Karoo landscape can be considered a valuable 'cultural landscape' in the South African context. Although the cultural landscape concept is relatively new,

it is becoming an increasingly important concept in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002).

The typical Karoo landscape, which consist of wide-open plains and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Beaufort West, engulfed by an otherwise rural environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context.

Considering this, it is important to assess whether the introduction of new substations and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape, keeping in mind that the proposed development will occur within authorised wind farms. In addition, although the proposed development will be visible from the N12 national route which traverses the study area, the section of the route within the study area is not considered to be of scenic value.

6.4.2 Visual Resource

Visual Resource Value, Scenic Quality, and Landscape Sensitivity

The value of the visual resource and its associated scenic quality (using the scenic quality rating criteria described in Appendix A which is contained in the Visual Impact Assessment Report – Appendix 5.8) is primarily derived from the combination of land-uses described above. The study area is relatively flat with subtle ridges and is characterised by low scrub and bush. Long views across a seemingly arid and uninhabited landscape give rise to a sense of remoteness typical of the Great Karoo. It was however determined that the landscape exhibits few qualities of use over time and as such it does not fulfil the criteria of a significant cultural landscape and visual resource. Prominent elements found in the landscape include the 400kV and 22kV powerlines, as well as the Trakaskuilen substation. As such, the developments will also conform with the typical elements and character of the area, thereby reducing the impact on the landscape as a visual resource.

When the criteria listed in Appendix A are considered and understood within the context of the sub-region, a visual resource value of *low* to *moderate* is assigned to the study area i.e., for the most part the study area generally exhibits a mixture of character, which is common within the sub-region. There are some positive characteristics, but there is evidence of alteration and degradation of these features (caused by existing power infrastructure) resulting in more negative areas. A summary of these values is provided in Table 6-2 below.

It was therefore concluded that, from a cultural perspective, the visual impact resulting from the proposed developments is rated as *moderate to low*.

Table 6-2: Value of the Visual Resource (After LiEMA, 2013)

High None in the study area	Moderate Majority of the study	Low Power infrastructure areas and roads
This landscape type is considered to have a <i>high</i> value because it is a: Distinct landscape that exhibits an extremely positive character with valued features that combine to give the experience of unity, richness and harmony. It is a landscape that may be of particular importance to conserve, and which has a strong sense of place.	This landscape type is considered to have a <i>moderate</i> value because it is a: Common landscape that exhibits some positive character, but which has evidence of alteration / degradation/ erosion of features resulting in areas of more mixed character.	This landscape type is considered to have a <i>low</i> value because it is a: Minimal landscape generally negative in character with few, if any, valued features.
<u>Sensitivity:</u> It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with.	<u>Sensitivity:</u> It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with.	<u>Sensitivity:</u> It is not sensitive to change in general and change.

Visual Sensitivity

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e., topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgments of these receptors towards a new development (Oberholzer, 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be associated with this aesthetic appeal.

According to Swartz (2018:43), the study area is rated as having a low to moderate visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. No formal protected areas, leisure-based tourism activities, or sensitive receptor locations were identified in the study area and relatively few potentially sensitive receptors were found to be present.

In this instance, the proposed revised grid connection infrastructure is intended to serve the authorised Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) Wind Farms and as such, the substation and associated infrastructure will be perceived as part of the greater wind farm developments and the visual impact will be relatively minor when compared to the visual impact associated with wind farms.

6.5 HERITAGE RESOURCES

The geology of the area is underlain by continental (fluvial/lacustrine) sediments of the Abrahamskraal Formation (Lower Beaufort Group). The landscape is situated on a generally flat and featureless plain called "Die Vlakte", characterized by low relief, gently rolling to hilly terrain between 1000 to 1100m above mean

sea level (amsl). The highest points lie along a low, rock ridge trending west-east towards the northern edge of the study area. The vegetation is predominantly karroid bossieveld, with trees confined to shallow, intermittent-flowing drainage lines and shallow, gravelly soils.



Figure 6-20: View to the south with the Swartberg Mountains in the background.

The edge of the Trakas WEF is intersected by the N12. Parallel to this road, on the west side, are two (2) rows of powerlines. From the N12 the landscape of the site is a typically expansive one (1), with soft undulations and the occasional ridge. The land rises to a distinct high ridge on the northern border of the farm, the high point known as Varsfontein. From the top of this ridge there is a drop down to a plain that extends towards the mountains of the Karoo National Park. To the south the line of the Swartberg Mountains is visible on the horizon (Figure 6-21).



Figure 6-21: View to the south with Willow Tree Dam in the foreground.

The Beaufort West and Trakas Wind Farms are centred on the farm Trakaskuilen No. 15. It is bounded to the north by Amospoortjie, to the northeast by Dwaalberg, to the northwest by Groot Antjiesfontein, to the southwest by Leeuwkaal and to the southeast by Platberg and Wolvekraal. The Trakasrivier runs through Trakaskuilen and there are two (2) seasonal dams, the One Fig Tree Dam and the Willow Tree Dam on Portion 1 of Trakaskuilen No.15.

6.5.1 Palaeontological Background

The project area is underlain by continental (fluvial / lacustrine) sediments of the Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) of Middle Permian age. The bedrocks can be assigned to the uppermost portion of the Abrahamskraal Formation (probably equivalent to the Karelskraal Member) which is characterised by fossil biotas of the Diictodon-Styracocephalus Subzone of the Tapinocephalus Assemblage Zone (Johnson & Keyser, 1979; Johnson *et al.*, 2006; Almond, 2018; Day & Rubidge, 2020). This subzone is associated with the end-Middle Permian Extinction Event of c. 260 million years ago, so vertebrate and other fossils from this stratigraphic horizon are typically very sparse but of considerable palaeontological interest.



Figure 6-22: Extract from 1: 250 000 geology sheet 3222 Beaufort West (Council for Geoscience, Pretoria) showing geology of combined Beaufort West Cluster wind farm project area situated either side of the N12 national road (yellow polygon) as well as the approximate location of the present study area for on-site substation and associated infrastructure²⁶.

6.5.2 Archaeological Background

The area is known to have been inhabited since the Early Stone Age (ESA) and throughout the Middle Stone Age (MSA). MSA surface scatters appear to predominate as a background scatter of material across the landscape but can occur in denser concentrations in certain localities. Cape Archaeological Survey cc (2016) recorded a few such MSA 'sites'. They are described as a dense scatter of artefacts comprising cores, flakes and blades of fine-grained chert, frequently occurring on elevated ridges.

PGS Heritage (2019) described two (2) sites characterised by low to medium density scatters of lithics consisting of cores and flaked debitage. They reported that the raw material varied from medium to fine-grained quartzite pebbles used in the production of ESA choppers and cleavers (this report indicates that the material is LSA rather than ESA) to fine grained chert associated with MSA cores and flaked debitage. The LSA is generally associated with the ancestors of the San hunter-gatherer groups who roamed this area periodically and depending on rainfall during the last 30 000 years. Within the last 2 000 years pastoralists (Khoekhoen) arrived in the area and although their remains have been recorded in the Sea Cow River Valley, none have been reported in this area. Rock art is rare in this area but are found more usually in this area in the form of rock engravings on the dark dolerite boulders that characterise parts of the Karoo. However, there no records of rock engravings in this general area.

²⁶ The main rock units mapped here include: Pa (pale yellow) = Abrahamskraal Formation (Adelaide Subgroup, Lower Beaufort Group). Pt (green) = Teekloof Formation, here represented by the basal sandstone-rich Poortjie Member. Dark Yellow = Cenozoic (Pleistocene to Recent). Note numerous W-E trending fold axes and faults indicated here.

In terms of colonial period archaeology, there are several farm complexes surrounding Trakas Kuilen with ruined structures and associated dump areas with a wide variety of historical material. However, they are all outside the development footprint and are located within the 5km buffer zone of the authorised Beaufort West and Trakas wind farms.

The exception is the ruined stockpost of Witpoortjie. The complex of ruined farm structures (which can be classified as archaeological) were recorded by Cape Archaeological Survey cc some 2km to the east of the site area alternatives. It comprises a stock farming complex and the ruins are described to be of “*historical interest rather than outstanding significance*”. This farm was consolidated into the Traskuilen estate in the 1950s and its current status is an outlying sheep shelter and windmill site. The werf consists of a dipping kraal, a modern sheep shelter, two (2) large stone kraals and a stone shepherd’s hut. All have fallen into a state of disrepair and for this reason grouped under archaeology. These ruins have been graded Grade IIIc.

Graves: The only graves recorded by Cape Archaeological Survey cc lie in the 5km buffer to the northwest of the authorised Beaufort West and Trakas wind farms.

6.5.3 Historical Background and Built Environment

In the seventeenth and eighteenth centuries, European settlers ousted the Khoekhoen and the San from much of the land which they inhabited in southern Africa. The Dutch East India Company legitimized settler occupation of the land by granting them exclusive use of lands they acquired in freehold or on loan (Guelke & Shell, 1992). Initial *trekboers* movement into the interior of the Karoo commenced soon after the establishment of the Dutch East India at the Cape (Figure 6-23).

However, early farmers, in search of water and grazing for their livestock, favoured areas such as the Tanqua Karoo and the Roggeveld where they could make use of differences in altitude to exploit year-round grazing. Between about 1740 and 1770 there was a rapid expansion of *trekboers* into this zone, resulting in an extended period of conflict with San hunter-gatherer groups and transhumant Khoekhoen. *Trekboer* commandos launched attacks which enslaved the indigenous population or drove them out of the area. As their access to water dwindled, the Khoekhoen found it increasingly difficult to support themselves and many were compelled to work for the *trekboers*. After they settled in the Roggeveld and Nuweveld, the *trekboers* turned southeast as they entered the land of summer rains.

The farms to the south of Beaufort West (in the vicinity of the study area) were settled relatively late, as they lacked permanent water (Guelke & Shell, 1992) (Figure 6-23).

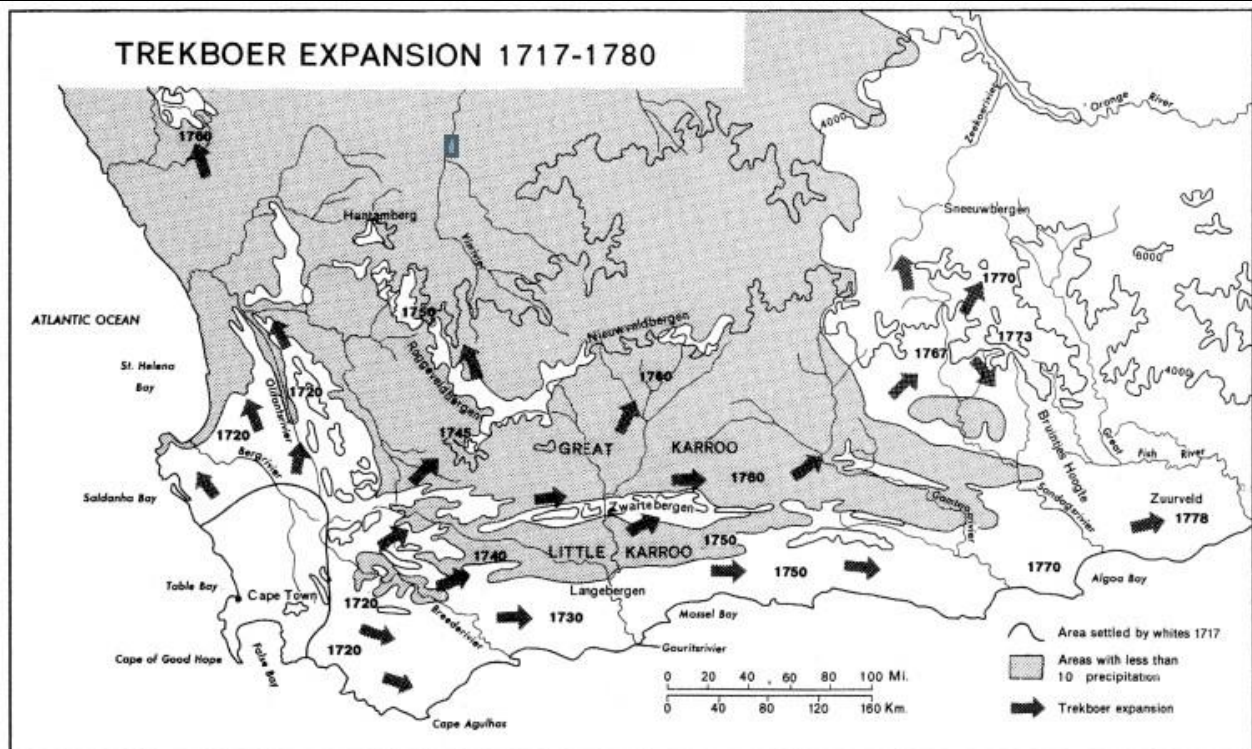


Figure 6-23: Guelke & Shell (1992:818). The westward expansion of the trekboers.

The town of Beaufort West was established in 1818 as a sub-Drostdy for Graaff-Reinet to control a generally lawless north-eastern frontier. Prince Albert, some 40km to the southwest of the study area, was founded on the farm Queekvalleij in 1762. When Generals Janssens and Lichtenstein visited the area in 1804, the population comprised only twenty (2) individuals, indicating the very sparse occupation of the area until the mid-19th century.

The HIA by Cape Archaeological Survey cc (2016) contains an attachment by Jean Grey which summarizes the records from the Deeds Office and Surveyor Generals Office. It details the history of the farms as well as those within the 5km buffer. The only farm werf which occurs within the boundaries of the Beaufort West and Trakas wind farms is Trakas Kuilen 15. It was first granted to Johannes Christian Horn in 1899, although it may have been registered as early as 1873. It was probably used for seasonal stock farming and there is evidence of a farm dam but no indication of any farm buildings from this earlier period. Cape Archaeological Survey cc describes the gable on the main house dating to 1957 and she has graded it as NCW. However, there are some adjacent ruins which suggest that the original farmhouse at Trakas Kuilen was abandoned, and the new werf rebuilt in its current location between 1950 and 1970.

A few farms were recorded within the 5km buffer of the authorised Beaufort West and Trakas wind farms and are discussed in the Grey report. Some of these farms have buildings and ruins that are older than 60 years (S34 of the NHRA). The illustrations for these may be obtained from the Cape Archaeological Survey cc (2016) report as these farm complexes lie outside the study area were not re-visited for the purposes of this study.

Amos Poortje, which is located immediately north of the proposed Beaufort West WEF, consists of a portion of the farm Brits Eigendom 374. The farm cemetery contains graves dating to 1881. The historic settlement

of Zeekoegat is located 5km to the southeast of Trakas Kuilen and has an 19th century hotel which became popular during the gold rush in the Prince Albert District in the 1890's (Kramer & Proust, 2021). The shop at the hotel was raided by the Boer commandant Gideon Scheepers during the Boer War, and the church, dating to 1906, is a Provincial Heritage site (Grade II).

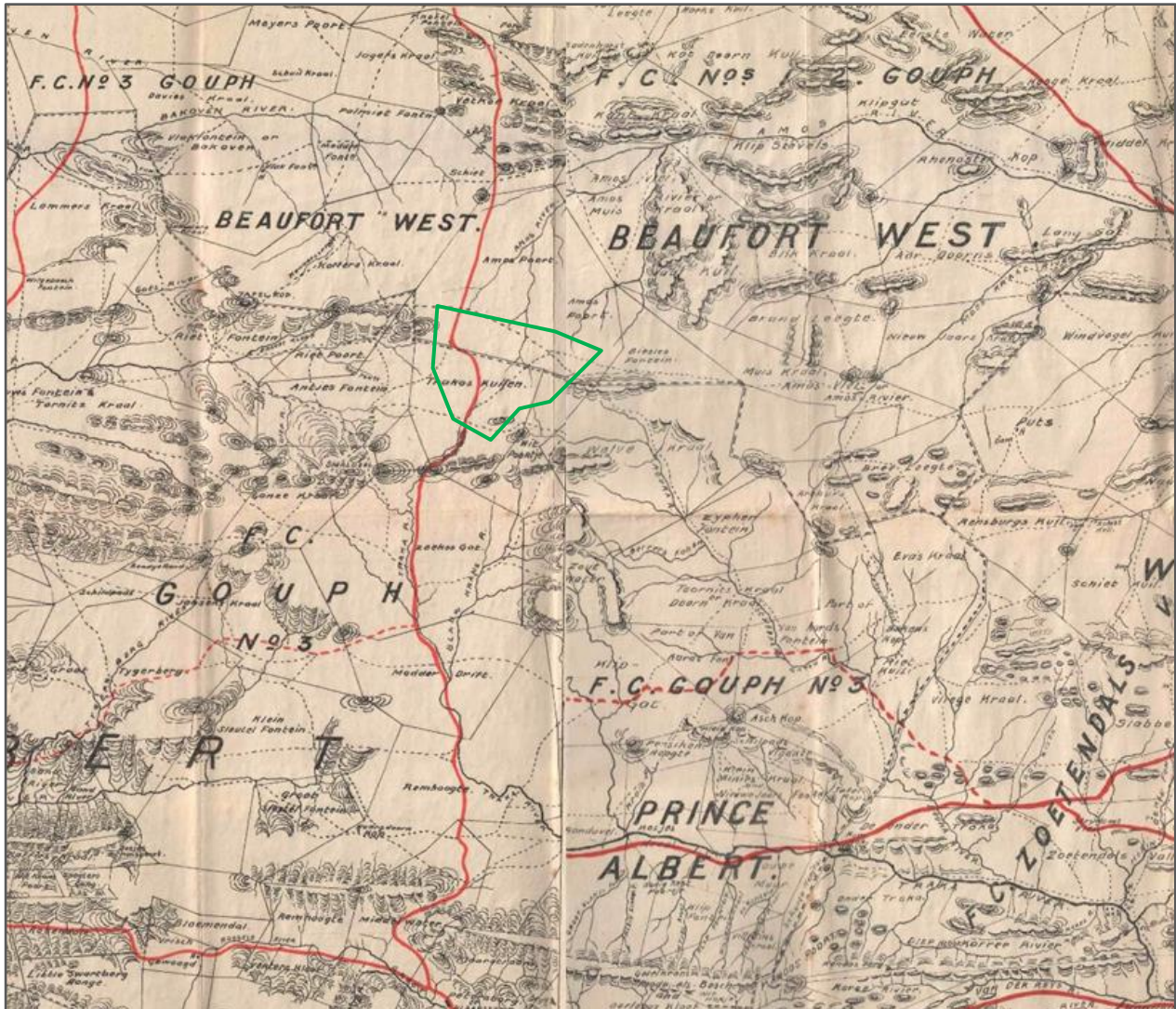


Figure 6-24: British Military Maps of Prince Albert and Willowmore dated to 1906 (UCT Special Maps Collection) showing the location of the project.

6.5.4 Cultural Landscape

The study area is located in the Great Karoo and forms part of the Karoo Cultural Landscape. Located between the Swartberg Range in the south and the Nuweveld Mountains in the north, it is characterised by wide open spaces and expansive vistas. The overriding quality is one (1) of remoteness – a wide expansive landscape with a predominance of horizon and sky with long views. The plains are covered in small shrubs with taller shrubs along the drainage lines. Winter and Oberholzer (2013) comment:

“The region as a whole cannot strictly be defined as a cultural landscape. Across many of its vast open spaces the impact of human interventions over time is not very evident”.

With respect palaeontology, the region is a fossil rich area of international significance including rich and well-preserved remains of terrestrial vertebrates from the Permian Period (255 million years ago) and a record tracing the evolution of reptiles to mammals (Winter and Oberholzer, 2013).

The pre-colonial or archaeological landscape includes the remains left behind by San hunter-gatherers and Khoekhoe herders. The former inhabited small shelters, where these are available or lived in temporary shelters in the open. Very little trace is left of their presence except for scatters of stone tools and occasionally fragments of ostrich eggshell. Khoekhoe herders may be identified by fragments of pottery. The precolonial landscape is essentially a natural or primeval landscape because there is so little human modification of the landscape.

The expansion of trekboers into the Karoo during the late 18th and early 19th centuries has also contributed to the layered history of the area, but their presence in the landscape is limited and comprises stone-built residential structures (sometimes only ruins) together with associated structures like stone walled kraals, old threshing floors and graves. They are often hidden in valleys and very little traces have been left on the landscape. The structures on farm werfs within the buffer of the authorised Beaufort West and Trakas wind farms show signs of layering and changes which make historic fabric difficult to identify. Only one (1) Grade IIIB farm werf complex (Amos Poortjie) was identified on the northern periphery of the authorised Beaufort West and Trakas WEFs which is of social/historical significance.

The more recent cultural landscape of the Beaufort West area may be described as a partially organically evolved landscape through farming. Settlement is highly dispersed and limited in extent. Many of the farm werfs include historic structures made of local stone and painted white. The farm complexes are characterised by clumps of trees. There are outbuildings and often stone kraals along the lower slopes of stone kopjes. The main form of agriculture is small stock farming and large areas are needed to support them. The farms are divided into large camps with barbed wire crossed by two-track farm roads. The presence of windmills gives the landscape a unique aesthetic quality. The presence of ruins (in particular stone kraals) is a strong character in the landscape, exhibiting the theme of isolation, desolation and abandonment.

The presence of historic roads, farm tracks and outspans also contribute to the layered history of the landscape. Figure 6-24, which dates to 1906, shows that the current N12 is closely aligned to the historic road which connected Oudtshoorn to Beaufort West and would have formed an important link in historic times. The current N12, which bisects the authorised Beaufort West Wind Farm, is described as a scenic route of secondary importance and along this particular section of the road, is not considered to have high scenic value (Winter and Oberholzer, 2013).

When these various elements are considered individually and in combination, then a grading for the landscape (pre-construction of the wind farms) of Grade IIIC is considered appropriate.

6.5.5 Sensitivity Mapping

Palaeontological Sensitivity

The provisional Very High palaeo-sensitivity for the substation and associated infrastructure project areas shown by the DFFE screening tool is contested. Based on desktop studies - including palaeontological data from several proposed WEF developments in the vicinity, such as the Kwagga 1-3 WEFs, Heuweltjies and

Kraaltjies WEFs, Koup 1 and 2 WEFs - as well as the previous and recent palaeontological surveys of the Beaufort West WEF and Trakas WEF project areas, the palaeontological sensitivity of the entire new substation and associated infrastructure project area is rated as LOW. However, the potential for isolated fossil sites of palaeontological interest cannot be entirely discounted.

Archaeological Sensitivity

With respect to Site Area Alternative 1, no significant archaeological resources were identified. The artefact scatters are all NCW and no further mitigation (in the form of monitoring or a buffer is required). The provisional Low heritage sensitivity for the substation project area shown by the DFFE screening tool is supported.

With respect to Site Area Alternative 2, the 'site' of 005/006 has been graded as IIIC as it is a denser accumulation of artefacts over a large area and appears to represent a deliberate aggregation of stone age materials dating to the Later Stone Age. It may represent a quarry site (where artefacts were made close to the source of the raw material) or a temporary camp site. While no monitoring or excavations are required, it is recommended that this site is avoided, by creating a buffer of 20m around it (Figure 6-25).

The scatter of archaeological sites along the tuffite band are graded as NCW. The construction of Site Area Alternative 2 on this location will result in the destruction of the archaeological resources. They are of low significance and no mitigation is required and no buffer is required (Figure 6-25).



Figure 6-25: The only 'site' 005/006 of archaeological sensitivity is shown in the green circle. The map also shows the location of the stone artifacts scatters along the tuffite ridge in Site Area Alternative 2²⁷.

²⁷ These scatters are however considered to be "Not Conservation Worthy"

Graves

No graves were recorded during the survey. In their report, Cape Archeological Survey cc (2016) recorded four (4) graves / family graveyards, but these are all a considerable distance outside of the proposed development footprints. In the case of Graves 3 and 4, they are located near farm dwellings some 15km to the north.

Cultural Landscape and Built Environment

The main house of Trakas Kuilen dates to 1957 and it is of Low heritage sensitivity. There will be no direct impacts and no mitigation (in the form of a buffer) is necessary for either the homestead or the N12 highway. There are no heritage features of high significance which require a specific heritage mitigation measure such as a buffer. Heritage resources are not concentrated at any specific locations on Trakas Kuilen 15 and therefore there are no highly sensitive heritage locations. The grading of IIC is based on the overall assessment of the palaeontological, archaeological, built environment resources and landscape features.

6.5.6 Palaeontology

Geological Context

The Beaufort West Cluster wind farm project area, spanning the N12 some 60km south of Beaufort West, is characterised by low relief, gently rolling to hilly terrain between 1000 to 1100 m amsl. towards the southern margins of the Great Karoo region *sensu stricto* (cf Almond 2018).

Much of the landscape is clothed in karroid *bossieveld* vegetation, with trees mainly confined to shallow, intermittent-flowing, dendritic drainage lines, and thin, gravelly soils. The present project area is traversed by shallow tributary streams of the Trakarivier, itself a tributary of the Grootrivier.

Geomorphological maps show that this topographically-subdued but slightly elevated region of the Great Karoo represents a relict patch of an ancient land surface of possible Cretaceous to Miocene age. This African Land Surface of Partridge and Maud (1987) is typified by limited bedrock exposure and a pervasive mantle of Late Cenozoic superficial deposits. The Palaeozoic bedrocks in this region lie within the northern margins of the Cape Fold Belt and are tightly-folded along E-W axes, as clearly visible on satellite images, although this is not readily apparent on the ground.

The geology of the southern Karoo region to the south of Beaufort West is outlined on the 1: 250 000 scale geology sheet 3222 Beaufort West with a short sheet explanation by Johnson and Keyser (1979). The Beaufort West Cluster wind farm project area has been described and illustrated in some detail, with extensive references, by Almond (2018). The more restricted project areas for the proposed on-site substation and associated infrastructure, including the short 132kV transmission line corridor, are underlain by continental (fluvial / lacustrine) sediments of the Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) of Middle Permian age (Johnson & Keyser 1979, Johnson *et al.* 2006, Day & Rubidge 2014, Cole *et al.* 2016). The bedrocks can be assigned to the uppermost portion of the Abrahamskraal Formation - probably equivalent, at least for the most part, to the mudrock-dominated Karelskraal Member – but the underlying Moordenaars Member sandstone package might also be represented here; further detailed field mapping would be required to confirm the local stratigraphy. A series of W-E trending anticlines and synclines fold the Karoo Supergroup bedrocks in this region which lies within the northern margins of the Cape Fold Belt, as clearly shown on satellite images and the geological map (Figs. 2 & 3). No

Karoo dolerite intrusions are mapped within the region. The Beaufort Group bedrocks within the study area are extensively overlain by unconsolidated Late Caenozoic superficial deposits such as eluvial gravels, stream alluvium as well as various sandy to gravelly soils.

Bedrock exposure levels within the entire project area and its vicinity are generally very poor indeed, and mainly limited to (1) narrow, east-west trending packages of channel sandstones building low, rocky ridges and (2) occasional small patches of grey-green overbank mudrocks containing occasional horizons of ferruginous carbonate concretions marking palaeosol (ancient soil) horizons. These last are the primary focus for palaeontological recording. The bedrocks are gently folded with low dips. Where well-exposed they may display moderately high levels of tectonic cleavage and jointing, compromising fossil preservation, while local concentrations of vein quartz eluvial gravels suggest zones of fracturing in the subsurface. Over the great majority of the low-relief project area the bedrocks are mantled by thin to thick (>1m) unconsolidated Late Caenozoic sandy to gravelly eluvium (downwasted surface gravels of wacke, tuffite, vein quartz, pedocrete nodules), sheetwash sediments and alluvium associated with small water courses feeding into the Trakarivier and associated dams. A prominent WNW-ESE band of tuffite - *i.e.*, fine-grained greenish, orange-weathering cherty rock composed of a mixture of volcanic ash and terrigenous sediment - which is locally associated with a central band of coffee-brown ferruginous carbonate, traverses the project area from the Willow-tree Dam into the Site Area Alternative 2 site. It runs along the crest of a low ridge and sheds abundant angular colluvial debris on either side. Such tuffite bands can be radiometrically dated with great accuracy and have potential for calibrating the Middle Permian Extinction Event. They also provide an important raw material for stone artefacts (*cf* Kinahan, 2008).

Palaeontological Heritage

The palaeontology of the folded southern margins of the Main Karoo Basin in the Beaufort West Cluster project area has been outlined, with extensive references, in previous PIA reports by Almond (2010, 2015, 2018) as well as more recent PIA reports by the same author for several other WEF projects in the region (Almond 2021a-e).

Fossil biotas represented within the present project area are referred to the late Middle Permian (Capitanian) *Tapinocephalus* Assemblage Zone (AZ) (Rubidge 1995, Smith *et al.*, 2012, Day & Rubidge, 2020). More specifically, the upper part of the Abrahamskraal succession, including the Moordenaars and Karelskraal Members, is characterised by fossil biotas of the recently defined *Diictodon – Styraococephalus* Subzone which extends into the lower part of the Poortjie Member and has an estimated age of 262-260 Ma, *i.e.*, late Capitanian (Day & Rubidge, 2020). Marked impoverishment of fossil assemblages, notably with very few dinocephalians, within the upper part of the subzone (largely above the Moordenaars Member) are associated with the catastrophic, global end-Capitanian ecological crisis and Mass Extinction Event (*cf* Day *et al.*, 2015).

No historical fossil sites are indicated in the present project area on the published 1: 250 000 geological map (Figure 6-22). Middle Permian fossil remains previously recorded in the adjoining Beaufort West WEF and Trakas WEF project areas include sparse vertebrate remains (mainly large- and small-bodied therapsids), tetrapod and lungfish burrows, petrified wood and low diversity invertebrate trace fossils.

None of the fossil sites recorded during the original palaeontological survey of the Trakas and Beaufort West WEFs and associated grid connection by Almond (2018) lie close to or within the new grid connection project

area (The closest site is c. 1.5km NE of the Site Area Alternative 1 project area; see fossil sites mapped on the satellite image in Figure 6-26 below).

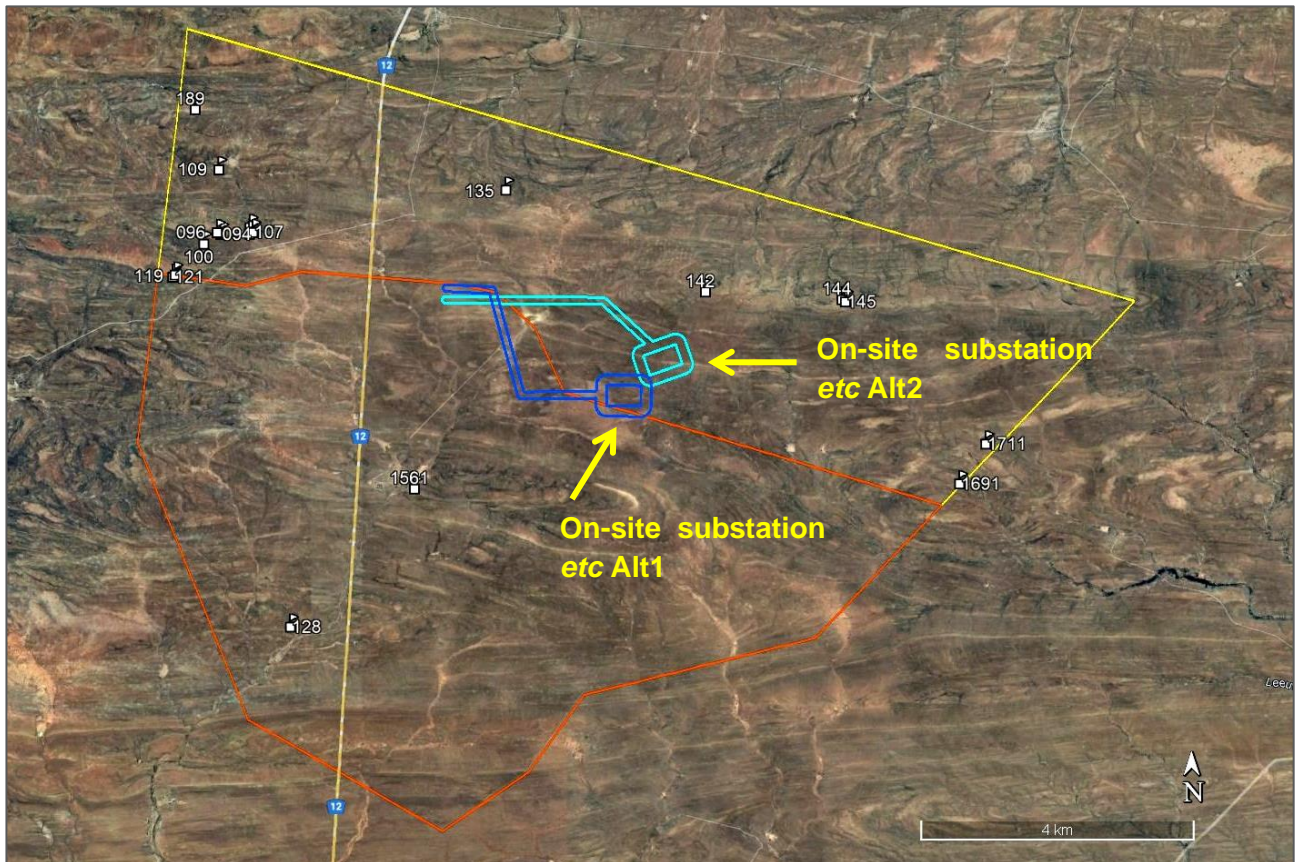


Figure 6-26: Google Earth© satellite image of Beaufort West Cluster electrical and associated infrastructure project area on Portion 1 and Remainder of Farm Trakaskuilen No. 15²⁸. No additional fossil sites were recorded during recent one (1)-day palaeontological site visit focusing on alternative project areas.

The numbered white squares in the figure above (Figure 6-26) mark fossil sites recorded during the original palaeontological heritage survey of the combined Beaufort West Cluster project area by John Almond (2018), which tabulates details of the fossil finds concerned. **No new fossil remains were recorded from the Beaufort Group bedrocks or the overlying superficial sediments during the recent one (1)-day site visit (23 October 2021).**

Given (1) the well-known scarcity of scientifically valuable fossils within the uppermost part of the Abrahamskraal Formation which is related to the catastrophic end-Middle Permian Extinction Event, (2) the very poor bedrock exposure levels within the project area and (3) the unlikely occurrence of fossil remains within the unconsolidated Late Caenozoic superficial deposits, the overall palaeosensitivity of the project area is assessed as LOW. However, the possibility of rare fossil sites of scientific or conservation importance here, at surface or in the subsurface, cannot be completely discounted.

²⁸ Figure also shows adjoining project areas for authorised Beaufort West Wind Farm (yellow polygon) and Trakas Wind Farm (orange polygon). **No additional fossil sites were recorded during recent one (1)-day palaeontological site visit focusing on alternative project areas.**

Site Sensitivity Verification

Site sensitivity maps for palaeontological heritage using the DFFE National Web-Based Environmental Screening Tool suggest that the Beaufort Cluster on-site substation and associated infrastructure project areas are all of VERY HIGH Palaeosensitivity, largely due to the potentially fossiliferous bedrocks of the Lower Beaufort Group represented here.

Based on several previous desktop and field-based PIA studies in the Beaufort West Cluster project area (Almond 2010, 2015, 2018), as well as the recent one (1)-day site visit when no fossils were recorded within the project area, it is concluded that this area is generally of LOW palaeosensitivity. **The DFFE-based palaeosensitivity mapping is accordingly *contested* here.**

However, the potential for rare, largely unpredictable fossil sites of high scientific and/or conservation value at surface or in the subsurface cannot be entirely discounted. These potential unrecorded fossil sites are best handled through a Chance Fossil Finds Protocol.

7. IMPACT ASSESSMENT AND DESCRIPTION

7.1 IMPACT RATING

The impacts of the proposed development (during the Pre-Construction, Construction, Operation and Decommissioning phases) are assessed and rated according to the methodology described in Section 3.5.6, which was developed by SLR to align with the requirements of the EIA Regulations, 2014 (as amended). Specialists were required to make use of the impact rating matrix provided for this purpose.

The impacts identified by each respective specialist are detailed in the sections below, with a significance of the impact also being rated according to SLR's impact rating methodology.

7.1.1 Terrestrial Ecology Impacts

The development of the substation is likely to result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure. The likely impacts on the terrestrial ecology of the site resulting from the development of the substation are identified and assessed below with reference to the characteristics and features of the site.

Vegetation:

Vegetation clearing for access roads, substation areas and other infrastructure will impact on vegetation and protected plant species. As the site is arid, it is not likely that vegetation cover and diversity can be fully restored at decommissioning. In addition, as the site is considered low sensitivity with few species of concern present, there would not be a significant loss of irreplaceable resources. This impact can only be partly mitigated as the majority of impact results from the loss of intact vegetation to hard infrastructure.

Mammals:

In general, impacts on mammals would occur due to disturbance and habitat loss. During the construction phase there would be some disturbance at the site due to construction-related activities and increased vehicle movement to and from the project site. During operation, disturbance related to the current development components would be low and significant long-term impacts on mammals would be unlikely. However, the site would also be developed as a wind farm and the disturbance and habitat loss related to those components would dominate as compared to the minor contribution from the substation.

Reptiles:

In general, the major impacts on reptiles associated with the development would be disturbance and habitat loss during construction and increased vehicle movement to and from the project site. However, there do not appear to be any species that would be especially affected. The most important areas for reptiles are likely to be the occasional rocky outcrops and the larger drainage lines of the site. The footprint within these areas would be very low and as such there do not appear to be any significant limitations or red-flag issues associated with reptiles and the development of the substation.

Amphibians:

The impact of the development on these breeding sites would be very low and a direct impact on these habitats is unlikely. Given the localised nature of important amphibian habitats at the site as well as the generally arid nature of the site and the low overall abundance of amphibians, a significant long-term impact on amphibians is unlikely.

Critical Biodiversity Areas & Broad-Scale Processes:

The presence of the project infrastructure through the CBA would result in very little habitat loss and as such would not be likely to compromise any of the underlying features of the CBA (habitat for Cape Mountain Zebra, presence of a FEPA River Corridor, Gamka Karoo vegetation type, Shale Gas Very High Sensitivity Dry Rivers and Shale Gas Very High Sensitivity Terrestrial areas and Watercourse Protection – Great Karoo) to a significant degree. The impact of the substation on CBAs and ESAs is concluded to be minor and is therefore considered acceptable.

7.1.1.1 Impact Assessment

Impacts associated with the development of the substation and associated infrastructure are assessed below for the pre-construction, construction, operation and decommissioning phases of the development. Associated mitigation and avoidance measures to reduce impacts are described thereafter.

Pre-construction & Construction Phase Impacts:**Table 7-1: Impacts on vegetation and protected plant species**

Issue: Impacts on vegetation and protected plant species.		
Description of Impact		
Vegetation clearing for access roads, substation areas and other infrastructure will impact on vegetation and protected plant species.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite	Definite
Significance	Medium -	Medium -
Degree to which impact can be reversed	The impact is reversible to some degree by removal of the hardened infrastructure and rehabilitation as per the mitigation measures recommended below. As the site is arid, it is not likely that vegetation cover and diversity can be fully restored at decommissioning.	
Degree to which impact may cause irreplaceable loss of resources	As the site is considered low sensitivity with few species of concern present, there would not be a significant loss of irreplaceable resources.	
Degree to which impact can be mitigated	As the majority of impact results from the loss of intact vegetation to hard infrastructure, this impact can only be partly mitigated.	
Mitigation Actions		
The following measures are recommended:	1) Pre-construction walk-through of the approved development footprint to ensure that sensitive habitats and species are avoided where possible.	

	<p>2) Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development.</p> <p>3) Pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.</p> <p>4) Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.</p>	
Monitoring Actions		
The following monitoring is recommended:	Monitoring of vegetation clearing during construction by the EO to ensure that any plant SCC within the development footprint area are translocated to safety where necessary.	
Cumulative Impacts		
Nature of Cumulative Impacts	The development will result in habitat loss of approximately 10ha in extent. This will add to the other sources of habitat loss on the site, which would result mainly from the development of the two wind farms which would be approximately 100ha. There are also several other planned wind and solar energy facilities in the area that potentially have a total extent of up 500ha. The current level of transformation in the area is however currently very low and the contribution of the current development at 10ha is considered minimal.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Table 7-2: Impacts on fauna due to construction activities

Issue: Impacts on fauna due to construction activities		
Description of Impact		
Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite	Probable
Significance	Medium -	Medium -

Degree to which impact can be reversed	Noise and disturbance would be transient and would be significantly reduced at operation. However, impacts related to habitat loss would be longer lived and some residual impact would persist even after decommissioning.
Degree to which impact may cause irreplaceable loss of resources	As the site is considered low sensitivity with few fauna species or habitats of concern present, there would not be a significant loss of irreplaceable resources.
Degree to which impact can be mitigated	Although the noise and disturbance generated during the construction phase is largely unavoidable, impacts such as those resulting from the presence of construction personnel within the development area can be easily mitigated.
Mitigation Actions	
The following measures are recommended:	<ol style="list-style-type: none"> 1) During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 2) The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site. 3) No fuelwood collection should be allowed on-site. 4) If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects, and which should be directed downwards. 5) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 6) No excavated holes or trenches should be left open for an extended period as fauna are likely to fall in and become trapped. Any trenches present should have occasional soil ramps present to allow fauna to escape while open holes should be inspected at least every second day to check for trapped fauna.
Monitoring Actions	
The following monitoring is recommended:	<ul style="list-style-type: none"> • Monitoring of vegetation clearing by the ECO to ensure that any fauna such as tortoises are removed from the affected areas before clearing commences. • All holes and trenches should be monitored on a daily basis to ensure that any fauna that have fallen in and become trapped are removed to safety.
Cumulative Impacts	
Nature of Cumulative Impacts	The development will result in some disturbance of fauna during the construction phase which would occur in addition to the disturbance created during construction of the wind farm components of the developments. However, as the area is largely undeveloped, larger fauna would be able to move away from disturbance during construction and return thereafter. However, the development would contribute approximately 10ha to long-term habitat loss in the area. However, given the largely intact nature of the area, this is considered a low contribution that would be acceptable.

Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Operational Phase Impacts:**Table 7-3: Impacts on fauna due to operational activities**

Issue: Impacts on fauna due to operational activities		
Description of Impact		
The operation and presence of the substation may lead to disturbance or persecution of fauna within or adjacent to the facility.		
Type of Impact	Direct & Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Very Low -	Very Low -
Degree to which impact can be reversed	The impact is reversible to some degree by removal of the hardened infrastructure and rehabilitation as per the mitigation measures recommended below. As the site is arid, it is not likely that vegetation cover and diversity can be fully restored at decommissioning, so there would be some residual impact.	
Degree to which impact may cause irreplaceable loss of resources	As the site is considered low sensitivity with few species of concern present, there would not be a significant loss of irreplaceable resources.	
Degree to which impact can be mitigated	To a large extent, but some low-level residual impact due to noise and human disturbance during maintenance is likely.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. 2) If the substation or other parts of the site must be lit at night for security purposes, this should be done with downward-directed low-Ultraviolet (UV) type lights (such as most LEDs), which do not attract insects. 3) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 4) All vehicles accessing the site should adhere to a low-speed limit (30km/h max for heavy vehicles and 40km/h max for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. 5) If the substation area is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted, but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the 	

	electrified strands should be placed on the inside of the fence and not the outside.	
Monitoring Actions		
The following monitoring is recommended:	Records should be kept of any fauna killed by electric fencing or traffic on the site and should such deaths start to occur on a regular basis, the operational phase EMPr should be adjusted so as to address the cause and location of these impacts.	
Cumulative Impacts		
Nature of Cumulative Impacts	The development would contribute to cumulative disturbance for fauna, but the contribution would be low for most species and is not considered highly significant.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Table 7-4: Impacts on CBAs and ESAs due to the presence and operation of the facility.

Issue: Impacts on CBAs and ESAs due to the presence and operation of the facility		
Description of Impact		
Transformation and presence of the facility will contribute to cumulative habitat loss within CBAs and impacts on broad-scale ecological processes such as fragmentation.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low -	Very Low -
Degree to which impact can be reversed	The impact is reversible to some degree by removal of the hardened infrastructure and rehabilitation as per the mitigation measures recommended below. As the site is arid, it is not likely that vegetation cover and diversity can be fully restored at decommissioning, so there would be some residual impact.	
Degree to which impact may cause irreplaceable loss of resources	The habitats present on site are not localized or unique and as the footprint within these areas would be low, there would not be an irreplaceable loss of resources as related to the ESAs and CBAs of the affected area.	
Degree to which impact can be mitigated	To some extent, but habitat loss will persist for the lifetime of the facility.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development. 2) Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities. 	

	3) All erosion and alien management plans must be effectively implemented at the site.	
Monitoring Actions		
The following monitoring is recommended:	N/	
Cumulative Impacts		
Nature of Cumulative Impacts	The development would contribute to cumulative disturbance for fauna, but the contribution would be low for most species and is not considered highly significant.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Table 7-5: Habitat degradation due to erosion and alien plant invasion.

Issue: Habitat Degradation due to Erosion and Alien Plant Invasion		
Description of Impact		
Disturbance created during the construction phase will leave the development area vulnerable to erosion and alien plant invasion for several years into the operation phase.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Medium -	Low -
Degree to which impact can be reversed		
Degree to which impact may cause irreplaceable loss of resources	Provided that there is not significant erosion or alien plant invasion, the impact can be considered reversible.	
Degree to which impact can be mitigated	With effective implementation of the suggested mitigation, there would be no irreplaceable loss of resources.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) Erosion management within the development area should take place according to the Erosion Management Plan and Rehabilitation Plan. 2) Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 3) Regular monitoring for erosion during operation to ensure that no erosion problems have developed as a result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. 4) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 	

	<p>5) There should be follow-up rehabilitation and re-vegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area.</p> <p>6) Alien management at the site should take place in accordance with the Alien Invasive Management Plan.</p> <p>7) Regular monitoring for alien plant proliferation during the operation phase to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project.</p> <p>8) Woody alien plant species should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.</p>	
Monitoring Actions		
The following monitoring is recommended:	Annual monitoring of alien vegetation presence and abundance along with annual monitoring of any erosion problems within the affected area. This should be used to inform alien clearing and revegetation efforts as detailed in the relevant management plans.	
Cumulative Impacts		
Nature of Cumulative Impacts	The development would contribute to cumulative disturbance for fauna, but the contribution would be low for most species and is not considered highly significant.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Decommissioning Phase Impacts:**Table 7-6: Impacts on fauna due to construction activities**

Issue: Impacts on fauna due to decommissioning phase activities		
Description of Impact		
Increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the decommissioning activities and might be killed.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite	Probable
Significance	Medium -	Medium -
Degree to which impact can be reversed	Noise and disturbance would be transient and after decommissioning the site would be returned to a near-natural state.	

Degree to which impact may cause irreplaceable loss of resources	Provided that decommissioning is conducted responsibly, there would be no irreplaceable loss of resources.	
Degree to which impact can be mitigated	Although the noise and disturbance generated during decommissioning is largely unavoidable, this would be transient the site would be returned to a near-natural state after decommissioning.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. 2) The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site. 3) No fuelwood collection should be allowed on-site. 4) If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects, and which should be directed downwards. 5) All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. 6) No excavated holes or trenches should be left open for an extended period as fauna are likely to fall in and become trapped. Any trenches present should have occasional soil ramps present to allow fauna to escape while open holes should be inspected at least every second day to check for trapped fauna. 	
Monitoring Actions		
The following monitoring is recommended:	Monitoring by the ECO to ensure that any fauna effected by the decommissioning activities are removed to safety.	
Cumulative Impacts		
Nature of Cumulative Impacts	The development will result in some disturbance of fauna during the decommissioning phase, but the site would be restored to near-natural state thereafter.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Table 7-7: Habitat degradation due to erosion and alien plant invasion due to decommissioning.

Issue: Habitat Degradation due to Erosion and Alien Plant Invasion		
Description of Impact		
Disturbance created during the decommissioning will leave the development area vulnerable to erosion and alien plant invasion for several years after decommissioning.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low

Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Possible
Significance	Medium -	Low -
Degree to which impact can be reversed	Provided that there is not significant erosion or alien plant invasion, the impact can be considered reversible.	
Degree to which impact may cause irreplaceable loss of resources	With effective implementation of the suggested mitigation, there would be no irreplaceable loss of resources.	
Degree to which impact can be mitigated	With mitigation, there would be very low residual impacts.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) Erosion management within the development area should take place according to the Erosion Management Plan and Rehabilitation Plan. 2) Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. 3) Regular monitoring for erosion after decommissioning to ensure that no erosion problems have developed as a result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. 4) All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. 5) There should be follow-up rehabilitation and re-vegetation of any remaining bare areas with indigenous perennial shrubs and succulents from the local area. 6) Alien management at the site should take place in accordance with the Alien Invasive Management Plan. 7) Regular monitoring for alien plant proliferation following decommissioning to ensure that no erosion problems have developed as result of the disturbance, as per the Alien Management Plan for the project. 8) Woody alien plant species should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present. 	
Monitoring Actions		
The following monitoring is recommended:	Annual monitoring after decommissioning to ensure that the site is kept clear of alien plant and erosion problems.	
Cumulative Impacts		
Nature of Cumulative Impacts	The decommissioning would generate some disturbance, but thereafter the site would be returned to a near-natural state. Although there is likely to be some residual erosion and habitat degradation, overall the site will be returned to a near-natural state and there would be little cumulative impact.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Very Low -	Very Low -

7.1.2 Avifaunal Impacts

Negative impacts on avifauna by electricity infrastructure generally take two (2) main forms, namely electrocution and collisions (Ledger & Annegarn, 1981; Ledger 1983; Ledger, 1984; Hobbs and Ledger, 1986a; Hobbs & Ledger, 1986b; Ledger, Hobbs & Smith, 1992; Verdoorn, 1996; Kruger & Van Rooyen, 1998; Van Rooyen, 1998; Kruger, 1999; Van Rooyen, 1999; Van Rooyen, 2000; Van Rooyen, 2004; Jenkins *et al.*, 2010). Displacement due to habitat destruction and disturbance associated with the construction of the electricity infrastructure and other associated infrastructure is another impact that could potentially impact on avifauna.

The following potential impacts have been identified:

Construction Phase

- Displacement due to disturbance associated with the construction of the substation and associated infrastructure.
- Displacement due to habitat transformation associated with the construction of the substation and associated infrastructure.

Operational Phase

- Electrocutions within the substation yard.

Decommissioning Phase

- Displacement due to disturbance associated with the decommissioning of the substation and associated infrastructure.

Cumulative Impacts

- Displacement due to disturbance associated with the construction and decommissioning of the substation and associated infrastructure.
- Displacement due to habitat transformation associated with the substation and associated infrastructure.
- Electrocutions within the substation yard.

7.1.2.1 Electrocutions

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen, 2004). Electrocutions within the proposed on-site substation yard are possible but should not affect the more sensitive Red List bird species, as these species are unlikely to use the infrastructure within the substation yard for perching or roosting. Species that are more vulnerable to this impact are corvids, owls and certain species of waterbirds.

The priority species which are potentially vulnerable to this impact are listed in Table 6-1 and below:

- Common Buzzard
- Jackal Buzzard
- Cape Crow
- Pied Crow

-
- Booted Eagle
 - Martial Eagle
 - Verreaux's Eagle
 - Spotted Eagle-Owl
 - Lanner Falcon
 - Egyptian Goose
 - Pale Chanting Goshawk
 - Helmeted Guineafowl
 - Black Harrier
 - Black-headed Heron
 - African Sacred Ibis
 - Hadada Ibis
 - Greater Kestrel
 - Rock Kestrel
 - Black-winged Kite
 - Yellow-billed Kite
 - White-necked Raven

7.1.2.2 Displacement due to habitat destruction and disturbance

During the construction of substations and other associated infrastructure, habitat destruction / transformation inevitably takes place. The construction activities will constitute the following:

- Site clearance and preparation
- Construction of the infrastructure (i.e., the on-site substation and associated infrastructure)
- Transportation of personnel, construction material and equipment to the site, and personnel away from the site
- Removal of vegetation for the proposed on-site substation and associated infrastructure (BESS, laydown area and O&M building), and stockpiling of topsoil and cleared vegetation
- Excavations for infrastructure

These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed substation through transformation of habitat, which could result in temporary or permanent displacement. Unfortunately, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the on-site substation yard is unavoidable. However, the habitat in the study area is highly uniform from a bird impact perspective. The loss of a relatively small quantity of the habitat for priority species due to direct habitat transformation associated with the construction of the proposed on-site substation and associated infrastructure is likely to be minimal.

Apart from direct habitat destruction, the above-mentioned activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although in practice that can

admittedly be very challenging to implement. Terrestrial species are most likely to be affected by displacement due to disturbance in the study area.

The broader area contains one (1) Martial Eagle territory, with the nest situated on Tower 162 of the Droërivier - Proteus 400kV. However, construction activities at the proposed substation and associated infrastructure should not impact on the birds, due to the distance from the proposed infrastructure (12km).

The priority species which are potentially vulnerable to displacement are listed in Table 6-1 and below:

- Secretarybird
- Kori Bustard
- Ludwig's Bustard
- Blue Crane
- Helmeted Guineafowl
- Karoo Korhaan
- Southern Black Korhaan

7.1.2.3 Impact Assessment

The impacts discussed above are rated below in table form. An individual impact table is provided for each impact.

Construction Phase

The following impacts are anticipated during the construction phase of the proposed project:

- Displacement due to disturbance associated with the construction of the substation and associated infrastructure.
- Displacement due to habitat transformation associated with the construction of the substation and associated infrastructure.

Table 7-8: Displacement of priority species due to disturbance associated with construction of the on-site substation and associated infrastructure

Issue: Displacement of priority species due to disturbance associated with construction of the on-site substation and associated infrastructure		
Description of Impact		
During the construction of substations and other associated infrastructure, habitat destruction inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed substation, which could result in temporary or permanent displacement.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Low
Probability	Probable	Possible / frequent

Significance	Low -	Very Low +
Degree to which impact can be reversed	The disturbance factor will be limited to the construction period, after which it will cease. The impact should therefore be reversed through natural processes in due course.	
Degree to which impact may cause irreplaceable loss of resources	It is very unlikely that the impact will result in the permanent loss of resources.	
Degree to which impact can be mitigated	Not much can be done to mitigate the impact, but the short duration of the impact will help to reduce significance of the impact.	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. 	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Displacement of priority species due to disturbance associated with construction of the on-site substations will be a feature of all the proposed renewable energy projects within a 30km radius around the project. However, the South African Renewable Energy EIA Application Database (REEA) available at the time (namely "REEA_OR_2021_Q2") shows only a few renewable energy projects (wind and solar) authorised or being proposed within close proximity to the town of Beaufort West, including the Beaufort West Cluster which consists of two (2) authorised wind farm projects and associated electrical infrastructure (namely the Beaufort West Wind Farm – 12-12-20-1784-1) and Trakas Wind Farm - 12-12-20-1784-2).	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Very Low +

Table 7-9: Displacement due to habitat transformation associated with the construction of the on-site substation and associated infrastructure.

Issue: Displacement due to habitat transformation associated with the construction of the on-site substation and associated infrastructure.	
Description of Impact	
During the construction of substations and other associated infrastructure, habitat destruction / transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed substation through transformation of habitat, which could result in temporary or permanent displacement.	
Type of Impact	Direct
Nature of Impact	Negative

Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Site	Site
Consequence	Low	Low
Probability	Definite / Continuous	Probable
Significance	Low -	Low -
Degree to which impact can be reversed		
	The habitat transformation is for all practical purposes permanent.	
Degree to which impact may cause irreplaceable loss of resources		
	Due to the small footprint relative to the available habitat, the impact is unlikely to lead to irreplaceable loss of resources.	
Degree to which impact can be mitigated		
	Not much can be done to mitigate the inevitable loss of habitat.	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> Vegetation clearance should be limited to what is absolutely necessary. The mitigation measures proposed by the vegetation specialist must be strictly enforced. 	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Displacement of priority species due to habitat transformation associated with construction of the on-site substation will be a feature of all the proposed renewable energy projects within a 30km radius around the project. However, the South African Renewable Energy EIA Application Database (REEA) available at the time (namely "REEA_OR_2021_Q2") shows only a few renewable energy projects (wind and solar) authorised or being proposed within close proximity to the town of Beaufort West, including the Beaufort West Cluster which consists of two (2) authorised wind farm projects and associated electrical infrastructure (namely the Beaufort West Wind Farm – 12-12-20-1784-1) and Trakas Wind Farm - 12-12-20-1784-2).	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Low -

Operational Phase

The following impacts are anticipated during the operational phase of the proposed project:

- Electrocutions within the substation yard.

Table 7-10: Mortality of priority species due to electrocutions within the substation yard.

Issue: Mortality of priority species due to electrocutions within the substation yard.
Description of Impact
Electrocutions as a result of bird perching or attempting to perch on the electrical structure. Electrocutions within the proposed on-site substation yard are possible but should not affect the more sensitive Red List bird species,

as these species are unlikely to use the infrastructure within the substation yard for perching or roosting. Species that are more vulnerable to this impact are corvids, owls and certain species of waterbirds.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Conceivable	Unlikely / improbable
Significance	Low -	Very Low +
Degree to which impact can be reversed		
	The impact can be reversed to a certain extent through natural recruitment.	
Degree to which impact may cause irreplaceable loss of resources		
	It is expected that the electrocution impact will not cause irreplaceable loss of resources, as it is likely to be a rare event, and can be virtually eliminated with mitigation.	
Degree to which impact can be mitigated		
	The impact could be well mitigated through the insulation of live components in the substation.	
Mitigation actions		
The following measures are recommended:	The hardware within the proposed transmission substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species is unlikely to frequent the substation and be electrocuted.	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Electrocution mortality associated with substations will be a feature of all the proposed renewable energy projects within a 30km radius around the project. However, the South African Renewable Energy EIA Application Database (REEA) available at the time (namely "REEA_OR_2021_Q2") shows only a few renewable energy projects (wind and solar) authorised or being proposed within close proximity to the town of Beaufort West, including the Beaufort West Cluster which consists of two (2) authorised wind farm projects and associated electrical infrastructure (namely the Beaufort West Wind Farm – 12-12-20-1784-1) and Trakas Wind Farm - 12-12-20-1784-2).	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Very Low -

Decommissioning Phase

The following impacts are anticipated during the decommissioning phase of the proposed project:

- Displacement due to disturbance associated with the decommissioning of the substation and associated infrastructure.

Table 7-11: Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and associated infrastructure.

Issue: Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and associated infrastructure		
Description of Impact		
During the decommissioning of substations and other associated infrastructure, habitat destruction / transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the site through transformation of habitat, which could result in temporary or permanent displacement.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Site	Site
Consequence	Low	Low
Probability	Probable	Possible / frequent
Significance	Low -	Very Low +
Degree to which impact can be reversed	The disturbance factor will be limited to the decommissioning period, after which it will cease. The impact should therefore be reversed through natural processes in due course.	
Degree to which impact may cause irreplaceable loss of resources	It is very unlikely that the impact will result in the permanent loss of resources.	
Degree to which impact can be mitigated	Not much can be done to mitigate the impact, but the short duration of the impact will help to reduce significance of the impact.	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> • Decommissioning activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. 	
Monitoring		
The following monitoring is recommended:	None	
Cumulative impacts		
Nature of cumulative impacts	Displacement of priority species due to disturbance associated with decommissioning of the on-site substations and grid connections will be a feature of all the proposed renewable energy projects within a	

	30km radius around the project. However, the South African Renewable Energy EIA Application Database (REEA) available at the time (namely "REEA_OR_2021_Q2") shows only a few renewable energy projects (wind and solar) authorised or being proposed within close proximity to the town of Beaufort West, including the Beaufort West Cluster which consists of two (2) authorised wind farm projects and associated electrical infrastructure (namely the Beaufort West Wind Farm – 12-12-20-1784-1) and Trakas Wind Farm - 12-12-20-1784-2).	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Very Low +

7.1.3 Aquatic / Surface Water Impacts

The aquatic environment is typical of this portion of the Great Karoo ecoregion, being dominated by large numbers of small drainage lines and watercourse that flow for short periods of time, with little to no facultative aquatic habitats. With regards to impacts, these systems are largely influenced by changes to any hydrological regimes and direct disturbance. Secondary impacts are most related to water quality (spills) and the increase in surface flows presented by hard surfaces. This, if no stormwater management is provided, then results in erosion and sedimentation. Although it may be argued erosion and sediment transport is a natural phenomenon within these systems, acceleration of these natural process quickly results in scour and donga formation.

7.1.3.1 Impact Assessment

The following impacts were assessed, which are aligned with those contained in the Biodiversity Assessment Protocol and include in the table below and assessed against the proposed alignment and potential activities:

Biodiversity Assessment Protocol Impacts found applicable to this project	Impacts assessed
Faunal and vegetation communities inhabiting the site	Impact 1 and 2
Fragmentation (physical loss of ecological connectivity and or CBA corridors)	Impact 1 and 2
Changes in numbers and density of species	Impact 1 and 2
Water quality changes (increase in sediment, organic loads, chemicals or eutrophication)	Impact 3
Hydrological regime or Hydroperiod changes (Quantity changes such as abstraction or diversion)	Impact 4
Streamflow regulation	Impact 2
Erosion control	Impact 4
Cumulative Impacts	Impact 5

As highlighted above, the following impacts on the aquatic environment have been identified and will be assessed in greater detail as follows, as well as separately the 'No-Go' and Cumulative impacts:

Construction & Decommissioning Phase Impacts:

- Impact 1: Loss of aquatic species of special concern
- Impact 2: Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase
- Impact 3: Potential impact on localised surface water quality

Table 7-12: Summary of Construction & Decommissioning Phase Impacts

Impact 1		
Issue: Loss of aquatic species including any Species of Special Concern		
Description of Impact		
Potential loss of protected or listed aquatic species, however, none were observed on site.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Very Low
Duration	Medium-term	Short-term
Extent	Local	Site
Consequence	Medium	Very Low
Probability	Conceivable	Unlikely/ improbable
Significance	Low -	Insignificant
Degree to which impact can be reversed		
If any plants are encountered these can be relocated with a limited degree of success.		
Degree to which impact may cause irreplaceable loss of resources		
Low		
Degree to which impact can be mitigated		
High -		
Mitigation actions		
The following measures are recommended:	A final site walkdown is conducted after the site is approved, particularly now that some rainfall has occurred (October 2021) and going into the remainder of the growth season some plants may become evident.	
Monitoring		
The following monitoring is recommended:	ECO / ESO during construction inspects the area on a regular basis (weekly) for any unique plants (mostly bulbs and succulents) that may appear during the growth seasons.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses (Atlantic Energy Partners, Enertrag SA, Enegie & Mainstream projects). The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Insignificant

Impact 2		
Issue: Damage or loss of riparian systems and disturbance of waterbodies in the construction / decommissioning phase		
Description of Impact		
Construction & decommissioning could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site, especially where new crossing are made or large hard engineered surfaces are placed within these systems (including the proposed buffer). Loss can also include a functional loss, through change in vegetation type via alien encroachment for example		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Short-term
Extent	Local	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed		
Yes, with a significant amount of rehabilitation		
Degree to which impact may cause irreplaceable loss of resources		
Medium		
Degree to which impact can be mitigated		
High		
Mitigation actions		
The following measures are recommended:	<p>A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout (tower positions must be confirmed).</p> <p>Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).</p>	
Monitoring		
The following monitoring is recommended:	<p>All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings.</p> <p>Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation</p>	
Cumulative impacts		

Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses (Atlantic Energy Partners, Enertrag SA, Engie & Mainstream projects). The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

Impact 3		
Issue: Potential impacts on localises surface water quality		
Description of Impact		
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given.		
Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Short-term
Extent	Local	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed		
	Yes, with a significant amount of rehabilitation	
Degree to which impact may cause irreplaceable loss of resources		
	Medium	
Degree to which impact can be mitigated		
	High	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. 	

	<ul style="list-style-type: none"> • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation / sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management; • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. 	
Monitoring		
The following monitoring is recommended:	ESO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur a quickly rectified.	
Cumulative impacts		
Nature of cumulative impacts	Although most of the projects are linear in fashion, while being spread over a wide area, most of the projects are located within the greater Gouritz catchment. However, spills and water quality issues remain localised due to the ephemeral nature of the aquatic systems.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Very Low -

Operational Phase Impacts:

- Impact 4: Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.

Table 7-13: Summary of Operational Phase Impacts

Impact 4		
Issue: Changes to hydrological regimes that could also lead to sedimentation and erosion		
Description of Impact		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Short-term
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Conceivable

Significance	Medium -	Very Low +
Degree to which impact can be reversed	High with rehabilitation	
Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil.	
Monitoring		
The following monitoring is recommended:	This stormwater control systems must be inspected on an annual basis to ensure these are functional	
Cumulative impacts		
Nature of cumulative impacts	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of most of these projects and or review of the past assessments as part of any required Water Use Licenses (Atlantic Energy Partners, Enertrag SA, Enegie & Mainstream projects). The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Medium -	Low -

7.1.4 Visual Impacts

7.1.4.1 Potential Visual Issues

Wind farm infrastructure projects typically include medium to large-scale infrastructure that can cause change to the fabric and character of an area and possible visual intrusion in sensitive landscapes. In the case of these projects, the receiving environment is mostly open, and the site occurs in an area already approved for wind farm activity.

Refer to Figure 7-1 below, which indicates the location of the photo panoramas and potential sensitive viewer locations.

Typical issues associated with industrial development are:

- Who will be able to see the new development?
- What will they look like, and will they contrast with the receiving environment or blend with it?
- Are there sensitive views in the area that may be affected by the development, and if so, how?
- What will be the impact of the development during the day and at night?

-
- What will the cumulative impact be, if any?

These potential impacts have been considered and rated in the section below.

At the time of writing this BA Report, the results of the public participation process were still unknown, as potential concerns from the public with regard to visual and aesthetic impacts were still outstanding. However, because the project activities will take place within authorised wind farm projects, Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) Wind Farms respectively, it is anticipated that visual sensitivities will be low.

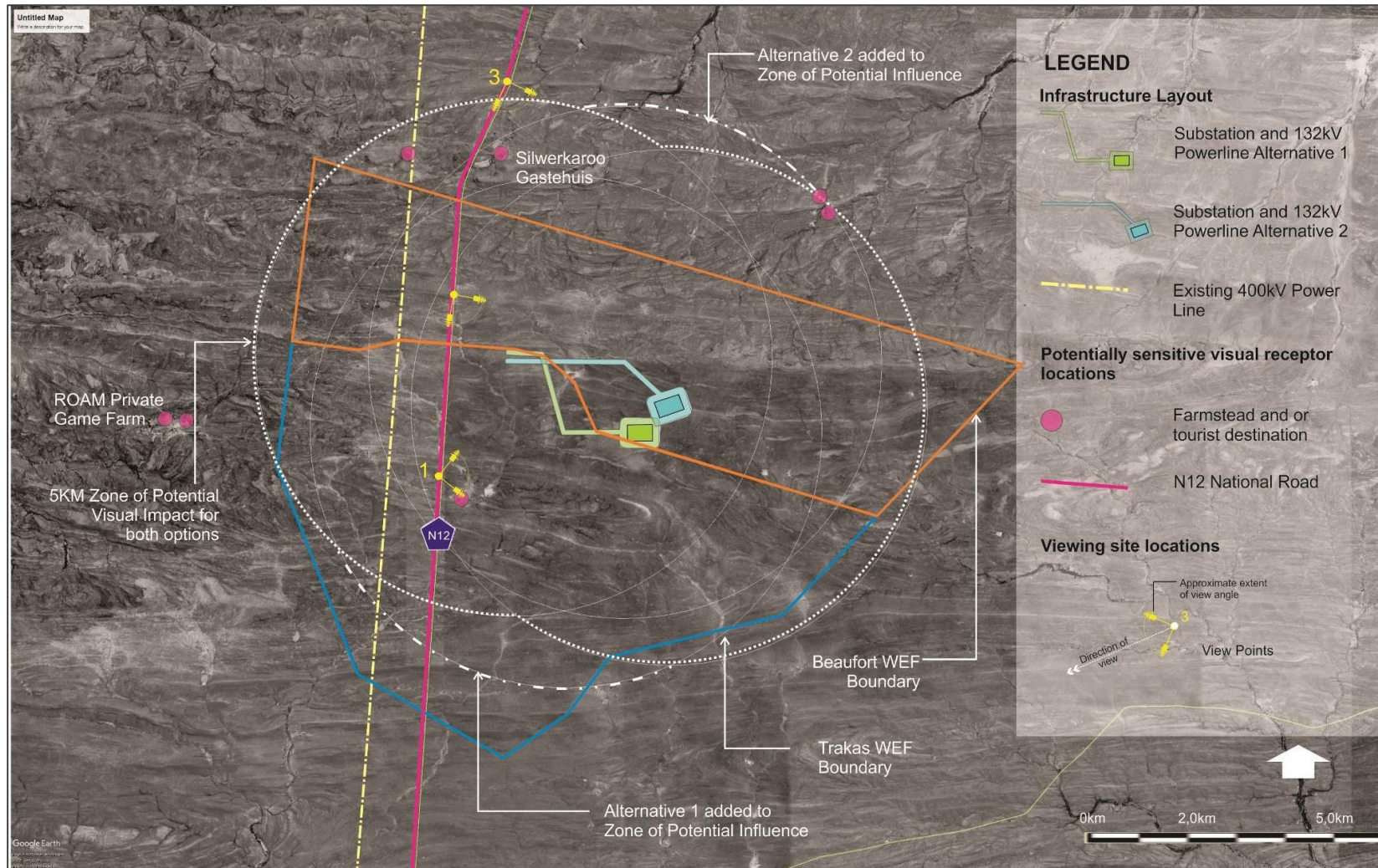


Figure 7-1: Visual Receptor Locations and View Points

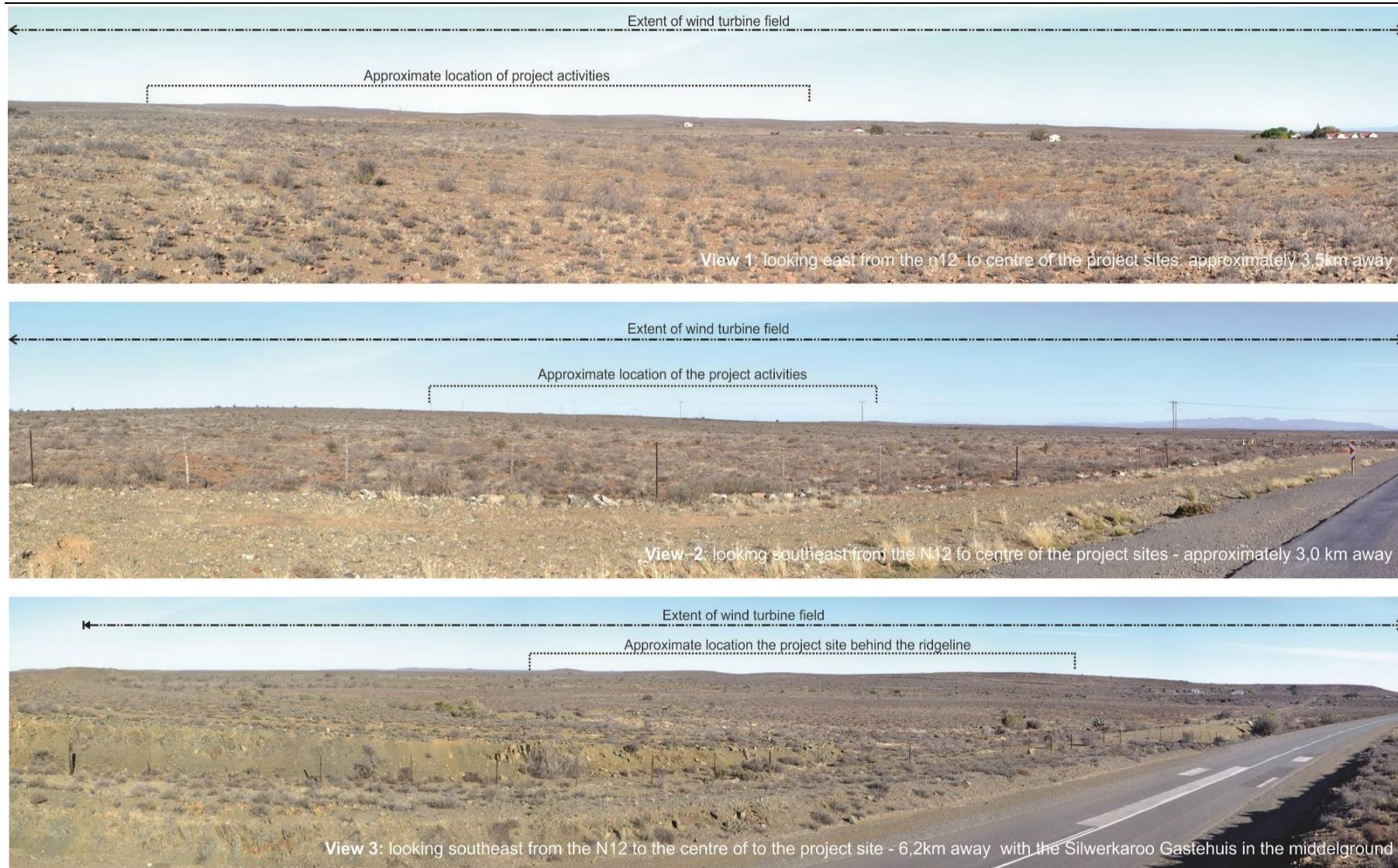


Figure 7-2: Landscape Character – Views 1, 2 and 3

7.1.4.2 Landscape Impact

The *landscape impact* (i.e., the change to the fabric and character of the landscape caused by the physical presence of the intervention) of the proposed Project when compared against the authorized powerline and infrastructure components, is considered *neutral*. The proposed development will cause no more impact than that of the authorised powerlines and sub-stations (14-12-16-3-3-2-925-1 & 14-12-16-3-3-2-925-2), due to the reduction in the area required by the proposed Project.

The physical change to the landscape at the Project's site must be understood in terms of the Project's visibility (impact on sensitive viewers and viewing areas) and its effect on the visual aesthetics of the area (as experienced through viewing the landscape – visual intrusion). The following sections discuss the effect the Project would have on the visual and aesthetic environment.

7.1.4.3 Visual Impact

Visual Receptors

A sensitive receptor location is defined as a location from where receptors would potentially be adversely impacted by a proposed development. Adverse impacts often arise where new development is seen as an intrusion that alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one (1) receptor to another, as it is largely based on the viewer's perception. A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptors would include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and certain residential dwellings in natural settings. (Swartz, 2018:46).

Sensitive Viewers

Although five (5) potentially sensitive receptor locations (Figure 7-1) occur within the study area, it is concluded that none of these are sensitive to the project. Accordingly, these receptors were excluded from the assessment as it is assumed that the occupants would have a vested interest in the wind farm development and the associated grid connection infrastructure (Swartz, 2018:47).

Furthermore, although the section of the N12 traversing the study area is not considered a scenic route, it is likely that the road is utilised, to some extent, for its tourism potential and as a result, it is classed as a potentially sensitive receptor road – i.e., a road being used by motorists who may object to the potential visual intrusion of the proposed substation and associated infrastructure (Swartz, 2018:47).

Visibility

The proposed substation and associated infrastructure will be visible from the N12, although these elements are between 1 and 5kms from the road and thus the visual impacts will be reduced. i.e., visual exposure is limited to middle and background views. Other roads in the study area are mostly gravel access roads used by residents. These roads are not valued or utilised for their scenic or tourism potential and as such are not considered to be visually sensitive. The potentially sensitive visual receptor locations relative to the zone of potential visual impact are indicated in Figure 7-2.

Visual Intrusion

Visual intrusion deals with the notion of contextualism i.e., how well does a project component fit with or disrupt/enhance the ecological and cultural aesthetic of the landscape as a whole? As the proposed substation and associated infrastructure will only be built when the authorised wind farms are built, they will appear as part of the overall power infrastructure and will not appear out of context. i.e., the VAC is high.

The Intensity of Visual Impact

The *magnitude* of visual impact is determined using visibility, visual intrusion, visual exposure and viewer sensitivity criteria. Referring to the discussions in the previous sections and using the criteria listed in Appendix B of the Visual Impact Assessment Report (Appendix 5.8), the *magnitude* of the worst-case scenario visual impact of the Project is rated in Table 7-14 below for all phases of the project.

To assess the magnitude of visual impact, four (4) main factors are considered as follows:

- **Visual Intrusion**: The nature of intrusion or contrast (physical characteristics) of a project component on the visual quality of the surrounding environment and its compatibility/discord with the landscape and surrounding land use, within the context of the landscape's VAC.
- **Visibility**: The area / points from which project components will be visible.
- **Visual exposure**: Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion.
- **Sensitivity**: Sensitivity of visual receptors to the proposed development.

In synthesizing the criteria a numerical or weighting system is avoided. Attempting to attach a precise numerical value to qualitative resources is rarely successful, and should not be used as a substitute for reasoned professional judgment (LI-IEMA, 2013).

According to the results tabulated below in Table 7-14 below, the intensity of visual impact on receptor locations (based on the worst-case scenario) of the proposed Project will be negligible (during all phases of the project) for both site area alternatives. The reason for this is that either of the alternatives would be visually experienced in the same visual envelope, which would include the field of wind turbines, and from approximately the same distance (i.e., visual exposure and intrusion would be similar). Therefore, from a visual perspective, either site area alternative is acceptable.

It should also be noted that the magnitude of the impact of the proposed development must be compared against the already authorised infrastructural layout impact i.e., would the proposed development layout have a greater or lesser impact than the authorised development?

Figure 7-3 below illustrates that the spatial extent of the zone of potential influence for the proposed development reduces when compared with the authorised development.

Table 7-14: Intensity of Impact for Both Site Area Alternatives of the Project

High None	Moderate None	Low	Negligible to None
<p>Major loss of or alteration to key elements / features / characteristics of the baseline in the immediate vicinity of the site.</p> <p>i.e., Pre-development landscape or view and / or introduction of elements considered to be uncharacteristic when set within the attributes of the receiving landscape.</p> <p>Result: A <i>high</i> scenic quality impacts would result.</p>	<p>Partial loss of or alteration to key elements / features / characteristics of the baseline.</p> <p>i.e., Pre-development landscape or view and / or introduction of elements that may be prominent but may not necessarily be substantially problematic when set within the attributes of the receiving landscape.</p> <p>Result: A <i>moderate</i> scenic quality impacts would result</p>	<p>Minor loss of or alteration to key elements / features / characteristics of the baseline.</p> <p>i.e., Pre-development landscape or view and / or introduction of elements that may not be problematic when set within the attributes of the receiving landscape.</p> <p>Result: A <i>low</i> scenic quality impacts would result.</p>	<p>Very minor loss or alteration to key elements / features / characteristics of the baseline.</p> <p>i.e., Pre-development landscape or view and / or introduction of elements that is not problematic with the surrounding landscape – approximating the ‘no change’ situation.</p> <p>Result: A <i>negligible to no</i> scenic quality impacts would result.</p>

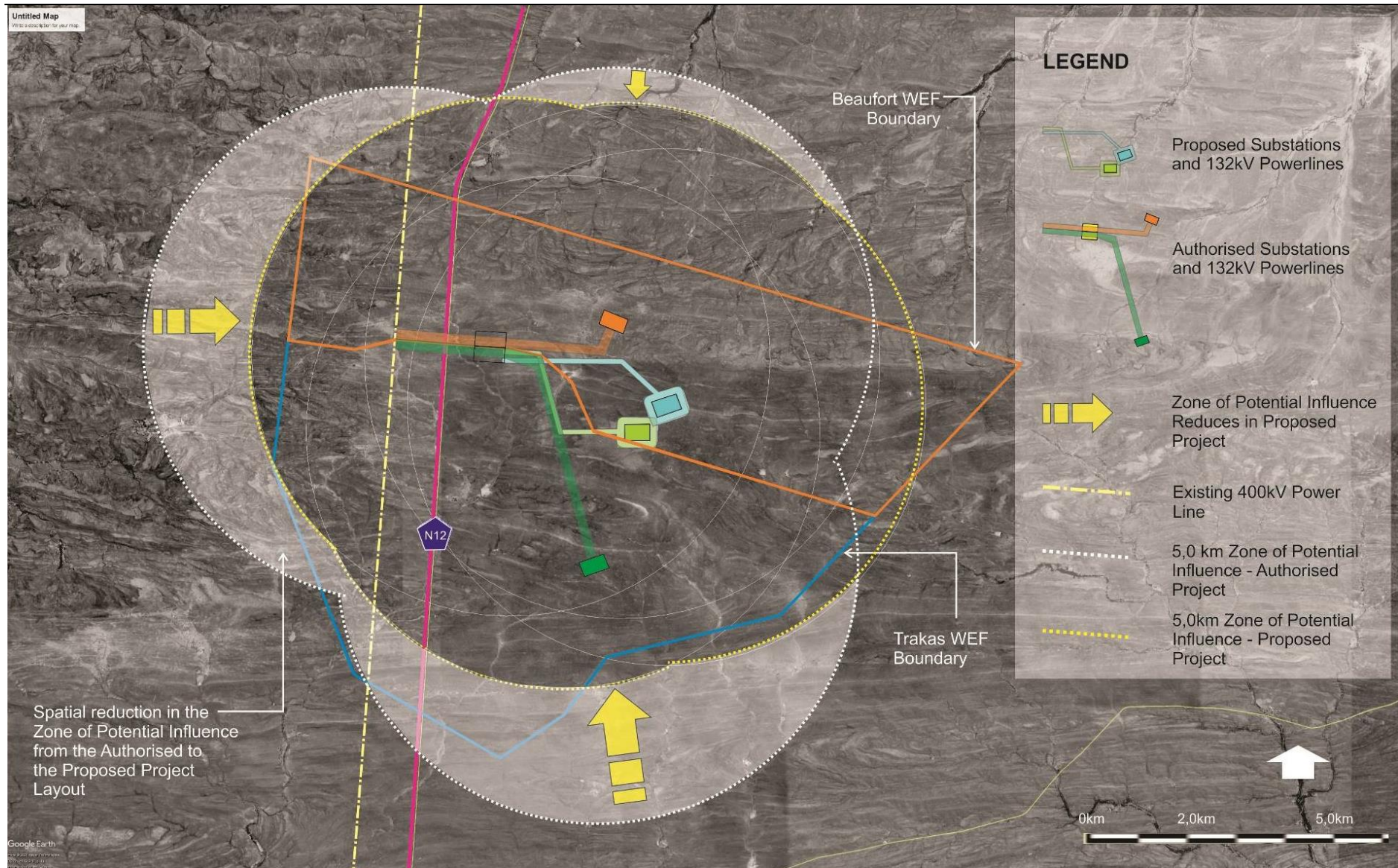


Figure 7-3: Beaufort West WEF: Layout Proposed vs Authorised

7.1.4.4 Significance of Visual Impact

The table below (Table 7-15) summarises the consequence and significance of the visual impact of the Project. These results are based on the worst-case scenario, when the impacts of all aspects of the Project are taken together using the impact criteria in Appendix D of the Visual Impact Assessment Report (Appendix 5.8). Consequence of impact is a function of intensity, duration, and spatial extent (SLR, 2021). The intensity of impact is taken from the situation as described in Table 7-14 above. These facilities are rated together, from a visual impact perspective, as the one (1) would not exist without the other and they must be understood as the collective / cumulative. Also, the visual impacts for the Construction, Operational and Decommissioning Phases are potentially similar and are therefore rated together in Table 7-15 below.

Construction, Operational and Decommissioning Phase Impacts:

Table 7-15: Significance of Visual Impact for Both Options of the Project (all phases)

Issue: Neutral visual impact		
Description of Impact		
The visual impact will be neutral to slightly less than the authorised development.		
Type of Impact	Direct	
Nature of Impact	Neutral	
Phases	Construction, Operational and Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Very Low	Very Low
Duration	Very short-term	Very short-term
Extent	Local	Local
Consequence	Very low	Very low
Probability	Unlikely/improbable	Unlikely/improbable
Significance	Insignificant	Insignificant
Degree to which impact can be reversed	The impact is inconsequential, therefore not requiring any consideration.	
Degree to which impact may cause irreplaceable loss of resources	The project will not cause irreplaceable loss of visual resources	
Degree to which impact can be mitigated	The impact is negligible, however normal good housekeeping and management are recommended.	
Mitigation Actions		
The following measures are recommended:	<ul style="list-style-type: none"> • With the preparation of the portions of land onto which activities will take place, the minimum amount of existing vegetation and topsoil should be removed. • Ensure, wherever possible, natural indigenous vegetation is retained and incorporated into the site rehabilitation. • All topsoil that occurs within the proposed footprint of an activity must be removed and stockpiled for later use. The construction contract must include the stripping and stockpiling of topsoil. Topsoil would be used later, during the rehabilitation phase of disturbed areas. The presence of degraded areas and disused construction roads, which are not rehabilitated, will increase the overall visual impact. • Specifications with regards to the placement of construction camps, as well as a site plan of the construction camp, indicating waste areas, storage 	

	<p>areas, and placement of ablution facilities should be included in the EMPr. These areas should either be screened or positioned in areas where they would be less visible from human settlements and main roads.</p> <ul style="list-style-type: none"> • Adopt responsible construction practices aimed at strictly containing the construction/establishment activities to specifically demarcated areas. • Building or waste material discarded should be undertaken at an authorised location, which should not be within any sensitive areas. • Earthworks should be executed in such a way that only the footprint and a small 'construction buffer zone' around the proposed activities are exposed. In all other areas, the naturally occurring vegetation should be retained, especially along the periphery of the sites. • All cut and fill slopes (if any) and areas affected by construction work should be progressively top soiled and re-vegetated as soon as possible. • Any soil must be exposed for the minimum time possible once cleared of vegetation, to avoid prolonged exposure to wind and water erosion and to minimise dust generation. • Where new vegetation is proposed to be introduced to the site, an ecological approach to rehabilitation, as opposed to a horticultural approach, should be adopted. For example, communities of indigenous plants will enhance biodiversity, a desirable outcome for the area. This approach can significantly reduce long-term costs, as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable. • Progressive rehabilitation of all construction areas should be carried out immediately after they have been established. • Paint the structures with colours that reflect and compliment the colours of the surrounding landscape (where possible). • "Housekeeping" procedures should be developed for the Project to ensure that the Project's site and lands adjacent to the Project's site are kept clean of debris, garbage, fugitive trash, or waste generated onsite. Housekeeping procedures should extend to control of "track out" of dirt on vehicles leaving the active construction site. • Install light fixtures that provide precisely directed illumination, to reduce light "spillage" beyond the immediate surrounds of the sites that may require security lighting i.e., lights (spotlights) are to be aimed away from the N12 and the nearby farmsteads. • Avoid high pole top security lighting and use only lights that are activated on illegal entry to the site. • Minimise the number of light fixtures to the bare minimum, including security lighting. • The applicant may wish to give consideration, where appropriate, to the development and installation of viewing areas, interpretation panels, visitor, or educational facilities as part of the development proposals. This may appeal to tourists visiting the area and travelling along the N12, who may be curious about renewable energy Projects.
Monitoring Actions	
The following monitoring is recommended:	N/A
Cumulative Impacts	

Nature of Cumulative Impacts	Intervisibility for the project within a 30km radius of the development site will be evident. The combined effect over time of these developments would result in the study area being impacted upon in a manner beyond the anticipated neutral negative impacts of the proposed Project alone.	
	WEFs (including their associated electrical infrastructure) have the potential to cause large-scale visual impacts and the location of several such developments near each other could significantly alter the sense of place and visual character in the broader region. Although substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	High -	Medium-High -

It should be noted that the specialist confirmed that the cumulative impact ratings of the renewable energy developments within a 30km radius of the project site (where information regarding this was available) would remain unchanged regardless of whether the proposed substation and associated infrastructure project is developed, as the impact of the substation and associated infrastructure would be dwarfed by the cumulative impact of the other renewable energy developments in the area (Section 7.3.1.4).

7.1.5 Agricultural Impacts

7.1.5.1 Assessment of Agricultural Impact

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or potential future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or potential future agricultural production. If there will be no impact on production, then there is no agricultural impact.

The proposed project has a negligible agricultural impact for two (2) reasons:

1. The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture is of very limited extent and therefore, entirely insignificant within this agricultural environment of large farms utilised only for low density grazing.
2. The affected land has very low agricultural potential.

The only possible source of impact is minimal disturbance to the land during construction and decommissioning. The single agricultural impact is therefore minimal soil and land degradation (erosion and topsoil loss) as a result of land disturbance. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal and the establishment of hard surface areas, including roads and laydown areas. Soil degradation will reduce the ability of the soil to support vegetation growth. This is a direct, negative impact that applies to only two (2) of the phases of the development (namely construction and decommissioning). This impact can be completely mitigated. However, farmers frequently complain that these impacts occur because the EMP, which would mitigate the impact, is not adequately implemented.

There is likely to be some nuisance disturbance to agricultural activities during construction. A common complaint from farmers is that gates are left open by contractors. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact as defined in the Agricultural assessment.

7.1.5.2 Micro-siting to minimize fragmentation and disturbance of agricultural activities

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low potential and the nature of the agricultural impact mean that the exact positions of all infrastructure will not make any material difference to agricultural impacts.

7.1.5.3 Confirmation of linear activity impact

The protocol provision of a linear impact confirmation only makes sense when the requirement for an Agricultural Compliance Statement is based on the fact that the development is a linear activity. In this case, the low and medium agricultural sensitivity determines that an Agricultural Compliance Statement suffices, even for non-linear activities.

7.1.5.4 Impact assessment and statement

Although an Agricultural Compliance Statement is not required to formally rate agricultural impacts, **it is hereby confirmed that the agricultural impact of the proposed development is negligible.** An Agricultural Compliance Statement is only required to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the project site. It must provide a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the following points:

- The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture is entirely insignificant within this agricultural environment.
- The affected land has very low agricultural potential, anyway.

Therefore, from an agricultural impact point of view, it is recommended that the development be approved

7.1.6 Heritage, Archaeology and Palaeontology Impacts

7.1.6.1 Specialist Findings Assessment of Impacts

Palaeontology: Due to the lack of irreplaceable, unique or rare fossils within the development footprints, and the extensive superficial deposit overlying the sensitive deposits, the significance of the overall impact of the development is expected to be very low following mitigation (Appendix 2 of Heritage Impact Assessment Report – Appendix 5.6).

The impact significance of the proposed development in terms of potential impacts of fossils of scientific or conservation value is rated as VERY LOW, both before and after mitigation of chance fossil finds. Given their

very similar underlying geology (and hence palaeontology), this assessment applies equally to both site area alternatives (Alternatives 1 & 2) for the on-site substation and associated infrastructure.

Given the low palaeosensitivity of the project area and the small footprint of the proposed development, no further specialist palaeontological monitoring or mitigation for this project is recommended, pending the potential discovery of significant chance fossil finds before or during the construction phase. The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the development should be made aware of the possibility of important fossil remains (vertebrate bones, teeth, petrified wood, plant-rich horizons *etc.*) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance (including access roads) and deeper (>1m) excavations by the ESO on an on-going basis during the construction phase is therefore recommended. Significant fossil finds should be safeguarded and reported at the earliest opportunity to HWC for recording and sampling by a professional palaeontologist (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 021 483 5959 Email: ceoheritage@westerncape.gov.za).

The palaeontologist responsible for the mitigation work will require a Fossil Collection Permit from HWC and a Mitigation Report must be submitted to HWC for consideration. All fieldwork and reporting should meet the standards of international best practice as well as those developed for PIA reports by SAHRA (2013) and HWC (2021). Fossil material collected must be safeguarded and curated within an approved palaeontological repository (e.g., museum or university collection) with full collection data.

These recommendations have been included within the EMPr (Appendix 7).

Archaeology: No sites of significance were recorded during the archaeological survey. The archaeological field assessment confirmed the findings of the previous surveys conducted by Cape Archaeological Survey cc and PGS Heritage. There is a general background scatter of MSA in the form of flakes and cores and they are considered NCW. Artefact scatters appear to be concentrated around the tuffite ridge. They are predominantly made on a fine-grained sandstone, although artefacts in chert, quartzite and hornfels occur in small numbers. However, these artefacts are sparsely distributed and are classified as NCW (Appendix 3 of Heritage Impact Assessment Report – Appendix 5.6).

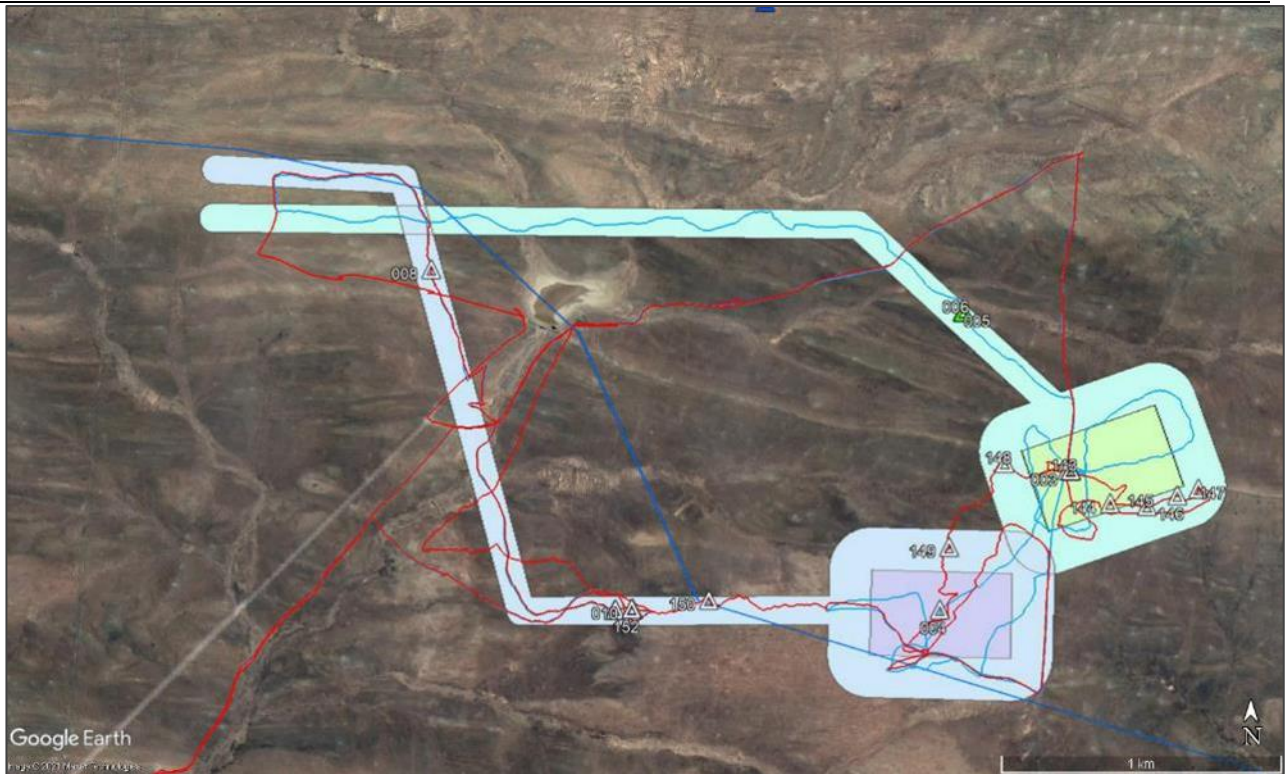


Figure 7-4: Tracks of the archaeological survey and location of archaeological material relative to the substation.

Table 7-16: Archaeological material identified during the survey.

Waypoint	GPS Coordinates	Description	Grading	Buffer
002	S32° 56.177' E22° 35.391'	Two (2) green-coloured chert flakes near the tuffite band. The flakes are not weathered – Site Area Alternative 2	NCW	N/A
003	S32° 56.178' E22° 35.398'	A bigger concentration of LSA cores, fresh flaking on fragments of sandstone rock in proximity to the tuffite band. Cortex weathered into a reddish colour, with flaked areas in pale greenish-grey – Site Area Alternative 2	NCW	N/A
004	S32° 56.443' E22° 35.102'	One (1) weathered MSA flake inside the 1st substation – Site Area Alternative 1	NCW	N/A
005 & 006	S32° 55.875' E22° 35.156' S32° 55.875' E22° 35.153'	Relatively dense and large (20m in diameter) of LSA flakes, cores and weathered cobbles with evidence of fresh flaking along one (1) end. Some cores are radial. There is also evidence of some retouch along some of the flakes. Cortex weathered into a reddish colour, with flaked areas in pale greenish-grey. The site is located between a tuffite band and a depression in the landscape where pools of water collect after heavy rains – Site Area Alternative 2	Grade III C	YES - 20m
007	S32° 55.716' E22° 34.558'	Tuffite band – no artefacts	NCW	N/A
008	S32° 55.794' E22° 33.943'	Three (3) sandstone flakes – Site Area Alternative 1	NCW	N/A
143 (002)	S32° 56.177' E22° 35.398'	Green chert artefacts – Site Area Alternative 2	NCW	N/A

144-146	S32° 56.240' E22° 35.487'	Small concentrations of LSA artefacts (a few meters each) including fresh looking sandstone, few chert artefacts along sandstone ridge, clustered around clusters of woody shrubs - Site Area Alternative 2	NCW	N/A
147	S32° 56.212' E22° 35.686'	Similar area, near tuffite band, concentration of chert artefacts, probably LSA (green colour). Along the band. Scatter down the slope – Site Area Alternative 2	NCW	N/A
148	S32° 56.163' E22° 35.249'	Similar, sandstone artefacts about 20 artefacts over 6 square metres. Next to bushes – Site Area Alternative 2	NCW	N/A
149	S32° 56.324' E22° 35.123'	Few artefacts, less than ten (10), on sandstone, recently looking. Near bush – Site Area Alternative 1	NCW	N/A
150	S32° 56.425' E22° 34.576'	Near small shrubs, five (5) sandstone artefacts and two (2) bits of broken glass – Site Area Alternative 1	NCW	N/A
151	S32° 56.444' E22° 34.363'	Small concentration of sandstone artefacts – Site Area Alternative 1	NCW	N/A
152	S32° 56.442' E22° 34.402'	Sandstone and chert artefacts, plus few fragments of ostrich eggshell and one (1) piece of refined earthenware with spongeware (green and red) design. Slight rise on landscape – Site Area Alternative 1	NCW	N/A



Figure 7-5: Flakes Cobbles, cores and flakes made on refined sandstone from Site 005/006 (left), their location (right).

Graves: No graves were recorded during the survey. In their report, Cape Archeological Survey cc (2016) recorded four (4) graves/family graveyards, but these are all a considerable distance outside of the proposed development footprints. In the case of Graves 3 and 4, they are located near farm dwellings some 15km to the north.

Built Environment: The only farm complex to be potentially affected by the proposed project is the Trakas Kuilen homestead. There will be no direct impacts, however, but rather indirect visual impacts to the farm. The werf has been graded as NCW by Cape Archeological Survey cc, due to the fact that the original werf is in ruins, and the current structure dates to 1957. All other farm complexes that have been discussed are in the 5km buffer zone and will not be impacted.

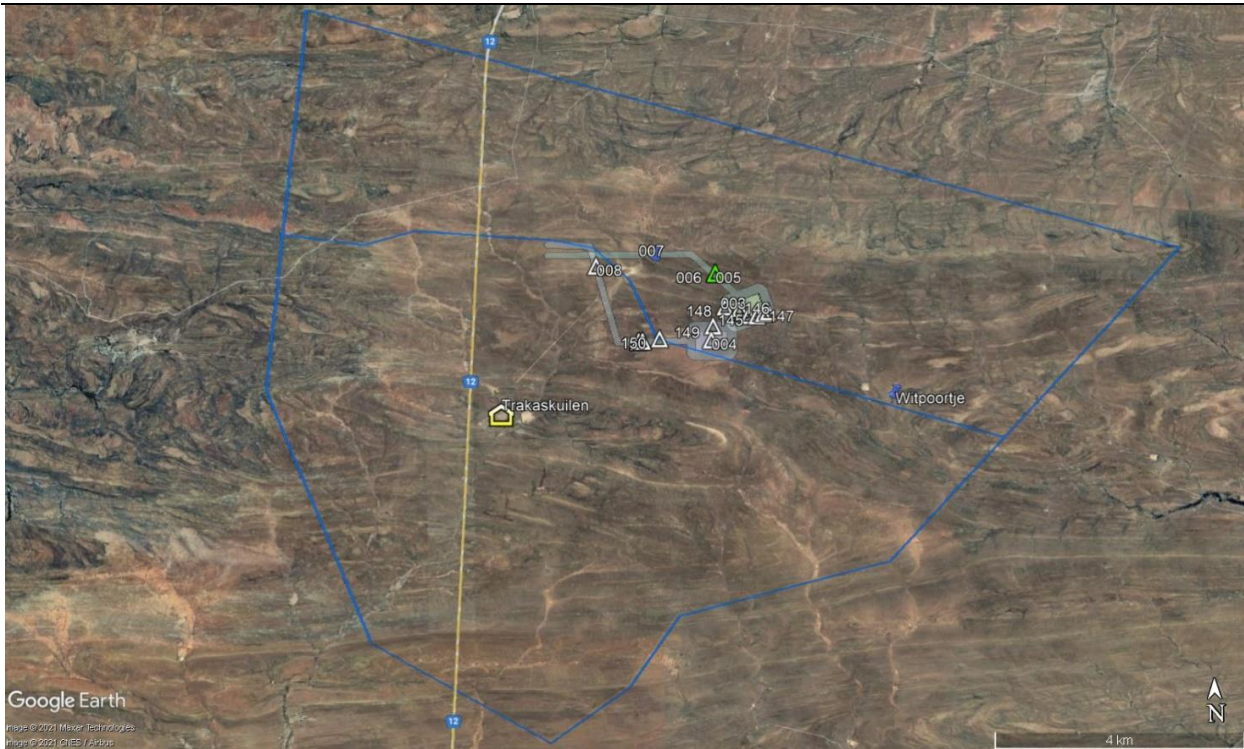


Figure 7-6: Distribution of heritage resources on the farm Trakas Kuilen 15 are limited to the farmhouse, the stockpost at Witpoortje, the N12 and a distribution of stone artefacts across the landscape.

Cultural Landscape: comprises tangible resources such as palaeontological resources, archaeological sites spread across the landscape, built environment features, graves and landscape features. On Trakas Kuilen this includes the homestead and the stock post at Witpoortje. It also includes the more intangible elements such as land use which may encompass traditional transhumance patterns and systems of livestock grazing, utilization of the intermittent water resources and knowledge of the value of the local vegetation. For example, there is evidence of attempts in the past to dam the Trakas River by constructing stone weirs across it. More difficult to define or grade are the aesthetic values relating the landscape itself, such as views from slight elevations (tuffite ridges) in the landscape, the Willow Tree Dam and the vistas to the Swartberg Mountains in the south. All these elements combine to characterize the landscape. All these elements typify the Karoo, but they do not make this particular area unique or highly significant and therefore a Grade IIIC grading is most appropriate.

Visual Impact: The results of the visual assessment are further discussed in Appendix 4 of the Heritage Impact Assessment Report (Appendix 5.6). The study area is largely characterised by open plains interspersed with dry river courses and low ridges. The most prominent feature in the landscape is the Groot Swartberg range located approximately 45km south of the project sites. Adding to the openness of the landscape, and hence wide-ranging vistas is the low and sparse Gamka Karoo vegetation type that covers the entire study area. Agricultural activity in the area is severely restricted by the arid nature of the local climate and shallow soils. Sheep farming is the dominant activity, although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence. The N12 national route is a dominant man-made feature in the landscape, bisecting the study area in a north-south direction, linking Beaufort West with De Rust and Oudtshoorn in the south.

7.1.6.2 Impact Assessment

Design / Pre-construction Phase Impacts:

No impacts to heritage resources are anticipated during this phase.

Construction Phase Impacts:

Direct impacts to palaeontological resources are confined to the construction phase and impacts to these resources are not anticipated during the operational or decommissioning phases. The construction of any infrastructure that requires excavation into bedrock or is located at sites of surface exposures of bedrock may potentially have high impacts to fossil resources. However, due to the lack of irreplaceable, unique or rare fossils within the development footprint, and the extensive superficial deposit overlying the sensitive deposits, the significance of the overall impact of the development is expected to be very low following mitigation.

Direct impacts to archaeological resources, graves and built environment may result from activities related to construction such as earth moving for the substation foundations, construction vehicles in the study area, clearing of land, earth moving, road construction etc. Stone Age archaeology is very sparsely distributed across the landscape. As a result, the probability of impacts to Stone Age archaeology is likely to be low before mitigation. The only colonial era heritage resource in proximity to the study area is the ruined stockpost of Witpoortje, but it will not be directly impacted. Impacts to graves, during construction, can be very high without mitigation. However, no graves have been recorded within the study area [Intensity – Low; Duration – Permanent; Extent – Site; Consequence – Medium; Probability – Conceivable].

The significance of the built environment (the Trakas Kuilen farm werf) within the study area is very low (NCW) and it is likely that the significance of impacts to the built environment will be low without mitigation. There will be no direct impacts to the homestead and the impacts are likely to be indirect.

Table 7-17: Impacts to Pre-Colonial and Colonial Archaeological sites and Graves

Issue: Destruction of Pre-Colonial and Colonial Archaeological sites and Graves.		
Description of Impact		
Construction activities may destroy, or damage surface or sub-surface archeological pre-colonial or colonial era remains or unmarked graves		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Medium	Low
Probability	Conceivable	Improbable
Significance	Low -	Low -
Degree to which impact can be reversed	Archaeological resources are not renewable and once the site is destroyed, it cannot be renewed.	

Degree to which impact may cause irreplaceable loss of resources	Impacts can be irreplaceable, but the archaeological resources are of Low significance or not conservation worthy.	
Degree to which impact can be mitigated	No mitigation is required for NCW sites. Site 005/006, graded IIIC, should be avoided and a 20m buffer implemented around the site. This will ensure its conservation.	
Mitigation Actions		
The following measures are recommended:	<ul style="list-style-type: none"> • Archaeological site 005/006 should be protected by a 20m buffer. • If any archaeological material is uncovered during the course of the development, then work must stop in the immediate area. The find must be reported to the Heritage Western Cape and may require inspection by an archaeologist. The find may require archaeological excavation and curation in an approved institution. • If any unmarked graves are uncovered, HWC must be alerted immediately as per Section 36(6) of the NHRA. A professional archaeologist must be contacted as soon as possible to inspect the findings. 	
Monitoring Actions		
The following monitoring is recommended:	N/A	
Cumulative Impacts		
Nature of Cumulative Impacts	Due to the sparse scatter of Stone Age archaeological material across the landscape and the absence of any specific 'archaeological sites', the significance of cumulative impacts is expected to be low. No ruined structures will be impacted and therefore there will be no additional cumulative impacts to colonial era archaeological remains. No impacts are anticipated on graves or cemeteries. While a number of renewable energy projects are planned to the east of the current Beaufort West and Trakas Wind Farms, they are in the design phase and potential impacts to archaeological resources can be mitigated through specialist studies. These studies have the potential to increase our understanding of pre-colonial and colonial utilization of the landscape, and therefore not all cumulative impacts are considered to be negative.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Medium -	Medium -

The impact significance of the proposed development in terms of potential impacts of Paleontological fossils of scientific or conservation value is rated as VERY LOW, both before and after mitigation of chance fossil finds [Intensity – V. Low; Duration – Permanent; Extent – Site; Consequence – Low; Probability – Conceivable]. This assessment applies equally to both site area alternatives for the on-site substation and associated infrastructure under consideration.

There is therefore no preference in terms of palaeontological heritage for any specific project layout. The project is not fatally flawed, and there are no objections on palaeontological grounds to its authorisation.

Table 7-18: Impacts to Cultural Landscape

Issue: Negative impact on the Cultural Landscape		
Description of Impact		
Construction activities as a result of an intrusion of incompatible structures in the area may lead to a loss of sense of place and negative impacts to the rural cultural landscape and heritage resources within it.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Probable	Probable
Significance	Medium -	Medium -
Degree to which impact can be reversed	Once the substation and other associated infrastructure have been removed, the impact to the landscape will decline	
Degree to which impact may cause irreplaceable loss of resources	Impacts to the cultural landscape can be irreversible, i.e., the cuttings for new roads, etc.	
Degree to which impact can be mitigated	No mitigation can effectively lessen the impact of the substation and other associated infrastructure on the landscape.	
Mitigation Actions		
The following measures are recommended:	<ul style="list-style-type: none"> Mitigation measures are proposed that relate mostly to good housekeeping during the construction phase. These are listed under "Management Measures" in the VIA report (Appendix 5.8), on pages 26-27. They include recommendations around preparatory work and construction, earthworks, an ecological approach, mounting structures and associated infrastructure, lighting and branding / marketing. 	
Monitoring Actions		
The following monitoring is recommended:	N/A	
Cumulative Impacts		
Nature of Cumulative Impacts	The substation and other associated infrastructure should be viewed in the overall context of the impacts of the wind turbines and the cumulative impacts of these structures and on the cultural landscape is considered to be Negative. There is the potential for the cumulative impact of the proposed substation and other associated infrastructure in conjunction with the proposed renewable energy facilities to negatively impact the cultural landscape, due to changes in the landscape character from wilderness to semi-industrial. The cumulative impact to the Cultural Landscape is considered to be MEDIUM, when considering the intensity, duration and extent of the change to the landscape. An increase in the number of wind farms will likely escalate the extent of impacts from local to regional, as larger areas of the Karoo are impacted.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation

	Low -	Low -
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The cultural landscape will be indirectly impacted through the introduction of incompatible structures (such as substations and other associated infrastructure) and construction vehicles in a rural landscape. Although the construction phase is quite short, the scarring of the landscape during the building of the substation and other associated infrastructure would take some time to rehabilitate. These indirect impacts can be mitigated by following good housekeeping (see VIA report provided in Appendix 4 of Heritage Impact Assessment Report - Appendix 5.6).

In their heritage Impact Assessment (2016), Cape Archaeological Survey cc recommended that the proposed substations and O&M building should be at least 500m from the N12. This has been achieved by the current layout, thereby mitigating some of the impacts.

Operational Phase Impacts:

No impacts to archaeological resources, graves and built environment are anticipated during the operational phase, as no new areas will be disturbed through operational activities. Vehicles are likely to use existing, established service roads. The significance of impact, without mitigation, would therefore be very low.

Impacts to cultural landscapes are predominantly indirect in nature, given that the resources are largely intangible. These impacts occur throughout the operational phase of the project. Indirect impacts occur as a result of an intrusion of incompatible structures in an area that can lead to a loss of sense of place and negative impacts to the rural cultural landscape and heritage resources within it. Indirect impacts pose the biggest threat to the significance and integrity of the cultural landscape. The visual aesthetic quality is diminished and the feeling of 'wilderness' is eroded. The nature of these impacts is cumulative.

Impacts to the cultural landscape will be continuous throughout the operational phase of the project, as a result of vehicles and personnel on site for maintenance, etc. These impacts will change the rural character of landscape. These impacts cannot be changed or mitigated.

Table 7-19: Impacts to the Cultural Landscape

Issue: Negative impacts on the Cultural Landscape		
Description of Impact		
Operational activities as a related to the operation of incompatible structures in the area can lead to a loss of sense of place and negative impacts to the rural cultural landscape and heritage resources within it.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Probable	Probable

Significance	Medium -	Medium -
Degree to which impact can be reversed	Once the substation and other associated infrastructure have been removed, the impact to the landscape will decline	
Degree to which impact may cause irreplaceable loss of resources	Impacts to the cultural landscape can be irreversible, i.e., the cuttings for new roads, etc.	
Degree to which impact can be mitigated	No mitigation can effectively lessen the impact of the substation and other associated infrastructure on the landscape.	
Mitigation Actions		
The following measures are recommended:	<ul style="list-style-type: none"> Mitigation measures are proposed that relate mostly to good housekeeping during the construction phase. These are listed under "Management Measures" in the VIA report (Appendix 5.8), on pages 26-27. They include recommendations around preparatory work and construction, earthworks, an ecological approach, mounting structures and associated infrastructure, lighting and branding / marketing. 	
Monitoring Actions		
The following monitoring is recommended:	N/A	
Cumulative Impacts		
Nature of Cumulative Impacts	The substation and other associated infrastructure should be viewed in the overall context of the impacts of the wind turbines and the cumulative impacts of these structures and on the cultural landscape is considered to be Negative. There is the potential for the cumulative impact of the proposed substation and other associated infrastructure in conjunction with the proposed renewable energy facilities to negatively impact the cultural landscape, due to changes in the landscape character from wilderness to semi-industrial. The cumulative impact to the Cultural Landscape is considered to be MEDIUM, when considering the intensity, duration and extent of the change to the landscape. An increase in the number of wind farms will likely escalate the extent of impacts from local to regional, as larger areas of the Karoo are impacted.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

Decommissioning Phase Impacts:

No impacts to archeological resources, graves and built environment are anticipated during the Decommissioning phase, as no new areas will be disturbed during decommissioning. The significance of impacts without mitigation would therefore be Very Low. The changes to the character of the landscape, and the negative impact on the sense of place and aesthetic value which result from the substation and other associated infrastructure are seen to be largely unmitigable with the only effective rehabilitation of the landscape after decommissioning serving as the effective remedial action.

Impacts to the cultural landscape will be continuous throughout the decommissioning phase, as a result of vehicles and personnel on site for the removal of the infrastructure. It should be noted, however, that any resulting impacts would be of short duration. The rehabilitation of the environment can be achieved by the removal of the substation and any other relevant infrastructure during the decommissioning process.

However, aspects of the rehabilitation may be hard to achieve, such as the roads and levelled areas for construction camps, and there will be residual impacts following decommissioning.

At this stage, indirect impacts to heritage resources that were felt during construction and operation can be reduced or removed with the successful rehabilitation of the site.

Table 7-20: Impacts to the Cultural Landscape

Issue: Impacts to the Cultural Landscape		
Description of Impact		
The removal of the substation and any other relevant infrastructure will result in the rehabilitation of the landscape which is able to return to its condition prior to the project.		
Type of Impact	Indirect	
Nature of Impact	Neutral	
Phases	Decommissioning	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Low	Low
Probability	Possible	Conceivable
Significance	Very Low -	Very Low -
Degree to which impact can be reversed	The impact is reversible by removal of the hardened infrastructure and rehabilitation of the landscape	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation of this impact during decommissioning, the roads, etc. will result in permanent scarring on the landscape.	
Degree to which impact can be mitigated	There is significant scope for mitigation if the landscape is rehabilitated.	
Mitigation Actions		
The following measures are recommended:	<ul style="list-style-type: none"> Mitigation measures are proposed that relate mostly to good housekeeping during the construction phase. These are listed under "Management Measures" in the VIA report (Appendix 5.8), on pages 26-27. They include recommendations around preparatory work and construction, earthworks, an ecological approach, mounting structures and associated infrastructure, lighting and branding / marketing. 	
Monitoring Actions		
The following monitoring is recommended:	N/A	
Cumulative Impacts		
Nature of Cumulative Impacts	The substation and other associated infrastructure should be viewed in the overall context of the impacts of the wind turbines and the cumulative impacts of these structures and on the cultural landscape is considered to be Negative. There is the potential for the cumulative impact of the proposed substation and other associated infrastructure in conjunction with the proposed renewable energy facilities to negatively impact the cultural landscape, due to changes in the landscape character from wilderness to semi-industrial. The cumulative impact to the Cultural	

	Landscape is considered to be MEDIUM, when considering the intensity, duration and extent of the change to the landscape. An increase in the number of wind farms will likely escalate the extent of impacts from local to regional, as larger areas of the Karoo are impacted.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

7.1.7 Reptiles (specifically Karoo Dwarf Tortoise)

As mentioned in Section 6.2.4, the DFFE's Online Screening Tool Reports which were generated (Appendix 8.3) listed *Chersobius boulengeri* (Karoo Dwarf Tortoise) as being a species of Medium sensitivity within the Animal Species Theme. This species is currently listing under IUCN as *Endangered*. However, based on the findings of the site sensitivity verification, the rating of Medium sensitivity has been adjusted to being Low. Considering this, a formal impact assessment was not undertaken and a TASCs (Appendix 5.2) has been compiled instead, with specific focus on Karoo Dwarf Tortoise.

The main conclusion of the site sensitivity verification is that the Karoo Dwarf Tortoise does not occur within either of the development nodes. This conclusion is based primarily on the following:

- the absence of suitable or optimal habitat for this species;
- the absence of evidence of live or dead specimens during the field survey;
- the absence of observations by two (2) tortoise experts that have worked in the general region; and
- the absence of observations by the landowner.

Although the Karoo Dwarf Tortoise is known to occur in the general region, it seems unlikely that it is present within the proposed development areas. As such, no specific mitigation measures are proposed in terms of safeguarding Karoo Dwarf Tortoises. Even though real absence cannot in fact be stated with absolute certainty, the confidence of this being the case is 90+%. As such, this species is not deemed to be a relevant constraint in the context of the proposed developments here.

7.2 SUMMARY OF IMPACT SIGNIFICANCE

Based on the results of the impact assessment undertaken by the respective specialists, as described in the relevant sections above, the impacts associated with the proposed project can be kept to acceptable levels (i.e., either Medium Negative, Low Negative and/or Very Low Negative) after the implementation of the appropriate mitigation measures. The Avifauna and Aquatic specialists have also identified several impacts associated with the proposed project which have Very Low Positive significance, while the Aquatic specialist found that the loss of aquatic species of special concern would have an Insignificant significance after the implementation of mitigation measures. The visual impact on sensitive receptors during the construction, operational and decommissioning phases will also have an Insignificant significance before and after mitigation. In addition, no fatal flaws have been identified by any of the specialists.

The identified impacts associated with the proposed project are therefore deemed to be acceptable.

Please refer to Table 7-21 below for a summary of the results of the impact assessment undertaken by the respective specialists (including significance before and after mitigation), as described in the relevant sections above.

Table 7-21: Summary of Impacts and Impact Significance Ratings from Specialist Assessments

Specialist	Impacts	Impact Rating	
		Without Mitigation	With Mitigation
Agriculture	<p>Although an Agricultural Compliance Statement is not required to formally rate agricultural impacts, it is hereby confirmed that the agricultural impact of the proposed development is negligible. The proposed project has a negligible agricultural impact for the following reasons:</p> <ul style="list-style-type: none"> The direct, permanent, physical footprint of the respective developments that has any potential to interfere with agriculture is of very limited extent and therefore, entirely insignificant within this agricultural environment of large farms utilised only for low density grazing. The affected land has very low agricultural potential. <p>There is likely to be some nuisance disturbance to agricultural activities during construction. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.</p>		
	Construction & Decommissioning Phases		
Aquatic	Loss of aquatic species of special concern	Low -	Insignificant
	Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase	Medium -	Very Low +
	Potential impact on localised surface water quality	Medium -	Very Low +
	Operational Phase		
	Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.	Medium -	Very Low +
Terrestrial Ecology	Pre-Construction & Construction Phase		
	Impacts on vegetation and protected plant species	Medium -	Medium -
	Impacts on fauna due to construction activities	Medium -	Medium -
	Operational Phase		
	Impacts on fauna due to operational activities	Very Low -	Very Low -
	Impacts on CBAs and ESAs due to the presence and operation of the facility	Low -	Very Low -
	Habitat degradation due to erosion and alien plant invasion	Medium -	Low -
	Decommissioning Phase		
	Impacts on fauna due to construction activities	Medium -	Medium -
Habitat degradation due to erosion and alien plant invasion due to decommissioning	Medium -	Low -	
Construction Phase			

Specialist	Impacts	Impact Rating	
		Without Mitigation	With Mitigation
Avifauna	Displacement due to disturbance associated with the construction of the substation and associated infrastructure.	Low -	Very Low +
	Displacement due to habitat transformation associated with the construction of the associated infrastructure.	Low -	Low -
	Operational Phase		
	Electrocutions within the substation yard.	Low -	Very Low +
	Decommissioning Phase		
	Displacement due to disturbance associated with the decommissioning of the substation and associated infrastructure.	Low -	Very Low +
Heritage & Archaeology	Construction Phase		
	Destruction of Pre-Colonial and Colonial Archaeological sites and Graves.	Low -	Low -
	Negative impact on the Cultural Landscape	Medium -	Medium -
	Operational Phase		
	Negative impacts on the Cultural Landscape	Medium -	Medium -
Decommissioning Phase			
	Impacts to the Cultural Landscape	Very Low -	Very Low -
Palaeontology	Construction Phase		
	Impacts to fossil resources as a result of the construction of any infrastructure that requires excavation into bedrock or is located at sites of surface exposures of bedrock	Very Low -	Very Low -
Visual	Construction, Operational and Decommissioning Phases		
	Visual impact on sensitive receptors during construction, operational and decommissioning phases	Insignificant	Insignificant
Reptiles (specifically Karoo Dwarf Tortoise)	<p>The main conclusion of the site sensitivity verification is that the Karoo Dwarf Tortoise does not occur within either of the development nodes. This conclusion is based primarily on the following:</p> <ul style="list-style-type: none"> • the absence of suitable or optimal habitat for this species; • the absence of evidence of live or dead specimens during the field survey; • the absence of observations by two (2) tortoise experts that have worked in the general region; and • the absence of observations by the landowner. 		

Specialist	Impacts	Impact Rating	
		Without Mitigation	With Mitigation
	<p>Although the Karoo Dwarf Tortoise is known to occur in the general region, it seems unlikely that it is present within the proposed development areas. As such, no specific mitigation measures are proposed in terms of safeguarding Karoo Dwarf Tortoises. Even though real absence cannot in fact be stated with absolute certainty, the confidence of this being the case is 90+%. As such, this species is not deemed to be a relevant constraint in the context of the proposed developments here.</p>		

7.3 CUMULATIVE ASSESSMENT

In relation to an activity, cumulative impact means “*the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*” (NEMA EIA Reg GN R982 of 2014).

As mentioned in Section 3.5.6 of the BAR, the cumulative impact assessed is the collective impact of the proposed project along with the authorised Beaufort West Wind Farm and Trakas Wind Farm (including the associated electrical infrastructure), as well as the three (3) WEFs and their associated infrastructure on properties immediately east of the authorised Beaufort West Wind Farm site, which are located within a 30km radius of the project site.

An assessment of the cumulative impacts associated with the proposed development, per specialist assessment, are provided in the sections below.

7.3.1 Cumulative Impacts

7.3.1.1 Terrestrial Ecology

The South African Renewable Energy EIA Application Database (REEA) available at the time (namely “REEA_OR_2021_Q2”) shows that there are no operational renewable energy developments situated within a 30km radius of the proposed project site. In addition, only a few renewable energy projects (wind) are authorised within close proximity to the town of Beaufort West. This includes the Beaufort West Cluster which consists of two (2) authorised wind farm projects and associated electrical infrastructure (namely the Beaufort West Wind Farm – [12-12-20-1784-1-AM2](#) and Trakas Wind Farm - [12-12-20-1784-2-AM2](#)).

In addition to the above, the application for EA for the Leeu Gamka Solar Power Plant ([12/12/20/2296](#)) which was identified within a 30km radius of the proposed project site has been withdrawn and/or lapsed.

The cumulative impact assessed will therefore be the collective impact of the proposed onsite substation, BESS, laydown area, O&M building and powerline application along with the authorised Beaufort West Wind Farm and Trakas Wind Farm, which are located within a 30km radius of the project site.

In terms of the recommended mitigation measures associated with the different projects, the consultant has worked on both the Trakas and Beaufort West projects, with the result that the findings of these studies has already been included and integrated into the current study. The other solar PV projects are still in process and the ecological reports are currently not available for review. Given the features of the area, the most important mitigation and avoidance measures associated with the different projects include minimizing impact on the drainage lines of the area and avoiding impact on protected plant and animal species. Similar mitigation and avoidance has been recommended and implemented in terms of the layout of the Koup 1 WEF and as such, the Koup 1 WEF project is considered aligned and consistent with the mitigation and avoidance that has been recommended on other projects in the immediate environment.

Table 7-22: Cumulative impact on ecological processes.

Issue: Cumulative impact on ecological processes		
Description of Impact		
Renewable energy development in the wider area around the site will generate cumulative impacts on habitat loss and fragmentation for fauna and flora.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Cumulative Impact	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Low	Low
Probability	Probable	Probable
Significance	Low -	Low -
Degree to which impact can be reversed	The impact is reversible to some degree by removal of the hardened infrastructure and rehabilitation of the site at decommissioning. As the site is arid, it is not likely that vegetation cover and diversity can be fully restored at decommissioning, so there would be some residual impact.	
Degree to which impact may cause irreplaceable loss of resources	The habitats present on site are not localized or unique and as the footprint within these areas would be low, there would not be an irreplaceable loss of resources as related to the ESAs and CBAs of the affected area.	
Degree to which impact can be mitigated	To some extent, but habitat loss and fragmentation will persist for the lifetime of the facility.	
Mitigation Actions		
The following measures are recommended:	<ol style="list-style-type: none"> 1) Minimise habitat loss and degradation within high-value faunal habitats such as drainage lines. 2) Promote sustainable land use practices in the area and especially on the wind farm properties to improve the quality of the habitat for fauna and flora. 3) Ensure that alien species of flora as well as fauna are managed to ensure that they do not have a broadly negative impact. 	
Monitoring Actions		
The following monitoring is recommended:	Construction phase monitoring by the ECO to ensure that the development footprint is confined to the planned areas.	
Cumulative Impacts		
Nature of Cumulative Impacts	The development would contribute to cumulative habitat loss and fragmentation in the area, but the contribution of the current development would be very small compared to the other sources of impact and is not considered highly significant.	
Rating of Cumulative Impacts	Without Mitigation	With Mitigation
	Low -	Low -

7.3.1.2 Avifauna

From an avifaunal perspective, the following cumulative impacts are associated with the proposed project:

- Displacement due to disturbance associated with the construction and decommissioning of the substation and associated infrastructure.

- Displacement due to habitat transformation associated with the substation and associated infrastructure.
- Electrocutions within the substation yard.

Based on the impact assessment undertaken in Section 7.1.2.3 (Table 7-8, Table 7-9, Table 7-10 and Table 7-11), the significance of the above-mentioned cumulative impacts can be mitigated to acceptable levels (i.e., either Low Negative or Very Low Negative) after the implementation of the appropriate mitigation measures. In addition, two (2) of the cumulative impacts are anticipated to result in Very Low Positive impacts from an avifauna perspective (namely Displacement of priority species due to disturbance associated with construction and decommissioning of on-site substations and associated infrastructure).

The only existing HV line in the 30km radius around the project site is the Droërvier – Proteus 400kV transmission line, of which a 60km is contained in the 30km radius. The sum total of the existing and planned Beaufort West Wind Farm grid connection in the 30km radius thus amounts to an estimated 63.45km, of which the proposed Beaufort West Wind Farm grid connection constitute a maximum of 3.45km, or 5.4%. The contribution of the Beaufort West Wind Farm grid connection application / project to the cumulative impact of all the planned and existing HV lines is thus low.

7.3.1.3 Aquatic / Surface Water

Overall, the cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the cumulative impact on the aquatic environment would be Low (1) prior to the implementation of mitigation measures and very Low (-) after the implementation of the recommend mitigation measures. There are thus no fatal flaws and the project will not result in significant cumulative impacts that cannot be mitigated effectively.

Table 7-23: Cumulative Map indicating REFs within the 30km buffer of the proposed Substation and Associated Infrastructure

Issue: Cumulative Impacts on Aquatic Environment		
Description of Impact		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and/or review of the past assessments as part of any required Water Use Licenses (Enertrag SA, Atlantic Energy Partners & Mainstream projects).		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Short-term
Extent	Site	Site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium -	Very Low +
Degree to which impact can be reversed	High with rehabilitation	

Degree to which impact may cause irreplaceable loss of resources	Medium	
Degree to which impact can be mitigated	High	
Mitigation actions		
The following measures are recommended:	The premise of all the reviewed or assessed projects has been the avoidance of impacts on the aquatic environment, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines for some of the longer grid connections for those projects.	
Monitoring		
The following monitoring is recommended:	-	
Cumulative impacts		
Nature of cumulative impacts	Negative	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Very Low -

7.3.1.4 Visual

The cumulative effect of WEFs and Associated Infrastructure

Intervisibility for the project described above and within a 30km radius of the development site will be evident. The combined effect over time of these developments would result in the study area being impacted upon in a manner beyond the anticipated neutral negative impacts of the proposed Project alone. WEFs (including their associated electrical infrastructure) have the potential to cause large-scale visual impacts and the location of several such developments near each other could significantly alter the sense of place and visual character in the broader region. Although substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

The authorised Beaufort West ([12-12-20-1784-1-AM2](#)) and Trakas ([12-12-20-1784-2-AM2](#)) wind farms are both integrally linked to the proposed grid connection projects ([14-12-16-3-3-2-925-1](#) & [14-12-16-3-3-2-925-2](#)) and are located within the 5km visual assessment zone of potential impact for this project. In addition, the proposed wind farms and the grid connection infrastructure are all within the 5km viewing distance of the potentially sensitive receptor locations identified in the study area. The proposed substation and associated infrastructure project are however located entirely on the two (2) authorised wind farm application sites and as such will be perceived as part of the greater Beaufort West Cluster of wind developments. It could therefore be argued that the proposed substation and associated infrastructure development will not increase the cumulative impacts of the authorised wind farms and associated electrical infrastructure to any significant degree.

The visual assessment undertaken for the combined Beaufort West and Trakas Wind Farm identified visual impacts in their report (Oberholzer, 2010:20) and determined an overall impact rating of High (before mitigation) and Medium-High (after mitigation). The impacts for the three (3) Kwagga Wind Farms have not been published at the date of writing this report, however, it is reasonable to expect that these would be high, given the vast spatial extent of the project and their relationship to the N12.

It should be noted that the above cumulative impact ratings would remain unchanged regardless of whether the proposed substation and associated infrastructure project is developed, as the impact of the substation and associated infrastructure would be dwarfed by the cumulative impact of the other renewable energy developments in the area. As such, as shown in the impact assessment undertaken in Section 7.1.4.4 (Table 7-15), the significance of the cumulative impacts will be Medium-High after the implementation of the appropriate mitigation measures. The specialist has however confirmed that there are no fatal flaws associated with the proposed project.

7.3.1.5 Agriculture

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for these projects is an assessment only of the impacts associated with these projects, however, seen in the context of all surrounding impacts. It is concerned with these projects' contribution to the overall impact, within the context of the overall impact.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of agricultural land, with a consequent decrease in agricultural production. The defining question for assessing the cumulative agricultural impact is this:

What level of loss of agricultural land use and associated loss of agricultural production is acceptable in the area, and will the loss associated with the proposed developments, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Because the developments themselves lead to negligible agricultural land loss, their cumulative impact must also logically be negligible. It therefore does not make sense to conduct a more formal assessment of cumulative impacts as per DFFE requirements. Many times, more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of agricultural land loss are exceeded. Acceptable levels of change in terms of other types of impact (for example visual impact) would be exceeded long before the levels for agricultural impact became an issue. In reality, the landscape in this environment could be covered with infrastructure such as powerlines and agricultural production would continue largely unaffected.

Due to all the considerations discussed above, the cumulative impact of loss of agricultural land use can confidently be assessed as not having an unacceptable negative impact on the agricultural production capability of the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.

7.3.1.6 Heritage, Archaeology and Palaeontology

The following cumulative impacts have been identified from a heritage and archaeology perspective:

- Destruction of Palaeontological Fossils during construction
- Destruction of Pre-Colonial and Colonial Archaeological sites and Graves during construction
- Impacts to the Cultural Landscape during construction and operation

The above-mentioned cumulative impacts which are associated with the proposed project from a heritage and archaeology perspective are assessed in the tables below.

Destruction of Palaeontological Fossils during construction

Issue: Destruction of Palaeontological Fossils	
Description of Impact	
Construction activities may destroy or damage palaeontological fossils	
Type of Impact	Indirect
Nature of Impact	Negative
Cumulative impacts	
Nature of cumulative impacts	The Cumulative Impacts on Palaeontological fossils of scientific or conservation value is rated as VERY LOW . Provided that the proposed monitoring and mitigation recommendations for the project is implemented, the cumulative impacts of the substation and associated infrastructure is likely to be very low. Unlike other forms of heritage, palaeontological resources can benefit from better research and improved understanding arising from appropriate professional mitigation, partially compensating for the unavoidable residual negative impacts. This is regarded as positive impact for Karoo palaeontological heritage.

Destruction of Pre-Colonial and Colonial Archaeological sites and Graves during construction

Issue: Destruction of Pre-Colonial and Colonial Archaeological sites and Graves.	
Description of Impact	
Construction activities may destroy or damage surface or sub-surface archaeological pre-colonial or colonial era remains or unmarked graves	
Type of Impact	Indirect
Nature of Impact	Negative
Cumulative impacts	
Nature of cumulative impacts	Due to the sparse scatter of Stone Age archaeological material across the landscape and the absence of any specific 'archaeological sites', the significance of cumulative impacts is expected to be LOW . No ruined structures will be impacted and therefore there will be no additional cumulative impacts to colonial era archaeological remains. No impacts are anticipated on graves or cemeteries. While a number of renewable energy projects are planned to the east of the current Beaufort West and Trakas Wind Farms, they are in the design phase and potential impacts to archaeological resources can be mitigated through specialist studies. These studies have the potential to increase our understanding of pre-colonial and colonial utilization of the landscape, and therefore not all cumulative impacts are considered to be negative.

Impacts to the Cultural Landscape during construction and operation

Issue: Impacts to the Cultural Landscape	
Description of Impact	
Construction and Operational activities may have a negative impact on the Cultural Landscape	
Type of Impact	Indirect
Nature of Impact	Negative
Cumulative impacts	
Nature of cumulative impacts	The substation and other associated infrastructure should be viewed in the overall context of the impacts of the wind turbines and the cumulative impacts of these structures and on the cultural landscape is considered to be Negative. There is the potential for the cumulative impact of the proposed substation and other associated infrastructure in conjunction with the proposed renewable energy facilities to negatively impact the cultural landscape, due to changes in the landscape character from wilderness to semi-industrial. The cumulative impact to the Cultural Landscape is considered to be MEDIUM , when considering the intensity, duration and extent of the change to the landscape. Figure 7-4 illustrates the renewable energy projects which planned to the east of the current Beaufort West and Trakas Wind Farms. An increase in the number of wind farms will likely escalate the extent of impacts from local to regional, as larger areas of the Karoo are impacted.

In addition, the Visual Impact Assessment (Appendix 5.8) comments that:

“WEFs (including their associated electrical infrastructure) have the potential to cause large-scale visual impacts and the location of several such developments near each other could significantly alter the sense of place and visual character in the broader region. Although powerlines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place. The authorised Beaufort West (12-12-20-1784-1-AM2) and Trakas (12-12-20-1784-2-AM2) wind farms are both integrally linked to the proposed grid connection projects (14-12-16-3-3-2-925-1 & 14-12-16-3-3-2-925-2) and are located within the 5km visual assessment zone of potential impact for the project. In addition, the proposed wind farms and the grid connection infrastructure are all within the 5km viewing distance of the potentially sensitive receptor locations identified in the study area. The proposed substation and associated infrastructure project is however located entirely on the two (2) authorised wind farm application sites and as such will be perceived as part of the greater Beaufort West Cluster of wind developments. It could therefore be argued that the proposed substation and associated infrastructure development will not increase the cumulative impacts of the authorised wind farms and associated electrical infrastructure to any significant degree.

The visual assessment undertaken for the combined Beaufort West and Trakas Wind Farm identified visual impacts in their report (Oberholzer, 2010:20) and determined an overall impact rating of High (before mitigation) and Medium-High (after mitigation). The impacts for the three (3) Kwagga Wind Farms have not been published at the date of writing this report, however, it is reasonable to expect that these would be high, given the vast spatial extent of the project, and their relationship to the N12”

As show in the tables above, the Cumulative Impacts on heritage, archaeological and palaeontological resources range from Low, Very Low and Medium Negative. However, no fatal flaws have been identified from a cumulative impact perspective and the cumulative impacts can be mitigated to acceptable levels.

7.3.2 Summary of Cumulative Impact Rating

A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists and is discussed in the sections above (see Section 3.5.6 and Section 7.3.1). Based on the rating of cumulative impacts undertaken by the specialists, the cumulative impacts associated with the proposed project can be mitigated to acceptable levels after the implementation of mitigation measures. The cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, however, no fatal flaws have been identified by the visual specialist. In addition, the impact of the substation and associated infrastructure would be dwarfed by the cumulative impact of the other renewable energy developments in the area. It should also be noted that several Very Low Positive impacts have been identified by the Avifauna specialist.

The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

The results of the rating of significance of cumulative impacts associated with the proposed project are summarised in Table 7-24 below.

Table 7-24: Summary of Cumulative Impact Rating

Specialist Study	Nature of Cumulative Impacts	Significance Rating	
		Without Mitigation	With Mitigation
Terrestrial Ecology	The development would contribute to cumulative habitat loss and fragmentation in the area, but the contribution of the current development would be very small compared to the other sources of impact and is not considered highly significant.	Low -	Low -
Avifauna	During the construction of substations and other associated infrastructure, habitat destruction inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the substations, which could result in temporary or permanent displacement. Displacement of priority species due to disturbance associated with construction of the on-site substations will be a feature of all the proposed renewable energy projects within a 30km radius around the project.	Low -	Very Low +
	During the construction of substations and other associated infrastructure, habitat destruction / transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the infrastructure through transformation of habitat, which could result in temporary or permanent displacement. Displacement of priority species due to habitat transformation associated with construction of the on-site substations will be a feature of all the proposed renewable energy projects within a 30km radius around the project.	Low -	Low -

	Electrocutions as a result of bird perching or attempting to perch on the electrical structure. Electrocutions within on-site substation yards are possible but should not affect the more sensitive Red List bird species, as these species are unlikely to use the infrastructure within the substation yard for perching or roosting. Species that are more vulnerable to this impact are corvids, owls and certain species of waterbirds. Electrocution mortality associated with substations will be a feature of all the proposed renewable energy projects within a 30km radius around the project.	Low -	Very Low -
	During the decommissioning of substations and other associated infrastructure, habitat destruction / transformation inevitably takes place. These activities could impact on birds breeding, foraging and roosting in or in close proximity of the sites through transformation of habitat, which could result in temporary or permanent displacement. Displacement of priority species due to disturbance associated with decommissioning of the on-site substations and grid connections will be a feature of all the proposed renewable energy projects within a 30km radius around the project.	Low -	Very Low +
Aquatic / Surface Water	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and/or review of the past assessments as part of any required Water Use Licenses (Enertrag SA, Atlantic Energy Partners & Mainstream projects).	Low -	Very Low -
Agriculture	The cumulative impact of loss of agricultural land use can confidently be assessed as not having an unacceptable negative impact on the agricultural production capability of the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.		
Heritage, Archaeology & Palaeontology	Construction activities may destroy or damage palaeontological fossils	Very Low -	Very Low -
	Construction activities may destroy or damage surface or sub-surface archaeological pre-colonial or colonial era remains or unmarked graves	Low -	Low -
	Construction and Operational activities may have a negative impact on the Cultural Landscape	Medium -	Medium -
Visual	Intervisibility for the project within a 30km radius of the development site will be evident. The combined effect over time of these developments would result in the study area being impacted upon in a manner beyond the anticipated neutral negative impacts of the proposed Project alone. WEFs (including their associated electrical infrastructure) have the potential to cause large-scale visual impacts and the location of several such developments near each other could significantly alter the sense of place and visual character in the broader region. Although substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.	High -	Medium-High -

As mentioned, the cumulative impacts associated with the proposed project can be mitigated to acceptable levels after the implementation of mitigation measures, while several impacts with Very Low Positive significance have also been identified. In addition, no fatal flaws have been identified by any of the specialists. The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

7.4 ENVIRONMENTAL MONITORING AND AUDITING OF THE PROJECT DEVELOPMENT PHASES

The EMPr becomes a tool by which compliance on the proposed site can be measured against. In order to utilise this tool, environmental monitoring needs to take place with regular audits against the EMPr to ensure that all aspects are attended to. Environmental monitoring establishes benchmarks to judge the nature and magnitude of potential environmental and social impacts.

Some of the key parameters for monitoring and auditing of the proposed development include the following *inter alia*:

- Impacts to Agriculture;
- Impacts on Terrestrial Ecology;
- Impacts on Plants;
- Impacts on Animals (including Avifauna);
- Impacts on Heritage resources (including Archaeology, Palaeontology and Cultural Landscape);
- Impact on Aquatic Environment(s); and
- Visual impacts.

Based on the outcomes of the impact assessment process concluded in Section 7, a Generic EMPr for the substation and associated infrastructure is included in Appendix 7. However, it should be noted that a Final Generic EMPr will be submitted to the DFFE for review and approval prior to construction commencing.

A monitoring programme will be implemented for the duration of the lifecycle of the proposed development. This programme will include:

- Monthly Audits During the Construction Phase;
- According to the EMPr, EA and permit conditions which will be conducted by the ECO. These audits can be conducted randomly and do not require prior arrangement with the project manager;
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities; and
- Annual Audits conducted during the Operational Phase.

The environmental monitoring program will operate throughout the pre-construction, construction, and operation phases. It will consist of a number of activities, each with a specific purpose with key indicators and criteria for significance assessment. The subsections below describe the various phases of the project and outline the overall objectives of what monitoring is to achieve. The requirements of the EMPr and EA will be monitored at defined intervals by an independent ECO.

7.4.1 Pre-construction Phase

- Ensures that the design of the substation and associated infrastructure responds to the identified environmental constraints and opportunities;
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements;
- Ensures that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable);

-
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area; and
 - Ensures that the best environmental options are selected for the substation and associated infrastructure.

7.4.2 Construction Phase

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts;
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, as well as effects on local residents;
- Minimises the impact on the indigenous natural vegetation, protected tree species and habitats of ecological value;
- Minimises impacts on fauna using the site; and
- Minimises the impact on heritage sites, should they be uncovered.

7.4.3 Operational Phase

- Ensures that operational activities are properly managed in respect of environmental aspects and impacts;
- Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regards to farming practices, traffic and road use, as well as effects on local residents; and
- Minimises impacts on fauna.

7.4.4 Decommissioning Phase

The proposed development might need to be decommissioned at the end of its operational phase. Should the proposed development need to be decommissioned, the applicant will rehabilitate the project site as per the requirements in the NEMA Regulations, following the decommissioning of the project site. The aim of the decommissioning phase would be to return the site to as close to its original pre-construction condition as possible. In the unlikely event that decommissioning is required, the decommissioning phase will be undertaken in line with the EMPr and the requirements in the NEMA Regulations.

In the event of the proposed development being decommissioned, the components will be reused and recycled (where possible) or disposed of (where necessary) in accordance with the relevant regulatory requirements. Certain components may also be traded or sold if there is an active second-hand market for these. It must be noted that the decommissioning phase of the proposed development is also expected to create skilled and unskilled employment opportunities.

The general specifications of Construction and Rehabilitation are relevant to the decommissioning of the proposed development and must be adhered to. These include the following, amongst others:

- All structures not required for the post-decommissioning use of the site are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.

-
- Rehabilitate access / service roads and servitudes not required for the post-decommissioning use of the development. If necessary, an Ecologist must be consulted to give input into rehabilitation specifications.
 - All disturbed areas must be compacted, sloped and contoured to ensure drainage and run-off and to minimise the risk of erosion.
 - Monitor rehabilitated areas quarterly for at least a year following decommissioning and implement remedial action, as and when required.
 - Any fauna encountered during decommissioning activities must be removed to safety by a suitably qualified person.
 - All vehicles to adhere to low-speed limits (i.e., 40km/h max) on the project site, to reduce risk of faunal collisions as well as reduce dust.
 - Retrenchments must comply with South African Labour legislation of the day.

8. RISK MATRIX ASSOCIATED WITH THE BESS TECHNOLOGY ALTERNATIVES

The BESS battery alternative technologies considered for the proposed BESS were as follows:

- Li-ion (lithium ion) Battery Technology
- 2Vanadium Redox Flow Battery Technology
- Zinc-hybrid (Zinc-Bromine - ZNBR) Flow Battery Technology

Although Li-ion technology is currently the most widely used and assessed battery storage technology available, all three (3) battery technologies were assessed so as not to limit the developer in the future, should the technology of certain battery types advance.

Each battery technology has potential risks associated with it. The table below outlines the technology associated with each battery technology type as well as the capability to mitigate the risk, based on practical and applicable technology solutions.

Table 8-1: Risks and Design Mitigation Measures associated with each Battery Technology

Risk	Mitigation
Li-ion battery technology	
<p><u>Temperature fluctuations</u> Temperature fluctuations in the Beaufort West area (minimum temperatures of below 0°C and maximum temperatures of over 25°C) mean that the batteries may be at risk of being damaged due to instability of temperatures. Resultant impacts could include fire, or permanent structural damage to the batteries.</p>	<p>The design of the Li-ion system includes:</p> <ul style="list-style-type: none"> • Insulated containers • High powered HVAC (Heating, Ventilation and Air-Conditioning) System, monitored centrally • Multiple temperature sensors for both the cells and air temperature • Automated shut down mechanism if temperatures get too high • Containers sealed and douse in case of fire to prevent the spread • Battery management system to prevent overuse and maintain good battery condition
<p><u>Fire and dangerous chemicals</u> The volatility of the battery system, prior to any mitigation, could result in significant fire danger. In addition to this, there is a risk associated with the chemicals contained within the actual battery storage system itself.</p>	<p>The design of the Li-ion system includes:</p> <ul style="list-style-type: none"> • Fire detection and suppressant systems • Gas level monitoring for several different gases (related to degradation of the batteries that increases risk of fire) • Heat sensors • Battery condition monitoring • Dousing mechanism for emergency cooling and fire suppression

	<ul style="list-style-type: none"> • Density limits in the containers • Spacing limits between containers
Vanadium redox flow battery technology	
<p><u>Dangerous chemicals and gases</u></p> <p>Due to the use of aqueous electrolytes, the fire risk of VRFB systems is much lower than with other technologies. Overcharging the battery does not lead to fire but to a reduction in battery performance and aging of the stacks. Thermal runaway as with lithium-ion batteries is excluded.</p> <p>In addition to its corrosive character, the vanadium electrolyte solution is classified as toxic and hazardous to groundwater. The electrolyte is used in a closed system and vanadium can escape solely through electrolyte leaks.</p> <p>In spite of the measures described above, there will always be a small amount of hydrogen produced during charging at high states of charge, which is a safety risk due to the possible explosive reaction with atmospheric oxygen. The amount is extremely small, but must be taken into account when installing the battery.</p>	<p>The design of the VRFBs includes:</p> <ul style="list-style-type: none"> • Battery condition monitoring • Fire detection and suppressant systems • Leak detection and monitoring system • A secondary containment to prevent the escape of vanadium solution into the environment during operation (storage and refilling when required). The VRFBs will be placed within a 2.5 m high berm wall. • Hydrogen gas is discharged from the negative tank into the environment through a simple pipe and the battery room or container is well ventilated and flushed with fresh air to prevent any build-up of hydrogen gas. • A Major Hazards Risk Assessment must be undertaken prior to construction (should VRFBs be used), and the recommendations of the assessment implemented.
Zinc-hybrid (zinc-bromine) flow battery technology	
<p>Bromine is a highly toxic material through inhalation and absorption. Maintaining a stable amine complex with the bromine is key to system safety.</p> <p>In addition, repeated plating of metals in general is difficult due to the formation of “rough” surfaces (dendrite formation) that can puncture the separator.</p>	<p>The design of the ZNBRs includes:</p> <ul style="list-style-type: none"> • Active cooling systems are provided by system manufacturers to maintain stability of the bromine-amine complex when ambient temperatures may exceed 95°F. • Special cell design and operating modes (pulsed discharge during charge) are required to achieve uniform plating and reliable operation.

Based on the appropriate design mitigation measures outlined above, the risks associated with each Battery technology can be adequately mitigated. In addition, based on the above risk matrix, Beaufort West Wind Farm have chosen the Solid-State Lithium Ion (Li-Ion) Batteries as the preferred Battery Technology for the proposed BESS.

9. CONCLUSION AND RECOMMENDATIONS

The EIA Regulations, 2014 (as amended), prescribe the required content of a BAR, including, *inter alia*, the Environmental Impact Statement which is presented in the subsections below. This BAR has identified and assessed the potential biophysical and socio-economic impacts associated with the proposed substation, BESS, laydown area and O&M building. The BA process for the proposed development has been conducted in accordance with the EIA Regulations, 2014 (as amended), promulgated in terms of Chapter 5 of the NEMA. A detailed public participation process is being followed as part of the BA process, which conforms to the public consultation requirements as stipulated in the EIA Regulations, 2014 (as amended). In addition, all issues raised by I&APs and key stakeholders as part of the BA process will be captured in the FBAR and where possible, mitigation measures provided in the EMP to address these concerns.

The EIA Regulations, 2014 (as amended), require that the need and desirability are considered and evaluated against the principles of sustainability. This requires investigation of the effect of the project on social, economic and ecological systems, and places emphasis on consideration of a project's justification. Various means for assessing the needs have been investigated in assessing the proposed project's need and desirability in the context of both the greater community, as well in the context of the proponent.

The EAP and specialists, through the interrogation of planning documents (Section 2 and Section 4) and, where these planning documents are not available - using best judgment, have considered the anticipated needs and interests of the broader community. In summary, supporting grid connection infrastructure for wind energy facilities is desirable as it:

- Creates a more **sustainable economy** by promoting South Africa's energy policy towards energy diversification.
- **Reduces the demand on scarce resources** such as water by promoting energy generating facilities which are less resource intensive.
- **Assists in meeting international commitments to carbon emission targets** in line with global climate change commitments.
- **Reduces pollution** by using 'cleaner' energy generating mechanisms and reducing the demand on carbon-based fuels.
- **Promotes local economic development** by creating jobs and promoting skills development.
- **Enhances energy security** by assisting in diversifying generation (since the project will service authorised wind energy facilities).

The proposed project is viewed in a positive context due to the potential for employment creation within the local community. It should also be noted that the cumulative effect of the proposed project and other developments in the area has the potential to result in positive socio-economic opportunities for the region. The proposed project, in conjunction with the authorised Beaufort West cluster of wind developments, will also address electricity constraints within both the local and district Municipalities by generating, distributing and evacuation a continued realisable source of electricity. Improved electrification, increased electricity supply to houses and businesses and investment in renewable energy developments are strategic objectives of both the District and Local Municipality.

It is also important to note that the IRP 2019 indicates that there is a short-term electricity supply gap of approximately 2 000MW and battery storage technologies will improve energy security by optimizing energy supply and demand, reducing the need to import electricity, and reducing the need to continuously adjust generation unit output. In addition, a substation with associated BESS can provide system security by supplying energy during electricity outages, minimizing the disruption and costs associated with power cuts, amongst other benefits, such as reduction in greenhouse gas emissions, utilisation of cleaner, renewable energy alternatives and overall financial benefits.

It should further be noted that on 28 October 2021, the Minister of Mineral Resources and Energy announced the Preferred Bidders of the Round 5 REIPPPP, and both the Beaufort West Wind Farm (12-12-20-1784-1-AM2) and Trakas Wind Farm (12-12-20-1784-2-AM2) received Preferred Bidder status. These wind energy facilities have now become SIPs (i.e., SIPs 8 and 10), which target the development of green energy in support of the South African economy and the provision of electricity transmission and distribution respectively.

This BAR has identified and assessed the potential biophysical and social impacts associated with the proposed project. Based on the results of the impact assessment undertaken by the respective specialists, as summarised in Table 9-1 below as well as in Section 7.2, the impacts associated with the proposed project can be kept to acceptable levels (i.e., either Medium Negative, Low Negative and/or Very Low Negative significance) after the implementation of the appropriate mitigation measures. The Avifauna and Aquatic specialists have also identified several impacts associated with the proposed project which have Very Low Positive significance, while the Aquatic specialist found that the loss of aquatic species of special concern would have an Insignificant significance after the implementation of mitigation measures. The visual impact on sensitive receptors during the construction, operational and decommissioning phases will also have an Insignificant significance before and after mitigation. In addition, no fatal flaws have been identified by any of the specialists. The identified impacts associated with the proposed project are therefore deemed to be acceptable.

With regards to cumulative impacts, based on the rating of impacts undertaken by the specialists (see Table 7-24 in Section 7.3.2), the cumulative impacts associated with the proposed project can be kept to acceptable levels (i.e., either Medium, Low or Very Low Negative significance) after the implementation of mitigation measures. The cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, however, no fatal flaws have been identified by the visual specialist or any of the other specialists. In addition, the impact of the substation and associated infrastructure would be dwarfed by the cumulative impact of the other renewable energy developments in the area. It should also be noted that several impacts with Very Low Positive significance have been identified by the Avifauna specialist. The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

While there are several negative impacts on the receiving environment associated with the proposed project, the cumulative positive effect of the proposed development and other developments in the area has the potential to result in positive socio-economic opportunities for the region. In addition, none of the specialists identified any fatal flaws and recommended that the proposed project should be authorised.

A summary of the findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social) is provided in Table 9-1 below (this includes impact significance).

Table 9-1: Summary of findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social)

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
Agriculture	<p>Although an Agricultural Compliance Statement is not required to formally rate agricultural impacts, it is hereby confirmed that the agricultural impact of the proposed development is negligible. The proposed project has a negligible agricultural impact for the following reasons:</p> <ul style="list-style-type: none"> The direct, permanent, physical footprint of the respective developments that has any potential to interfere with agriculture is of very limited extent and therefore, entirely insignificant within this agricultural environment of large farms utilised only for low density grazing. The affected land has very low agricultural potential. <p>The only potential source of impact is minimal disturbance to the land during construction and decommissioning of the project. This impact can be completely mitigated. There is likely to be some nuisance disturbance to agricultural activities during construction. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.</p> <p>The cumulative impact of loss of agricultural land use can confidently be assessed as not having an unacceptable negative impact on the agricultural production capability of the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.</p>			<p>The assessed site area alternatives are entirely on land that has only ever had grazing as an agricultural land use. The land's predominantly low agricultural sensitivity, with a maximum of medium sensitivity, is confirmed by this assessment.</p> <p>Conclusion</p> <p>The proposed development will have negligible agricultural impact significance and will be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the facts that the amount of agricultural land loss resulting from the development is totally insignificant, and that the land is of very low agricultural potential.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved. The conclusion of the assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.</p>
	Aquatic	Construction & Decommissioning Phases		
Loss of aquatic species of special concern		Low -	Insignificant	
Damage or loss of riparian systems and disturbance of the waterbodies in the construction phase		Medium -	Very Low +	
Potential impact on localised surface water quality		Medium -	Very Low +	
Operational Phase				

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	Impact on aquatic systems through the possible increase in surface water runoff on form and function - Increase in sedimentation and erosion.	Medium -	Very Low +	overall impact and risk to Aquatic resources, if Site Area Alternative 2 is selected.
	Cumulative Impacts			
	Cumulative Impacts on Aquatic Environment	Low -	Very Low -	<p>Overall, the catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas. The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the study area. The DFFE ratings were based on the presence of Aquatic Critical Biodiversity Areas (CBAs), Rivers and Freshwater Ecosystem Priority Area quinary catchments (NFEPAs). The presence of these Very High Sensitivity features was confirmed during this assessment (See Appendix 2 of specialist report for Verification Statement), but also extended to include additional areas.</p> <p>The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area and did not contain any wetland clusters or listed Threatened Ecosystems.</p> <p>The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Overall, it is expected that the impact on the aquatic environment would be Low (-).</p> <p>Noteworthy areas, that should be avoided, include the Very High Sensitivity areas.</p> <p>Conclusion</p>

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				Based on the findings of the study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. A key recommendation is also that that during the later design process, that the temporary construction camps and/or substations (as required) be located outside of the water courses (including the 10m buffer).
Terrestrial Ecology	Pre-Construction & Construction Phase			<p>In general, the vegetation of the site is considered low sensitivity and there are few species of concern present. In terms of fauna, the diversity of mammals, reptiles and amphibians is considered relatively low, even by Karoo standards, which can be ascribed to the homogeneity and aridity of the site. Although the site falls within the broad distribution of the Riverine Rabbit, the site was previously extensively camera trapped by the consultant to evaluate the potential presence of this species and as it was not detected, it is concluded that this species is not likely to be present. In addition, the typical habitat for this species is not present within the site with the result that no impact on this species is anticipated.</p> <p>Conclusion There are no impacts associated with the proposed Substation and associated infrastructure (BESS, laydown area and O&M building) project that cannot be mitigated to an acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the substation and associated infrastructure on the local environment can be reduced to a low and acceptable magnitude. The contribution of the development to</p>
	Impacts on vegetation and protected plant species	Medium -	Medium -	
	Impacts on fauna due to construction activities	Medium -	Medium -	
	Operational Phase			
	Impacts on fauna due to operational activities	Very Low -	Very Low -	
	Impacts on CBAs and ESAs due to the presence and operation of the facility	Low -	Very Low -	
	Habitat degradation due to erosion and alien plant invasion	Medium -	Low -	
	Decommissioning Phase			
	Impacts on fauna due to construction activities	Medium -	Medium -	
	Habitat degradation due to erosion and alien plant invasion due to decommissioning	Medium -	Low -	
	Cumulative Impacts			
Cumulative impact on ecological processes	Low -	Low -		

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				cumulative impact in the area would be low and is considered acceptable. Overall, there are no specific long-term impacts likely to be associated with the development of the substation and associated infrastructure that cannot be reduced to a low significance. As such, there are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.
Avifauna	Construction Phase			<p>The Southern African Bird Atlas Project 2 (SABAP2) data indicates that a total of 152 bird species could potentially occur within the broader area. Of these, 36 species are classified as priority species and ten (10) of these are South African Red List species. Of the priority species, 18 are likely to occur regularly at the study area and immediate surrounding area, and another 18 could occur sporadically.</p> <p>In terms of environmental sensitivities, no specific ‘No-Go’ areas were identified, as mitigation can be applied for most species. The impact of displacement is low due to the relatively small size of the footprint, and the availability of similar suitable habitat in the broader area further reduces the impact.</p> <p>Conclusion The expected impacts of the proposed project were rated to be Low to Medium negative pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of</p>
	Displacement due to disturbance associated with the construction of the substation and associated infrastructure.	Low -	Very Low +	
	Displacement due to habitat transformation associated with the construction of the associated infrastructure.	Low -	Low -	
	Operational Phase			
	Electrocutions within the substation yard.	Low -	Very Low +	
	Decommissioning Phase			
	Displacement due to disturbance associated with the decommissioning of the substation and associated infrastructure.	Low -	Very Low +	
	Cumulative Impacts			
	Displacement of priority species due to disturbance associated with construction of on-site substations and associated infrastructure	Low -	Very Low +	
	Displacement of priority species due to habitat transformation associated with construction of on-site substations and associated infrastructure	Low -	Low -	
Electrocution mortality associated with substations	Low -	Very Low -		

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	Displacement of priority species due to disturbance associated with decommissioning of on-site substations and associated infrastructure	Low -	Very Low +	all the identified impacts should be reduced to Low or Very low negative. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures as detailed in the Impact Tables and Section 8 of the specialist report, and the EMPr (Appendix 5 of specialist report), are strictly implemented.
Heritage & Archaeology	Construction Phase			<p>In terms of the heritage assessment, no constraints were identified. The alternative substation locations will not have significant impact on heritage resources, which are considered to be of Low significance.</p> <p>There are no significant heritage resources within the development footprint and no direct impacts are expected. With the exception of the Cultural Landscape, all impacts are expected to occur during the Construction Phase. Impacts to the Cultural Landscape will occur during the Construction, Operational and Decommissioning Phases of the project. The impacts during the Decommissioning Phase are generally positive as the removal of the removal of the infrastructure associated with the project will allow the landscape to return to its former rural condition. The anticipated impact significance on heritage resources in general is expected to be Low, with exception of the Cultural Landscape which is expected to be Medium.</p> <p>Conclusion No fatal flaws were identified and there are no permits required of the developer. The final comment from the heritage authority will act as the approval (with conditions). Should there be a need to conduct archaeological or</p>
	Destruction of Pre-Colonial and Colonial Archaeological sites and Graves.	Low -	Low -	
	Negative impact on the Cultural Landscape	Medium -	Medium -	
	Operational Phase			
	Negative impacts on the Cultural Landscape	Medium -	Medium -	
	Decommissioning Phase			
	Impacts to the Cultural Landscape	Very Low -	Very Low -	
	Cumulative Impacts			
	Construction activities may destroy or damage surface or sub-surface archaeological pre-colonial or colonial era remains or unmarked graves	Low -	Low -	
Construction and Operational activities may have a negative impact on the Cultural Landscape	Medium -	Medium -		

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				palaeontological mitigation, this would need to be done under a permit applied for and issued in the name of the person doing the mitigation work.
Palaeontology	Construction Phase			<p>The provisional Very High palaeosensitivity for the substation project area shown by the DFFE screening tool is <i>contested</i>. Based on desktop studies - including palaeontological data from several proposed WEF developments in the vicinity, as well as the previous and recent palaeontological surveys of the Beaufort West WEF and Trakas WEF project areas (Almond 2018, 2021), the palaeontological sensitivity of the entire new substation and associated infrastructure project area – including all layout options under consideration - is rated as Low. However, the potential for isolated fossil sites of palaeontological interest cannot be entirely discounted. These conclusions support those previously reached in the desktop- and field-based PIA report for the combined Beaufort West Cluster project area, including the present on-site substation and associated infrastructure study area by Almond (2018).</p> <p>The impact significance of the proposed development in terms of potential impacts of fossils of scientific or conservation value is rated as Very Low, both before and after mitigation of chance fossil finds.</p> <p>Conclusion The project is not fatally flawed, and there are no objections on palaeontological heritage grounds to its authorisation.</p>
	Impacts to fossil resources as a result of the construction of any infrastructure that requires excavation into bedrock or is located at sites of surface exposures of bedrock	Very Low -	Very Low -	
	Cumulative Impacts			
	Construction activities may destroy or damage palaeontological fossils	Very Low -	Very Low -	
Visual	Construction, Operational and Decommissioning Phases			

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	Visual impact on sensitive receptors during construction, operational and decommissioning phases	Insignificant	Insignificant	<p>Although the proposed development will be visible from the N12 national route which traverses the study area, the section of the route within the study area is not considered to be of scenic value. In addition, the level of contrast is significantly reduced by the presence of existing powerlines and associated infrastructure as well as the N12 road, which are prominent features in an open and relatively flat landscape.</p> <p>The study area only includes five (5) potentially sensitive receptors, however, these receptors have vested interest in the project and therefore not considered in the assessment. Travellers along the N12, who are tourists, were also considered as potentially sensitive receptors.</p> <p>The significance of impact, without mitigation and based on the worst-case scenario, for the sensitive receptors during the construction, operational and decommissioning phases, is neutral i.e., where the impact would not have any effect on the visual environment (over and above the authorised 132kV powerline and associated infrastructure developments), nor will it have a direct influence on the decision to develop the area.</p> <p>In terms of cumulative impacts, it was determined that the other renewable energy developments identified within a 30km radius of the proposed development would have a significant impact on the landscape and receptors within the visual assessment zone. It is anticipated that the concentration of WEFs will alter the inherent sense of place</p>
	<p>Cumulative Impacts</p> <p>Intervisibility for the project within a 30km radius of the development site</p>	High -	Medium-High -	

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
				<p>of the study area and introduce an increasingly industrial character into a largely natural landscape, resulting in some form of cumulative impacts. Although, it is anticipated that these impacts could be mitigated with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists (Oberholzer, 2010). In addition, impacts would be reduced to some degree with the presence of the existing 400kV powerline infrastructure and the N12 national route in the vicinity of the WEFs, which have already partly transformed the visual character</p> <p>Conclusion It is the opinion of the specialist that the visual effects associated with the proposed development are of neutral significance. Given the low level of human habitation and the absence of sensitive receptors, the spatial extent of the zone of potential influence is reduced and the impact of the development would be dwarfed by the cumulative effect of the other renewable energy developments. The project is thus deemed acceptable from a visual perspective, and should each be approved, provided that the mitigation/management measures are effectively implemented, managed, and monitored in the long term.</p>
Reptile (specifically Karoo Dwarf Tortoise)	According to the DFFE's Online Screening Tool Reports generated (Appendix 8.3), <i>Chersobius boulengeri</i> (Karoo Dwarf Tortoise) was listed as being a species of Medium sensitivity within the Animal Species Theme. This species is currently listing under IUCN as Endangered. However, based on the findings of the site sensitivity verification, the rating of Medium sensitivity has been adjusted to being Low. Considering this, a Terrestrial Animal Species Compliance Statement (TASCS) has been compiled (Appendix 5.2), with specific focus on Karoo Dwarf Tortoise.			Although the Karoo Dwarf Tortoise is known to occur in the general region, it seems unlikely that it is present within the proposed development areas. No specific mitigation measures are proposed in terms of safeguarding Karoo Dwarf Tortoises.

Specialist	Impacts	Impact Rating		Key Findings & Conclusion
		Without Mitigation	With Mitigation	
	<p>The general distribution pattern of the Karoo Dwarf Tortoise as per the map of all known records plotted shows that the proposed development area falls within the distribution of this species. The nearest records to the proposed development areas are located about 20 to 40km away. The general impression gained from these distribution records is thus that the species may possibly occur within the proposed development area, which is why the screening tool report lists as a species of potential occurrence that requires site sensitivity verification.</p> <p>No evidence of live specimens or shell fragments of Karoo Dwarf Tortoise was detected during the half-day site visit that was conducted during the September 2021 survey. However, observations of two (2) other tortoise species were made during this period, i.e., that of Leopard Tortoises (<i>Stigmochelys pardalis</i>) and Tent Tortoises (<i>Psammobates tentorius</i>). The IUCN conservation status of these two (2) tortoise species are both <i>Least Concern</i>.</p> <p>Due to the issue of low detectability, the absence of Karoo Dwarf Tortoise observations during the survey should not summarily be taken as proof that the species does not occur within the study area. However, judging by the general lack of suitable habitat within the proposed development units, it would appear as though this species is indeed absent from this particular area.</p>			<p>Conclusion</p> <p>The Karoo Dwarf Tortoise does not occur within either of the proposed development nodes of the Beaufort West Cluster of Wind Farms. This conclusion is based primarily on 1) the absence of suitable or optimal habitat for this species, 2) the absence of evidence of live or dead specimens during the field survey, 3) the absence of observations by two (2) tortoise experts that have worked in the general region, and 4) the absence of observations by the landowner.</p> <p>Although real absence cannot in fact be stated with absolute certainty, the confidence of this being the case is 90%. As such, this species is not deemed to be a relevant constraint in the context of the proposed development here.</p> <p>Based on the findings of the Site Sensitivity Verification Report, the Screening Tool Report Animal Species Theme rating of MEDIUM sensitivity is herewith adjusted to being LOW. In this scenario it is no longer required to compile a Specialist Impact Assessment Report, and thus a Terrestrial Animal Species Compliance Statement is presented instead.</p>

As mentioned, the impacts (including cumulative impacts) associated with the proposed project can be kept to acceptable levels after the implementation of the appropriate mitigation measures. Several impacts with a Very Low Positive significance have also been identified by some of the specialists, along with several impacts with an Insignificant significance after the implementation of mitigation measures. Even though the cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, no fatal flaws have been identified by the visual specialist.

The identified impacts associated with the proposed project (including cumulative impacts) are therefore deemed to be acceptable (Table 9-1).

In addition, the summary of the findings emanating from the specialist studies discussed above have concluded that no fatal flaws were identified, and any impacts can be mitigated to levels allowing for the development to be authorised.

The proposed site layout map which incorporates sensitive areas identified by the respective specialists (where applicable) is provided in Figure 9-1 below.

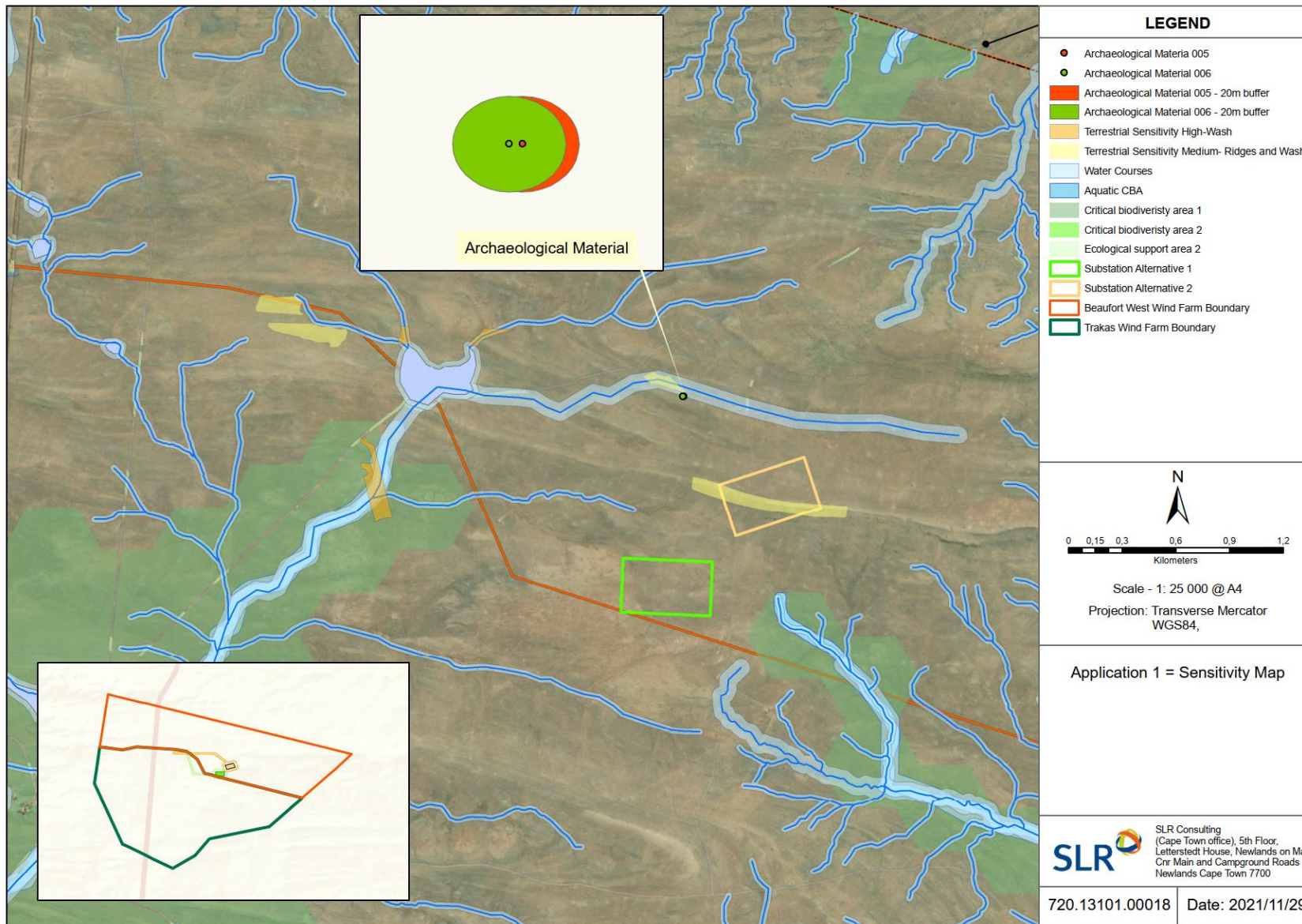


Figure 9-1: Site Sensitivity map based on specialist findings

9.1 IMPACT STATEMENT

This BAR has identified and assessed the potential biophysical and social impacts associated with the proposed project. Based on the findings of the BA process, no fatal flaws were identified, and any impacts identified can be mitigated to acceptable levels, allowing for the proposed project to be authorised. SLR, as the EAP, is therefore of the view that the site location and project description can be authorised based on the findings of the suite of specialist assessments.

Based on the findings of the comparative assessment of site area alternatives undertaken by the respective specialists, Site Area Alternative 2 is slightly preferred from an environmental perspective. However, **no fatal flaws are associated with any of the project alternatives and therefore both site area alternatives are deemed to be acceptable for authorisation.** Overall, Solid State Lithium-Ion technology has both been identified as the environmentally preferred technology alternative for the BESS. **Beaufort West Wind Farm (as the Applicant) have thus opted for Solid State Lithium-Ion technology for the proposed BESS.**

A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on the results of the cumulative impact assessment (Section 7.3), the cumulative impacts associated with the proposed project can be mitigated to acceptable levels after the implementation of mitigation measures. Even though the cumulative visual impacts will result in a Medium-High Negative impact after the implementation of mitigation measures, no fatal flaws have been identified by the visual specialist or any of the other specialists. In addition, the impact would be dwarfed by the cumulative impact of the other renewable energy developments in the area. It should also be noted that several impacts with Very Low Positive significance have been identified by the Avifauna specialist. The cumulative impacts associated with the proposed project are therefore deemed to be acceptable.

Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by an appointed independent ECO and the Competent Authority, the potential detrimental impacts associated with the proposed project can be mitigated to acceptable levels.

In terms of Section 31(n) of the NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured, and in this regard SLR believes that sufficient information is available for the DFFE (as the Competent Authority) to take a decision.

It is the reasoned opinion of SLR (as the independent EAP) that, based on the findings of the BA, the proposed development of the substation, laydown area, O&M building (**both site area alternatives**) and **solid state Lithium-Ion BESS technology alternative** should be granted a positive decision on EA and be allowed to proceed to construction phase. It is, however, important that all feasible and practical mitigation measures recommended by the various specialists are incorporated into the EMPr and implemented, where applicable. In addition, where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists. The final layout must also be submitted to the DFFE for review and approval, prior to commencing with the activity.

9.2 CONSTRUCTION TIMEFRAMES

Construction and implementation timeframes of the proposed substation and associated infrastructure were not available to the EAP at the time of writing this BAR. As such, it is requested that the EA for

construction, if issued by the Competent Authority, be valid for a period of ten (10) years from the date of signature.

9.3 UNDERTAKING

SLR Consulting SA (Pty) Ltd hereby confirms that, to the best of our knowledge, the information provided in this report was correct at the time of compilation. Information included in this report was based on the information which was provided to SLR Consulting SA (Pty) Ltd by the Applicant and various specialist assessment reports.

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